

CLOCK  
GENERATOR  
RTM880N-796  
PAGE 03

1  
**SO-DIMM A**  
Maximum 2+2GB  
PAGE 7

2  
**SO-DIMM B**  
Maximum 2+2GB  
PAGE 8

**CPU**  
AMD  
Conesus  
PROCESSOR  
10~15W  
812 EPGA  
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**  
PAGE 24  
WWAN

**PCIE MINI CARD**  
PAGE 24  
WLAN

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

**SATA HDD**  
PAGE 17

**G-SENSOR**  
PAGE 23

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

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

**DAUGHTER BOARD**  
USB PORT x 2  
PAGE 22

**AUDIO CODEC**  
IDT92HD81B1  
PAGE 21

**OPTIONAL USE**  
SATA  
PAGE 17

**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

**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

**Arwen Block Diagram**

**H310UA1**

**FLEX Computing**

|                               |                                          |                          |  |
|-------------------------------|------------------------------------------|--------------------------|--|
| Project Name :<br>ARWEN UA1   |                                          | Title :<br>BLOCK Diagram |  |
| Size :<br>Custom              | Document Number :<br>HPMH-40GAB4000-D000 | Rev :<br>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   |             |
|                                                                                             |      |             |
|                                                                                             |      |             |

**FLEX**Computing

Project Name :  
ARWEN UA1

Title :  
Power Diagram

Size :  
Custom

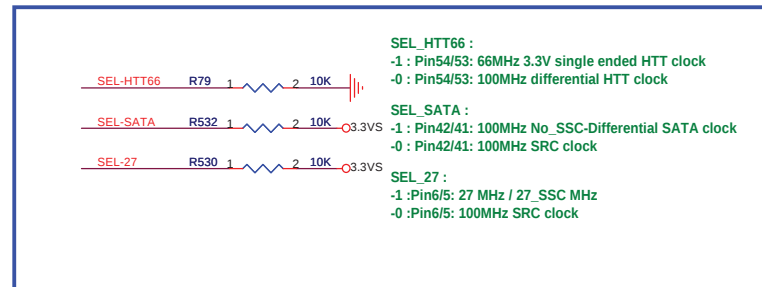
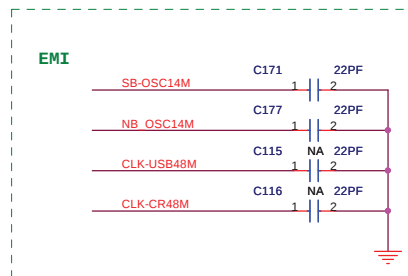
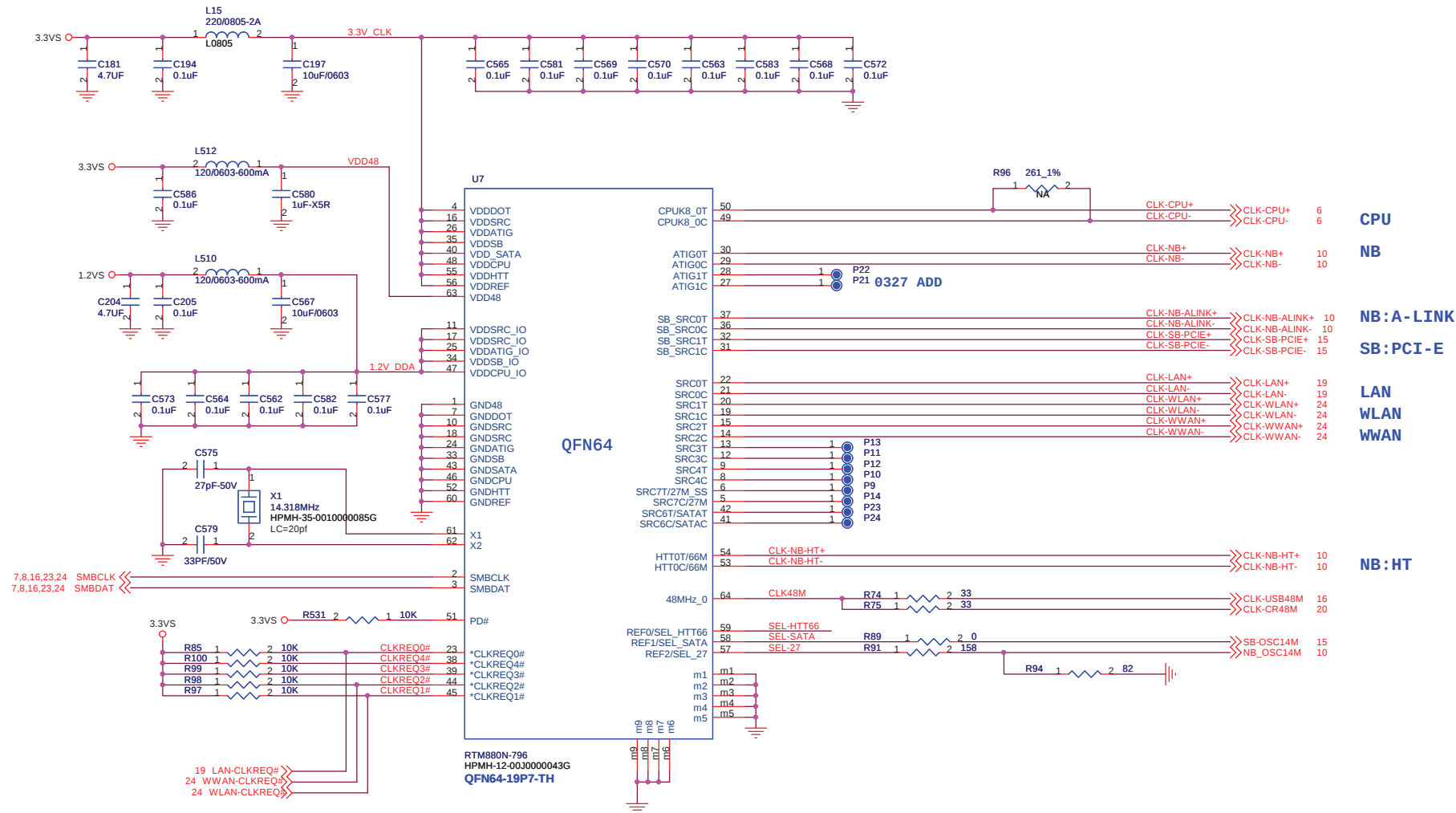
Document Number :  
HPMH-40GAB4000-D000

Rev :  
D

Date: Monday, August 17, 2009

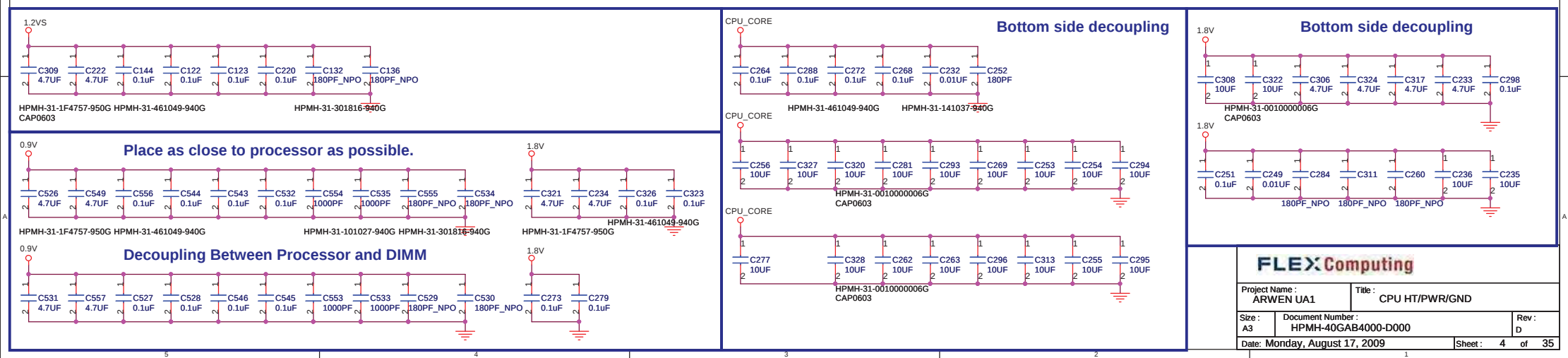
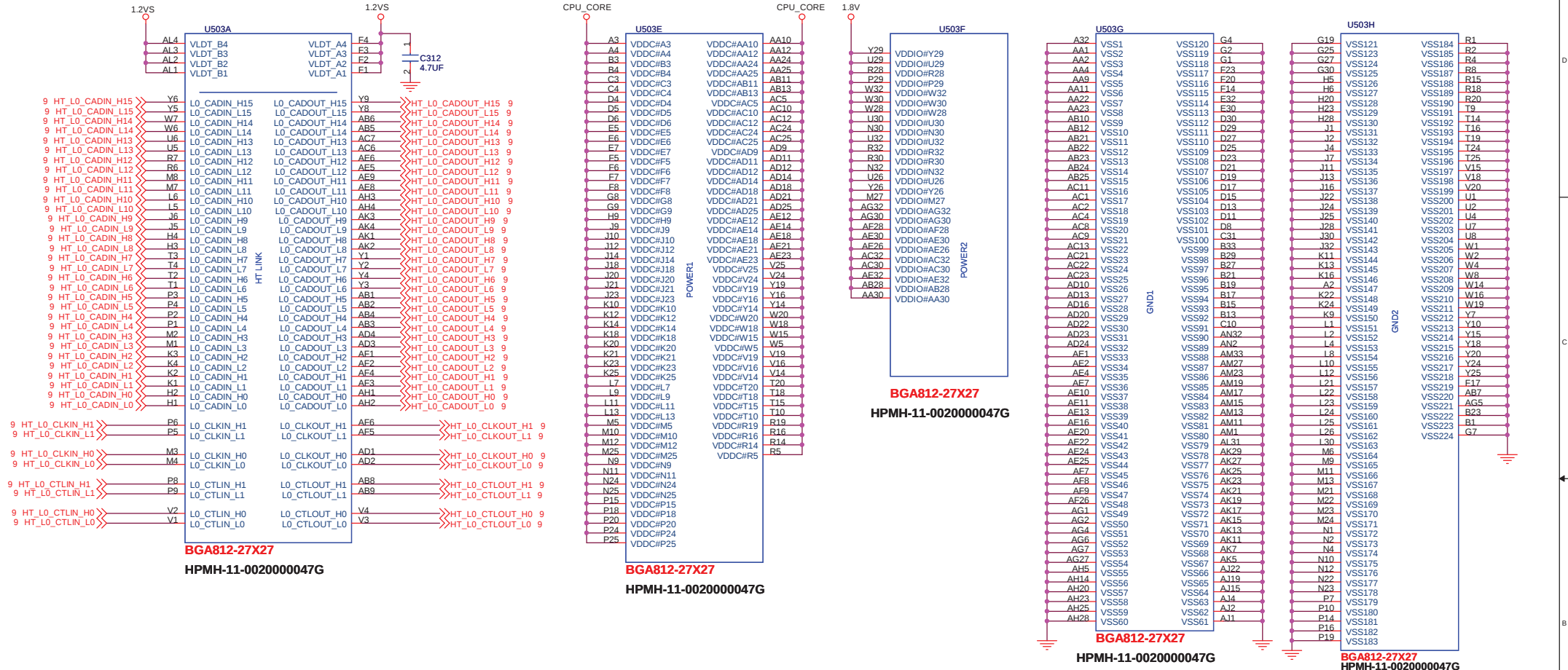
Sheet : 2 of 35

## CLOCK GENERATOR



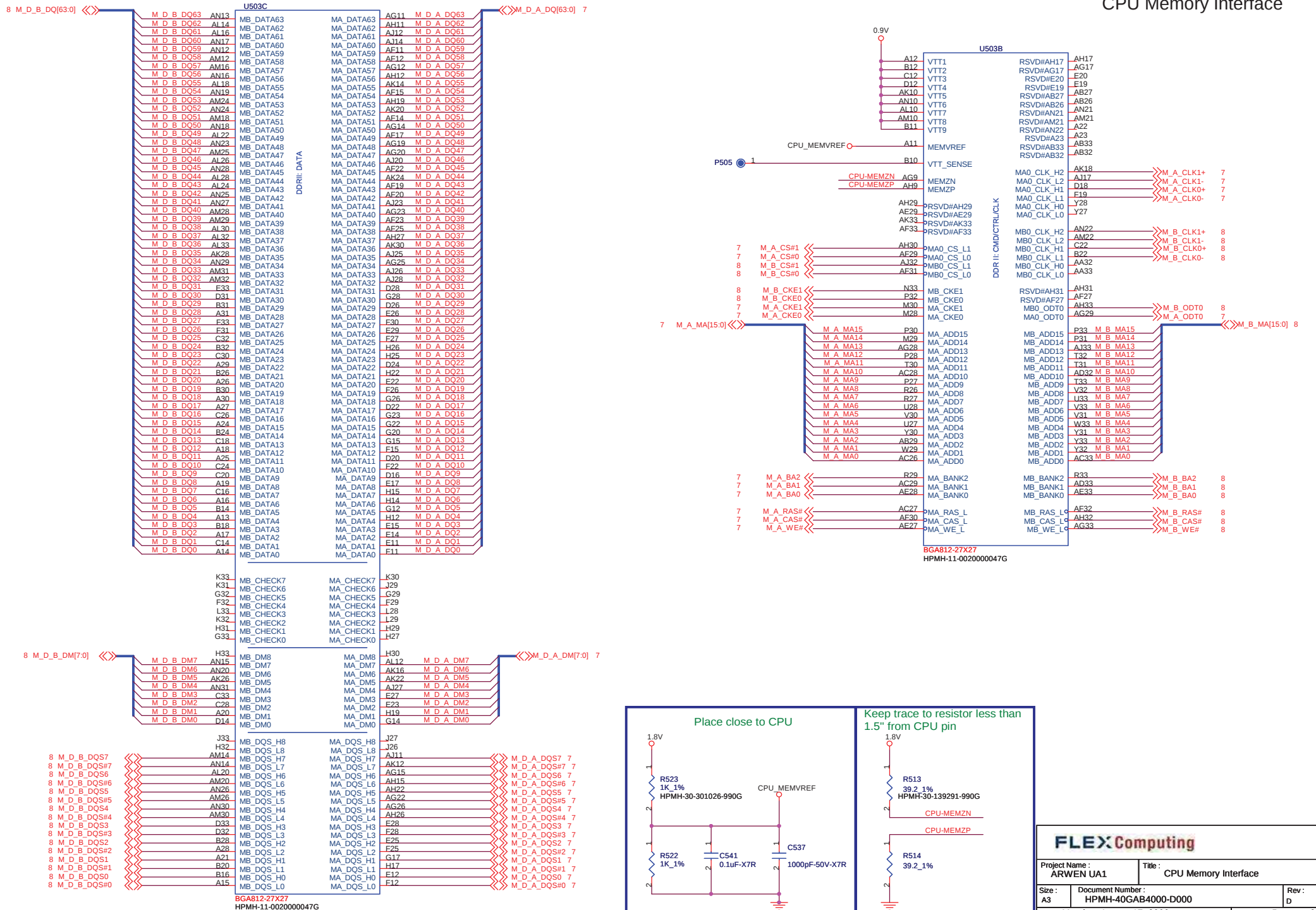
## CPU HT/PWR/GND

### VLDT Trace at Itast 200 mils wide

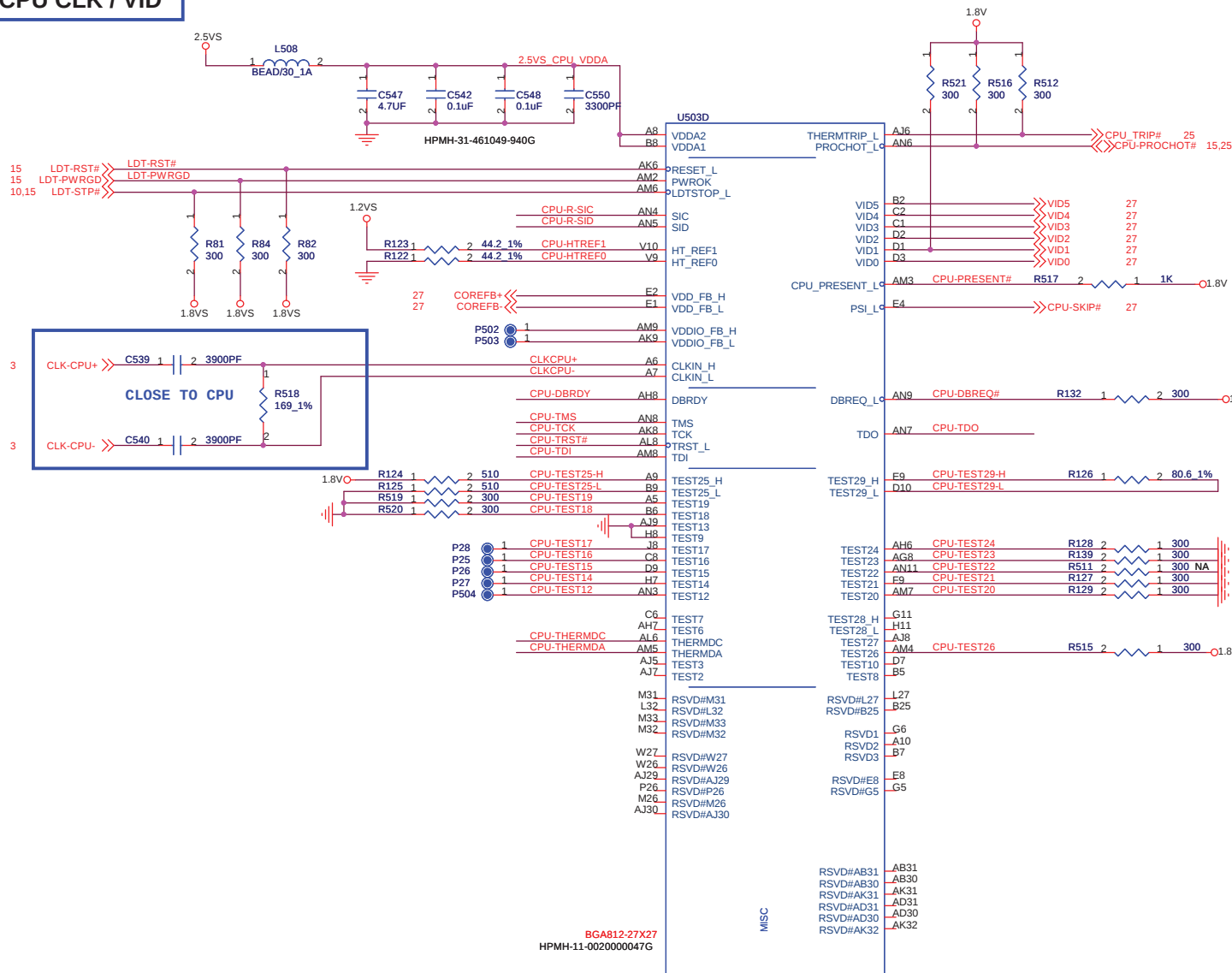


## CPU MEMORY A/B

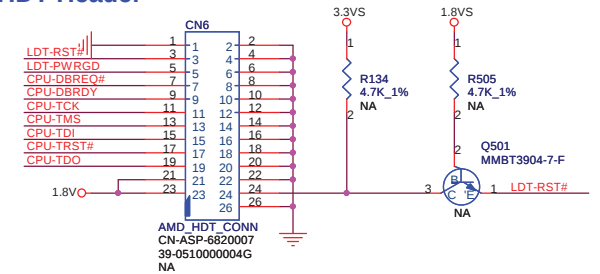
## CPU Memory Interface



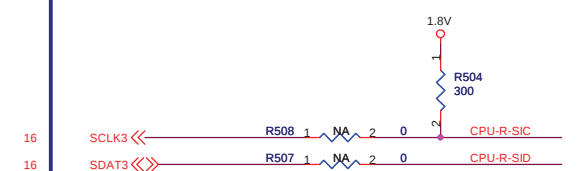
## CPU CLK / VID



## HDT Header



## Reserve for internal thermal

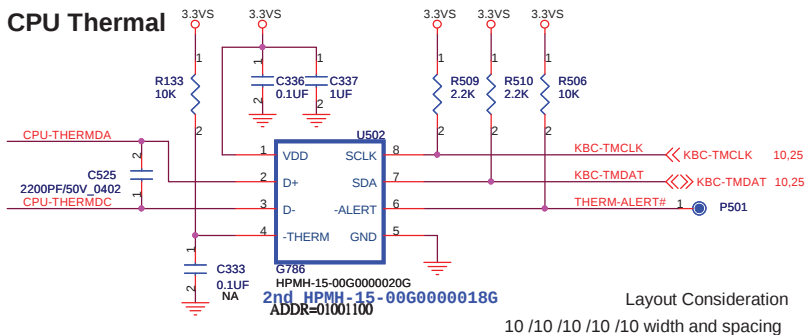


Delete LDT-STP# delay circuit for RS780 DA ER\_RS690B3

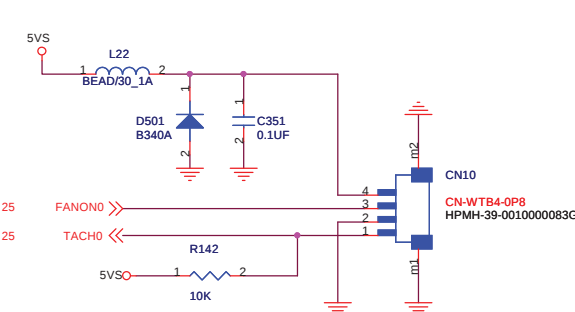
Layout (1) :Keep trace to resistor less than 600 mils from CPU pin and trace to AC caps less than 1250 mils

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

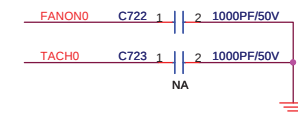
## CPU Thermal



## FAN



## EMI



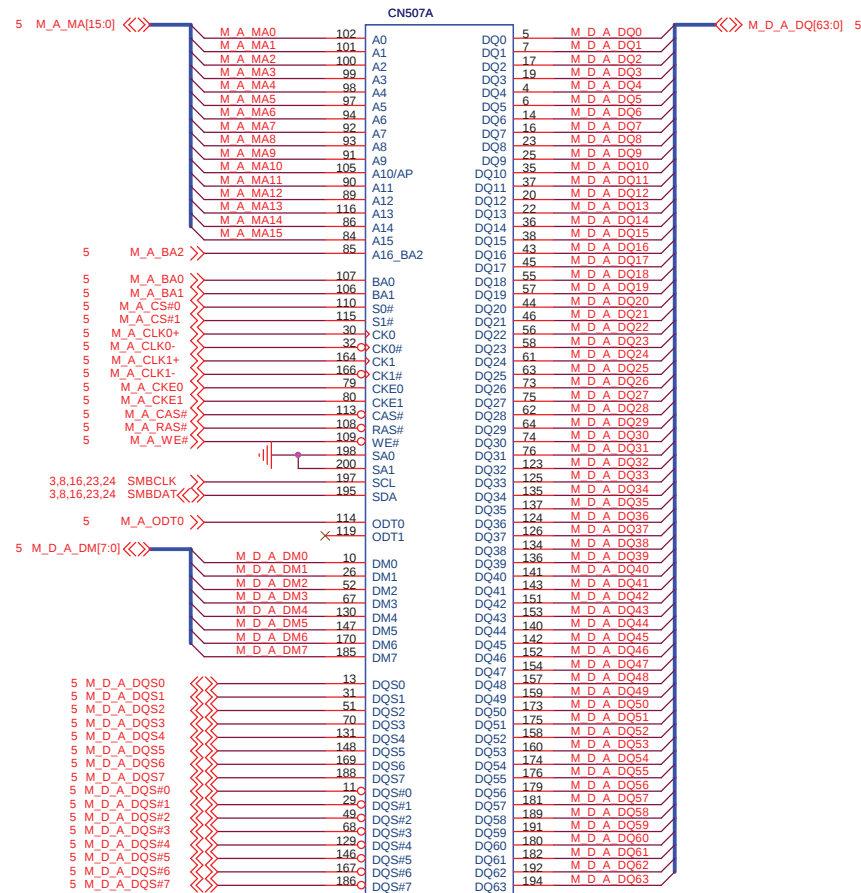
**FLEX Computing**

Project Name : ARWEN UA1 Title : CPU Control & Debug

Size : A3 Document Number : HPMH-40GAB4000-D000 Rev : D

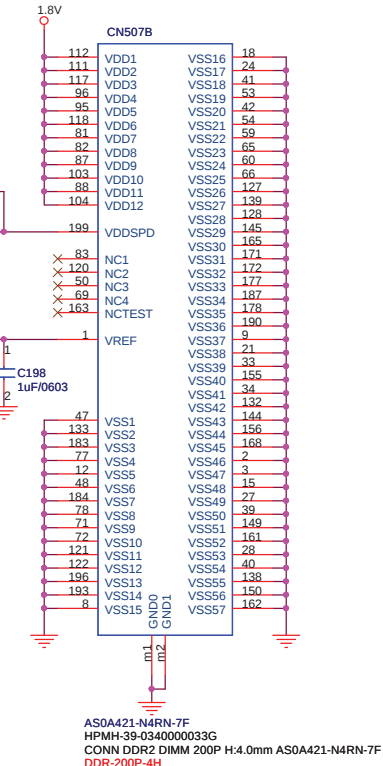
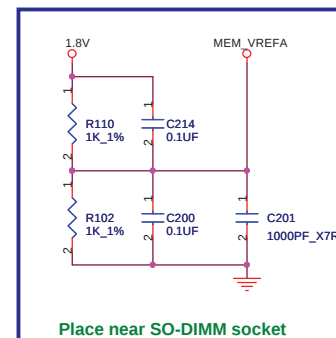
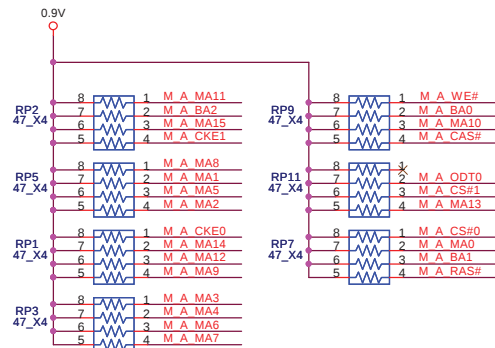
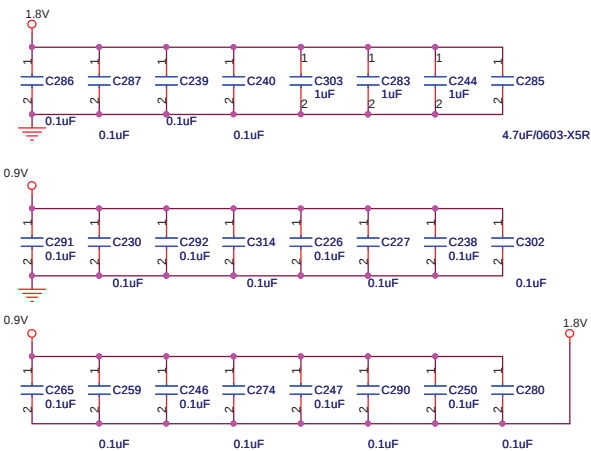
Date : Monday, August 17, 2009 Sheet : 6 of 35

# Memory Channel A

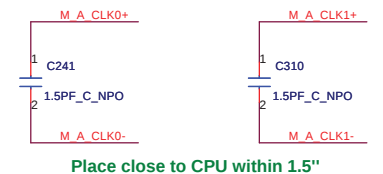


AS0A421-N4RN-7F  
HPMH-39-0340000033G  
CONN DDR2 200P H:4.0mm AS0A421-N4RN-7F  
DDR-200P-4H

Layout :  
Place these Caps near So-DimMA



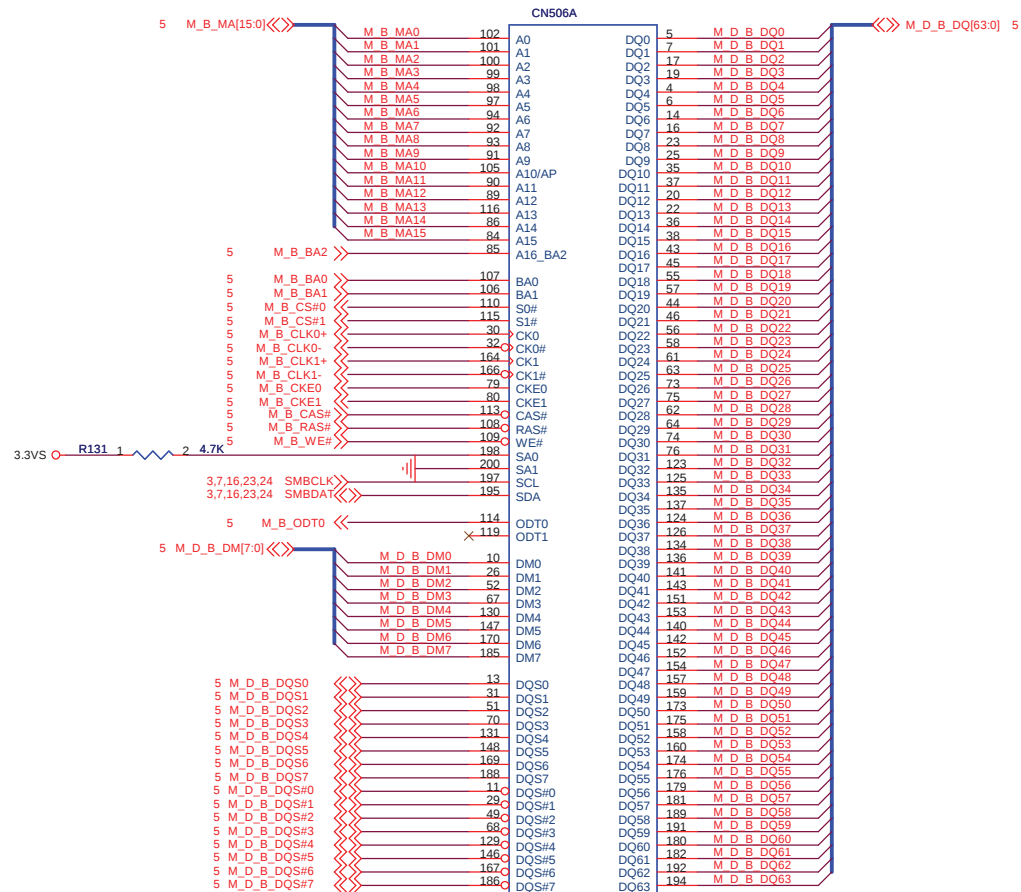
AS0A421-N4RN-7F  
HPMH-39-0340000033G  
CONN DDR2 DIMM 200P H:4.0mm AS0A421-N4RN-7F  
DDR-200P-4H



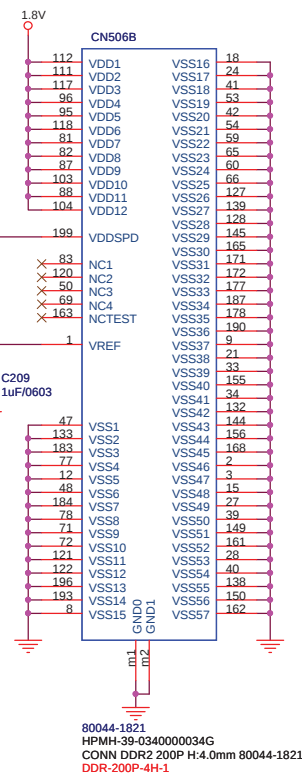
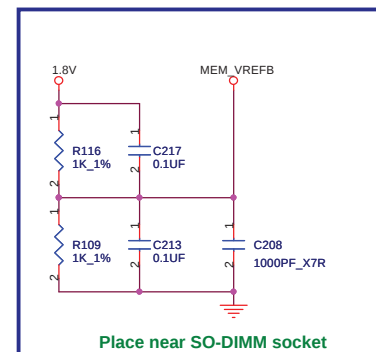
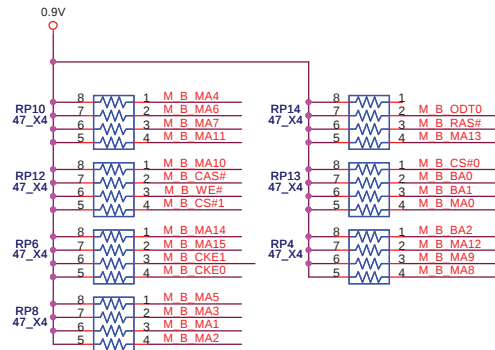
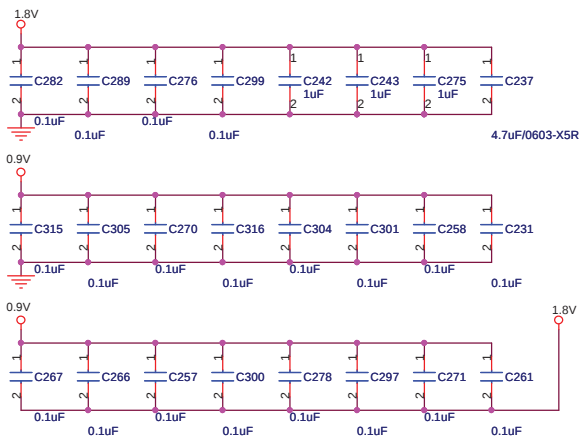
FLEX Computing

|                               |                                          |                                         |       |
|-------------------------------|------------------------------------------|-----------------------------------------|-------|
| Project Name :<br>ARWEN UA1   |                                          | Title :<br>DDR2 SO-DIMM A / Termination |       |
| Size :<br>A3                  | Document Number :<br>HPMH-40GAB4000-D000 | Rev :<br>D                              |       |
| Date: Monday, August 17, 2009 |                                          | Sheet : 7                               | of 35 |

## Memory Channel B



Layout :  
Place these Caps near So-DimmA



DDR2 Termination  
DDR2 SO-DIMMB

**Place close to CPU within 1.5"**

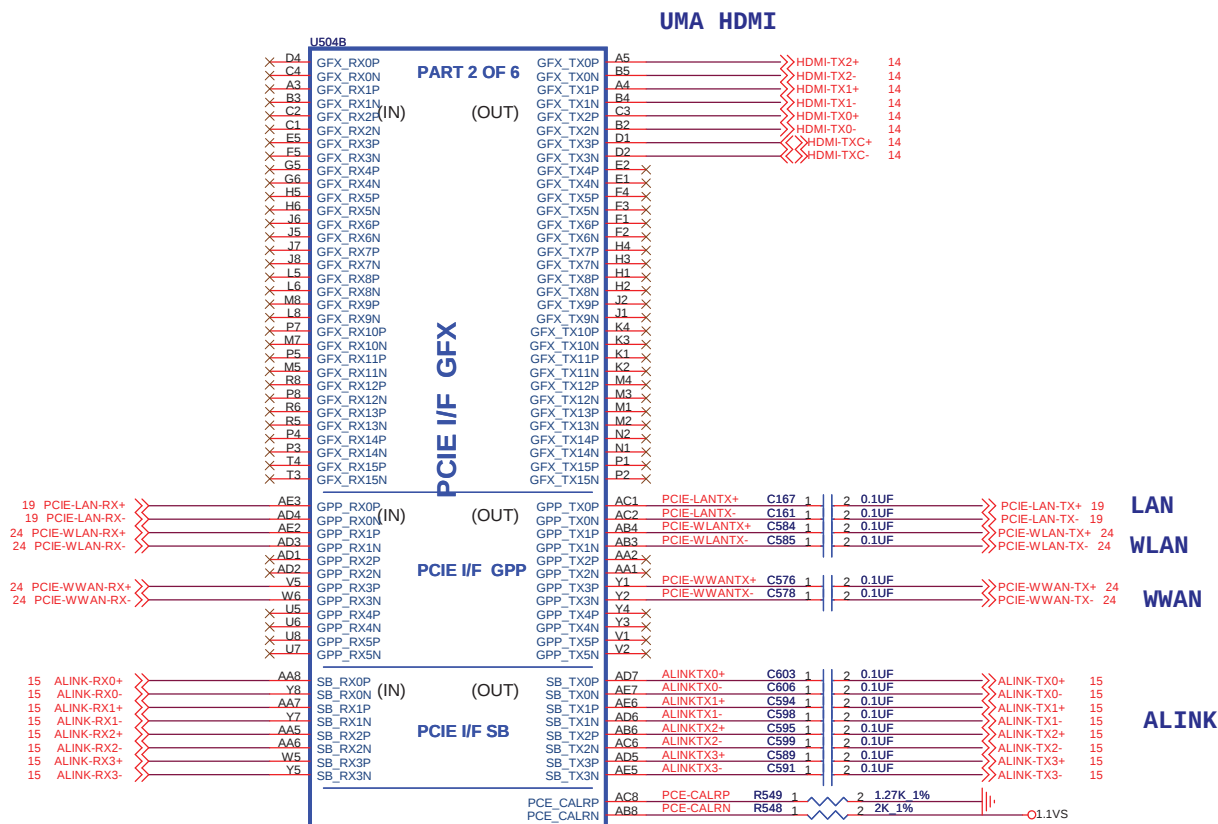
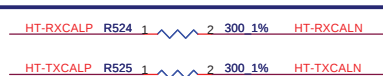
FLEXComputing

|                               |                                                                                                          |
|-------------------------------|----------------------------------------------------------------------------------------------------------|
| Project Name :<br>ARWEN UA1   | Title :<br>DDR2 SO-DIMM B / Termination                                                                  |
| Size :<br>A3                  | Document Number :<br>HPMH-40GAB4000-D000 <div style="float: right; text-align: right;">Rev :<br/>D</div> |
| Date: Monday, August 17, 2009 | Sheet: 8 of 35                                                                                           |

**RS780M HT/PCIE/HDMI**

RS780MN  
HPMH-10-0010000050G  
FCBGA528-RS780M

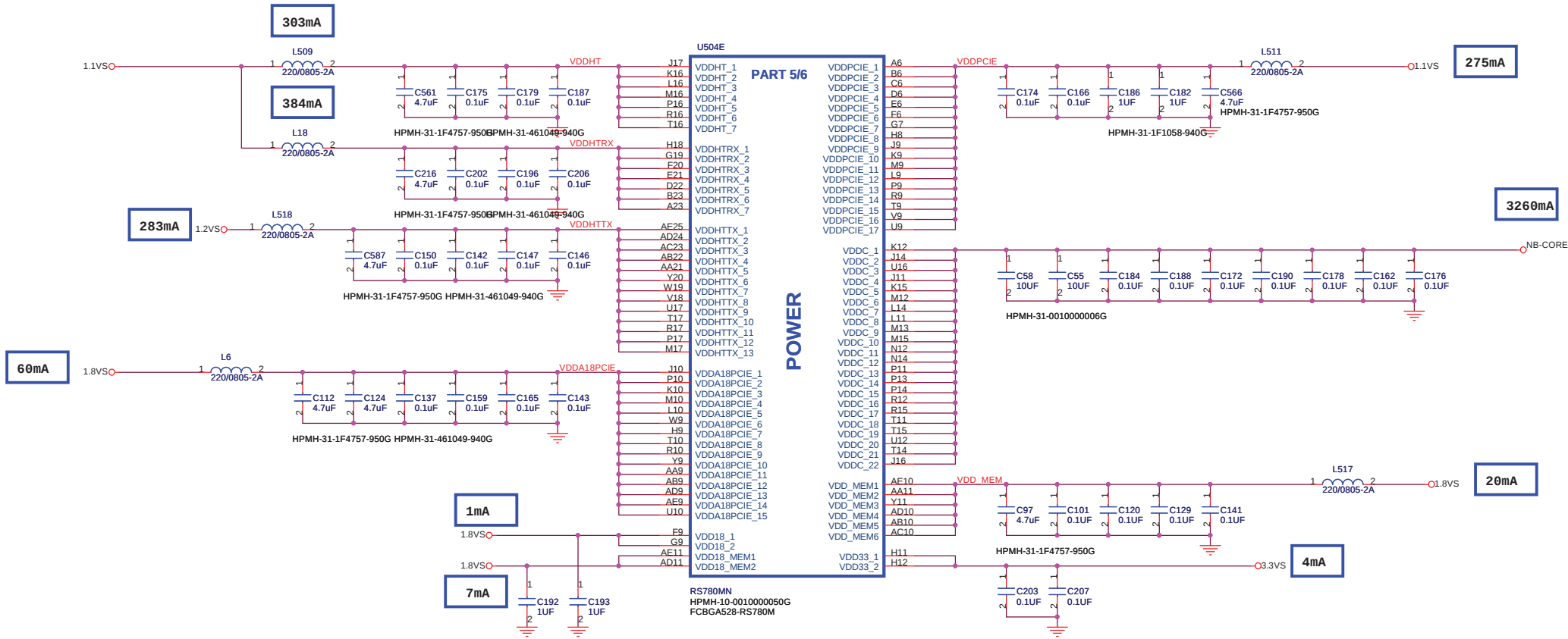
301 ohm to 300 ohm



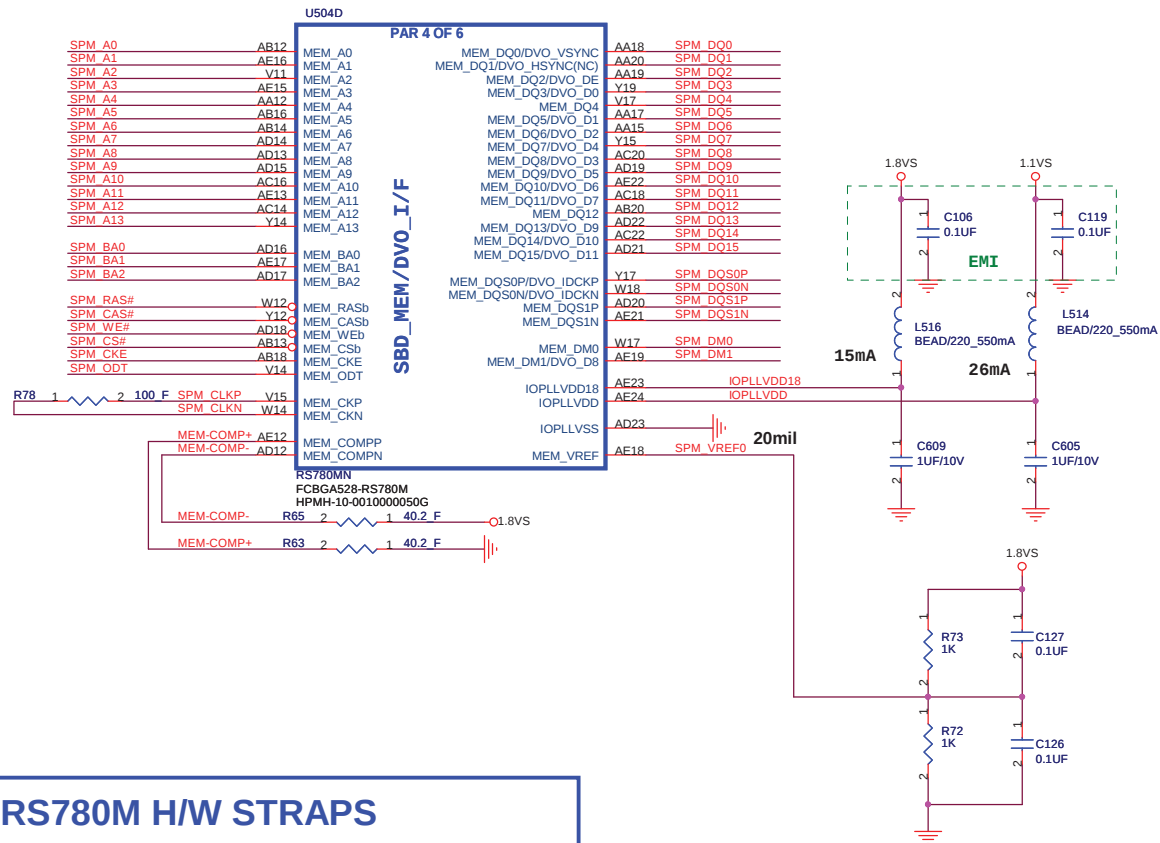
RS780MN  
HPMH-10-0010000050G  
FCBGA528-RS780M



# RS780M Power/Ground



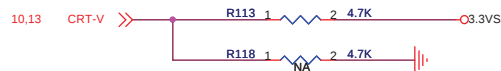
## NB\_SIDE PORT / STRAPS



## RS780M H/W STRAPS

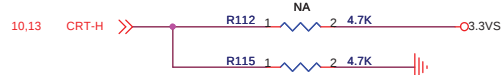
### STRAP\_DEBUG\_BUS\_GPIO\_ENABLE

Enables the Test Debug Bus using GPIO.  
DAC\_VSYNC (RS780.Pin B11)  
1 : Disable (RS780) ( default )  
0 : Enable (RS780)



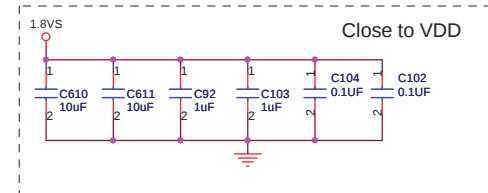
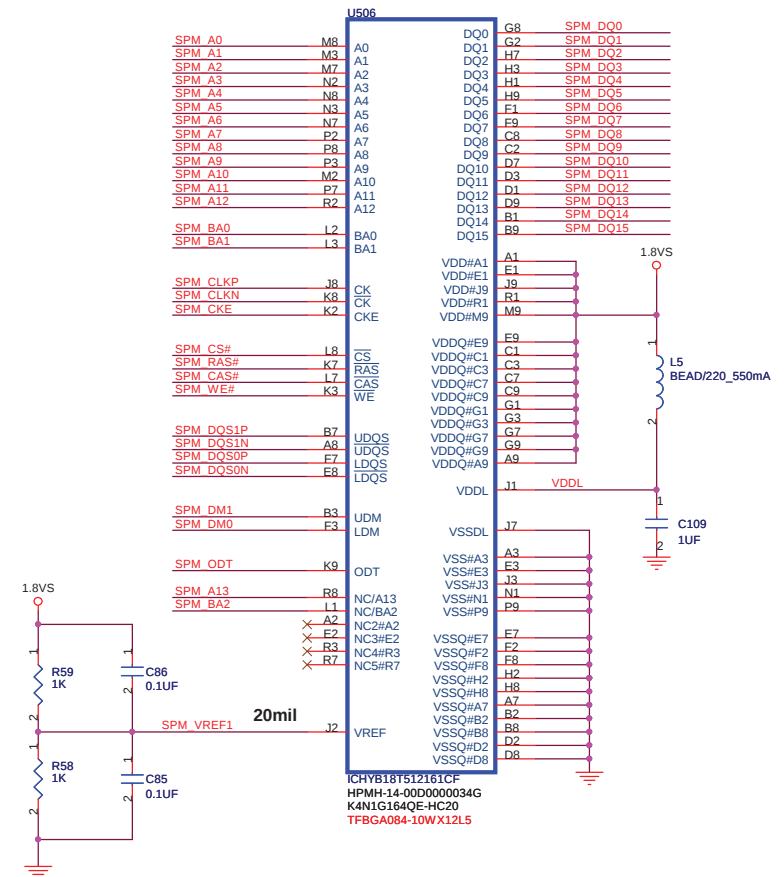
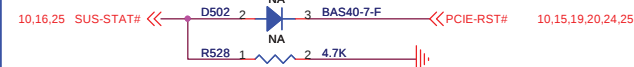
### RS780: Enable Side Port Memory

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

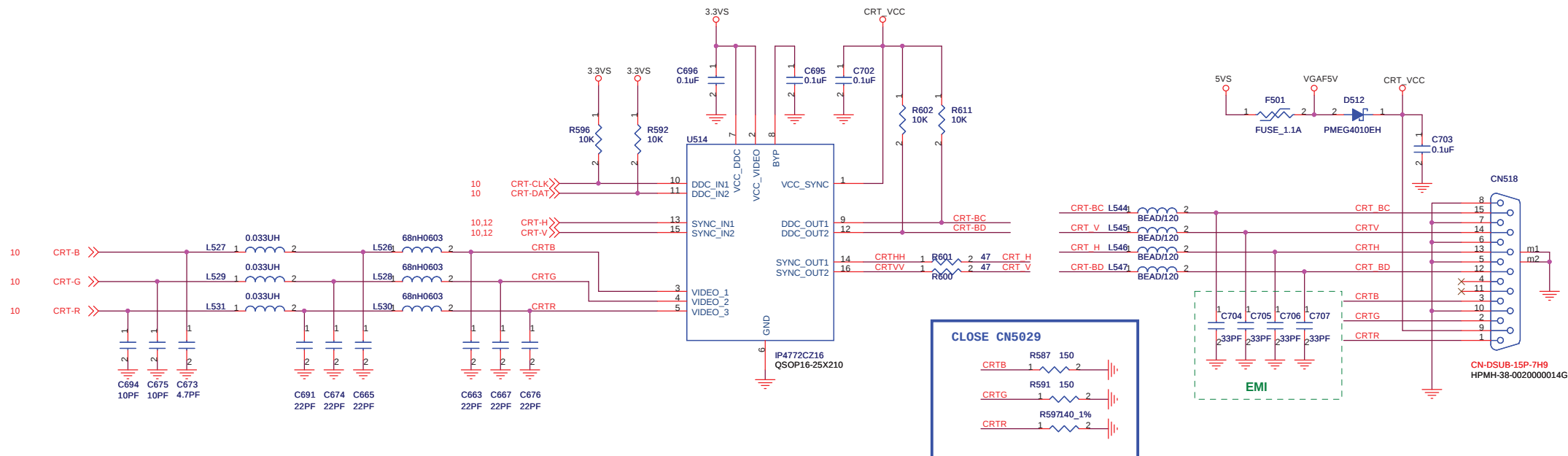
Selects Loading of STRAPS from EPROM  
SUS\_STAT# (RS780.Pin D12)  
-1\*: Bypass the loading of EEPROM straps and use Hardware Default Values  
-0 : I2C Master can load strap values from EEPROM if connected , or use default values if not connected



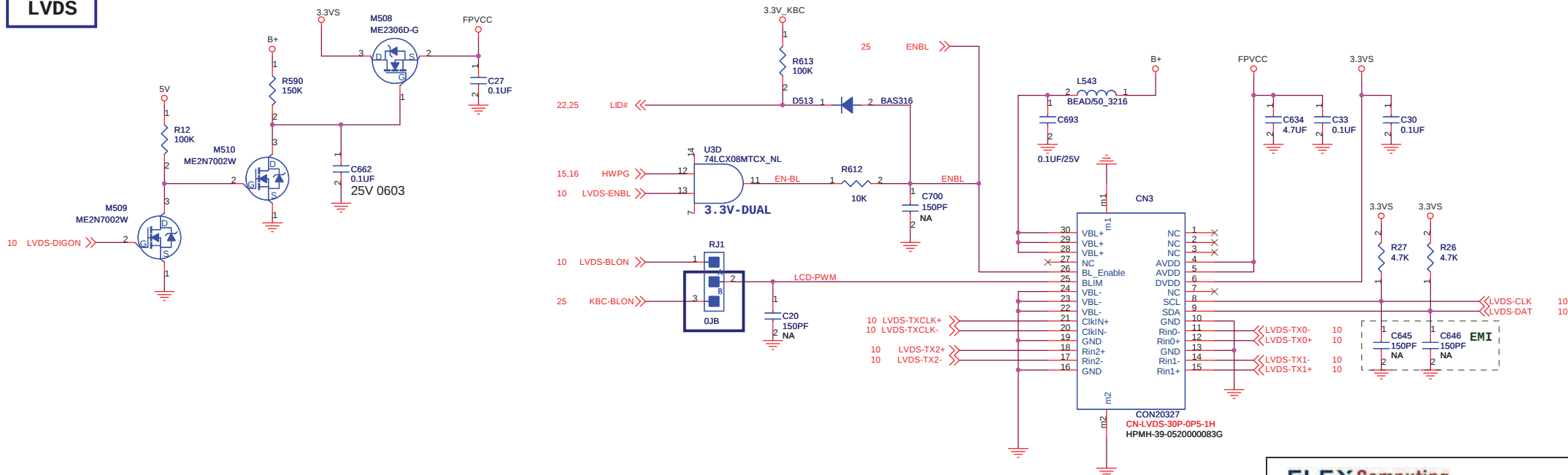
**FLEX Computing**

|                                |                                          |                                |            |
|--------------------------------|------------------------------------------|--------------------------------|------------|
| Project Name :<br>ARWEN UA1    |                                          | Title :<br>RS780M SBD / STRAPS |            |
| Size :<br>A3                   | Document Number :<br>HPMH-40GAB4000-D000 |                                | Rev :<br>D |
| Date : Monday, August 17, 2009 |                                          | Sheet : 12 of 35               |            |

## CRT



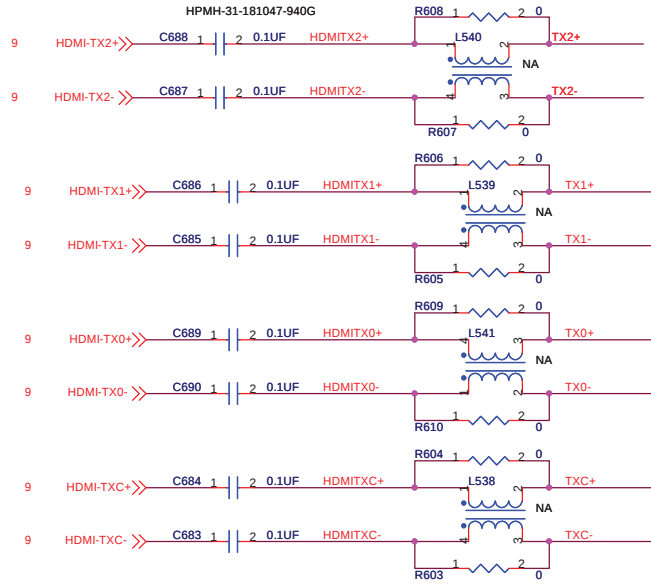
## LVDS



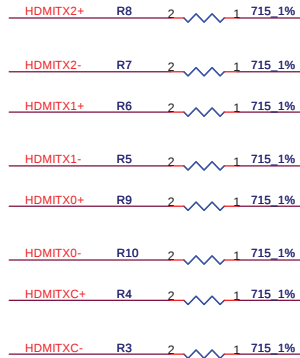
# HDMI

CLOSE CN5031

HPMH-32-4000000104G



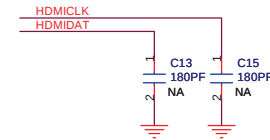
M92 SPEC SET 499 ohm



5VS

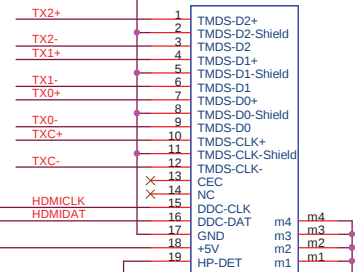


EMI



# HDMI

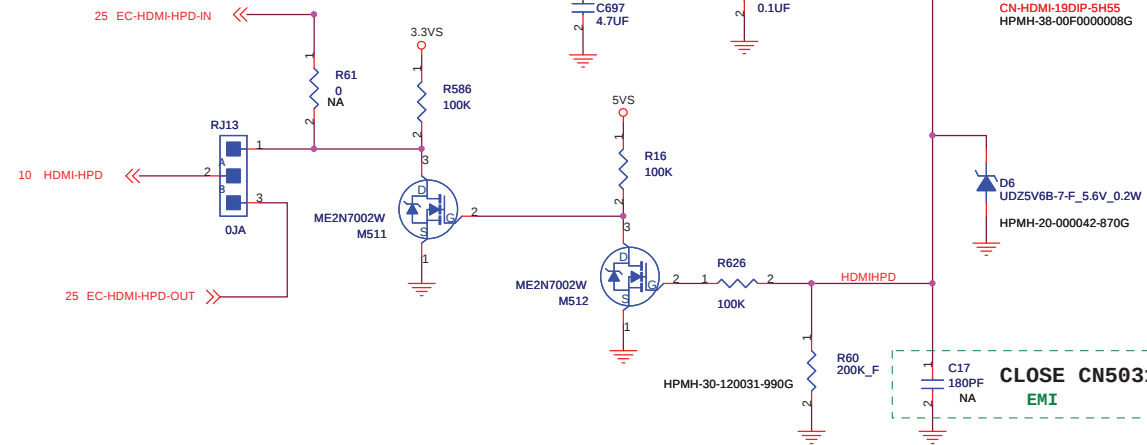
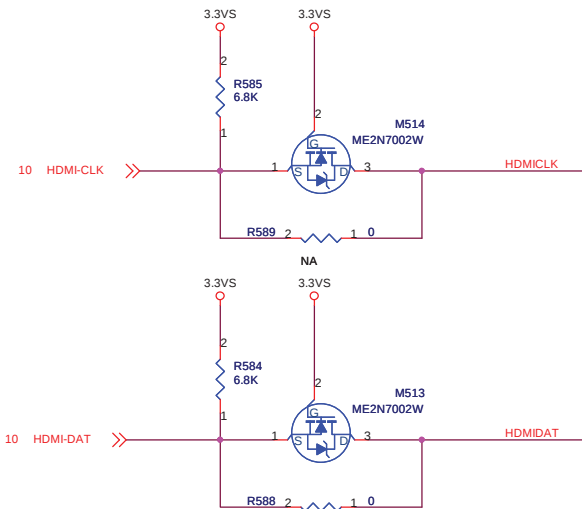
CN515



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

CLOSE CN5031

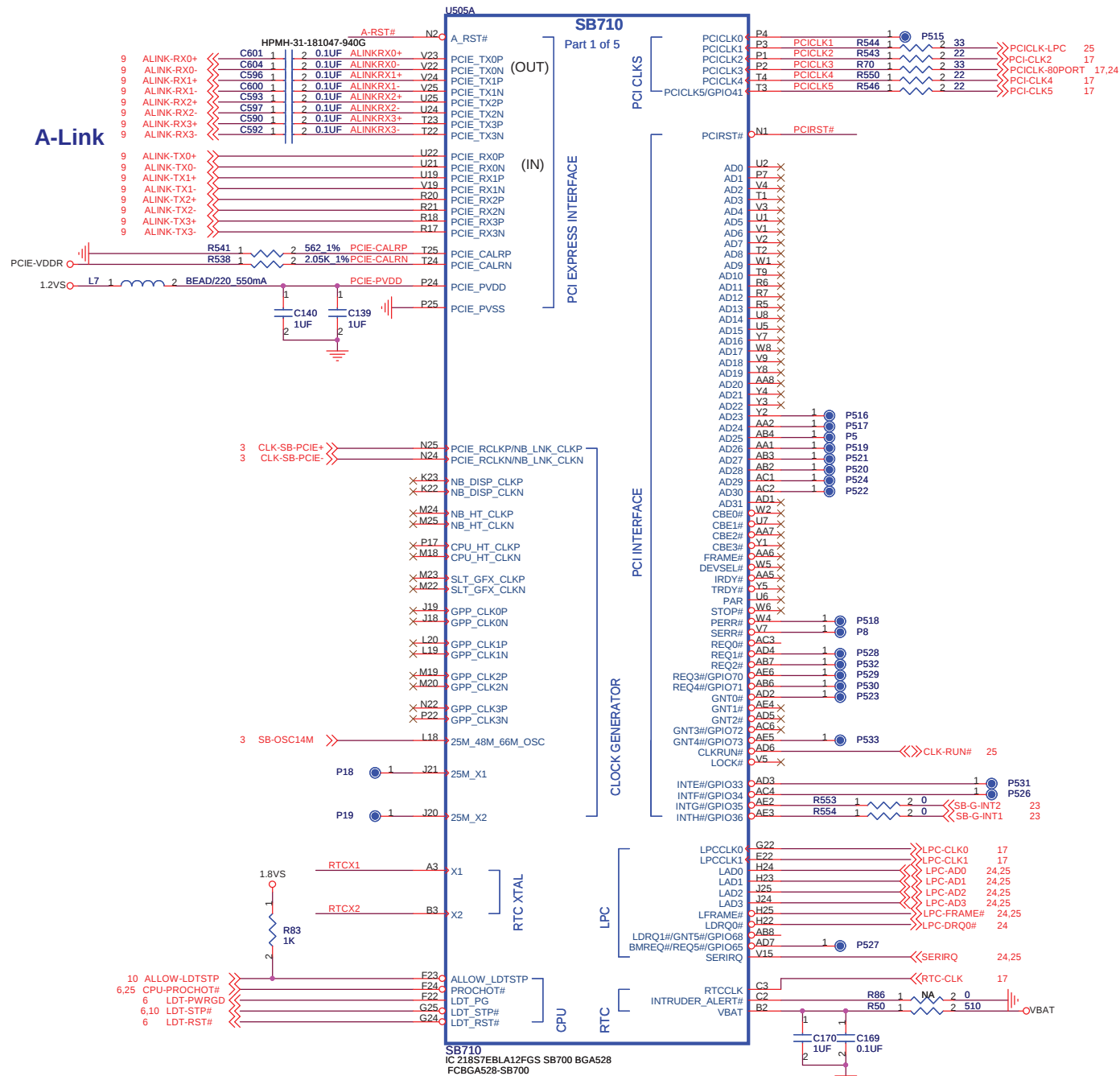
EMI



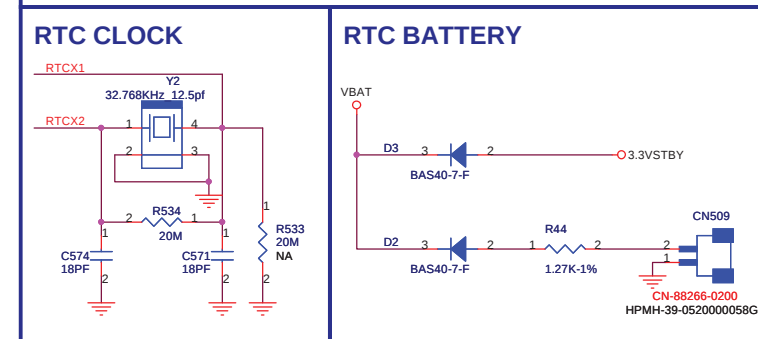
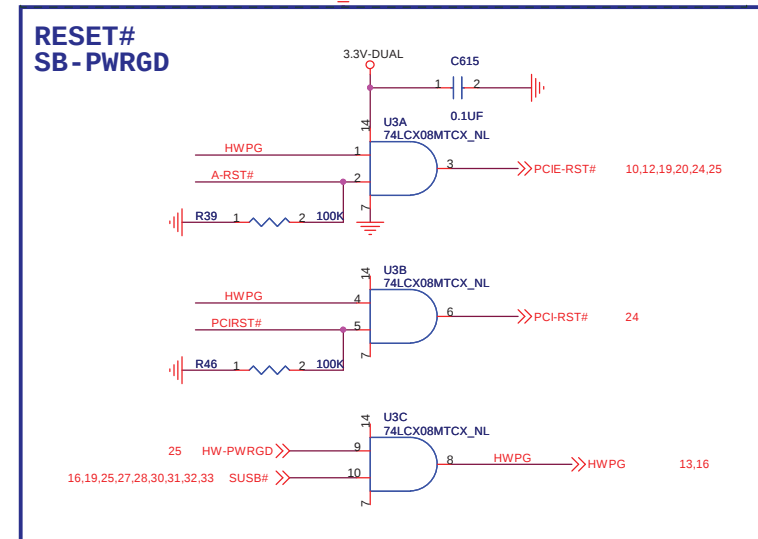
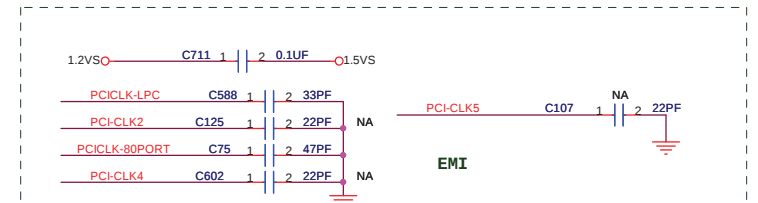
FLEX Computing

|                                |                                          |                           |            |
|--------------------------------|------------------------------------------|---------------------------|------------|
| Project Name :<br>ARWEN UA1    |                                          | Title :<br>HDMI Connector |            |
| Size :<br>A3                   | Document Number :<br>HPMH-40GAB4000-D000 |                           | Rev :<br>D |
| Date : Monday, August 17, 2009 |                                          | Sheet : 14                | of 35      |

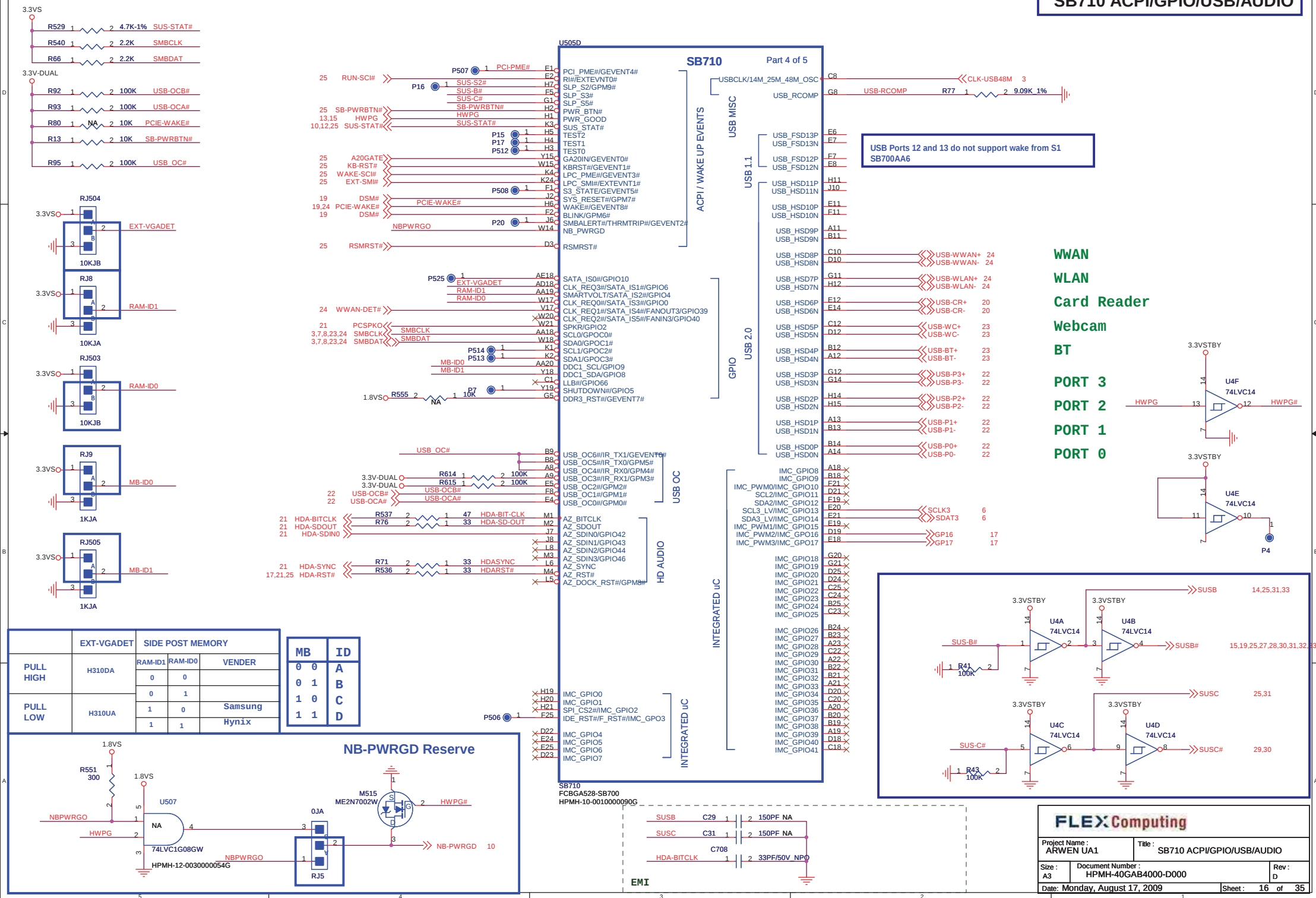
## SB710 PCIE/PCI/CPU/LPC



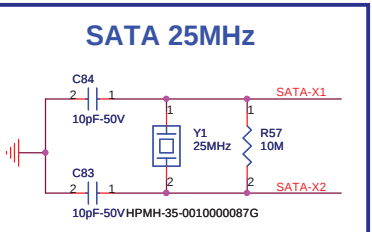
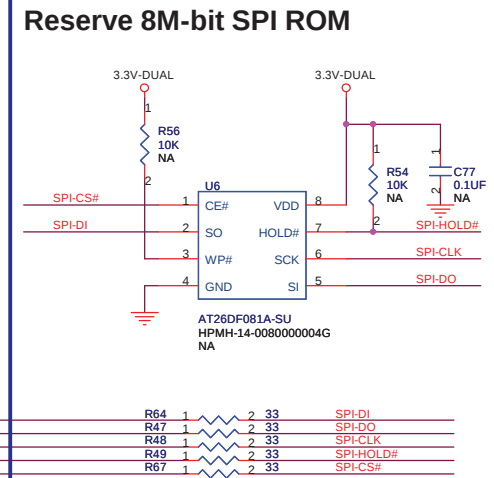
| 2         |                           |                        | 1                        |                        |                                    |          |
|-----------|---------------------------|------------------------|--------------------------|------------------------|------------------------------------|----------|
|           | PCI_AD28                  | PCI_AD27               | PCI_AD26                 | PCI_AD25               | PCI_AD24                           | PCI_AD23 |
| PULL HIGH | USE LONG RESET<br>DEFAULT | USE PCI PLL<br>DEFAULT | USE ACPI BCLK<br>DEFAULT | USE IDE PLL<br>DEFAULT | USE DEFAULT PCIE STRAPS<br>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 SATA / IDE / HWM / SPI / STRAPS**

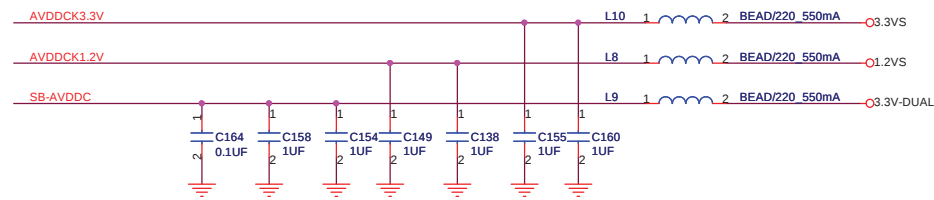
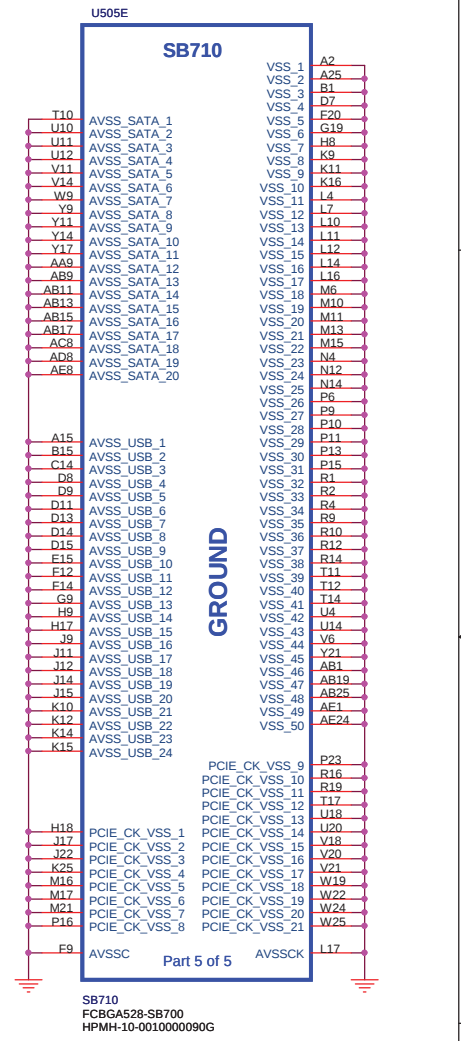
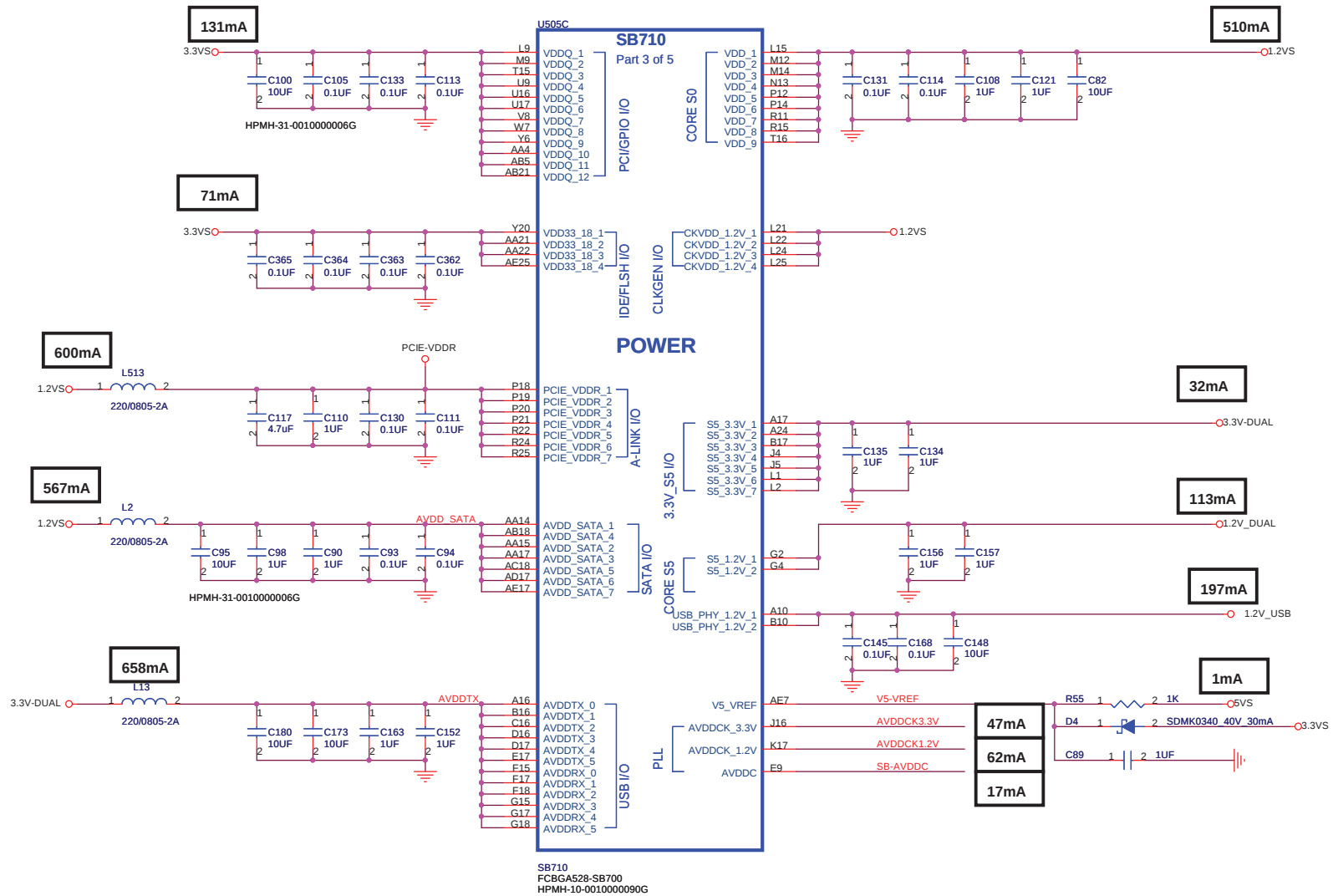


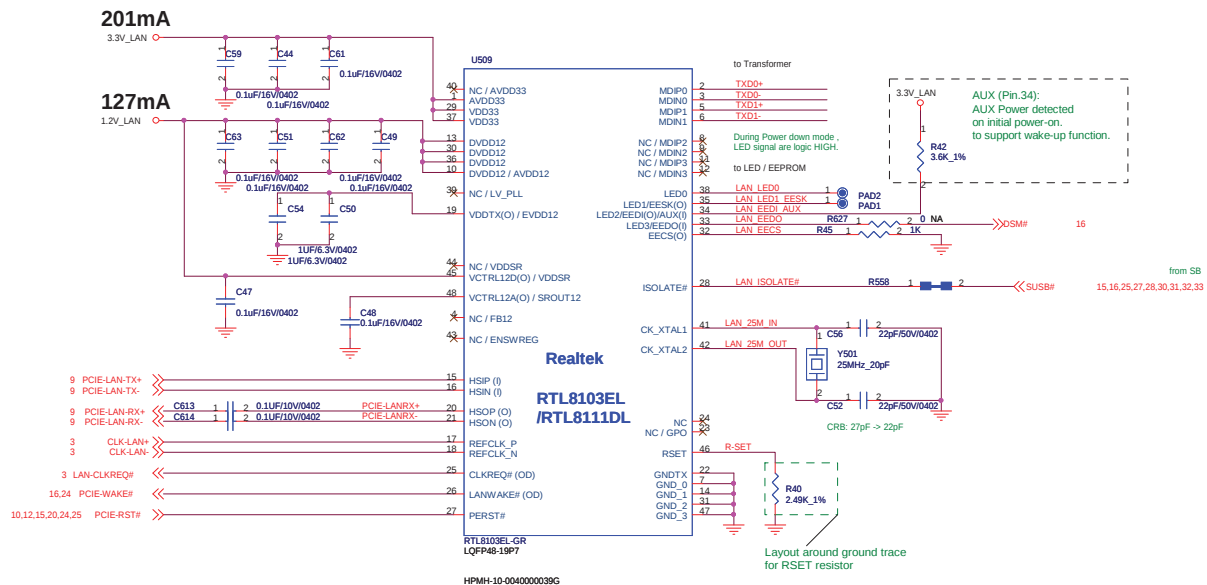
15 LPC-CLK0 << R87 1 2 10K << 15 PCI-CLK2 << R542 1 2 10K <<  
 15 LPC-CLK1 << R88 1 2 10K << 15,24 PCI-CLK-80PORT << R539 1 2 10K <<  
 RTC-CLK << R90 1 2 10K << 0.3VSTBY 15 PCI-CLK4 << R547 1 NA 2 x10K << 16  
 16,21,25 HDA-RST# << R23 1 2 10K << 15 PCI-CLK5 << R545 1 NA 2 x10K << 15

HPMH-30-301036-990G  
 HPMH-30-310011-990G

|           | PCI-CLK2                                           | PCI-CLK3                       | PCI-CLK4 | PCI-CLK5 | LPC-CLK0                                                    | LPC-CLK1                       | RTC-CLK                                     | AZ-RST#                                                     | GP17                                          | GP16 |
|-----------|----------------------------------------------------|--------------------------------|----------|----------|-------------------------------------------------------------|--------------------------------|---------------------------------------------|-------------------------------------------------------------|-----------------------------------------------|------|
| PULL HIGH | WATCHDOG TIMER ON NB_PWRGD ENABLED                 | USE DEBUG STRAPS               | RESERVED | RESERVED | ENABLE PCI MEM BOOT (A11)<br>IMC ENABLED (A12)              | CLKGEN ENABLED                 | INTERNAL RTC<br><br>DEFAULT                 | IMC ENABLED (A11)<br>ENABLE PCI MEM BOOT (A12)              | H,H = Reserved<br><br>H,L = SPI ROM (Default) |      |
| PULL LOW  | WATCHDOG TIMER ON NB_PWRGD DISABLED<br><br>DEFAULT | IGNORE DEBUG STRAPS<br>DEFAULT |          |          | DISABLE PCI MEM BOOT (A11)<br>IMC DISABLED (A12)<br>DEFAULT | CLKGEN DISABLED<br><br>DEFAULT | EXT. RTC (PD on X1, apply 32KHz to RTC_CLK) | IMC DISABLED (A11)<br>DISABLE PCI MEM BOOT (A12)<br>DEFAULT | L,H = LPC ROM<br><br>L,L = FWH ROM            |      |

|                                                                                       |                                          |                                              |            |
|---------------------------------------------------------------------------------------|------------------------------------------|----------------------------------------------|------------|
|  |                                          |                                              |            |
| Project Name :<br>ARWEN UA1                                                           |                                          | Title :<br>SB710 SATA / IDE / SPI / HDD CONN |            |
| Size :<br>A3                                                                          | Document Number :<br>HPMH-40GAB4000-D000 |                                              | Rev :<br>D |
| Date: Monday, August 17, 2009                                                         |                                          | Sheet: 17                                    | of 35      |





## RTL8103E LED Configuration:

| LED1-0 | *00     | 01    | 10   | 11      |
|--------|---------|-------|------|---------|
| LED0   | Tx/Rx   | Tx/Rx | Tx   | Tx      |
| LED1   | LINK100 | LINK  | LINK | LINK100 |
| LED2   | LINK10  | FULL  | Rx   | LINK10  |
| LED3   | NA      | NA    | NA   | NA      |

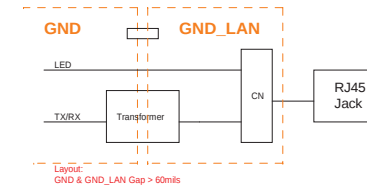
LED1-0's initial value comes from the 93C46  
If there is no 93C46, the default value is 00

## H310 mini-spec\_v1.4

## LAN LED:

- Amber : Activity (RX/TX)
- Green : Connectivity (Link)

## Layout notes:



## SVTP\_v4.03

## 2.6 - Ethernet Checklist - Rev C.xls

## Ch.3.1.4.4

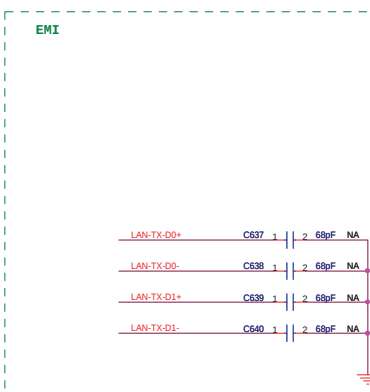
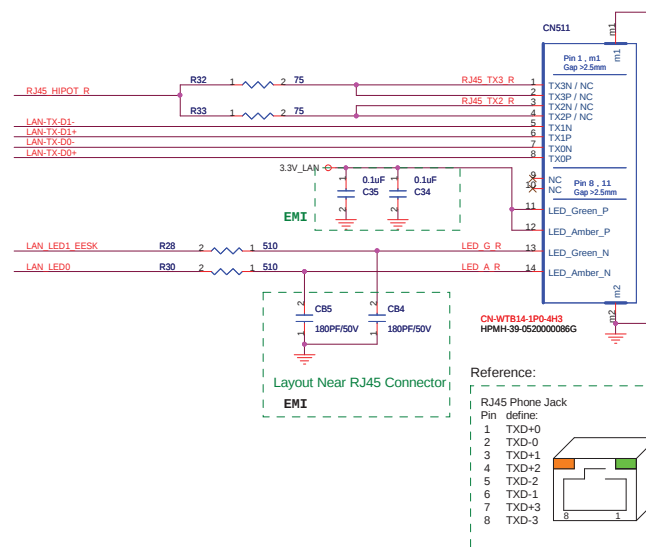
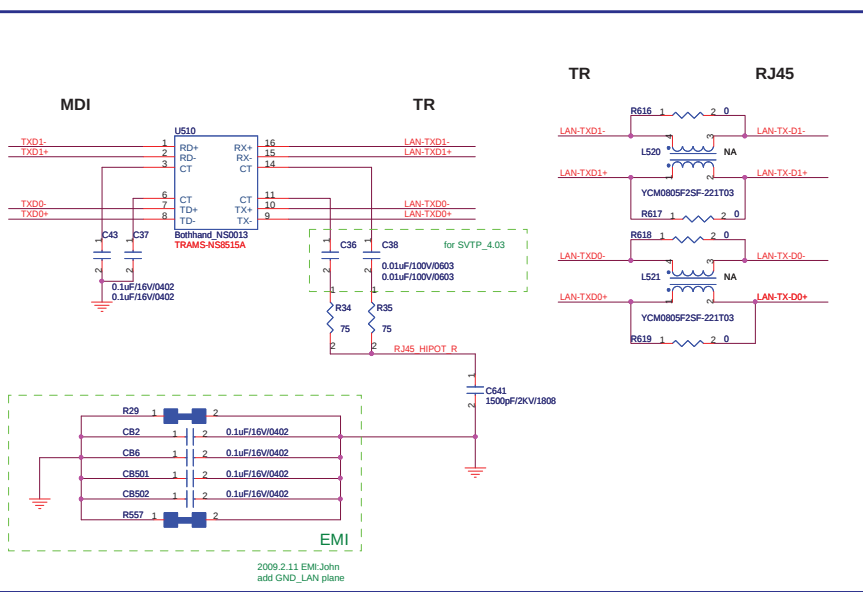
Some older cheap RJ-45s only populate pins 1,2,3,6.  
10/100 requires the other 4 pins for grounding. Gigabit Ethernet requires all 8 pins for data signals.

## Ch.3.1.4.13

Resistance from RJ-45 shell to any other chassis ground point (ohms) less than 1 ohm

## Ch.3.1.4.14 &amp; Ch.3.1.4.15

Protection against non-standard power-over-Ethernet (PoE) :  
Resistance between pins 1,3 (TXD0P, TXD1P) and pins 4,7 (TXD2P, TXD3P) of the RJ-45 greater than 58K ohms.



## FLEX Computing

Project Name: ARWEN UA1 Title: RTL8103EL (LQFP48)

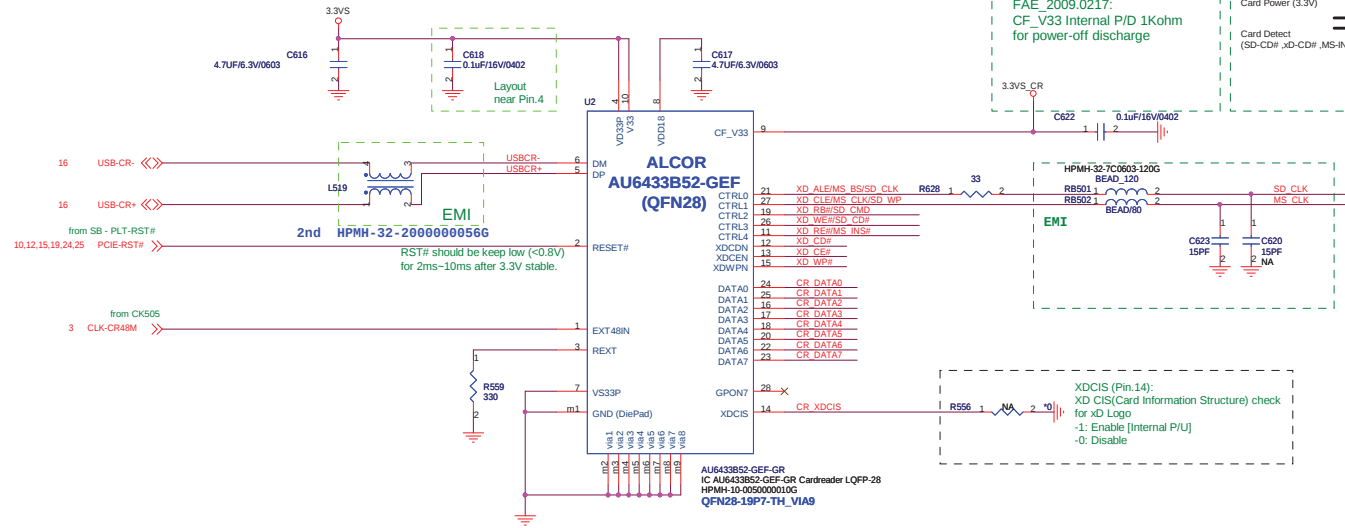
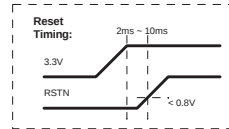
Size: C Document Number: HPMH-40GAB4000-D000 Rev: D

Date: Monday, August 17, 2009 Sheet: 19 of 35

## Card Reader

Alcor AU6433-GEF Card supported:

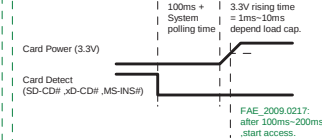
SD v2.0 (SDHC)  
MMC v4.2  
MS v1.43  
MS-PRO v1.03  
MS PRO-HG v1.01  
xD v1.2



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

### Card detect Power-In Timing

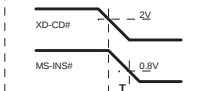


FAE\_2009.0117:  
Memory Stick Formatter for MS Logo  
- Enable

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.

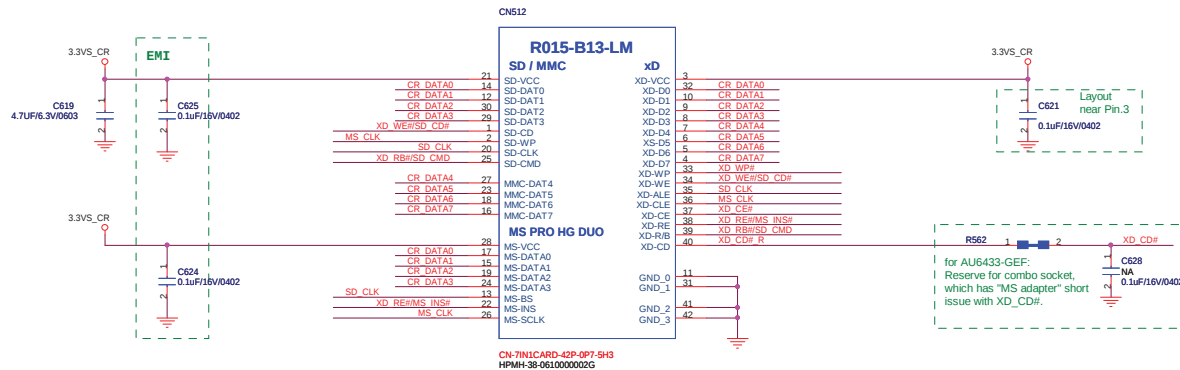


### Memory Card Socket

R015-B13-LM  
HPMH-38-0610000002G

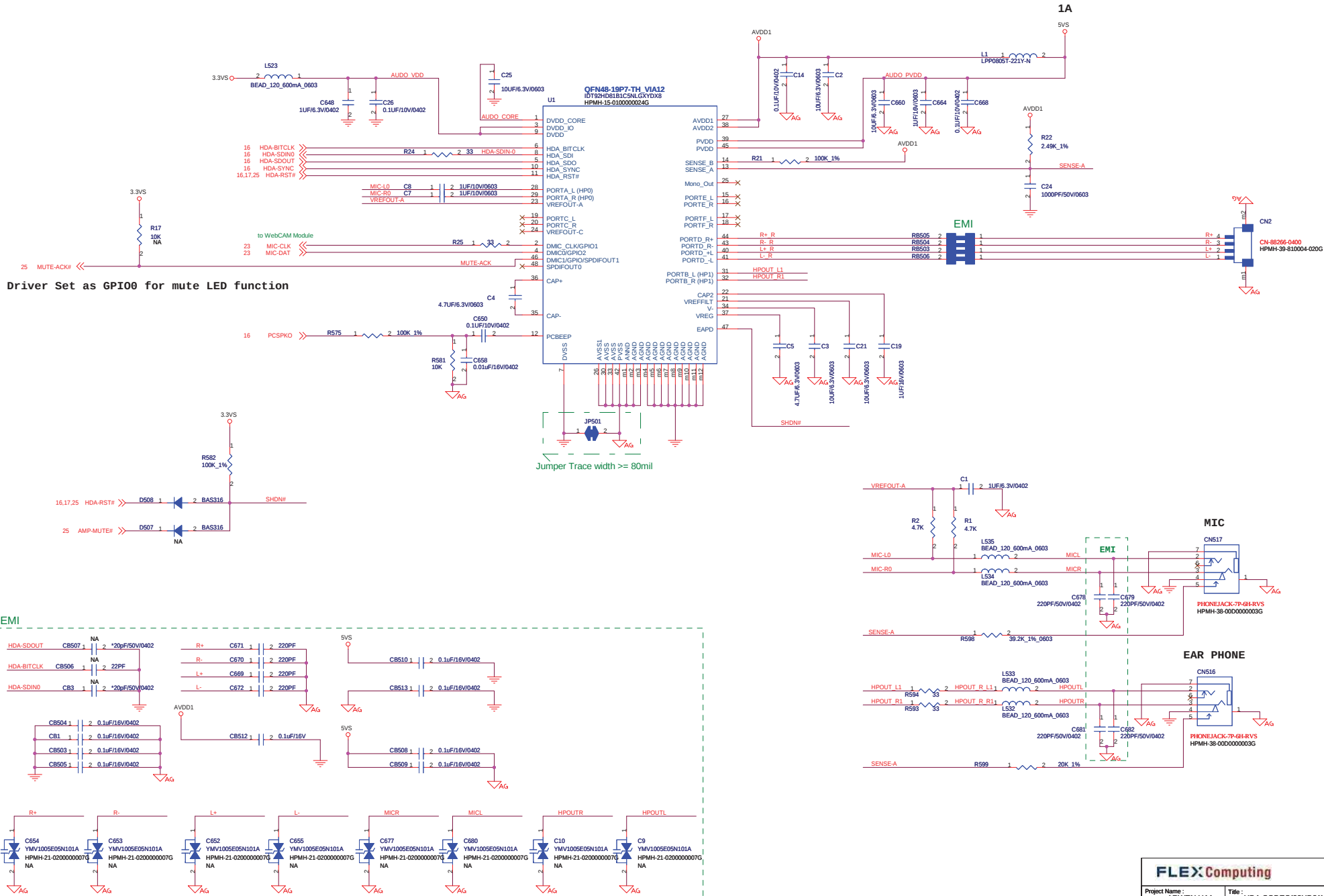
Card type Supported:

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

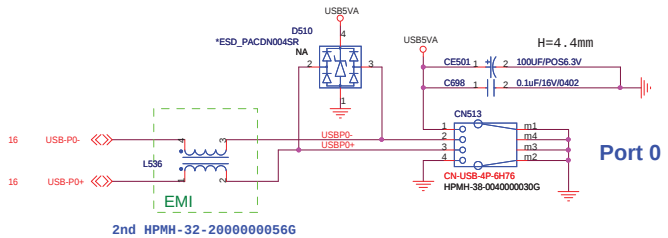


for AU6433-GEF:  
Reserve for combo socket,  
which has "MS adapter" short  
issue with XD\_CD#.

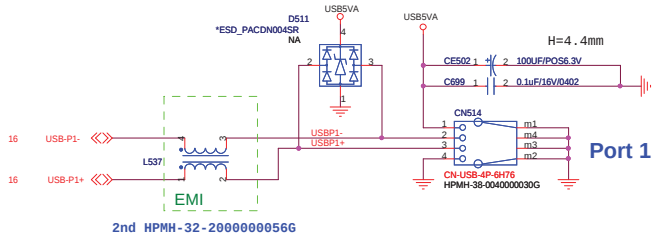
Audio CODEC



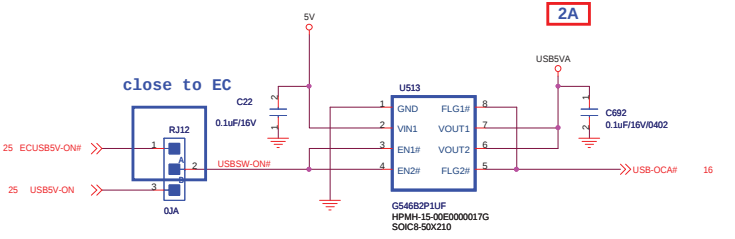
# USB Port 0 / 1



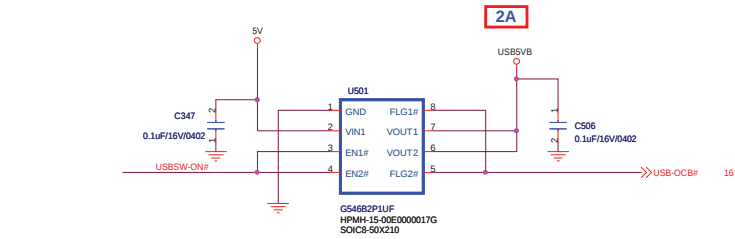
Port 0



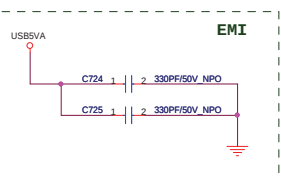
Port 1



2A

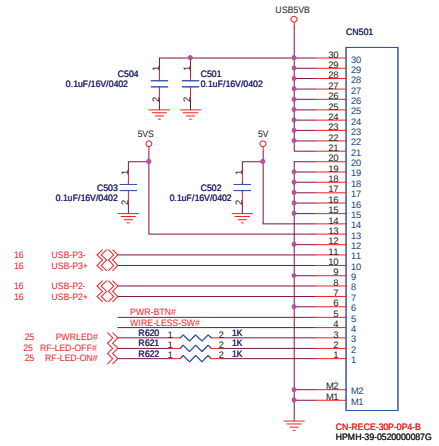


2A



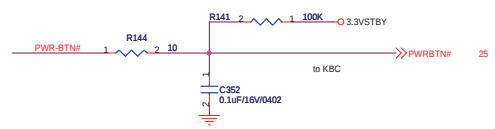
EMI

## USB DB CONN

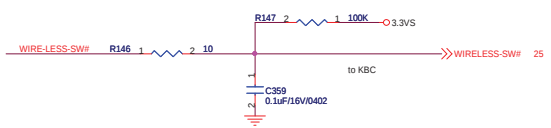


USB Power Connector needs >2A

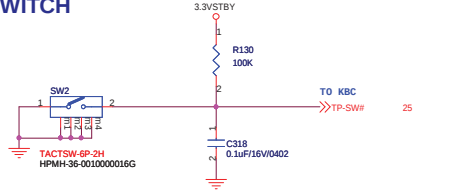
## Power ON/OFF Button



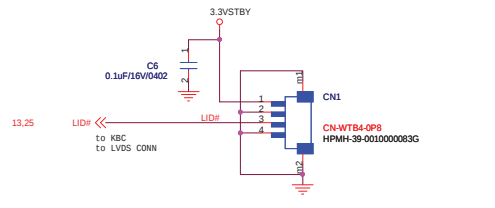
## Wireless ON/OFF Button



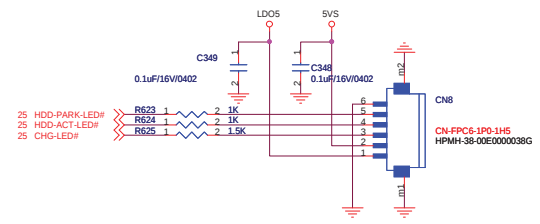
## TP LOCK SWITCH



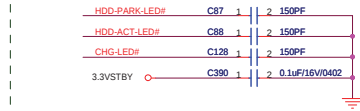
## LID Switch



## LED DB CONN



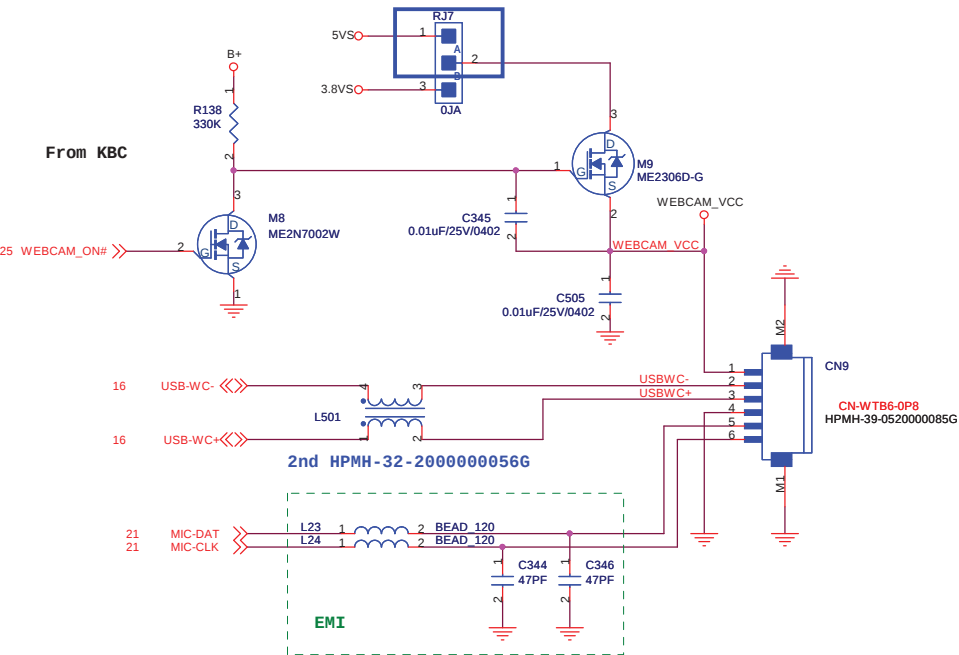
EMI



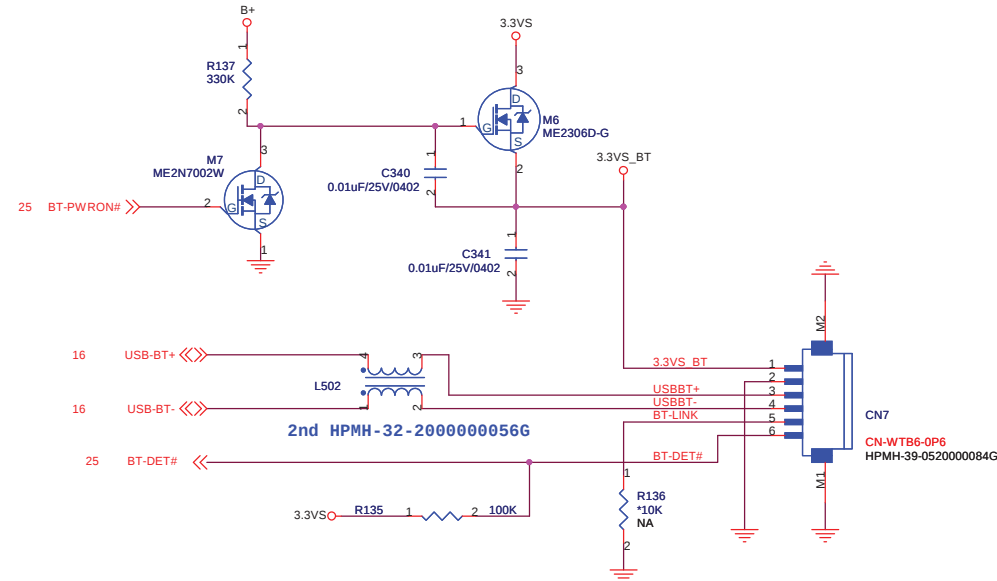
FLEX Computing

|                                |                                       |                       |  |
|--------------------------------|---------------------------------------|-----------------------|--|
| Project Name : ARWEN UA1       |                                       | Title : USB / USB CON |  |
| Size : C                       | Document Number : HPMH-40GAB4000-D000 | Rev : D               |  |
| Date : Monday, August 17, 2009 |                                       | Sheet : 22 of 35      |  |

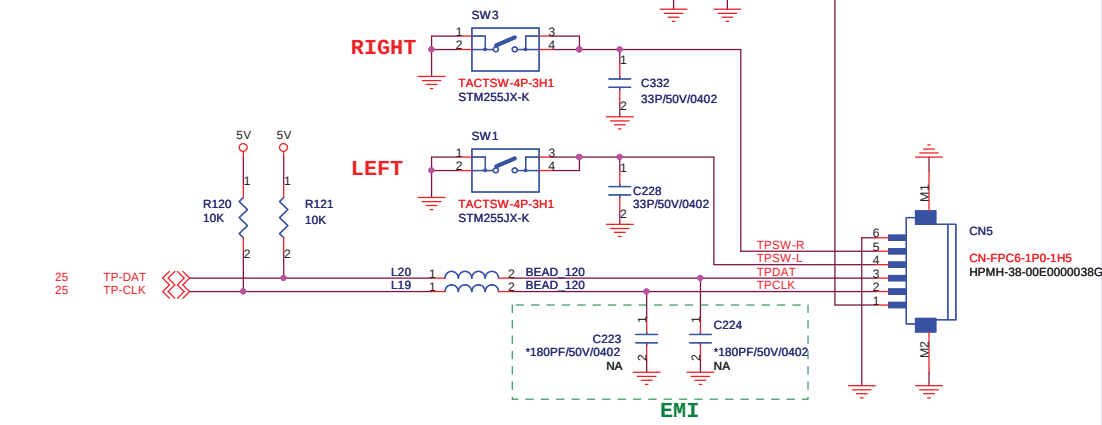
Web CAM



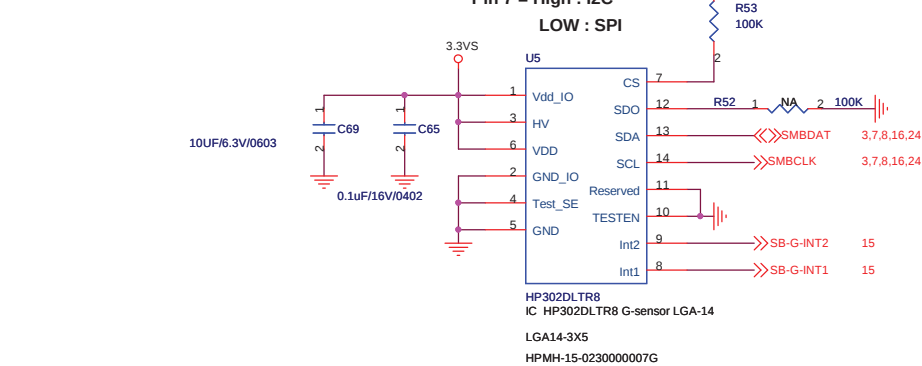
Blue Tooth



Touch Pad



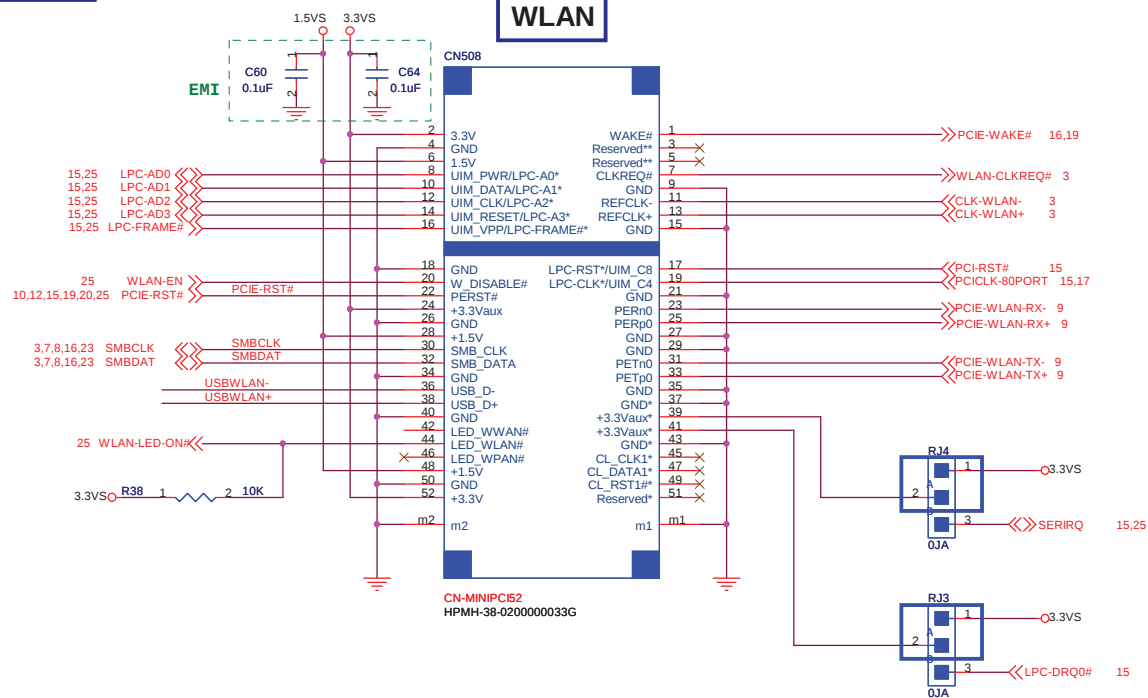
G-Sensor



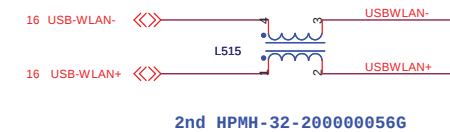
FLEX Computing

|                               |                                          |                                  |            |
|-------------------------------|------------------------------------------|----------------------------------|------------|
| Project Name :<br>ARWEN UA1   |                                          | Title :<br>BT/WEBCAM/TP/G-SENSOR |            |
| Size :<br>Custom              | Document Number :<br>HPMH-40GAB4000-D000 |                                  | Rev :<br>D |
| Date: Monday, August 17, 2009 |                                          | Sheet : 23 of 35                 |            |

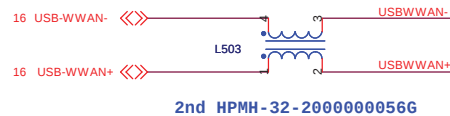
# WLAN / WWAN



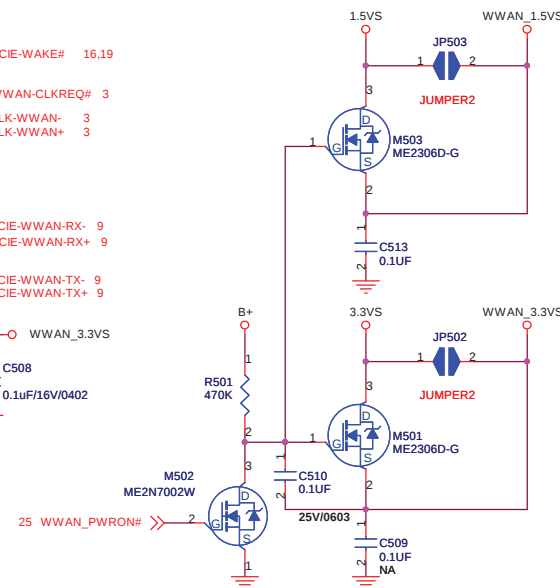
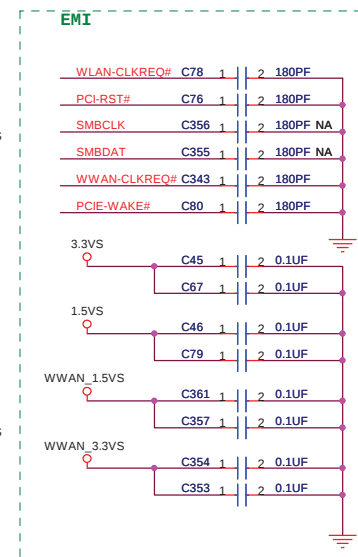
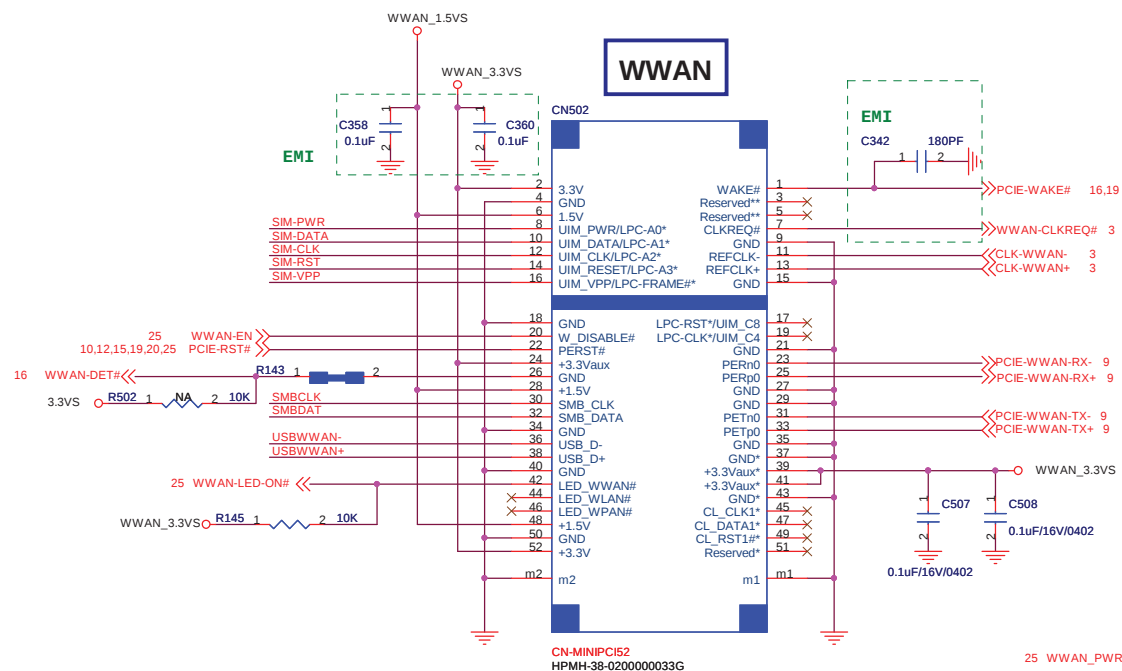
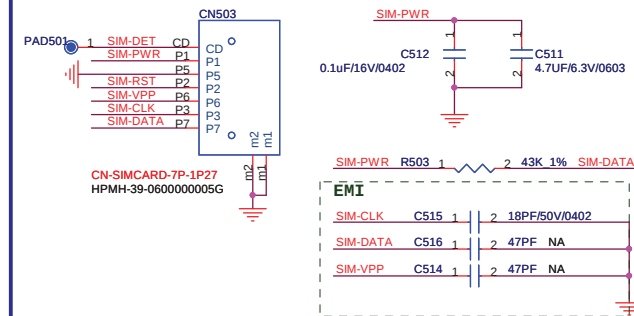
## WLAN



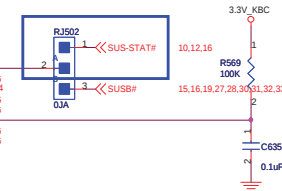
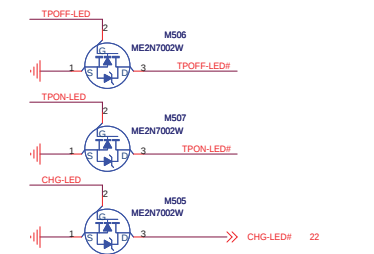
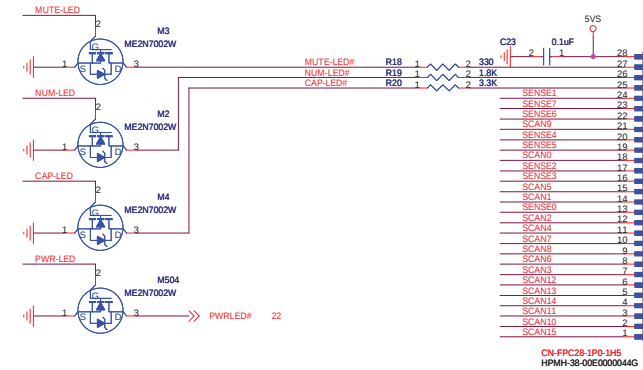
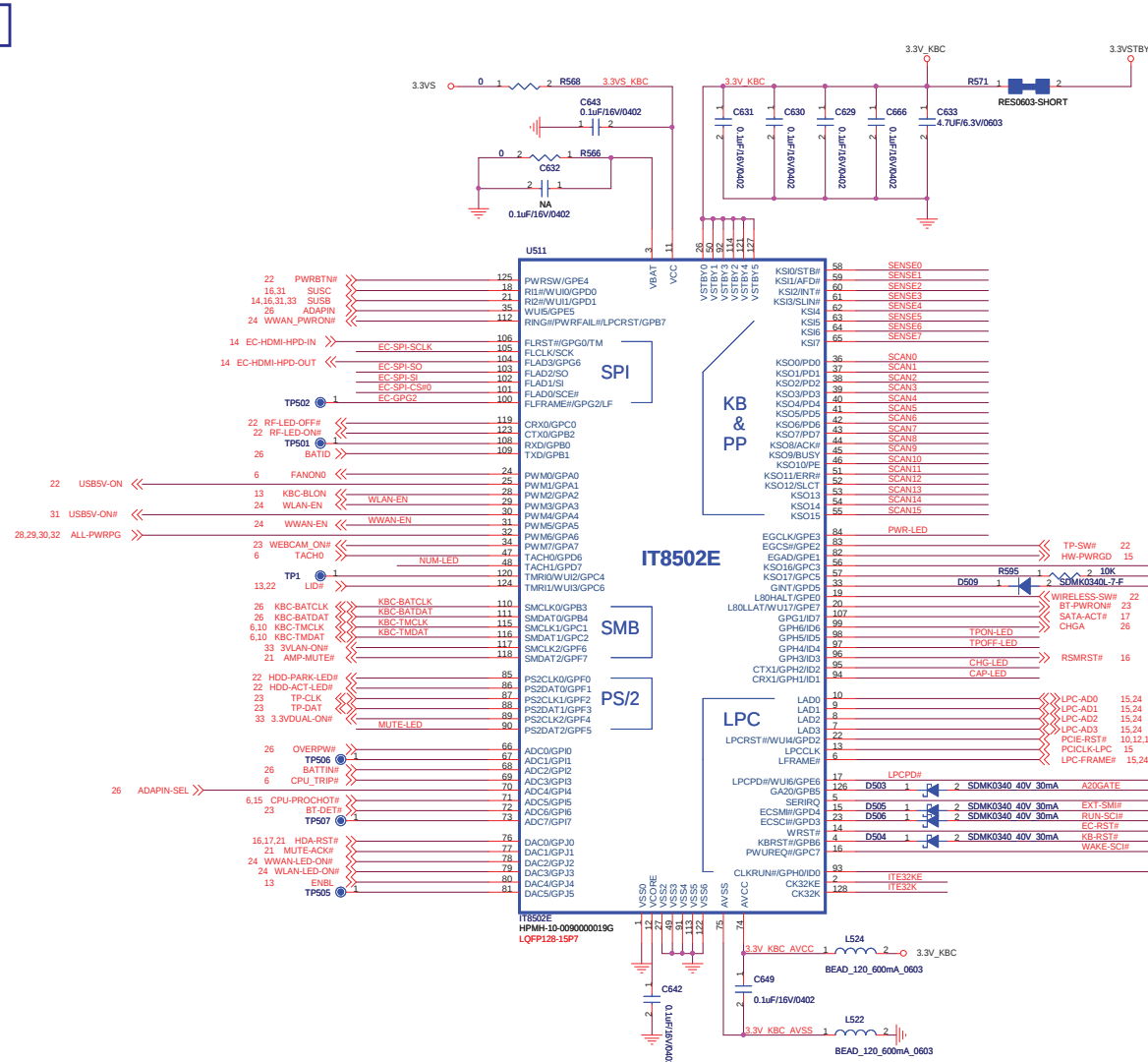
## WWAN



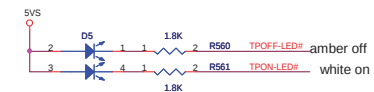
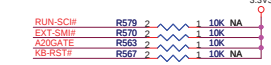
## SIM



|               |                         |                         |          |
|---------------|-------------------------|-------------------------|----------|
| Project Name: |                         | Title:                  |          |
| ARWEN UA1     |                         | MINI PCIE (WLAN / WWAN) |          |
| Size:         | Document Number:        | Rev:                    |          |
| A3            | HPMH-40GAB4000-D000     | D                       |          |
| Date:         | Monday, August 17, 2009 | Sheet:                  | 24 of 35 |

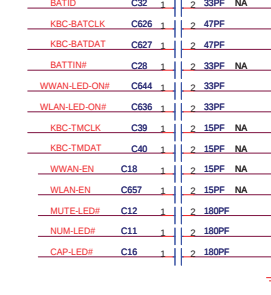
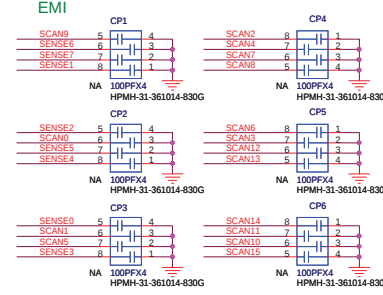
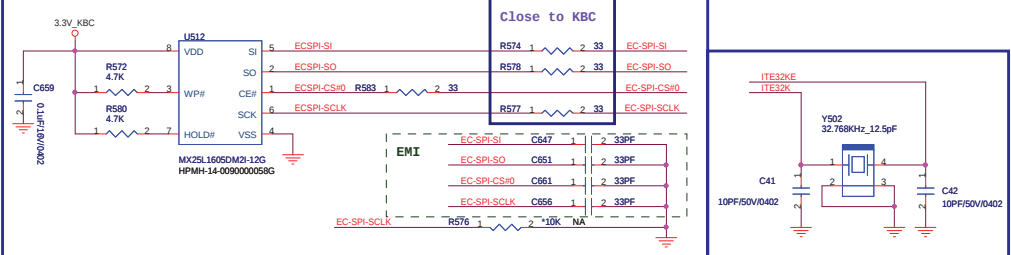


## Touch Pad Active LED

18-225A/S2T3D-C01/3T  
HPMH-37-0010000059G  
LED-4P-1P6X0P6

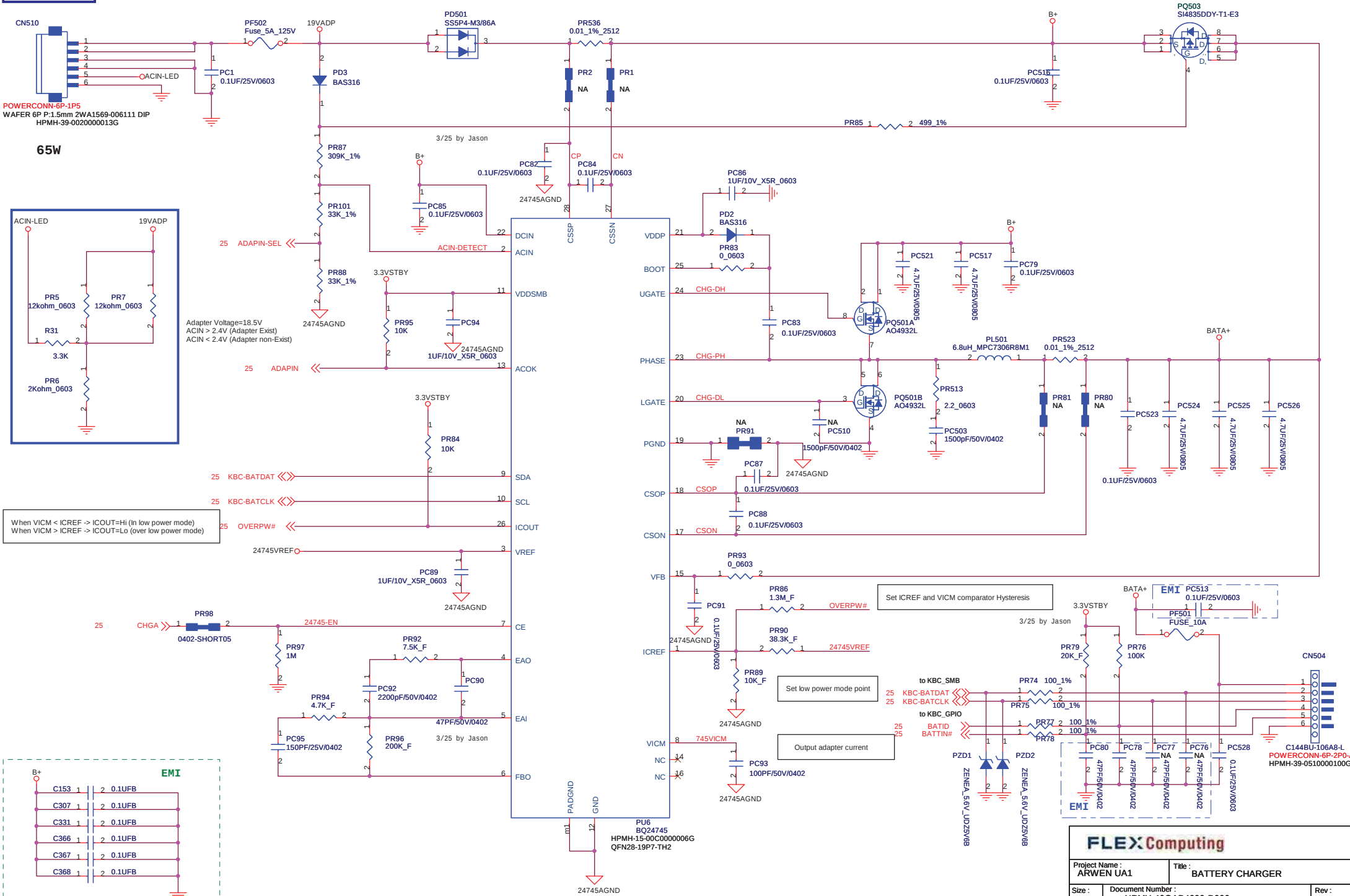
FLEX Computing

## SPI ROM (16M-bit)

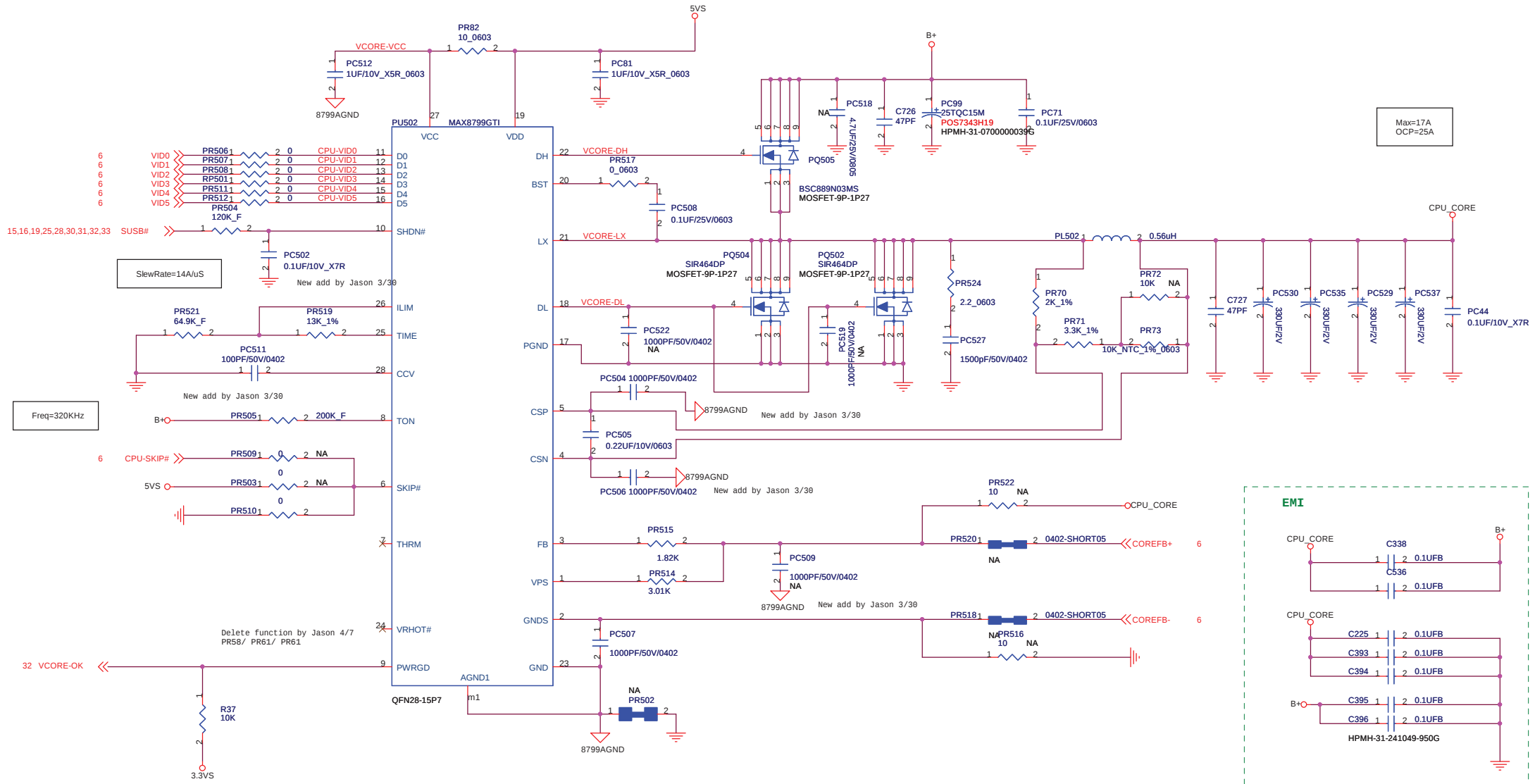


FLEX Computing

# Charger

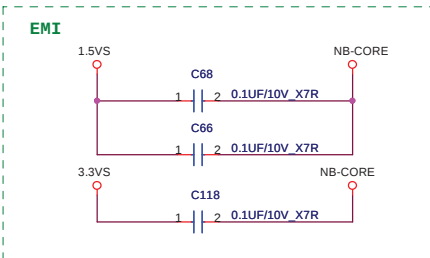
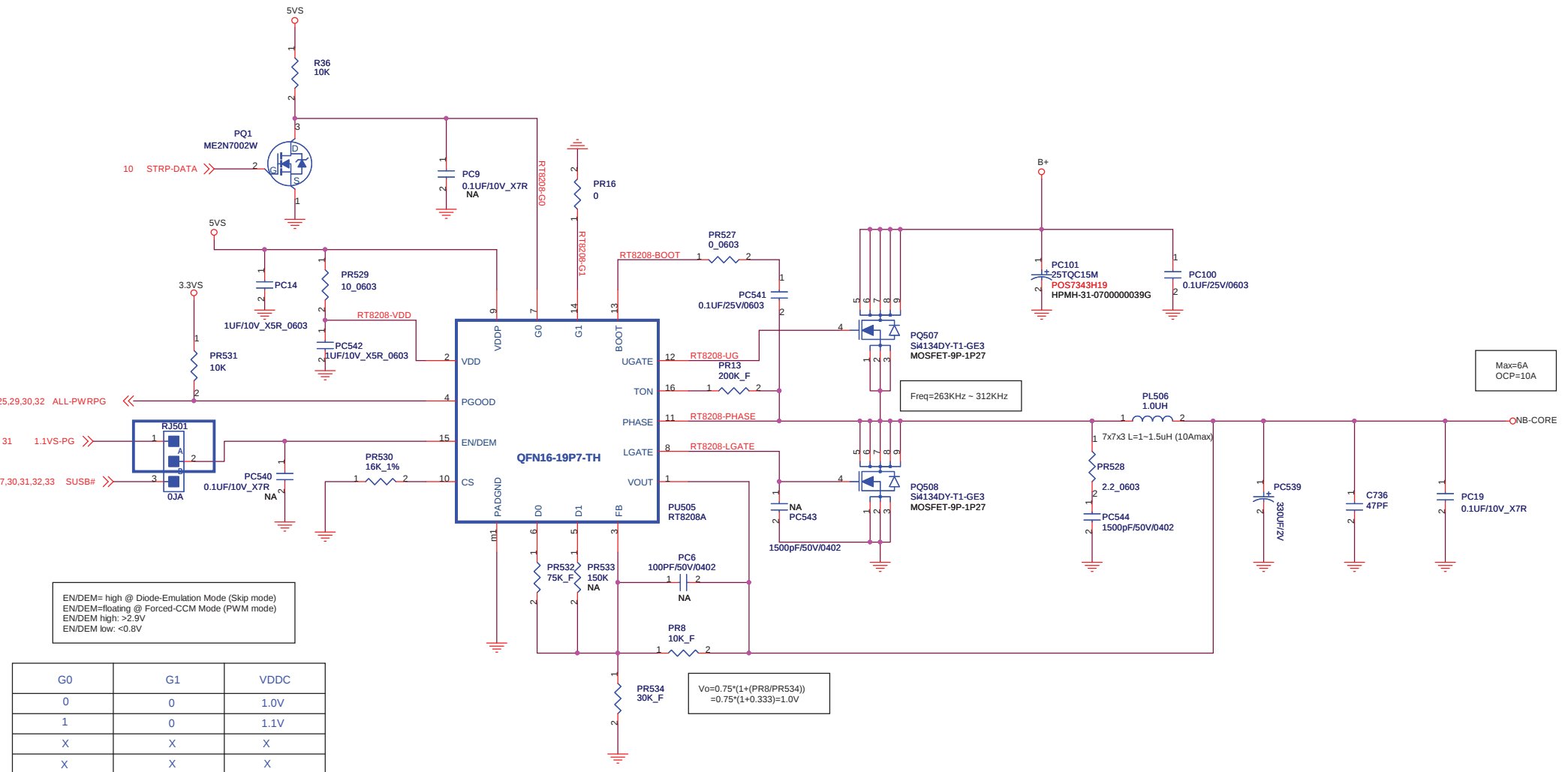


## CPU\_CORE



| 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**



5V / 3.3VSTBY

Freq=300KHz  
Max=6A  
OCP=9.7A(typ)

Freq=375KHz  
Max=6A  
OCP=9.7A

Close to PR51

Close to PR51

5V/3.3VSTBY ON

TRIP 3V

TRIP 5V

Current limit

Table 3. Enabling State

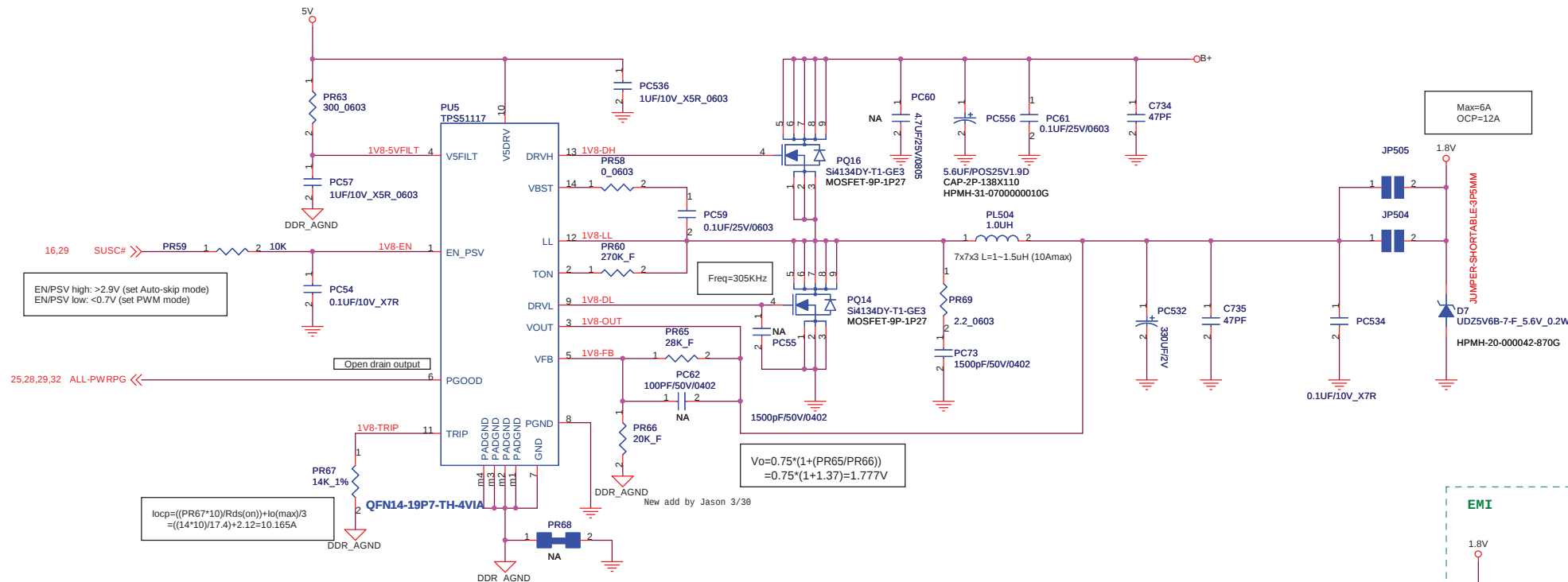
| EN0      | ENTRIP1    | ENTRIP2    | VREF | VREG5 | VREG3 | CH1 | CH2 | VCLK |
|----------|------------|------------|------|-------|-------|-----|-----|------|
| GND      | Don't Care | Don't Care | Off  | Off   | Off   | Off | Off | Off  |
| R to GND | Off        | Off        | On   | On    | On    | Off | Off | Off  |
| R to GND | On         | Off        | On   | On    | On    | On  | Off | Off  |
| R to GND | Off        | On         | On   | On    | On    | Off | On  | Off  |
| R to GND | On         | On         | On   | On    | On    | On  | On  | Off  |
| Open     | Off        | Off        | On   | On    | On    | Off | Off | Off  |
| Open     | On         | Off        | On   | On    | On    | On  | Off | On   |
| Open     | Off        | On         | On   | On    | On    | Off | On  | Off  |
| Open     | On         | On         | On   | On    | On    | On  | On  | On   |

For PCB Acoustic Noise

FLEX Computing

|                               |                                          |                        |            |
|-------------------------------|------------------------------------------|------------------------|------------|
| Project Name :<br>ARWEN UA1   |                                          | Title :<br>5V/3.3VSTBY |            |
| Size :<br>A3                  | Document Number :<br>HPMH-40GAB4000-D000 |                        | Rev :<br>D |
| Date: Monday, August 17, 2009 |                                          | Sheet : 29             | of 35      |

1.8V / 0.9V



S3 and S5 Control Tabl

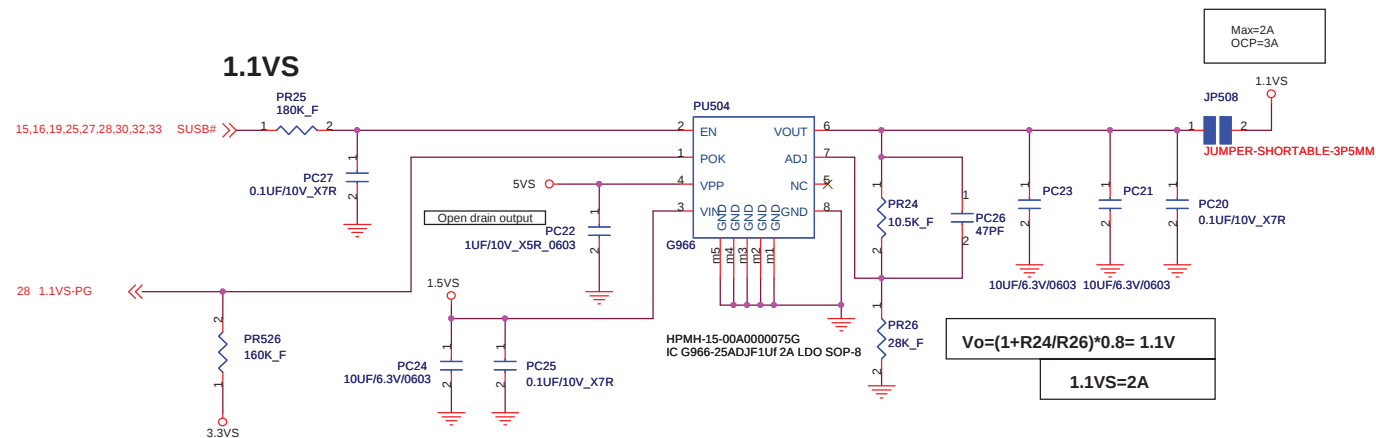
| STATE                | S3 | S5 | VTTREF        | VTT           |
|----------------------|----|----|---------------|---------------|
| S0                   | H  | H  | 1             | 1             |
| S3 <sup>(1)</sup>    | L  | H  | 1             | 0 (high-Z)    |
| S4/S5 <sup>(1)</sup> | L  | L  | 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.

**FLEX** Computing

|                                |                                          |                      |            |
|--------------------------------|------------------------------------------|----------------------|------------|
| Project Name :<br>ARWEN UA1    |                                          | Title :<br>1.8V/0.9V |            |
| Size :<br>A3                   | Document Number :<br>HPMH-40GAB4000-D000 |                      | Rev :<br>D |
| Date : Monday, August 17, 2009 |                                          | Sheet : 30 of 35     |            |

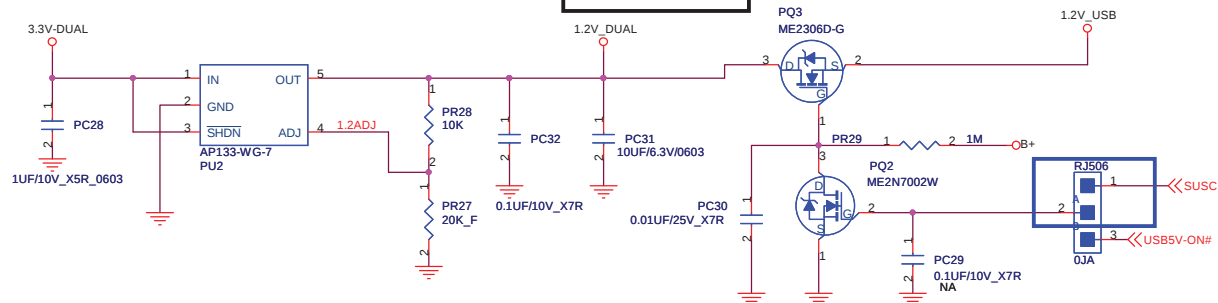
## 1.1VS



## 1.2VSTBY / 1.2V\_USB

$$V_o = 0.8 * (1 + (PR160/PR162)) = 0.8 * (1 + 0.5) = 1.2V$$

1.2V\_DUAL=250mA

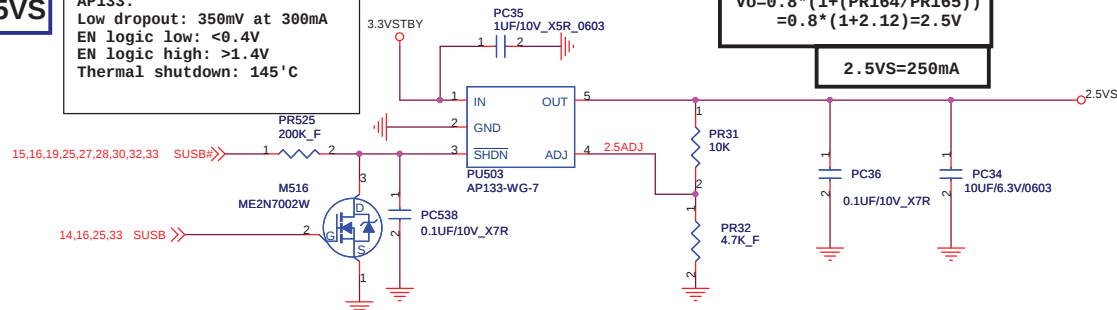


## 2.5VS

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

$$V_o = 0.8 * (1 + (PR164/PR165)) = 0.8 * (1 + 2.12) = 2.5V$$

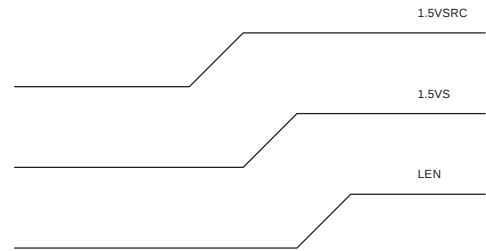
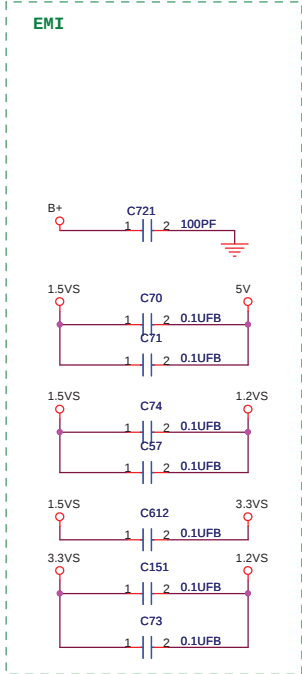
2.5VS=250mA



**FLEX** Computing

|                               |                                          |                                 |            |
|-------------------------------|------------------------------------------|---------------------------------|------------|
| Project Name :<br>ARWEN UA1   |                                          | Title :<br>1.1VS/2.5VS/1.2V_USB |            |
| Size :<br>A3                  | Document Number :<br>HPMH-40GAB4000-D000 |                                 | Rev :<br>D |
| Date: Monday, August 17, 2009 |                                          | Sheet : 31 of 35                |            |

**1.5VS / 1.2VS**



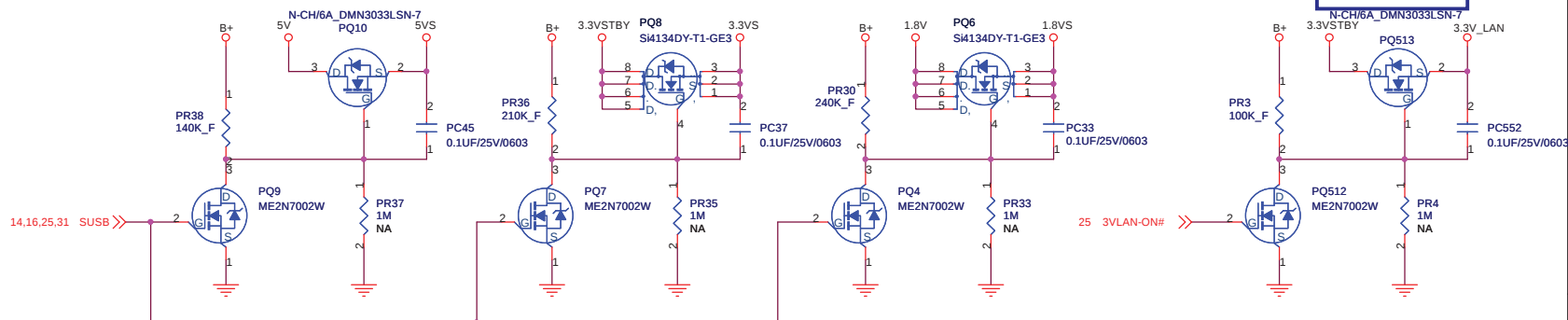
S4/S3 OFF

5VS

3.3VS

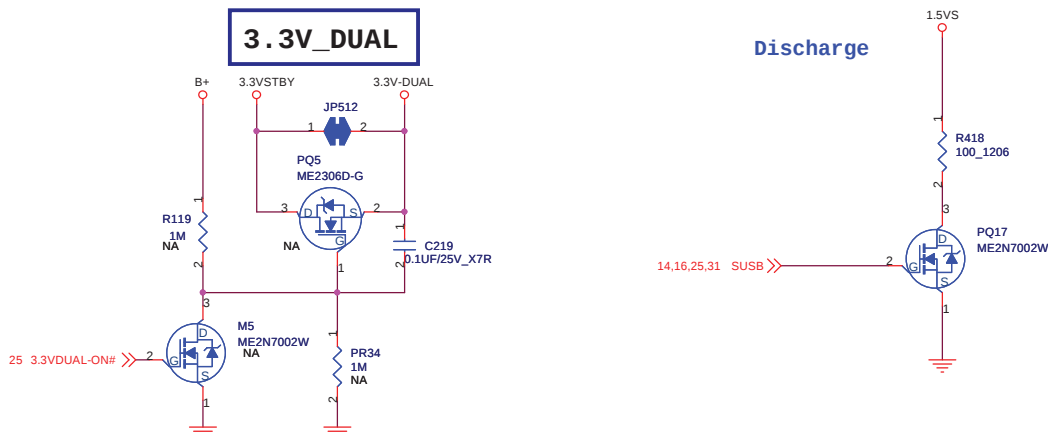
1.8VS

LAN\_3.3V



3.3V\_DUAL

Discharge



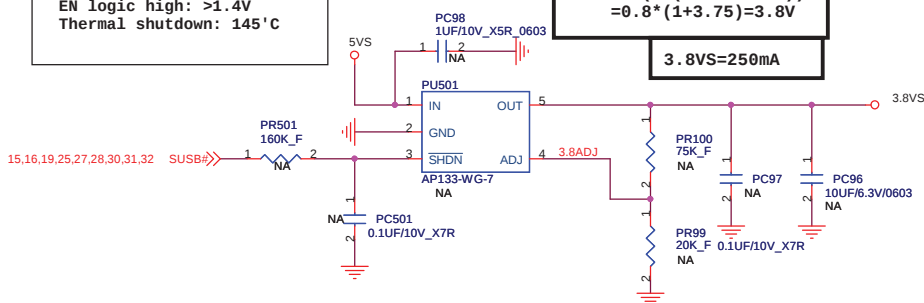
AP133:  
Low dropout: 350mV at 300mA  
EN logic low: <0.4V  
EN logic high: >1.4V  
Thermal shutdown: 145°C

3.8VS

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

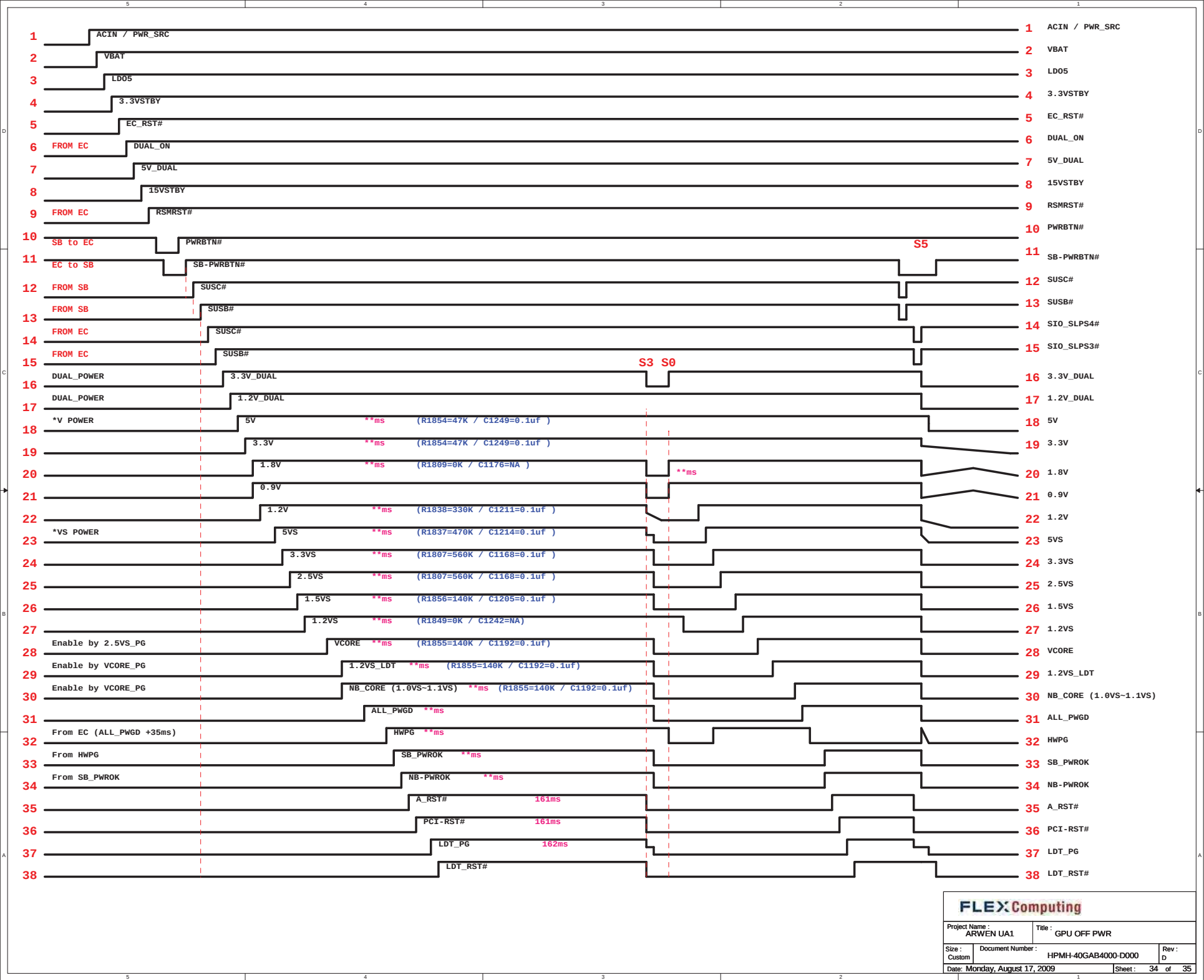
$$= 0.8 * (1 + 3.75) = 3.8V$$

3.8VS=250mA



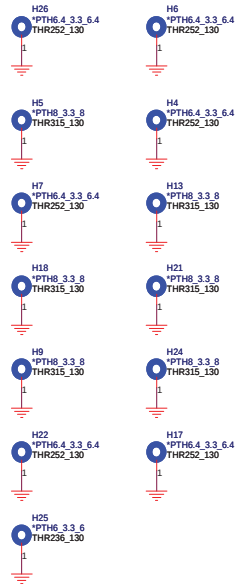
FLEX Computing

|                               |                                          |                          |            |
|-------------------------------|------------------------------------------|--------------------------|------------|
| Project Name :<br>ARWEN UA1   |                                          | Title :<br>VVS/VGA POWER |            |
| Size :<br>Custom              | Document Number :<br>HPMH-40GAB4000-D000 |                          | Rev :<br>D |
| Date: Monday, August 17, 2009 |                                          | Sheet : 33 of 35         |            |



## Screw Hole

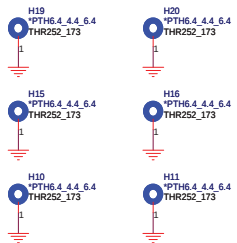
## MB x 16



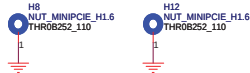
## FID

- 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.

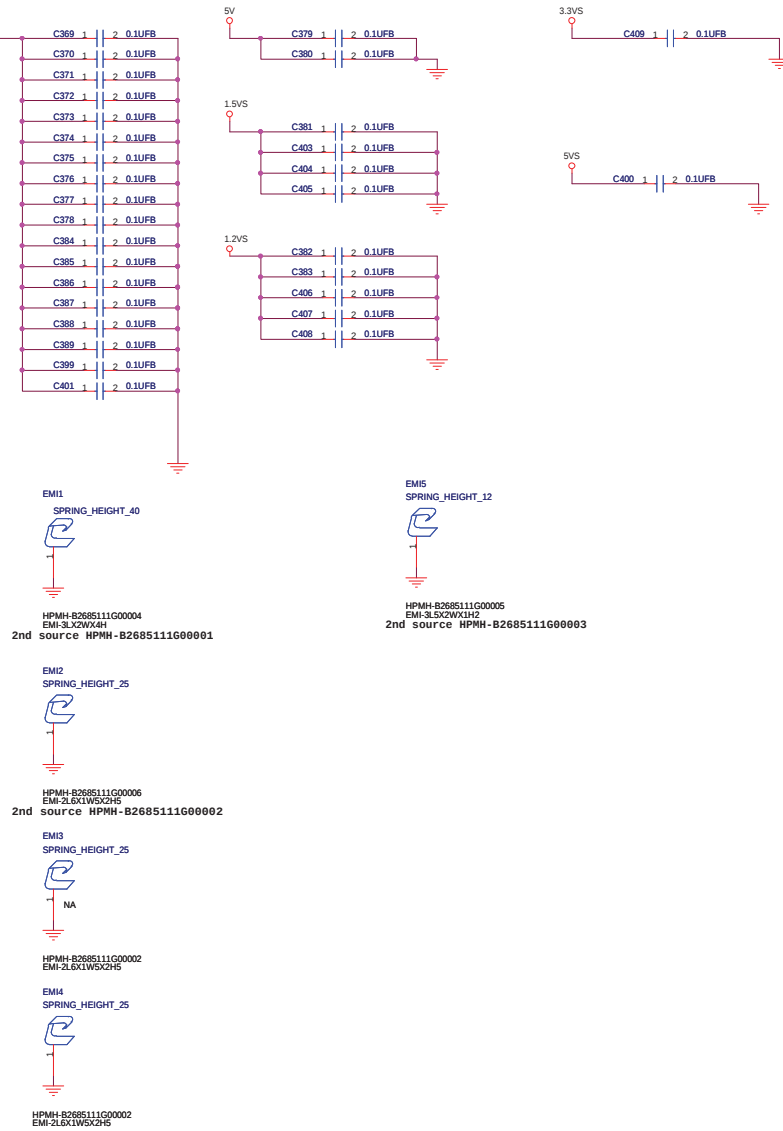
## CPU/VGA x 8



## MINI CARD x 2



## EMI x 2



FLEX Computing

|                               |                   |                                 |          |
|-------------------------------|-------------------|---------------------------------|----------|
| Project Name :<br>ARWEN UA1   |                   | Title :<br>PAD/ SCREW/ Moat Cap |          |
| Size :                        | Document Number : | Rev :<br>D                      |          |
| Date: Monday, August 17, 2009 |                   | Sheet :                         | 35 of 35 |