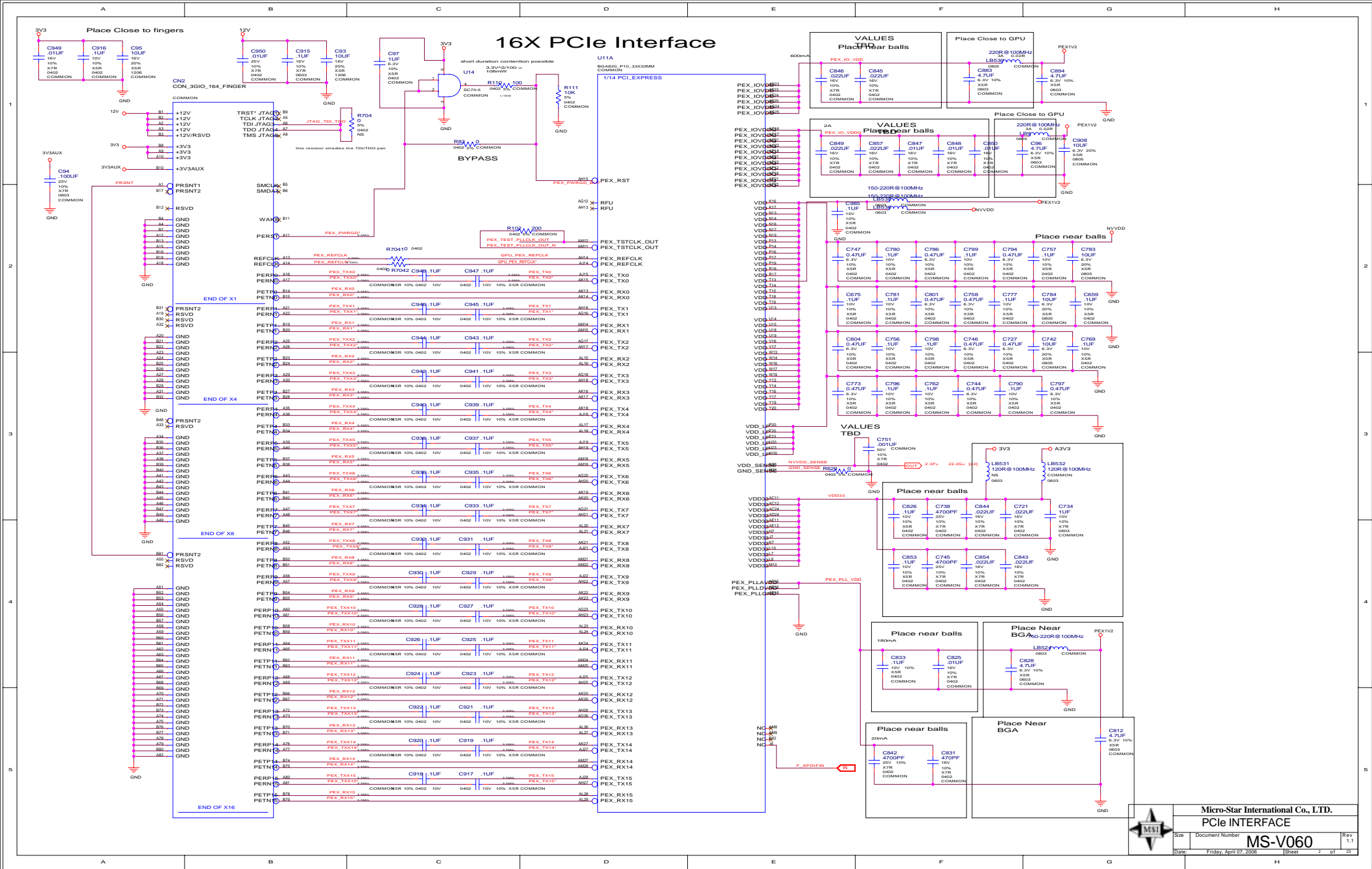


# MS-V060 -- G73, 128/256 Mb DDR3-136pin, VGA, DVI-I, SD/HDTV, VIVO

## SUMMARY:

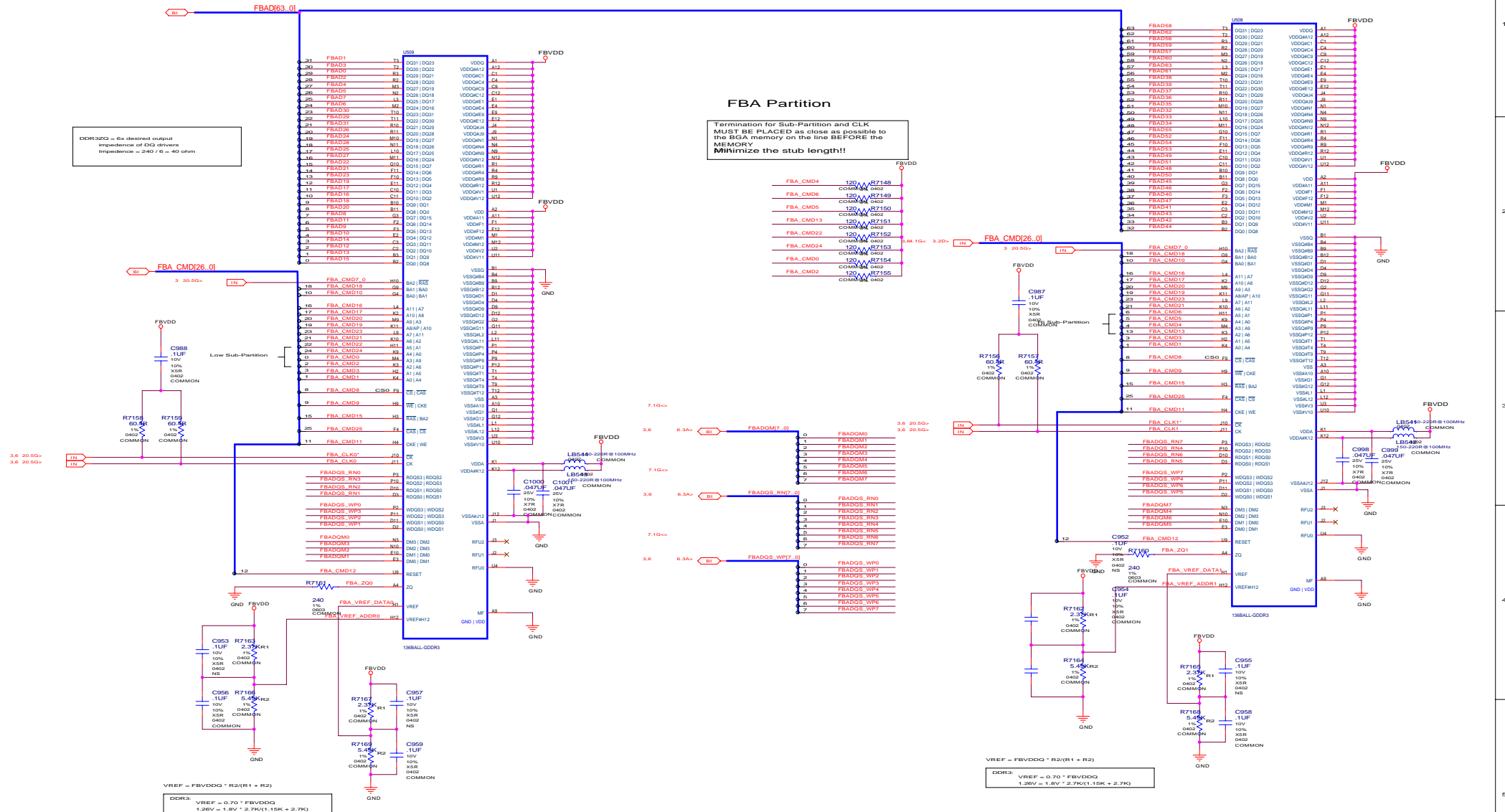
1. Base on V045-10 to Modify
  2. BGA-136 DDRIII
  3. Dual MS-11 for NVVDD and FBVDD
- 110... remove U518  
110... Change Infineon DDR3 16x32 -1.4  
110... VID table change to 2.0V  
110... Strapping change to 0001  
110... Change GPU with HDCP and add HDCP ROM circuit

|                                    |                        |         |         |
|------------------------------------|------------------------|---------|---------|
| Micro-Star International Co., LTD. |                        |         |         |
| SUMMARY                            |                        |         |         |
| Size                               | Document Number        | MS-V060 |         |
| Custom                             |                        |         | Rev 1.1 |
| Date                               | Friday, April 07, 2006 | Sheet   | 1 of 23 |



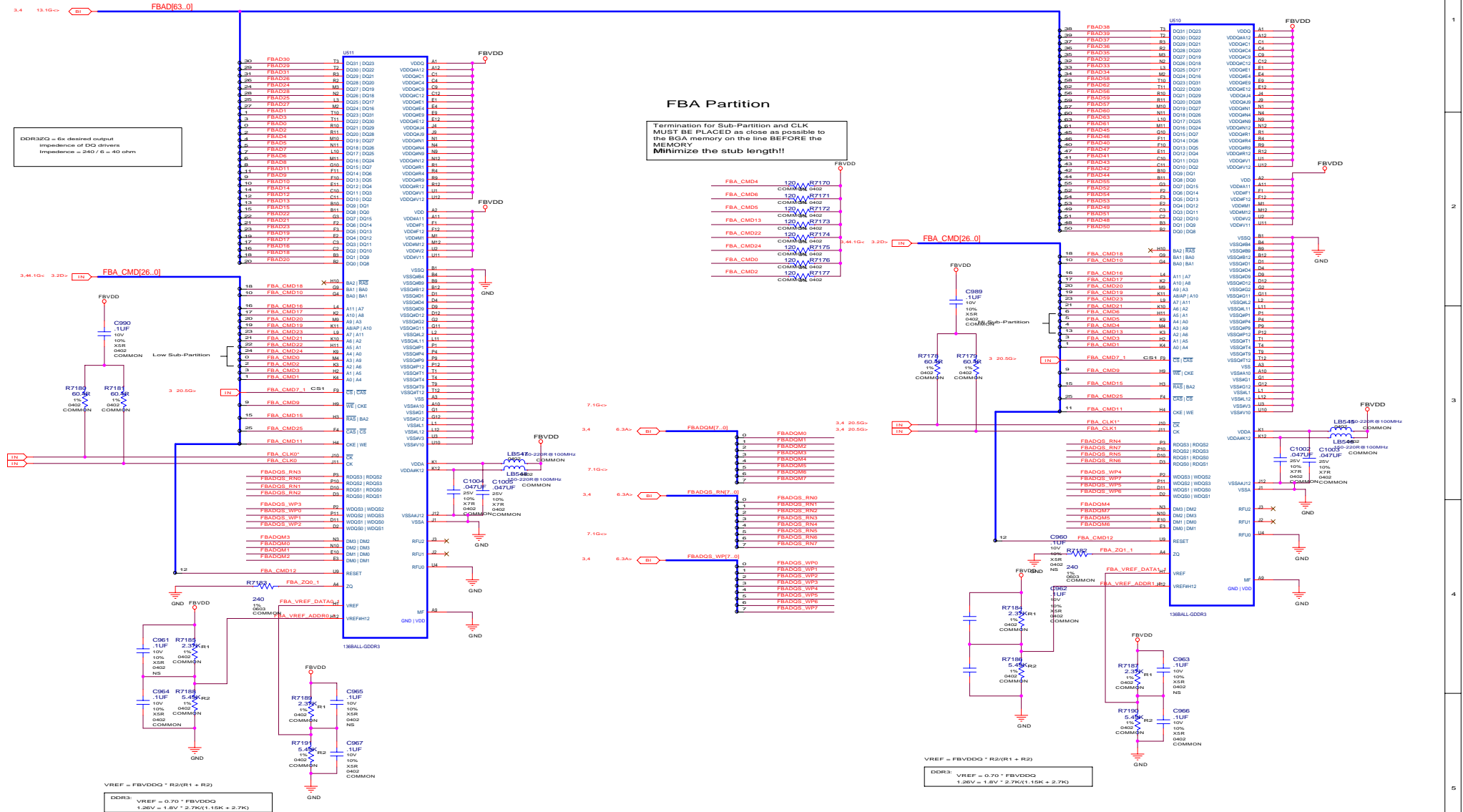


5 FrameBuffer: Partition A  
8Mx32 BGA136 DDR3





5 FrameBuffer: Partition A  
8Mx32 BGA136 DDR3

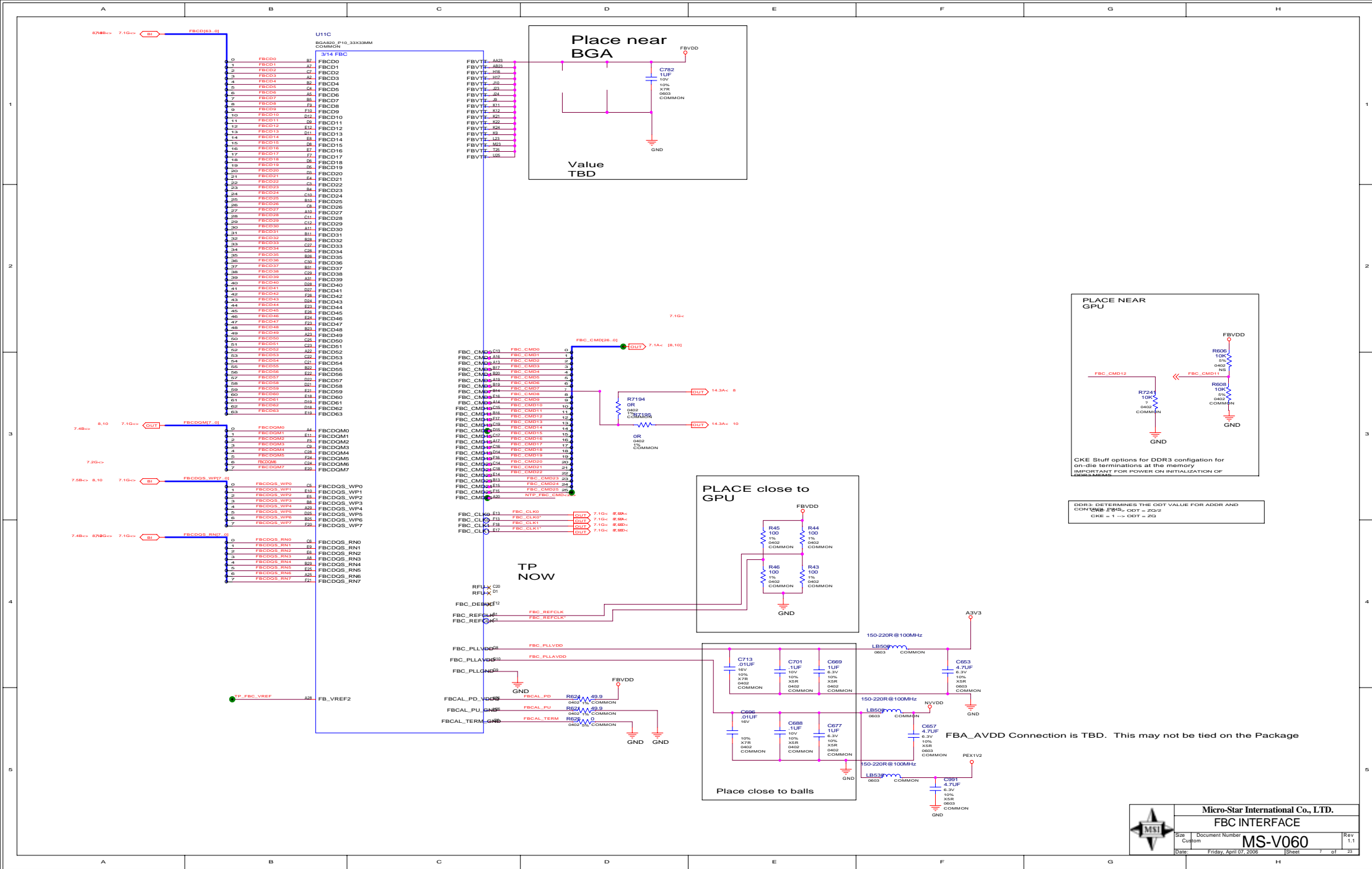


Micro-Star International Co., LTD.

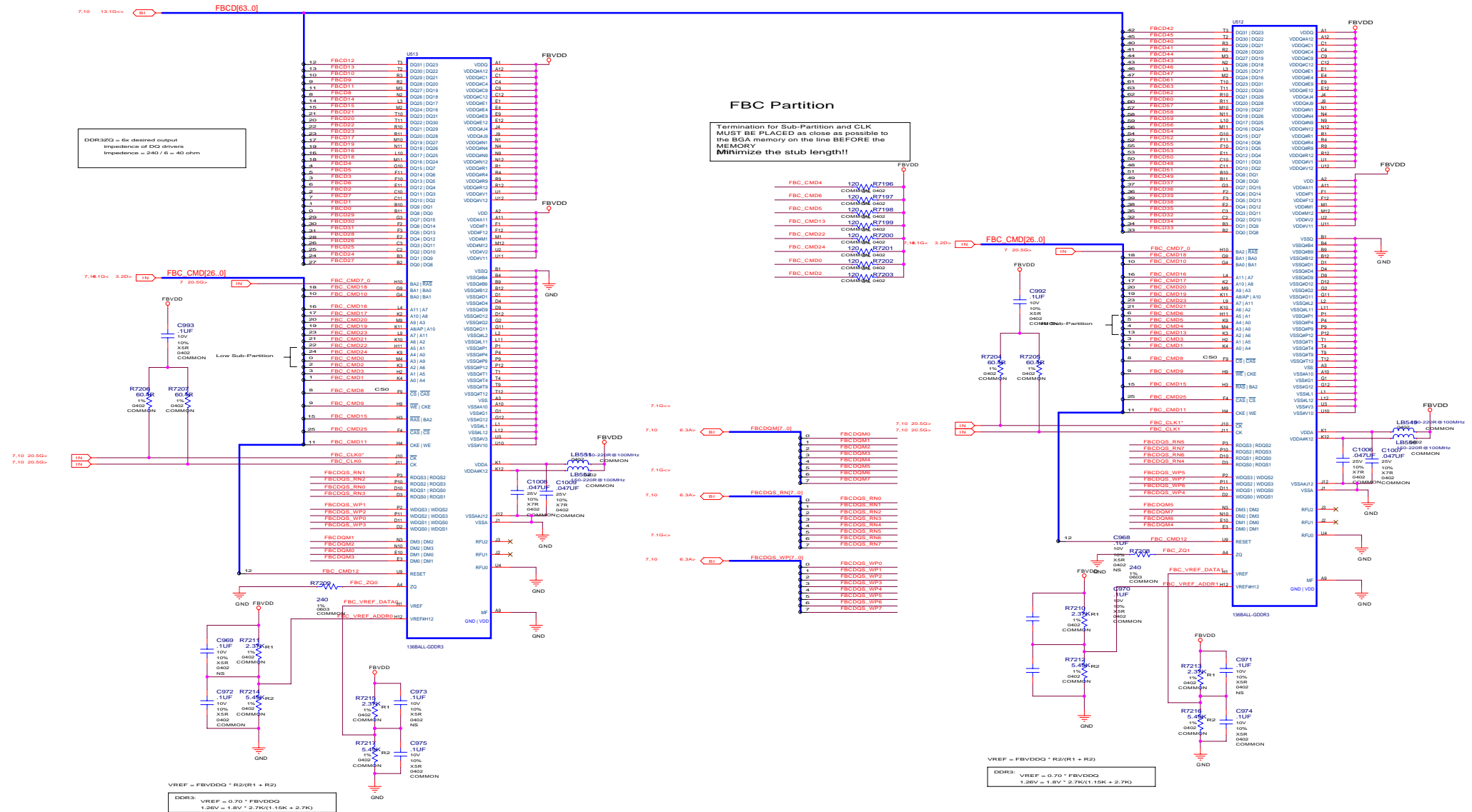
FB A2

|                              |                                   |            |
|------------------------------|-----------------------------------|------------|
| Size<br>Custom               | Document Number<br><b>MS-V060</b> | Rev<br>1.1 |
| Date: Friday, April 07, 2006 | Sheet 6 of 23                     |            |

Date: Friday, April 07, 2006 Sheet 6 of 23



FRAMEBUFFER: PARTITION  
C 8Mx32 BGA136 DDR3



**Micro-Star International Co., LTD.**

FB C1

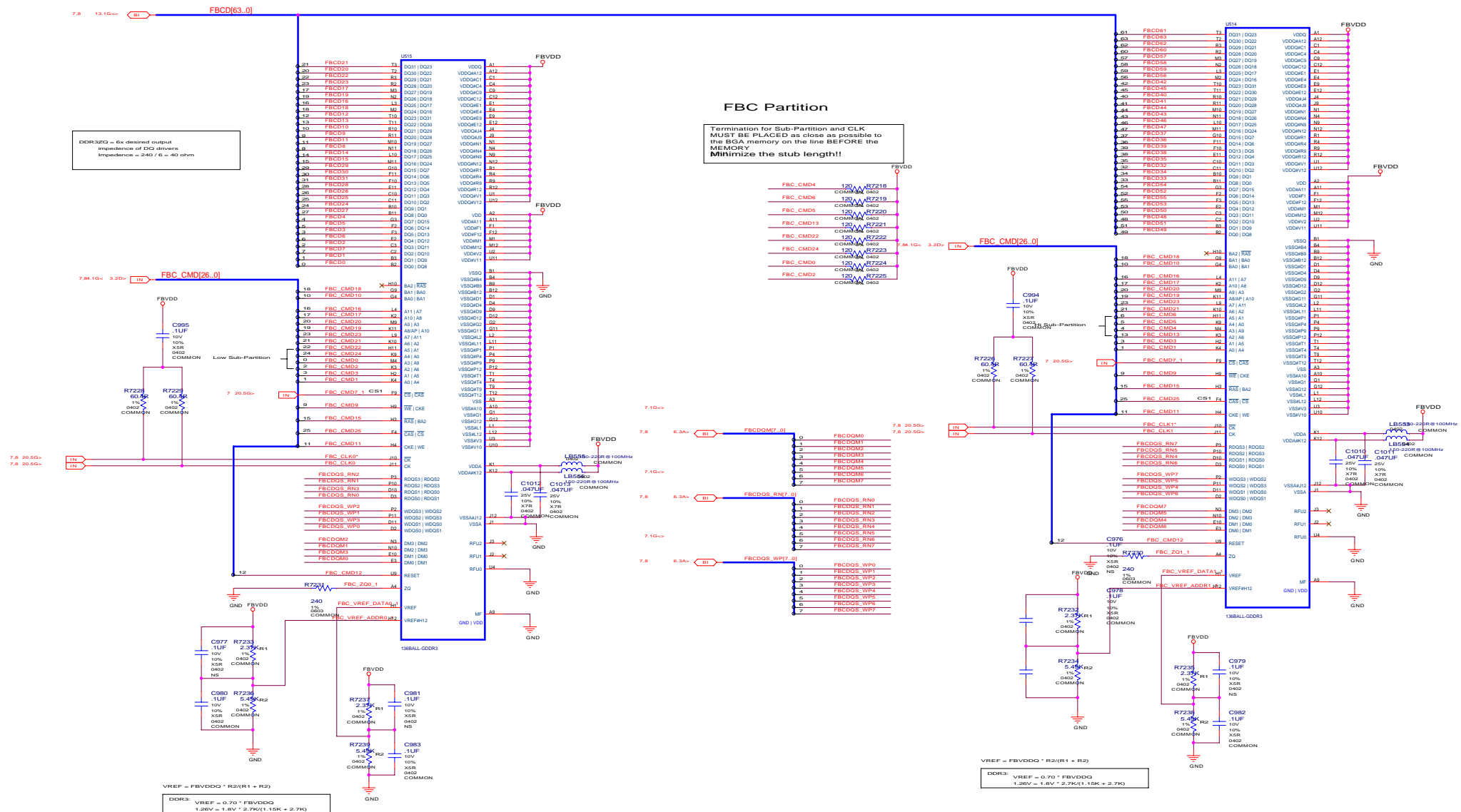
|                              |                                   |            |
|------------------------------|-----------------------------------|------------|
| Size<br>Custom               | Document Number<br><b>MS-V060</b> | Rev<br>1.1 |
| Date: Friday, April 07, 2006 | Sheet 8 of 23                     |            |

Date: Friday, April 07, 2006 Sheet 8 of 23



1

FRAMEBUFFER: PARTITION  
C 8Mx32 BGA136 DDR3

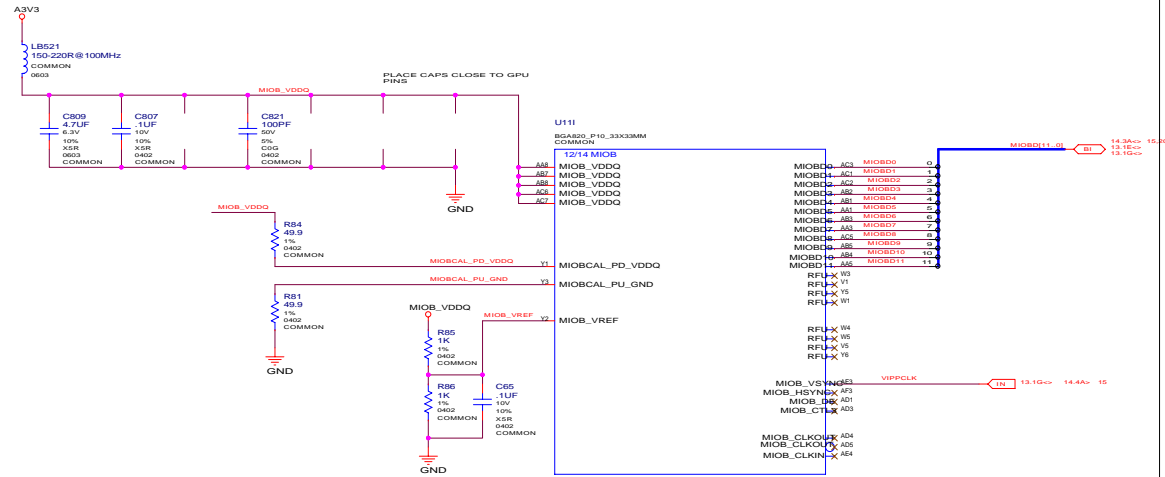


Micro-Star International Co., LTD.

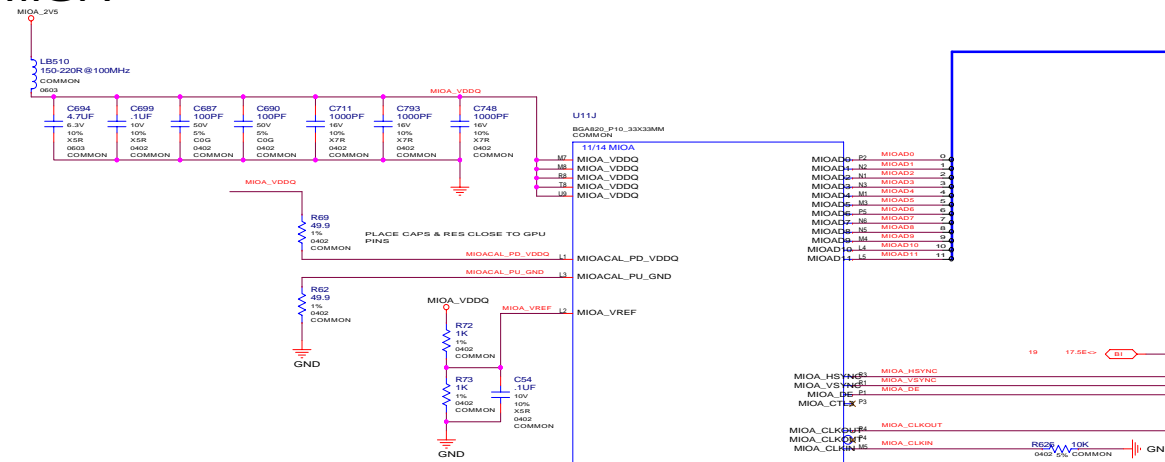
FB C2

|                              |                                   |            |
|------------------------------|-----------------------------------|------------|
| Size<br>Custom               | Document Number<br><b>MS-V060</b> | Rev<br>1.1 |
| Date: Friday, April 09, 2006 | Sheet 10 of 25                    |            |

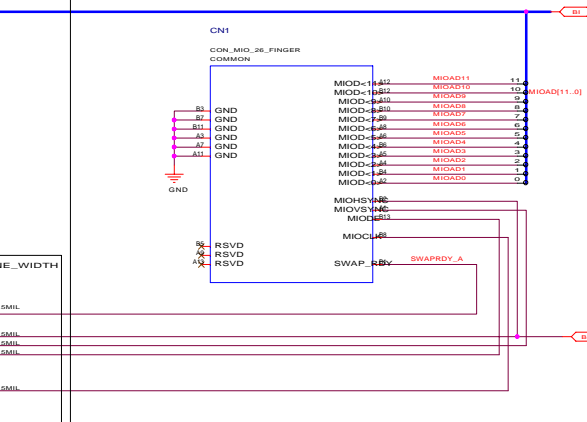
G3  
VIP/MIOB



G3  
MIOA



| Feature                       | Connector        |
|-------------------------------|------------------|
| 1. High-Speed Data Transfer   | USB-C            |
| 2. Versatile Connectivity     | Thunderbolt 3    |
| 3. Compact Design             | Mini DisplayPort |
| 4. Wide Compatibility         | HDMI             |
| 5. Durable Construction       | Lightning        |
| 6. Easy Setup                 | FireWire         |
| 7. High Resolution Support    | DisplayPort      |
| 8. Power Delivery             | USB-A            |
| 9. Wide Range of Applications | SD Card          |
| 10. Interchangeable           | Micro-USB        |



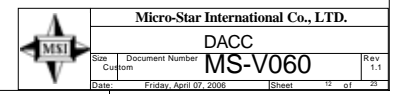
**Micro-Star International Co., LTD.**

MIOA/MIOB

|                              |                                   |            |
|------------------------------|-----------------------------------|------------|
| Size<br>Custom               | Document Number<br><b>MS-V060</b> | Rev<br>1.1 |
| Date: Friday, April 07, 2006 | Sheet 11 of 23                    |            |

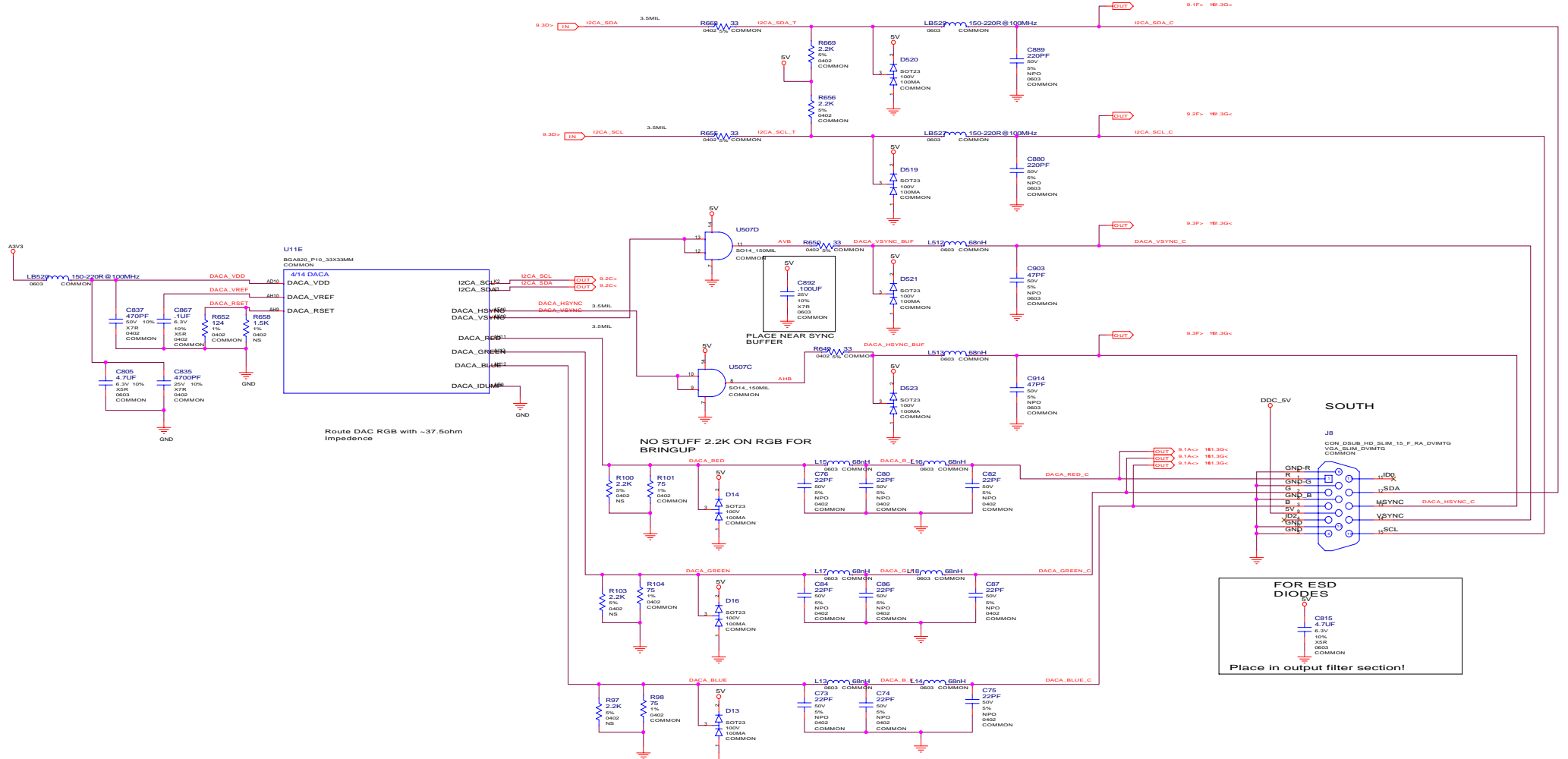
Date: Friday, April 07, 2006 Sheet 11 of 23

DACC  
RGB-FILTER



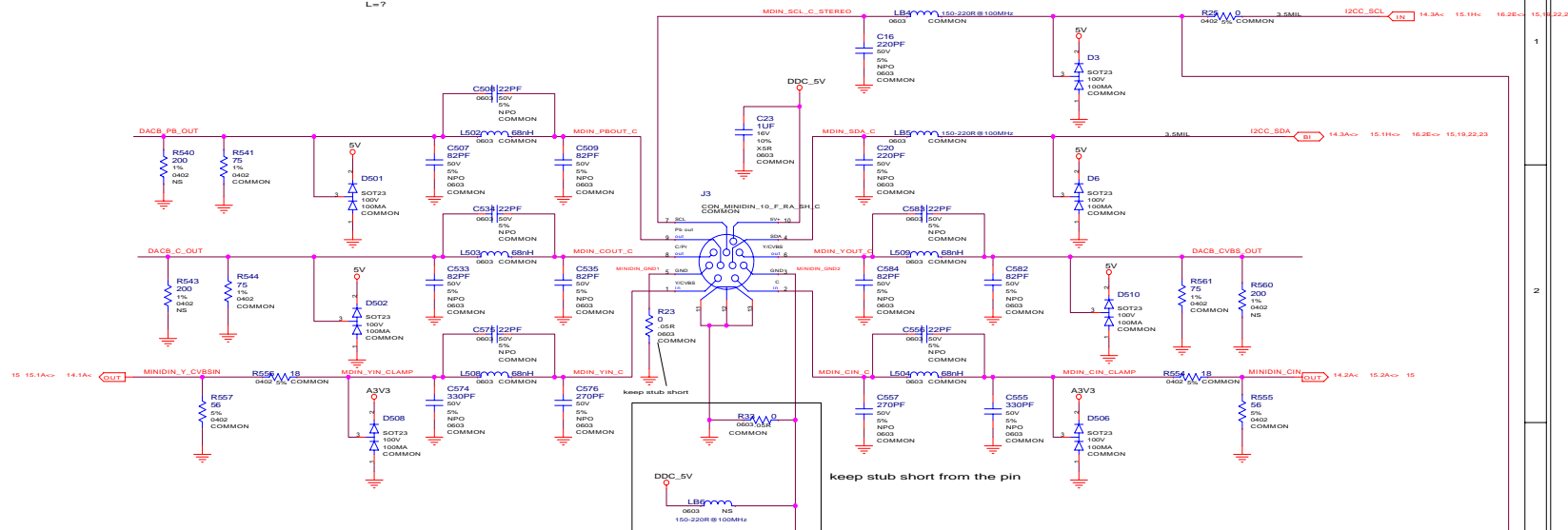
# Primary Display (DACA), Slim DB15

## DACA RGB-FILTER



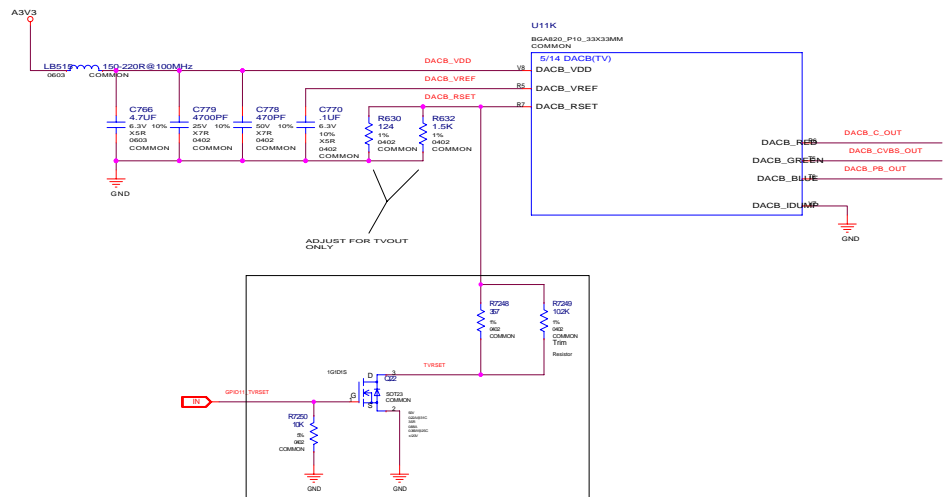
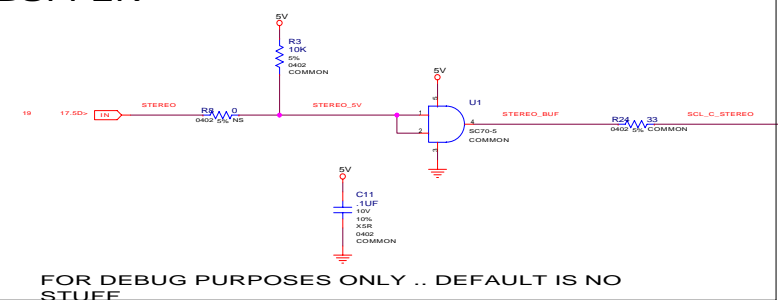
# DACB .. MiniDIN VIDEO IN/OUT CONNECTOR /STEREO GLASSES

FILTER  
NOTES:  
SD- USE  
NEED 0.01H  
L=7



For STEREO GLASSES 3pin MiniDIN  
0.01H bead!  
And replace 0 Ohm resistor with 220PF cap!

## STEREO GLASSES BUFFER to MiniDIN connector!



NC for G73



Micro-Star International Co., LTD.

|        |                        |       |          |
|--------|------------------------|-------|----------|
| Size   | Document Number        | DACB  | Rev      |
| Custom | MS-V060                | 1.1   |          |
| Date   | Friday, April 07, 2006 | Sheet | 11 of 23 |

1



3

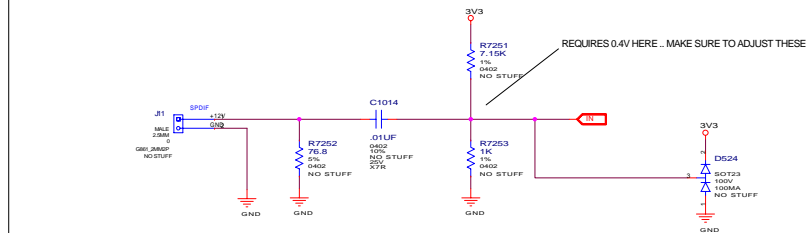
5

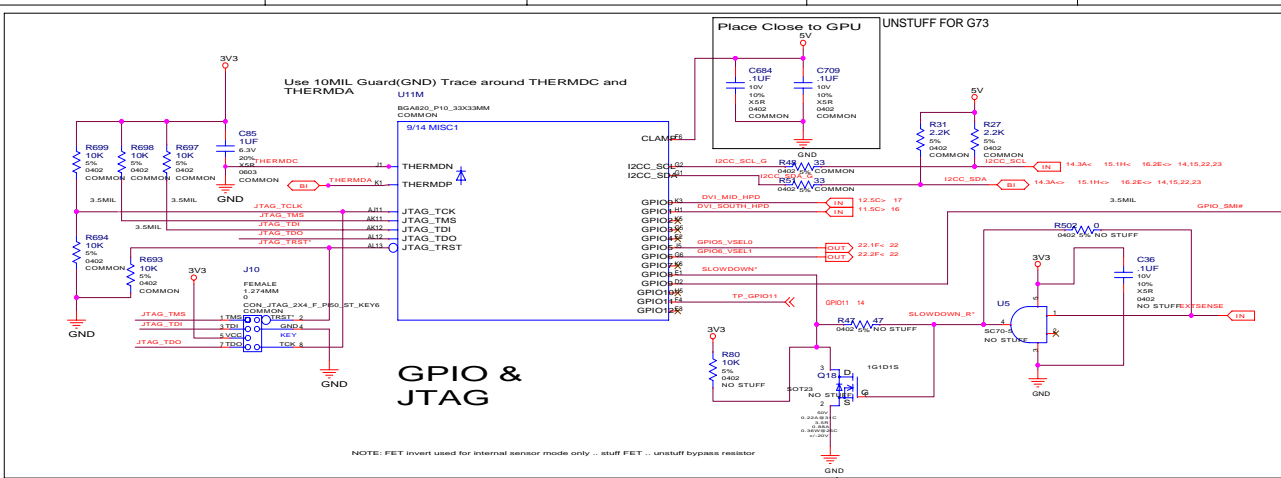




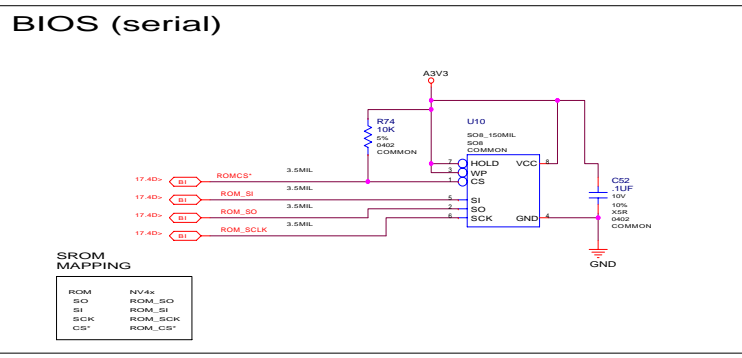
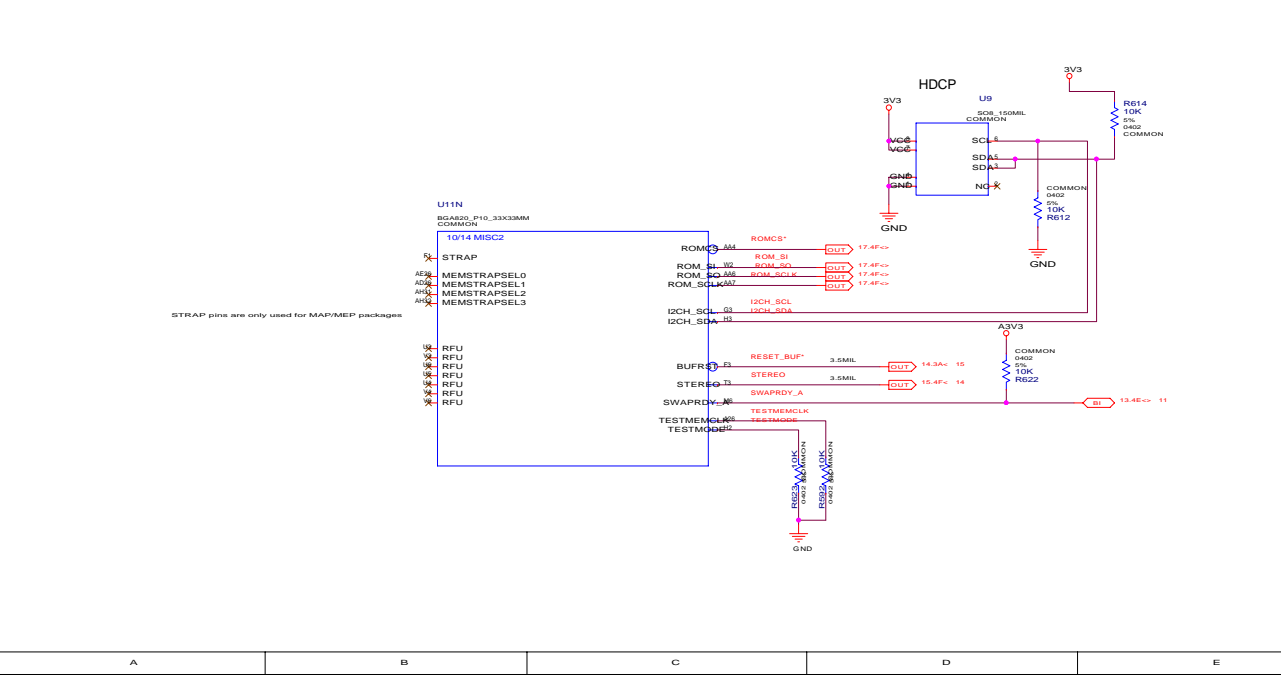


## EXTERNAL 4-PIN VIDEO IN CONNECTOR



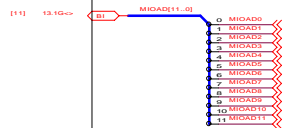


| GPIO Assignment Table |                            |
|-----------------------|----------------------------|
| GPIO#                 | FUNCTION                   |
| 0                     | IN DVI MID HOTPLUG DET     |
| 1                     | IN DVI SOUTH HOTPLUG DET   |
| 2                     | IN RESERVED                |
| 3                     | IN RESERVED                |
| 4                     | IN TUNER IRQ               |
| 5                     | OUT NVVDD VOLTAGE SELECT 0 |
| 6                     | OUT NVVDD VOLTAGE SELECT 1 |
| 7                     | IN RESERVED                |
| 8                     | IN RESERVED                |
| 9                     | OUT PWM FAN                |
| 10                    | IN RESERVED                |
| 11                    | IN TVRSET                  |
| 12                    | IN RESERVED                |



# BIOS, Straps, Misc

Assembly:  
BIOS



STUFF  
2.0K  
BOND OPTION 0 =  
DISCRETE



REG:  
NV\_PEXTDEV\_BOOT\_0  
Bit Signal VALUE\_ID VALUES

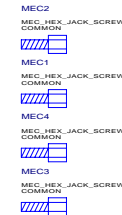
| 00 | PCI_AD_SWAP     | 0   | REVERSED        |
|----|-----------------|---|-----------------|
| 01 | SUB_VENDOR      | 0   | BIOS            |
| 02 | RAM_CFG_0       | 0000                                      | RAM             |
| 03 | RAM_CFG_1       | 0000                                      | RAM             |
| 04 | RAM_CFG_2       | 0000                                      | RAM             |
| 05 | RAM_CFG_3       | 0000                                      | RAM             |
| 06 | CRYSTAL_0       | 01  | 14.31818 Mhz    |
| 07 | CRYSTAL_1       | 11  | 10.27000 Mhz    |
| 08 | TV_MODE_0       | 0   | TV              |
| 09 | TV_MODE_1       | 0   | TV              |
| 10 | AGP_Enable      | 0   | AGP Disabled    |
| 11 | AGP_FASTWR      | 0   | disabled        |
| 12 | PCI_DEVID_0     | 0000 0040 - 1111 00014F                   |                 |
| 13 | PCI_DEVID_1     | 0000 (default 0x140)                      |                 |
| 14 | PCI_DEVID_2     | 0101 (0x145)                              |                 |
| 15 | PCI_DEVID_3     |   |                 |
| 16 | BUS_TYPE        | BUS_TYPE[0]                               | 0 PCI           |
| 17 | FP_IFACE        | FP_IFACE[0]                               | 0 SBA           |
| 18 | FB_0            | FB(1-0)                                   | 0 SBA           |
| 19 | FB_1            | FB(1-0)                                   | 0 SBA           |
| 20 | BR              | BR[0]                                     | 0 SBA           |
| 21 | BR_128M         | BR bits are ignored if BRIDGE is disabled |                 |
| 22 | BR_AGP          | BR_AGP                                    | 0 SBA           |
| 23 | BR_IO           | BR_IO                                     | 0 SBA           |
| 24 | ROM_TYPE_0      | ROM_TYPE[1-0]                             | 00 Parallel     |
| 25 | ROM_TYPE_1      | ROM_TYPE[1-0]                             | 01 Serial AT25F |
| 26 | STRAP_USER[3-0] | 0000 (default)                            |                 |
| 27 | USER_1          |   |                 |
| 28 | USER_2          |   |                 |
| 29 | USER_3          |   |                 |

REG:  
NV\_STRAP\_1  
Bit Signal VALUE\_ID VALUES

| 11 | PEX_PLL_EN_TERM100     | 0 (default -- internal term on) |
|----|------------------------|---------------------------------|
| 12 | 3GIO_PADCFG_LUT_ADR[0] |                                 |
| 13 | 3GIO_PADCFG_LUT_ADR[1] |                                 |
| 14 | 3GIO_PADCFG_LUT_ADR[2] |                                 |
| 15 | SLOT_CLK_CONFIG        |                                 |

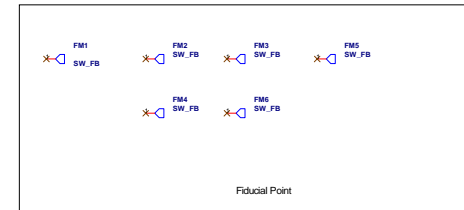
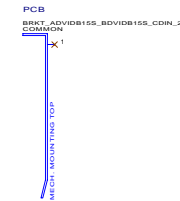
# Mechanical parts

NEED FANSINK SYMBOL  
FOR P216



155-00002-0000-000 SCREW PHIL PAN HD SS MACH 4-40  
3/16

MOS  
HEATSINK



Fiducial Point

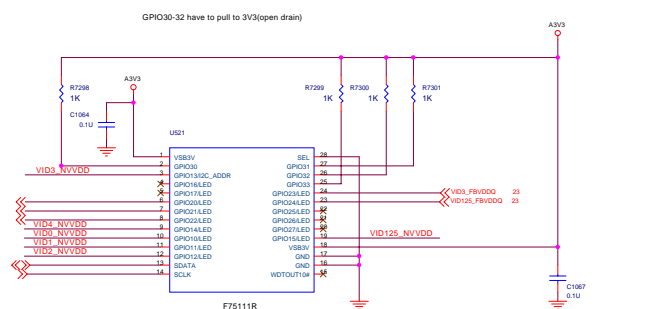
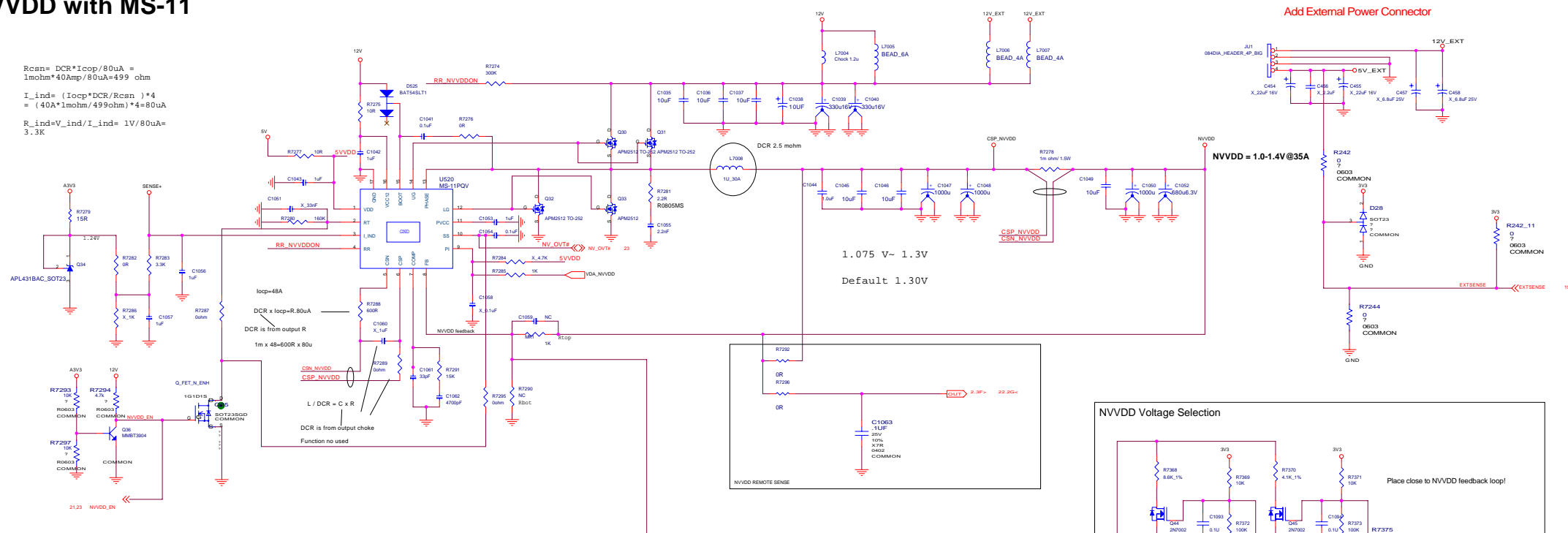


## NVVDD with MS-11

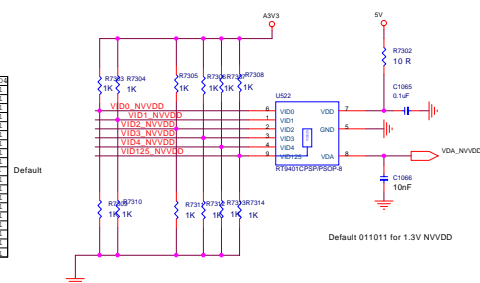
```
Rcsn= DCR*Icop/80uA =
1mohm*40Amp/80uA=499 ohm

I_ind= (Iocp*DCR/Rcsn) *4
= (40A*1mohm/499ohm)*4=80uA

R_ind=V_ind/I_ind= 1V/80uA=
3.3K
```



| Vda_Vddcc | VID125 | ID0 | ID1 | ID2 | ID3 |
|-----------|--------|-----|-----|-----|-----|
| E.180V5   | 0      | 1   | 1   | 0   | 1   |
| E.200V    | 1      | 0   | 1   | 0   | 1   |
| E.2125V   | 0      | 0   | 1   | 0   | 1   |
| E.225V    | 1      | 1   | 0   | 0   | 1   |
| E.2375V   | 0      | 1   | 0   | 0   | 1   |
| E.250V    | 1      | 0   | 0   | 0   | 1   |
| E.2625V   | 0      | 0   | 0   | 0   | 1   |
| E.275V    | 1      | 1   | 1   | 1   | 0   |
| E.287V    | 0      | 1   | 1   | 1   | 0   |
| E.300V    | 1      | 0   | 1   | 1   | 0   |
| E.3125V   | 0      | 0   | 1   | 1   | 0   |
| E.325V    | 1      | 1   | 0   | 1   | 0   |
| E.3375V   | 0      | 1   | 0   | 1   | 0   |
| E.350V    | 1      | 0   | 0   | 1   | 0   |
| E.3625V   | 0      | 0   | 0   | 1   | 0   |
| E.375V    | 1      | 1   | 1   | 0   | 0   |
| E.3875V   | 0      | 1   | 1   | 0   | 0   |
| E.400V    | 0      | 0   | 1   | 0   | 0   |
| E.4125V   | 0      | 0   | 1   | 0   | 0   |



**NVVDD 1.33V default 010101**

```
NVVD_ GPIO:10~15
FBVDDQ_ GPIO:20~24
DACA_ RESET---GPIO:25~28
DACC_ RESET---GPIO:30~32
```

## FBVDD with MS-11

