

CLOCK
GENERATOR
RTM880N-796
PAGE 03

SO-DIMM A
Maximum 2+2GB
PAGE 7

SO-DIMM B
Maximum 2+2GB
PAGE 8

CPU
AMD
Conesus
PROCESSOR
10~15W
812 EBGA
PAGE 4,5,6

AMD Embedded with ATI RS780MN & SB710

	SLP S3#
(Full ON)	HIGH
(Suspend to RAM)	LOW
(Suspend to Disk)	LOW
(Soft OFF)	LOW

64M * 16 DDR3 667

SIDE- PORT
128MB
PAGE 12

CRT / LCD
PAGE 13

HDMI
PAGE 14

North Bridge
AMD
RS780M
INTEGRATED
GRAPHICS
6W
21x21 mm
528 FCBGA
PAGE 9,10,11,12

USB 2.0

PCIE x1

USB 2.0

PCIE x1

USB 2.0

PCIE x1

USB 2.0

PCIE x1

USB 2.0

PCIE x1

USB 2.0

PCIE x1

USB 2.0

PCIE x1

USB 2.0

PCIE x1

USB 2.0

PCIE x1

USB 2.0

PCIE x1

USB 2.0

PCIE x1

USB 2.0

PCIE x1

USB 2.0

PCIE x1

USB 2.0

PCIE x1

USB 2.0

PCIE x1

USB 2.0

PCIE x1

USB 2.0

PCIE x1

USB 2.0

PCIE x1

USB 2.0

PCIE x1

USB 2.0

PCIE x1

PCIE MINI CARD
WWAN
PAGE 24

PCIE MINI CARD
WLAN
PAGE 24

LAN REALTEK
RTL8103EL-GR
PAGE 19

RJ 45
CONN
PAGE 19

800/900,1800/1900/2100
Antenna

802.11 a/g/b/n
Antenna

SIM CONN
PAGE 24

USB DB CONN
LED DB CONN
DB CONN
LID / TP LOCK
PAGE 22

V / VS
VGA POWER
S3 / S4 OFF POWER
WEB CAM POWER
PAGE 33

NB_CORE
PAGE 28

CPU_CORE
PAGE 27

1.1VS / 2.5VS
1.2V-USB
PAGE 31

5V/3.3VSTBY
PAGE 29

0.9V/1.8V
PAGE 30

1.5VS/1.2VS
PAGE 32

CHARGER
PAGE 26

SCREW/EMI
PAGE 35

SB USB PORT	Device
Port 10 NC	
Port 9 NC	
Port 8 WWAN	
Port 7 WLAN	
Port 6 CARDREADER	
Port 5 WEBCAM	
Port 4 BLUE TOOTH	
Port 3 USB(DAUGHTER)	
Port 2 USB(DAUGHTER)	
Port 1 USB(ON BOARD)	
Port 0 USB(ON BOARD)	

LED STATUS	
(1) Dual color TP	white : On amber: Off
(1) Dual color RF	blue: enable amber: disable
(2) Power on	white: Power on
USB D/B	
(1) Battery Charging	white
(2) Dual color HDD	white : Active amber: Park
LED D/B	
(1) Num Lock	white
(2) Mute LED	amber
(3) Caps Lock	blink white: Stanby white

SATA HDD
PAGE 17

G-SENSOR
PAGE 23

South Bridge
AMD
SB710
4W
21x21 mm
528 FCBGA
PAGE 15,16,17,18

SPI ROM
PAGE 25

FAN
PAGE 6

CPU THERMAL
PAGE 6

ITE KBC
ITE8502E
PAGE 25

KEYBOARD CONN
PAGE 25

NB THERMAL
PAGE 10

TouchPad
PAGE 23

DAUGHTER BOARD
USB PORT x 2
PAGE 22

AUDIO CODEC
IDT92HD81B1
PAGE 21

SPI ROM
PAGE 17

BLUE TOOTH
PAGE 23

CARD READER
AU6433B52-GEF
PAGE 20

WEBCAM
PAGE 23

ON BOARD
USB PORT * 2
PAGE 22

MIC JACK
PAGE 21

DIGITAL MIC
PAGE 23

EAR PHONE JACK
PAGE 21

SPEAKER
PAGE 21

CARD SLOT
7 IN 1
PAGE 20

Arwen Block Diagram




H310UA1

FLEX Computing

Project Name : ARWEN UA1		Title : BLOCK Diagram	
Size : Custom	Document Number : HPMH-40GAB4000-D000	Rev : D	
Date: Monday, August 17, 2009		Sheet : 1	of 35

PAGE	DESCRIPTION
1	Block Diagram
2	INDEX & POWER STATUS
3	CLOCK GEN
4-8	CPU
9-12	North bridge RS780
13	CONN - LVDS/CRT
14	CONN - HDMI
15-18	SOUTH BRIDGE RS780
19	LAN - RT8103EL
20	CARD READER - ALCOR AU6433B52-GEF
21	AUDIO - IDT 92HD81
22	USB CONN / SWITCH / LID
23	BT / WEBCAM / TOUCHPAD / G-SENSOR
24	WLAN / WWAN
25	KBC - ITE8502E
26	PWR - BATTERY CHARGER
27	PWR - CPU CORE
28	PWR - NB CORE
29	PWR 5V / 3.3 VSTBY
30	PWR 1.8V / 0.9V
31	PWR - 1.1VS / 2.5VS / 1.2V-USB
32	PWR - 1.5VS / 1.2VS
33	PWR - V / VS / VGA POWER
34	POWER SEQUENCE
35	OTHER SCREW / EMI CAPS

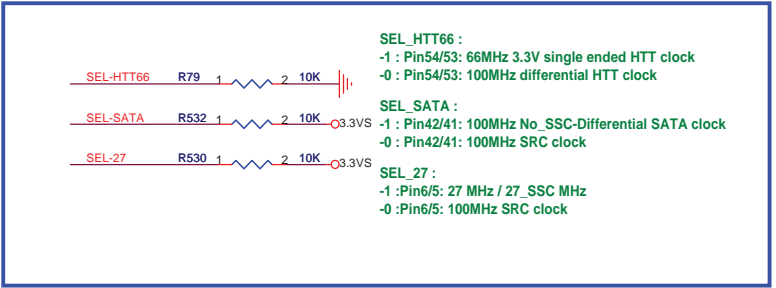
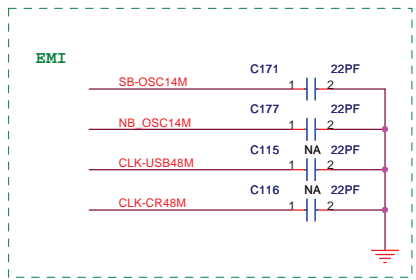
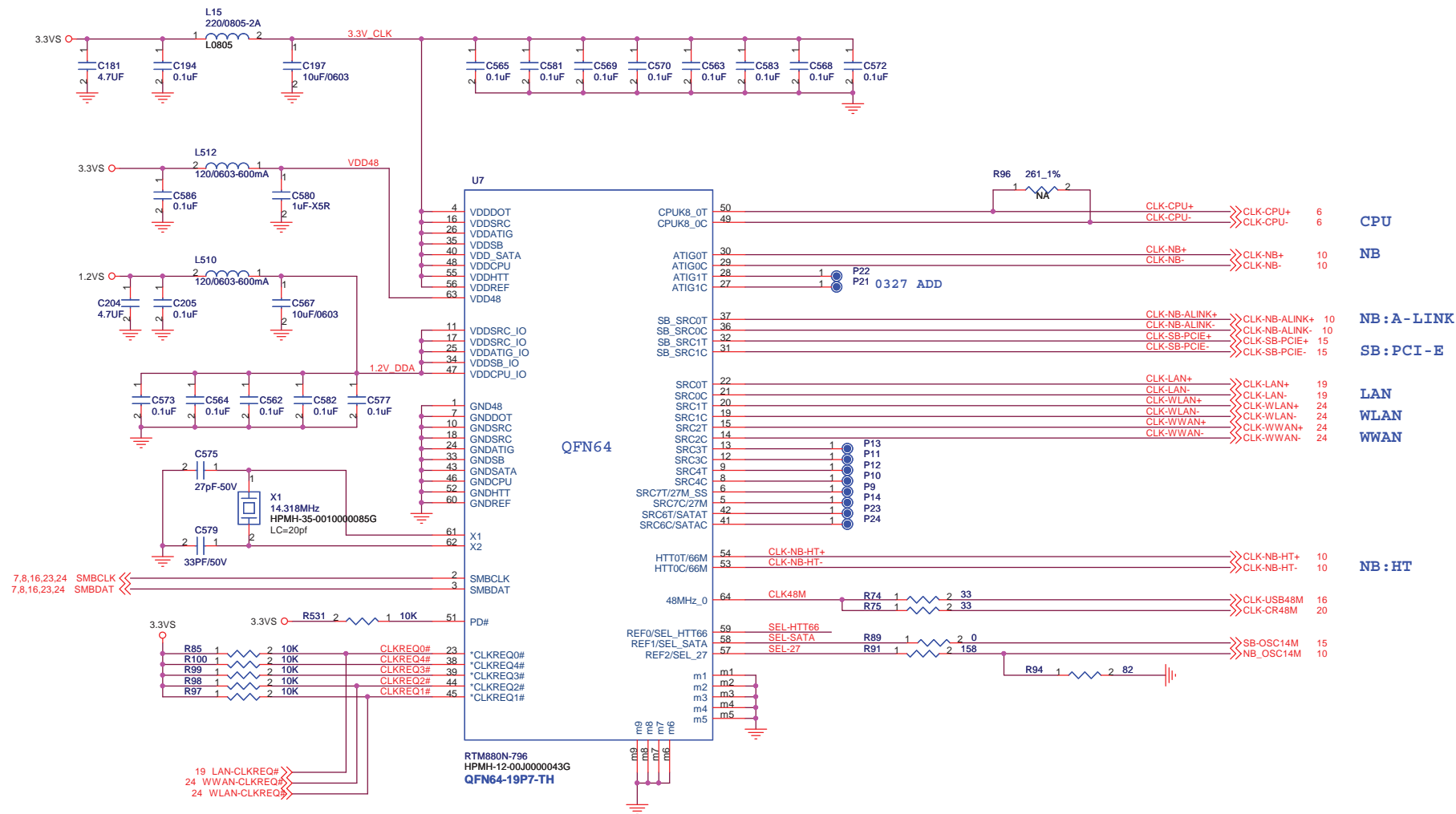
POWER PLANE	VOLTAGE	PAGE	DESCRIPTION	CONTROL SIGNAL	ACTIVE IN
ACIN	~+19V	26	ADAPTER IN POWER		S0~S5
B+	+10~+19V	13,23,24,26,27,28,29,30,31,32,33	MAIN POWER		S0~S5
VBAT	+3.0V~+3.3V	15	RTC BATTERY		S0~S5
LDO5	+5V	22,29	LDO POWER	B+	S0~S5
LDO3	+3.3V	29	LDO POWER	B+	S0~S5
3.3VSTBY	+3.3V	15,16,17,22,25,26,29,31,33	STANDBY POWER	B+	S0~S5
3.3V-DUAL	+3.3V	15,16,17,18,25,31,33	EC CTRLD POWER	3.3VDUAL-ON#	BY EC CONTROL
1.2V-DUAL	+1.2V	18,31	3.3V-DUAL CTRLD POWER	3.3V-DUAL	BY EC CONTROL
5V	+5V	22,23,29,30,32,33,	SUS-C# CTRLD POWER	SUSC#	S0,S3
3.3V	+3.3V	13,33	SUS-C# CTRLD POWER	SUSC	S0,S3
1.8V	+1.8V	04,05,06,07,08,30,33	SUS-C# CTRLD POWER	SUSC#	S0,S3
0.9V	+0.9V	04,05,07,08,30	SUS-C# CTRLD POWER	SUSC#,SUSB#	S0,S3
5VS	+5V	06,13,14,17,18,21,22,23,25,27,28,31,32,33	SUS-B# CTRLD POWER	SUSB	S0
3.8VS	+3.8V	23,33	SUS-B# CTRLD POWER	SUSB#	S0
3.3VS	+3.3V	03,06,07,08,10,11,12,13,14,16,17,18,20,21,22,23,24,25,27,28,29,31,32,33	SUS-B# CTRLD POWER	SUSB	S0
2.5VS	+2.5V	06,31	SUS-B# CTRLD POWER	SUSB#	S0
1.8VS	+1.8V	06,10,11,12,15,16,33	SUS-B# CTRLD POWER	SUSB	S0
1.5VS	+1.5V	11,12,16,24,28,31,32	SUS-B# CTRLD POWER	SUSB#	S0
1.2VS	+1.2V	04,06,11,15,17,18,32	SUS-B# CTRLD POWER	SUSB#	S0
1.1VS	+1.1V	09,10,11,12,31	SUS-B# CTRLD POWER	SUSB#	S0
CPU_CORE		04,27	CPU CORE POWER	SUSB#	S0
NB_CORE	+1.0V~+1.1V	11,18,32	NORTH BRIDGE CORE POWER	1.1VS-PG	S0
BATA+	+10V~+17V	26	MAIN BATTERY		S0~S5

GND PLANE	PAGE	DESCRIPTION
 GND	ALL	
 AGND	19	
 LAN-GND	21	

FLEXComputing

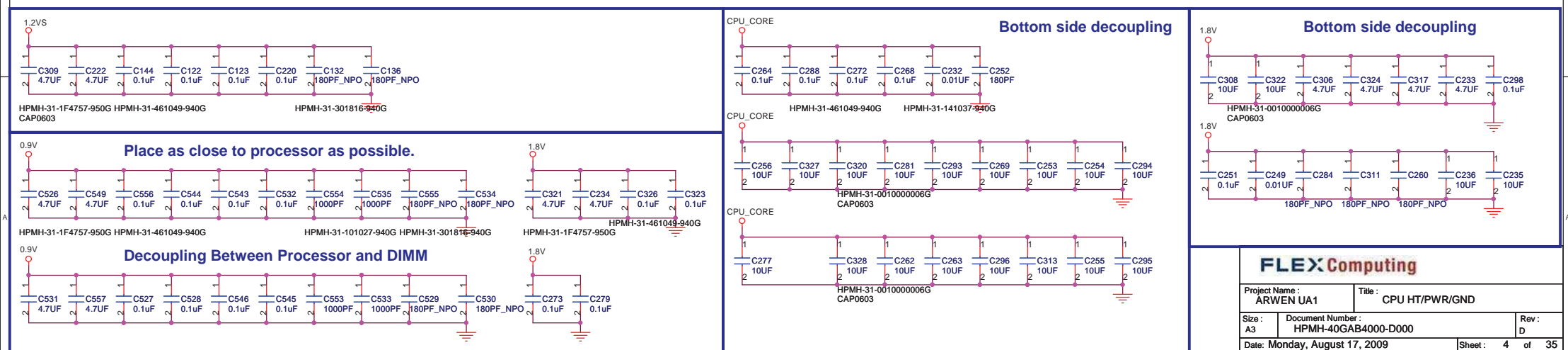
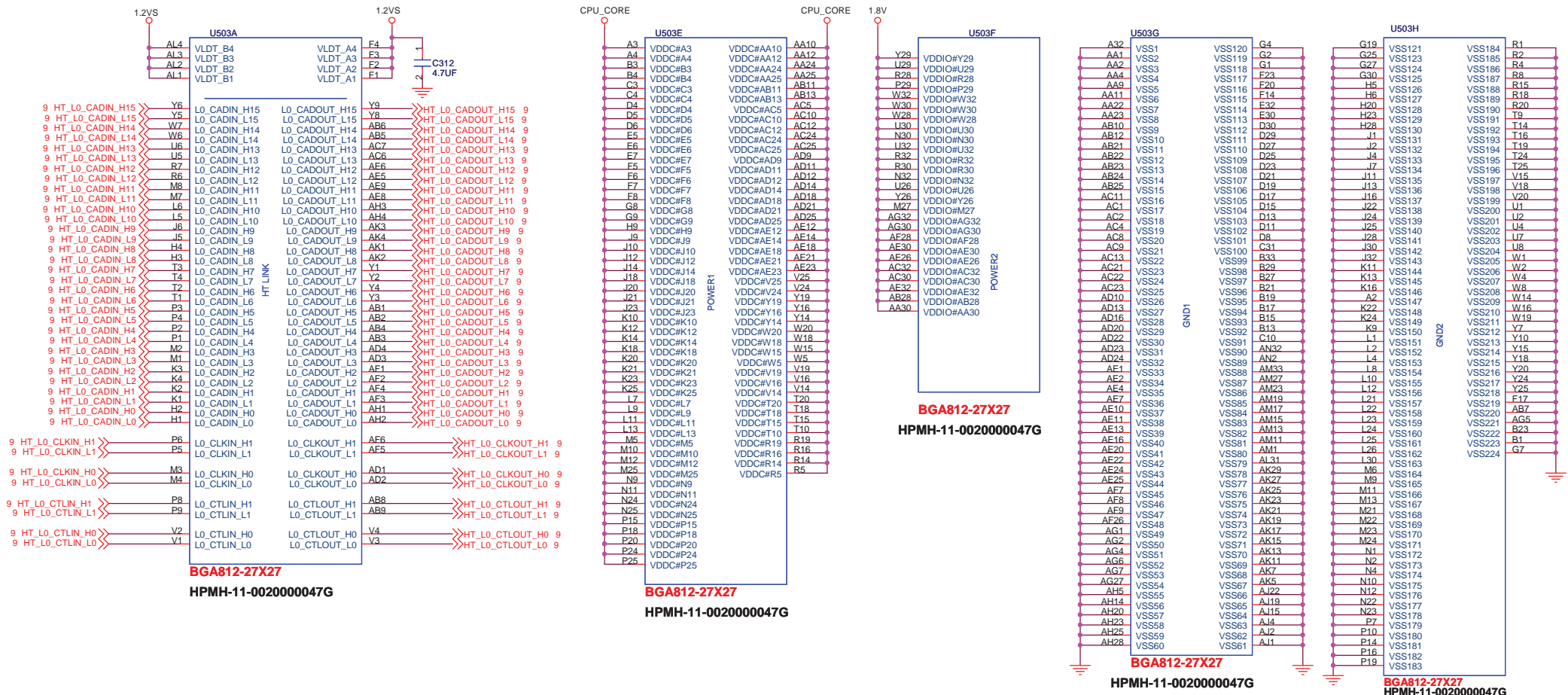
Project Name : ARWEN UA1		Title : Power Diagram	
Size : Custom	Document Number : HPMH-40GAB4000-D000		Rev : D
Date: Monday, August 17, 2009		Sheet : 2	of 35

CLOCK GENERATOR



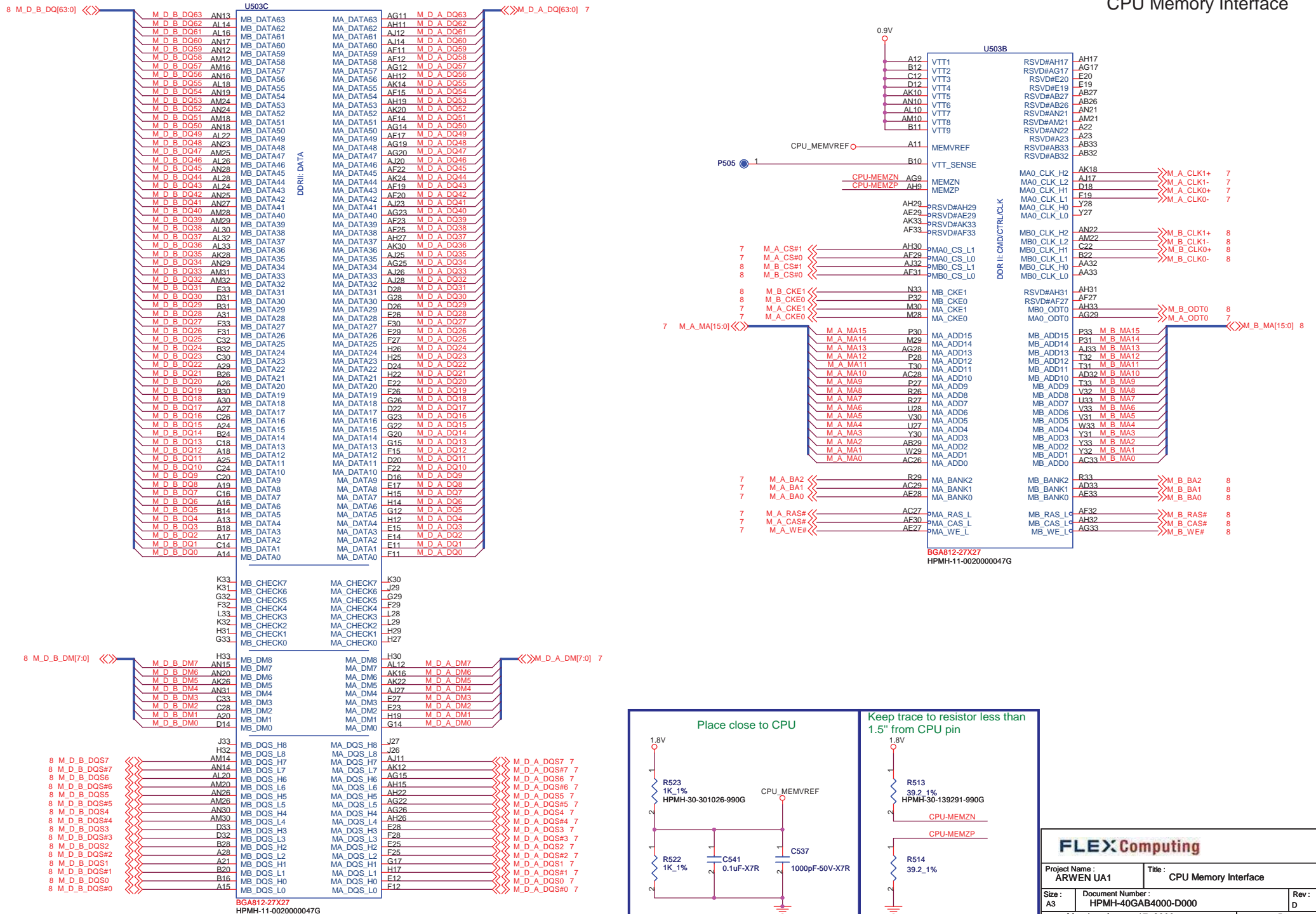
CPU HT/PWR/GND

VLDT Trace at Itast 200 mils wide

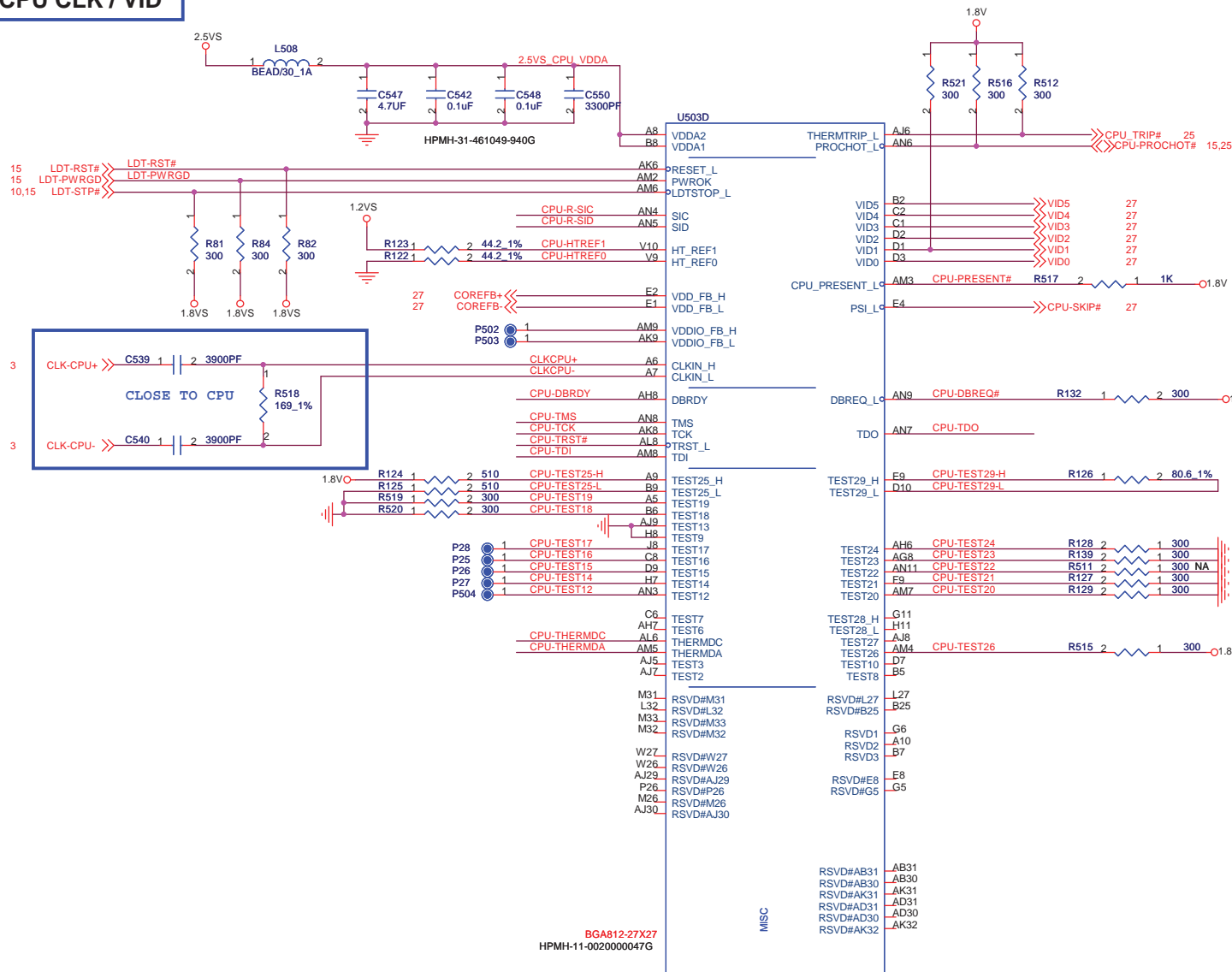


CPU MEMORY A/B

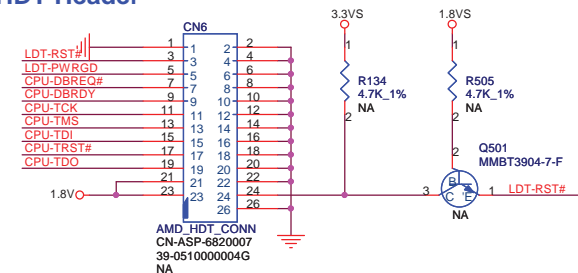
CPU Memory Interface



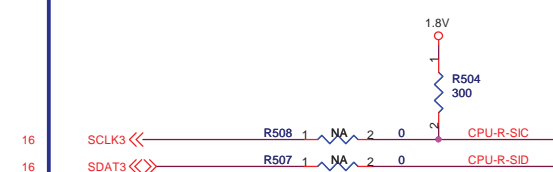
CPU CLK / VID



HDT Header



Reserve for internal thermal

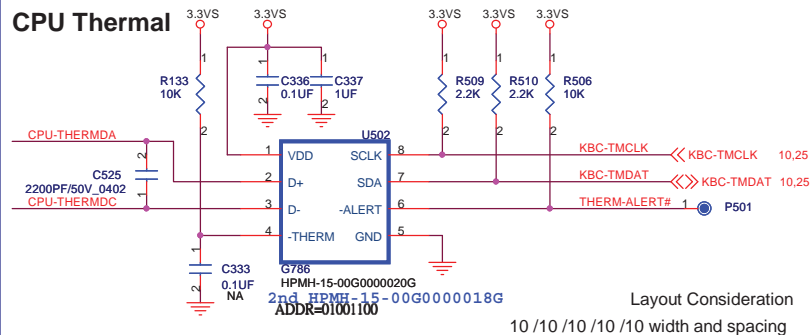


Delete LDT-STP# delay circuit for RS780 DA ER_RS690B3

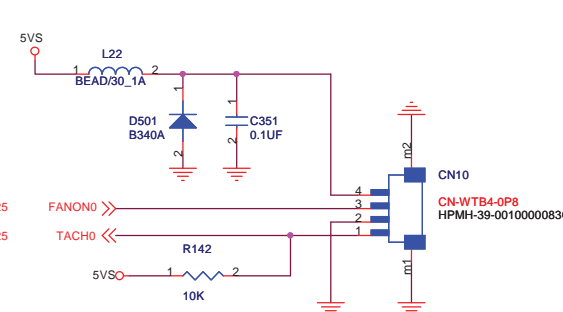
Layout (1) :Keep trace to resistor less than 600 mils from CPU pin and trace to AC caps less than 1250 mils

Layout (2) :Route VDDA trace approx. 50 mils wide (use 2x25 mil traces to exit ball field) and 500 mils long.

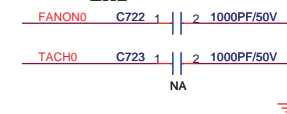
CPU Thermal



FAN



EMI



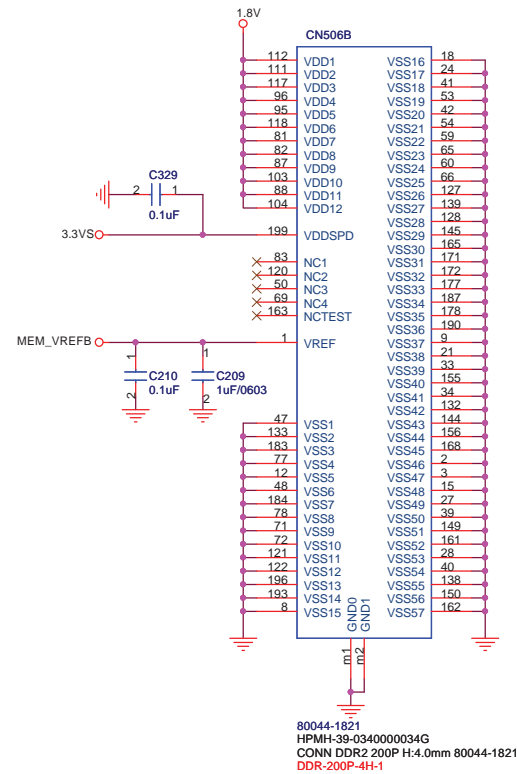
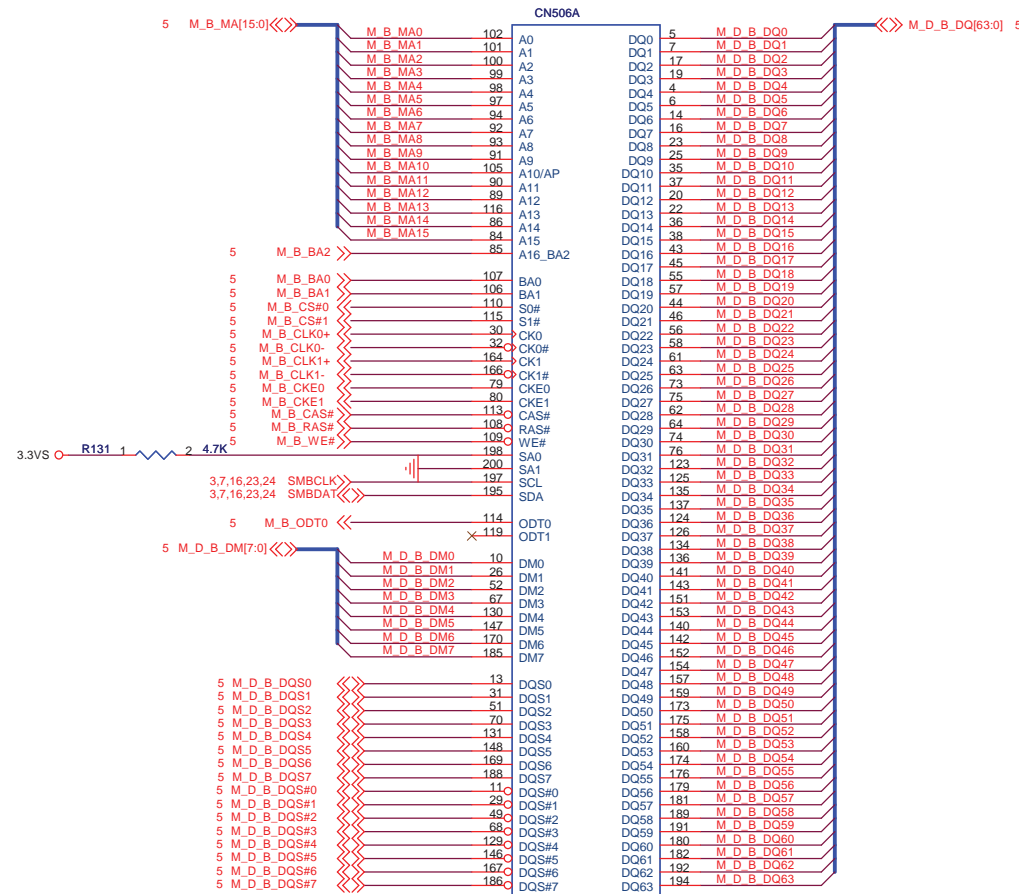
FLEX Computing

Project Name : ARWEN UA1 Title : CPU Control & Debug

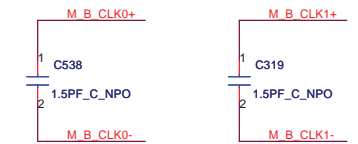
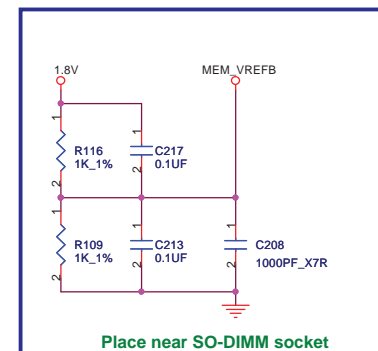
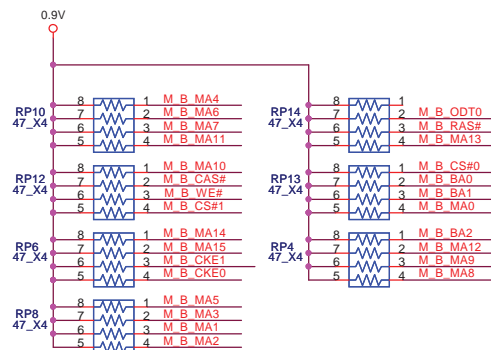
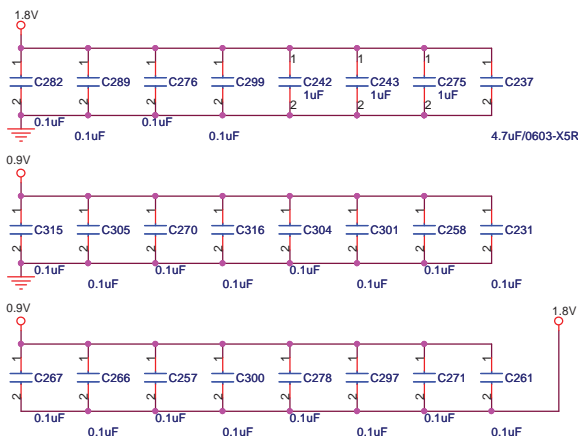
Size : A3 Document Number : HPMH-40GAB4000-D000 Rev : D Date : Monday, August 17, 2009 Sheet : 6 of 35

Memory Channel B

DDR2 Termination
DDR2 SO-DIMMB



Layout :
Place these Caps near So-DimmA

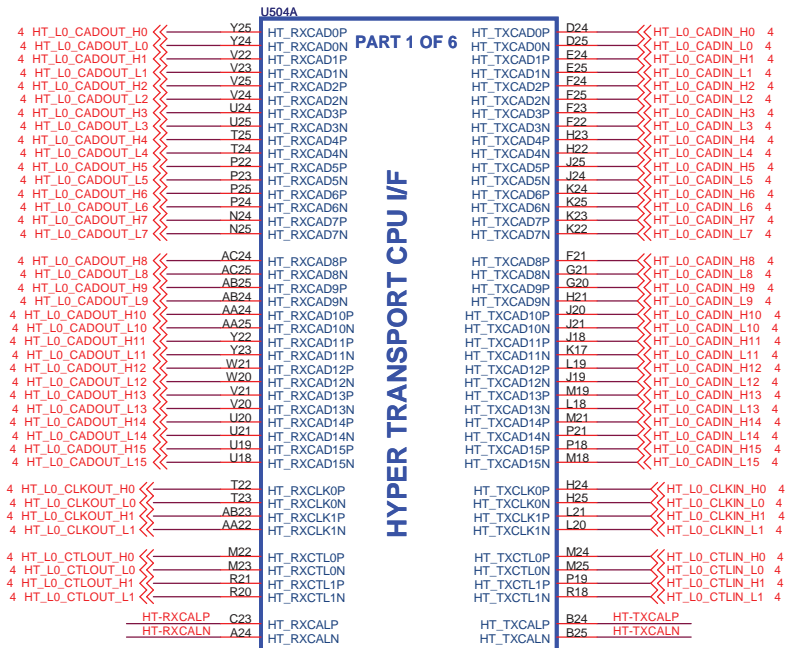


Place close to CPU within 1.5"

FLEX Computing

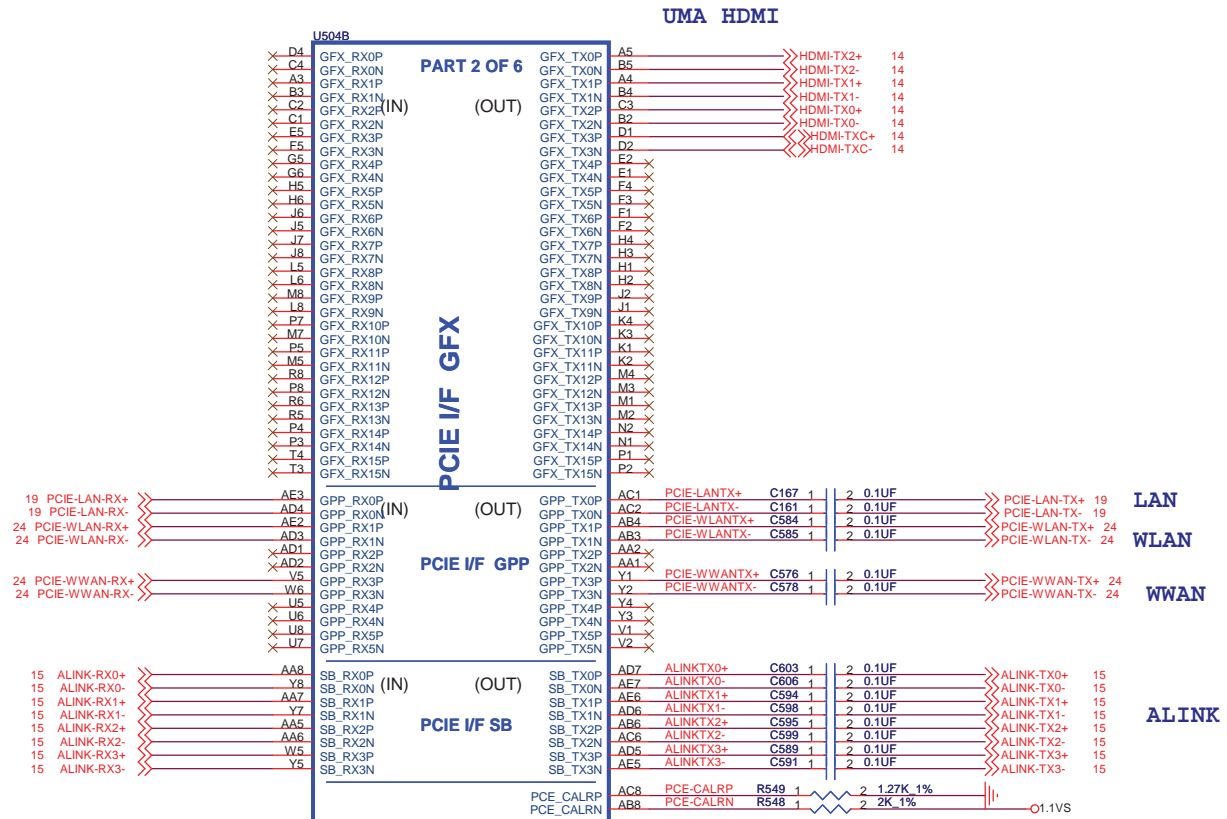
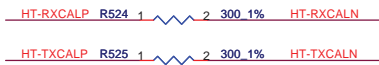
Project Name : ARWEN UA1		Title : DDR2 SO-DIMM B / Termination	
Size : A3	Document Number : HPMH-40GAB4000-D000		Rev : D
Date: Monday, August 17, 2009		Sheet: 8 of 35	

RS780M HT/PCIE/HDMI

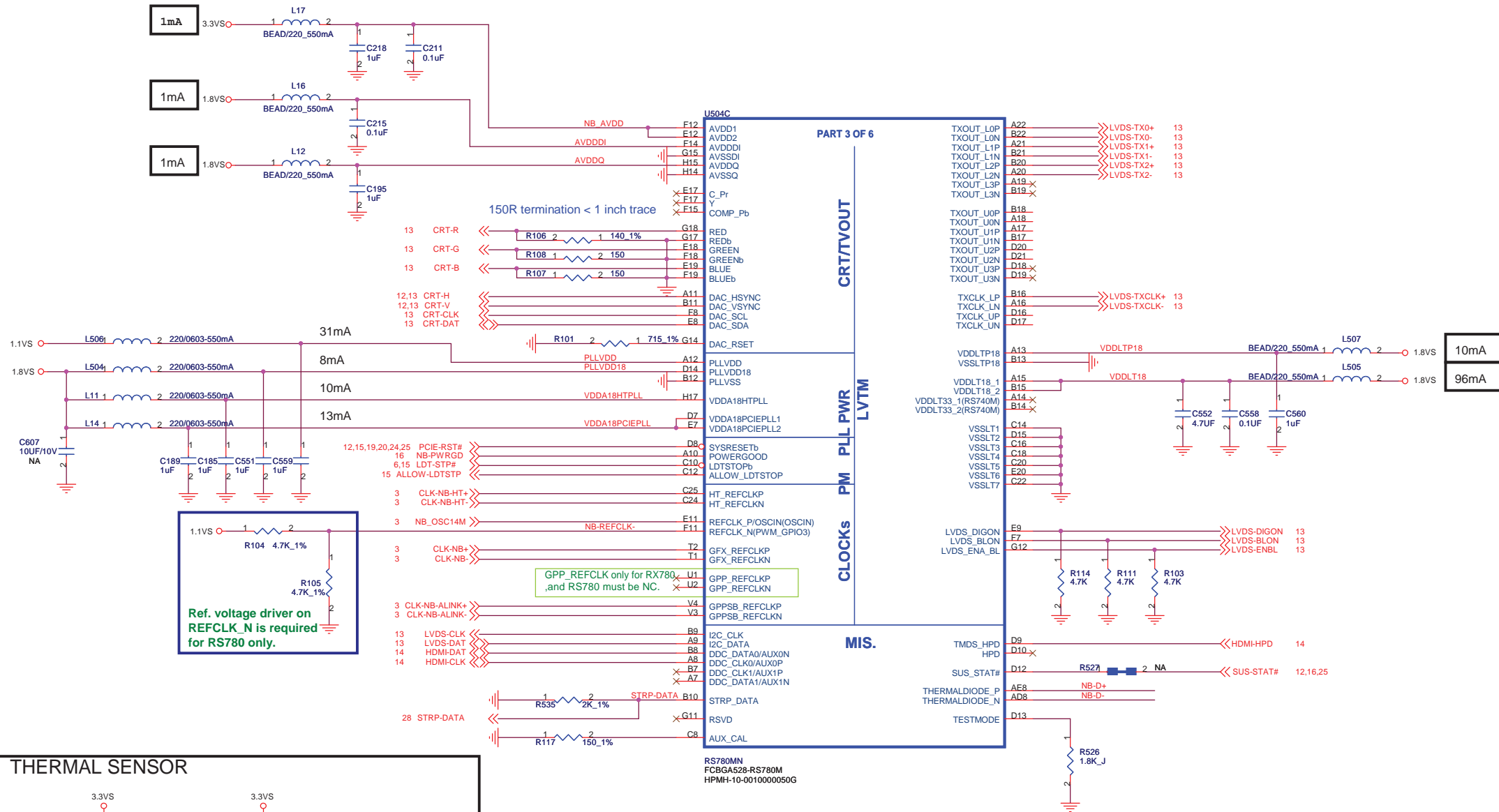


RS780MN
HPMH-10-0010000050G
FCBGA528-RS780M

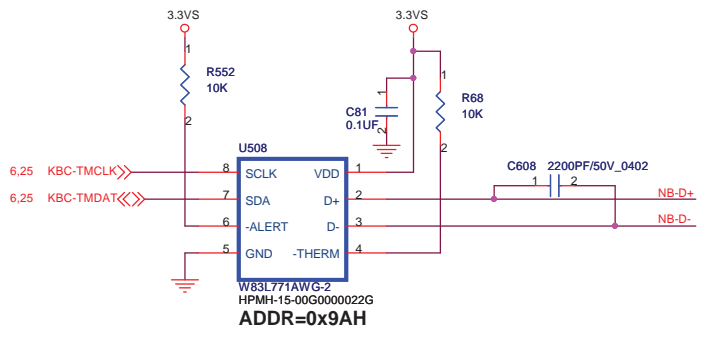
301 ohm to 300 ohm



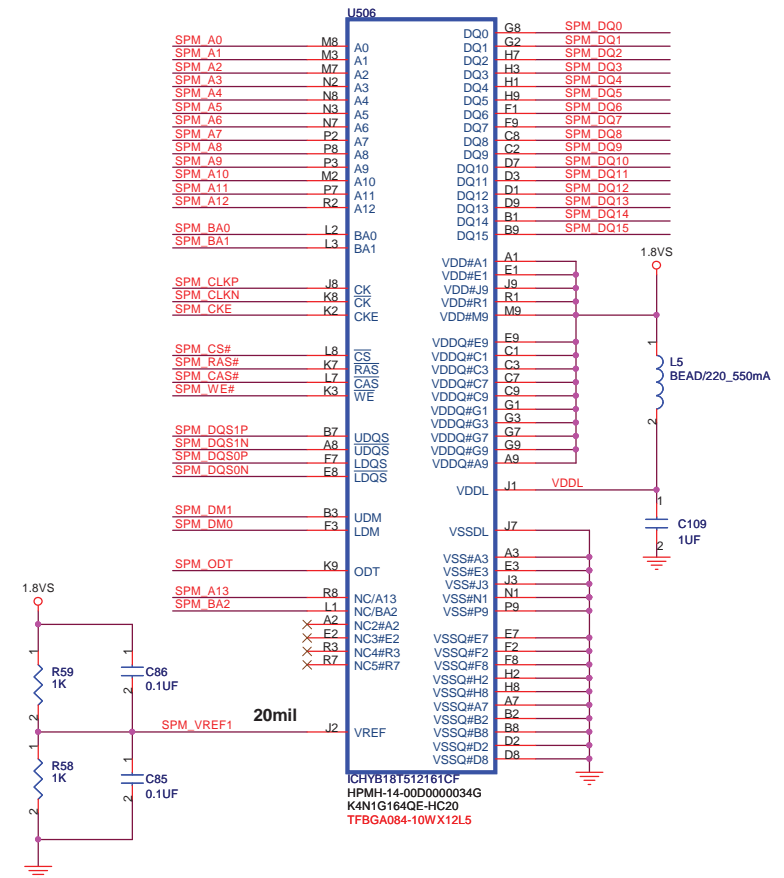
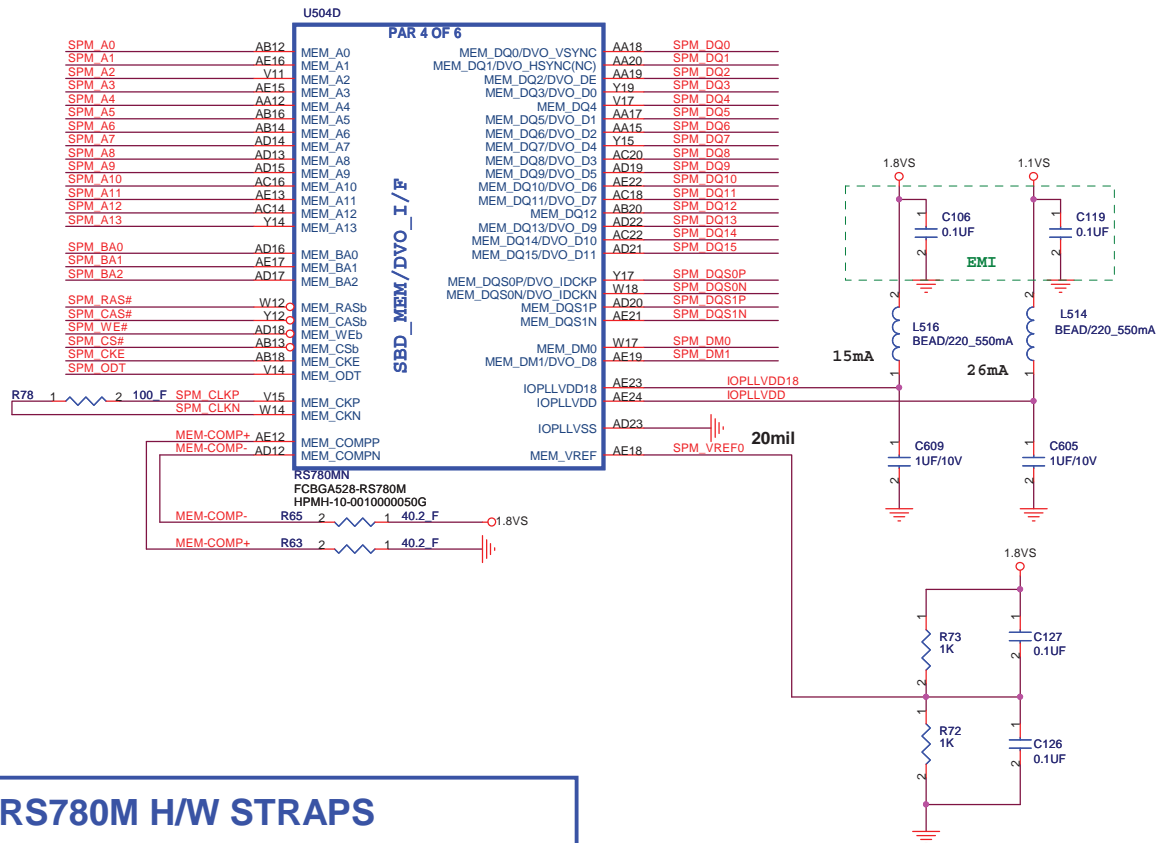
RS780MN
HPMH-10-0010000050G
FCBGA528-RS780M

RS780M HT/PCIE/HDMI

THERMAL SENSOR



NB_SIDE PORT / STRAPS



RS780M H/W STRAPS

STRAP_DEBUG_BUS_GPIO_ENABLE

```
Enables the Test Debug Bus using GPIO.
DAC_VSYNC (RS780.Pin B11)
1 : Disable (RS780) ( default )
0 : Enable (RS780)
```



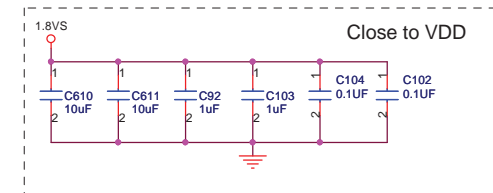
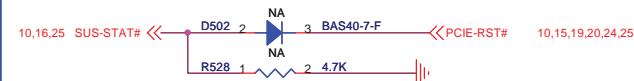
RS780: Enable Side Port Memory

```
Selects if Memory SIDE PORT is available or not
DAC_HSYNC (RS780.Pin A11)
1 : Disable (default)
0 : Enable
Register Readback of strap:
NB_CLKCFG:CLK TOP SPARE D[1]
```

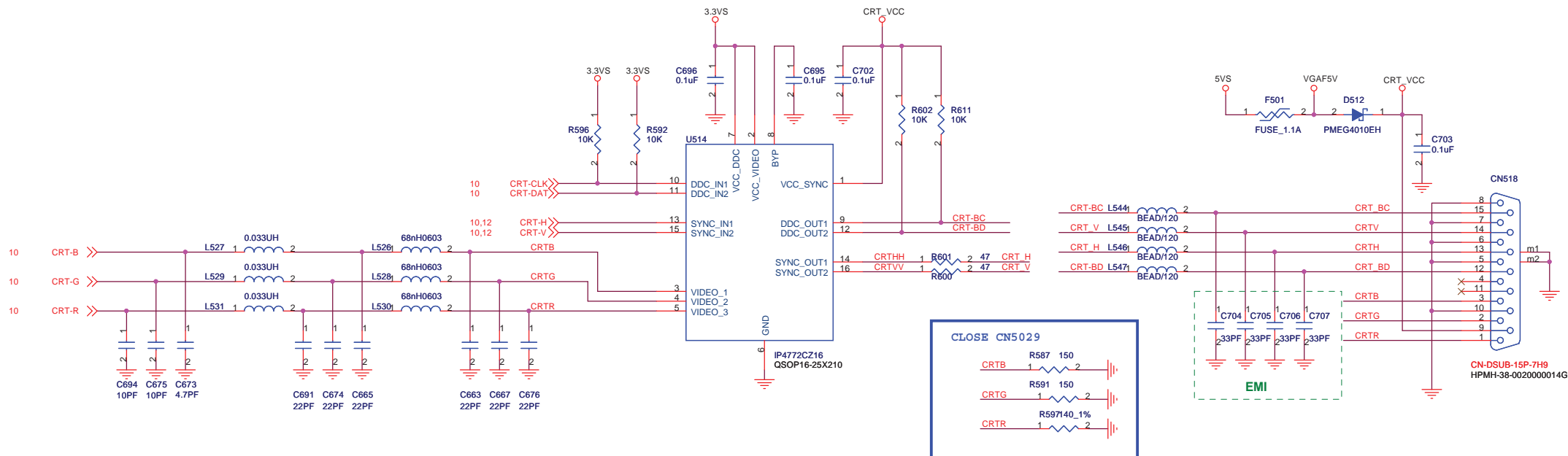


DFT_GPIO1: LOAD_EEPROM_STRAPS

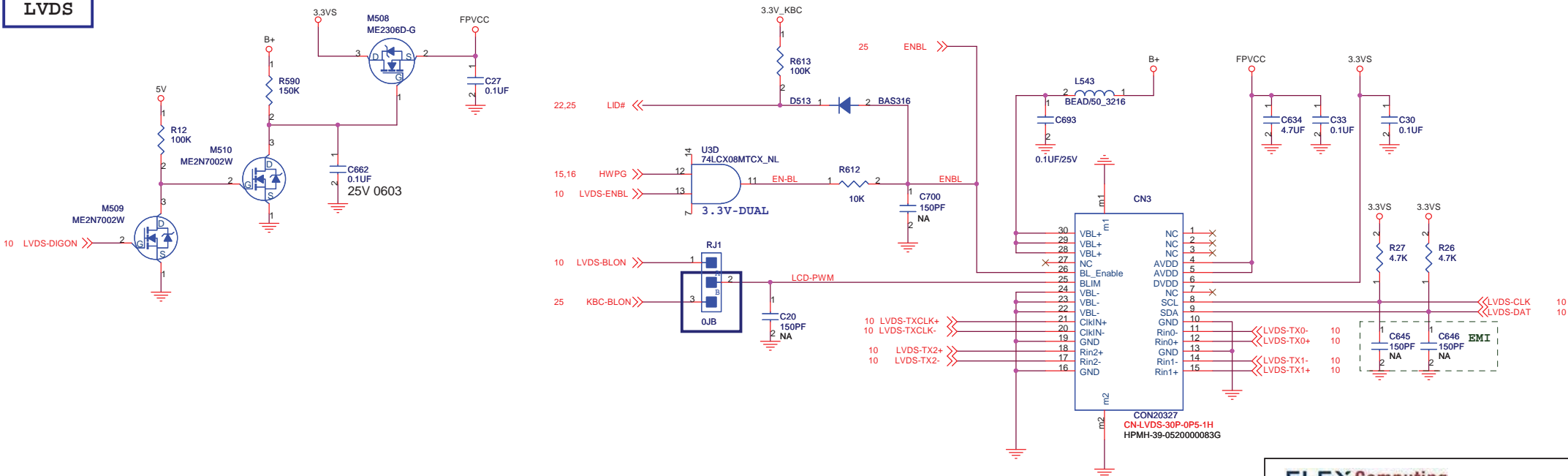
```
Selects Loading of STRAPS from EPROM
SUS_STAT# (RS780.Pin D12)
-1*: Bypass the loading of EEPROM straps and
    use Hardware Default Values
-0 : I2C Master can load strap values from EEPROM if connected
    , or use default values if not connected
```



CRT



LVDS

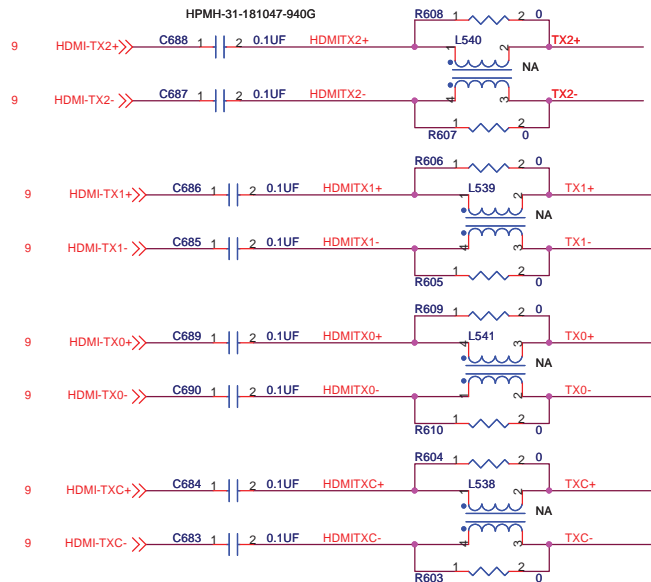


HDMI

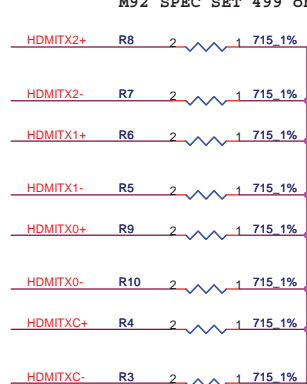
CLOSE CN5031

HPMH-32-4000000104G

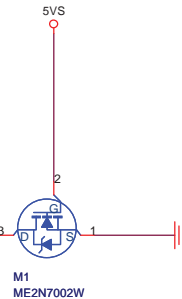
HPMH-31-181047-940G



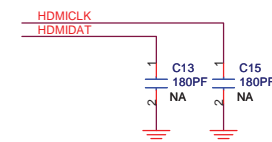
M92 SPEC SET 499 ohm



5VS

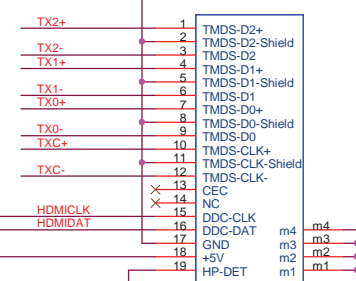


EMI

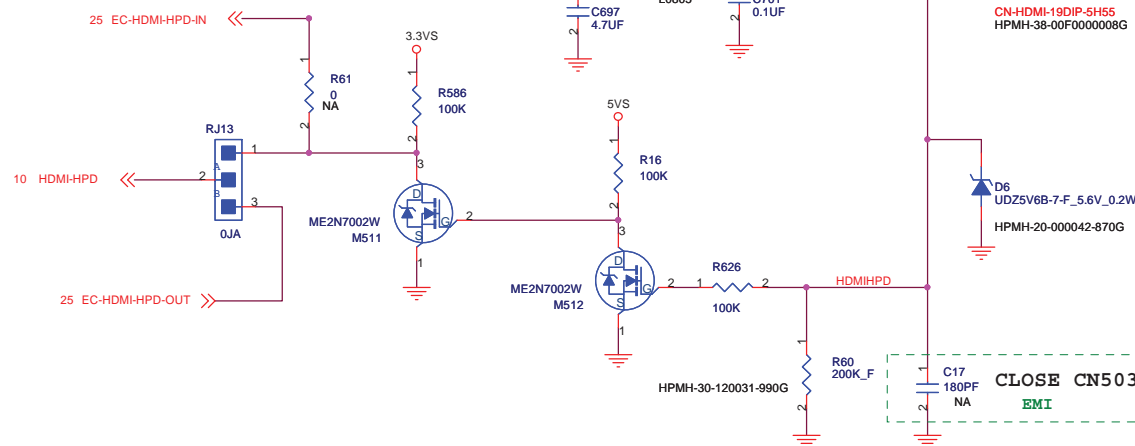
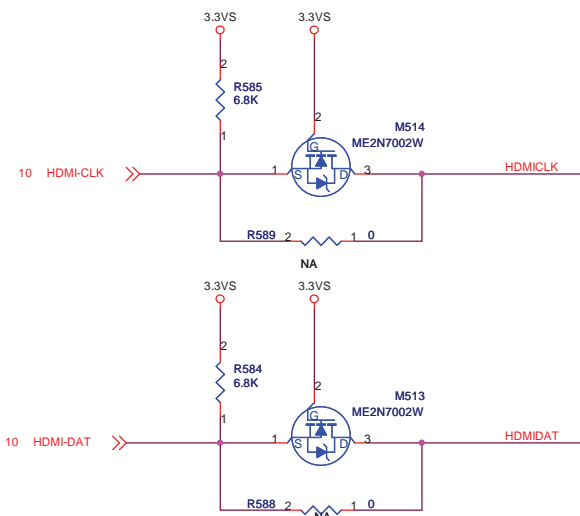


HDMI

CN515



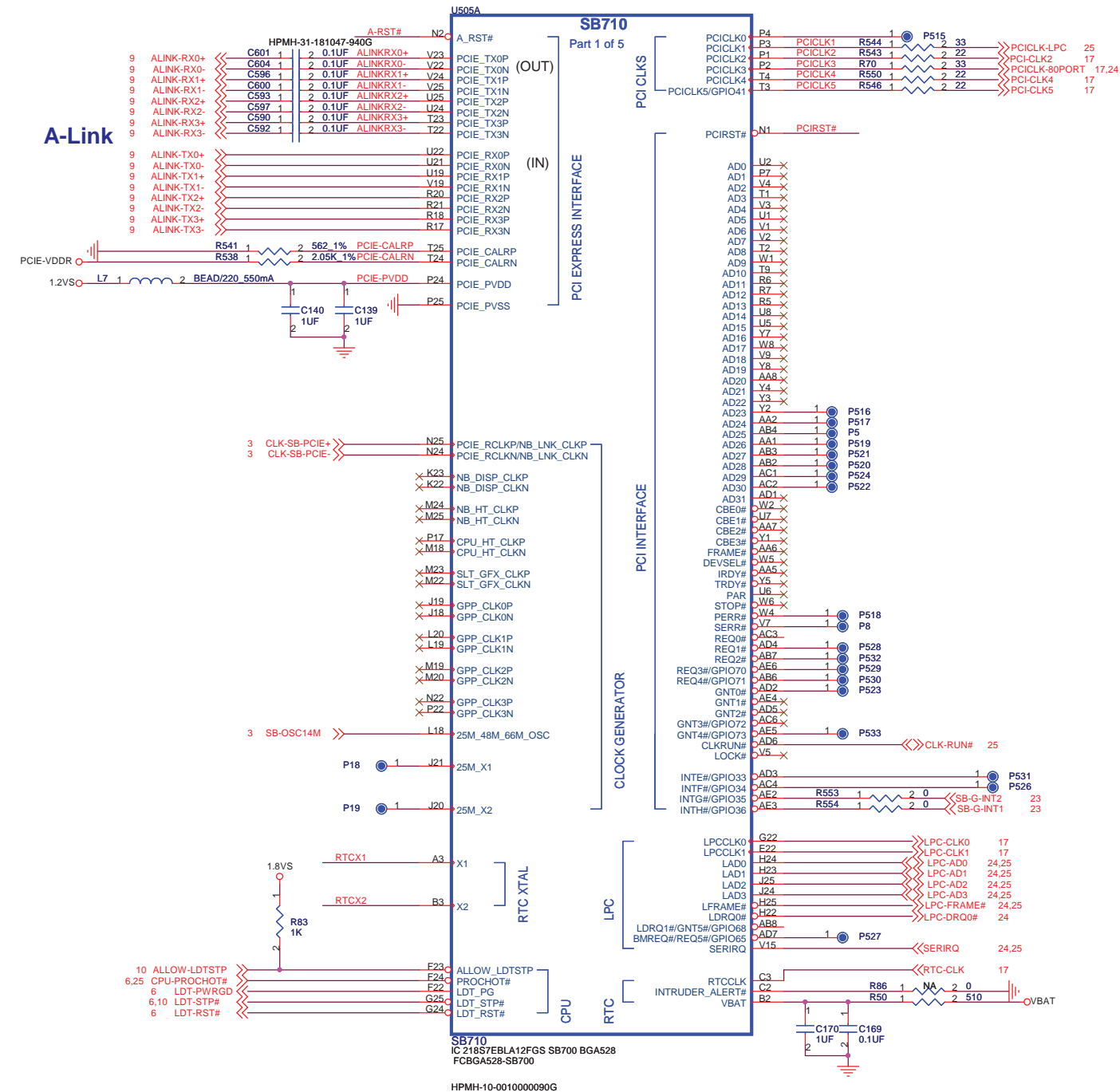
CN-HDMI-19DIP-5H55
HPMH-38-00F0000008G



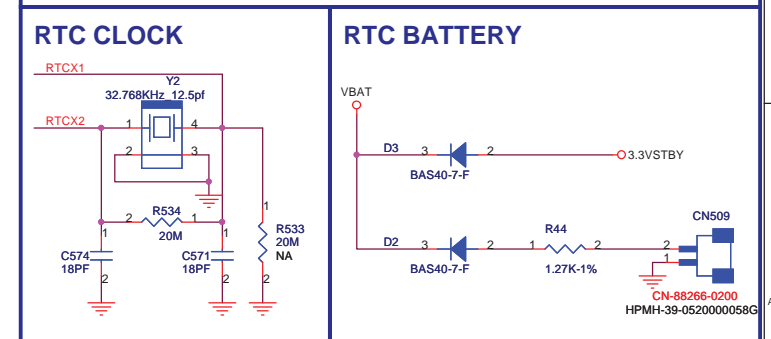
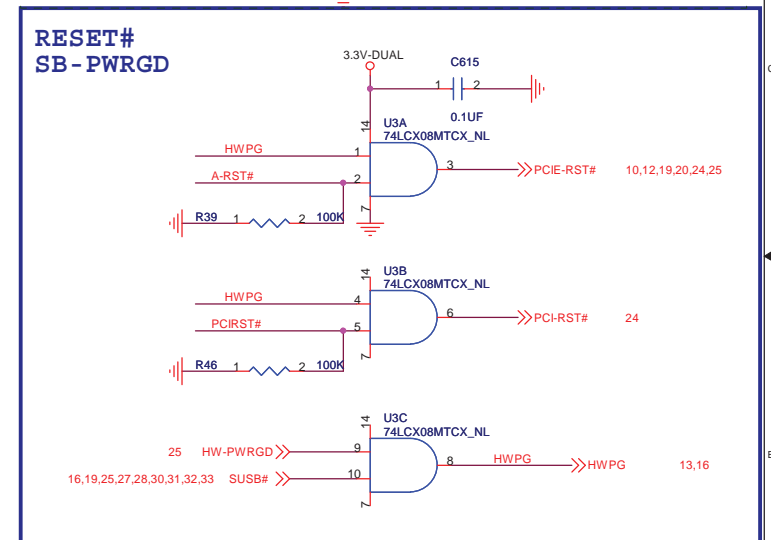
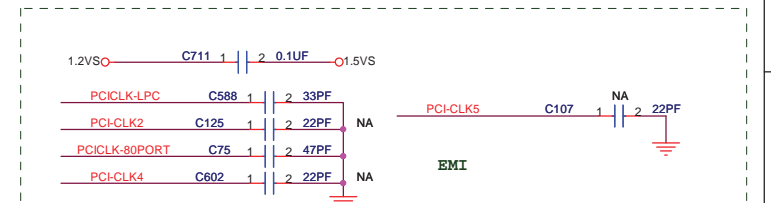
F CLOSE CN5031

EM

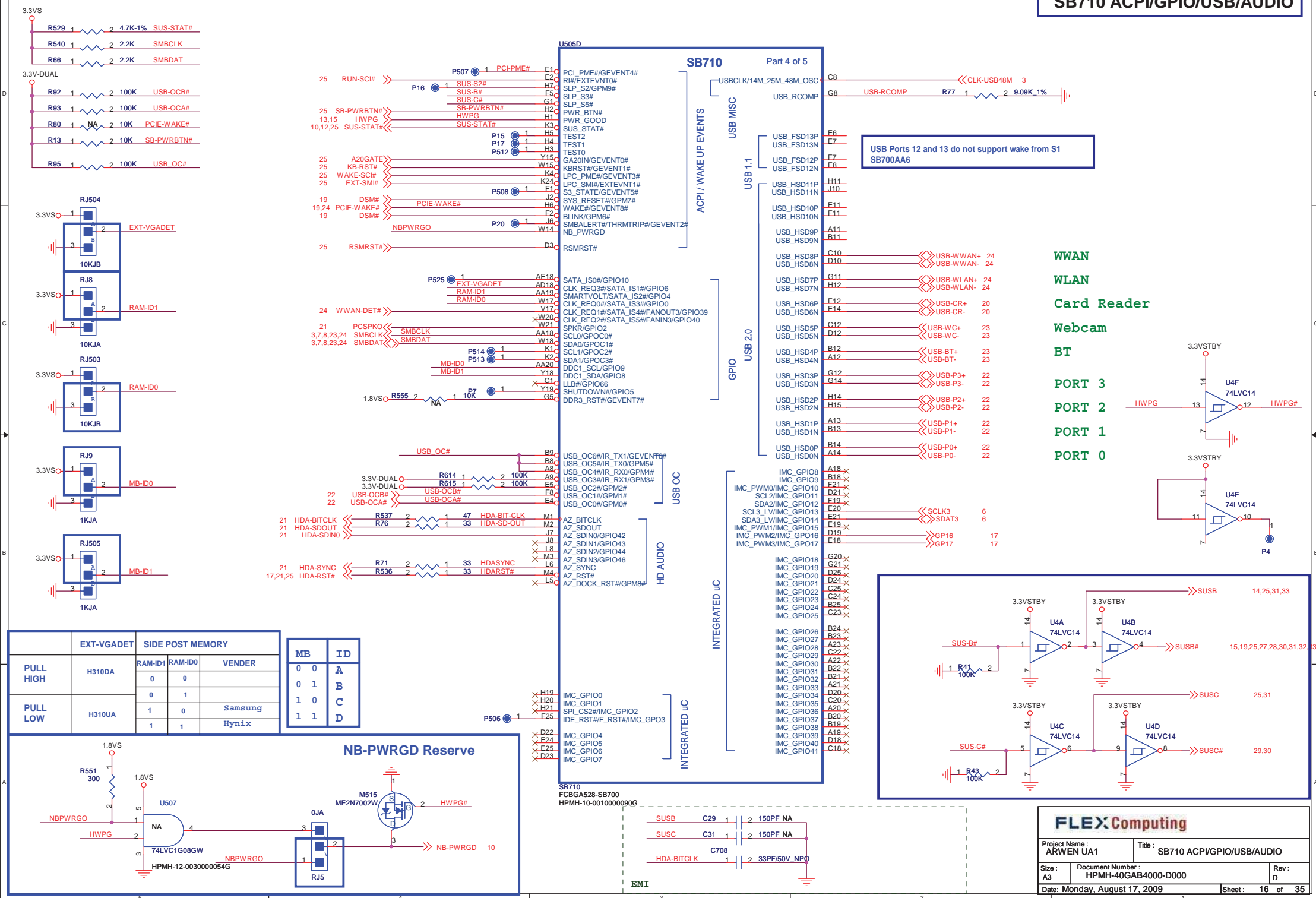
SB710 PCIE/PCI/CPU/LPC



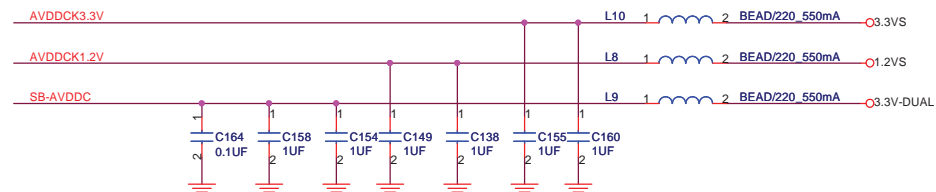
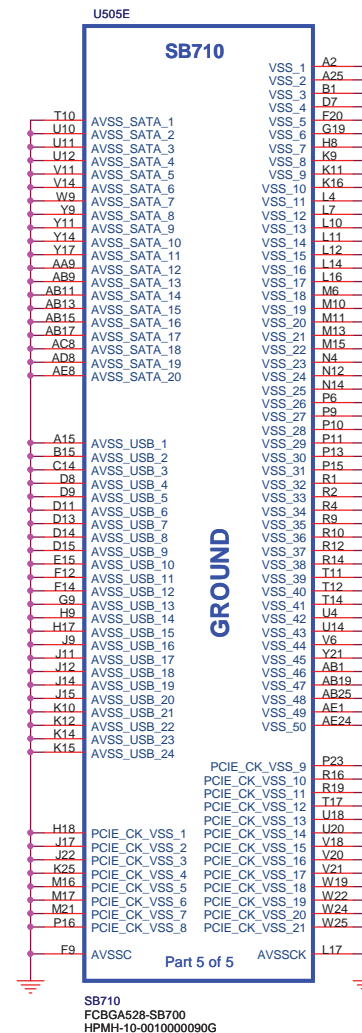
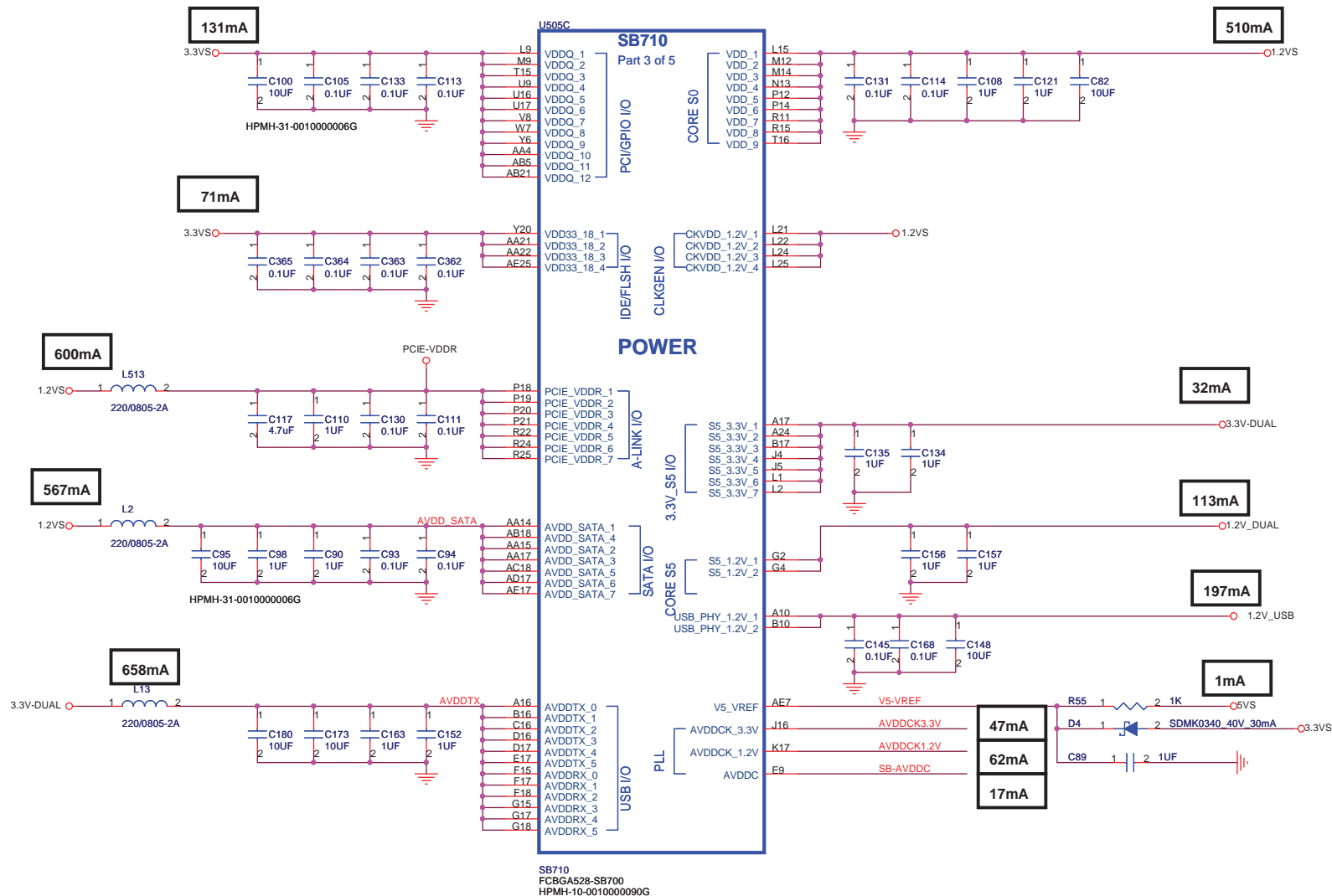
2			1			
	PCI_AD28	PCI_AD27	PCI_AD26	PCI_AD25	PCI_AD24	PCI_AD23
PULL HIGH	USE LONG RESET DEFAULT	USE PCI PLL DEFAULT	USE ACPI BCLK DEFAULT	USE IDE PLL DEFAULT	USE DEFAULT PCIE STRAPS DEFAULT	RESERVED
PULL LOW	USE SHORT RESET	BYPASS PCI PLL	BYPASS ACPI BCLK	BYPASS IDE PLL	USE EEPROM PCIE STRAPS	



SB710 ACPI/GPIO/USB/AUDIO



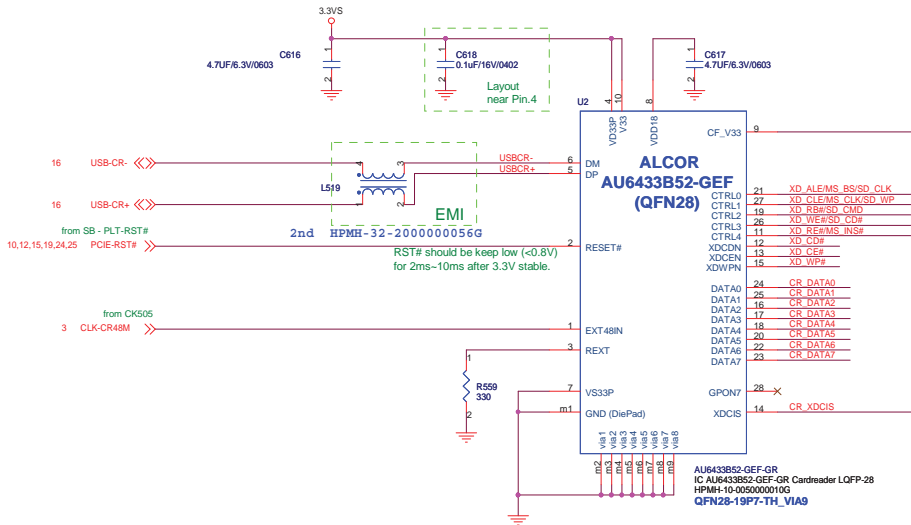
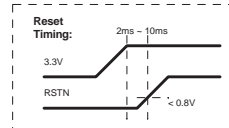
SB710 PWR / GND



Card Reader

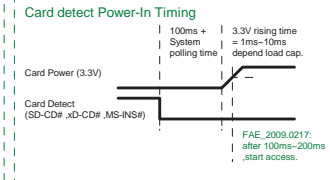
Alcor AU6433-GEF Card supported:

SD v2.0 (SDHC)
MMC v4.2
MS v1.43
MS-PRO v1.03
MS PRO-HG v1.01
xD v1.2



Card Power V33 = 3.3V ~ 2.8V
Card Power OCP = 420mA

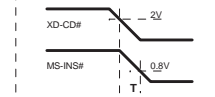
F AE_2009.0217:
CF_V33 Internal P/D 1Kohm
for power-off discharge



FAE_2009.0117:
Memory Stick Formatter for MS Logo
- Enable

FAE_2009.0117:
SD write protect
- Decided by SD-WP of SD Card

Solution for MS Adapter short issue
when $T < 128\text{ms}$,
XD-CD# event will not be affected.

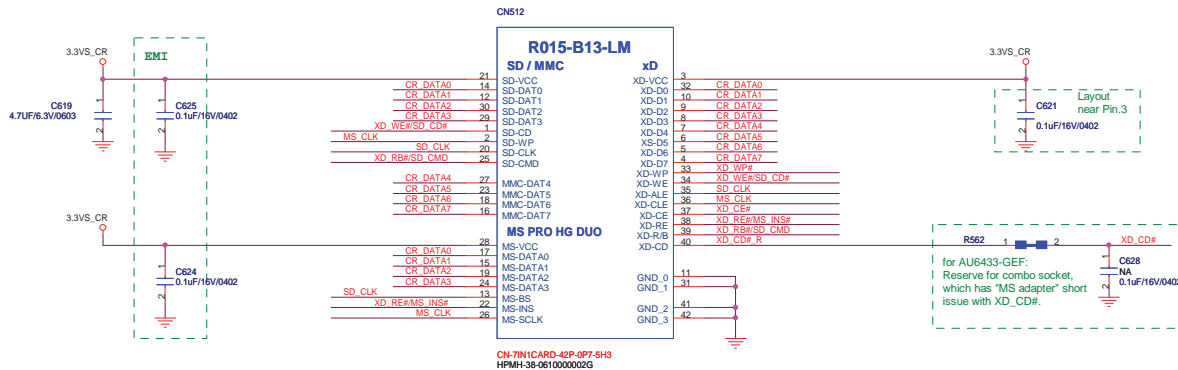


Memory Card Socket

R015-B13-LM
HPMH-38-0610000002G

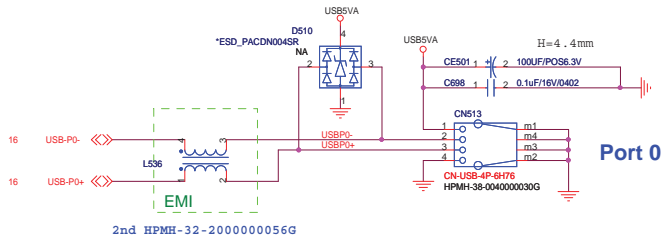
Card type Supported:

- SD
- SD IO
- MMC
- MMC4.0
- MS
- MS Pro
- xD

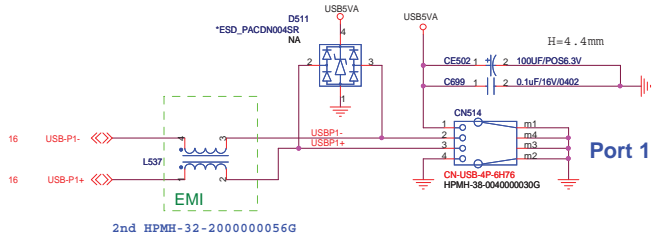


for AU6433-GEF:
Reserve for combo socket,
which has "MS adapter" short
issue with XD_CD#.

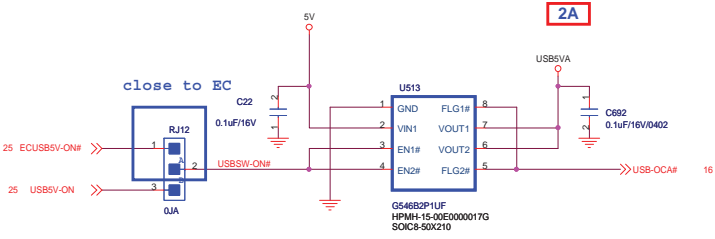
USB Port 0 / 1



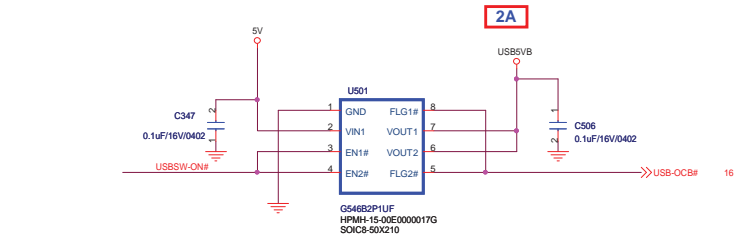
Port 0



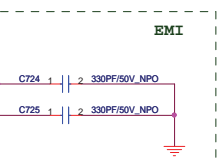
Port 1



2A

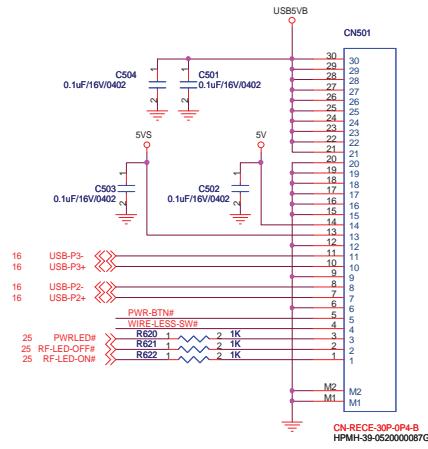


2A



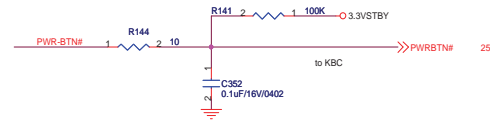
EMI

USB DB CONN

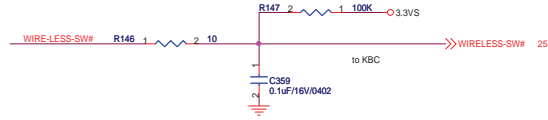


USB Power Connector needs >2A

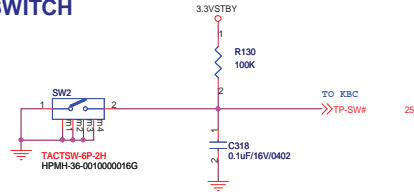
Power ON/OFF Button



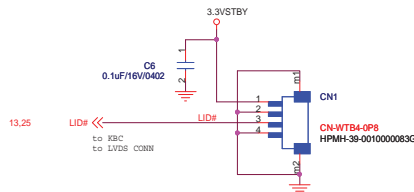
Wireless ON/OFF Button



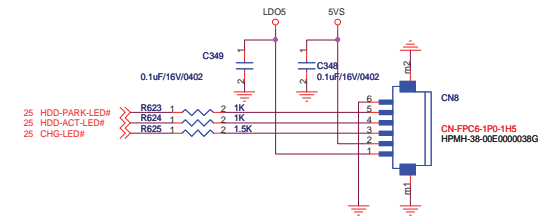
TP LOCK SWITCH



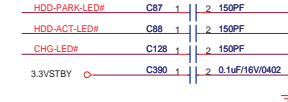
LID Switch



LED DB CONN



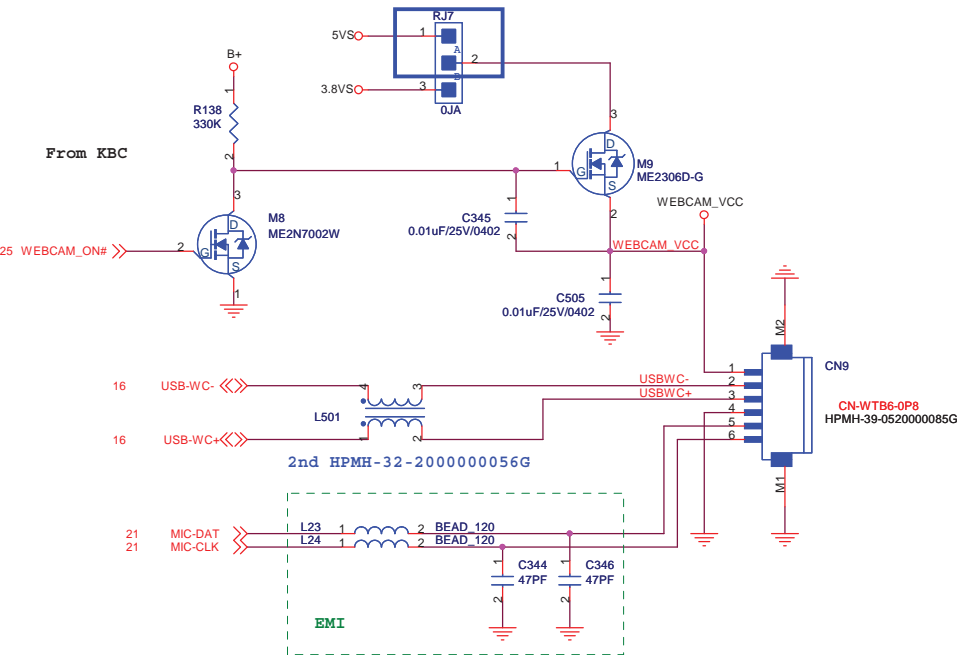
EMI



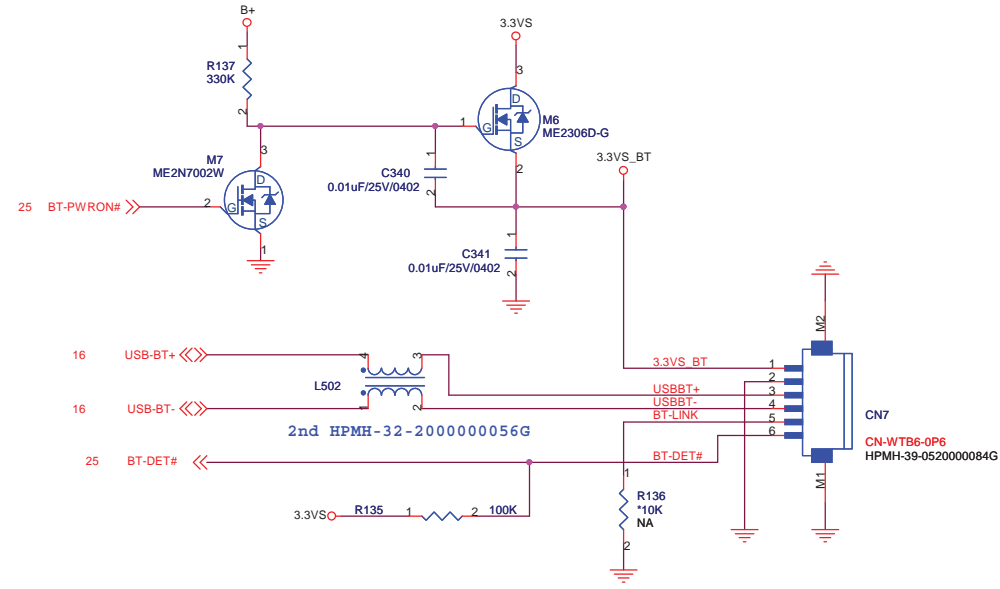
FLEX Computing

Project Name : ARWEN UA1		Title : USB / USB CON	
Size : C	Document Number : HPMH-40GAB4000-D000	Rev : D	
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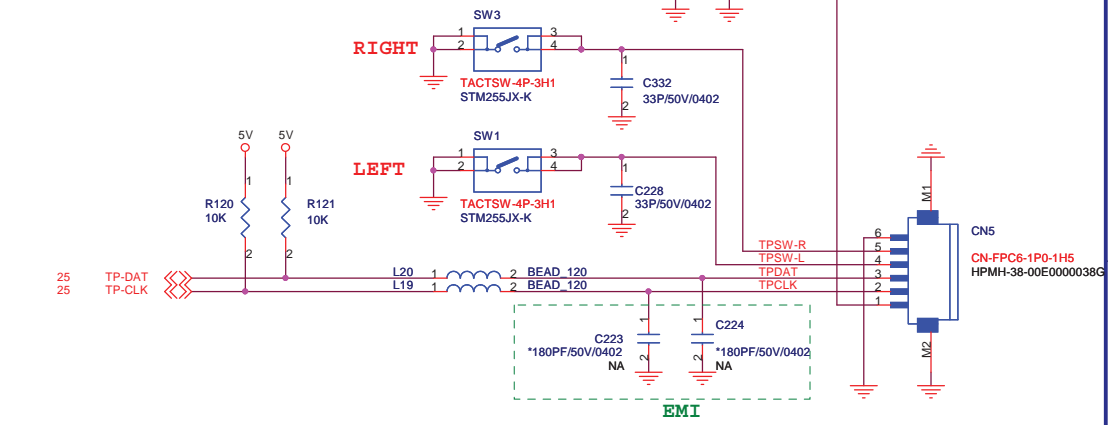
Web CAM



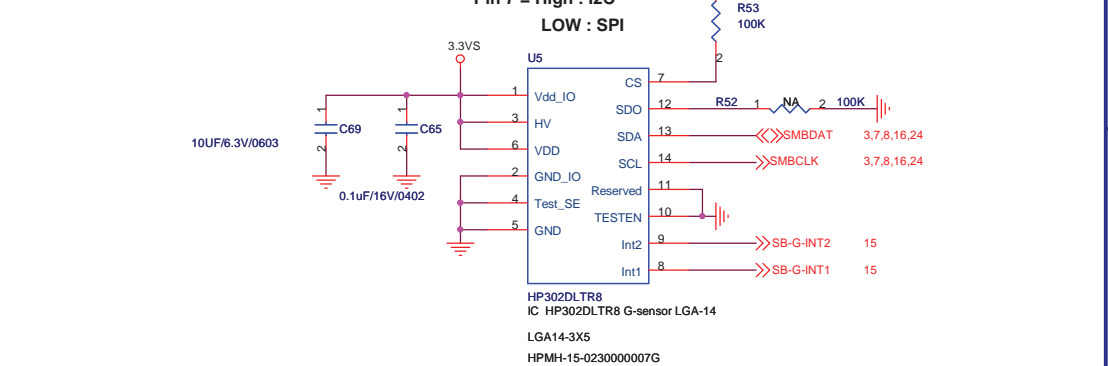
Blue Tooth



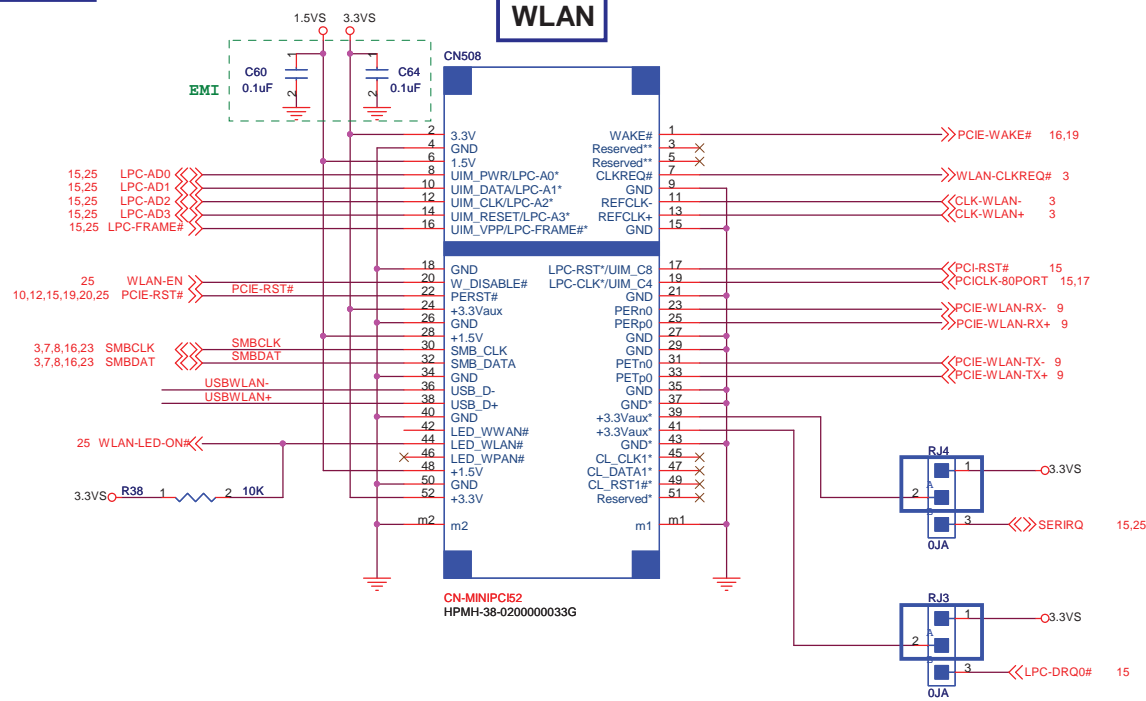
Touch Pad



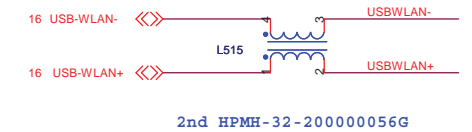
G-Sensor



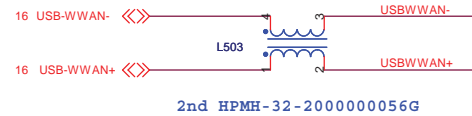
WLAN / WWAN



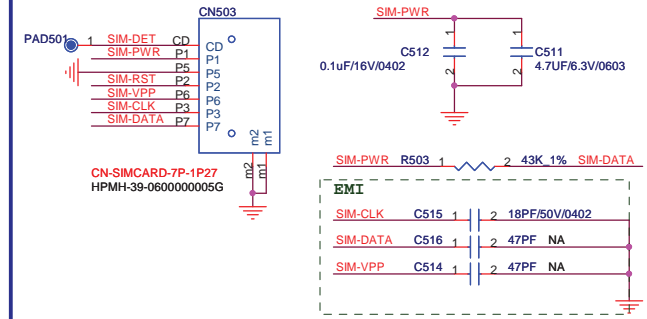
WLAN



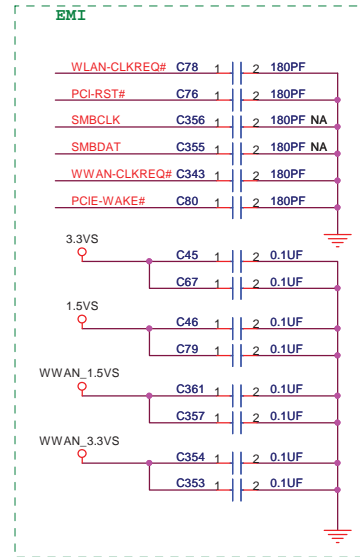
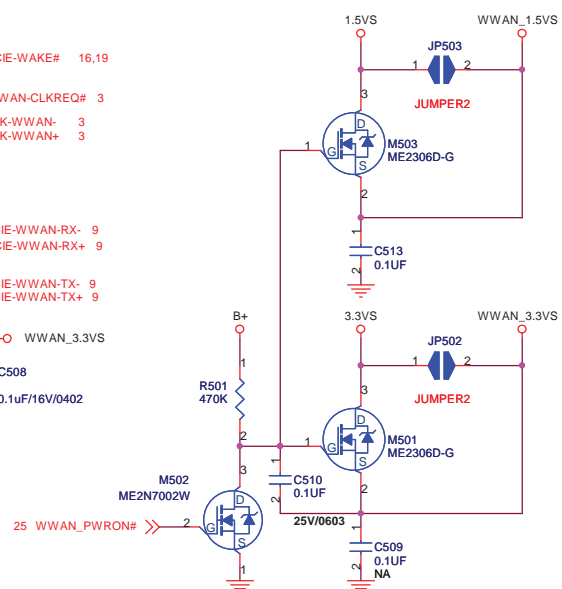
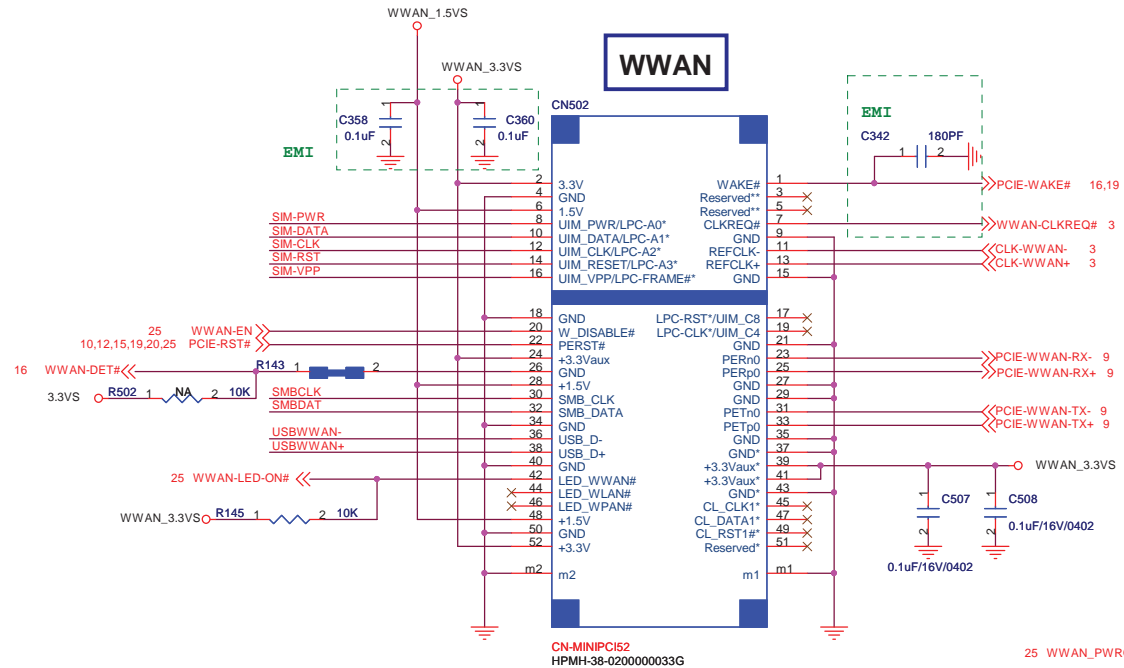
WWAN



SIM

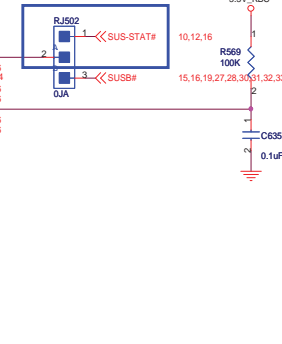
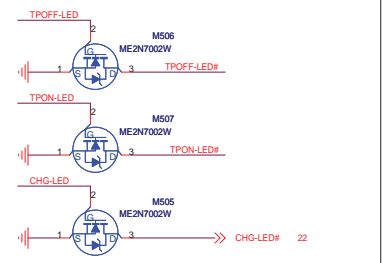
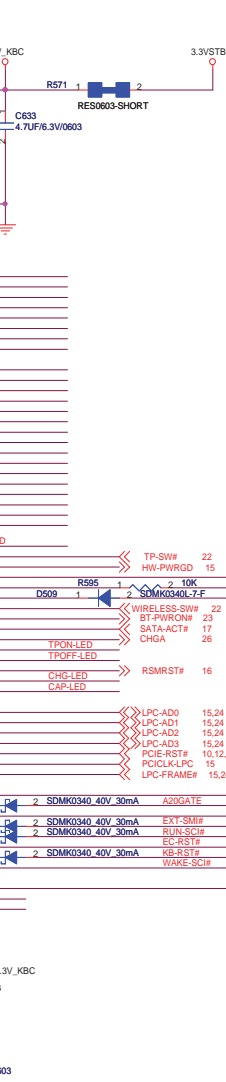


WWAN

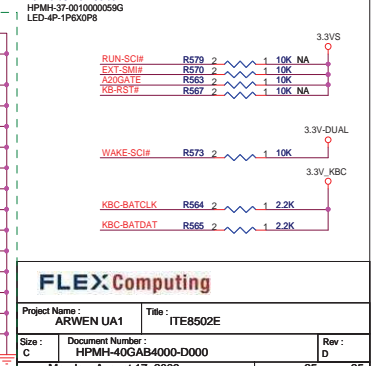
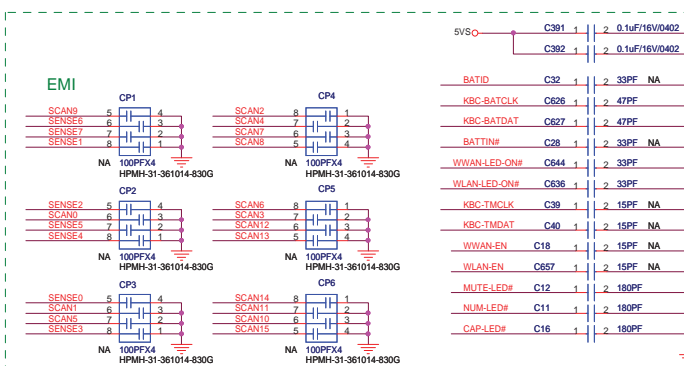
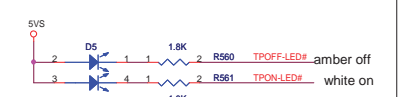


FLEX Computing

Project Name:		Title:	
ARWEN UA1		MINI PCIE (WLAN / WWAN)	
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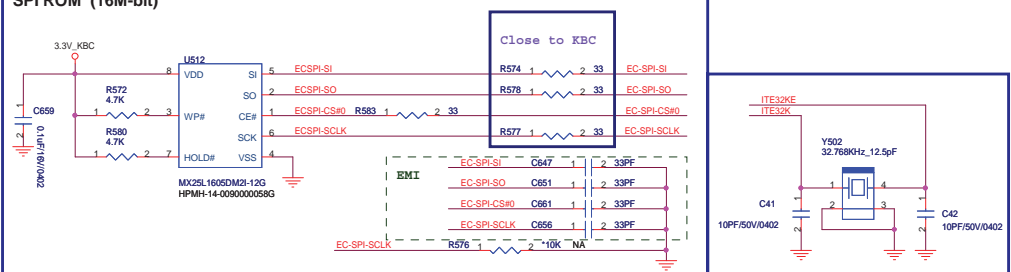
Touch Pad Active LED



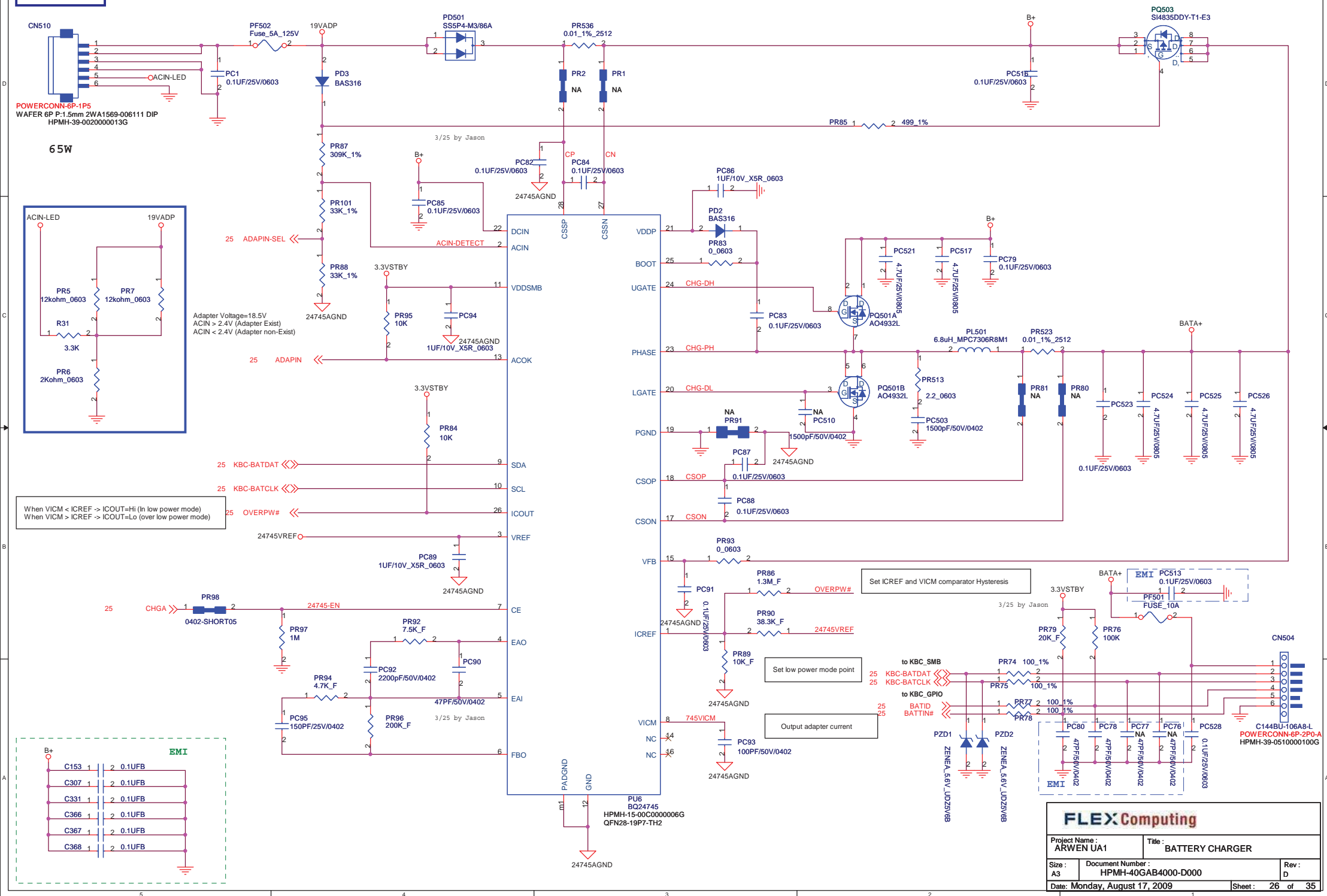
FLEX Computing

Project Name :		Title :	
ARWEN UA1		ITE8502E	
Size :	Document Number :		Rev :
C	HPMH-40GAB4000-D000		D

SPL ROM (16M-bit)



Charger

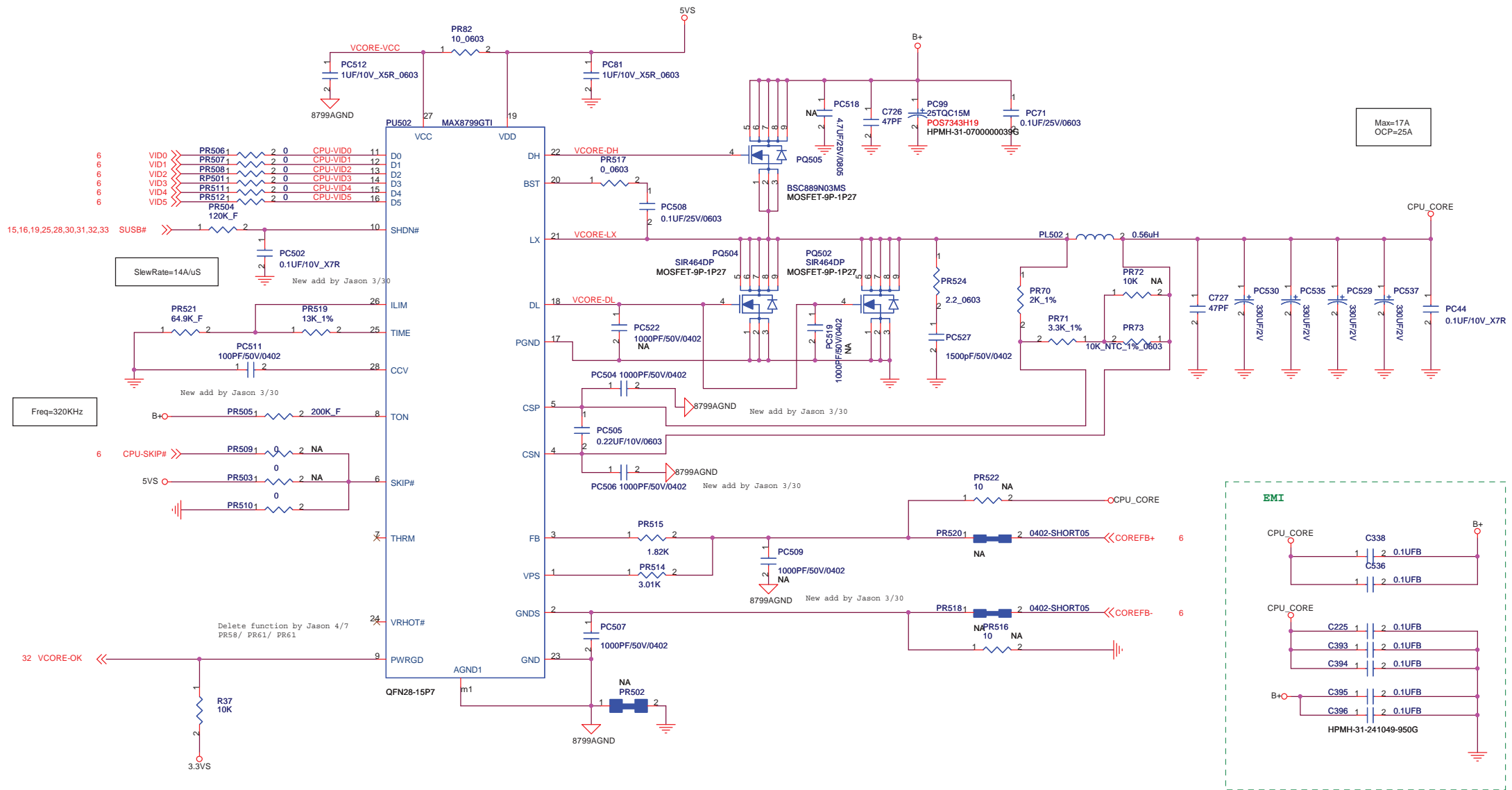


FLEX Computing

Project Name : ARWEN UA1	Title : BATTERY CHARGER
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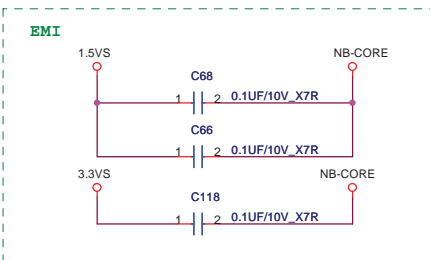
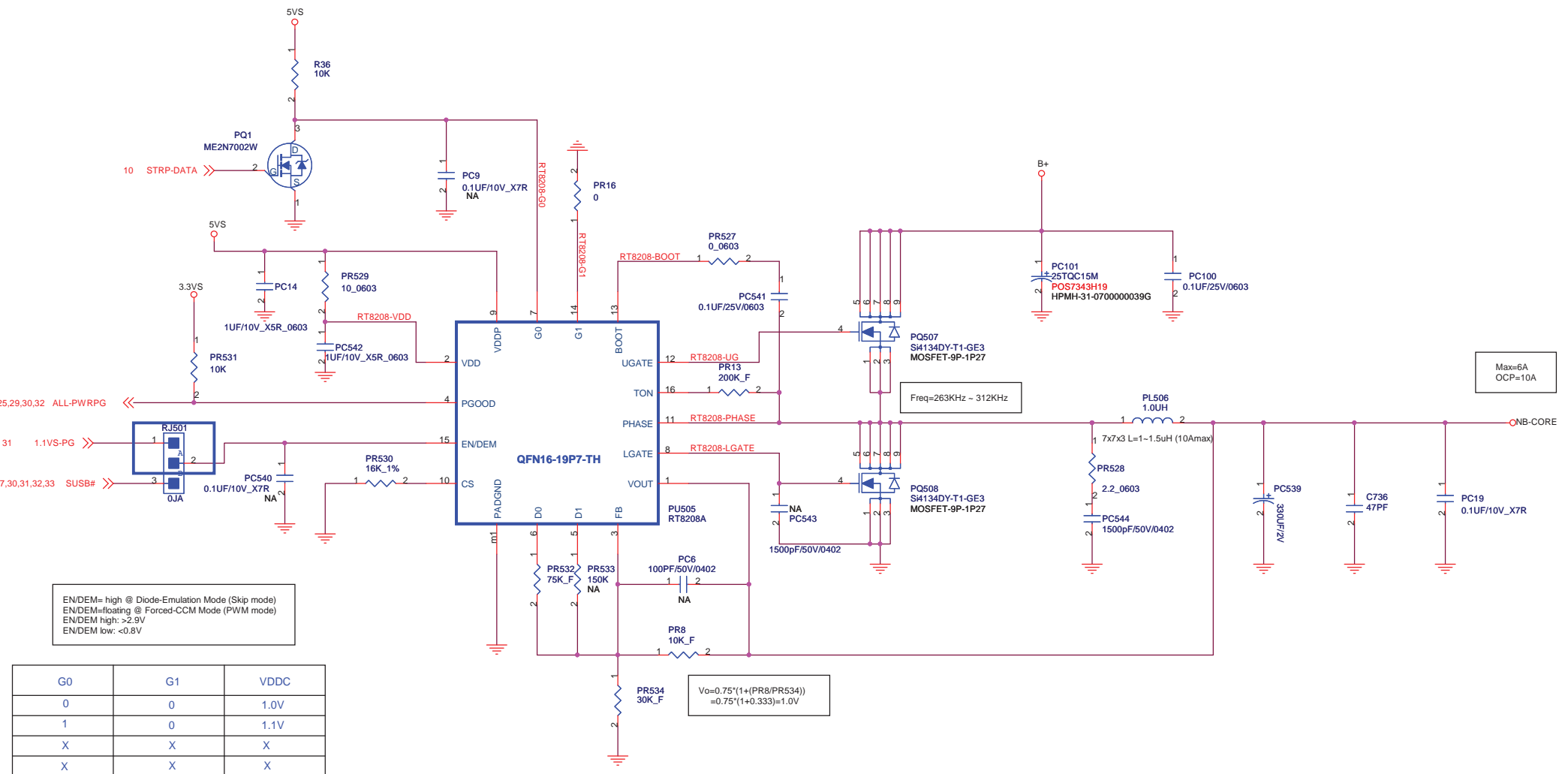
Size : A3	Document Number : HPMH-40GAB4000-D000	Rev : D
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CPU_CORE

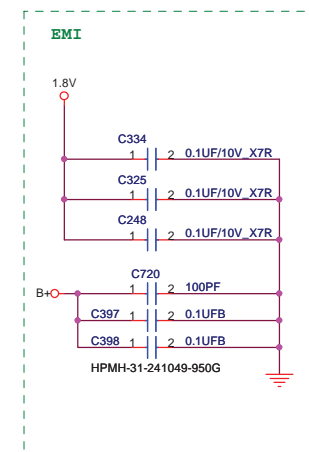
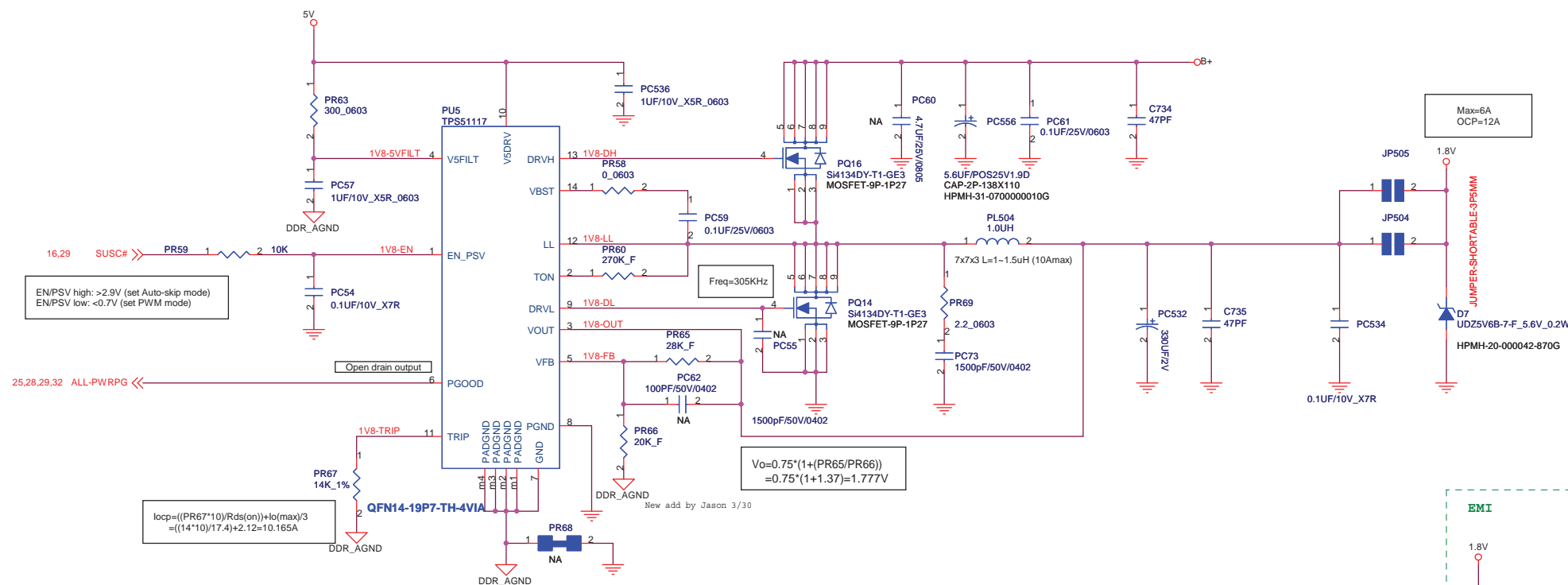


CPU Voltage	VID 0	VID 1	VID 2	VID 3	VID 4	VID 5
1.00V	0	1	1	0	1	0
1.05V	0	0	1	0	1	0
1.10V	0	1	0	0	1	0

NB_CORE



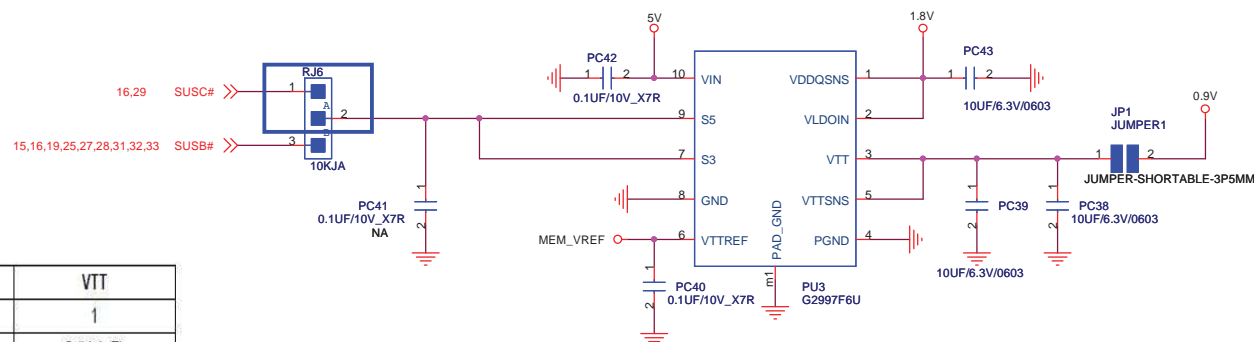
1.8V / 0.9V



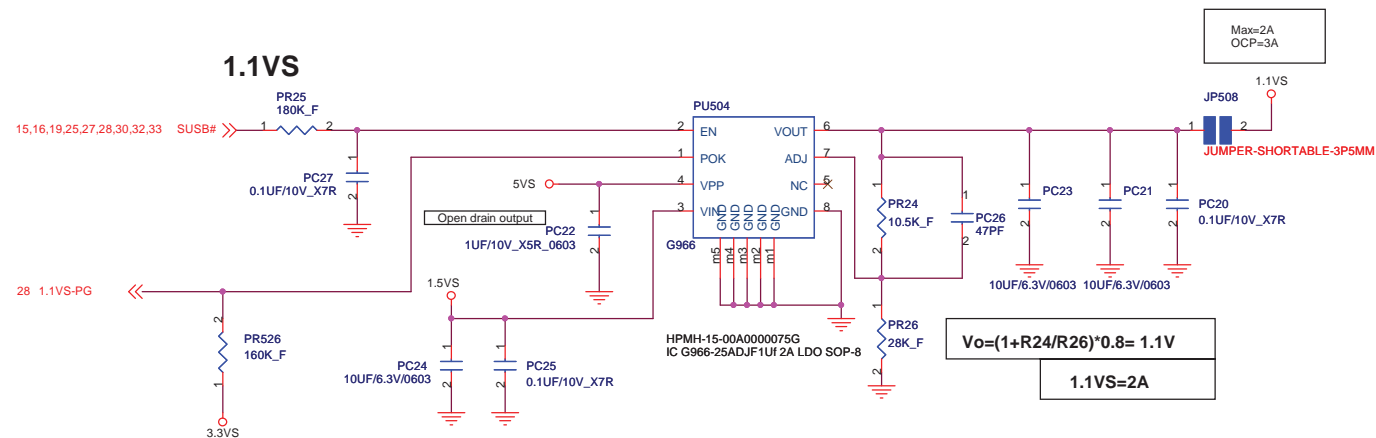
S3 and S5 Control Tabl

STATE	S3	S5	VITREF	VTT
S0	H	H	1	1
S3 ⁽¹⁾	L	H	1	0 (high-Z)
S4/S5 ⁽¹⁾	L	L	0 (discharge)	0 (discharge)

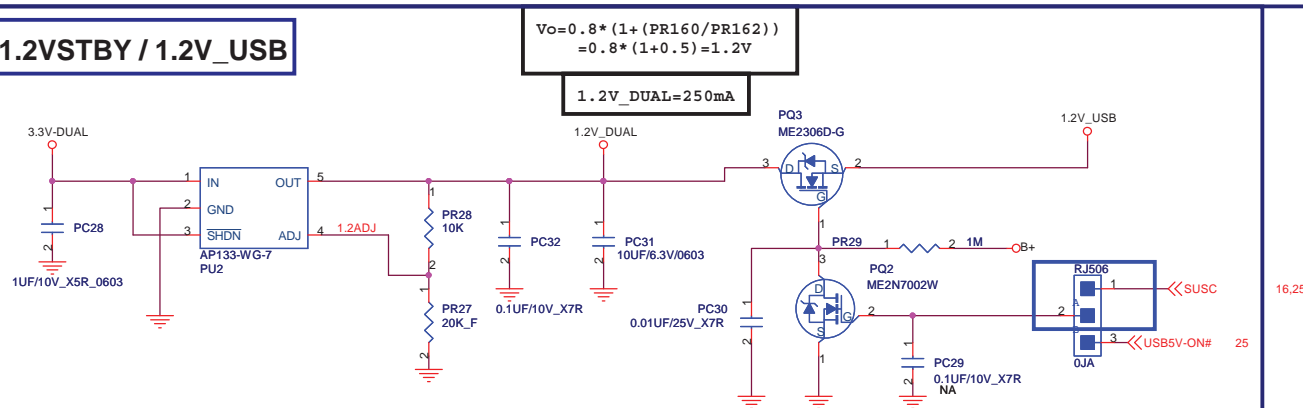
(1) In case S3 is forced to H and S5 to L, VTTREF is discharged and VTT is at High-Z state. This condition is NOT recommended.



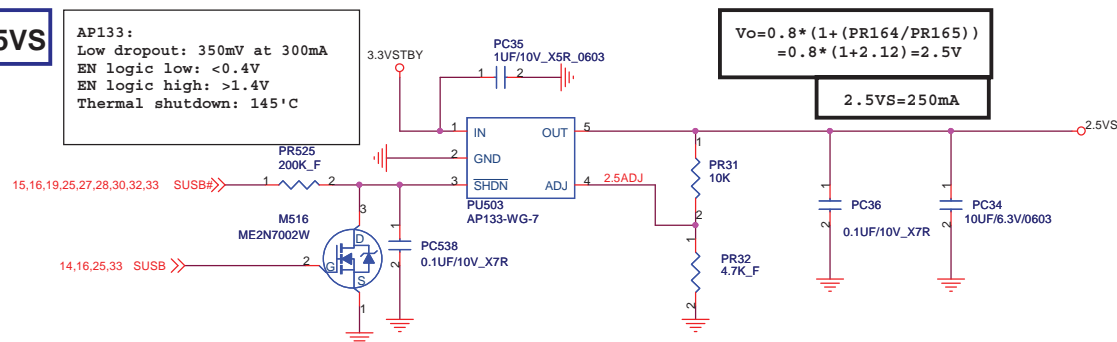
1.1VS



1.2VSTBY / 1.2V_USB



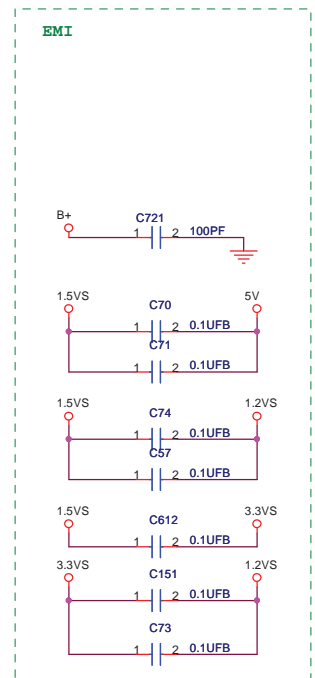
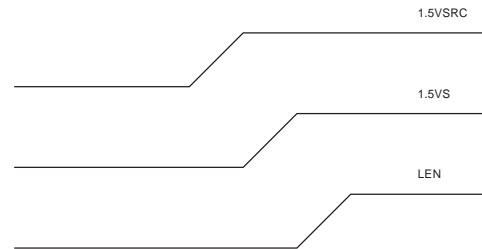
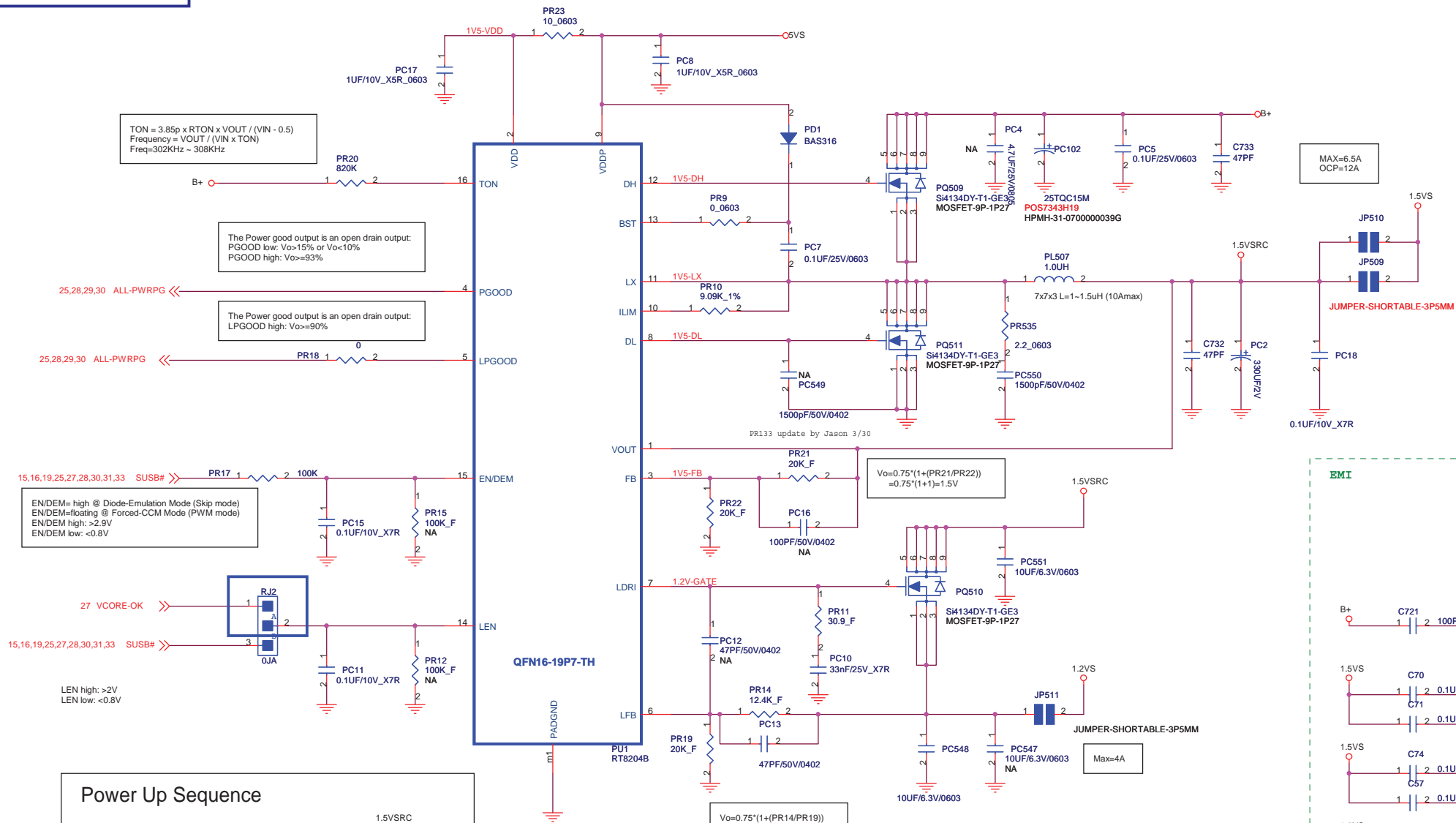
2.5VS



FLEX Computing

Project Name : ARWEN UA1		Title : 1.1VS/2.5VS/1.2V_USB	
Size : A3	Document Number : HPMH-40GAB4000-D000		Rev : D
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1.5VS / 1.2VS



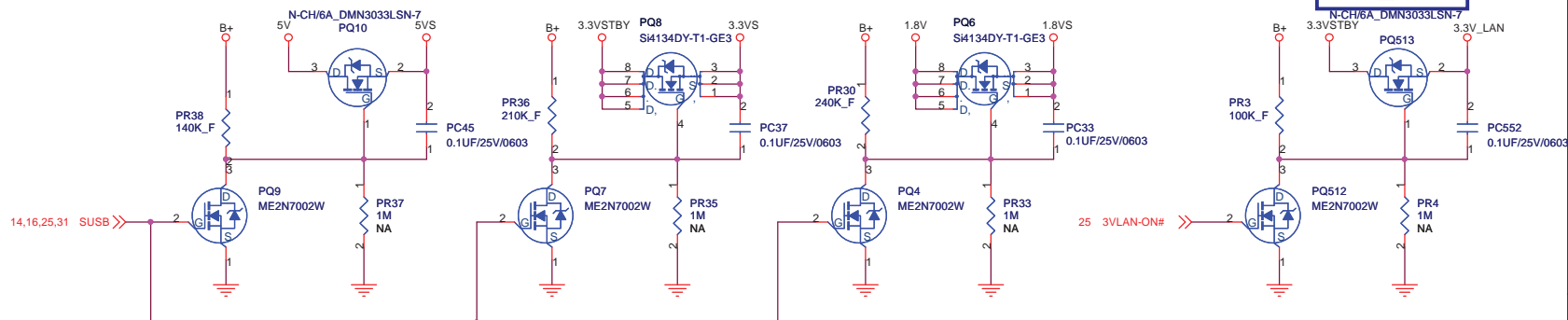
S4/S3 OFF

5VS

3.3VS

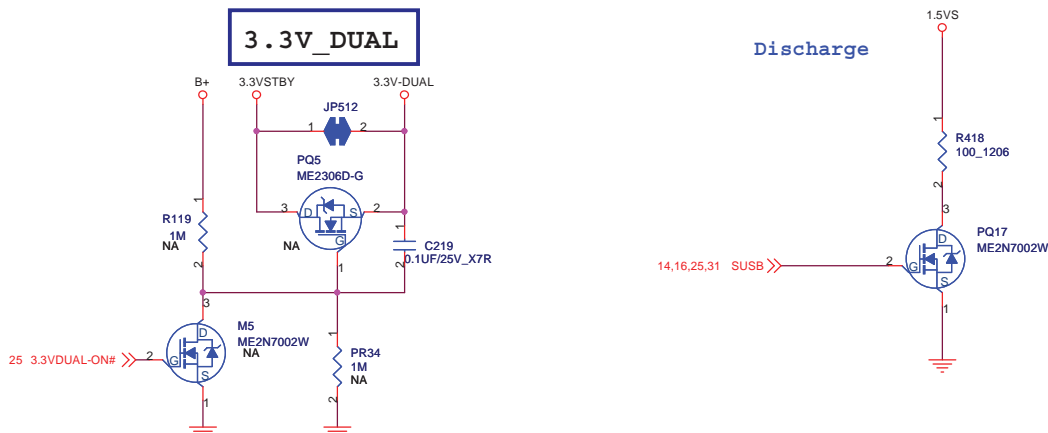
1.8VS

LAN_3.3V



3.3V_DUAL

Discharge

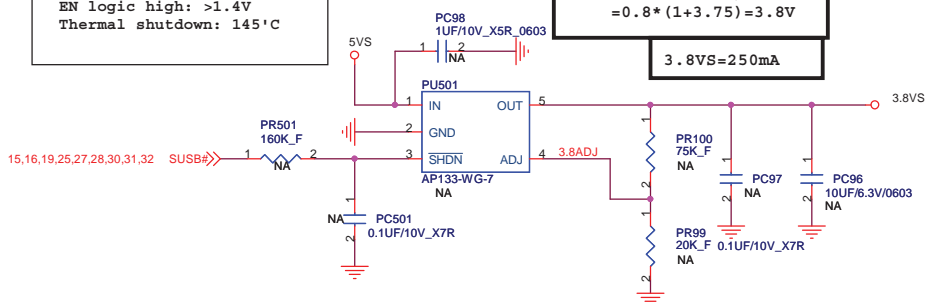


AP133:
Low dropout: 350mV at 300mA
EN logic low: <0.4V
EN logic high: >1.4V
Thermal shutdown: 145°C

3.8VS

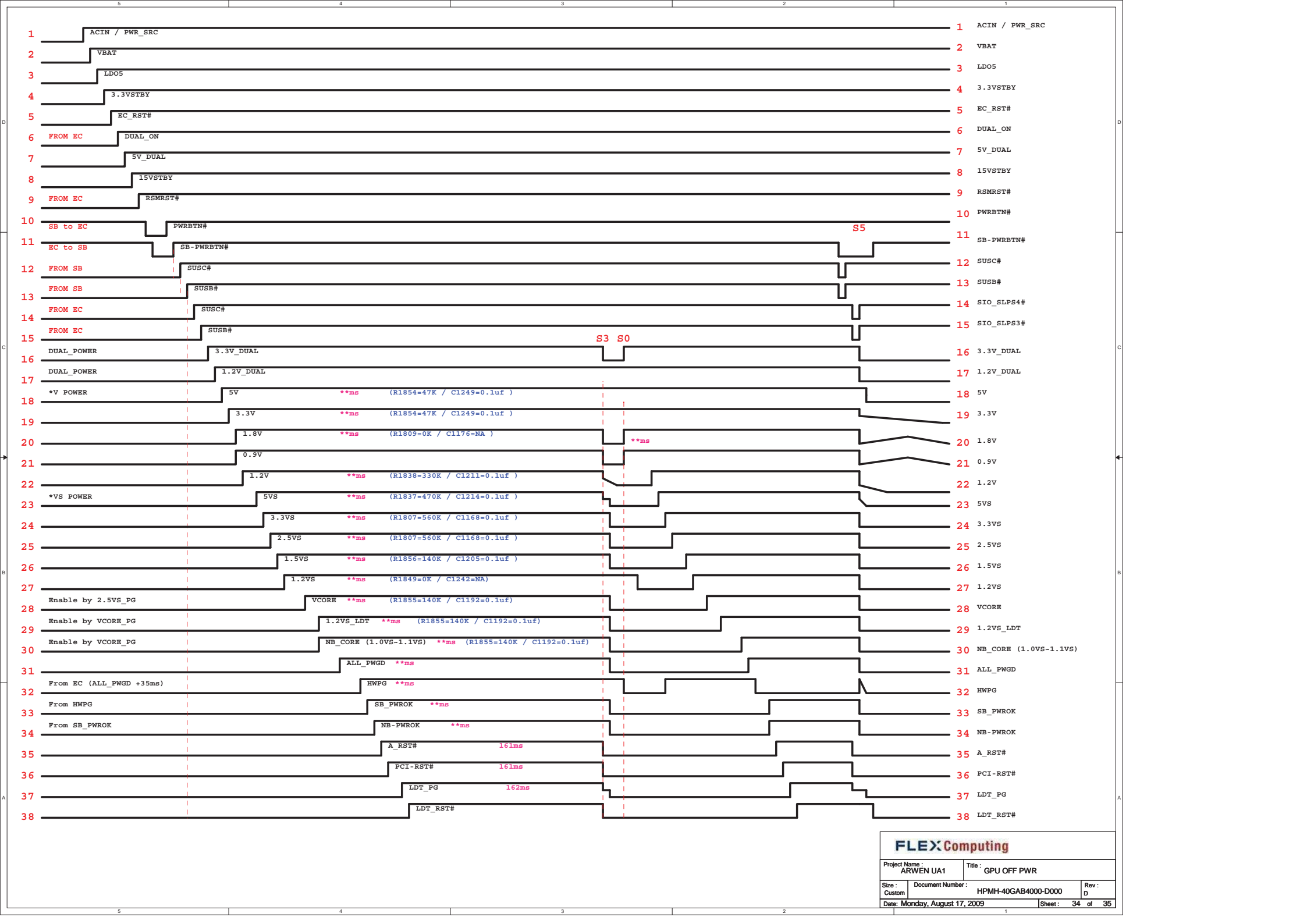
$$V_o = 0.8 * (1 + (PR100 / PR99)) = 0.8 * (1 + 3.75) = 3.8V$$

3.8VS=250mA



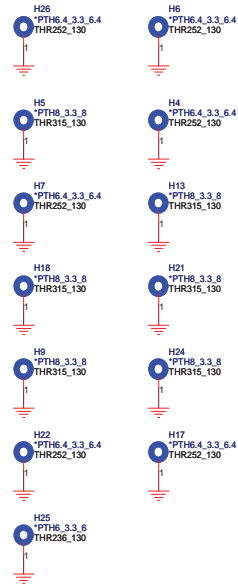
FLEXComputing

Project Name : ARWEN UA1		Title : VVS/VGA POWER	
Size : Custom	Document Number : HPMH-40GAB4000-D000		Rev : D
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Screw Hole

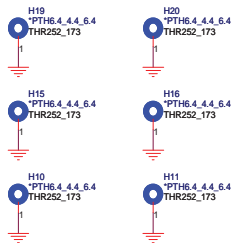
MB x 16



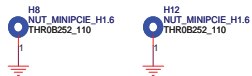
FID

- FID1 *FIDUCIAL CAD-016
⊗ NC, NO CONNECT TO ANY.
- FID3 *FIDUCIAL CAD-016
⊗ NC, NO CONNECT TO ANY.
- FID4 *FIDUCIAL CAD-016
⊗ NC, NO CONNECT TO ANY.
- FID5 *FIDUCIAL CAD-016
⊗ NC, NO CONNECT TO ANY.
- FID6 *FIDUCIAL CAD-016
⊗ NC, NO CONNECT TO ANY.
- FID7 *FIDUCIAL CAD-016
⊗ NC, NO CONNECT TO ANY.
- FID8 *FIDUCIAL CAD-016
⊗ NC, NO CONNECT TO ANY.
- FID2 *FIDUCIAL CAD-016
⊗ NC, NO CONNECT TO ANY.

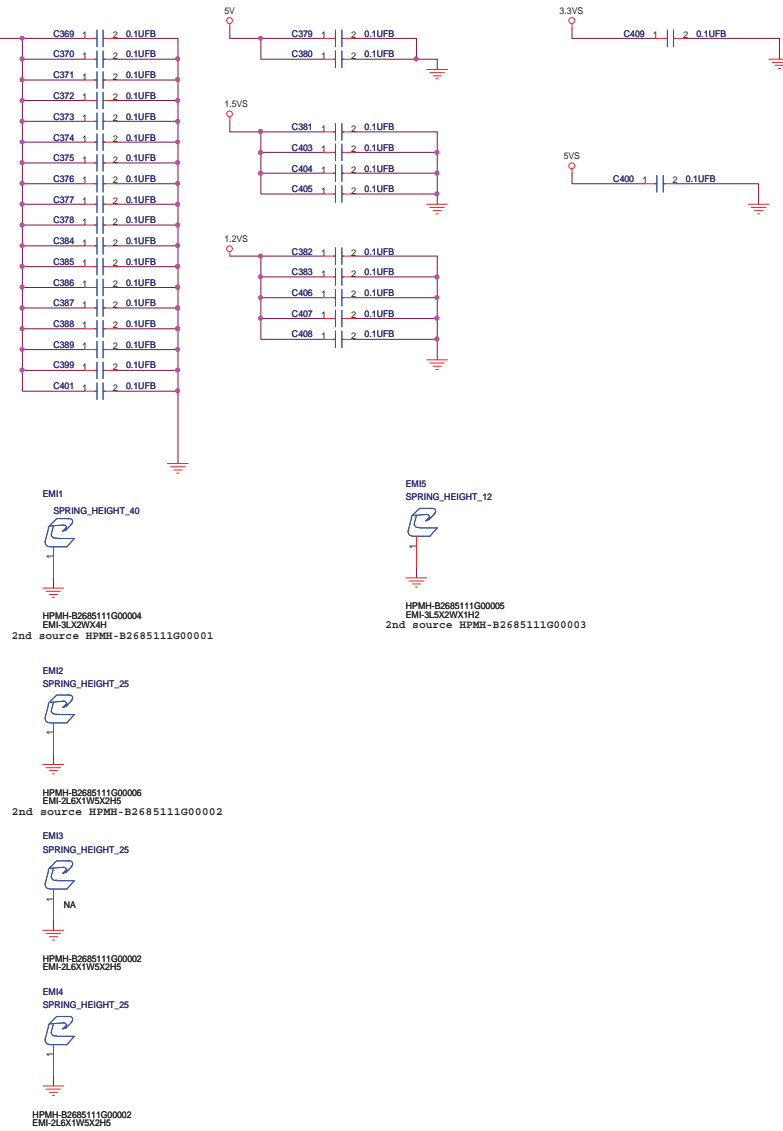
CPU/VGA x 8



MINI CARD x 2



EMI x 2



FLEX Computing

Project Name : ARWEN UA1		Title : PAD/ SCREW/ Moat Cap	
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