

## VAR-AM33CustomBoard v1.10



### CONTENT

| PAGE NO. | SCHEMATIC PAGE             |
|----------|----------------------------|
| 1        | Cover                      |
| 2        | Block Diagram              |
| 3        | VAR-SOM-AM33               |
| 4        | BUS MUXING ,Display Buffer |
| 5        | USB                        |
| 6        | G. Ethernet                |
| 7        | Display ,Touch             |
| 8        | Peripherals                |
| 9        | DVK Exp. Connectors        |
| 10       | Power & Mechanics          |

### Disclaimer:

Schematics are for reference only.  
Variscite LTD provides no warranty for the use of  
these schematics.  
Schematics are subject to change without notice.

## Revision History

### Revision History

|           |                                                                                                                                         |
|-----------|-----------------------------------------------------------------------------------------------------------------------------------------|
| Rev 1.0   | Initial                                                                                                                                 |
| Rev 1.02  | Major changes:<br>LCD buffer added for SOM protection<br>GPMC mux changed<br>Back light connector added<br>LVDS connector pinout change |
| Rev 1.02A | Compatible to DVK with wired 1.02 PCB ,<br>refer to Ver 1.1 as a design reference                                                       |
| Rev 1.10  | Major changes:<br>VAR-SOM-AMM33 GPIO3_9 Replaced with GPIO3_4<br>USB Power limiter to 5V<br>G.PHY 125Mhz clock topology update          |

VPC1

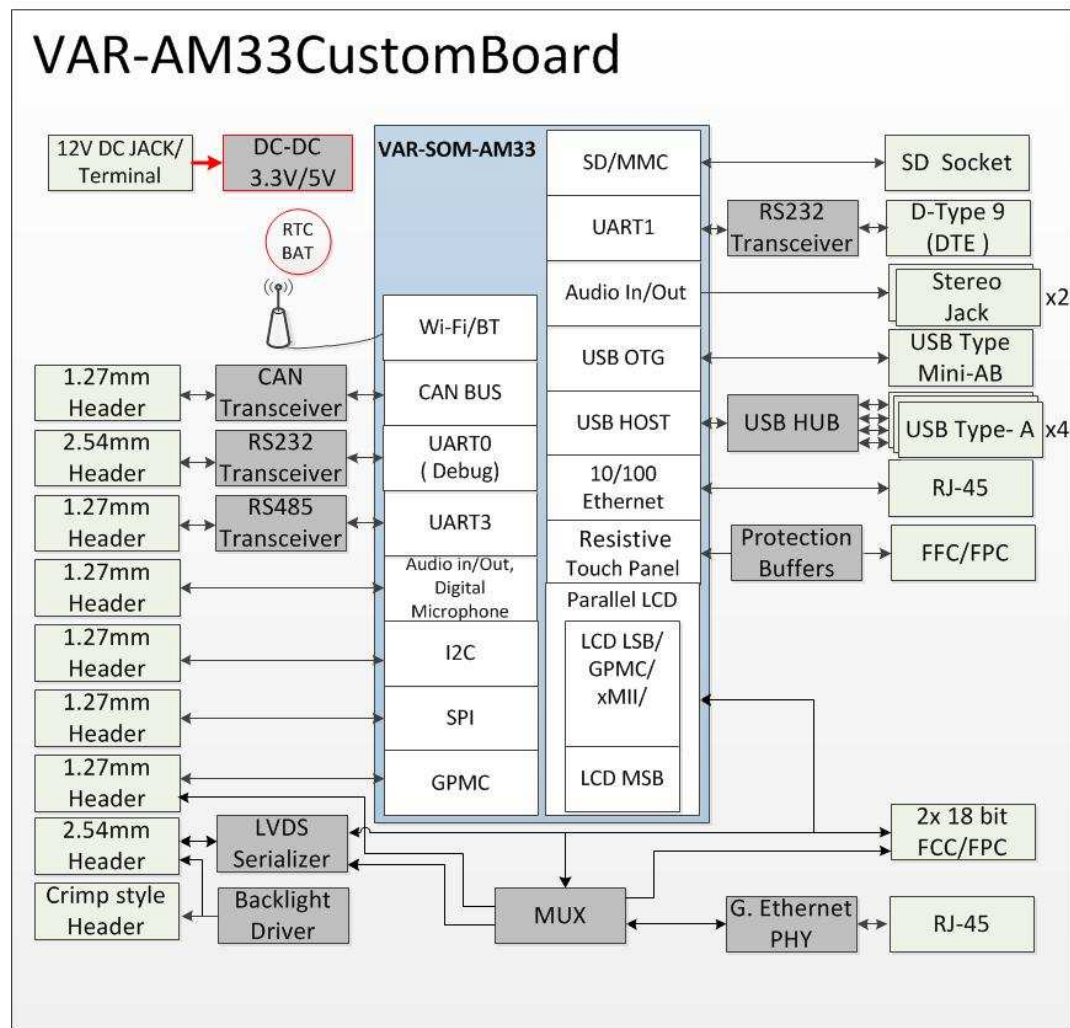


PCB



|                                                 |                                        |                                |             |
|-------------------------------------------------|----------------------------------------|--------------------------------|-------------|
| Title<br>01. Cover                              |                                        |                                |             |
| Size<br>A3                                      | Document Number<br>VAR-AM33Customboard | Project<br>VAR-AM33Customboard | Rev<br>1.10 |
| Designer:<br>Date: Thursday, September 27, 2012 |                                        | Approved By:<br>Sheet 1 of 10  |             |

## 02 - Block Diagram

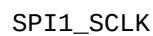


|                            |                                        |                                      |             |
|----------------------------|----------------------------------------|--------------------------------------|-------------|
| Title<br>02. Block Diagram |                                        |                                      |             |
| Size<br>A3                 | Document Number<br>VAR-AM33Customboard | Project<br>VAR-AM33Customboard       | Rev<br>1.10 |
| Designer<br><Designer>     | Approved By<br><Approved By>           | Date<br>Thursday, September 27, 2012 |             |
|                            |                                        | Sheet<br>2                           | of<br>10    |

**03. VAR-SOM-AM33**

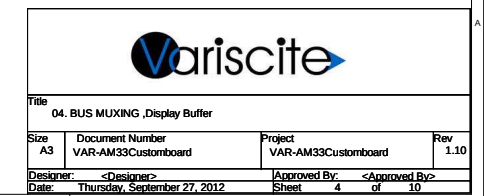


BYTE0,1: RGMII2 \ GPMC



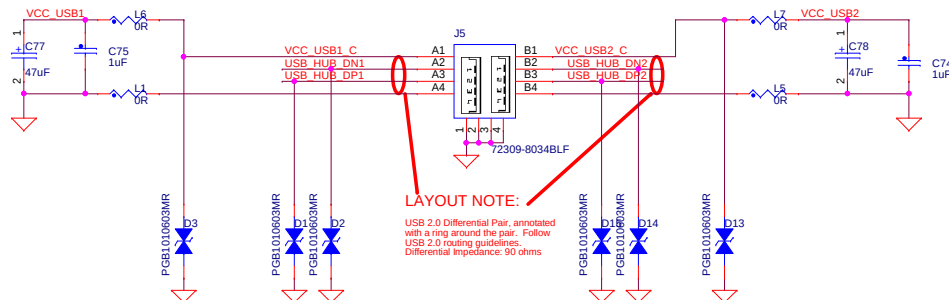
## Display Buffer

## G. GPMC ENABLE

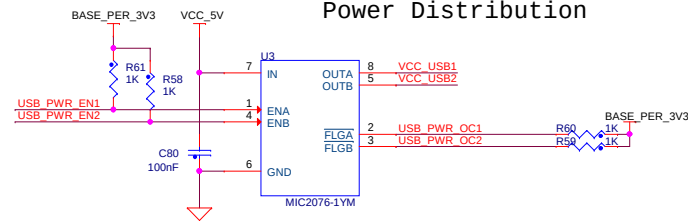


## 5. USB

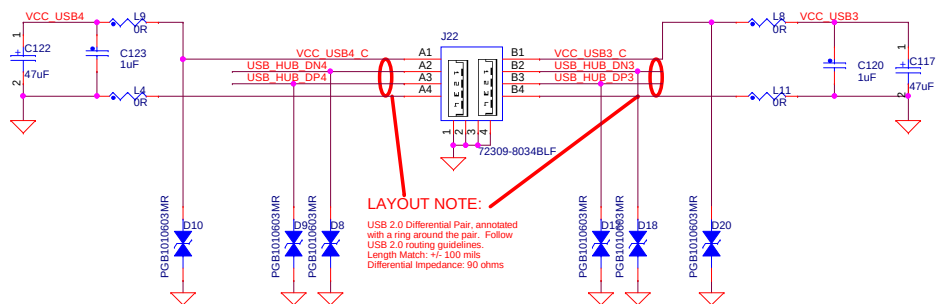
### USB PORT 1-2 : 2 x USB 2.0 Host-Dual Type A Rear Panel



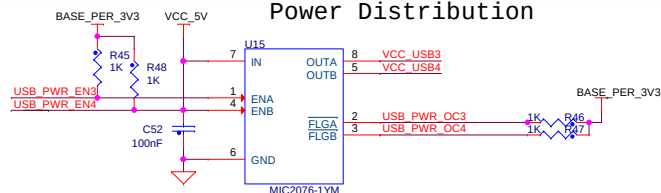
#### Power Distribution



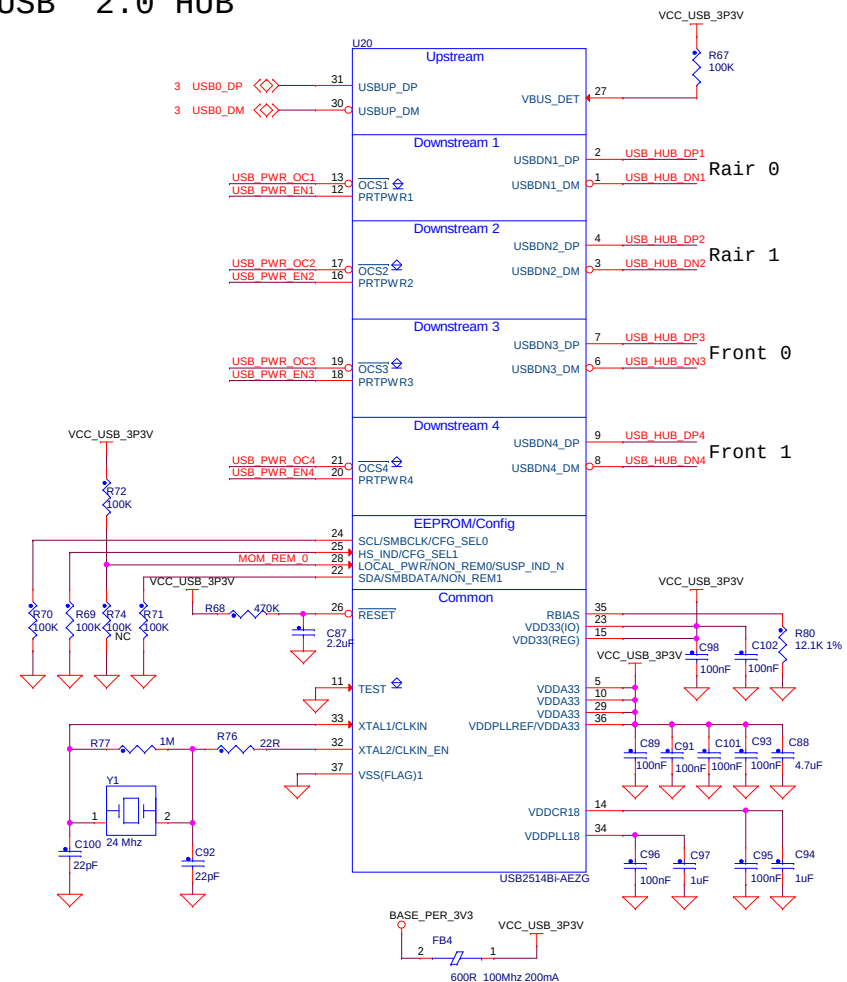
### USB PORT 3-4 : 2 x USB 2.0 Host-Dual Type A Front Panel



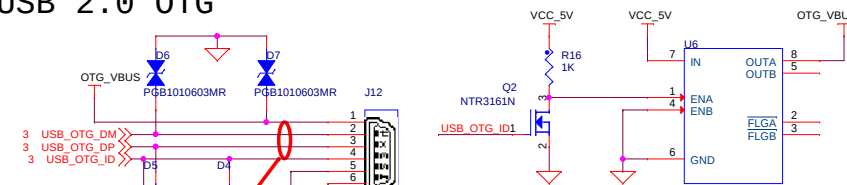
#### Power Distribution



## USB 2.0 HUB



## USB 2.0 OTG



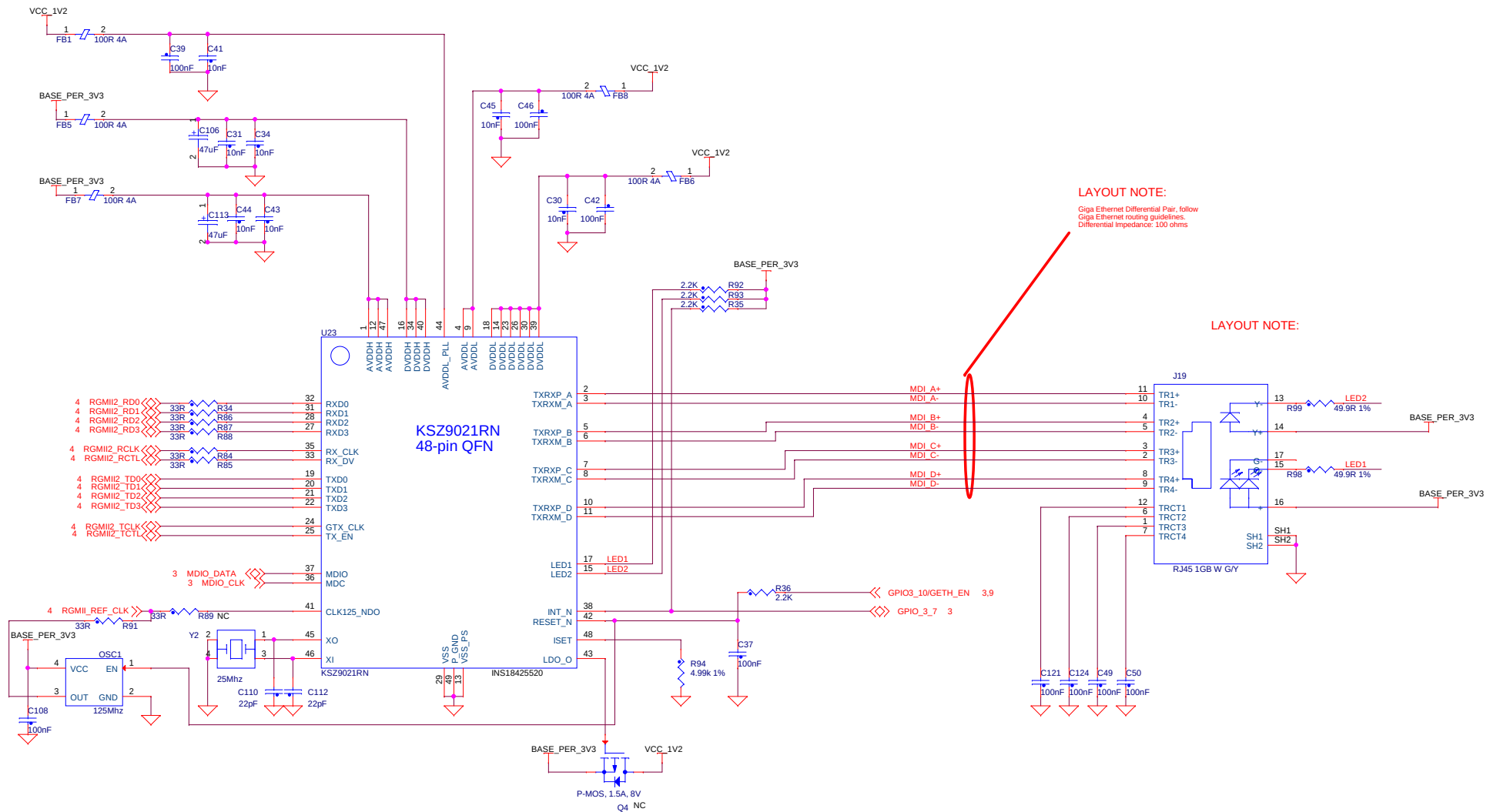
#### LAYOUT NOTE:

USB 2.0 Differential Pair, annotated with a ring around the pair. Follow USB 2.0 routing guidelines. Differential Impedance: 90 ohms



|                        |                                        |                                      |             |
|------------------------|----------------------------------------|--------------------------------------|-------------|
| Title<br>05. USB       |                                        |                                      |             |
| Size<br>A3             | Document Number<br>VAR-AM33Customboard | Project<br>VAR-AM33Customboard       | Rev<br>1.10 |
| Designer<br><Designer> | Approved By<br><Approved By>           | Date<br>Thursday, September 27, 2012 |             |
| Sheet<br>5             |                                        | of<br>10                             |             |

## 06. G. Ethernet

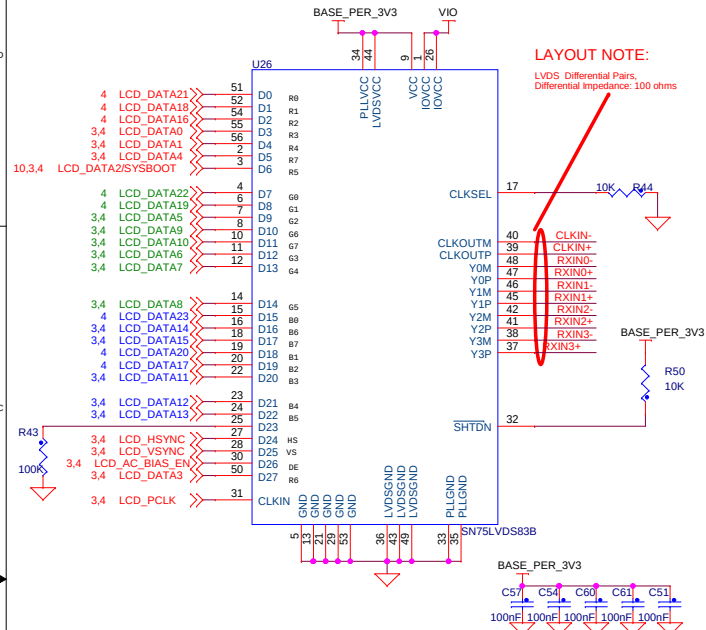


|                                    |                     |                            |      |
|------------------------------------|---------------------|----------------------------|------|
| Title                              |                     |                            |      |
| 06. G. Ethernet                    |                     |                            |      |
| Size                               | Document Number     | Project                    | Rev  |
| A3                                 | VAR-AM33Customboard | VAR-AM33Customboard        | 1.10 |
| Designer: <Designer>               |                     | Approved By: <Approved By> |      |
| Date: Thursday, September 27, 2012 |                     | Sheet 6 of 10              |      |

# 07. Display , Touch

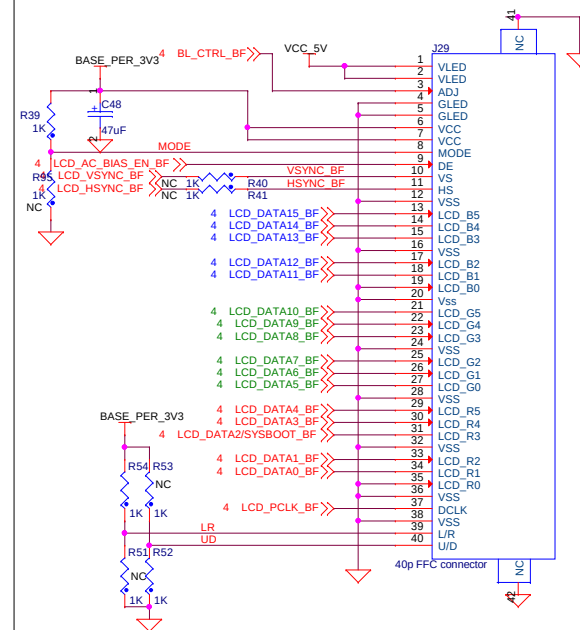
## LVDS

### 24BIT LVDS serializer

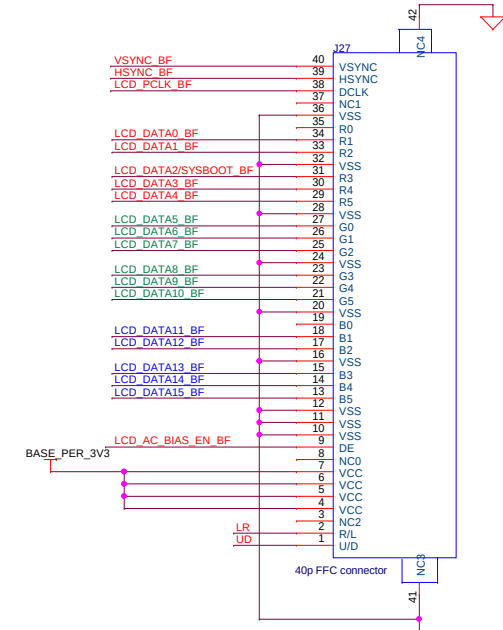


## Parallel RGB

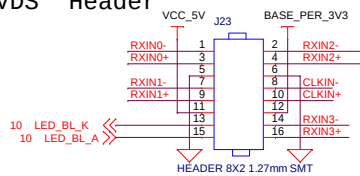
### Resistive LCD



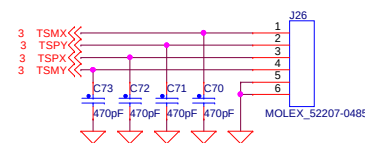
### Capacitive LCD



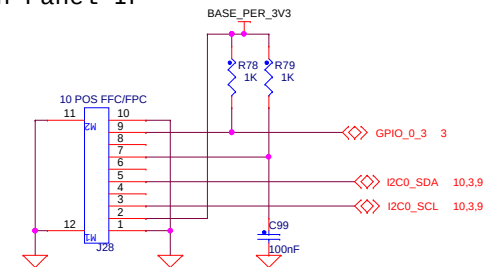
## LVDS Header



## Touch Panel IF



## Touch Panel IF



## AM335x LCD Color Assignments

|              |    |      |    |      |    |      |    |         |    |      |    |      |    |      |   |        |   |   |   |   |   |   |   |        |  |  |  |  |  |  |  |
|--------------|----|------|----|------|----|------|----|---------|----|------|----|------|----|------|---|--------|---|---|---|---|---|---|---|--------|--|--|--|--|--|--|--|
| 23           | 22 | 21   | 20 | 19   | 18 | 17   | 16 | 15      | 14 | 13   | 12 | 11   | 10 | 9    | 8 | 7      | 6 | 5 | 4 | 3 | 2 | 1 | 0 |        |  |  |  |  |  |  |  |
|              |    |      |    |      |    |      |    | PIXEL_n |    |      |    |      |    |      |   |        |   |   |   |   |   |   |   |        |  |  |  |  |  |  |  |
| B[0]         |    | G[0] |    | R[0] |    | B[1] |    | G[1]    |    | R[1] |    | B[2] |    | R[2] |   |        |   |   |   |   |   |   |   |        |  |  |  |  |  |  |  |
|              |    |      |    |      |    |      |    | B[7:3]  |    |      |    |      |    |      |   | G[7:2] |   |   |   |   |   |   |   | R[7:3] |  |  |  |  |  |  |  |
| 16-bit panel |    |      |    |      |    |      |    |         |    |      |    |      |    |      |   |        |   |   |   |   |   |   |   |        |  |  |  |  |  |  |  |
| 24-bit panel |    |      |    |      |    |      |    |         |    |      |    |      |    |      |   |        |   |   |   |   |   |   |   |        |  |  |  |  |  |  |  |

Figure 2. RGB888 Mode LCD Controller Output Pin Mapping (LCD\_DATA[23:0])

COPY/PASTE WARNING!!!!  
THIS IS A BOTTOM SIDE CONNECTOR  
IF TOP SIDE CONNECTOR IS USED  
MIRROR PINOUT AND USE DIFFERENT  
CONNECTOR P/N

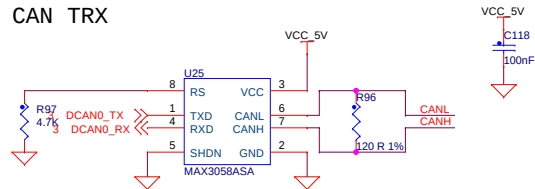


|                             |                                        |                                      |             |
|-----------------------------|----------------------------------------|--------------------------------------|-------------|
| Title<br>07. Display ,Touch |                                        |                                      |             |
| Size<br>A3                  | Document Number<br>VAR-AM33Customboard | Project<br>VAR-AM33Customboard       | Rev<br>1.10 |
| Designer<br><Designer>      | Approved By<br><Approved By>           | Date<br>Thursday, September 27, 2012 |             |
| Sheet<br>7                  |                                        | of<br>10                             |             |

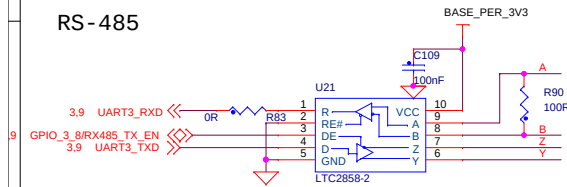
## 08. Peripherals

### Serail COMM

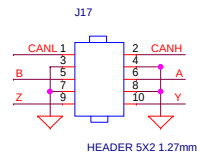
#### CAN TRX



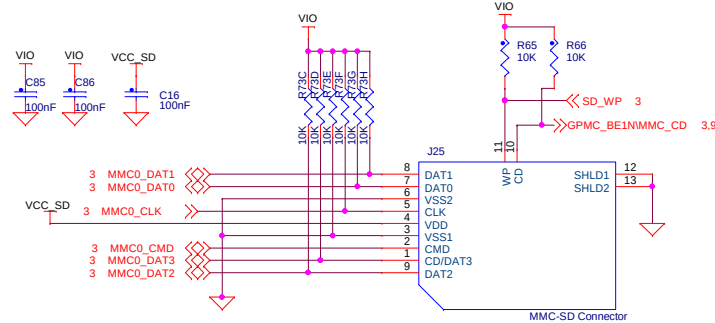
#### RS-485



#### Header



### SD-Card

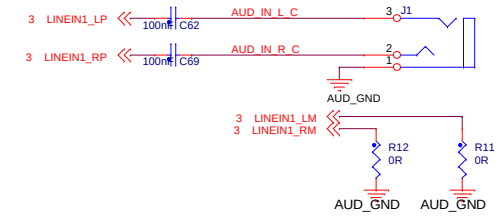


#### ESD Protection

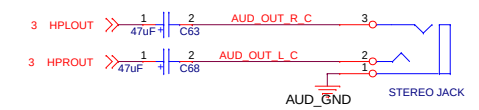


### AUDIO

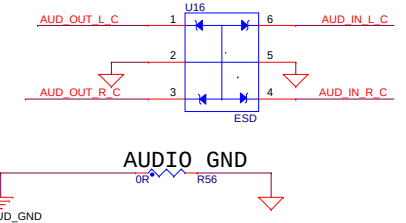
#### Line In



#### Headphone Out

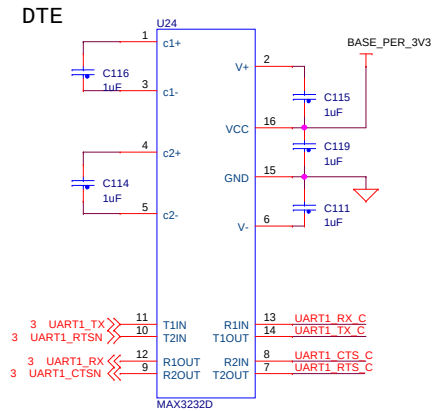


#### ESD Protection

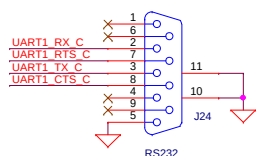


### UART 0&1

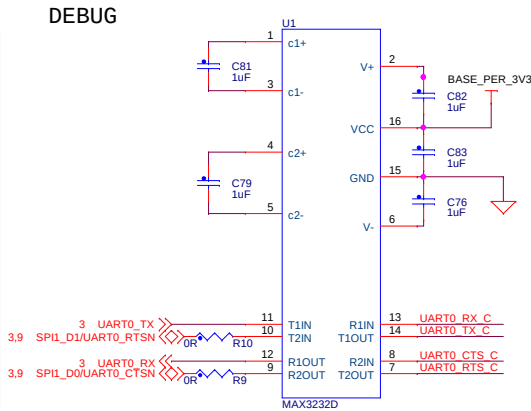
#### DTE



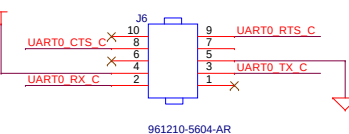
#### D-Type - Male



#### DEBUG

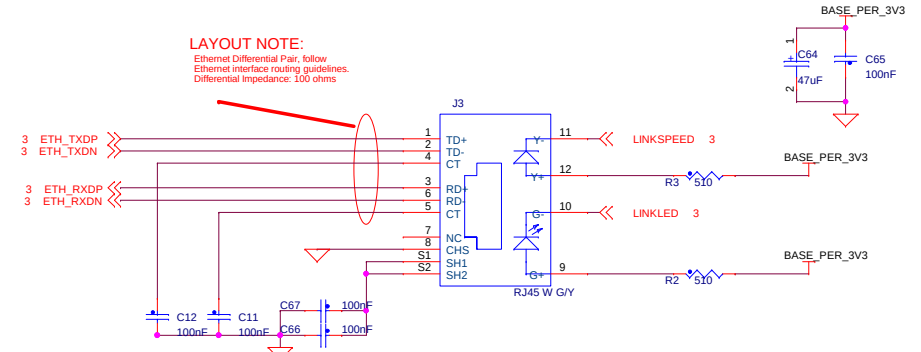


#### Header

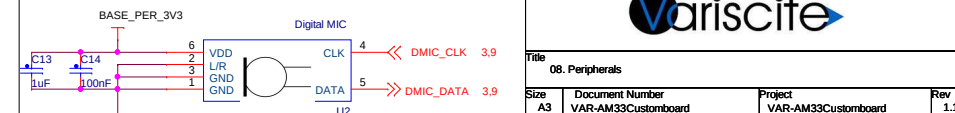


### 10/100 Mbps Ethernet

LAYOUT NOTE:  
Ethernet Differential Pair, follow  
Ethernet interface routing guidelines.  
Differential Impedance: 100 ohms



### Digital Microphone

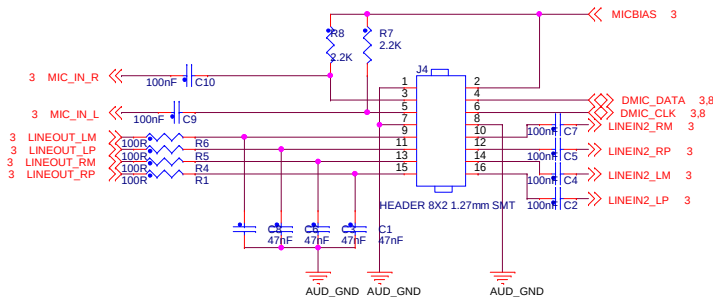


|                          |                                            |                                |                          |
|--------------------------|--------------------------------------------|--------------------------------|--------------------------|
| Title<br>08. Peripherals |                                            |                                |                          |
| Size<br>A3               | Document Number<br>VAR-AM33Customboard     | Project<br>VAR-AM33Customboard | Rev<br>1.10              |
| Designer<br>Date:        | <Designer><br>Thursday, September 27, 2012 | Approved By<br>Sheet           | <Approved By><br>8 of 10 |

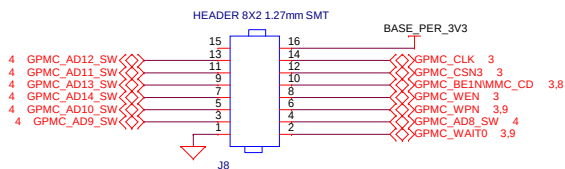
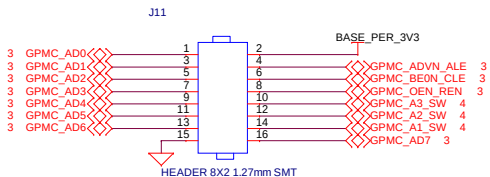
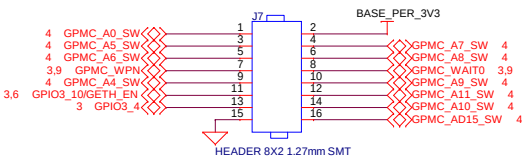


# 09. DVK Exp. Connectors

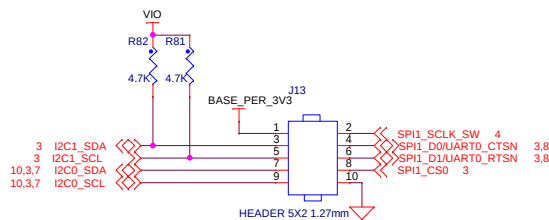
## AUDIO



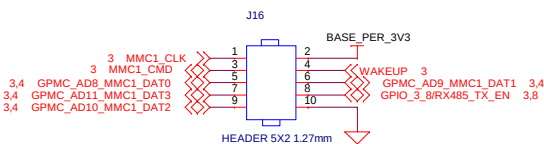
## GPMC



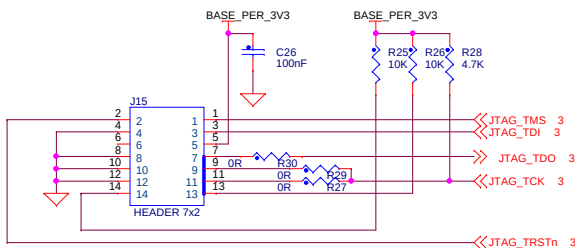
## SPI/I2C



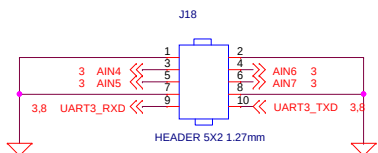
## SD/MMC



## JTAG



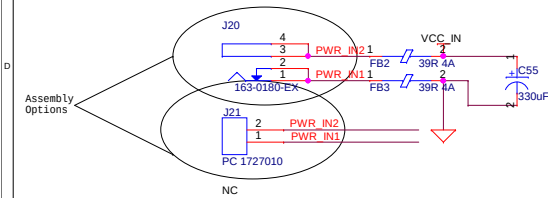
## Analog Inputs & UART3



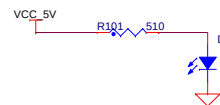
|                                  |                                            |                                |                                |
|----------------------------------|--------------------------------------------|--------------------------------|--------------------------------|
| Title<br>10. DVK Exp. Connectors |                                            |                                |                                |
| Size<br>A3                       | Document Number<br>VAR-AM33Customboard     | Project<br>VAR-AM33Customboard | Rev<br>1.10                    |
| Designer<br>Date                 | <Designer><br>Thursday, September 27, 2012 |                                | <Approved By><br>Sheet 9 of 10 |

# 11. Power & Mechanics

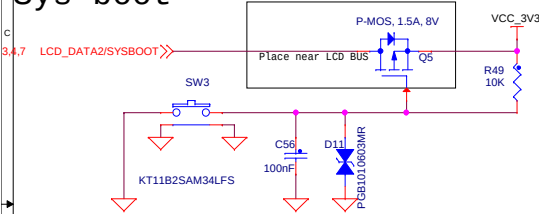
## VCC-IN - 7.5- 12V



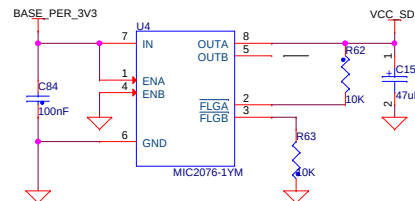
## Main Power LED



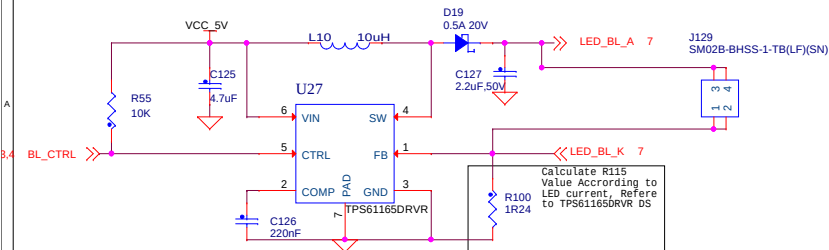
## Sys-boot



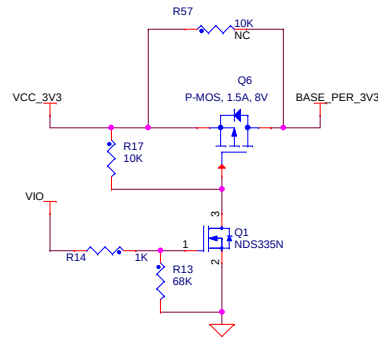
## SD card Power supply



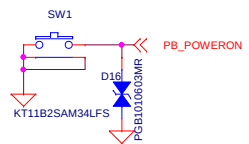
## LCD Backlight Driver



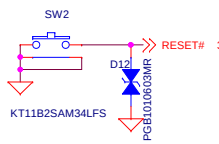
## Peripherals Power



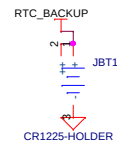
## Power On



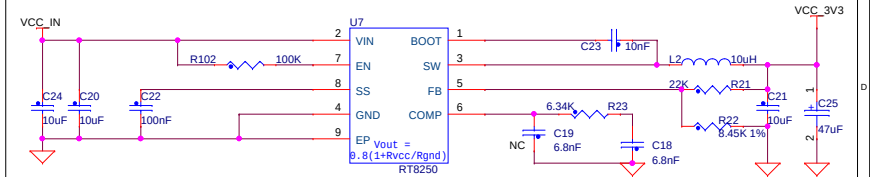
## Reset



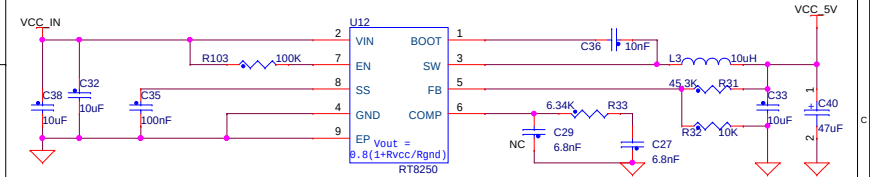
## RTC Backup Battery



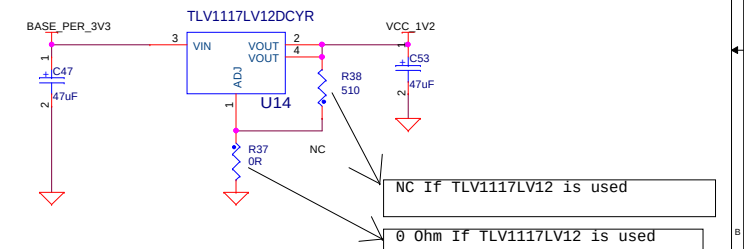
## 3.3V Digital 3A



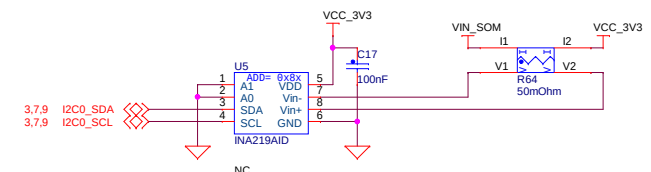
## 5V Digital 3A



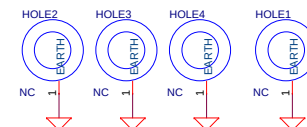
## G. Ethernet PHY Power 0.5A @ 1V2



## Current Monitor



## 4 X Chassis Holes



|                                |                                        |                                      |             |
|--------------------------------|----------------------------------------|--------------------------------------|-------------|
| Title<br>11. Power & Mechanics |                                        |                                      |             |
| Size<br>A3                     | Document Number<br>VAR-AM33Customboard | Project<br>VAR-AM33Customboard       | Rev<br>1.10 |
| Designer<br><Designer>         | Approved By<br><Approved By>           | Date<br>Thursday, September 27, 2012 |             |
| Sheet<br>10                    |                                        | of<br>10                             |             |