# CACTUS
# REV 0.991
## FAB G RETAIL

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RULES: (APPLIED WHEN POSSIBLE)
1. MSB TO LSB IS TOP TO BOTTOM
2. WHEN POSSIBLE: INPUTS ON LEFT, OUTPUTS ON RIGHT
3. ORDER OF PAGES=CHIP INTERFACES, TERMINATION, POWER, DECOUPLING
4. AVOID USING OFF PAGE CONNECTORS FOR ON PAGE CONNECTIONS
5. LANED SIGNALS ARE GROUPED ON SYMBOLS
6. TRANSIMITTER NAME USED AS PREFIX WITH RX AND TX CONNECTIONS
7. SUFFIX _V  IS USED FOR VOLTAGE RAIL SIGNAL NAMES
8. SUFFIX _DP AND _DN ARE USED FOR DIFFERIENTAL PAIRS
9.  UNNAMED NETS ARE NAMED WITH /2 TEXT SIZE
10. SUFFIX _N FOR ACTIVE LOW OR N JUNCTION
12. SUFFIX _P FOR P JUNCTION
13. SUFFIX _EN FOR ENABLE
14. 'CLK' FOR CLOCKS, 'RST' FOR RESETS
15. PWRGD FOR POWER GOOD
16. REV AND FAB ARE SET USING CUSTOM VARIABLES
    TOOLS>OPTIONS>VARIABLES



DRAWING
Thu Apr 20 16:18:47 2017

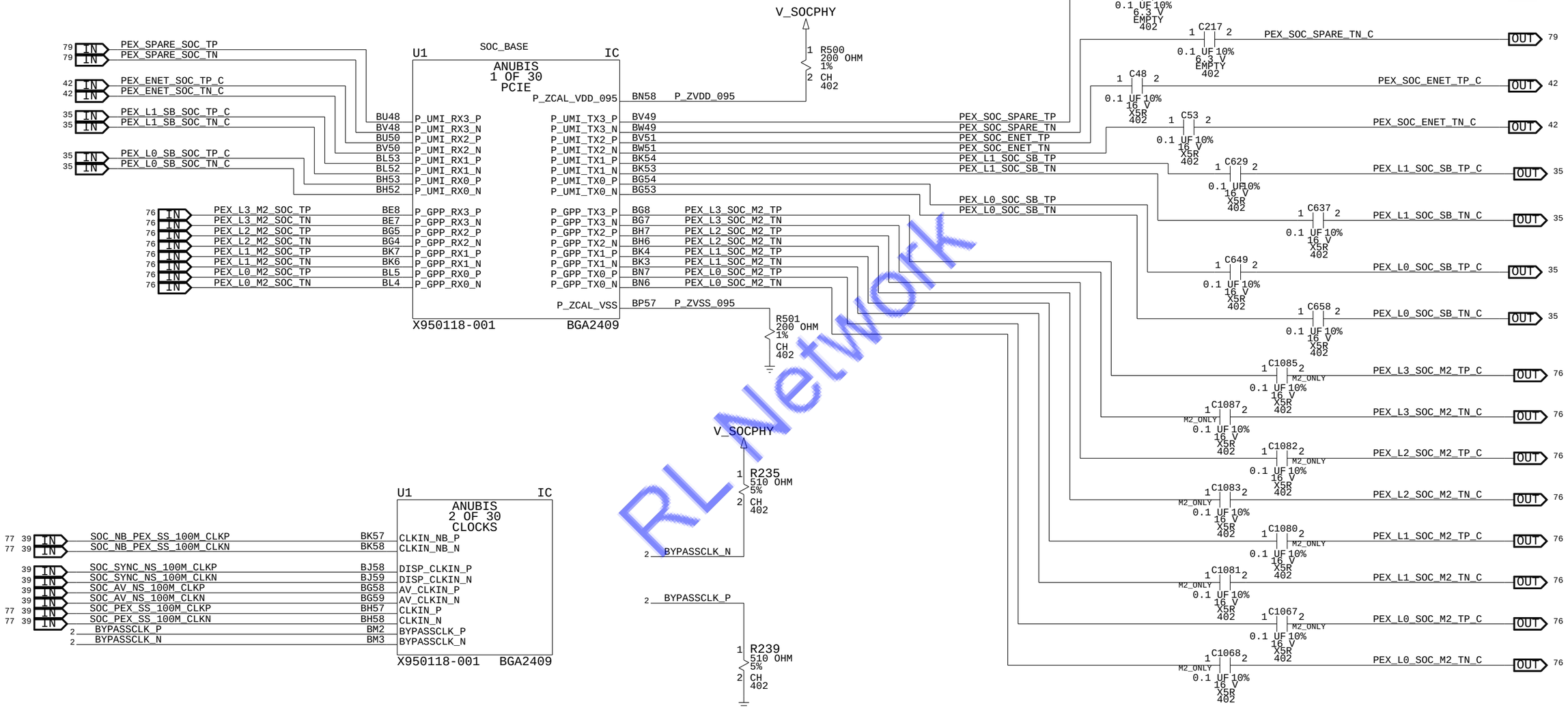
| | | | | | |
|---|---|---|---|---|---|
| MICROSOFT CONFIDENTIAL | PROJECT NAME: Cactus | PAGE: 1/82 | CSA PAGE: 1/82 | FAB: G-R | VER: 0.991 |

# SOC:PCIEX,CLOCKS

NOTES:

1.TO SUPPORT PCIE SPARE LANE INTERFACE (J28), POPULATE C215 AND C217

2.SEE PAGES 77 AND 79 FOR ADDITIONAL PCIE SPARE LANE INFORMATION












| MS_PART# | MATL | REF_DES | DESCR. | BOM PROPERTY |
|---|---|---|---|---|
| X950118-001 | IC | U1 | PROCSR-CPU-GPU,SM,1.0GHZ,BGA2049,ANUBIS | SOC_INCLUDE |
| X950118-001 | EMPTY | U1 | PROCSR-CPU-GPU,SM,1.0GHZ,BGA2049,ANUBIS | SOC_EMPTY |

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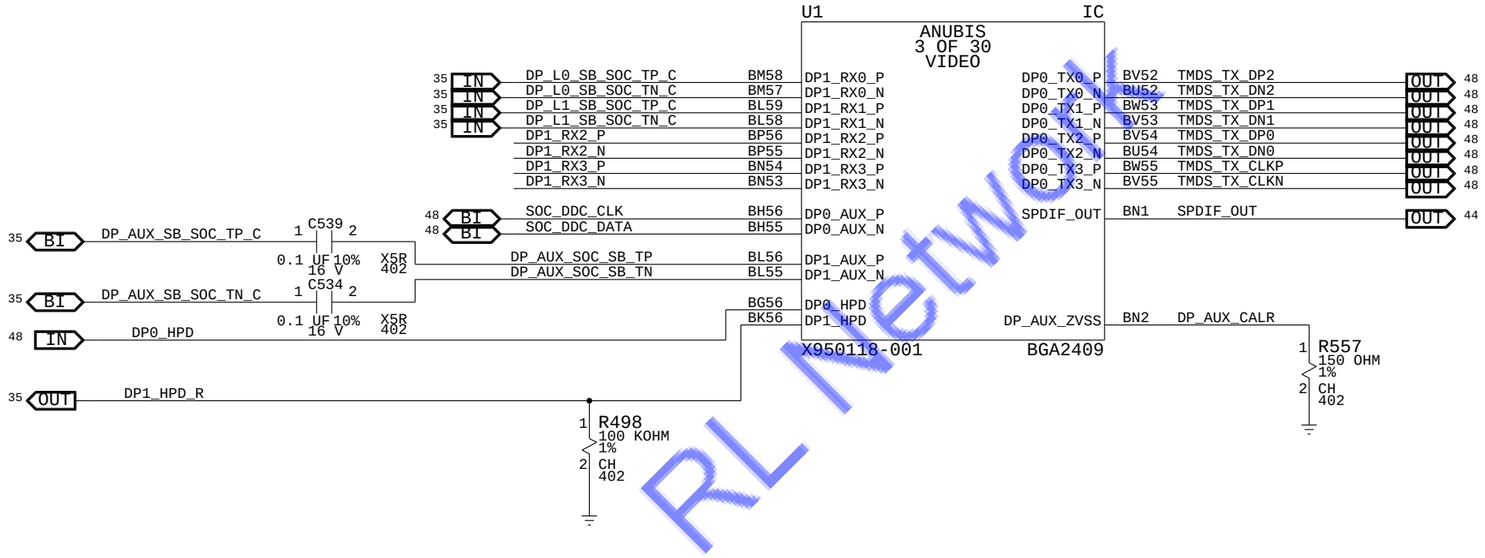
# SOC: VIDEO




| DVI PCB ROUTING ORDERING | DP PCB ROUTING ORDERING | PIN NAME |
|---|---|---|
| TMDS CLOCK - | DP LANE 3 - | DP0_TX3_N |
| TMDS CLOCK + | DP LANE 3 + | DP0_TX3_P |
| TMDS DATA0 - | DP LANE 2 - | DP0_TX2_N |
| TMDS DATA0 + | DP LANE 2 + | DP0_TX2_P |
| TMDS DATA1 - | DP LANE 1 - | DP0_TX1_N |
| TMDS DATA1 + | DP LANE 1 + | DP0_TX1_P |
| TMDS DATA2 - | DP LANE 0 - | DP0_TX0_N |
| TMDS DATA2 + | DP LANE 0 + | DP0_TX0_P |



| MICROSOFT CONFIDENTIAL | PROJECT NAME | PAGE | CSA PAGE | FAB | VER |
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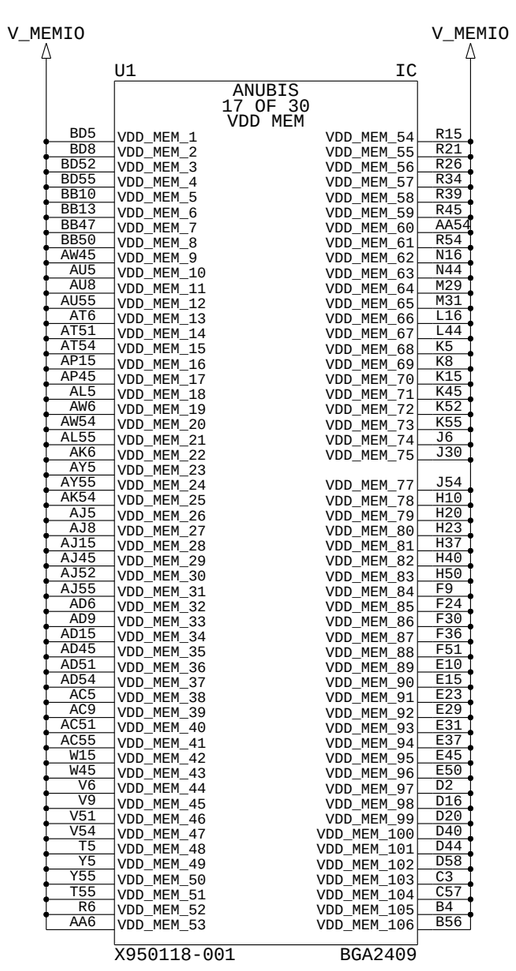
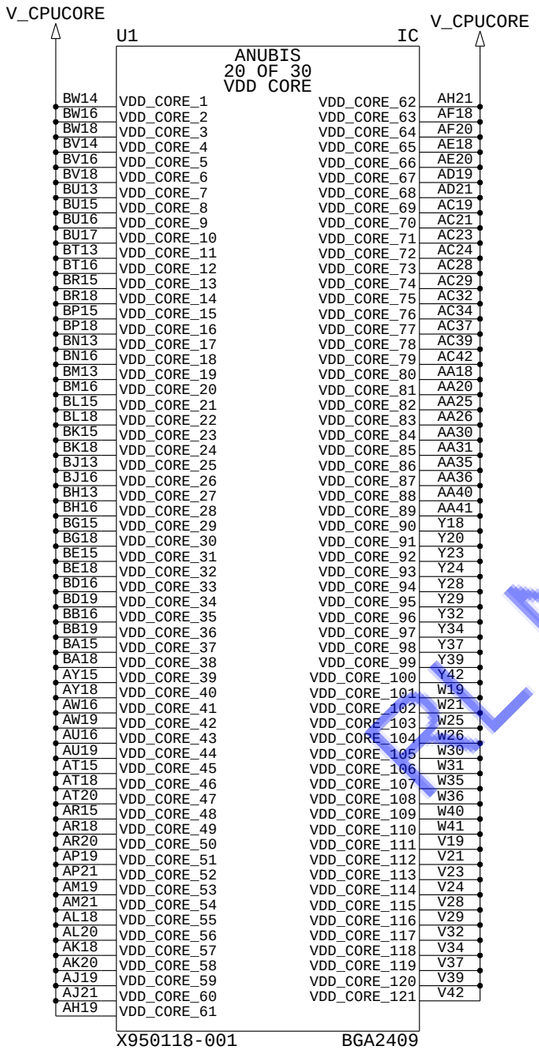
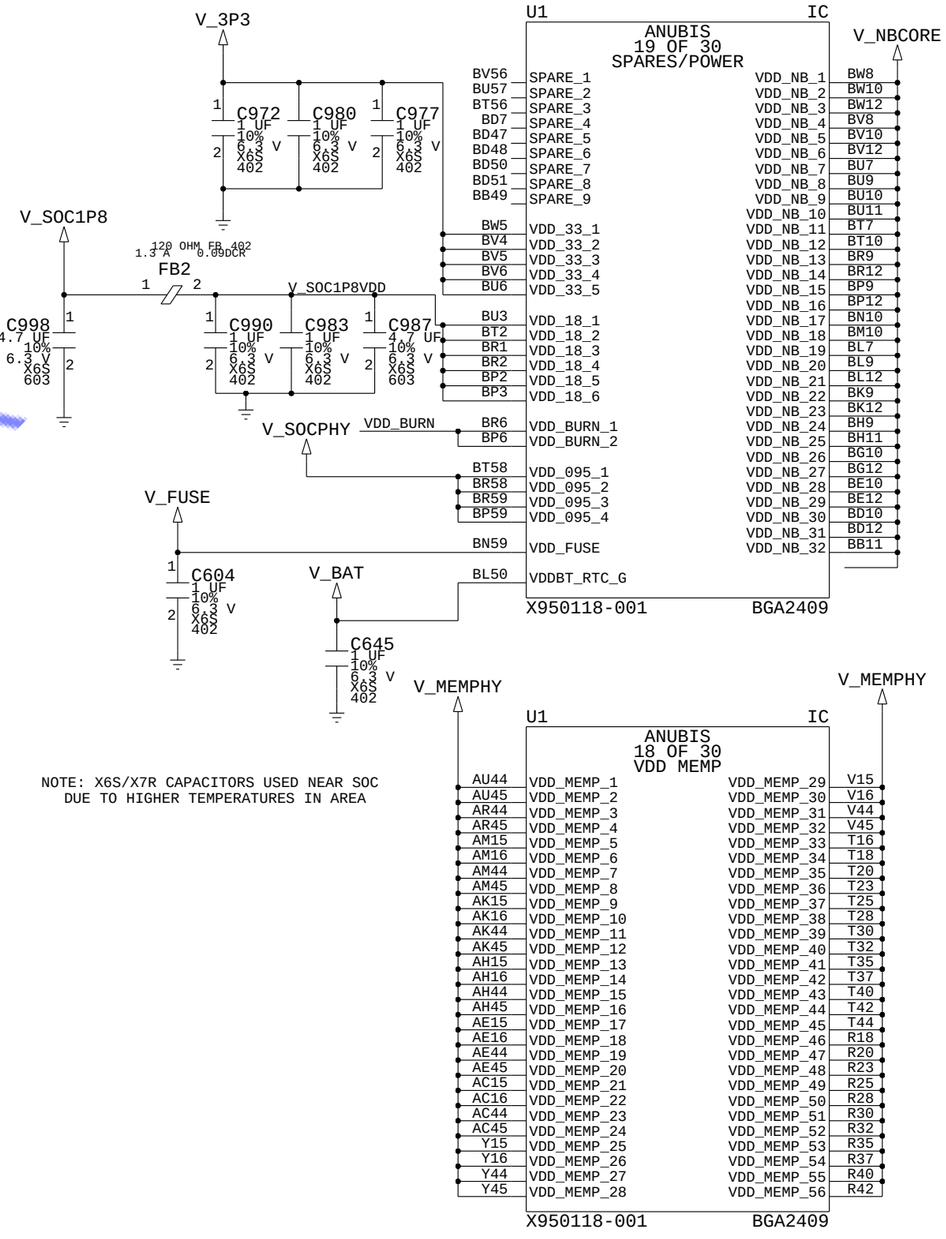
| | Cactus | 3/82 | 3/82 | G-R | 0.991 |

# SOC: POWER: MEMIO,MEMPHY,CPUCORE,NBCORE,MISC




NOTE: X6S/X7R CAPACITORS USED NEAR SOC
DUE TO HIGHER TEMPERATURES IN AREA






| MICROSOFT CONFIDENTIAL | PROJECT NAME | PAGE | CSA PAGE | FAB | VER |
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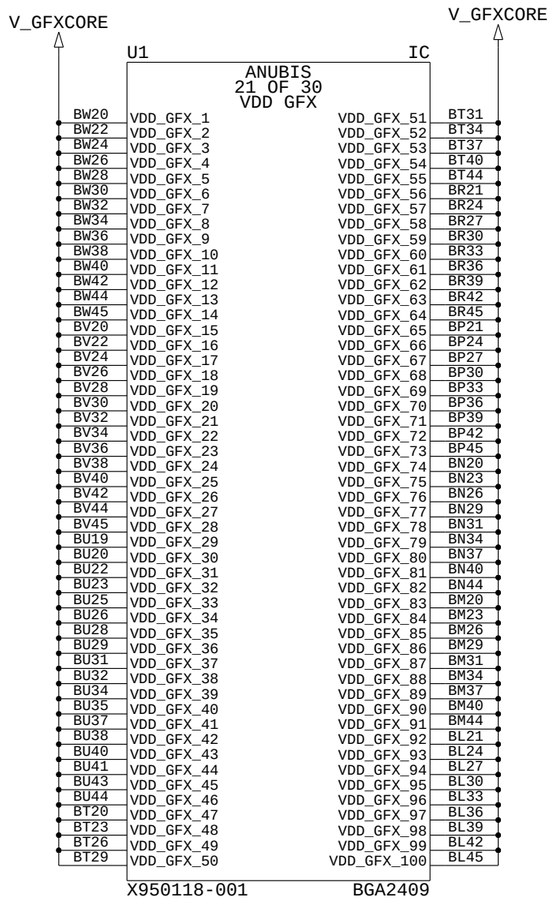
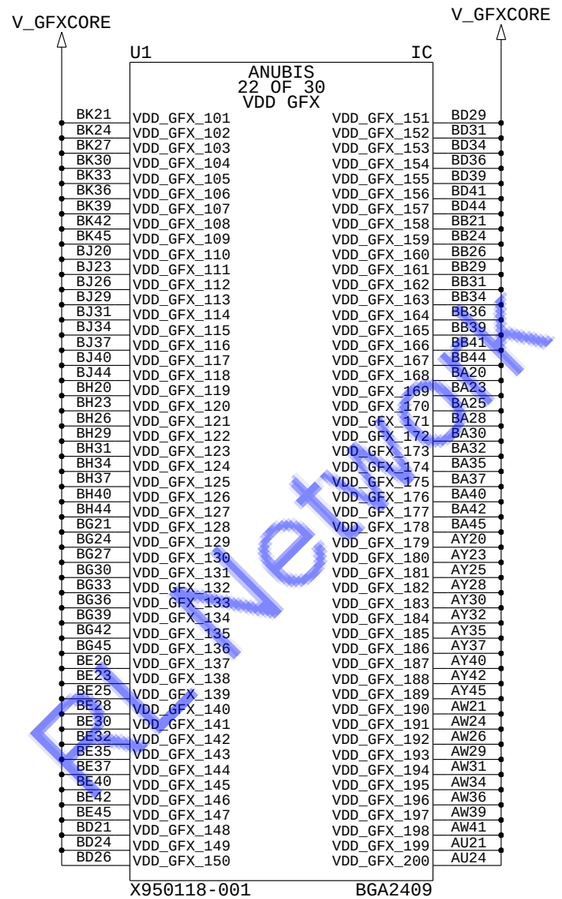
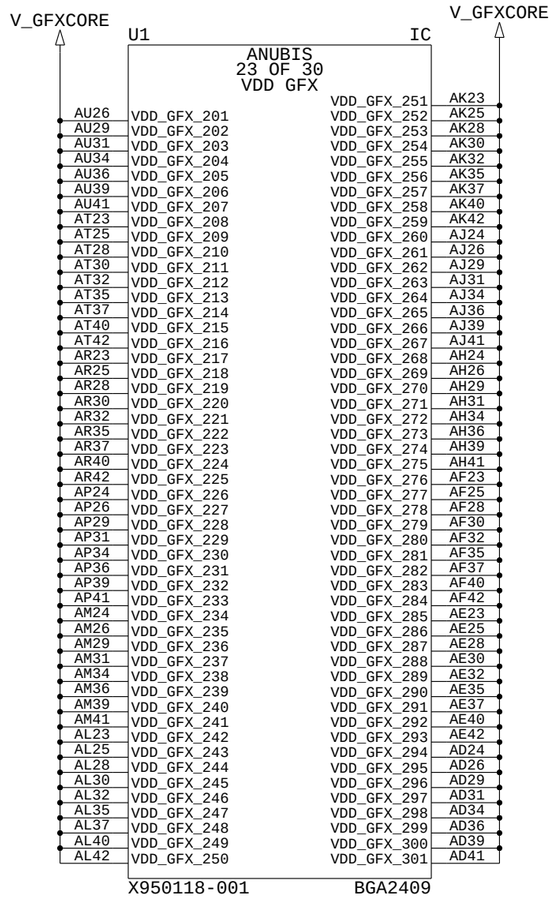
# SOC: POWER: GFXCORE






| MICROSOFT CONFIDENTIAL | PROJECT NAME | PAGE | CSA PAGE | FAB | VER |
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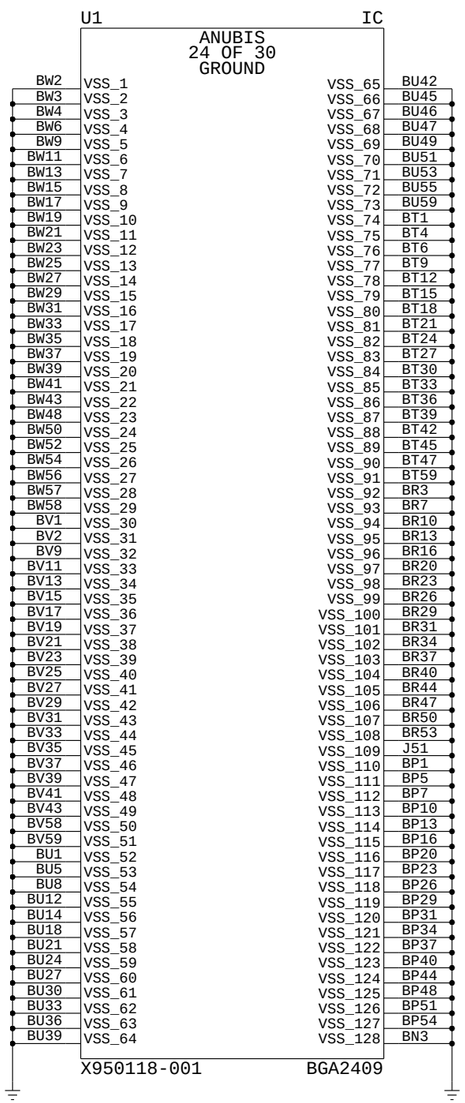
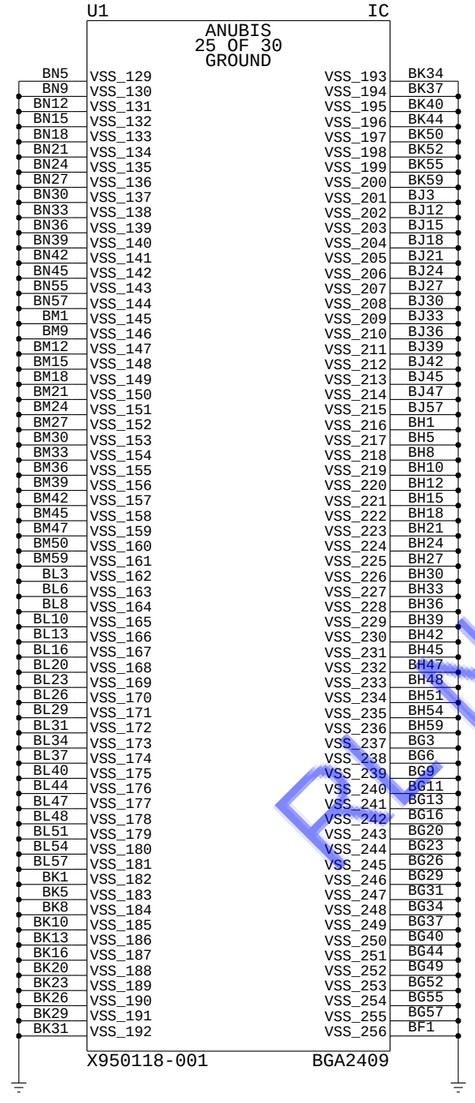
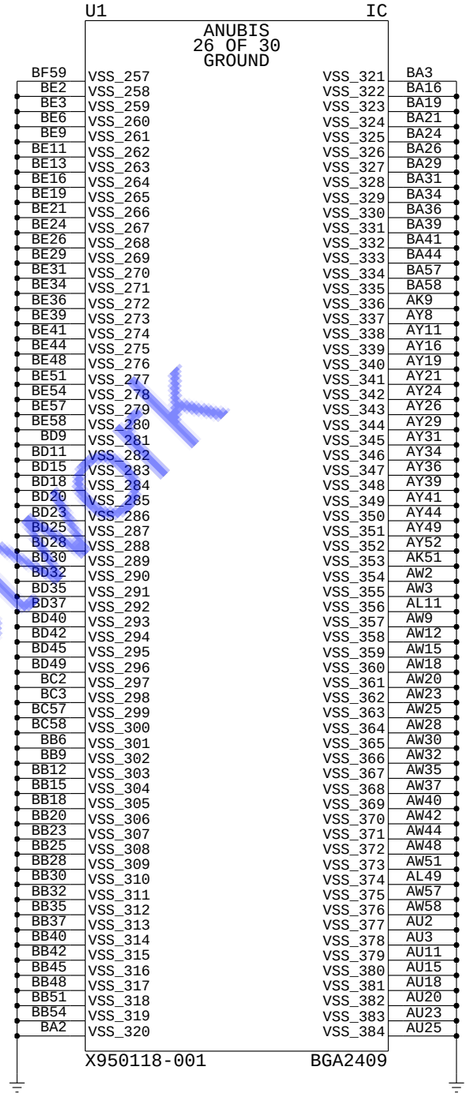
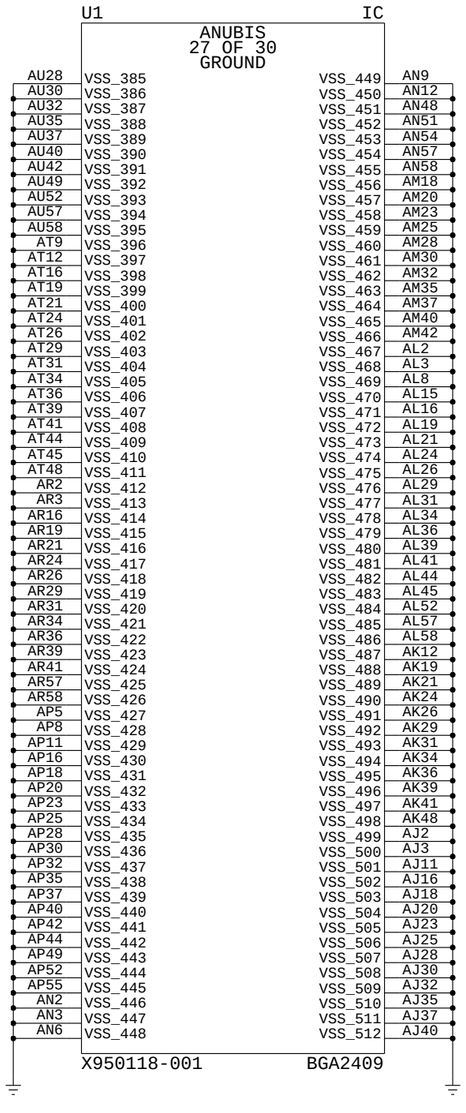
# SOC: POWER: VSS






| MICROSOFT CONFIDENTIAL | PROJECT NAME | PAGE | CSA PAGE | FAB | VER |
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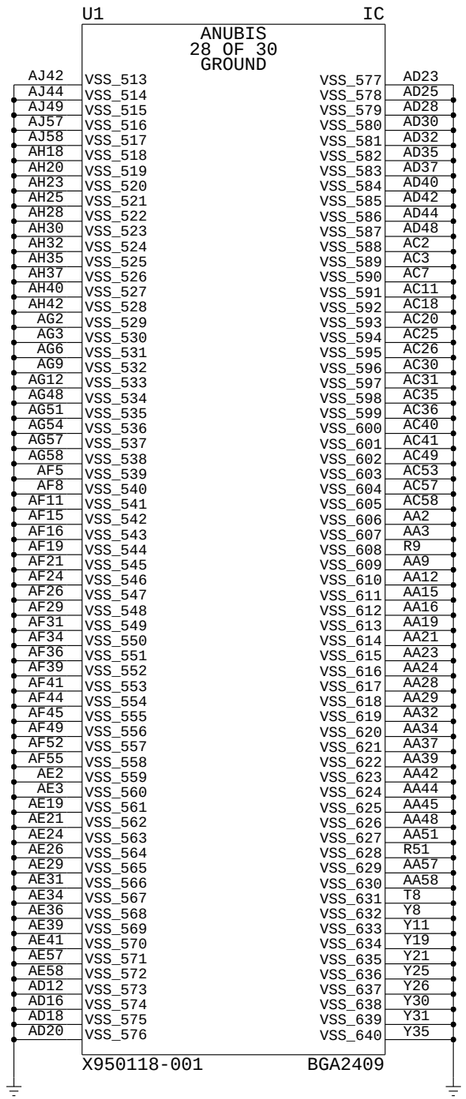
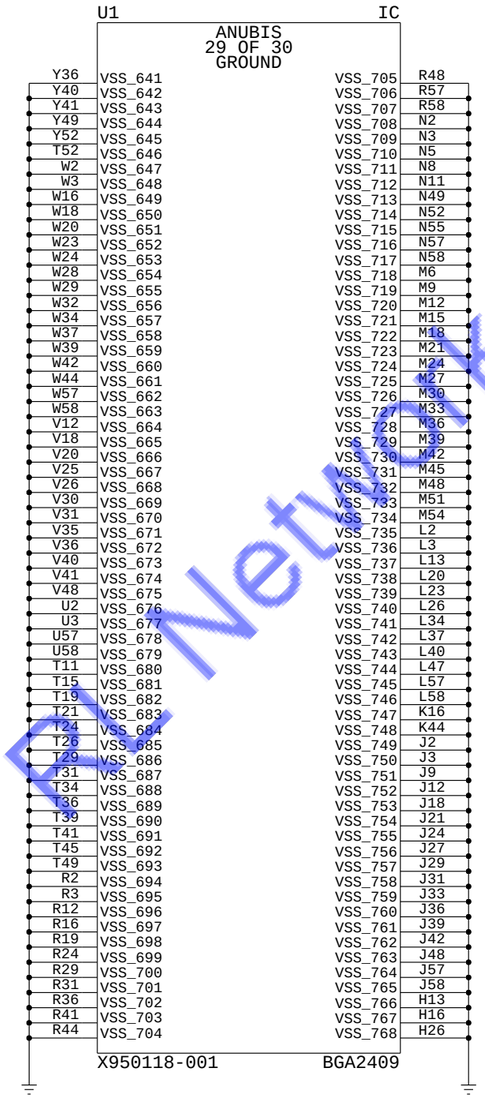
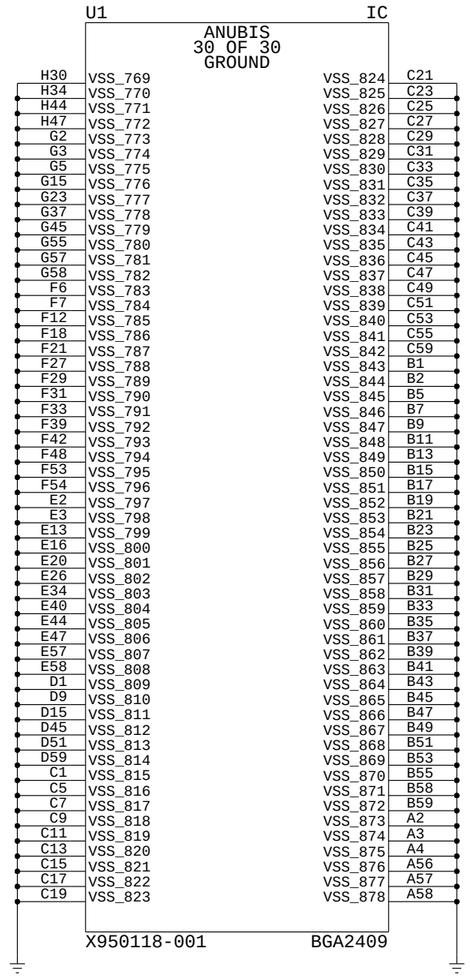
| | Cactus | 6/82 | 6/82 | G-R | 0.991 |

# SOC: POWER: VSS






| MICROSOFT CONFIDENTIAL | PROJECT NAME | PAGE | CSA PAGE | FAB | VER |
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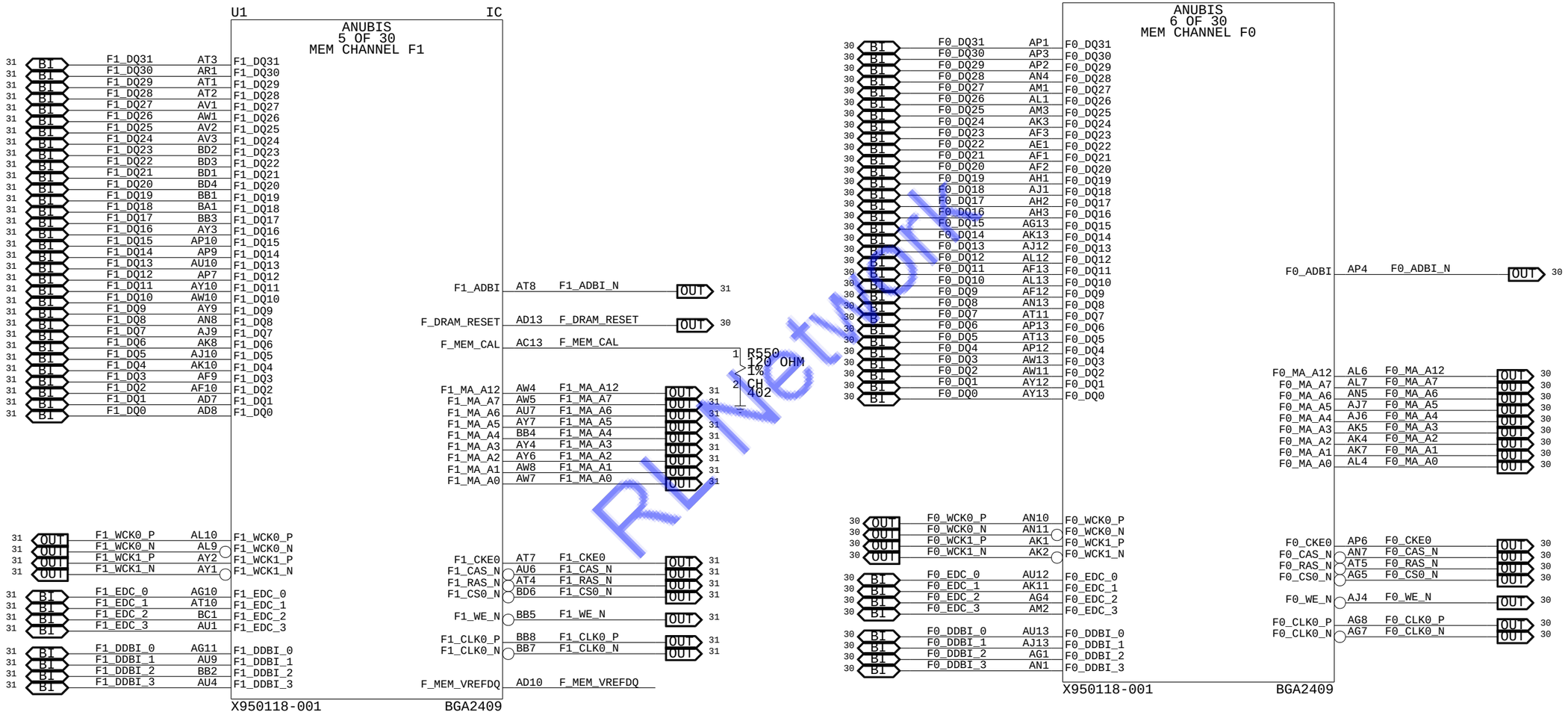
| | Cactus | 7/82 | 7/82 | G-R | 0.991 |

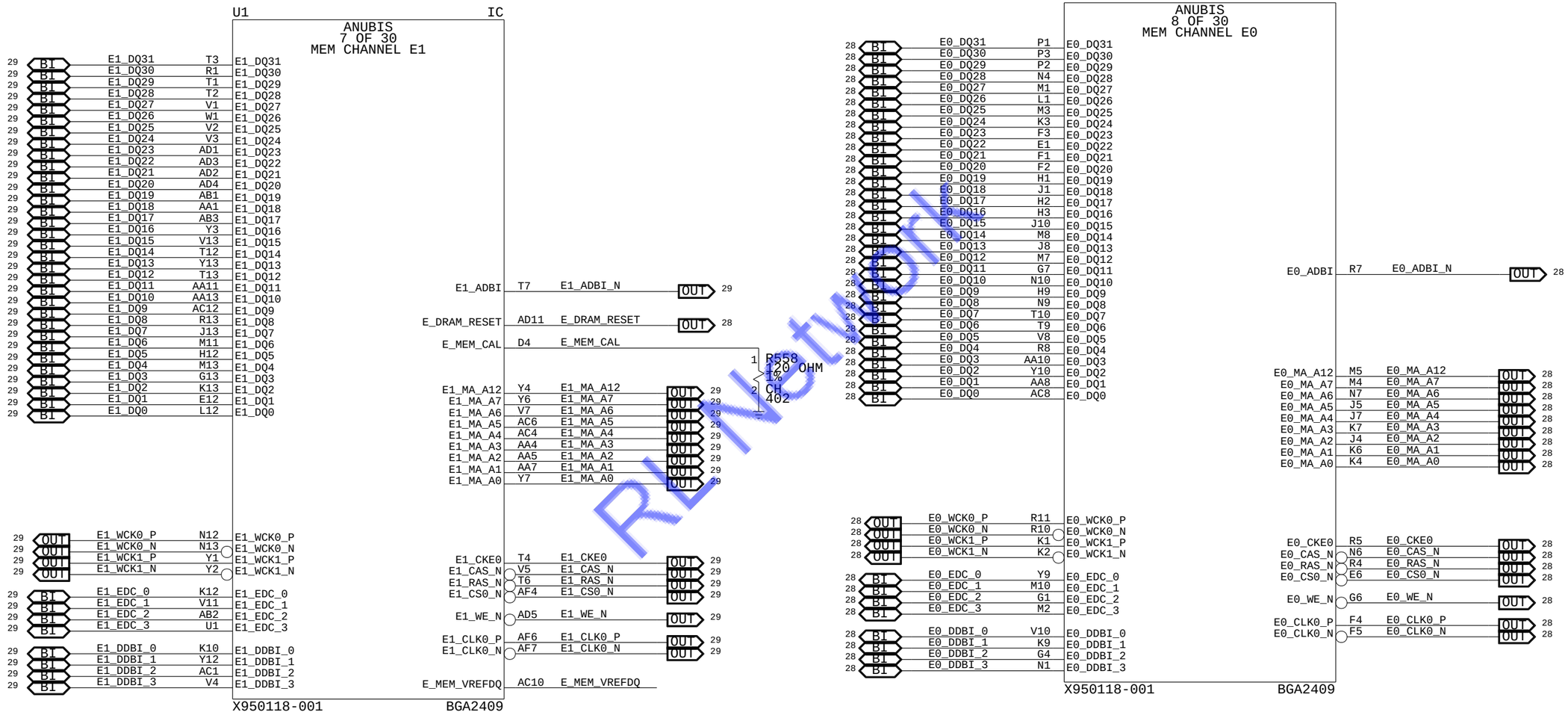
# MEMORY: PARTITION F1/F0






| MICROSOFT CONFIDENTIAL | PROJECT NAME | PAGE | CSA PAGE | FAB | VER |
|---|---|---|---|---|---|
| | Cactus | 8/82 | 8/82 | G-R | 0.991 |

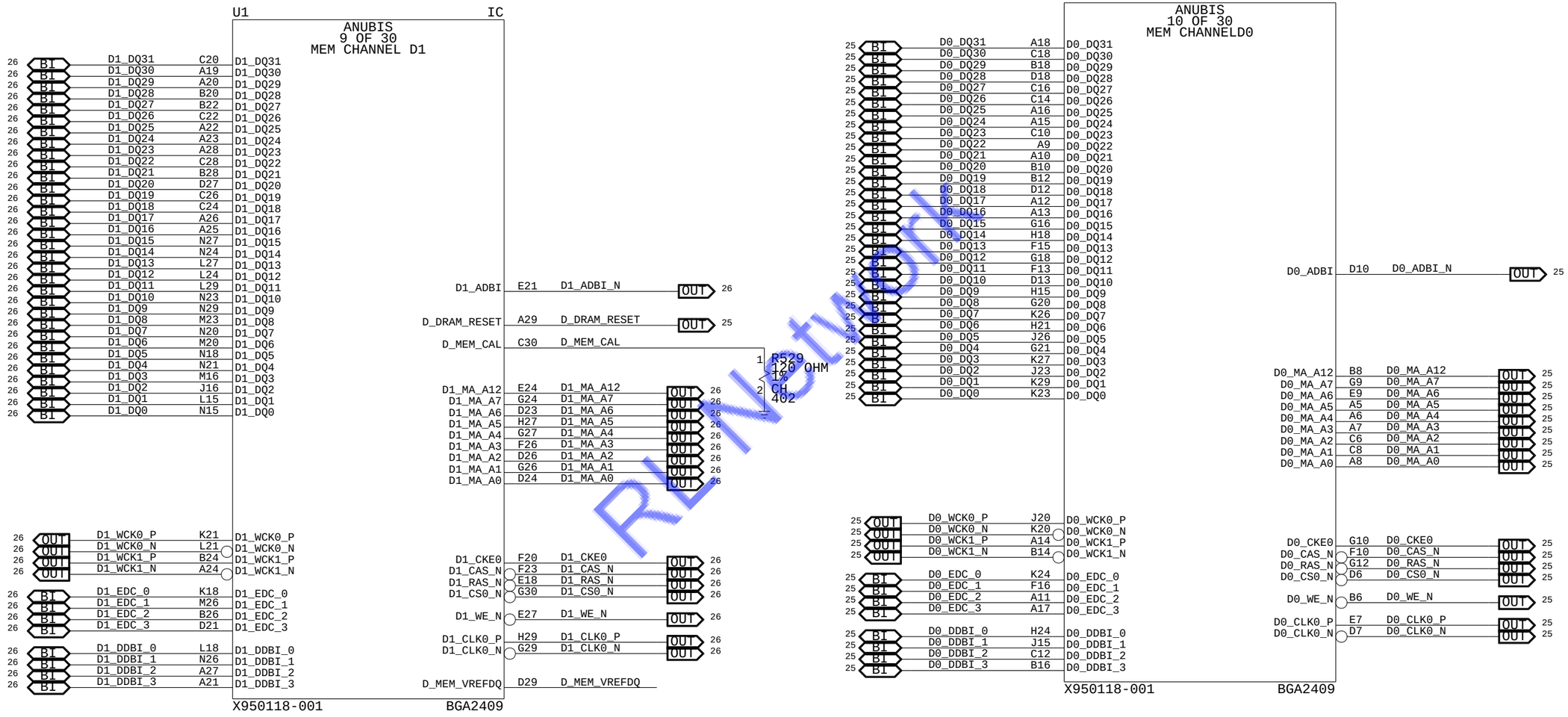
# MEMORY: PARTITION E1/E0






| MICROSOFT CONFIDENTIAL | PROJECT NAME | PAGE | CSA PAGE | FAB | VER |
|---|---|---|---|---|---|
| | Cactus | 9/82 | 9/82 | G-R | 0.991 |

# MEMORY: PARTITION D1/D0






| MICROSOFT CONFIDENTIAL | PROJECT NAME | PAGE | CSA PAGE | FAB | VER |
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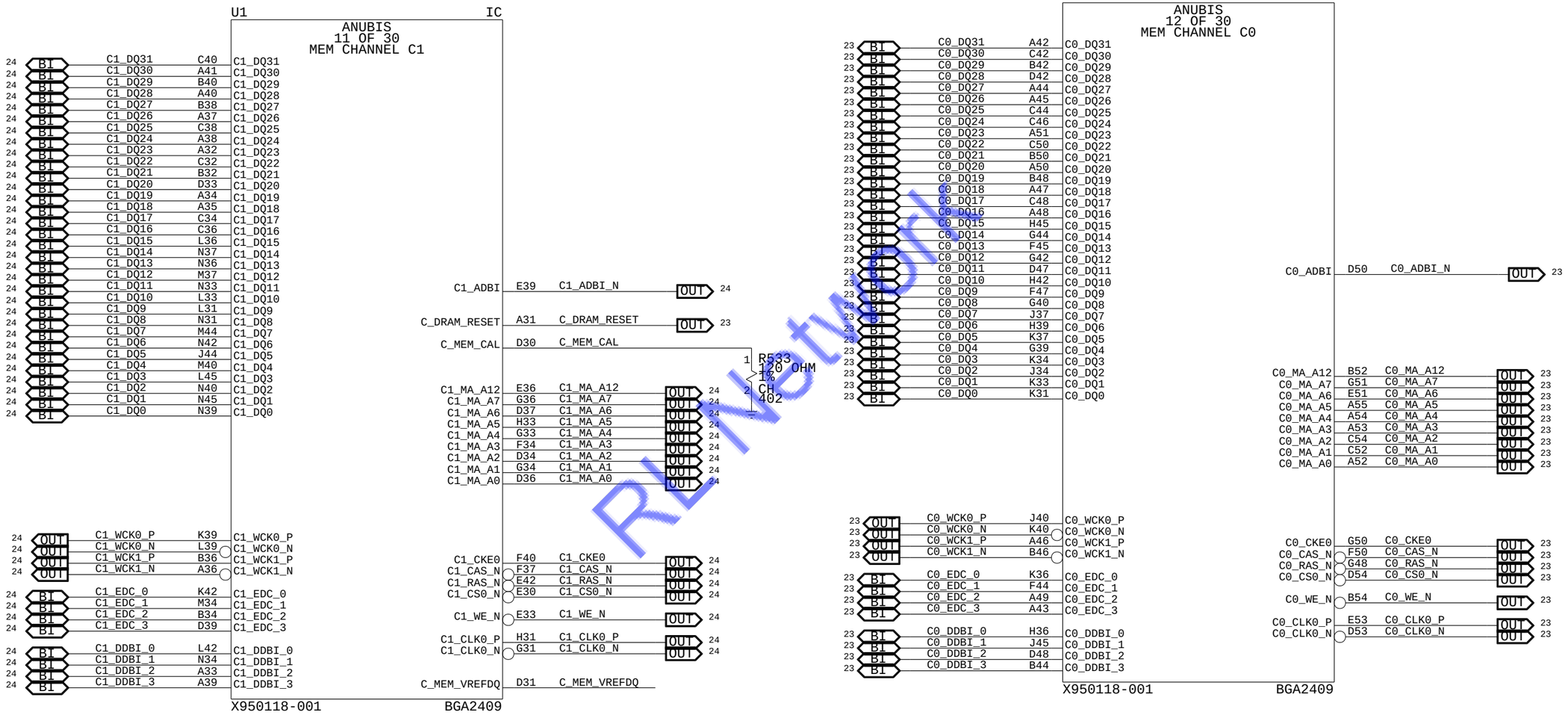
| | Cactus | 10/82 | 10/82 | G-R | 0.991 |

# MEMORY: PARTITION C1/C0






| MICROSOFT CONFIDENTIAL | PROJECT NAME | PAGE | CSA PAGE | FAB | VER |
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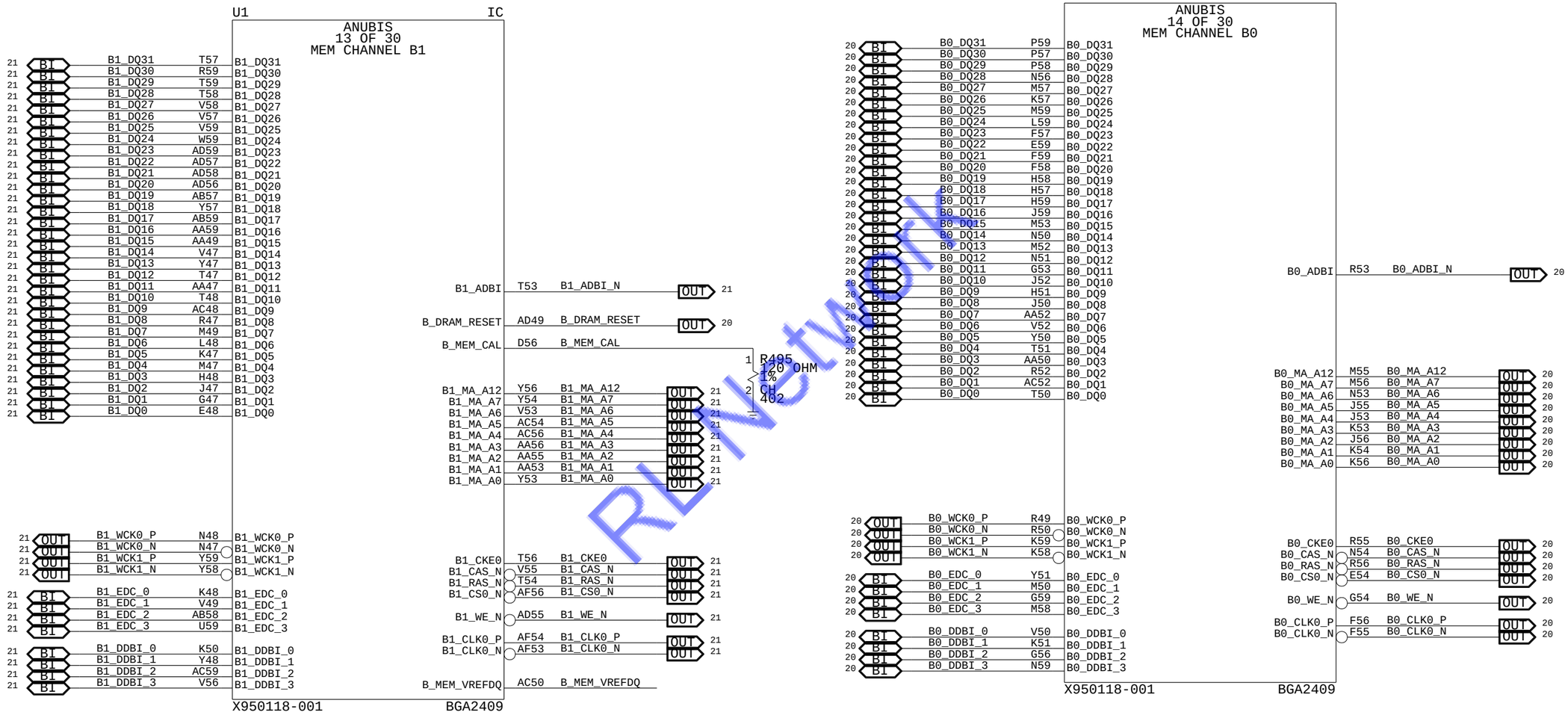
| | Cactus | 11/82 | 11/82 | G-R | 0.991 |

# MEMORY: PARTITION B1/B0






| MICROSOFT CONFIDENTIAL | PROJECT NAME | PAGE | CSA PAGE | FAB | VER |
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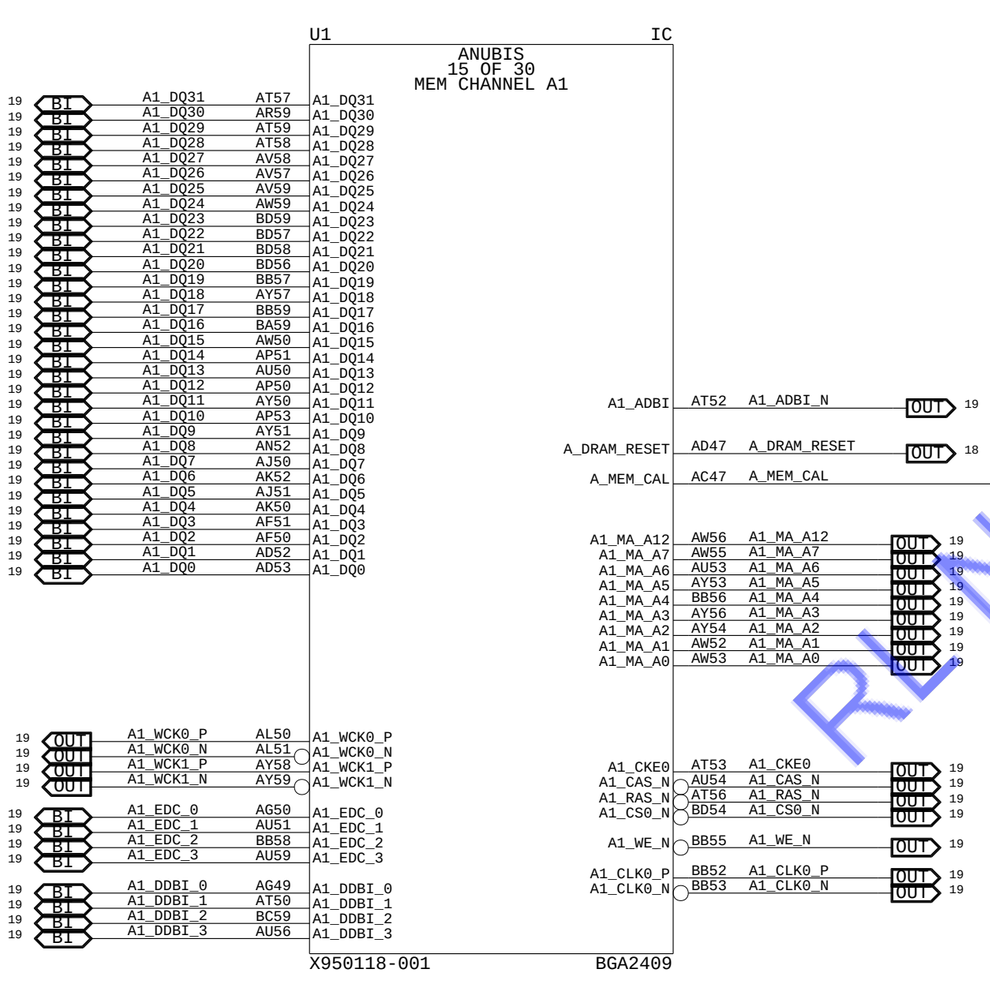
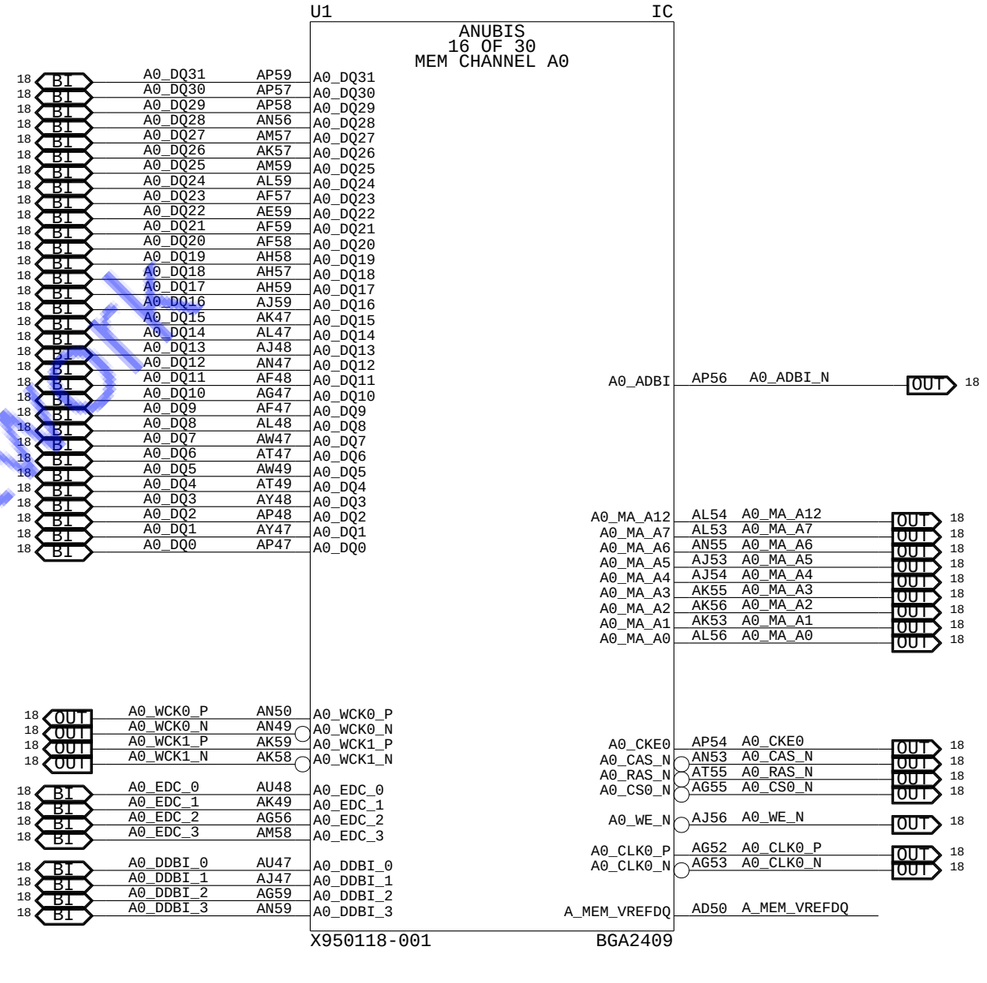
| | Cactus | 12/82 | 12/82 | G-R | 0.991 |

# MEMORY: PARTITION A1/A0



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# SOC:DEBUG,SB SIGNALS,V_BAT

U1 IC
ANUBIS
4 OF 30
JTAG/DEBUG

ATE_TSTCLK_EN BE47 ATE_TSTCLK_EN
BF58 DLY_PSP_RESET
BD13 PSEN
BF57 A0_BYPASS
36 OUT SOC_THERMTRIP_N BL1 THERMTRIP_N
39 IN X32K_X2_R R84 0 OHM 5% 402 CH
X32K_X2 BN50 X32K_X2
X32K_X1 BP50 X32K_X1
R97 20 MOHM 5% 402 EMPTY
GPIO_3P3_3 BD53 3P3V_GPIO3
GPIO_3P3_2 BE55 3P3V_GPIO2
GPIO_3P3_1 BE56 3P3V_GPIO1
GPIO_3P3_0 BE59 3P3V_GPIO0
58 OUT GPIO_1P8_3 BN56 1P8V_GPIO9
GPIO_1P8_2 BK51 1P8V_GPIO8
Y1 SM EMPTY 32.768 KHZ
GPIO_1P8_1 BT48 1P8V_GPIO7
C144 EMPTY 2.2 PF 402 50 V +/-0.1PF
C155 EMPTY 402 2.2 PF 50 V +/-0.1PF
FT415 FTP 1GPIO_1P8_0 BT50 1P8V_GPIO6
GPIO_POSTOUT_5 BR51 1P8V_GPIO5
GPIO_POSTOUT_4 BT51 1P8V_GPIO4
GPIO_POSTOUT_3 BR54 1P8V_GPIO3
GPIO_POSTOUT_2 BP53 1P8V_GPIO2
GPIO_POSTOUT_1 BT54 1P8V_GPIO1
GPIO_POSTOUT_0 BT53 1P8V_GPIO0
C144, C155 VALUE SELECTED TO CENTER XTAL FREQ
V_SOC1P8
75 IN DBREQ_L BF2 DBREQ_N
75 OUT DBRDY BE1 DBRDY
75 IN TRST_L BJ2 TRST_N
75 36 IN TMS BH2 TMS
R392 10 KOHM 5% 2 EMPTY 402
DB16
75 36 OUT TDI BG2 TDI
75 36 IN TCK BG1 TCK
R391 10 KOHM 1% 2 CH 402
75 36 IN SOC_RST_N BJ1 RESET_N
54 36 75 IN SOC_PWR_OK BL2 PWROK
FT414 FTP 1

TMON_CAL1 BH4 TMON_CAL1 1 FTP FT75
TMON_CAL0 BH3 TMON_CAL0 1 FTP FT78
PLLTEST0 BP4 PLLTEST0
PLLTEST1 BN4 PLLTEST1
OUT 75
OUT 75
THERMDA BE4 THERMDA
THERMDC BE5 THERMDC
R524 1 KOHM 1% CH 402 DEBUG
R525 1 KOHM 1% CH 402 DEBUG
ANALOGOUT BE50 ANALOGOUT
DIECRACKMON BE49 DIECRACKMON
BP_0 BG47 BP_0
BP_1 BG48 BP_1
BP_2 BH49 BP_2
BP_3 BH50 BP_3
SVT IN 54
SVD BI 54
SVC OUT 54
ANATSTIN_P BG50 ANATSTIN_P
ANATSTIN_N BG51 ANATSTIN_N
R626 0 OHM 5% 2 CH 402
R627 0 OHM 5% 2 CH 402
R628 0 OHM 5% 2 CH 402
ANATSTOUT_P BE52 ANATSTOUT_P
ANATSTOUT_N BE53 ANATSTOUT_N
ALERT_N BK2 SP_SMC_INT_N OUT 36
SVT BM48 SVT_R_SOC
SVD BR48 SVD_R_SOC
SVC BN48 SVC_R_SOC
SID BM51 SID
SIC BN51 SIC
RTCCLK BJ48 RTCCLK

R430 2 1 1% 243 OHM CH 402
SB_SOC_DATA
DEBUG C553 47 PF 5% 50 V 2 EMPTY 402
V_1P8STBY
DEBUG R405 475 OHM 1% 2 EMPTY 402
BI 36
R431 2 1 1% 243 OHM CH 402
SB_SOC_CLK
DEBUG C554 47 PF 5% 50 V 2 EMPTY 402
V_1P8STBY
DEBUG R406 475 OHM 1% 2 EMPTY 402
IN 36

VDD_MEM_SENSE K30 SOC_MEMIO_S BI 14 58
VDD_MEMP_SENSE N30 SOC_MEMPHY_S BI 14 58
VSS_MEM_SENSE L30 SOC_MEMIO_S_RTN BI 14 58
VSS_GFX_SENSE BV46 SOC_GFXCORE_S_RTN OUT 14 54
VDD_GFX_SENSE BW46 SOC_GFXCORE_S 1 DB127 OUT 14 54
VDD_NB_SENSE BV7 SOC_NBCORE_S BI 61
VSS_NB_SENSE BW7 SOC_NBCORE_S_RTN 61
VDD_CORE_SENSE BW47 SOC_CPUCORE_S OUT 14 54
VSS_CORE_SENSE BV47 SOC_CPUCORE_S_RTN BI 14 54
VDD_095_SENSE BP58 SOC_SOCPHY_S OUT 64
VSS_095_SENSE BR57

VDD_CORE_PROBE BP47 VDD_CORE_PROBE
VSS_CORE_PROBE BN47 VSS_CORE_PROBE
54 OUT VDD_GFX_PROBE BK47 VDD_GFX_PROBE
54 OUT VSS_GFX_PROBE BK48 VSS_GFX_PROBE
VDD_MEMP_PROBE B30 VDD_MEMP_PROBE
VSS_MEMP_PROBE A30 VSS_MEMP_PROBE
X950118-001 BGA2409

NOTE: SOC_MEMIO_S_RTN IS ACTUALLY SENSE RETURN FROM SOC FOR MEMPHY. NOT CHANGING NETNAME TO STAY CONSISTENT WITH SCB

58 14 SOC_MEMIO_S C1220 1 2 SOC_MEMIO_S_RTN 14 58
1 UF 10% 6.3 V EMPTY 402
58 14 SOC_MEMPHY_S C1221 1 2 SOC_MEMIO_S_RTN 14 58
1 UF 10% 6.3 V EMPTY 402
54 14 SOC_GFXCORE_S C1222 1 2 SOC_GFXCORE_S_RTN 14 54
1 UF 10% 6.3 V EMPTY 402
54 14 SOC_CPUCORE_S C1223 1 2 SOC_CPUCORE_S_RTN 14 54
1 UF 10% 6.3 V EMPTY 402

NOTE: SINCE C1222 AND C1223 ARE NEAR SOC, CHANGE THEM TO X6S/X7R IF EVER STUFFED DUE TO HIGHER TEMPERATURES IN AREA

C1220, C1221, C1222, AND C1223 ARE THE QUALIFICATION/MEASUREMENT TEST POINTS FOR THE RELEVANT SOC VR, AND MUST BE MEASURED WITH A DIFFERENTIAL PROBE

DB58 1
V_CPUCORE
DB63 1
V_GFXCORE
DB59 1
SENSE CONNECTION FOR VRTB

V_3P3STBY
U77
DB93 1 LARGE-TP
RTC_VREG_IN
DB92 1 LARGE-TP
3.0V BATTERY INPUT
SOT-523 EMPTY
C512 0.1 UF 10% 16 V EMPTY 402
RTC_VREG_IN_D
Q1 EMPTY
NCP663
VIN VOUT
NC GND
X899201-001 SC82
RTC_VREG_OUT
C513 0.1 UF 10% 16 V EMPTY 402
R77 0 OHM 5% 402 EMPTY
V_1P8STBY
R387 0 OHM 5% 2 CH 402
V_BAT
R388 221 KOHM 1% EMPTY 402
STUFF R388 IF SOC IS NOT STUFFED

V_BAT
NOM.VOLTAGE: 1.8V

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# SOC: DECOUPLING

V_GFXCORE

55 0805 22UF

C847 C771 C843 C735 C305
C772 C767 C692 C736 C279
C805 C804 C801 C846 C278
C693 C737 C845 C800 C277
C694 C802 C770 C768 C257
C293 C733 C803 C769 C690
C294 C734 C842 C844
C295 C280 C695 C691
C296 C281 C309 C732
C297 C264 C308 C262
C261 C254 C263
C260 C255 C253
C256 C307
C306

22 UF 20% 6.3 V X6S 805

V_GFXCORE

55 0805 22UF

C723 C703 C700 C722
C817 C727 C806 C697
C827 C834 C728 C698
C835 C701 C752 C838
C704 C758 C750 C837
C726 C751 C724 C808
C702 C836 C725 C782
C811 C749 C696
C780 C807
C699 C781

22 UF 20% 6.3 V X6S 805

2 0402 4.7UF

V_GFXCORE

C746 C747

4.7 UF 20% 6.3 V X6S 402

V_GFXCORE

57 0603 10UF

C742 C830 C687 C785
C761 C850 C718 C716
C789 C851 C744 C670
C678 C831 C763 C685
C684 C814 C791 C854
C712 C852 C815 C841
C730 C671 C719 C818
C741 C686 C688 C829
C759 C717 C745 C826
C766 C743 C764 C812
C784 C762 C792 C721
C798 C790 C816 C720
C832 C673 C833 C753
C813 C672 C853 C783
C828

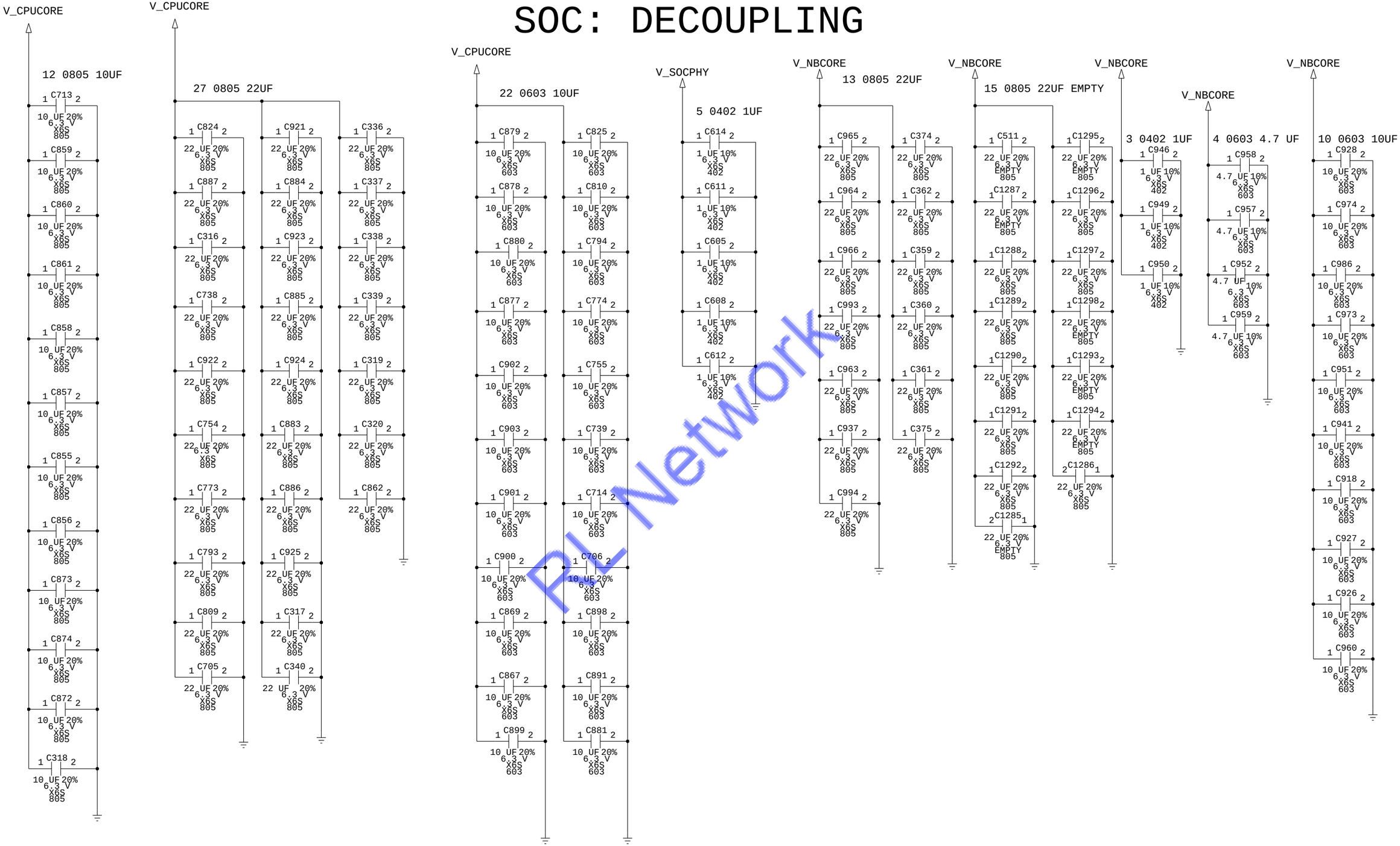
10 UF 20% 6.3 V X6S 603

NOTE: X6S/X7R CAPACITORS USED NEAR SOC
DUE TO HIGHER TEMPERATURES IN AREA



| MICROSOFT CONFIDENTIAL | PROJECT NAME | PAGE | CSA PAGE | FAB | VER |
|---|---|---|---|---|---|
| | Cactus | 15/82 | 15/82 | G-R | 0.991 |

# SOC: DECOUPLING

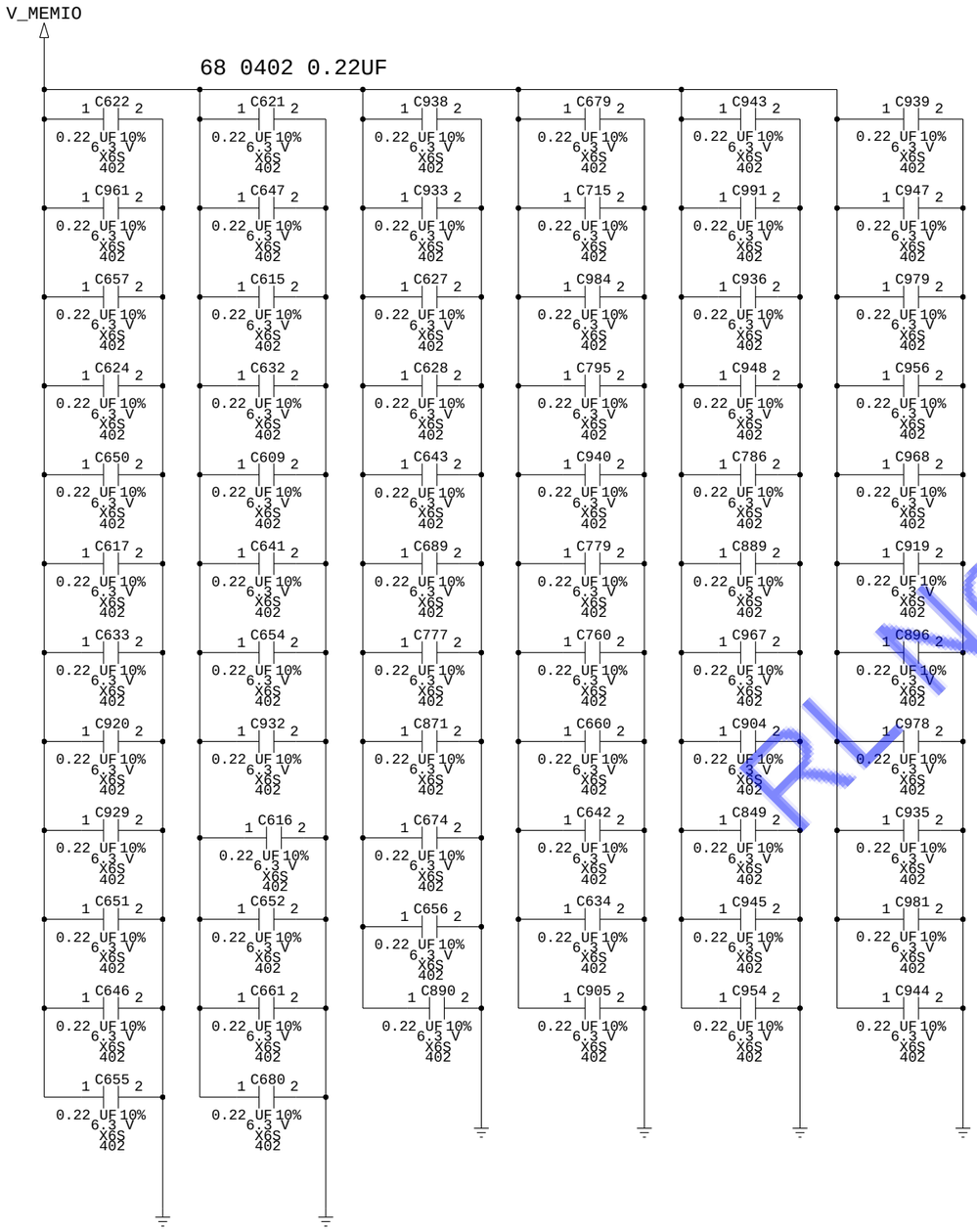


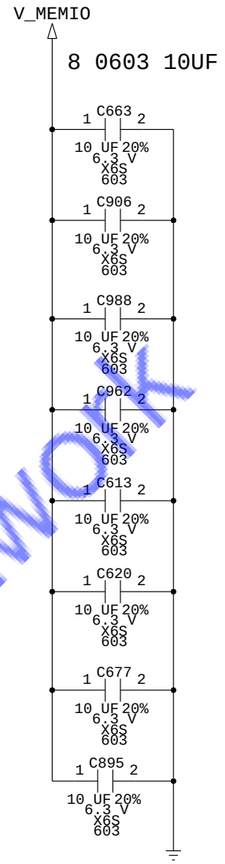


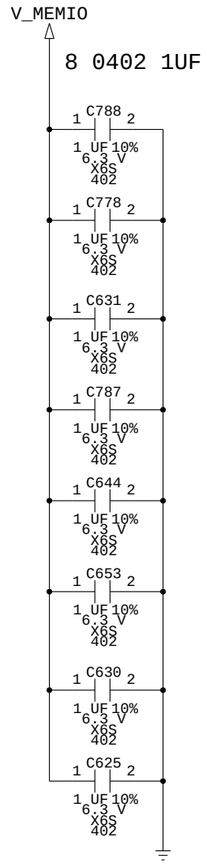

NOTE: X6S/X7R CAPACITORS USED NEAR SOC
DUE TO HIGHER TEMPERATURES IN AREA

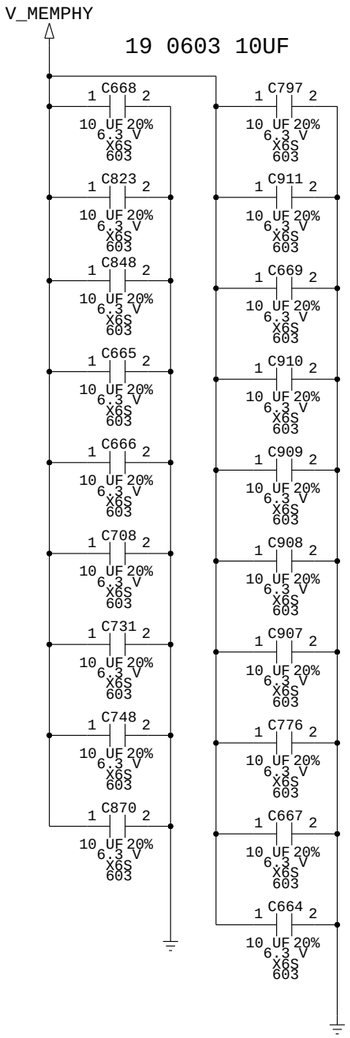
| MICROSOFT CONFIDENTIAL | PROJECT NAME | PAGE | CSA PAGE | FAB | VER |
|---|---|---|---|---|---|
| | Cactus | 16/82 | 16/82 | G-R | 0.991 |

# SOC: DECOUPLING



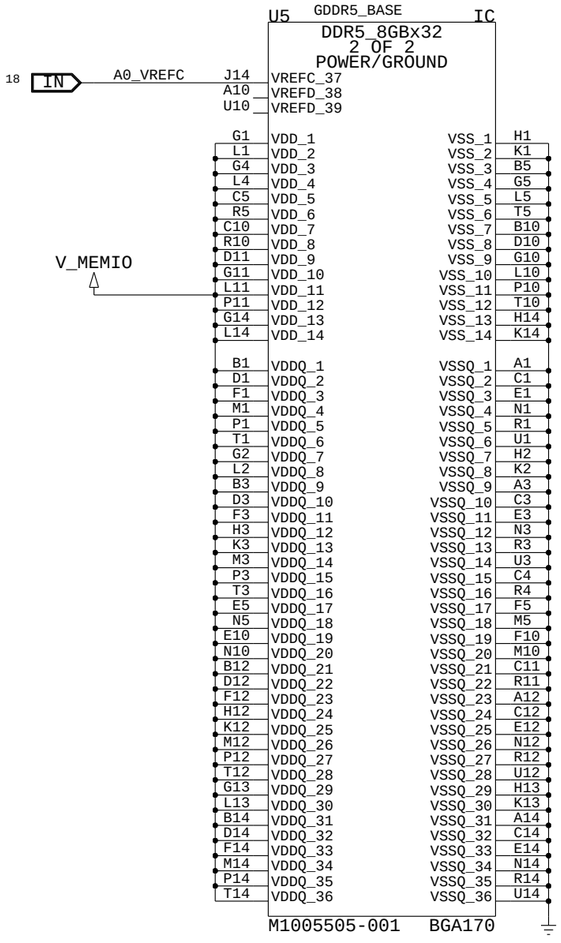



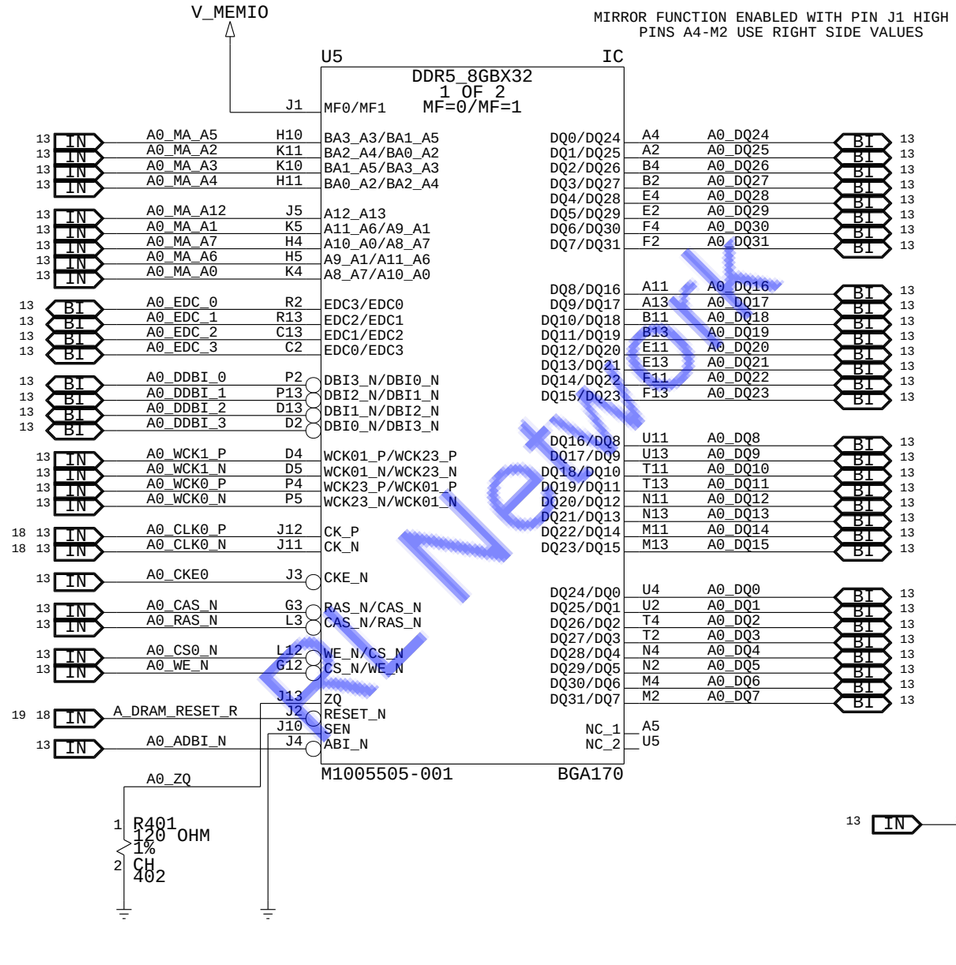

NOTE: X6S/X7R CAPACITORS USED NEAR SOC
DUE TO HIGHER TEMPERATURES IN AREA



| MICROSOFT CONFIDENTIAL | PROJECT NAME | PAGE | CSA PAGE | FAB | VER |
|---|---|---|---|---|---|
| | Cactus | 17/82 | 17/82 | G-R | 0.991 |

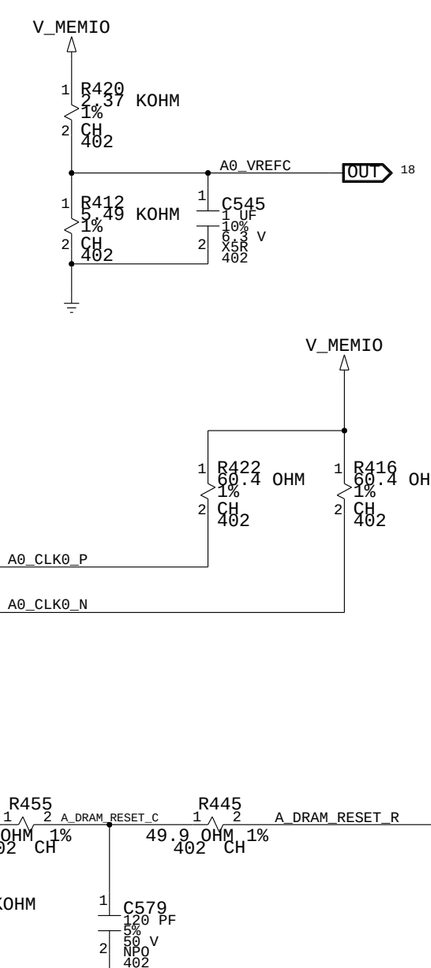
# MEMORY: CHANNEL A0



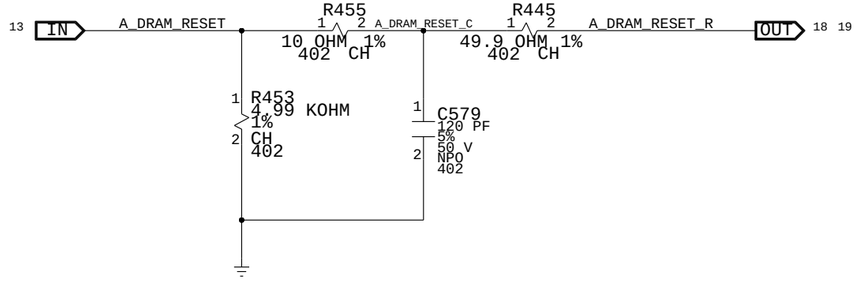

MIRROR FUNCTION ENABLED WITH PIN J1 HIGH
PINS A4-M2 USE RIGHT SIDE VALUES







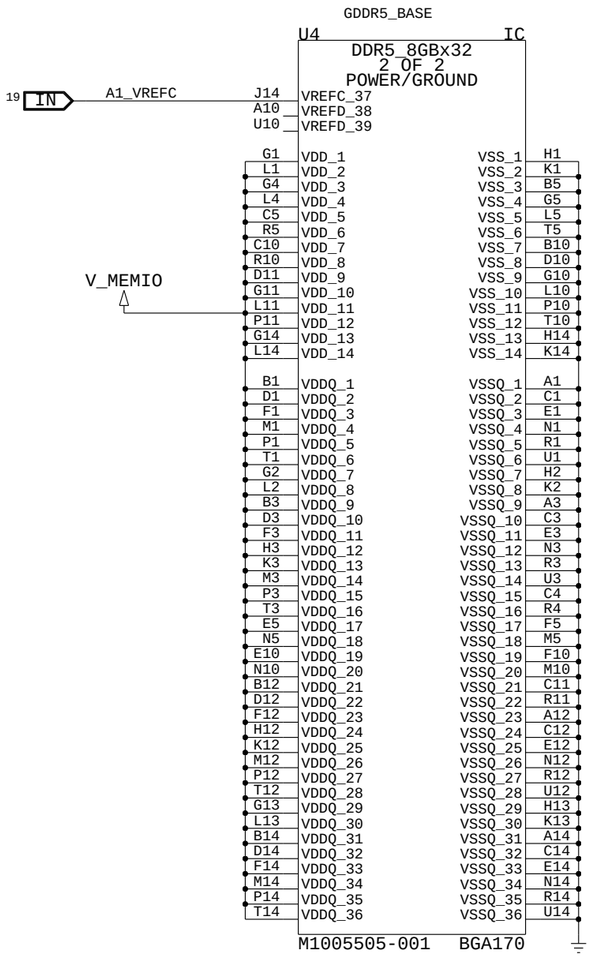


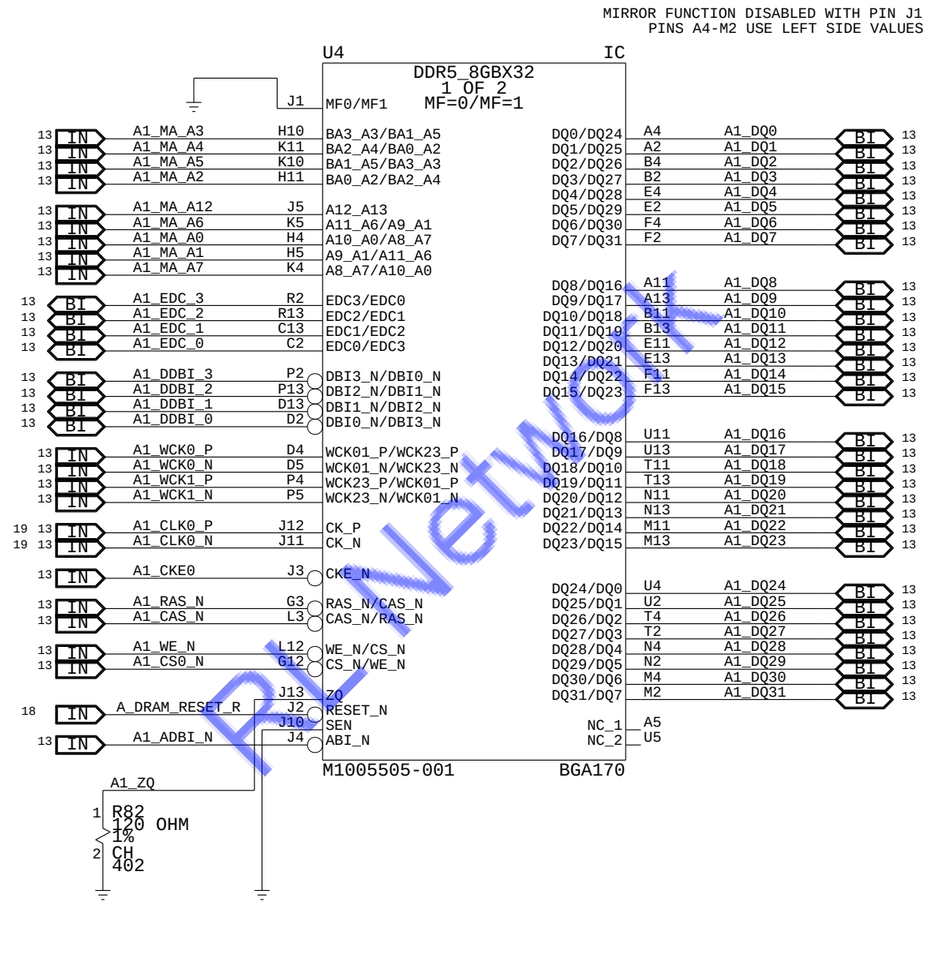

| MS_PART# | MATL | REF_DES | DESCR. | BOM PROPERTY |
|---|---|---|---|---|
| M1005505-001 | IC | U4,U5,U6,U7,U8,U9,U10,U11,U12,U13,U14,U15 | MEM,SM,8GB,16MX32,GDDR5,170FBGA | GDDR5_SAMSUNG |
| M1005717-001 | IC | U4,U5,U6,U7,U8,U9,U10,U11,U12,U13,U14,U15 | MEM,SM,8GB,16MX32,GDDR5,170FBGA | GDDR5_HYNIX |

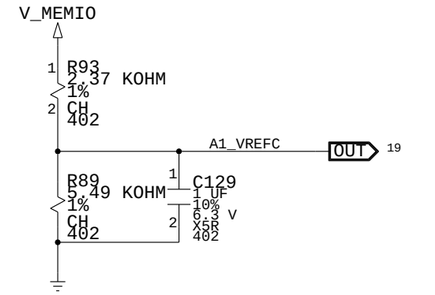


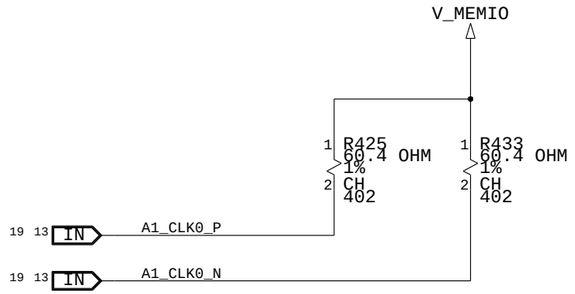
| MICROSOFT CONFIDENTIAL | PROJECT NAME | PAGE | CSA PAGE | FAB | VER |
|---|---|---|---|---|---|
| | Cactus | 18/82 | 18/82 | G-R | 0.991 |

# MEMORY: CHANNEL A1



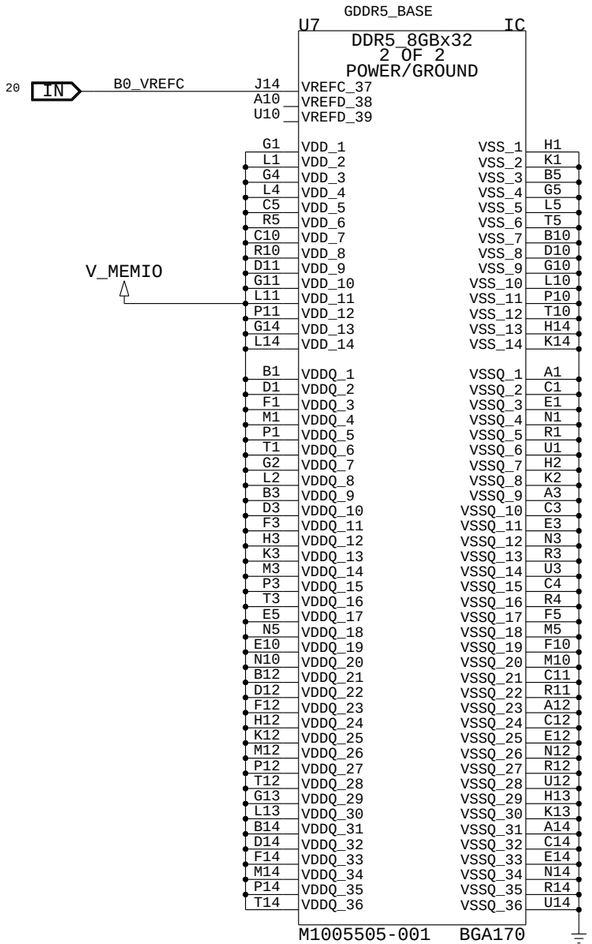



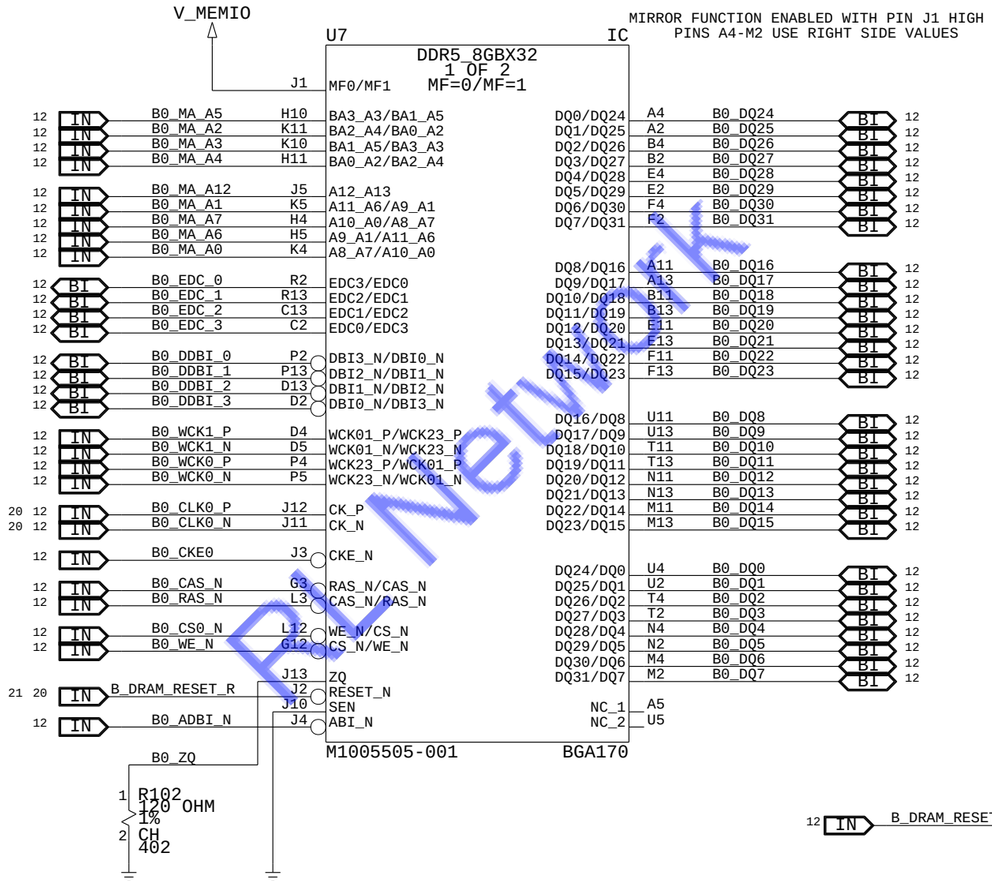



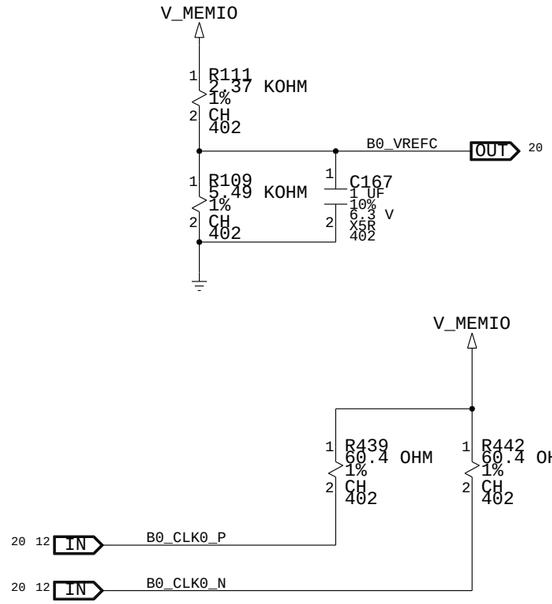


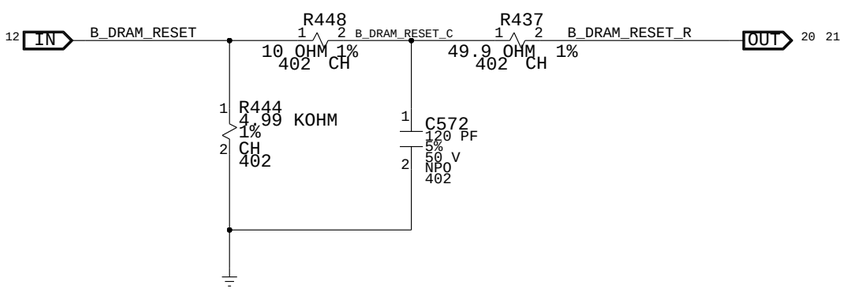

| MICROSOFT CONFIDENTIAL | PROJECT NAME | PAGE | CSA PAGE | FAB | VER |
|---|---|---|---|---|---|
| | Cactus | 19/82 | 19/82 | G-R | 0.991 |

# MEMORY: CHANNEL B0



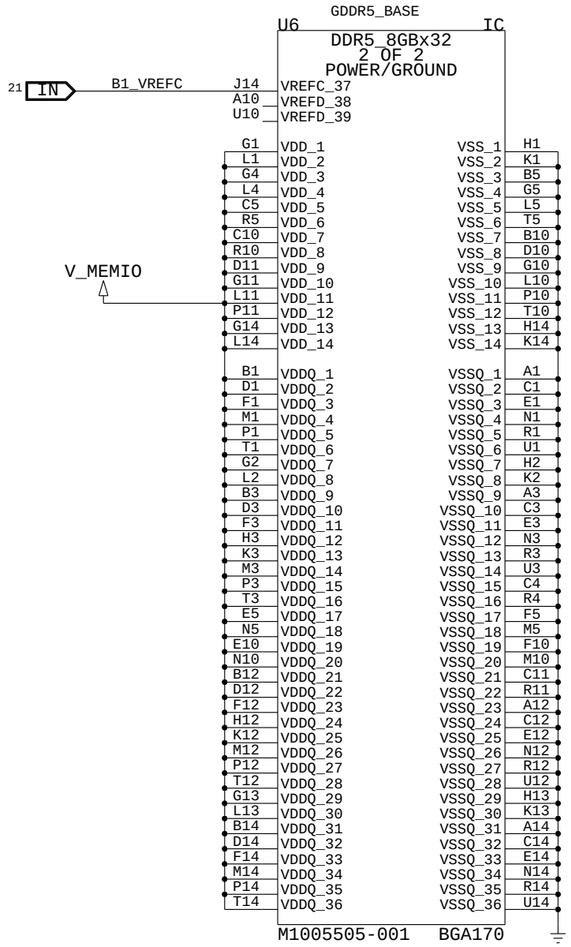



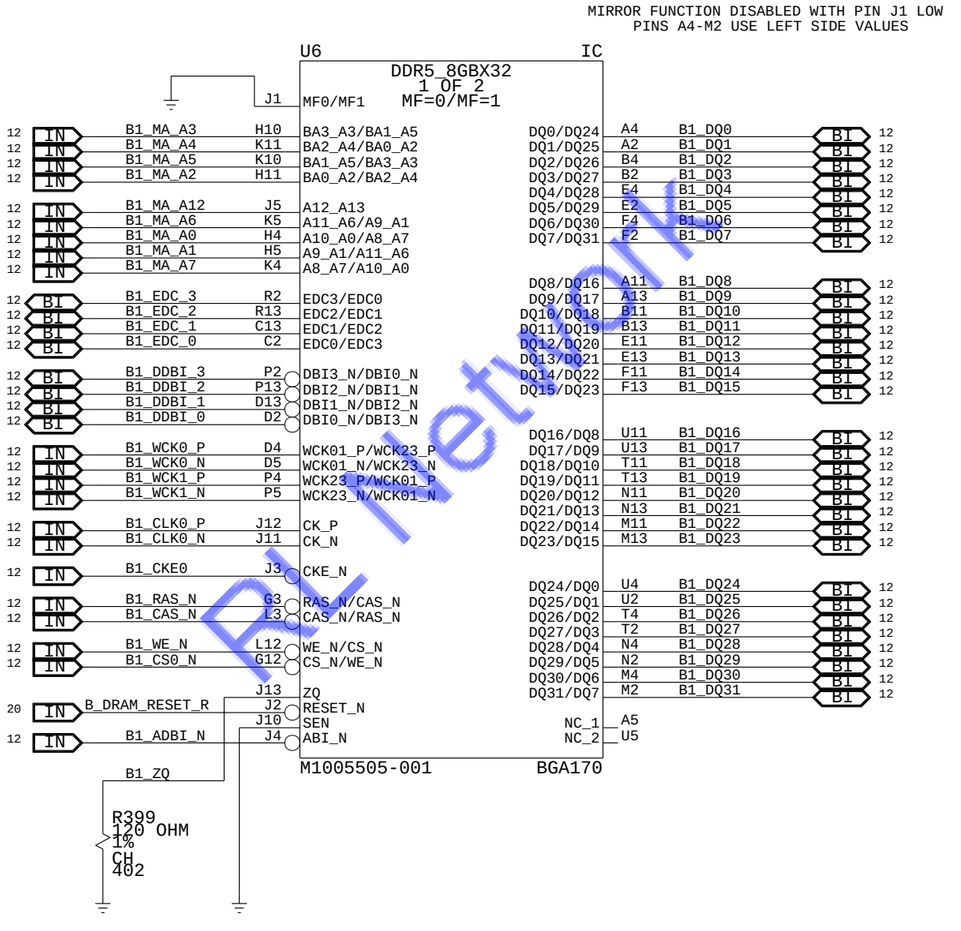



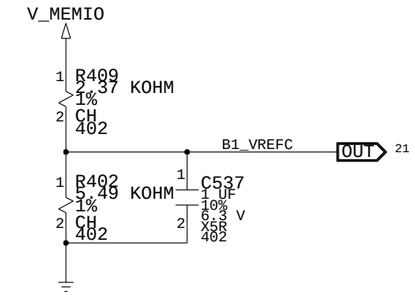


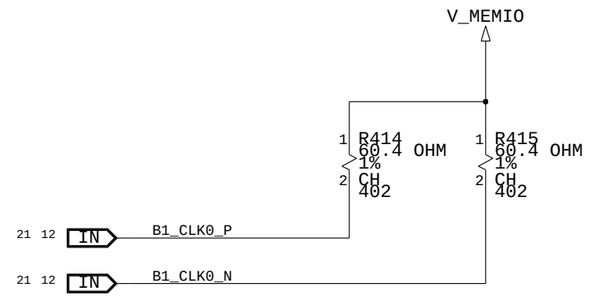

| MICROSOFT CONFIDENTIAL | PROJECT NAME | PAGE | CSA PAGE | FAB | VER |
|---|---|---|---|---|---|
| | Cactus | 20/82 | 20/82 | G-R | 0.991 |

# MEMORY: CHANNEL B1



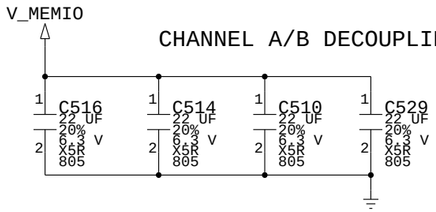



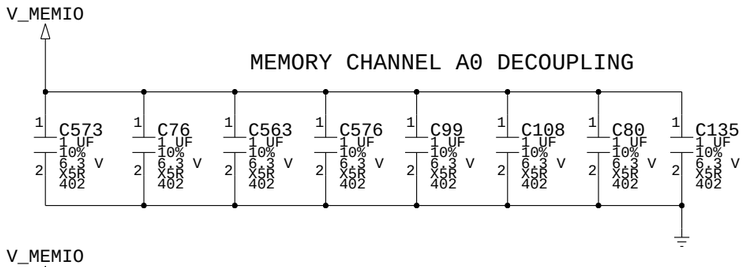



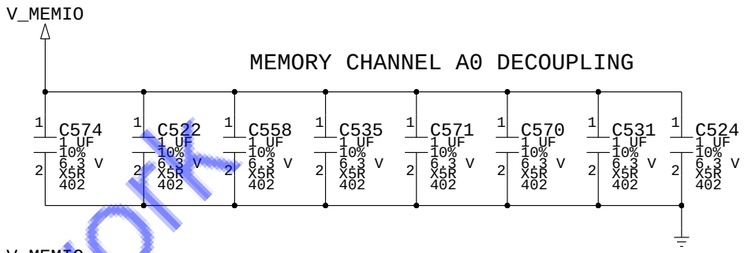


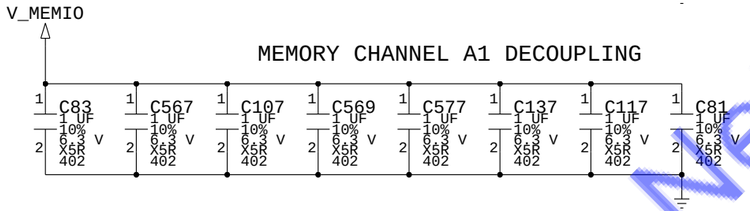

| MICROSOFT CONFIDENTIAL | PROJECT NAME | PAGE | CSA PAGE | FAB | VER |
|---|---|---|---|---|---|
| | Cactus | 21/82 | 21/82 | G-R | 0.991 |

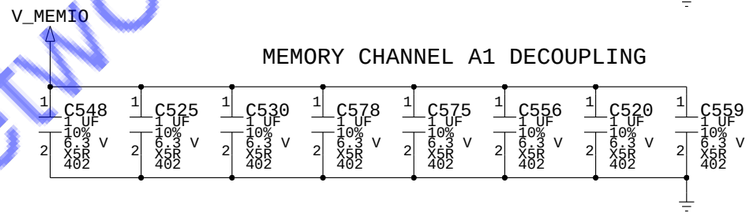
# MEMORY: CHANNEL A/B DECOUPLING

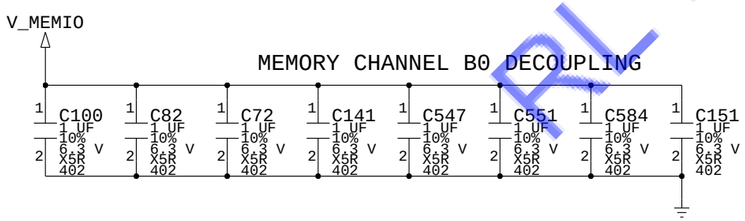


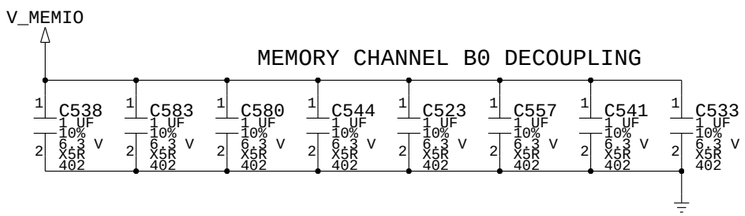



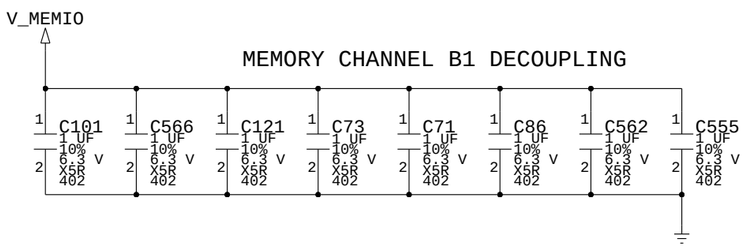



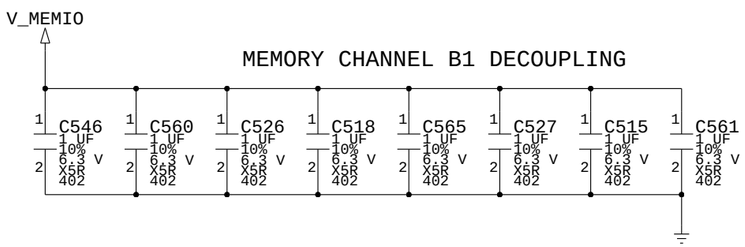



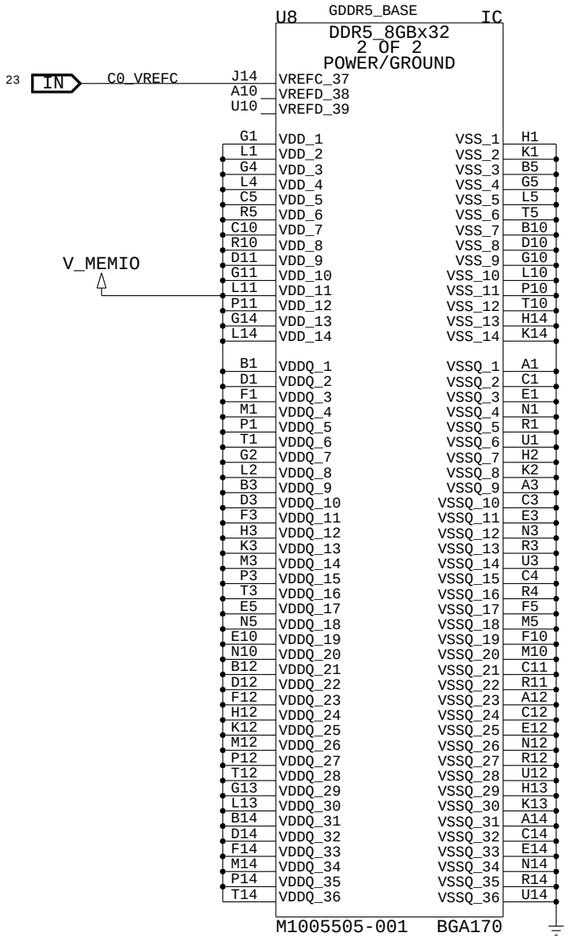





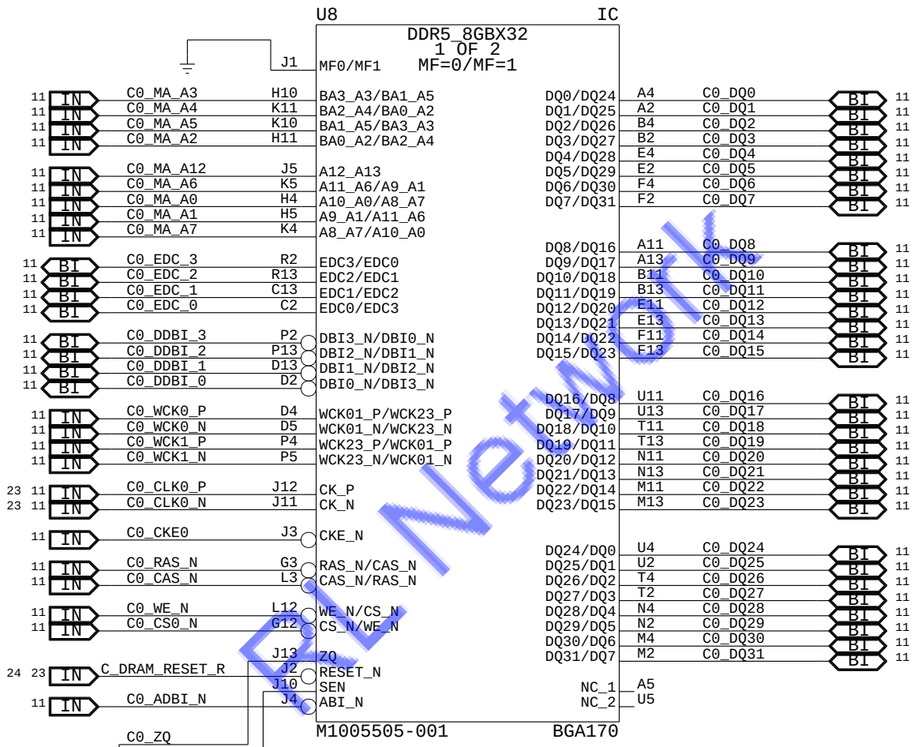

NOTE: ADDITIONAL MEMORY DECOUPLING ON PAGE 33

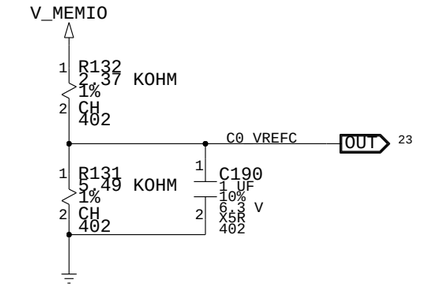
| MICROSOFT CONFIDENTIAL | PROJECT NAME | PAGE | CSA PAGE | FAB | VER |
|---|---|---|---|---|---|
| | Cactus | 22/82 | 22/82 | G-R | 0.991 |

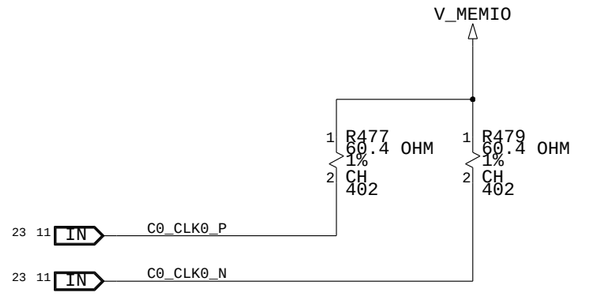
# MEMORY: CHANNEL C0

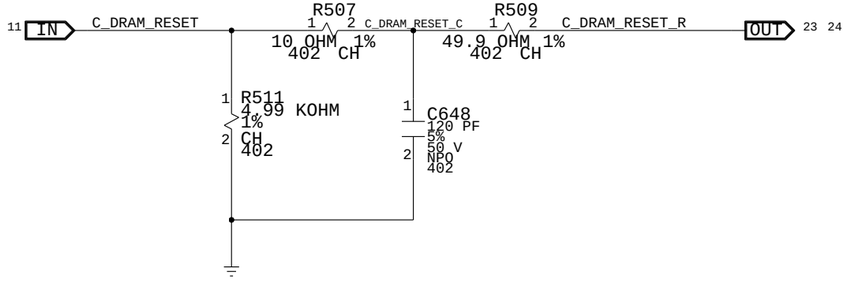



MIRROR FUNCTION DISABLED WITH PIN J1 LOW
PINS A4-M2 USE LEFT SIDE VALUES



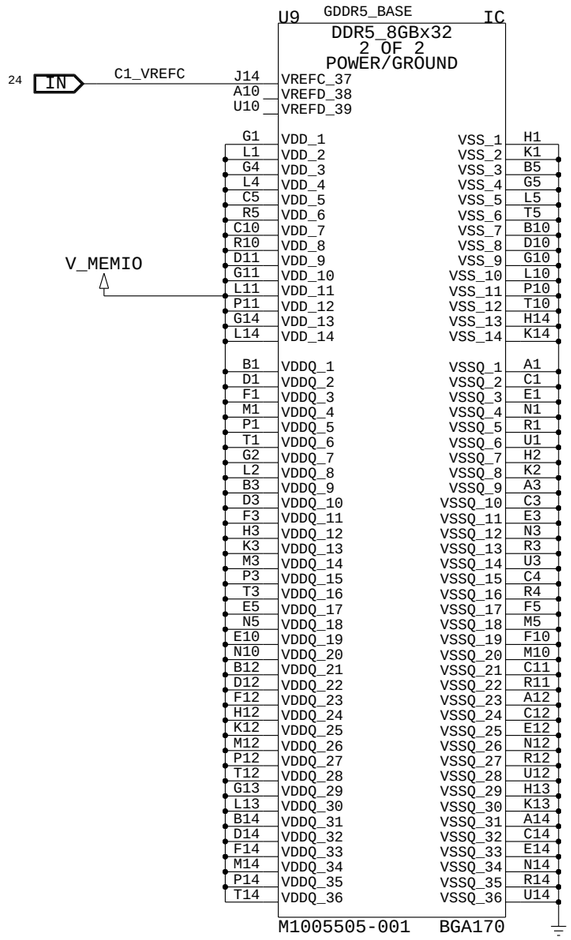



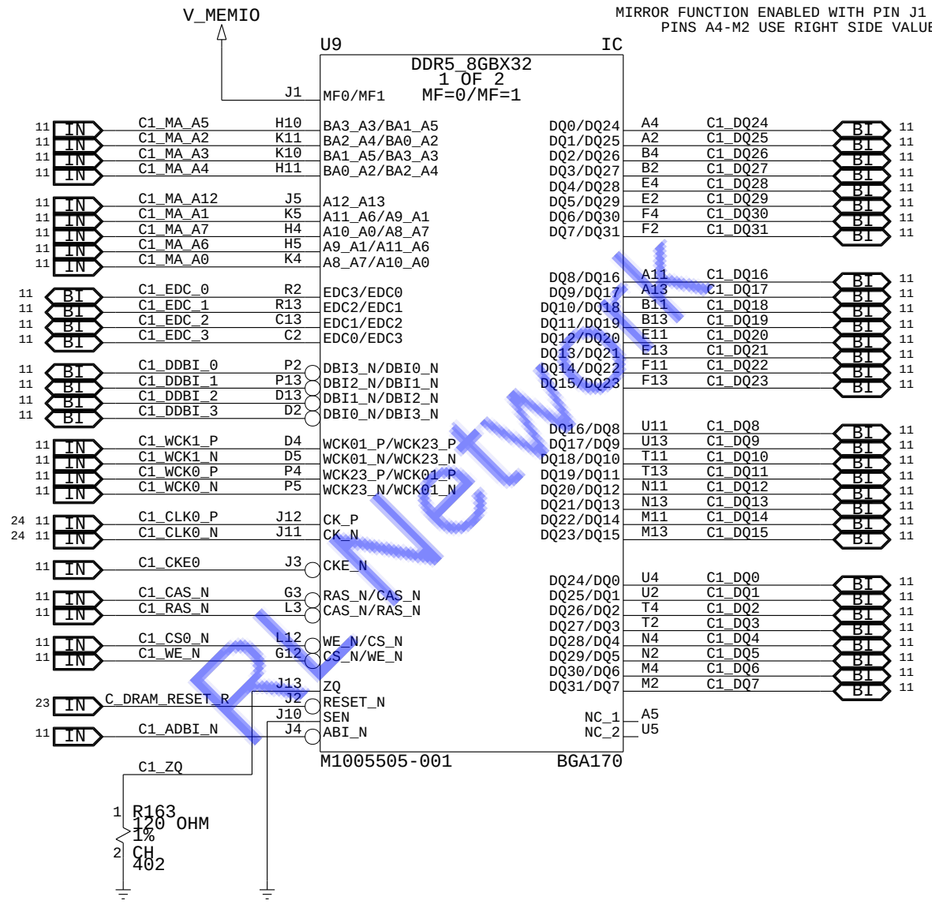



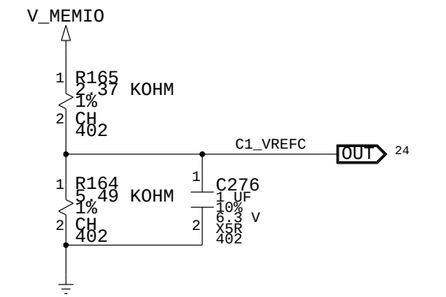


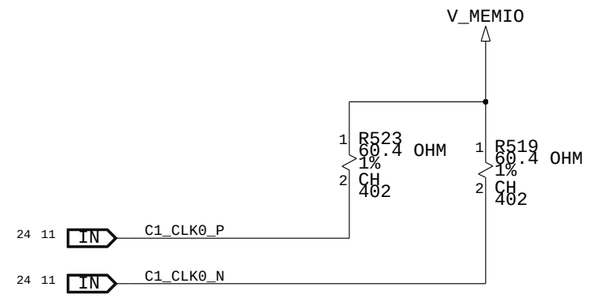

| MICROSOFT CONFIDENTIAL | PROJECT NAME | PAGE | CSA PAGE | FAB | VER |
|---|---|---|---|---|---|
| | Cactus | 23/82 | 23/82 | G-R | 0.991 |

# MEMORY: CHANNEL C1



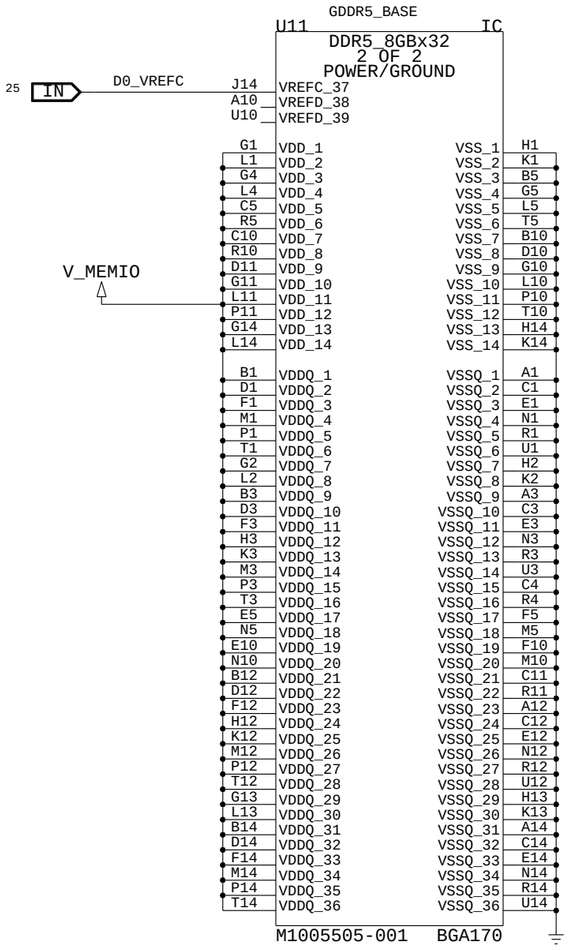



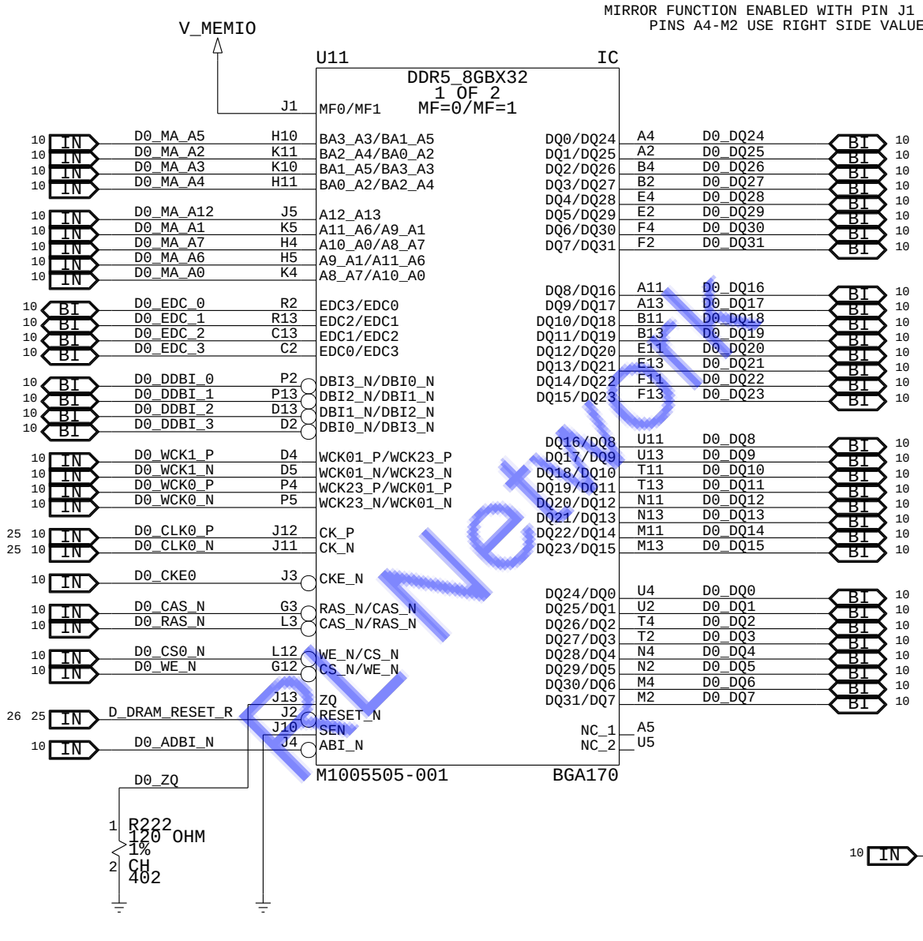



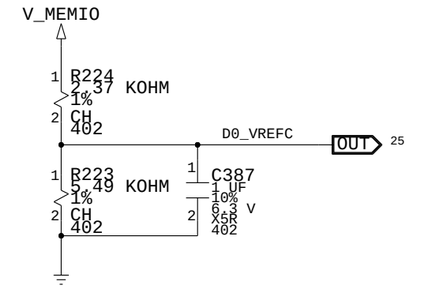


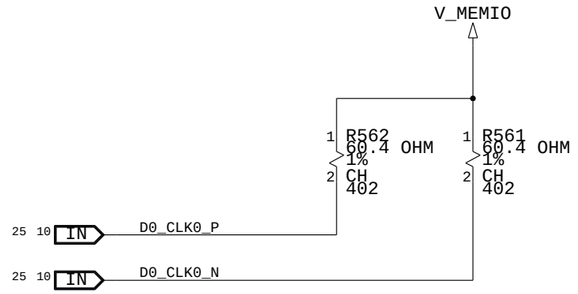

| MICROSOFT CONFIDENTIAL | PROJECT NAME | PAGE | CSA PAGE | FAB | VER |
|---|---|---|---|---|---|
| | Cactus | 24/82 | 24/82 | G-R | 0.991 |

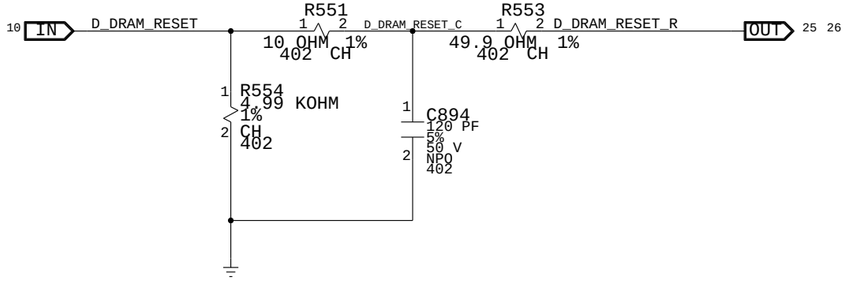
# MEMORY: CHANNEL D0



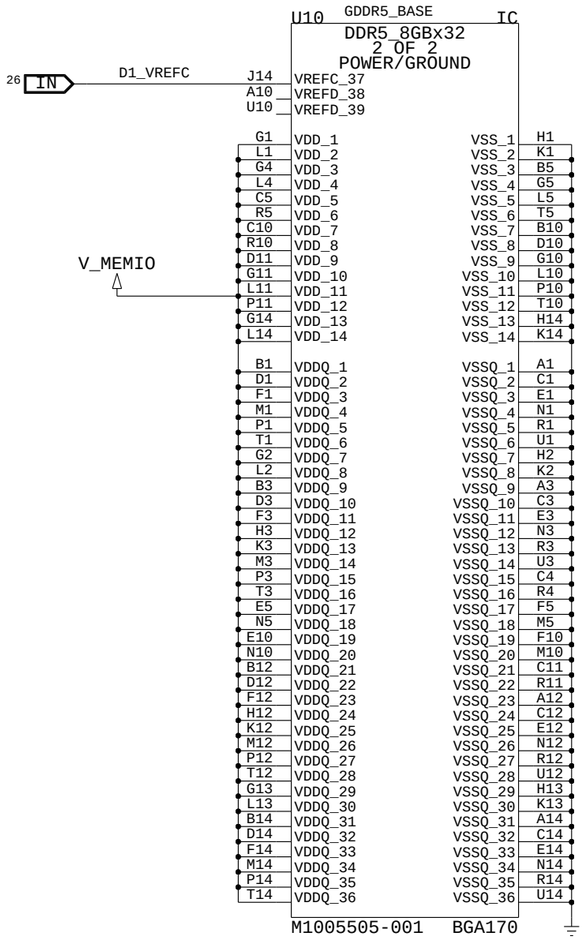



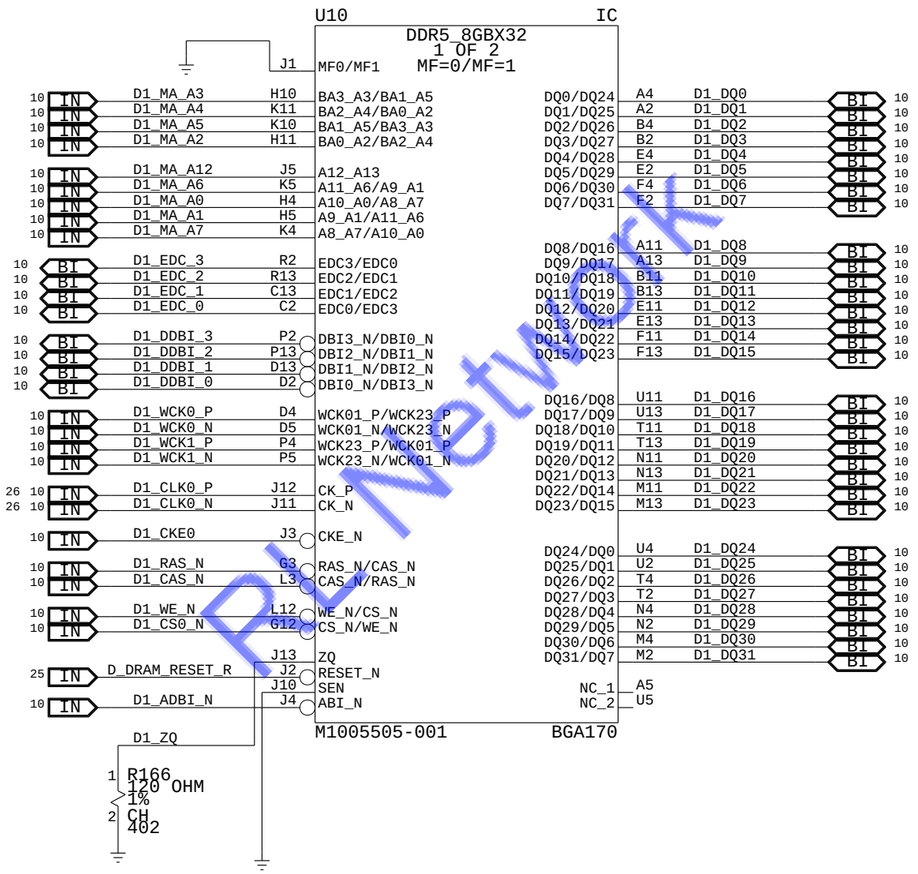


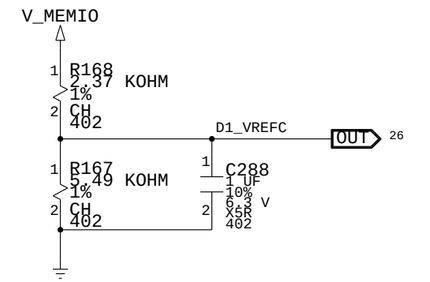

| MICROSOFT CONFIDENTIAL | PROJECT NAME | PAGE | CSA PAGE | FAB | VER |
|---|---|---|---|---|---|
| | Cactus | 25/82 | 25/82 | G-R | 0.991 |

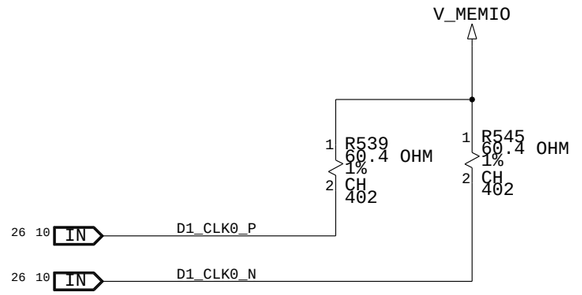
# MEMORY: CHANNEL D1




MIRROR FUNCTION DISABLED WITH PIN J1 LOW
PINS A4-M2 USE LEFT SIDE VALUES



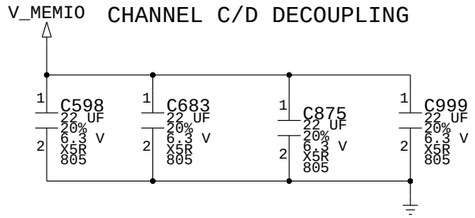





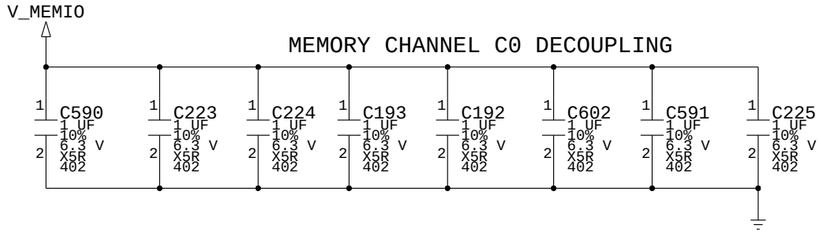

| MICROSOFT CONFIDENTIAL | PROJECT NAME | PAGE | CSA PAGE | FAB | VER |
|---|---|---|---|---|---|
| | Cactus | 26/82 | 26/82 | G-R | 0.991 |

# MEMORY: CHANNEL C/D DECOUPLING

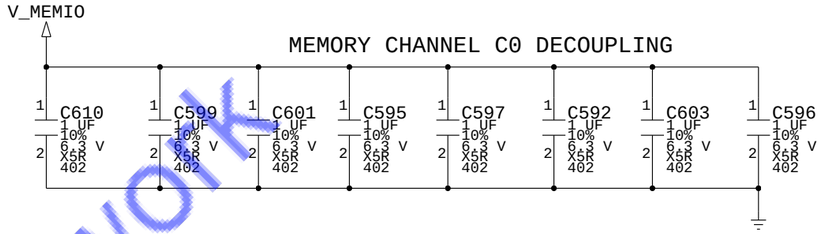
## CHANNEL C/D DECOUPLING



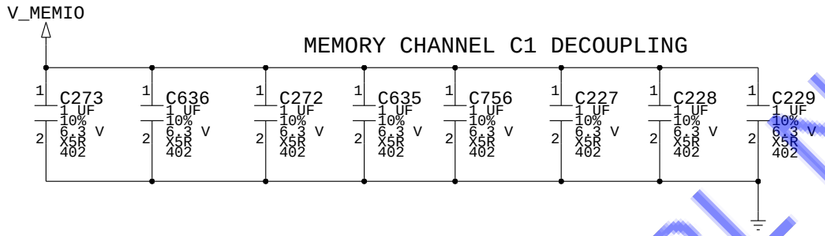

## MEMORY CHANNEL C0 DECOUPLING



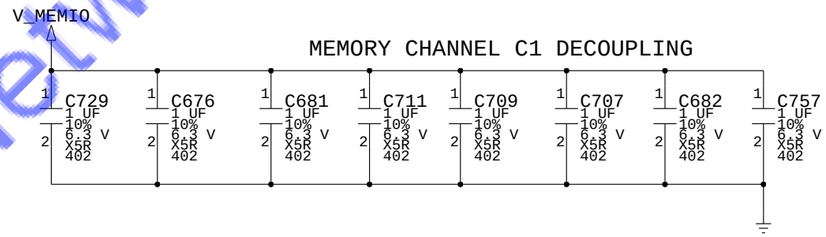

## MEMORY CHANNEL C0 DECOUPLING



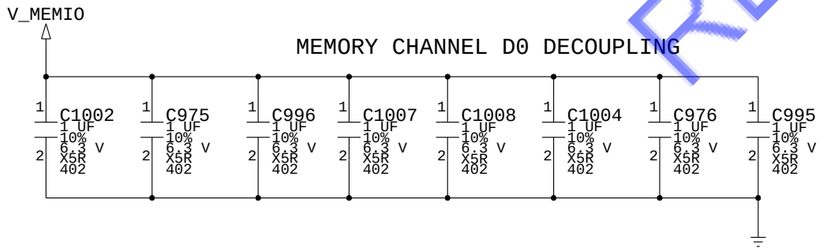

## MEMORY CHANNEL C1 DECOUPLING



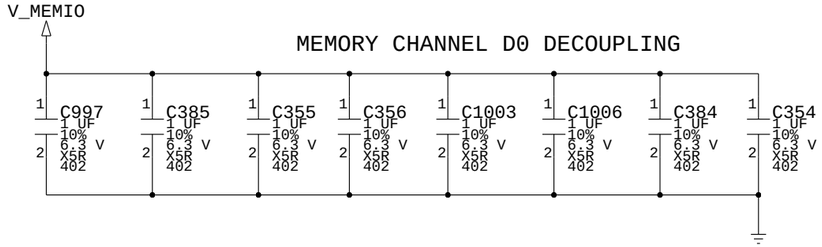

## MEMORY CHANNEL C1 DECOUPLING



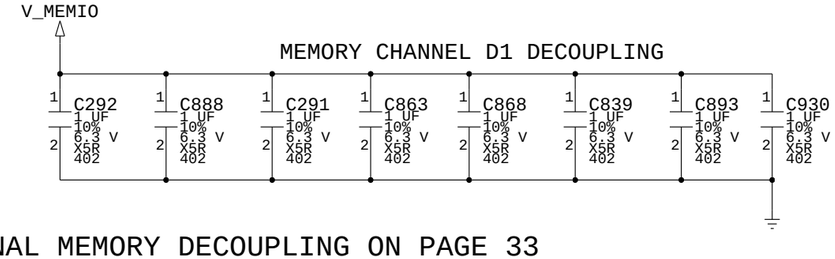

## MEMORY CHANNEL D0 DECOUPLING



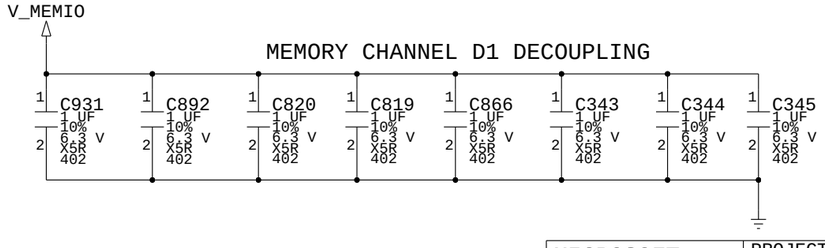

## MEMORY CHANNEL D0 DECOUPLING




## MEMORY CHANNEL D1 DECOUPLING



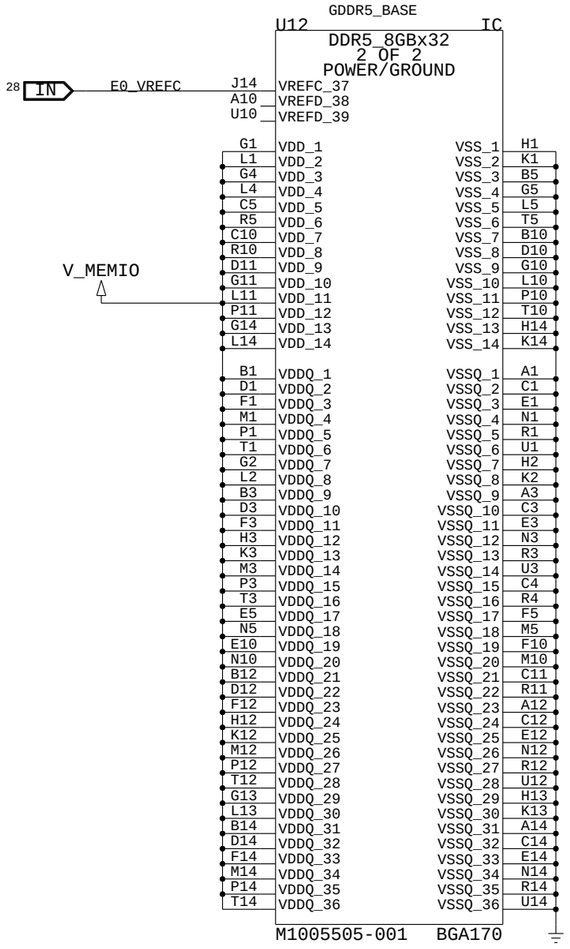

## MEMORY CHANNEL D1 DECOUPLING

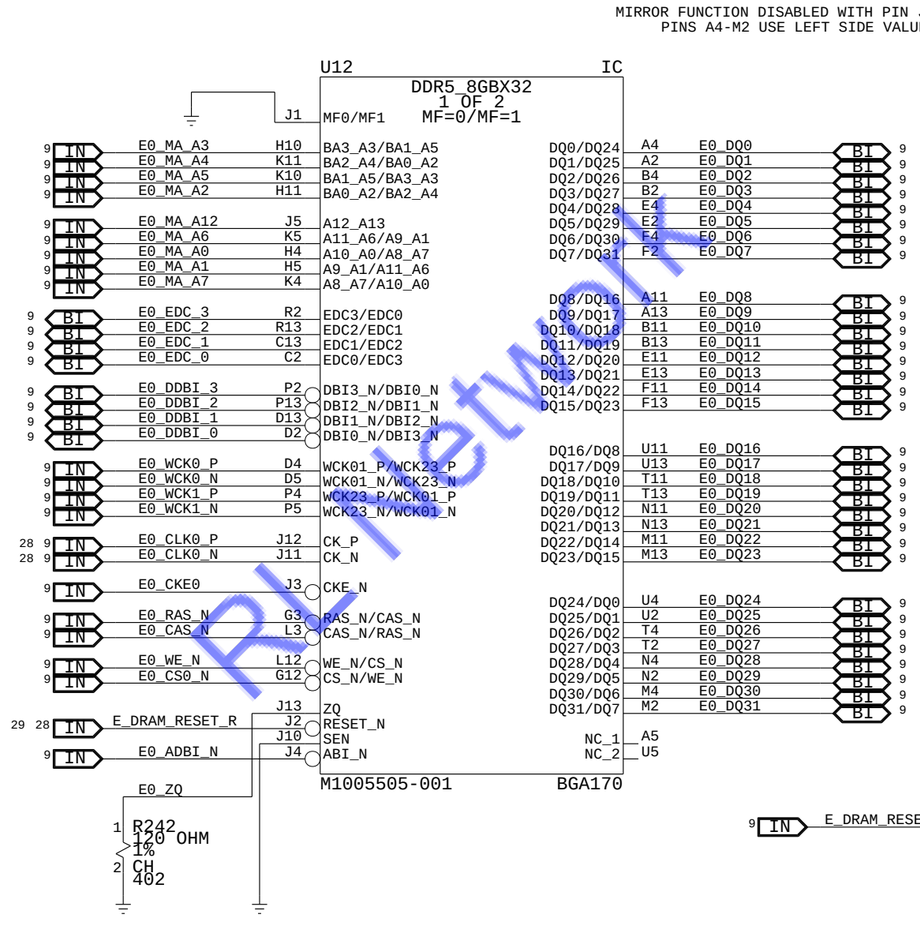


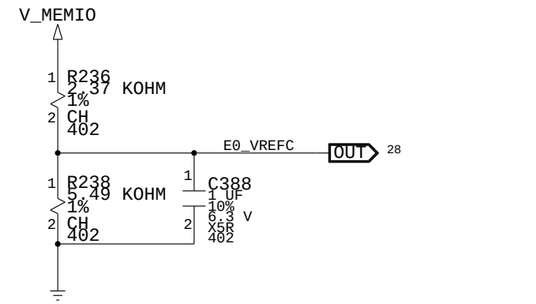


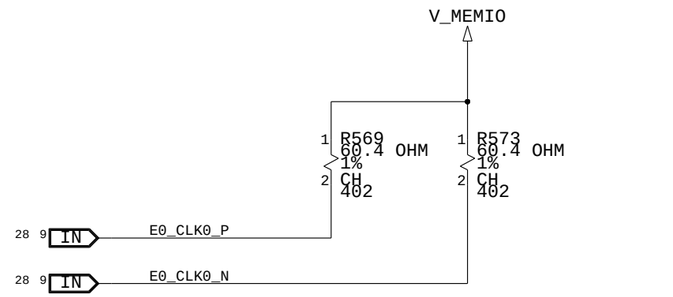

NOTE: ADDITIONAL MEMORY DECOUPLING ON PAGE 33

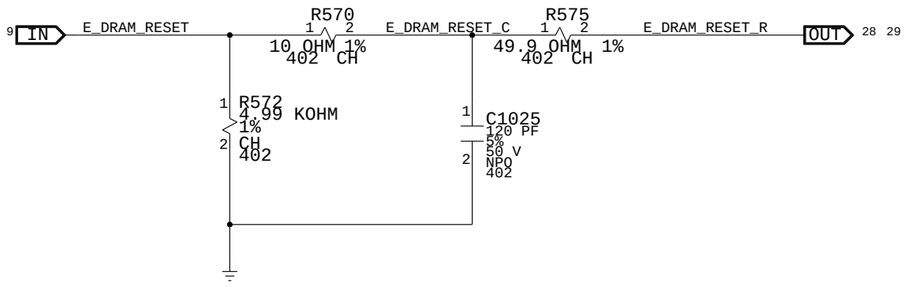
# MEMORY: CHANNEL E0






| MICROSOFT CONFIDENTIAL | PROJECT NAME | PAGE | CSA PAGE | FAB | VER |
|---|---|---|---|---|---|
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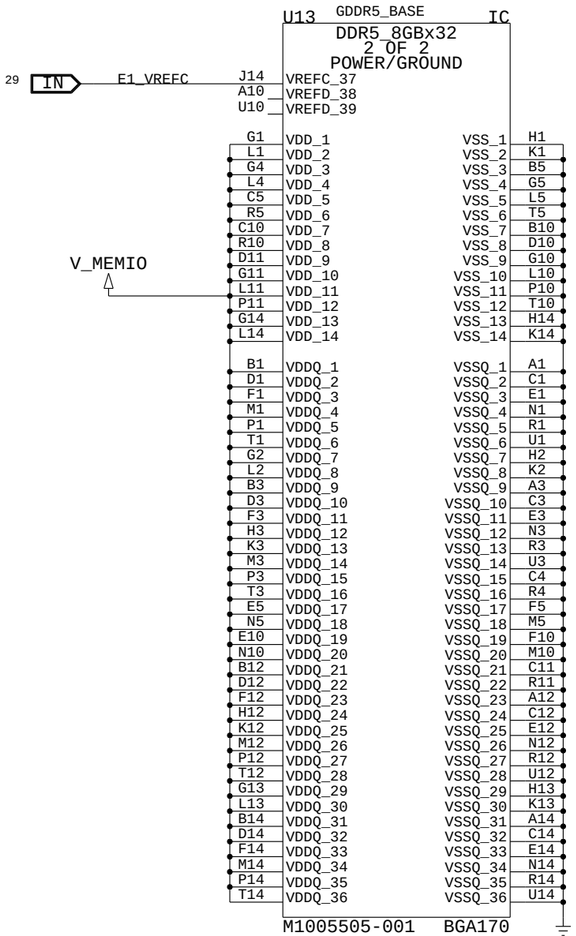
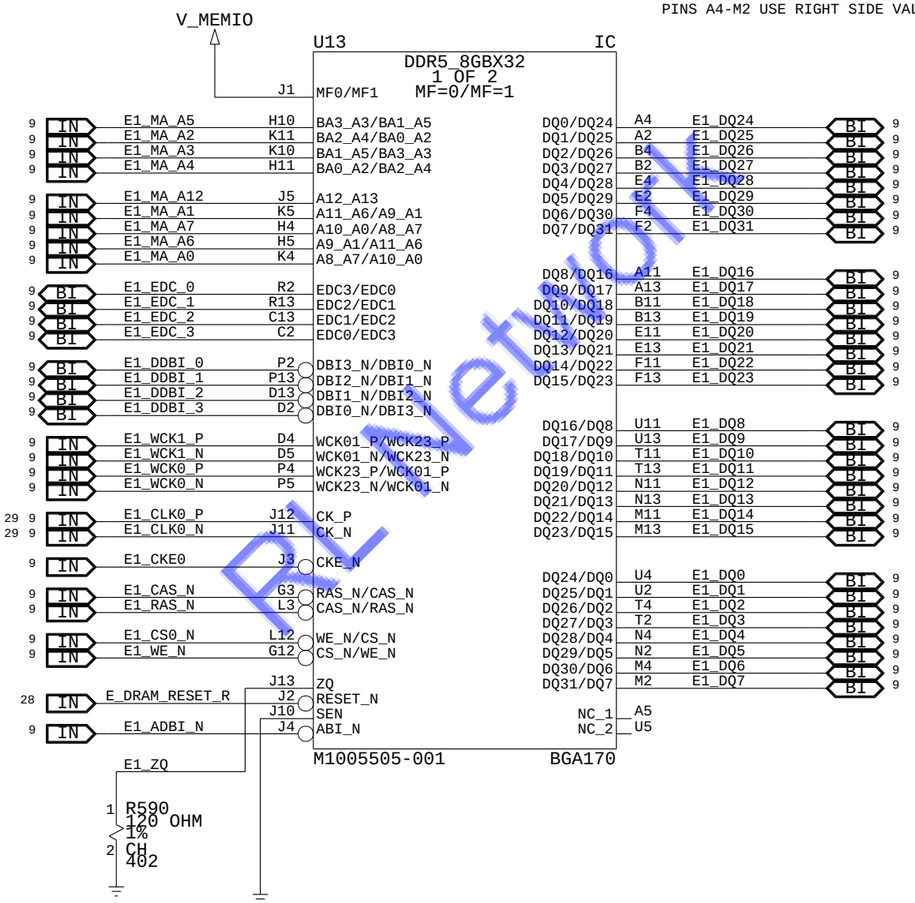
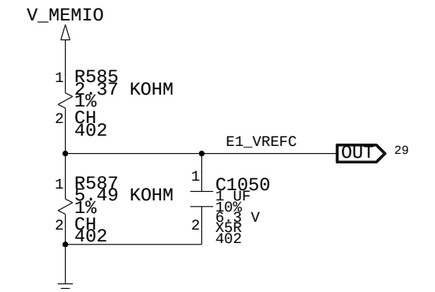
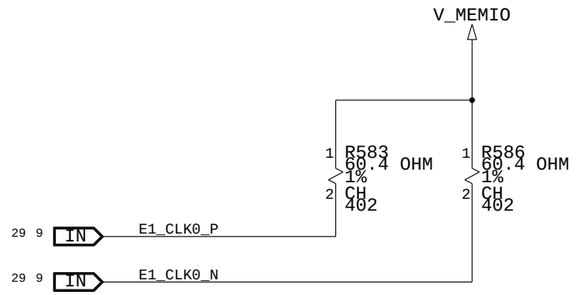
# MEMORY: CHANNEL E1




MIRROR FUNCTION ENABLED WITH PIN J1 HIGH
PINS A4-M2 USE RIGHT SIDE VALUES



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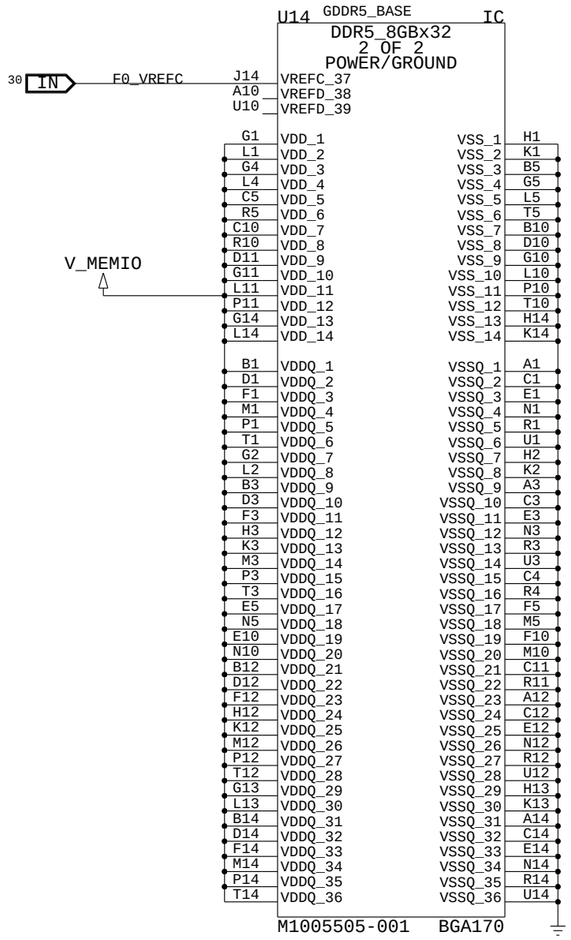
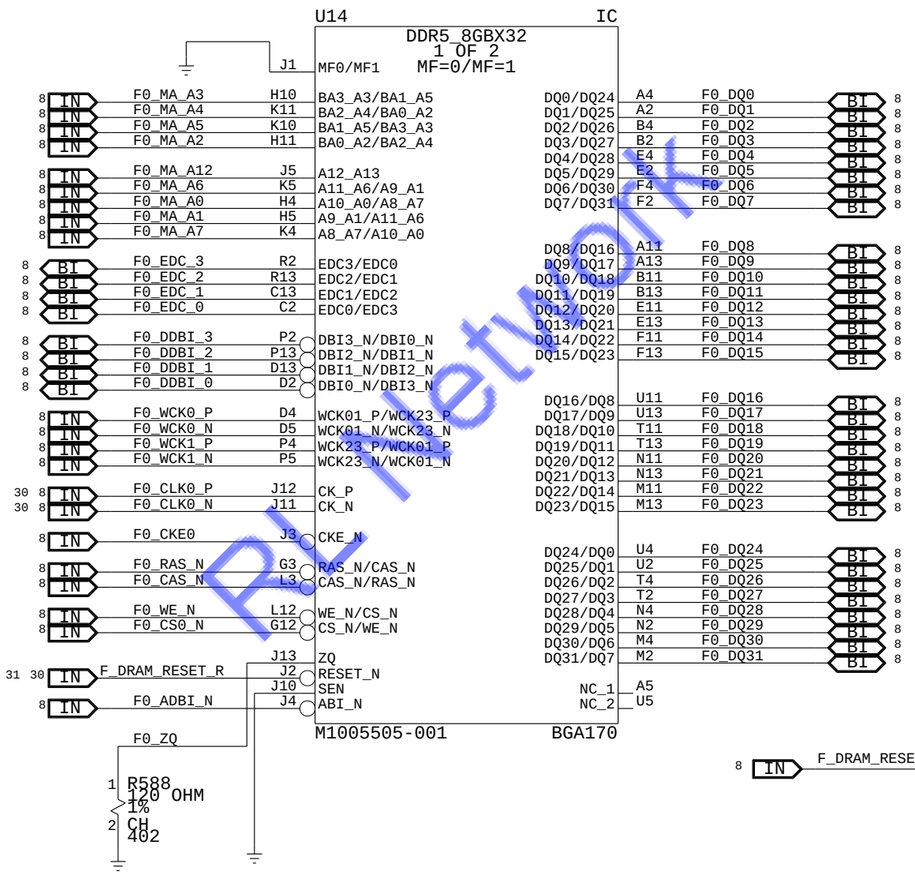
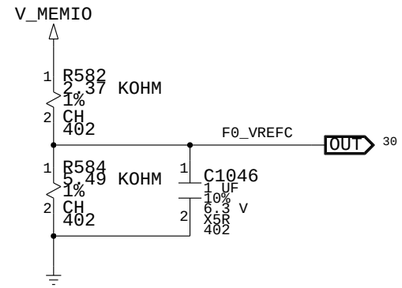
|---|---|---|---|---|---|
| | Cactus | 29/82 | 29/82 | G-R | 0.991 |

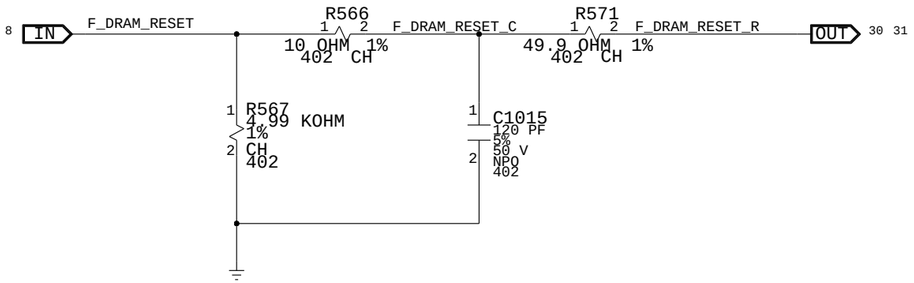
# MEMORY: CHANNEL F0




MIRROR FUNCTION DISABLED WITH PIN J1 LOW
PINS A4-M2 USE LEFT SIDE VALUES



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|---|---|---|---|---|---|
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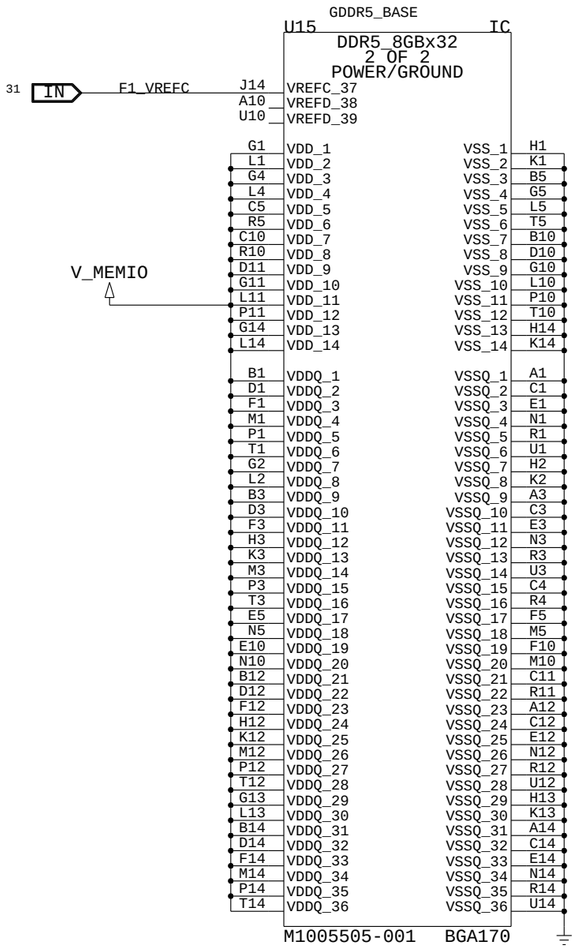
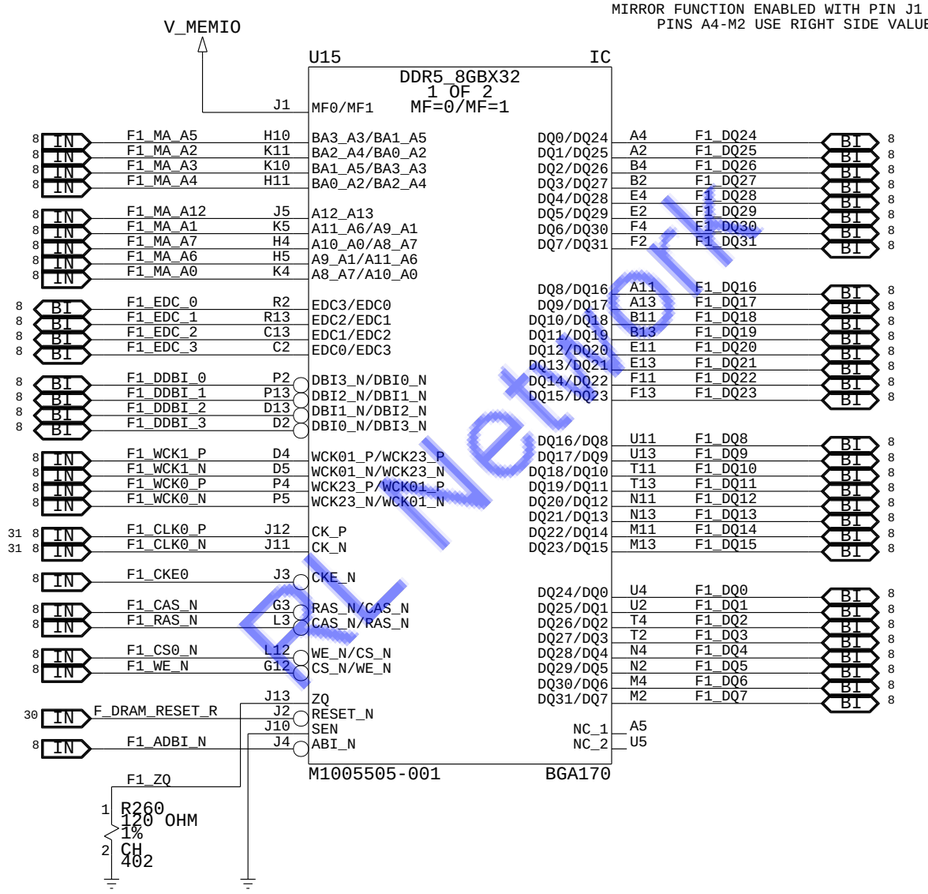
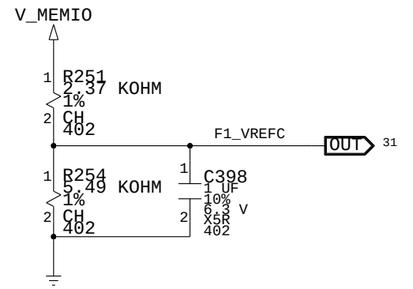
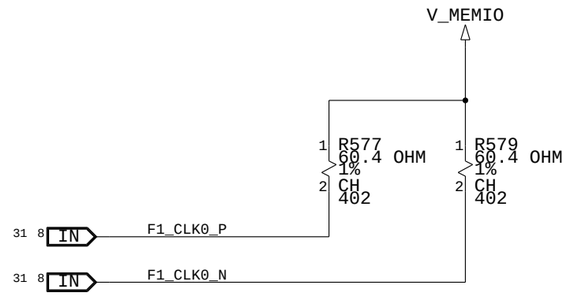
# MEMORY: CHANNEL F1



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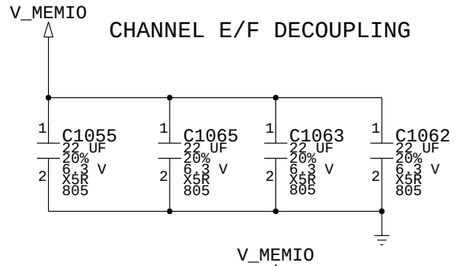
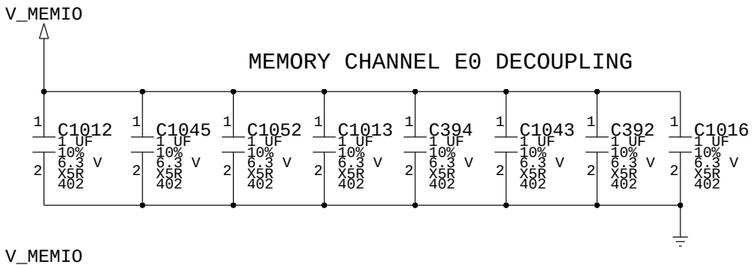
| | Cactus | 31/82 | 31/82 | G-R | 0.991 |

# MEMORY: CHANNEL E/F DECOUPLING

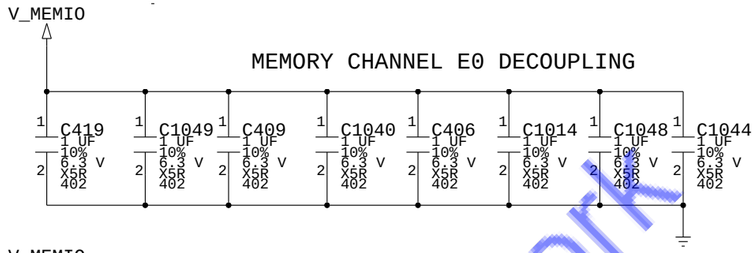
## CHANNEL E/F DECOUPLING



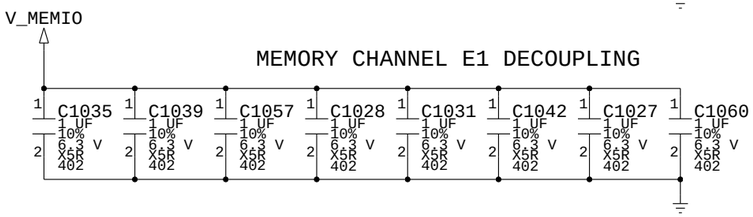

## MEMORY CHANNEL E0 DECOUPLING



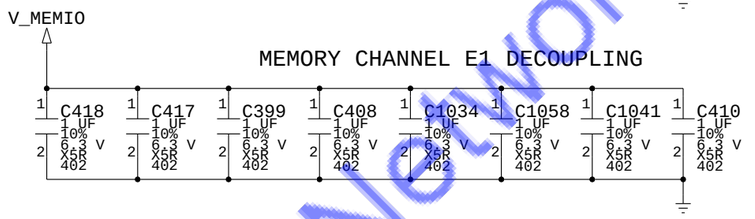

## MEMORY CHANNEL E0 DECOUPLING



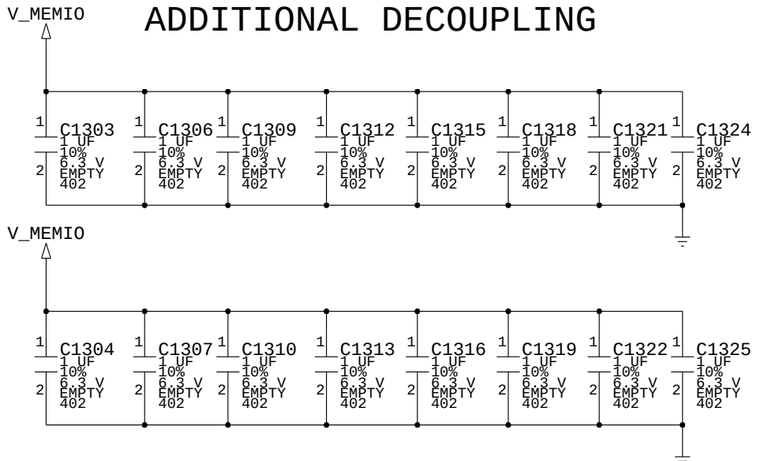

## MEMORY CHANNEL E1 DECOUPLING

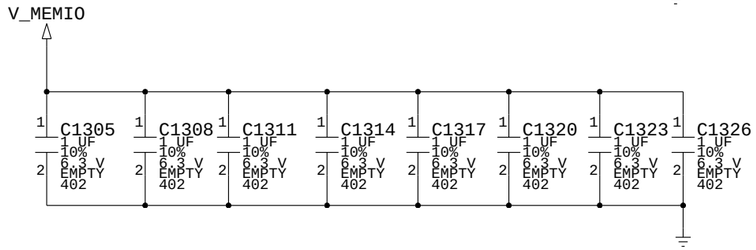



## MEMORY CHANNEL E1 DECOUPLING

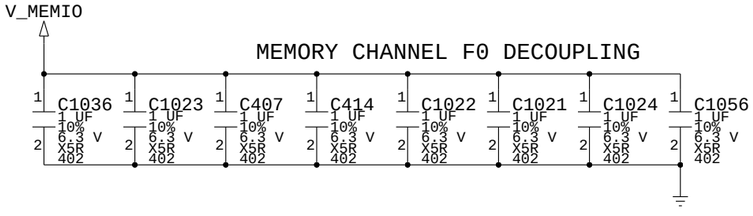



## ADDITIONAL DECOUPLING

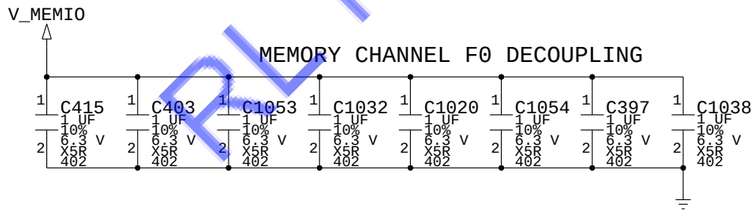


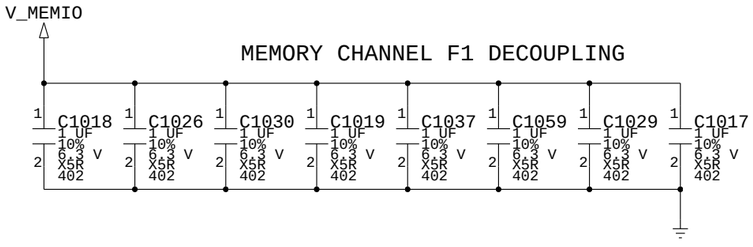

## MEMORY CHANNEL F0 DECOUPLING



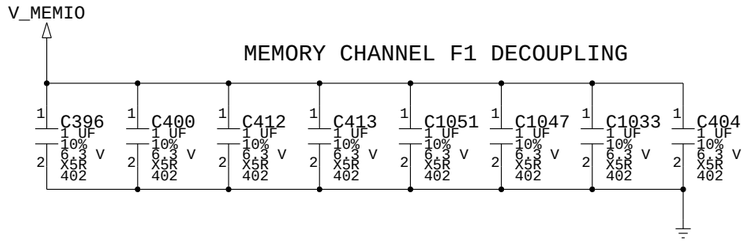

## MEMORY CHANNEL F0 DECOUPLING




## MEMORY CHANNEL F1 DECOUPLING




## MEMORY CHANNEL F1 DECOUPLING






NOTE: ADDITIONAL MEMORY DECOUPLING ON PAGE 33

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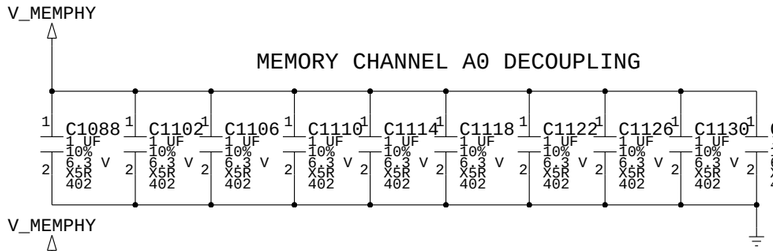
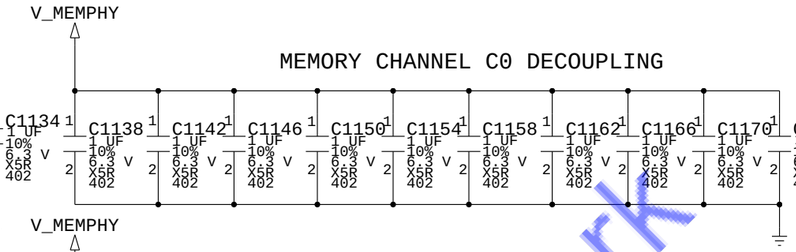
# MEMORY: ADDITIONAL DECOUPLING

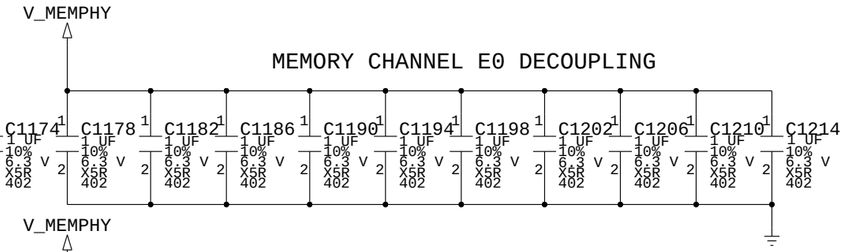
## MEMORY CHANNEL A0 DECOUPLING



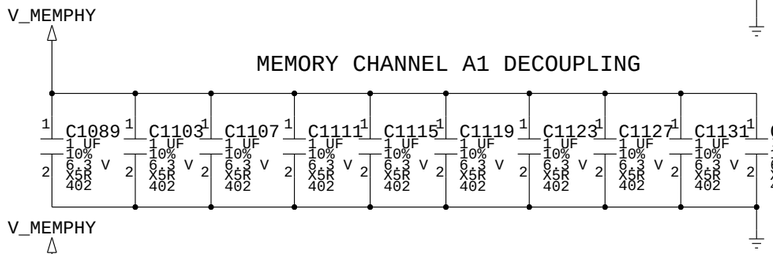

## MEMORY CHANNEL C0 DECOUPLING




## MEMORY CHANNEL E0 DECOUPLING




## MEMORY CHANNEL A1 DECOUPLING

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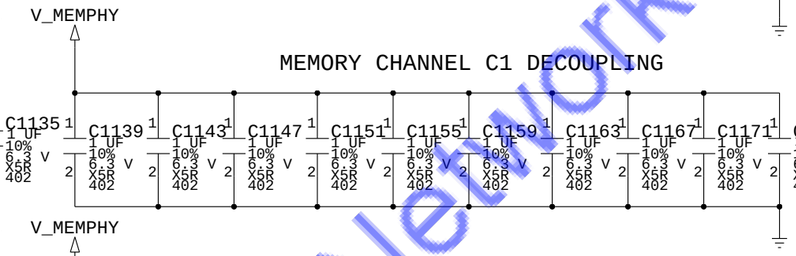
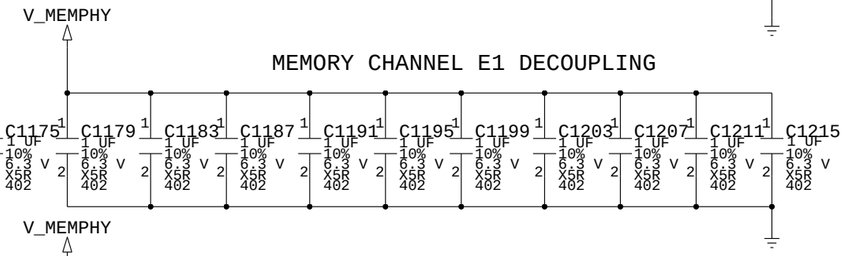



## MEMORY CHANNEL E1 DECOUPLING

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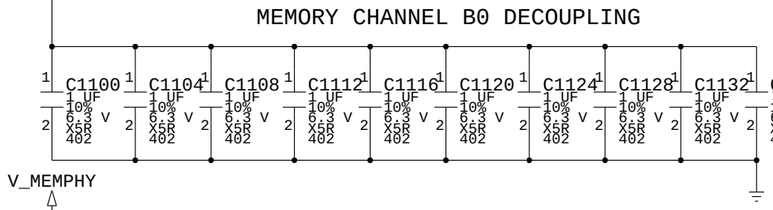
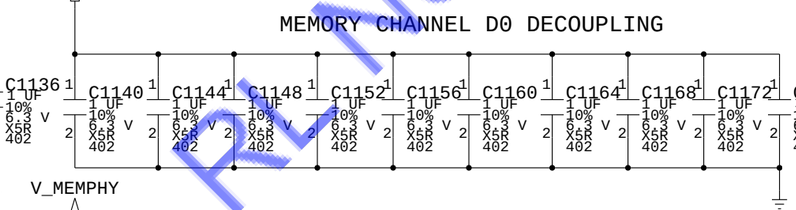
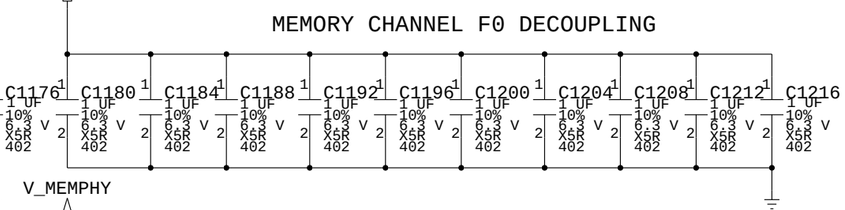


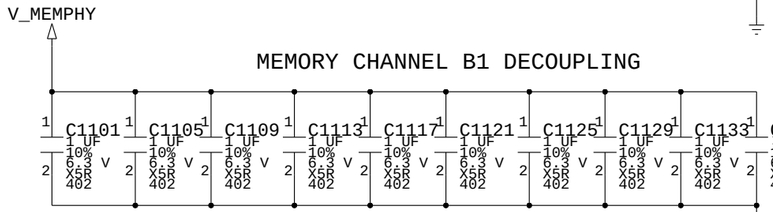

## MEMORY CHANNEL D0 DECOUPLING



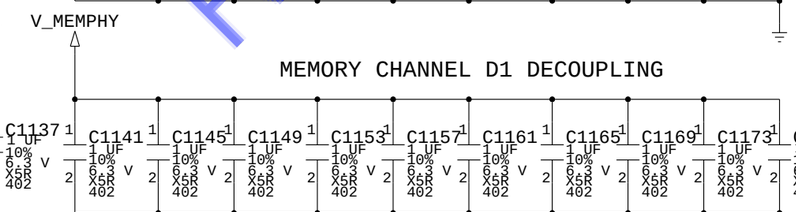

## MEMORY CHANNEL F0 DECOUPLING



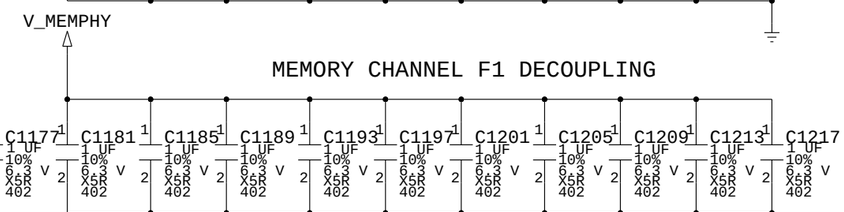

## MEMORY CHANNEL B1 DECOUPLING



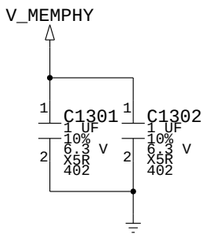

## MEMORY CHANNEL D1 DECOUPLING




## MEMORY CHANNEL F1 DECOUPLING




## ADDITIONAL DECOUPLING



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# KIC: USB

U2 KIC IC

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| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | USBD_D0_DP | AF8 | USB2_WIFI_DP | BI | 46 | WIFI |
| | | | | USBD_D0_DN | AE8 | USB2_WIFI_DN | BI | 46 | |
| | | | | USBC_D0_DP | AC4 | USB2_AUX_DP | BI | 45 | REAR 1 |
| | | | | USBC_D0_DN | AC3 | USB2_AUX_DN | BI | 45 | |
| REAR 1 | 45 IN | USB3_AUX_RP | Y1 USBC_D1_RXP | USBC_D1_TXP | W3 USB3_AUX_TP_C | C501 0.1 UF 10% X5R 16 V 402 | USB3_AUX_TP | OUT 45 | |
| | 45 IN | USB3_AUX_RN | Y2 USBC_D1_RXN | USBC_D1_TXN | W4 USB3_AUX_TN_C | C500 0.1 UF 10% X5R 16 V 402 | USB3_AUX_TN | OUT 45 | |
| REAR 0 | 45 IN | USB3_BP_P1_RP | V1 USBB_D2_RXP | USBB_D2_TXP | U3 USB3_BP_P1_TP_C | C499 0.1 UF 10% X5R 16 V 402 | USB3_BP_P1_TP | OUT 45 | REAR 0 |
| | 45 IN | USB3_BP_P1_RN | V2 USBB_D2_RXN | USBB_D2_TXN | U4 USB3_BP_P1_TN_C | C498 0.1 UF 10% X5R 16 V 402 | USB3_BP_P1_TN | OUT 45 | |
| | | | | USBB_D0_DP | AE4 | USB2_BP_P1_DP | BI | 45 | |
| | | | | USBB_D0_DN | AE3 | USB2_BP_P1_DN | BI | 45 | |
| | | | | USBB_D1_DP | AD2 | USB2_BP_P0_DP | 1 DB85 | | NOT USED |
| | | | | USBB_D1_DN | AD1 | USB2_BP_P0_DN | 1 DB84 | | |
| NOT USED | DB90 1 | USB3_BP_P0_RP | T1 USBB_D3_RXP | USBB_D3_TXP | R3 | USB3_BP_P0_TP | 1 DB14 | | |
| | DB91 1 | USB3_BP_P0_RN | T2 USBB_D3_RXN | USBB_D3_TXN | R4 | USB3_BP_P0_TN | 1 DB15 | | |
| | | | | USBA_D2_TXP | AB10 USB3_FP_P0_TP_C | C1097 0.1 UF 10% X5R 16 V 402 | USB3_FP_P0_TP | OUT 45 | FRONT |
| | | | | USBA_D2_TXN | AB9 USB3_FP_P0_TN_C | C1096 0.1 UF 10% X5R 16 V 402 | USB3_FP_P0_TN | OUT 45 | |
| FRONT | 45 IN | USB3_FP_P0_RP_BUFF | AA8 USBA_D2_RXP | | | | | | |
| | 45 IN | USB3_FP_P0_RN_BUFF | AA7 USBA_D2_RXN | | | | | | |
| | | | | USBA_D0_DP | AC7 | USB2_FP_P0_DP | BI | 45 | |
| | | | | USBA_D0_DN | AC8 | USB2_FP_P0_DN | BI | 45 | |
| | | | | USBA_D1_DP | AF6 | USB2_ACC_DP | BI | 51 | FRONT PANEL ACC |
| | | | | USBA_D1_DN | AF5 | USB2_ACC_DN | BI | 51 | |
| NOT USED | DB18 1 | USB3_ACC_RP | AB1 USBA_D3_RXP | USBA_D3_TXP | AA3 | USB3_ACC_TP | 1 DB20 | | NOT USED |
| | DB17 1 | USB3_ACC_RN | AB2 USBA_D3_RXN | USBA_D3_TXN | AA4 | USB3_ACC_TN | 1 DB22 | | |
| | | | | USBA_D2_AMOUT | AA5 USBA_D2_AMOUNT 1 | | DB97 | | |
| | | | | USBA_D1_AMOUT | AE6 USBA_D1_AMOUNT 1 | | DB23 | | |
| | | | | USBA_D0_AMOUT | AC11 USBA_D0_AMOUNT 1 | | DB100 | | |
| | | | | USBB_D2_AMOUT | R5 USBB_D2_AMOUNT 1 | | DB10 | | |
| | | | | USBB_D1_AMOUT | AD5 USBB_D1_AMOUNT 1 | | DB95 | | |
| | | | | USBB_D0_AMOUT | AF4 USBB_D0_AMOUNT 1 | | DB94 | | |
| | | | | USBC_D1_AMOUT | W5 USBC_D1_AMOUNT 1 | | DB24 | | |
| | | | | USBC_D0_AMOUT | AC5 USBC_D0_AMOUNT 1 | | DB21 | | |
| | | | | USBD_D0_AMOUT | AE9 USBD_D0_AMOUNT 1 | | DB98 | | |
| | | | USBA_D1_TXRTUNE AB11 USBA_D1_TXRTUNE | | | | | | |

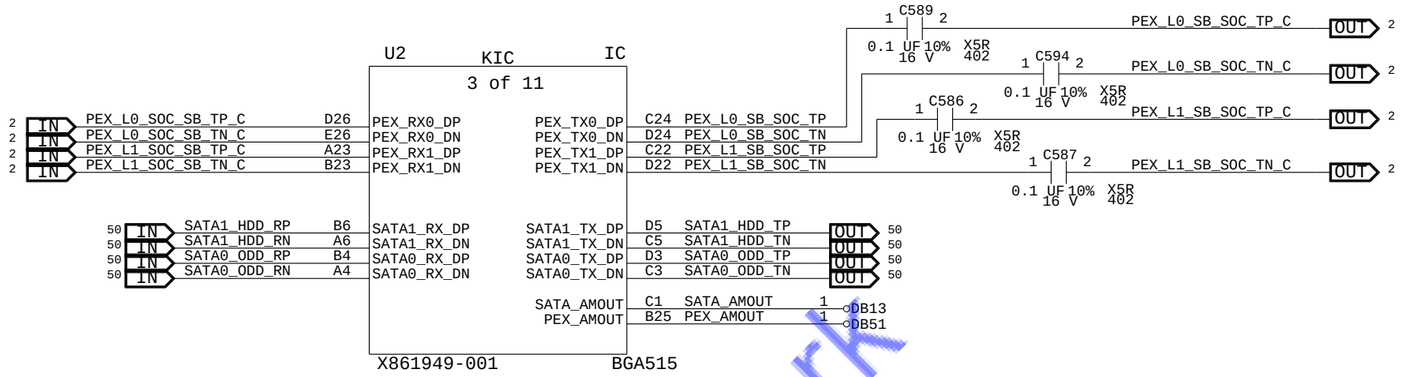
1 R86 174 OHM 1% 2 CH 402

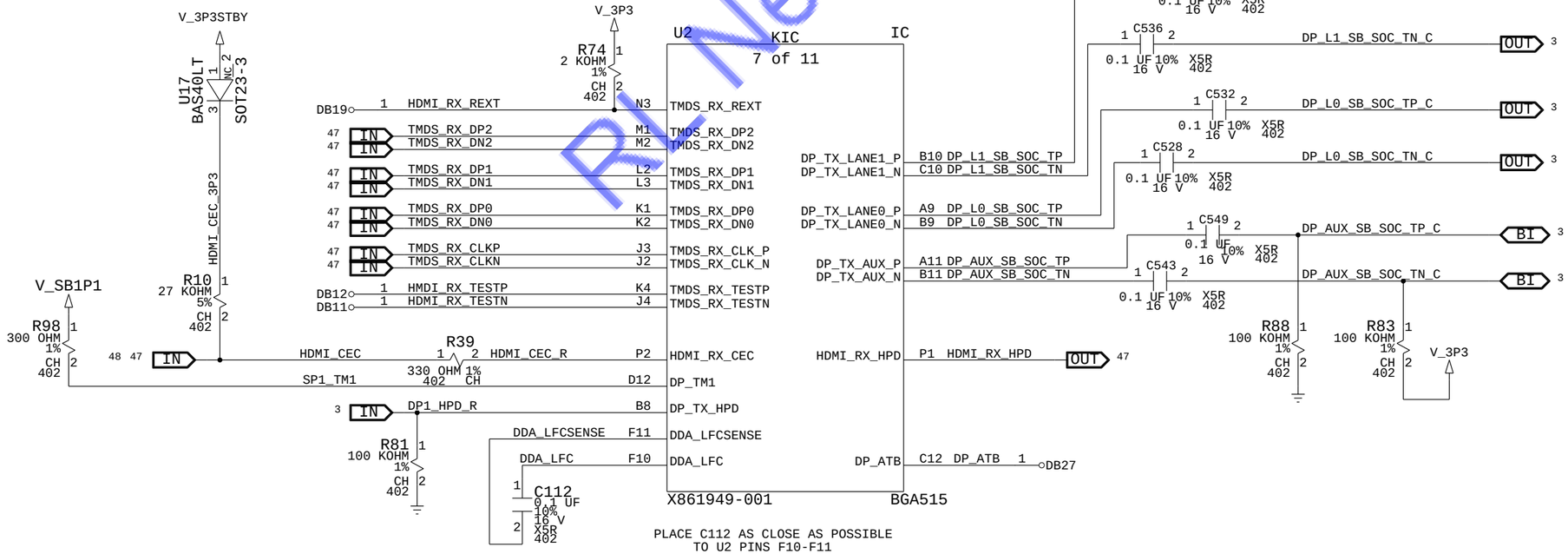
X861949-001 BGA515



| MICROSOFT CONFIDENTIAL | PROJECT NAME | PAGE | CSA PAGE | FAB | VER |
|---|---|---|---|---|---|
| | Cactus | 34/82 | 34/82 | G-R | 0.991 |

# KIC: PCIEX,SATA,VIDEO

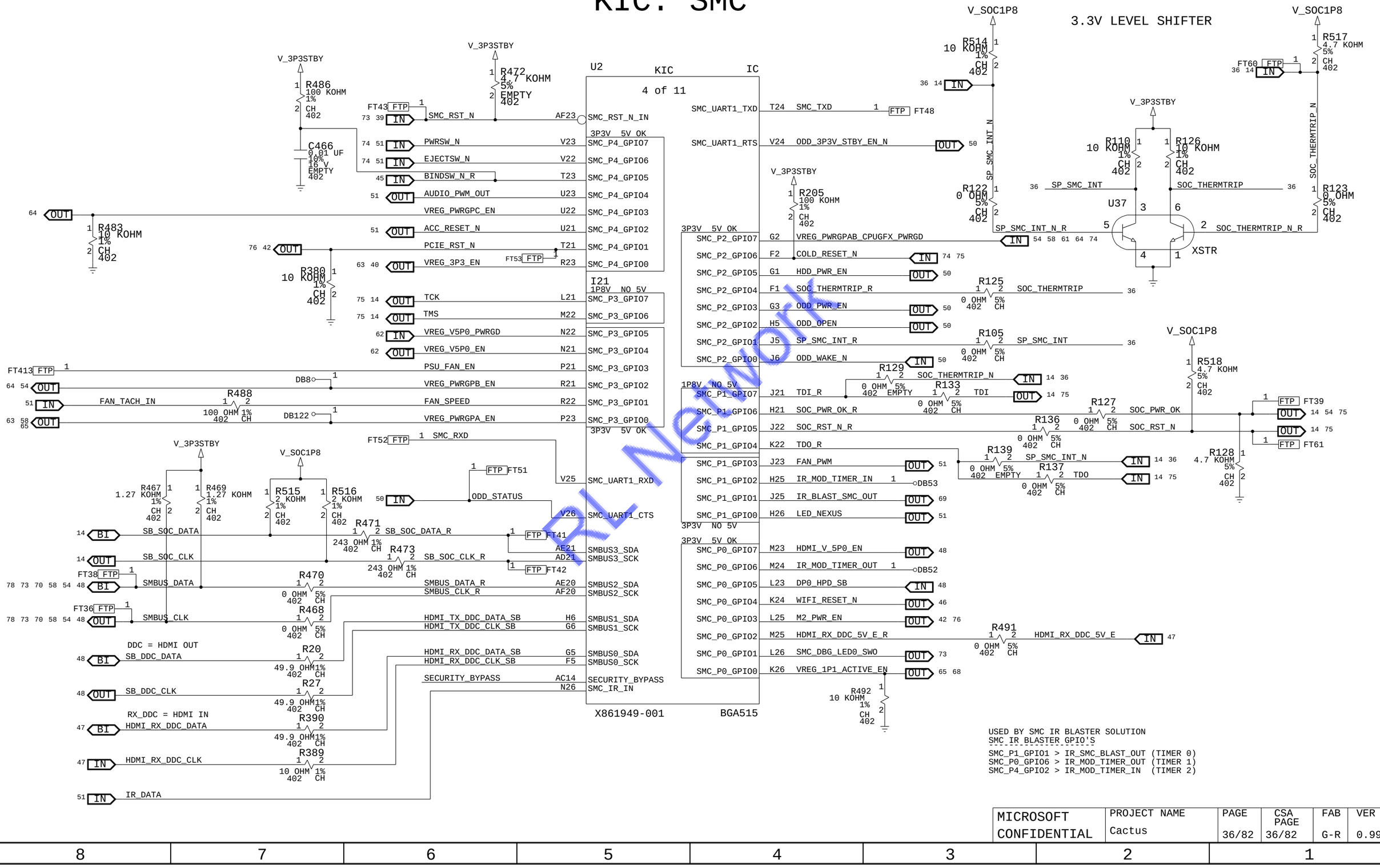


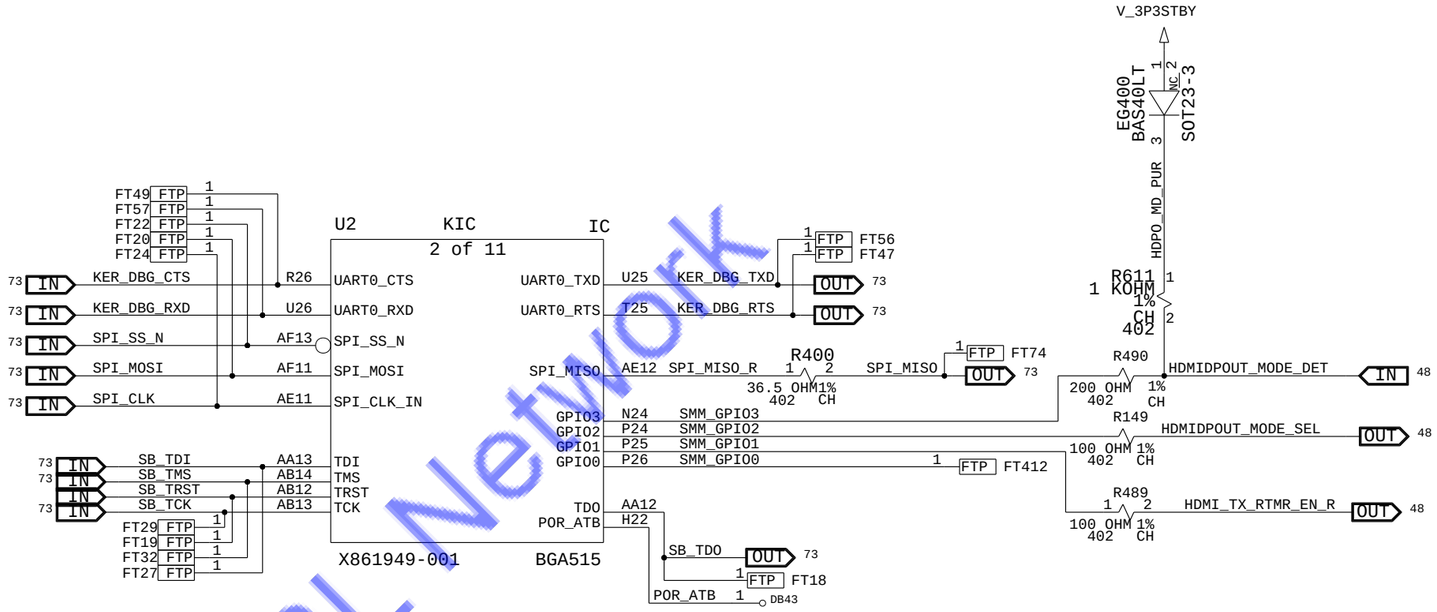



| MICROSOFT CONFIDENTIAL | PROJECT NAME | PAGE | CSA PAGE | FAB | VER |
|---|---|---|---|---|---|
| | Cactus | 35/82 | 35/82 | G-R | 0.991 |

# KIC: SMC


U2 KIC IC
4 of 11
X861949-001 BGA515
I21
3.3V LEVEL SHIFTER
V_SOC1P8
V_3P3STBY
SMC_RST_N
PWRSW_N
EJECTSW_N
BINDSW_N_R
AUDIO_PWM_OUT
VREG_PWRGPC_EN
ACC_RESET_N
PCIE_RST_N
VREG_3P3_EN
TCK
TMS
VREG_V5P0_PWRGD
VREG_V5P0_EN
PSU_FAN_EN
VREG_PWRGPB_EN
FAN_SPEED
VREG_PWRGPA_EN
SMC_RXD
ODD_STATUS
SB_SOC_DATA
SB_SOC_CLK
SMBUS_DATA
SMBUS_CLK
SB_DDC_DATA
SB_DDC_CLK
HDMI_RX_DDC_DATA
HDMI_RX_DDC_CLK
IR_DATA
FAN_TACH_IN
SMC_TXD
ODD_3P3V_STBY_EN_N
COLD_RESET_N
HDD_PWR_EN
SOC_THERMTRIP_R
ODD_PWR_EN
ODD_OPEN
SP_SMC_INT_R
ODD_WAKE_N
TDI_R
SOC_PWR_OK_R
SOC_RST_N_R
TDO_R
FAN_PWM
IR_MOD_TIMER_IN
IR_BLAST_SMC_OUT
LED_NEXUS
HDMI_V_5P0_EN
IR_MOD_TIMER_OUT
DP0_HPD_SB
WIFI_RESET_N
M2_PWR_EN
HDMI_RX_DDC_5V_E_R
SMC_DBG_LED0_SWO
VREG_1P1_ACTIVE_EN
SP_SMC_INT_N_R
SOC_THERMTRIP_N_R
SP_SMC_INT
SOC_THERMTRIP
SOC_PWR_OK
SOC_RST_N
TDI
TDO
SECURITY_BYPASS
HDMI_TX_DDC_DATA_SB
HDMI_TX_DDC_CLK_SB
HDMI_RX_DDC_DATA_SB
HDMI_RX_DDC_CLK_SB
SMBUS_DATA_R
SMBUS_CLK_R
SB_SOC_DATA_R
SB_SOC_CLK_R
DDC = HDMI OUT
RX_DDC = HDMI IN
USED BY SMC IR BLASTER SOLUTION
SMC_IR_BLASTER_GPIO'S
SMC_P1_GPIO1 > IR_SMC_BLAST_OUT (TIMER 0)
SMC_P0_GPIO6 > IR_MOD_TIMER_OUT (TIMER 1)
SMC_P4_GPIO2 > IR_MOD_TIMER_IN (TIMER 2)
MICROSOFT CONFIDENTIAL
PROJECT NAME
Cactus
PAGE
36/82
CSA PAGE
36/82
FAB
G-R
VER
0.991

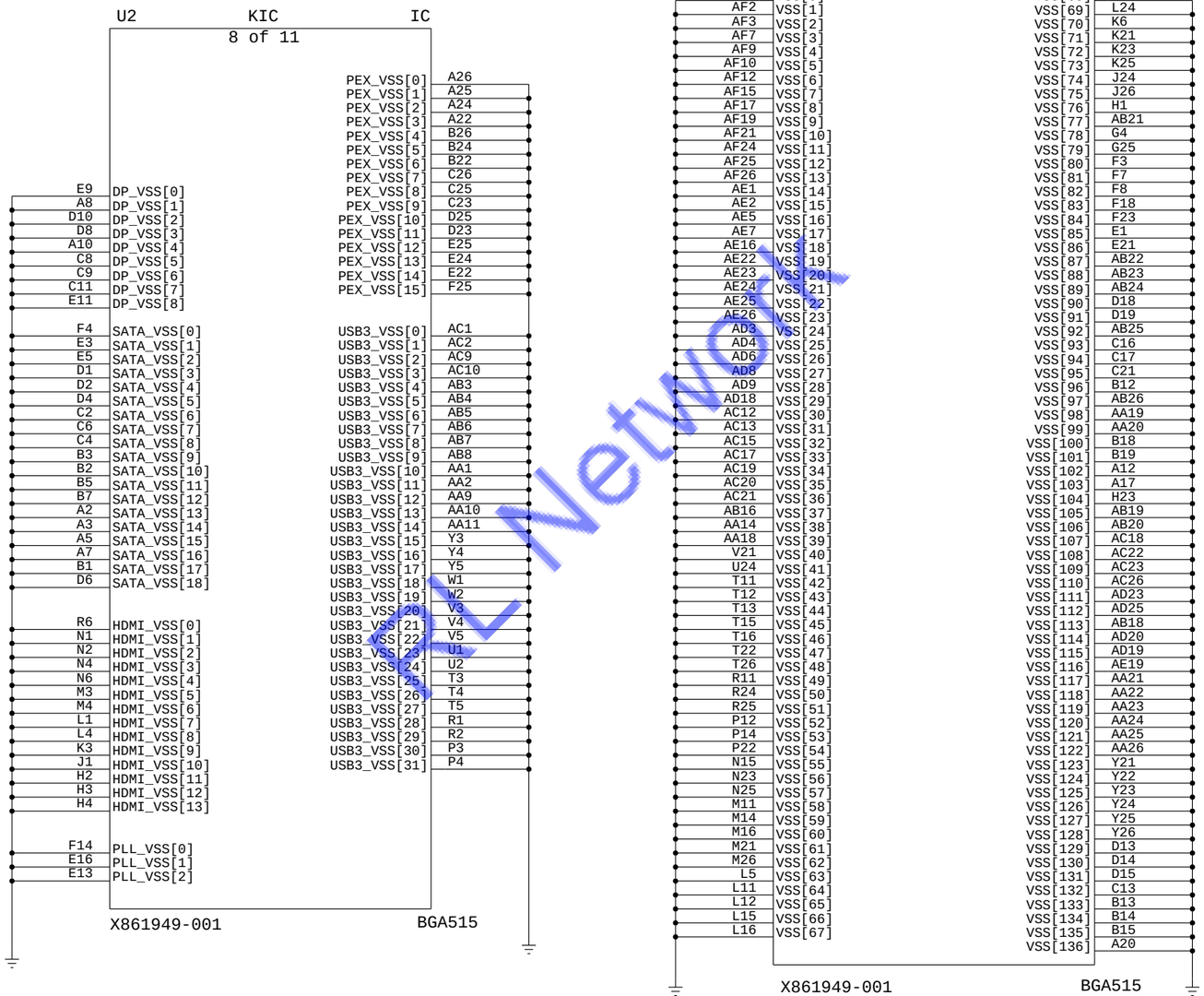
# KIC: FACET






| MICROSOFT CONFIDENTIAL | PROJECT NAME | PAGE | CSA PAGE | FAB | VER |
|---|---|---|---|---|---|
| | Cactus | 37/82 | 37/82 | G-R | 0.991 |

# KIC: POWER






| MICROSOFT CONFIDENTIAL | PROJECT NAME | PAGE | CSA PAGE | FAB | VER |
|---|---|---|---|---|---|
| | Cactus | 38/82 | 38/82 | G-R | 0.991 |

# KIC: CLOCKS,STRAPPING,POR

PEX REF CLOCKS CONTROLLED BY SMC

V_3P3
R94 10 KOHM 1% CH 402
R90 10 KOHM 1% EMPTY 402
R108 10 KOHM 1% CH 402
R107 10 KOHM 1% EMPTY 402

V_1P8STBY

KIC_BASE
U2 KIC IC
1 of 11

| | | | |
|---|---|---|---|
| | G22 | V_VDD18_DET | |
| PEX_REF_CLK1_REQN | C18 | PEX_REF_CLK1_REQN | |
| PEX_REF_CLK2_REQN | C19 | PEX_REF_CLK2_REQN | |
| | AD22 | VPGM | |
| DB36 1 BKUP_SB_SYNC_CLKP | E18 | 100M_SYNC_CLK_BYPASS_DP | |
| DB42 1 BKUP_SB_SYNC_CLKN | E19 | 100M_SYNC_CLK_BYPASS_DN | |
| SMC_XTAL_OUT | A18 | XTAL_CLK_OUT | |
| SMC_XTAL_IN | A19 | XTAL_CLK_IN | |
| | AD24 | TEST | |
| SMC_BYPASS_CLK_IN | D21 | SMC_BYPASS_CLK_IN | |
| DB25 1 BKUP_SB_PEX_REF_CLKP | E20 | PCIE_BYPASS_CLK_DP | |
| DB28 1 BKUP_SB_PEX_REF_CLKN | D20 | PCIE_BYPASS_CLK_DN | |
| DB46 1 250M_CLK_BYPASS_DP | F20 | 250M_CLK_BYPASS_DP | |
| DB47 1 250M_CLK_BYPASS_DN | F21 | 250M_CLK_BYPASS_DN | |
| DB31 1 BKUP_SB_AV_CLKP | D16 | AV_CLK_BYPASS_DP | |
| DB32 1 BKUP_SB_AV_CLKN | D17 | AV_CLK_BYPASS_DN | |

X861949-001

SMC_XTAL_OUT — R461 249 KOHM 1% 402 CH — R457 1 KOHM 1% 402 CH — SMC_XTAL_OUT_R
R465 49.9 OHM 1% EMPTY 402
Y2 25 MHZ XTAL M1020244-001 SM
C582 30 PF 5% 50 V NPO 402
C585 30 PF 5% 50 V NPO 402
R121 10 KOHM 1% 402 CH — SMC_BYPASS_CLK_IN

V_12P0_GATED
C212 1 UF 10% 16 V X5R 603
R494 10 KOHM 1% CH 402
R493 1.13 KOHM 1% CH 402
R494/V_EXT_DET IS NOW CONNECTED TO V_12P0_GATED
NOMINAL TRIP POINT = 9.55V

| | | | |
|---|---|---|---|
| V_EXT_DET | G21 | V_EXT_DET | |
| V_EXT_OK | F22 | V12P0_PWRGD | OUT 64 |
| SMC_RST_N_OUT | AF22 | SMC_RST_N_OUT_R | R476 1 KOHM 1% 402 CH — SMC_RST_N — OUT 36 73 |
| CLK_MONITOR | E17 | SB_CLK_MONITOR | DB29 |
| RTC_CLK_OUT | A21 | RTC_CLK_OUT | R120 0 OHM 5% 402 CH — X32K_X2_R — OUT 14 |
| EMMC_CLK | AC16 | MMC_CLK | OUT 43 |
| ENET_REF_CLK | C20 | | ENET_REF_CLK — OUT 42 |
| SOC_NS_SYNC_CLK_DP | B16 | SOC_SYNC_NS_100M_CLKP | OUT 2 |
| SOC_NS_SYNC_CLK_DN | B17 | SOC_SYNC_NS_100M_CLKN | OUT 2 |
| SOC_NS_AV_CLK_DP | A13 | SOC_AV_NS_100M_CLKP | OUT 2 |
| SOC_NS_AV_CLK_DN | A14 | SOC_AV_NS_100M_CLKN | OUT 2 |
| PEX_REF_CLK2_DP | B20 | SOC_NB_CLKP | NO_M2 R456 0 OHM 5% 402 CH — SOC_NB_CLKP_R — NO_M2 R460 0 OHM 5% 402 CH — SOC_NB_PEX_SS_100M_CLKP — OUT 2 77 |
| PEX_REF_CLK2_DN | B21 | SOC_NB_CLKN | R464 NO_M2 0 OHM 5% 402 CH — SOC_NB_CLKN_R — R459 NO_M2 0 OHM 5% 402 CH — SOC_NB_PEX_SS_100M_CLKN — OUT 2 77 |
| PEX_REF_CLK1_DP | C14 | ENET_CLKP | OUT 77 — NO_M2 R411 0 OHM 5% 402 CH — ENET_CLKP_R — NO_M2 R423 0 OHM 5% 402 CH — ENET_PEX_SS_100M_CLKP — OUT 42 77 |
| PEX_REF_CLK1_DN | C15 | ENET_CLKN | R419 NO_M2 0 OHM 5% 402 CH — ENET_CLKN_R — R428 NO_M2 0 OHM 5% 402 CH — ENET_PEX_SS_100M_CLKN — OUT 42 77 |
| PEX_REF_CLK0_DP | A15 | SOC_CLKP | OUT 77 — NO_M2 R427 0 OHM 5% 402 CH — SOC_CLKP_R — NO_M2 R443 0 OHM 5% 402 CH — SOC_PEX_SS_100M_CLKP — OUT 2 77 |
| PEX_REF_CLK0_DN | A16 | SOC_CLKN | R435 NO_M2 0 OHM 5% 402 CH — SOC_CLKN_R — R449 NO_M2 0 OHM 5% 402 CH — SOC_PEX_SS_100M_CLKN — OUT 2 77 |

BGA515

DB30 — KEEP DB29 AND DB30 CLOSE TO EACH OTHER IN LAYOUT

M2_ONLY R432 10 KOHM 1% CH 402
M2_ONLY R462 10 KOHM 1% CH 402

TODO; IF SMCFW CHANGES BASED ON M2_ONLY STUFFING OPTION, THEN TURN OFF CLOCKS INSTEAD OF TERMINATING

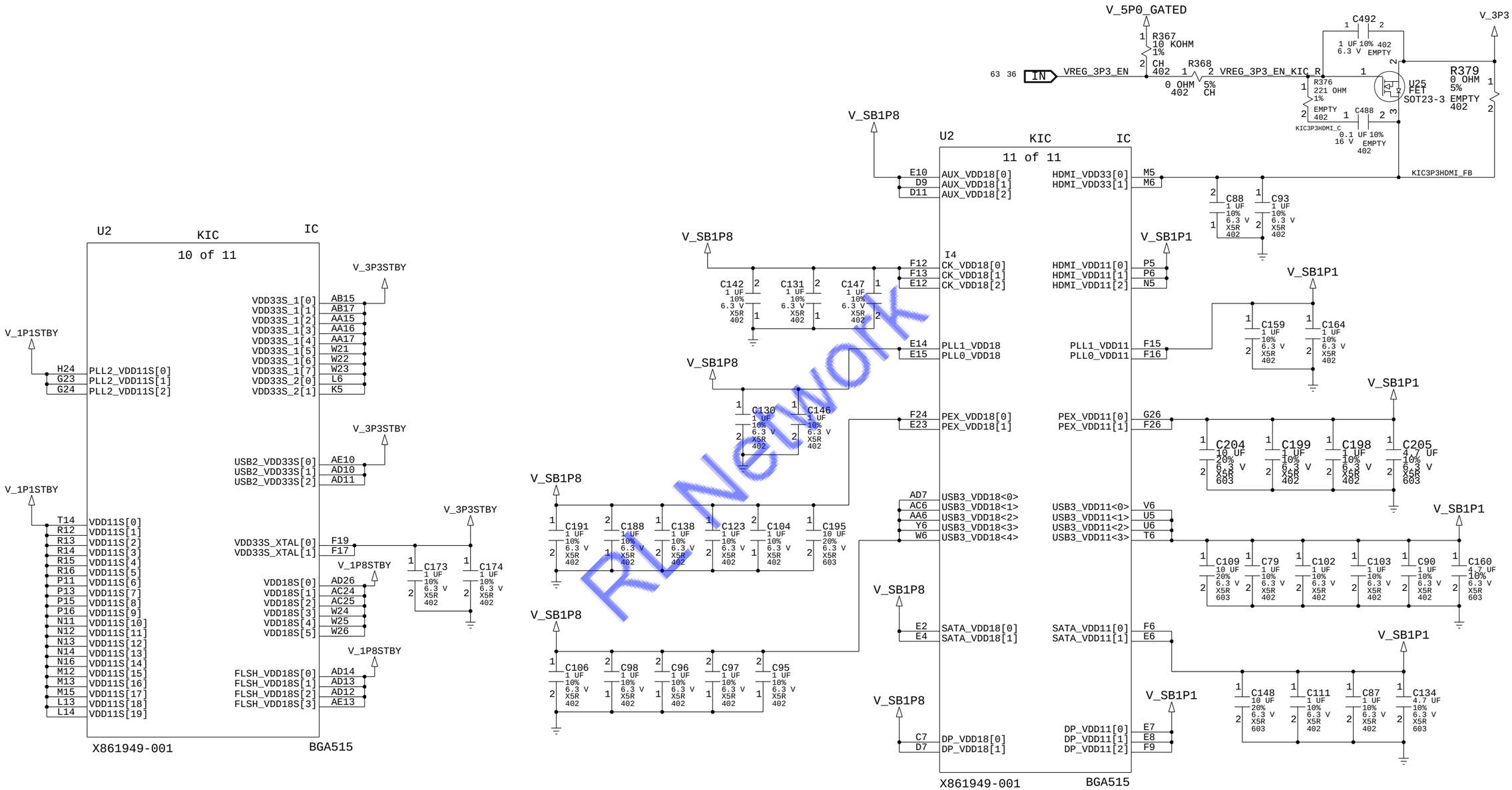
DO NOT STUFF RESISTORS IF BOTH HDD AND M2 ARE STUFFED



| MS_PART# | MATL | REF_DES | DESCR. | BOM PROPERTY |
|---|---|---|---|---|
| X861949-007 | IC | U2 | IC,KRAKEN SB,BGA515 | KIC_RETAIL |
| X861949-008 | IC | U2 | IC,KRAKEN SB,BGA515 | KIC_DEV |
| X861949-008 | EMPTY | U2 | IC,KRAKEN SB,BGA515 | KIC_EMPTY |

# KIC: POWER

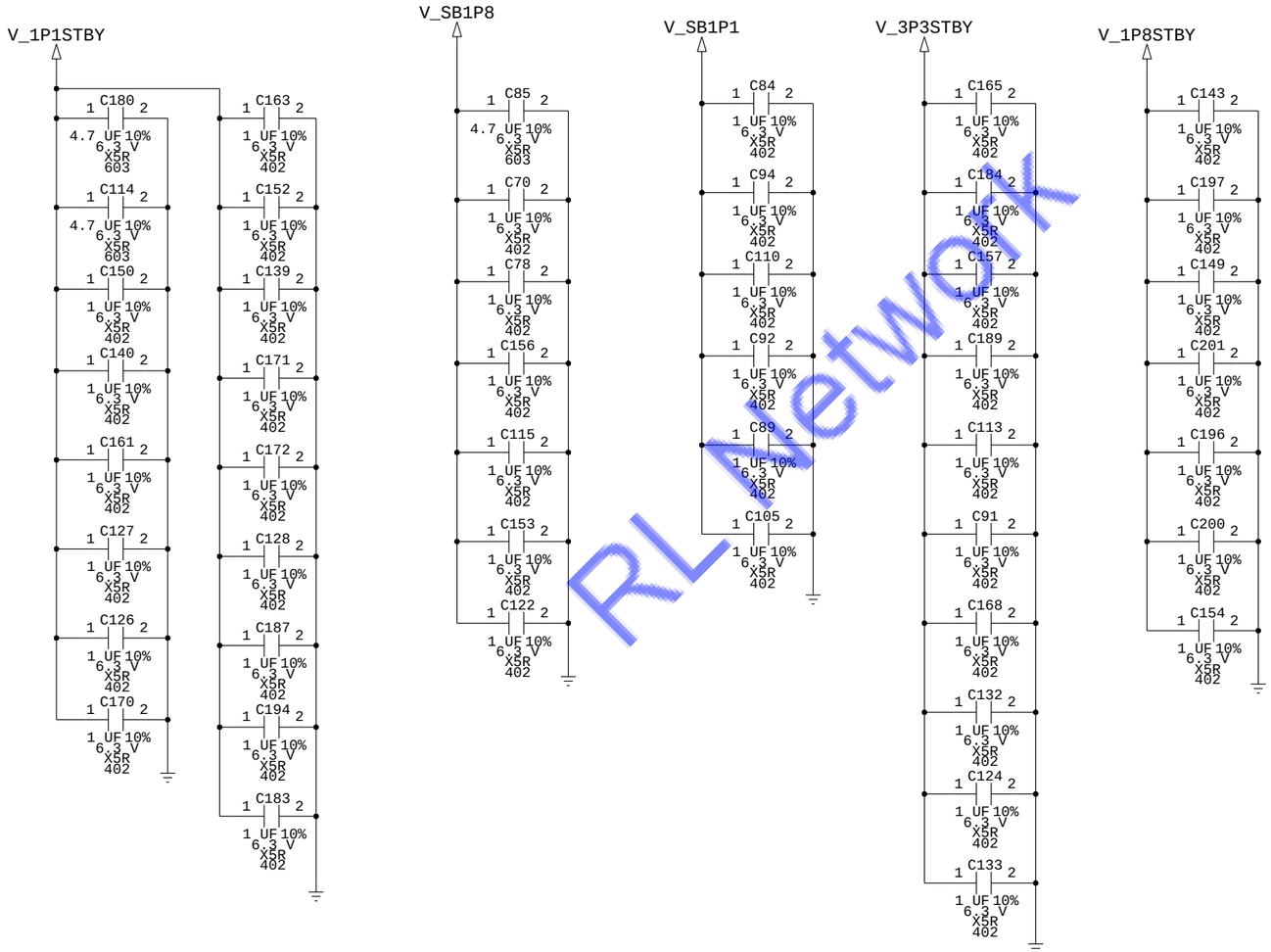
FET PREVENTS LEAKAGE THROUGH KRAKEN
FROM STANDBY RAILS TO 3P3 RAIL






| MICROSOFT CONFIDENTIAL | PROJECT NAME | PAGE | CSA PAGE | FAB | VER |
|---|---|---|---|---|---|
| | Cactus | 40/82 | 40/82 | G-R | 0.991 |

# KIC: DECOUPLING






| MICROSOFT CONFIDENTIAL | PROJECT NAME | PAGE | CSA PAGE | FAB | VER |
|---|---|---|---|---|---|
| | Cactus | 41/82 | 41/82 | G-R | 0.991 |

# ETHERNET CONTROLLER

RED = 1 GBPS LINK
GREEN = 10 MBPS LINK
NO INDICATION FOR 100 MBPS LINK

V_3P3_ENET
DEBUG
D1
LED
RED-GREEN
SM
IN 36 76 M2_PWR_EN
FT1 FTP
R357 0 OHM 5% 402 EMPTY
V_3P3_ENET
DEBUG
R33 10 KOHM 1% CH 402

ENET_LED2_R — DEBUG R26 511 OHM 1% 402 CH
ENET_LED0_R — DEBUG R17 511 OHM 1% CH 402
IN 39 ENET_REF_CLK — R36 100 OHM 1% 402 CH
R35 2.49 KOHM 1% CH 402 — DB4

R37 0 OHM 5% 402 EMPTY
V_3P3_ENET
R365 10 KOHM 1% CH 402
FT9 FTP

IN 76 36 PCIE_RST_N

U28
RTL8111HM
X896524-002
QFN33

| | | | |
|---|---|---|---|
| 44 BI | MDIP3 | 9 | MDIP3 |
| 44 BI | MDIN3 | 10 | MDIN3 |
| 44 BI | MDIP2 | 6 | MDIP2 |
| 44 BI | MDIN2 | 7 | MDIN2 |
| 44 BI | MDIP1 | 4 | MDIP1 |
| 44 BI | MDIN1 | 5 | MDIN1 |
| 44 BI | MDIP0 | 1 | MDIP0 |
| 44 BI | MDIN0 | 2 | MDIN0 |
| | ENET_LED2 | 25 | LED2 |
| | ENET_GPO | 26 | LED1/GPO |
| | ENET_LED0 | 27 | LED0 |
| | ENET_RSET | 31 | RSET |
| | ENET_XTAL2 | 29 | CKXTAL2 |
| | ENET_XTAL1 | 28 | CKXTAL1 |
| | ENET_ISOLATE_N | 20 | ISOLATE_N |
| 2 IN | PEX_SOC_ENET_TP_C | 13 | HSIP |
| 2 IN | PEX_SOC_ENET_TN_C | 14 | HSIN |
| 77 39 IN | ENET_PEX_SS_100M_CLKP | 15 | REFCLK_P |
| 77 39 IN | ENET_PEX_SS_100M_CLKN | 16 | REFCLK_N |
| | PERST_N | 19 | |
| | MPAD | 33 | |

IC

| | | | |
|---|---|---|---|
| AVDD33_2 | 32 | | |
| AVDD33_1 | 11 | | |
| DVDD10 | 22 | | |
| AVDD10_3 | 30 | | |
| AVDD10_2 | 8 | | |
| AVDD10_1 | 3 | | |
| VDDREG | 23 | | |
| REGOUT | 24 | | |
| LANWAKE_N | 21 | ENET_WAKE_N | |
| CLKREQ_N | 12 | ENET_CLKREQ_N | |
| HSOP | 17 | | |
| HSON | 18 | PEX_ENET_SOC_TP | |

FT2 FTP 1 DB78
V_3P3_ENET
PLACE 0.1UF CLOSE TO PINS 11, 23 AND 32
PLACE 4.7UF CLOSE TO PINS 11 AND 32
C502 0.1 UF 10% 16 V X5R 402
C482 0.1 UF 10% 16 V X5R 402
C477 0.1 UF 10% 16 V X5R 402
C505 4.7 UF 10% 6.3 V X5R 603
C12 4.7 UF 10% 6.3 V X5R 603

V_1P0_ENET
PLACE 0.1UF CLOSE TO PINS 3, 8, 22 AND 30
C481 0.1 UF 10% 16 V X5R 402
C491 0.1 UF 10% 16 V X5R 402
C485 0.1 UF 10% 16 V X5R 402
C496 0.1 UF 10% 16 V X5R 402
C30 1 UF 10% 6.3 V X5R 402
C10 4.7 UF 10% 6.3 V X5R 603

PLACE 0.1UF CLOSE TO PIN 24
C480 0.1 UF 10% 16 V X5R 402
FTP FT12 1 DB3

V_3P3_ENET
R366 10 KOHM 1% CH 402
V_3P3_ENET
R383 10 KOHM 1% CH 402
REF CLK CONTROLLED BY SMC

PEX_ENET_SOC_TP — C37 0.1 UF 16 V X5R 10% 402 — PEX_ENET_SOC_TP_C — OUT 2
PEX_ENET_SOC_TN — C34 0.1 UF 16 V X5R 10% 402 — PEX_ENET_SOC_TN_C — OUT 2

SOFT START
NOM. VOLTAGE: 3.3V
MAX POWER: 590MW

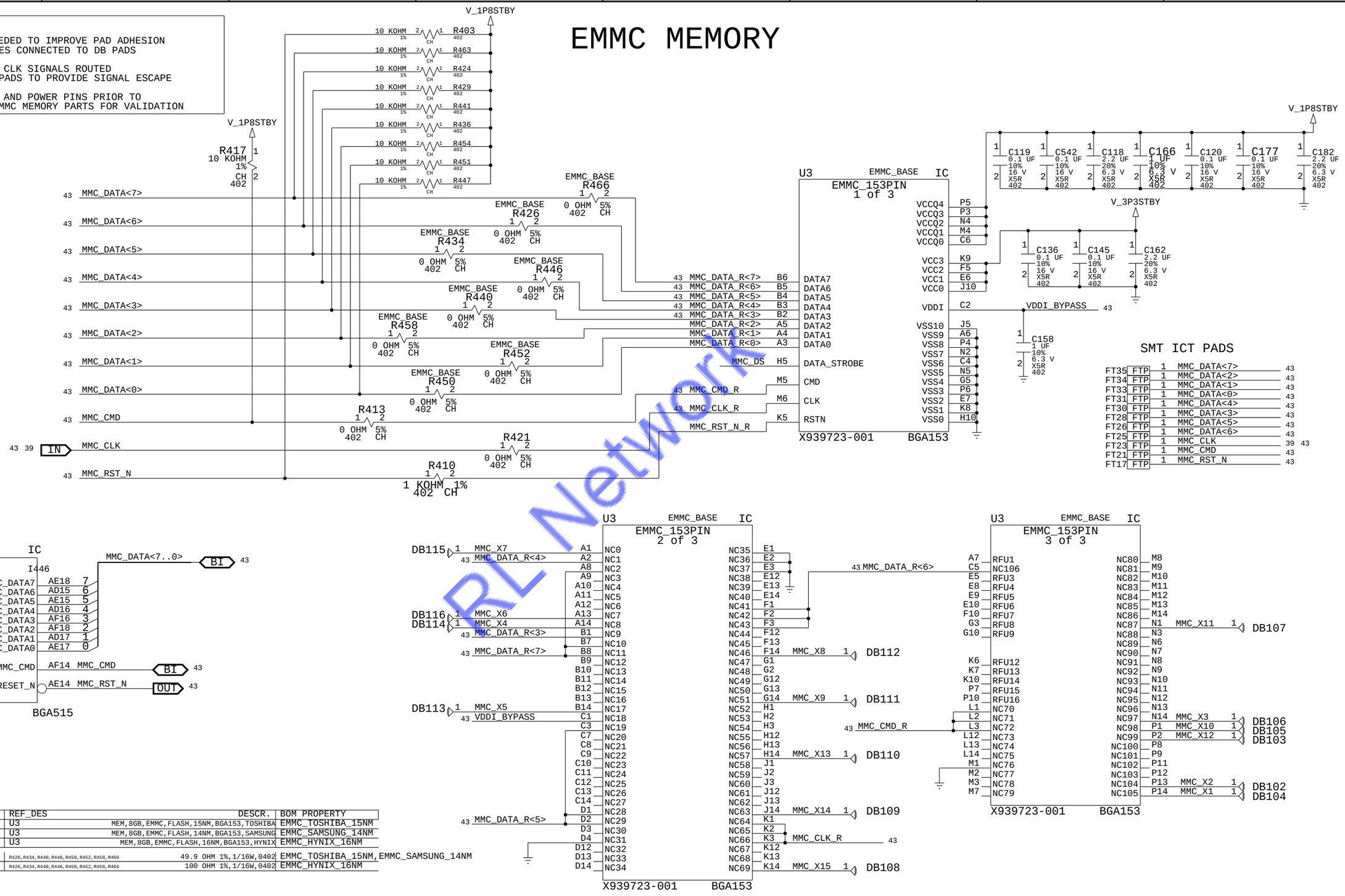
V_3P3
U30
FET
SOT23
X889118-002
V_3P3_ENET
C47 1 UF 10% 6.3 V X5R 402
C32 0.22 UF 10% 25 V X7R 603
C31 10 UF 20% 6.3 V X5R 603
V_ENET_G — R61 100 OHM 1% 402 CH — V_ENET_G_R
R67 20 KOHM 1% CH 402



| MICROSOFT CONFIDENTIAL | PROJECT NAME | PAGE | CSA PAGE | FAB | VER |
|---|---|---|---|---|---|
| | Cactus | 42/82 | 42/82 | G-R | 0.991 |

# EMMC MEMORY

NOTES:
1. MMC_X NETS ARE NEEDED TO IMPROVE PAD ADHESION USING 13 MIL TRACES CONNECTED TO DB PADS
2. EMMC DATA,CMD AND CLK SIGNALS ROUTED THROUGH MULTIPLE PADS TO PROVIDE SIGNAL ESCAPE
3. VERIFY ALL SIGNAL AND POWER PINS PRIOR TO CONSIDERING NEW EMMC MEMORY PARTS FOR VALIDATION

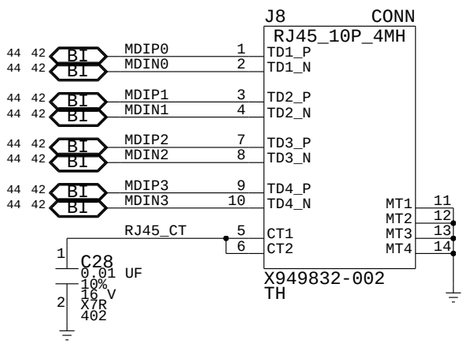


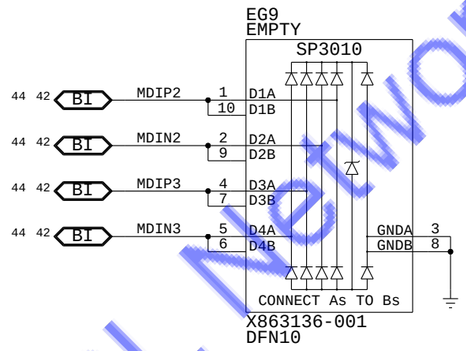

| MS_PART# | MATL | REF_DES | DESCR. | BOM PROPERTY |
|---|---|---|---|---|
| X934261-001 | IC | U3 | MEM,8GB,EMMC,FLASH,15NM,BGA153,TOSHIBA | EMMC_TOSHIBA_15NM |
| X945540-002 | IC | U3 | MEM,8GB,EMMC,FLASH,14NM,BGA153,SAMSUNG | EMMC_SAMSUNG_14NM |
| X939723-001 | IC | U3 | MEM,8GB,EMMC,FLASH,16NM,BGA153,HYNIX | EMMC_HYNIX_16NM |
| X800617-001 | RES | R426,R434,R440,R446,R450,R452,R458,R466 | 49.9 OHM 1%,1/16W,0402 | EMMC_TOSHIBA_15NM,EMMC_SAMSUNG_14NM |
| X809936-001 | RES | R426,R434,R440,R446,R450,R452,R458,R466 | 100 OHM 1%,1/16W,0402 | EMMC_HYNIX_16NM |

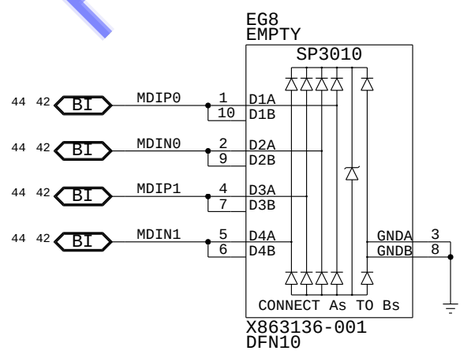


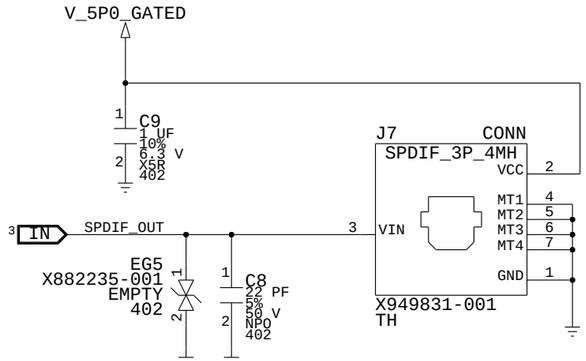
| MICROSOFT CONFIDENTIAL | PROJECT NAME | PAGE | CSA PAGE | FAB | VER |
|---|---|---|---|---|---|
| | Cactus | 43/82 | 43/82 | G-R | 0.991 |

# CONN: RJ45,TOSLINK






| MICROSOFT CONFIDENTIAL | PROJECT NAME | PAGE | CSA PAGE | FAB | VER |
|---|---|---|---|---|---|
| | Cactus | 44/82 | 44/82 | G-R | 0.991 |

# CONN: USB (FRONT & REAR)

EG26
ESD ARRAY
SP3010
X863136-001
DFN10

EG25
ESD ARRAY
SP3010
X863136-001
DFN10

EG27
EMPTY
SP3010
X863136-001
DFN10

REAR 1 (KINECT)
J4 CONN
USB3_9P_4MH
X949829-004
TH
TX/RX FROM
HOST PERSPECTIVE

REAR 0
J5 CONN
USB3_9P_4MH
X949829-004
TH
TX/RX FROM
HOST PERSPECTIVE

FRONT USB
MTG6
STANDOFF
M1015028-001
SM
MTG7
STANDOFF
M1015028-001
SM

FRONT USB CONNECTION
J27
2X10RCPT
SM

U79 IC
PTN36001
X949696-001
QFN12

FILT U76
ECMF02_2HSMX6
X900532-002
DFN6

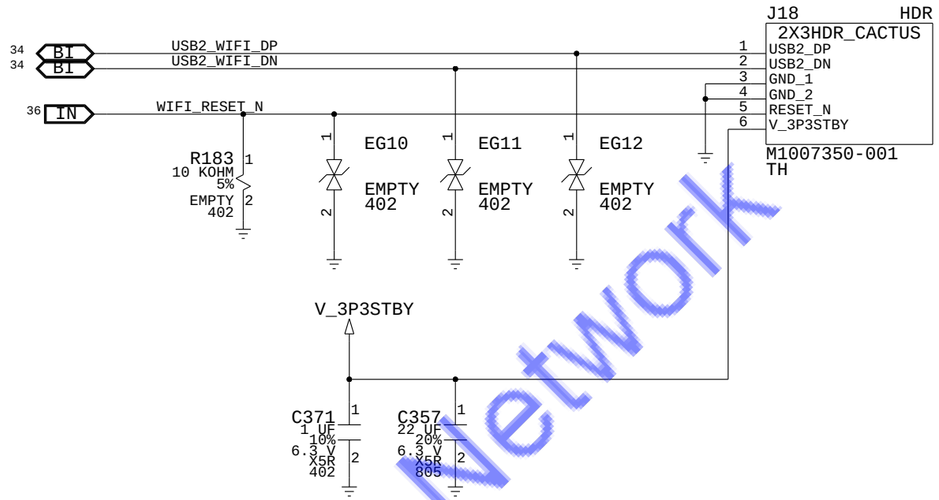
FILT U75
ECMF02_2HSMX6
X900532-002
DFN6

FILT U80
ECMF02_2HSMX6
X900532-002
DFN6



| MICROSOFT CONFIDENTIAL | PROJECT NAME | PAGE | CSA PAGE | FAB | VER |
|---|---|---|---|---|---|
| | Cactus | 45/82 | 45/82 | G-R | 0.99 |

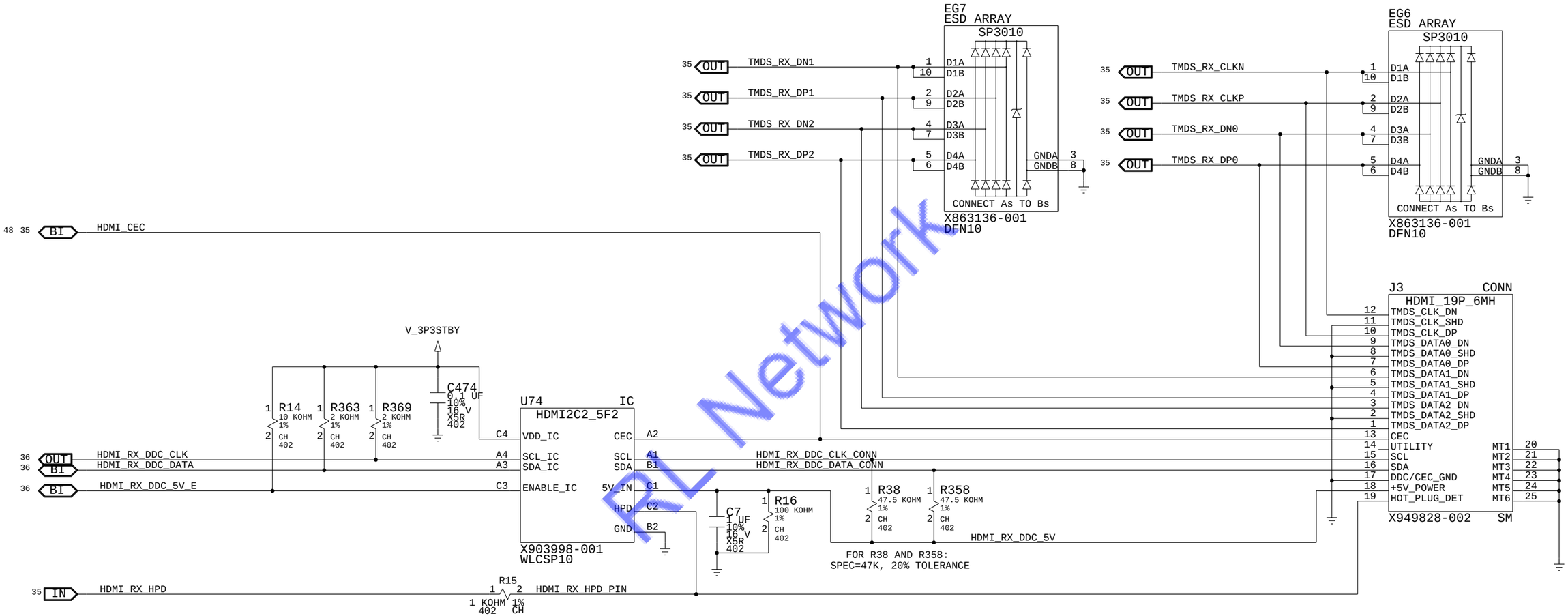
# CONN: WIFI






| MICROSOFT CONFIDENTIAL | PROJECT NAME | PAGE | CSA PAGE | FAB | VER |
|---|---|---|---|---|---|
| | Cactus | 46/82 | 46/82 | G-R | 0.991 |

# CONN: HDMI IN






| MICROSOFT CONFIDENTIAL | PROJECT NAME | PAGE | CSA PAGE | FAB | VER |
|---|---|---|---|---|---|
| | Cactus | 47/82 | 47/82 | G-R | 0.991 |

# CONN: HDMI OUT

| TDP158 CONTROL SLAVE ADDRESS | | | |
|---|---|---|---|
| SELECTED | A1/A0 | 7-BIT ADDRESS | 8-BIT ADDRESS |
| --> | 00 | 0X5E | BC/BD |
| | 01 | 0X5D | BA/BB |
| | 10 | 0X5C | B8/B9 |
| | 11 | 0X5B | B6/B7 |

LANE_SWAP MUST BE ENABLED DUE TO INVERTED TMDS PIN-ORDER IMPLEMENTATION (0X09[7]=1)

HDMIDPOUT_MODE_SEL: 0 = DP, 1 = HDMI

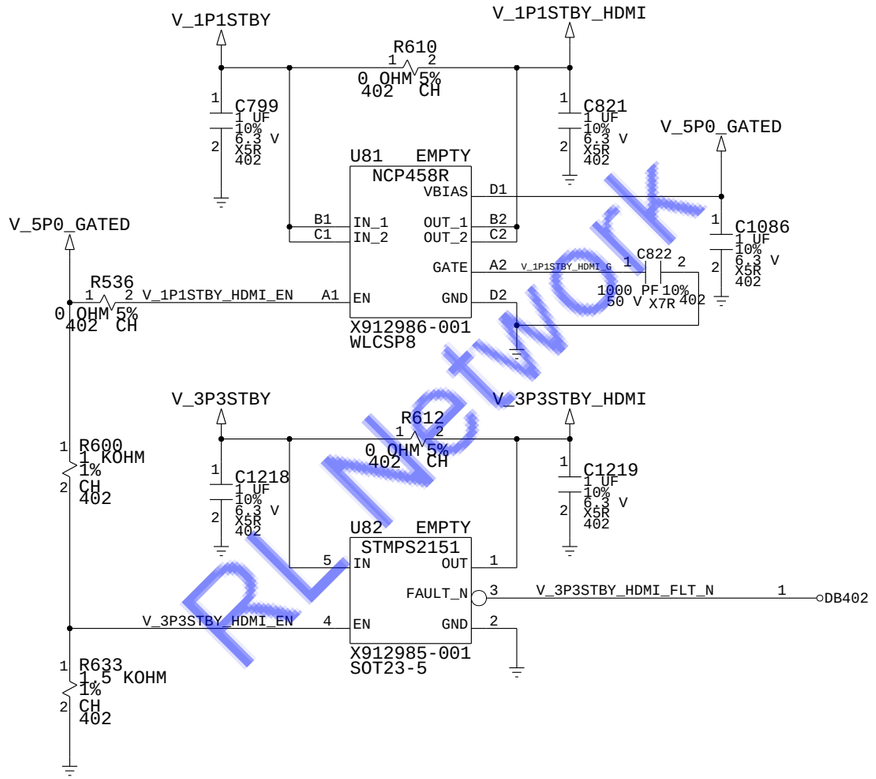
HDMI 5V LOAD SWITCH: 5V, 250MA MAX TDC

DP PWR LOAD SWITCH: 3.3V, 500MA MAX TDC



| MICROSOFT CONFIDENTIAL | PROJECT NAME | PAGE | CSA PAGE | FAB | VER |
|---|---|---|---|---|---|
| | Cactus | 48/82 | 48/82 | G-R | 0.991 |

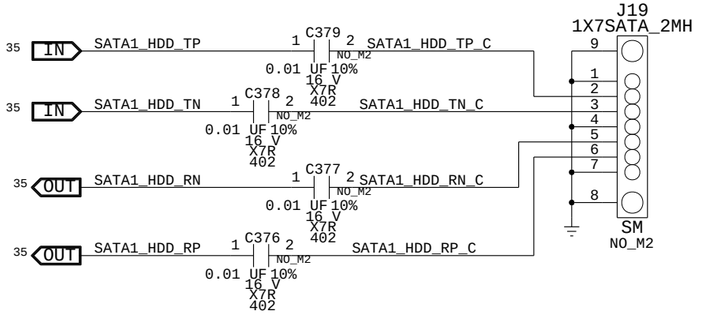
# HDMI LOAD SWITCHES



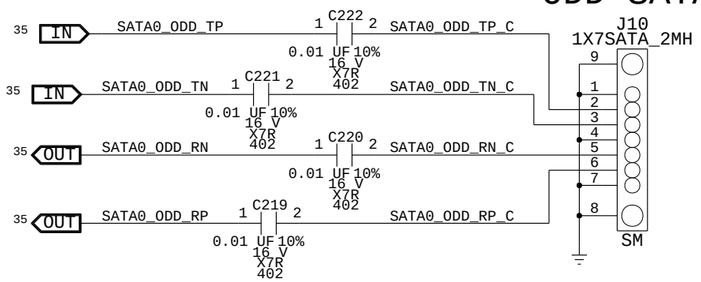

| RE-DRIVER | U29 | R610 | R612 | U81 | U82 |
|---|---|---|---|---|---|
| PG1.0 | M1003966-001 | EMPTY | EMPTY | STUFF | STUFF |
| PG1.1 | M1003966-002 | STUFF | STUFF | EMPTY | EMPTY |

# CONN: ODD & HDD

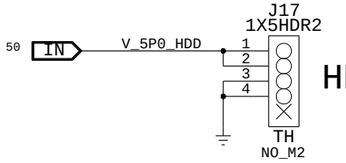
## HDD SATA



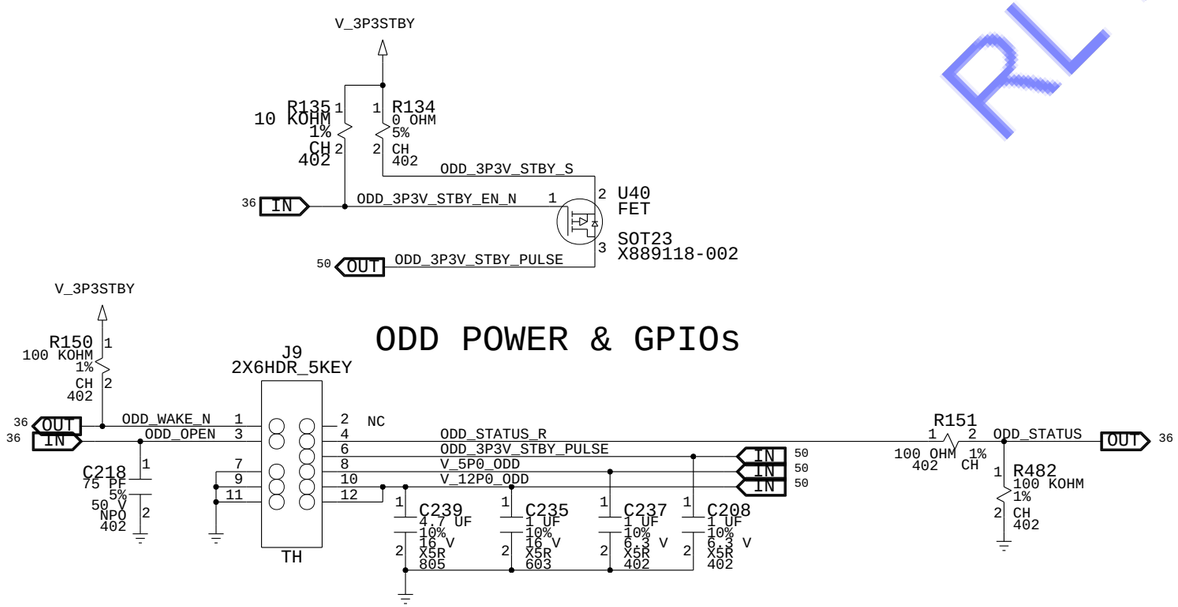

## ODD SATA




## HDD POWER

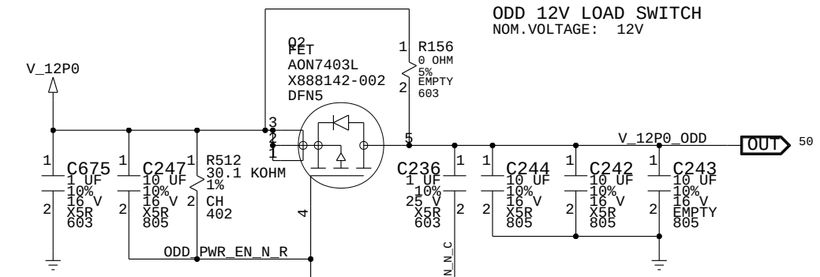



## ODD POWER & GPIOs



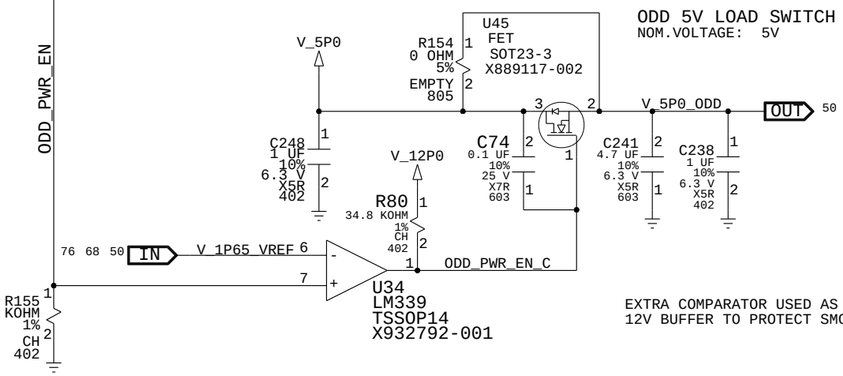

## ODD 12V LOAD SWITCH

NOM.VOLTAGE: 12V



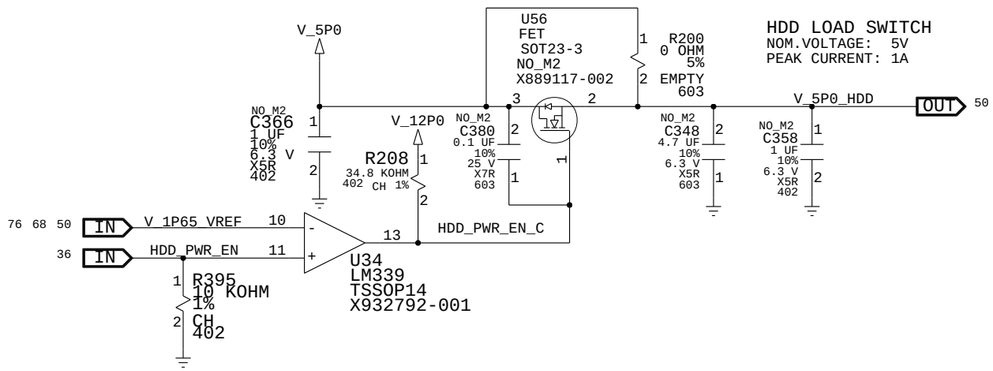

## ODD 5V LOAD SWITCH

NOM.VOLTAGE: 5V




## HDD LOAD SWITCH

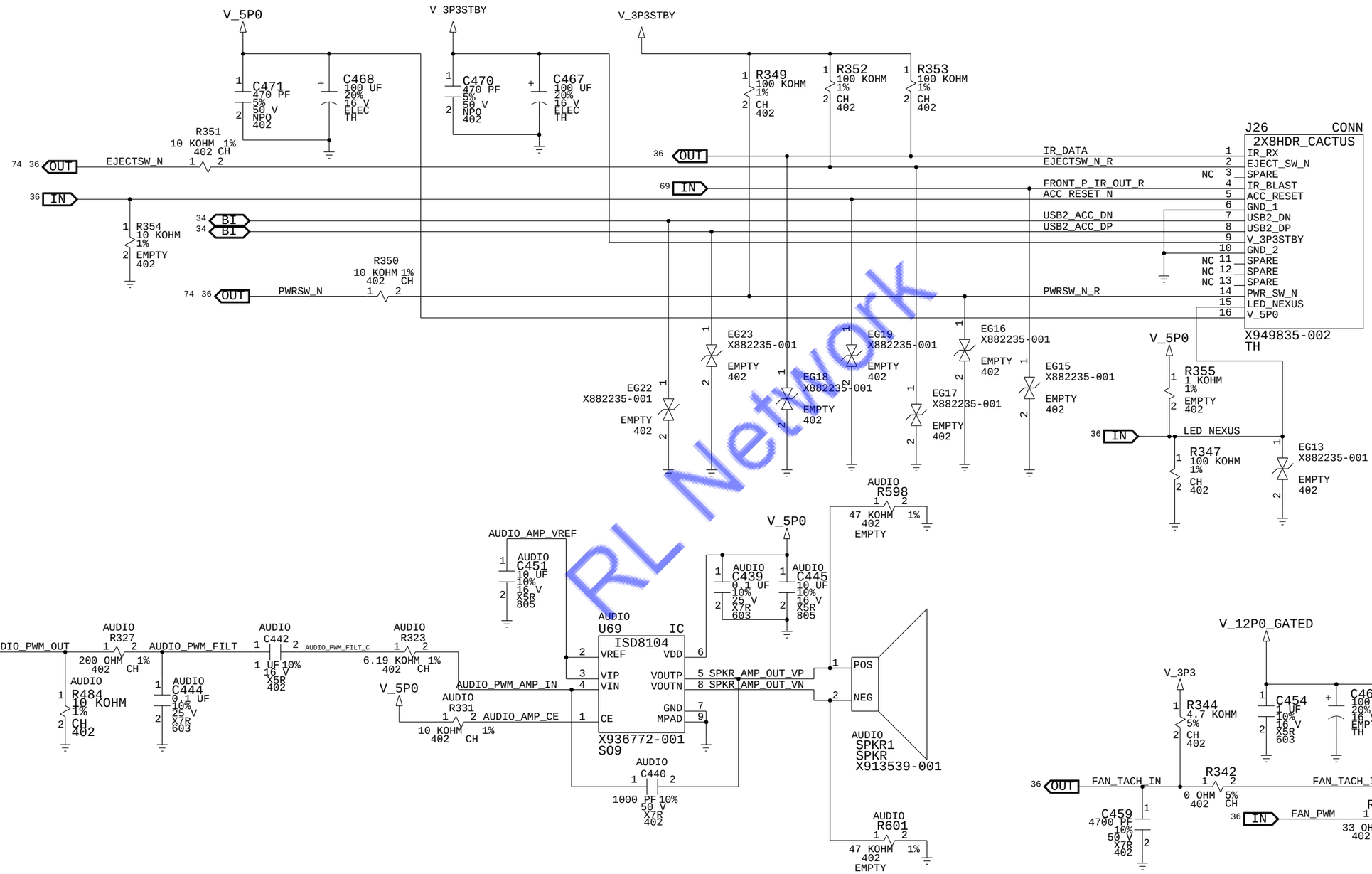
NOM.VOLTAGE: 5V
PEAK CURRENT: 1A






| MICROSOFT CONFIDENTIAL | PROJECT NAME | PAGE | CSA PAGE | FAB | VER |
|---|---|---|---|---|---|
| | Cactus | 50/82 | 50/82 | G-R | 0.991 |

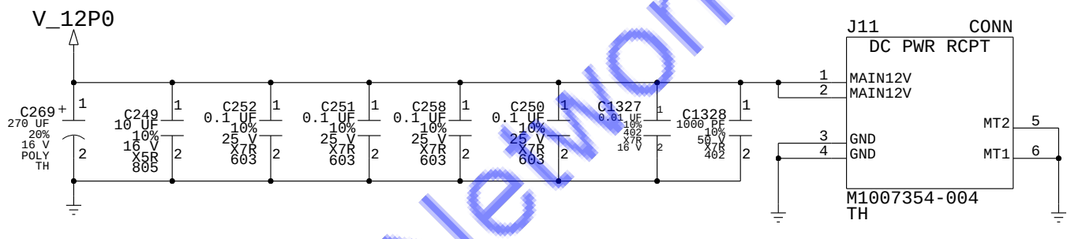
# CONN: FRONT PANEL,FAN, AUDIO






| MICROSOFT CONFIDENTIAL | PROJECT NAME | PAGE | CSA PAGE | FAB | VER |
|---|---|---|---|---|---|
| | Cactus | 51/82 | 51/82 | G-R | 0.99 |

# CONN: POWER

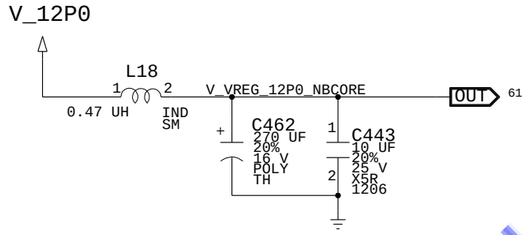




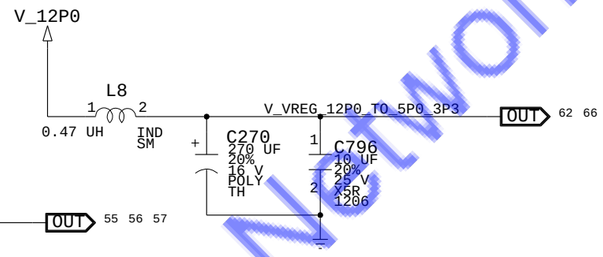

| MICROSOFT CONFIDENTIAL | PROJECT NAME | PAGE | CSA PAGE | FAB | VER |
|---|---|---|---|---|---|
| | Cactus | 52/82 | 52/82 | G-R | 0.991 |

# VREGS: INPUT AND OUTPUT FILTERS

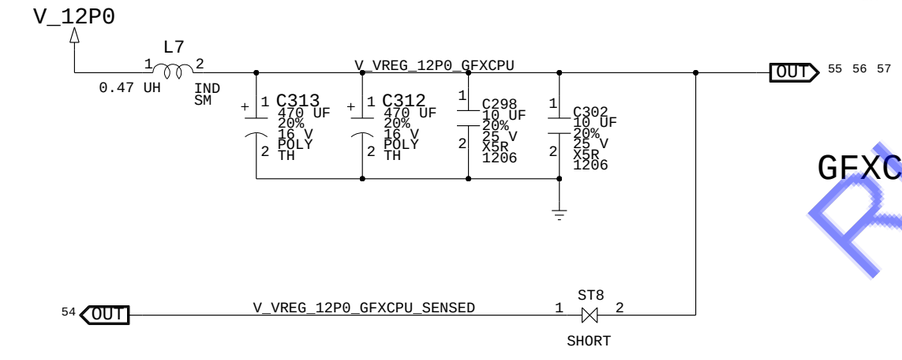
## NBCORE INPUT FILTER



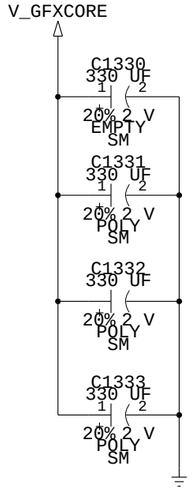

## V_5P0 AND V_3P3 INPUT FILTER



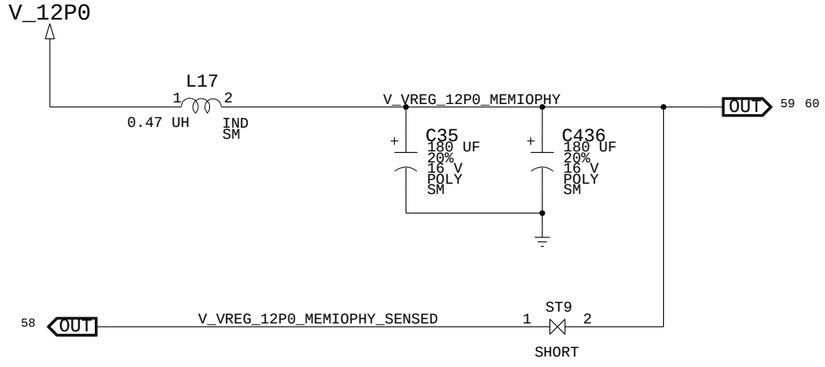

## GFX/CPU INPUT FILTER




## GFXCORE OUTPUT FILTER



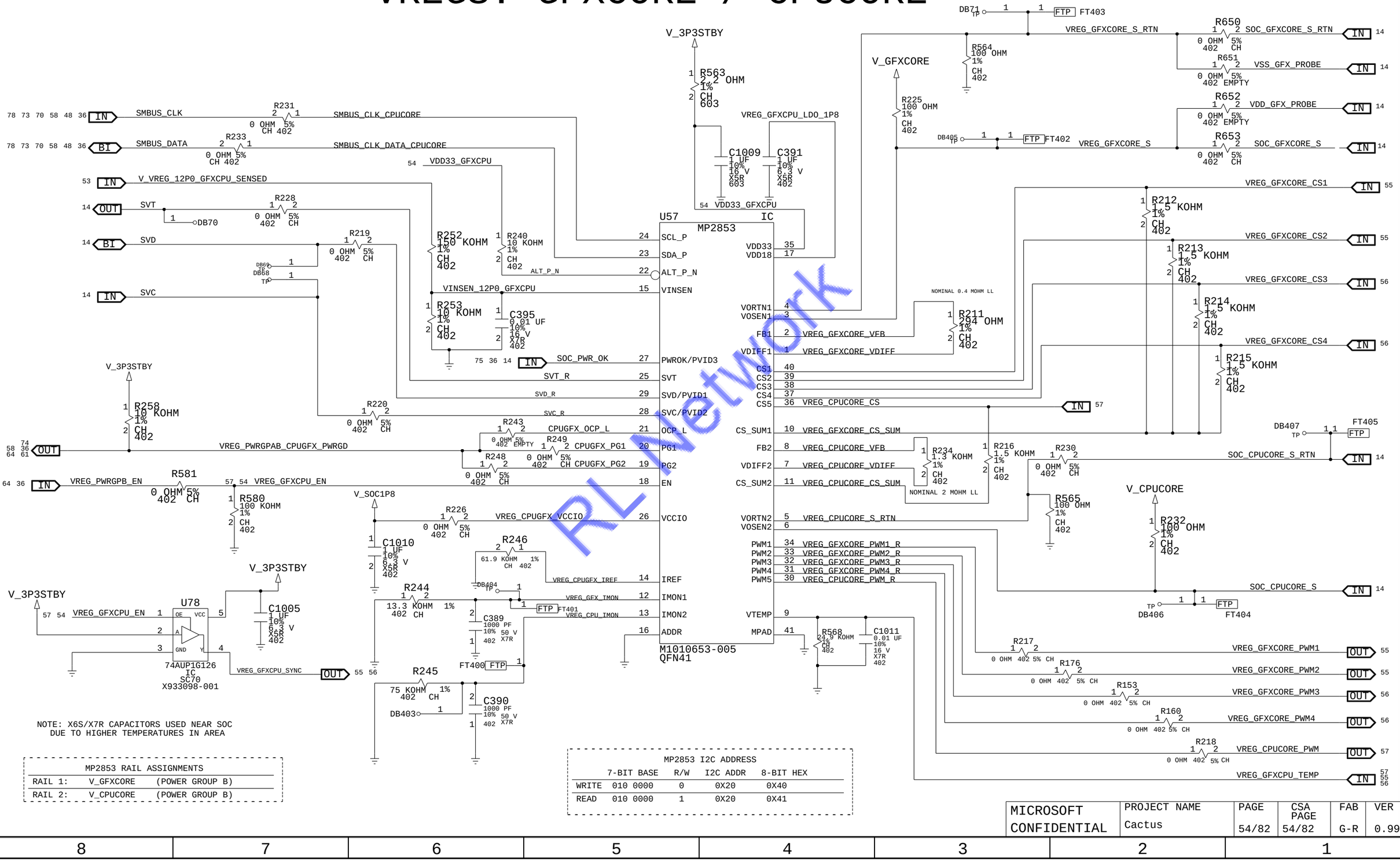

## MEMIO/MEMPHY INPUT FILTER





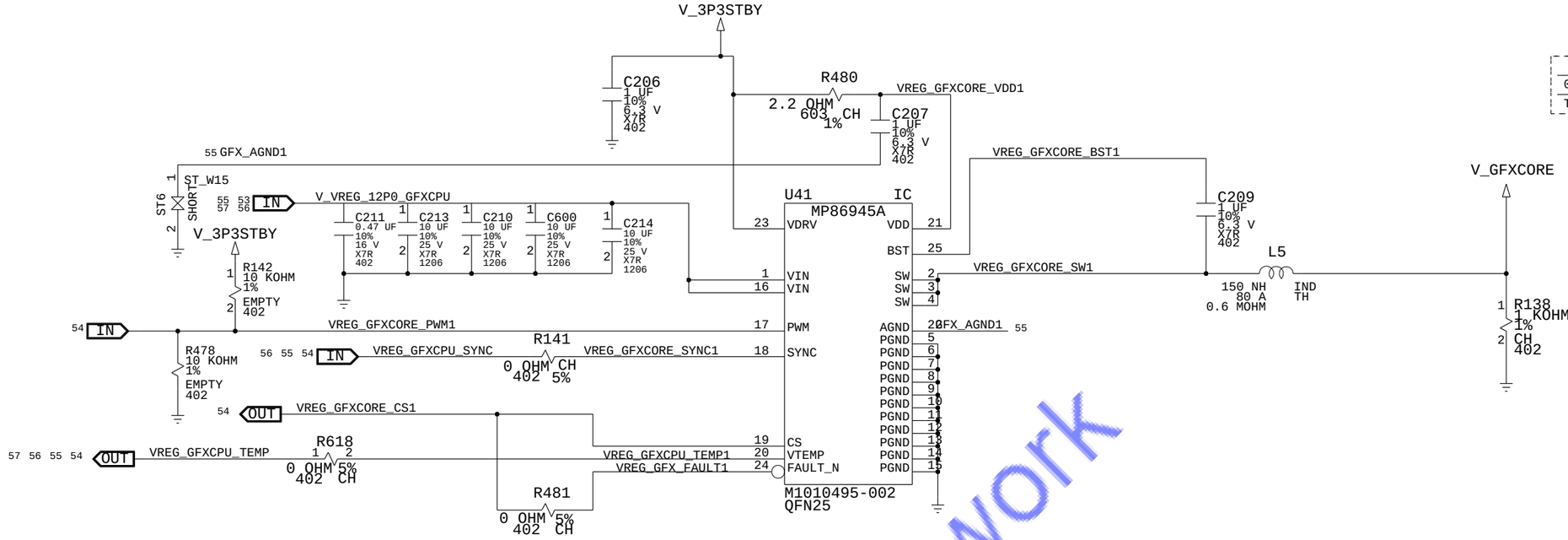

| MICROSOFT CONFIDENTIAL | PROJECT NAME | PAGE | CSA PAGE | FAB | VER |
|---|---|---|---|---|---|
| | Cactus | 53/82 | 53/82 | G-R | 0.991 |

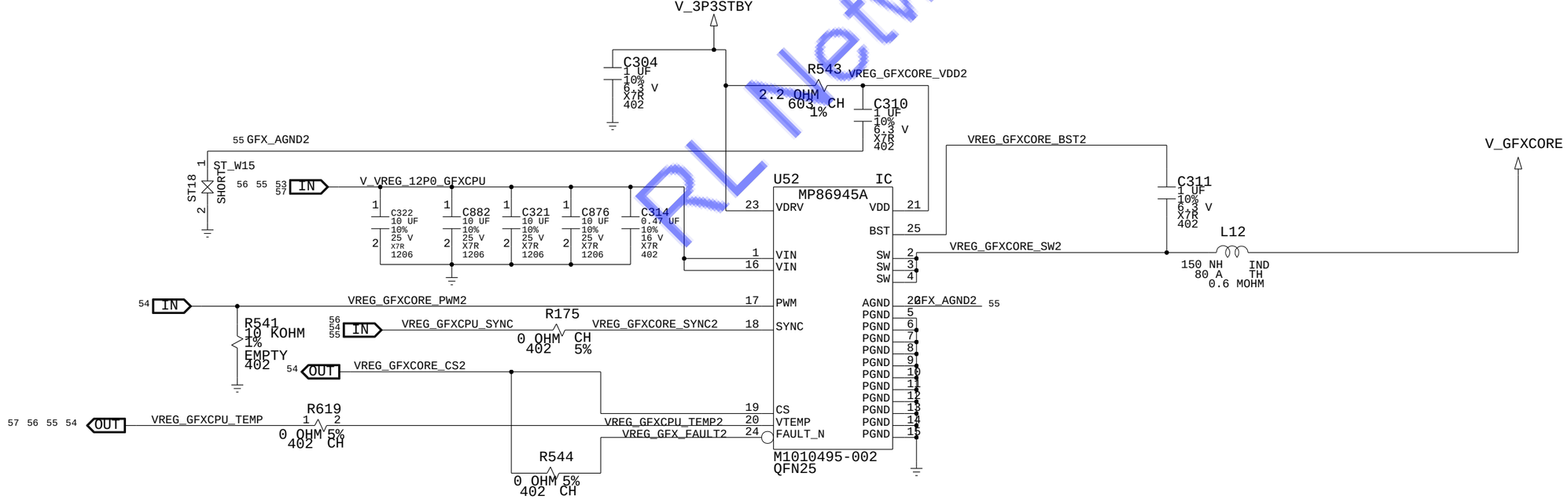
# VREGS: GFXCORE / CPUCORE



# VREGS: GFXCORE OUTPUT PHASE 1 & 2

| V_GFXCORE | | |
|---|---|---|
| 0.8V-1.2V | NOMINAL: 1V | |
| TDC: 136A | EDC: 175A | FSW: 700KHZ |



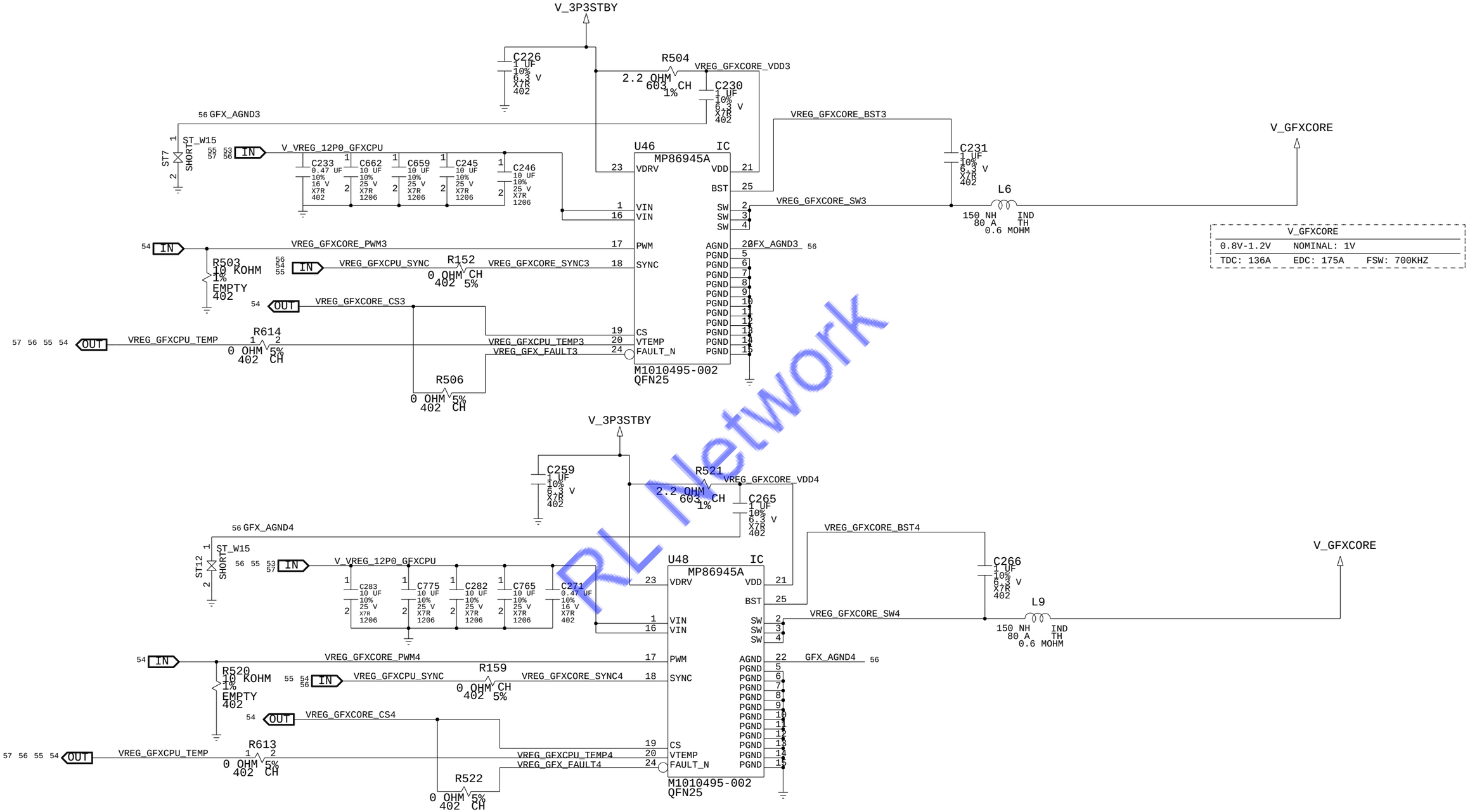






NOTE: X6S/X7R CAPACITORS USED NEAR SOC
DUE TO HIGHER TEMPERATURES IN AREA

| MICROSOFT CONFIDENTIAL | PROJECT NAME | PAGE | CSA PAGE | FAB | VER |
|---|---|---|---|---|---|
| | Cactus | 55/82 | 55/82 | G-R | 0.99 |

# VREGS: GFXCORE OUTPUT PHASE 3 & 4

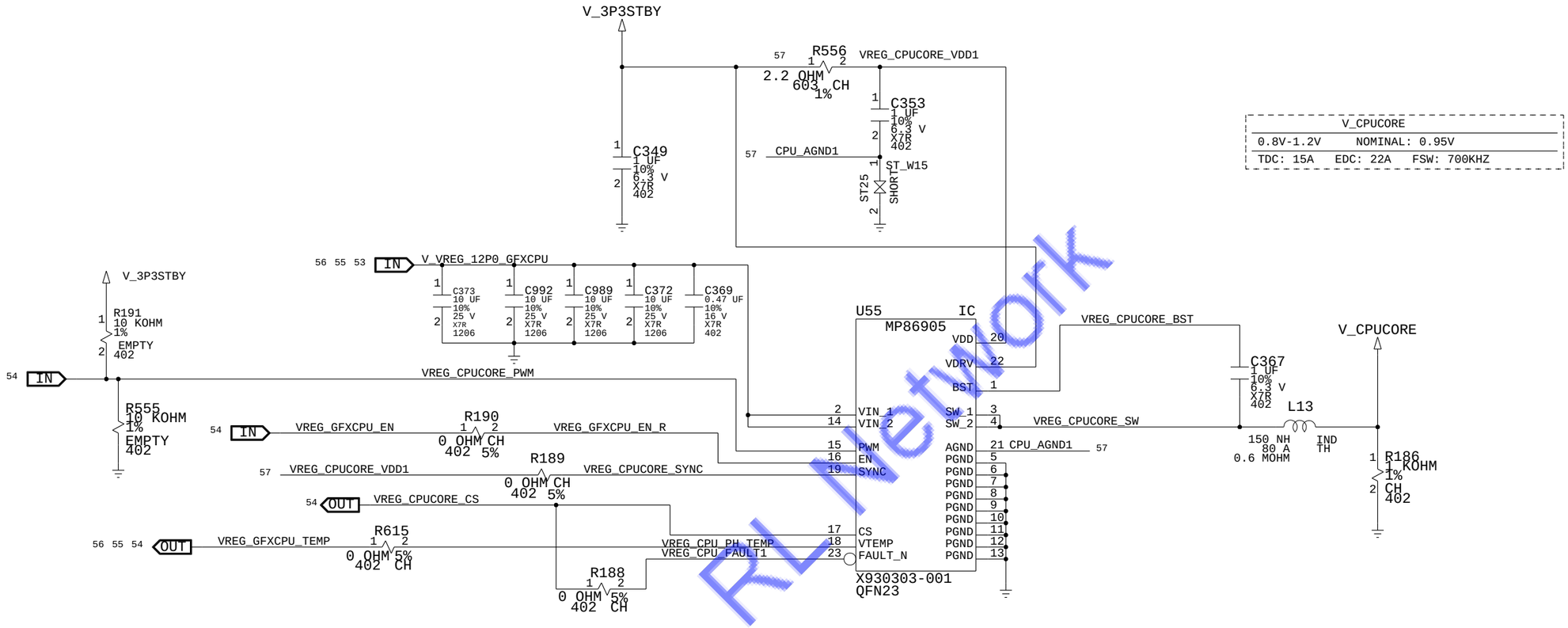





NOTE: X6S/X7R CAPACITORS USED NEAR SOC
DUE TO HIGHER TEMPERATURES IN AREA

| MICROSOFT CONFIDENTIAL | PROJECT NAME | PAGE | CSA PAGE | FAB | VER |
|---|---|---|---|---|---|
| | Cactus | 56/82 | 56/82 | G-R | 0.991 |

# VREGS: CPUCORE OUTPUT PHASE






NOTE: X6S/X7R CAPACITORS USED NEAR SOC
DUE TO HIGHER TEMPERATURES IN AREA

| MICROSOFT CONFIDENTIAL | PROJECT NAME | PAGE | CSA PAGE | FAB | VER |
|---|---|---|---|---|---|
| | Cactus | 57/82 | 57/82 | G-R | 0.991 |

# VREGS: MEMPHY / MEMIO

| MEMIO OUTPUT VOLTAGE SELECT (PVID) |
|---|
| GPIO_1P8_3 = LOW: MEMIO VOUT = 1.5V |
| GPIO_1P8_3 = HIGH: MEMIO VOUT = 1.35V |

| MP2949A RAIL ASSIGNMENTS | | |
|---|---|---|
| RAIL 1: | V_MEMPHY | (POWER GROUP B) |
| RAIL 2: | V_MEMIO | (POWER GROUP A) |
| RAIL 3: | V_NBCORE | (POWER GROUP B) |

MP2949A I2C ADDRESS

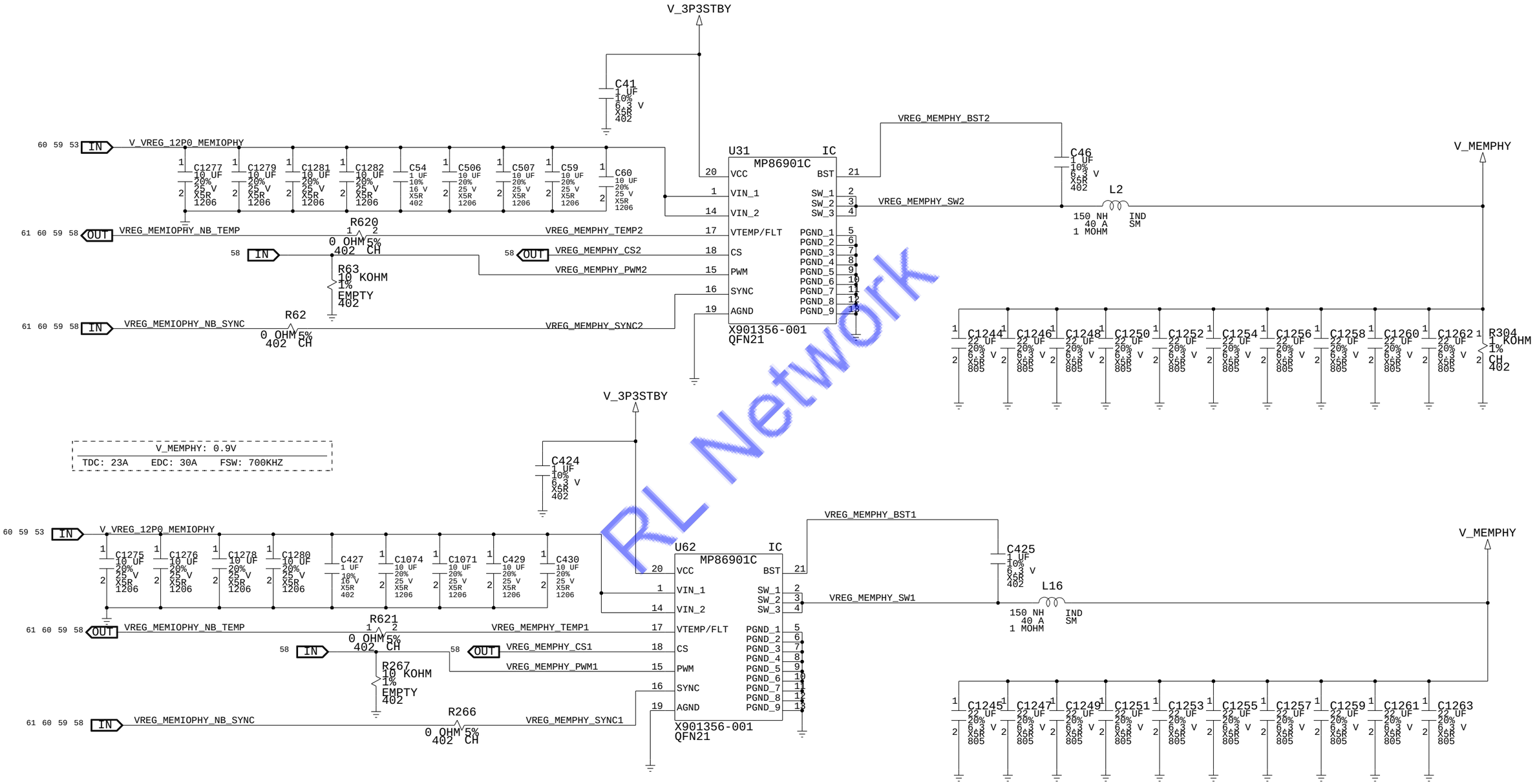
| | 7-BIT BASE | R/W | I2C ADDR | 8-BIT HEX |
|---|---|---|---|---|
| WRITE | 010 0010 | 0 | 0X22 | 0X44 |
| READ | 010 0010 | 1 | 0X22 | 0X45 |

NOTE: SOC_MEMIO_S_RTN IS ACTUALLY SENSE RETURN FROM SOC FOR MEMPHY. NOT CHANGING NETNAME TO STAY CONSISTENT WITH SCB



| MICROSOFT CONFIDENTIAL | PROJECT NAME | PAGE | CSA PAGE | FAB | VER |
|---|---|---|---|---|---|
| | Cactus | 58/82 | 58/82 | G-R | 0.99 |

# VREGS: MEMPHY OUTPUT

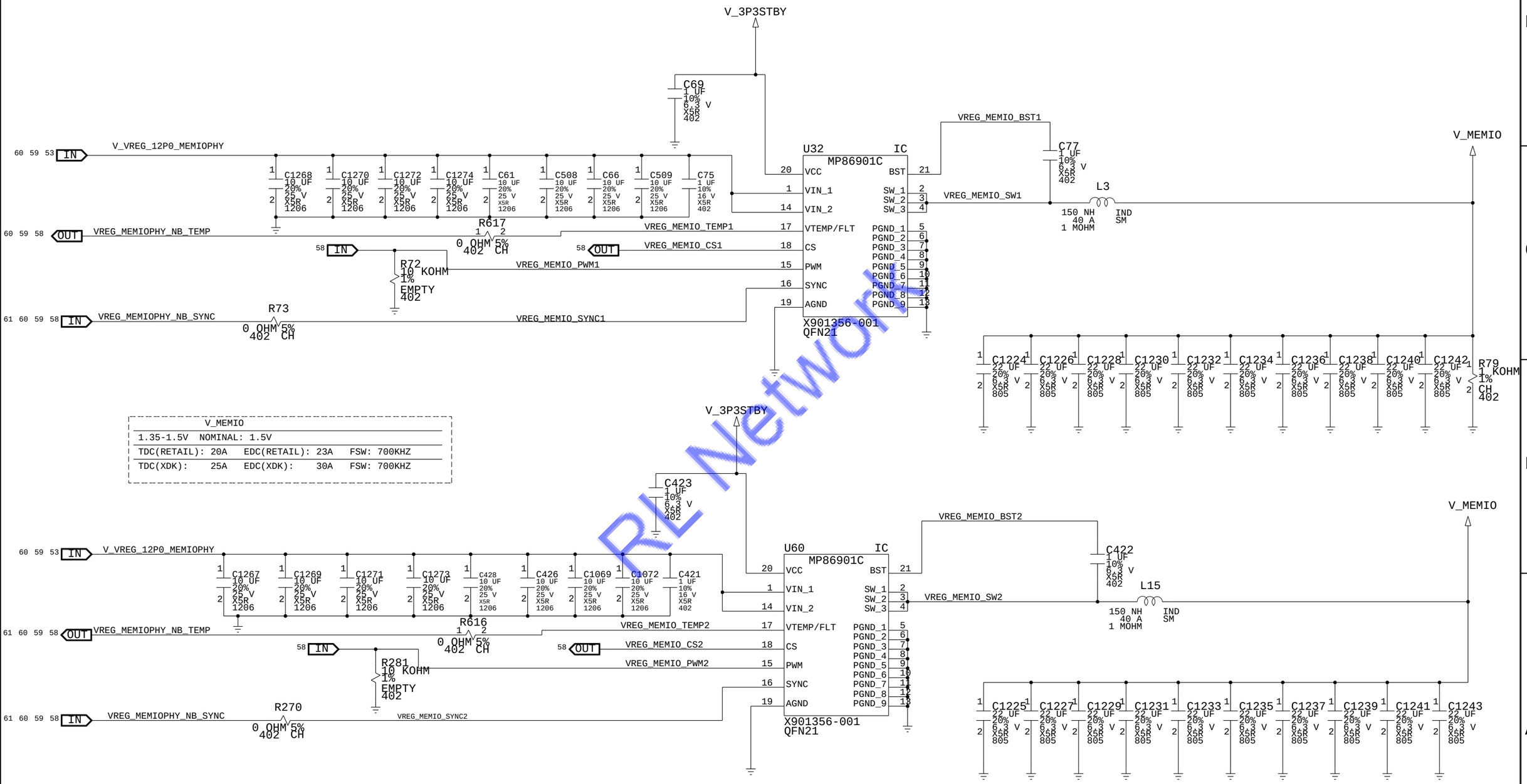





| MICROSOFT CONFIDENTIAL | PROJECT NAME | PAGE | CSA PAGE | FAB | VER |
|---|---|---|---|---|---|
| | Cactus | 59/82 | 59/82 | G-R | 0.991 |

# VREGS: MEMIO OUTPUT

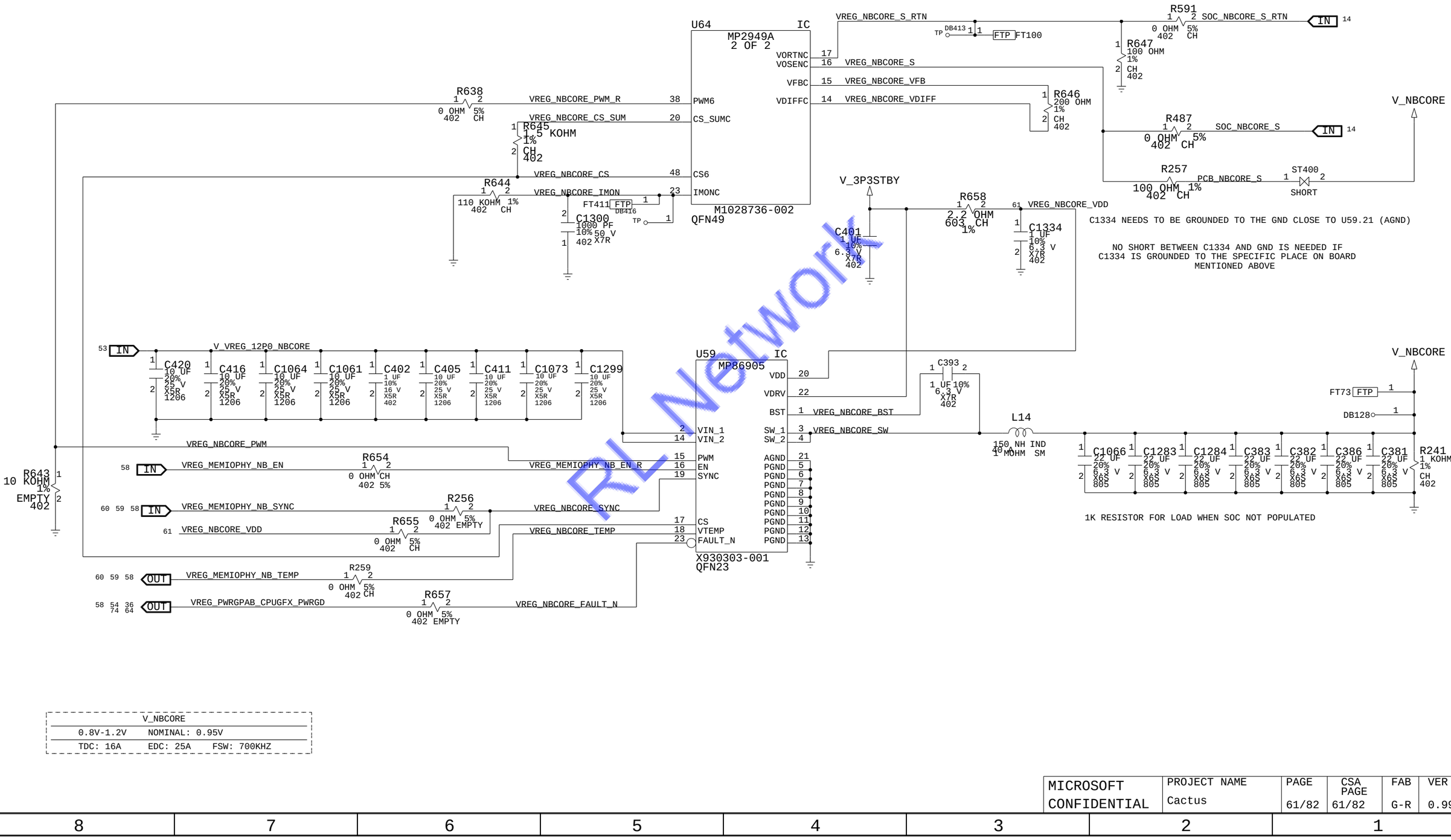
| V_MEMIO | | | | |
|---|---|---|---|---|
| 1.35-1.5V | NOMINAL: 1.5V | | | |
| TDC(RETAIL): 20A | EDC(RETAIL): 23A | FSW: 700KHZ | | |
| TDC(XDK): 25A | EDC(XDK): 30A | FSW: 700KHZ | | |






| MICROSOFT CONFIDENTIAL | PROJECT NAME | PAGE | CSA PAGE | FAB | VER |
|---|---|---|---|---|---|
| | Cactus | 60/82 | 60/82 | G-R | 0.991 |

# VREGS: NBCORE

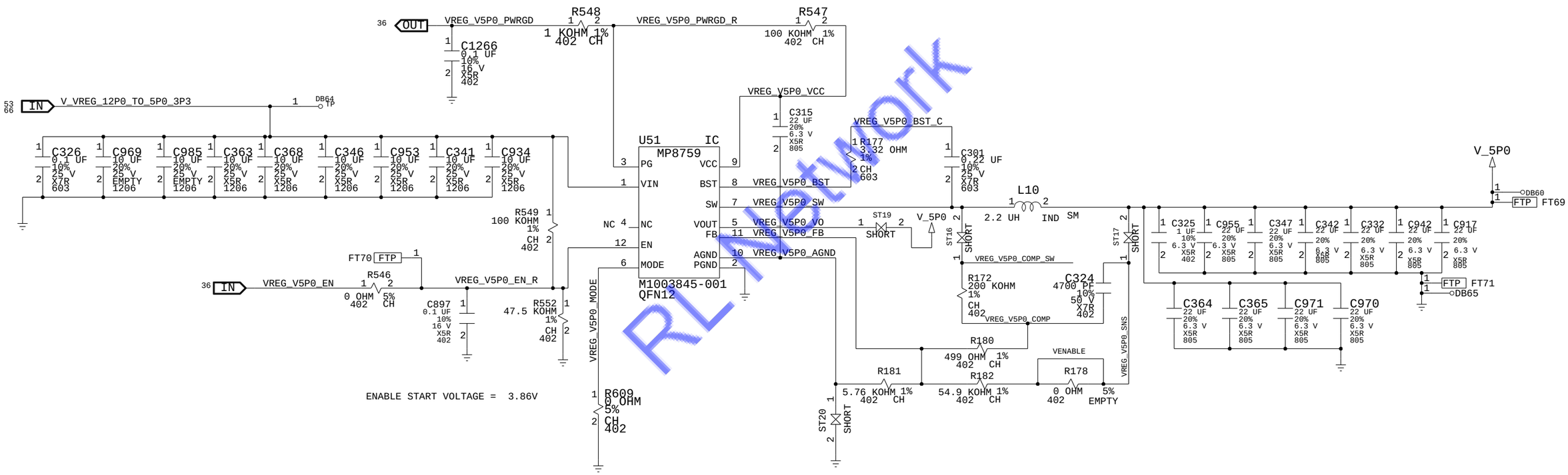



| V_NBCORE | | |
|---|---|---|
| 0.8V-1.2V | NOMINAL: 0.95V | |
| TDC: 16A | EDC: 25A | FSW: 700KHZ |

| MICROSOFT CONFIDENTIAL | PROJECT NAME | PAGE | CSA PAGE | FAB | VER |
|---|---|---|---|---|---|
| | Cactus | 61/82 | 61/82 | G-R | 0.991 |

# VREGS: V5P0

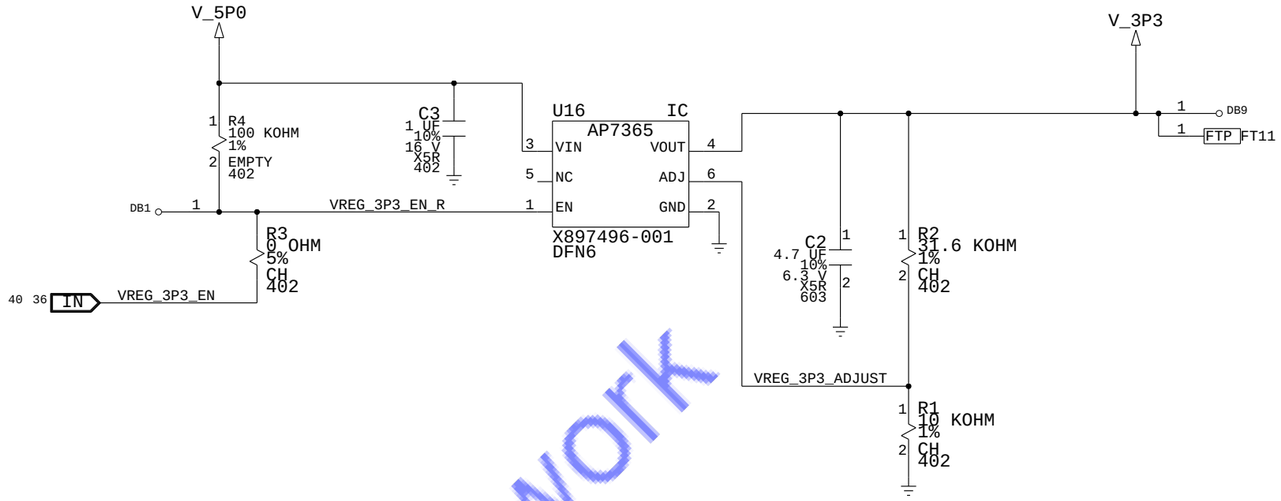
V_5P0
NOM. VOLTAGE: 5.1

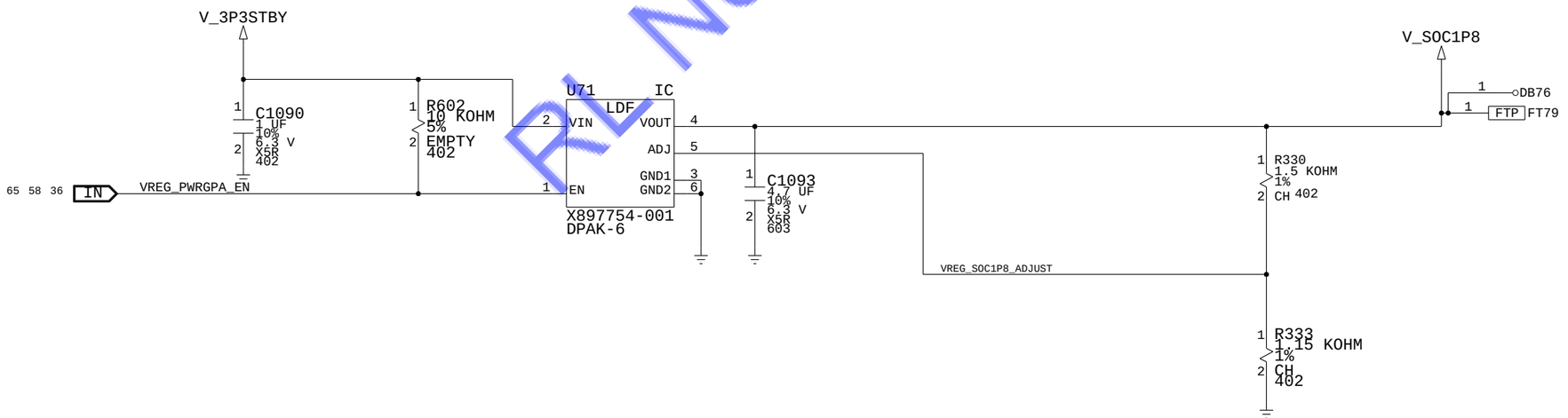





| MICROSOFT CONFIDENTIAL | PROJECT NAME | PAGE | CSA PAGE | FAB | VER |
|---|---|---|---|---|---|
| | Cactus | 62/82 | 62/82 | G-R | 0.991 |

# VREGS: V3P3, VSOC1P8

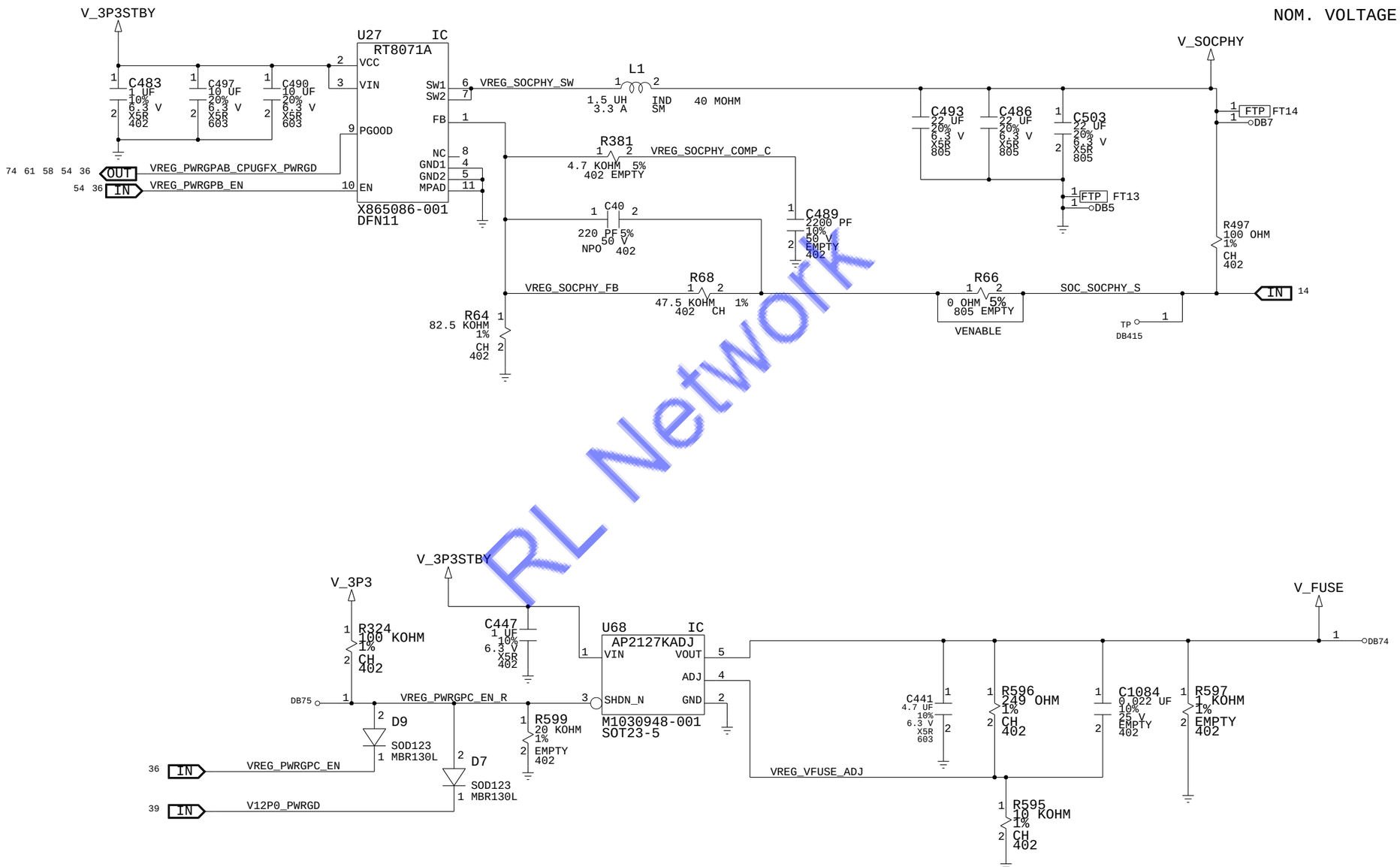





| MICROSOFT CONFIDENTIAL | PROJECT NAME | PAGE | CSA PAGE | FAB | VER |
|---|---|---|---|---|---|
| | Cactus | 63/82 | 63/82 | G-R | 0.991 |

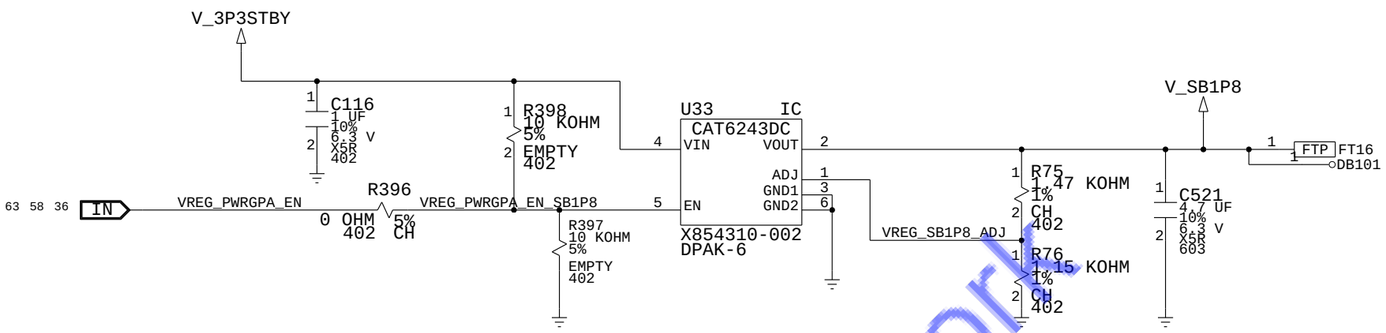
# VREGS: VSOCPHY/VFUSE

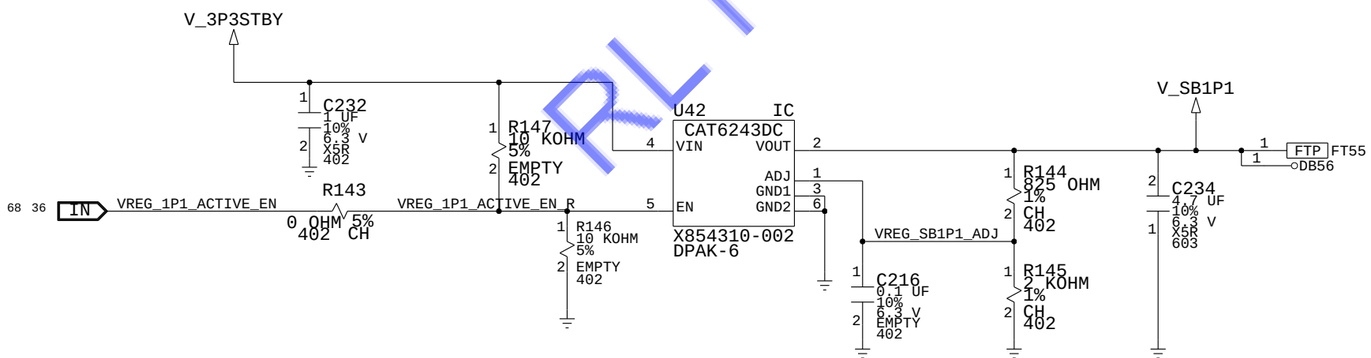





| MICROSOFT CONFIDENTIAL | PROJECT NAME | PAGE | CSA PAGE | FAB | VER |
|---|---|---|---|---|---|
| | Cactus | 64/82 | 64/82 | G-R | 0.991 |

# VREGS: V_SB1P8, V_SB1P1



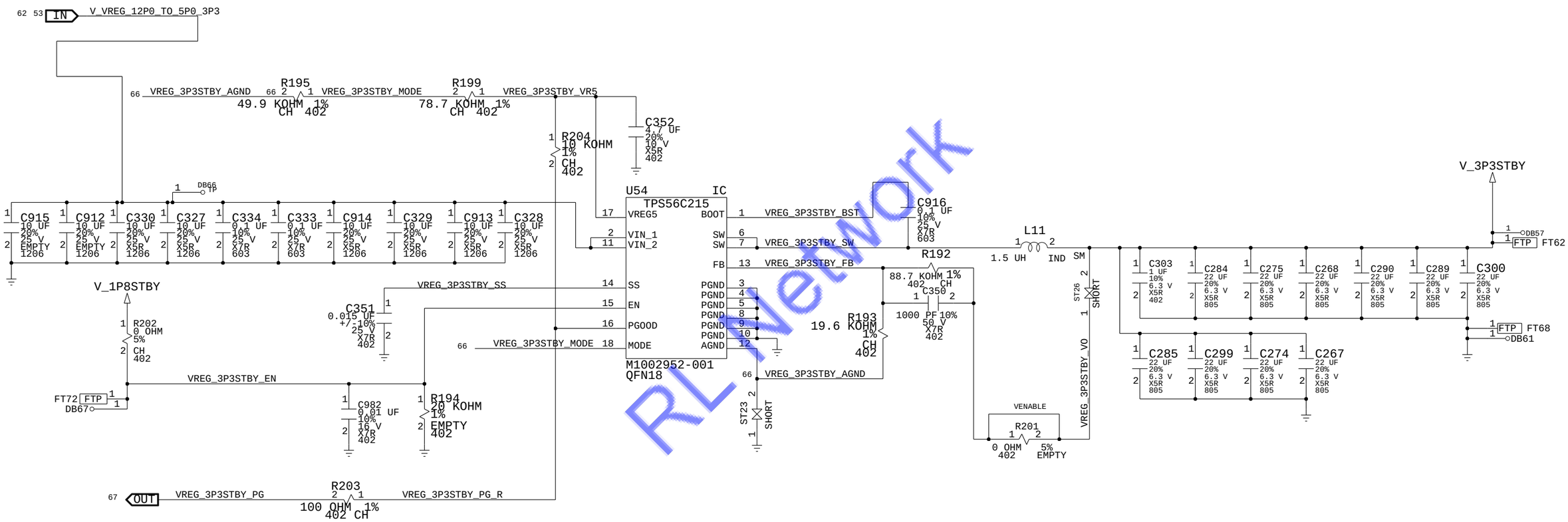






| MICROSOFT CONFIDENTIAL | PROJECT NAME | PAGE | CSA PAGE | FAB | VER |
|---|---|---|---|---|---|
| | Cactus | 65/82 | 65/82 | G-R | 0.991 |

# VREGS: V3P3 STANDBY

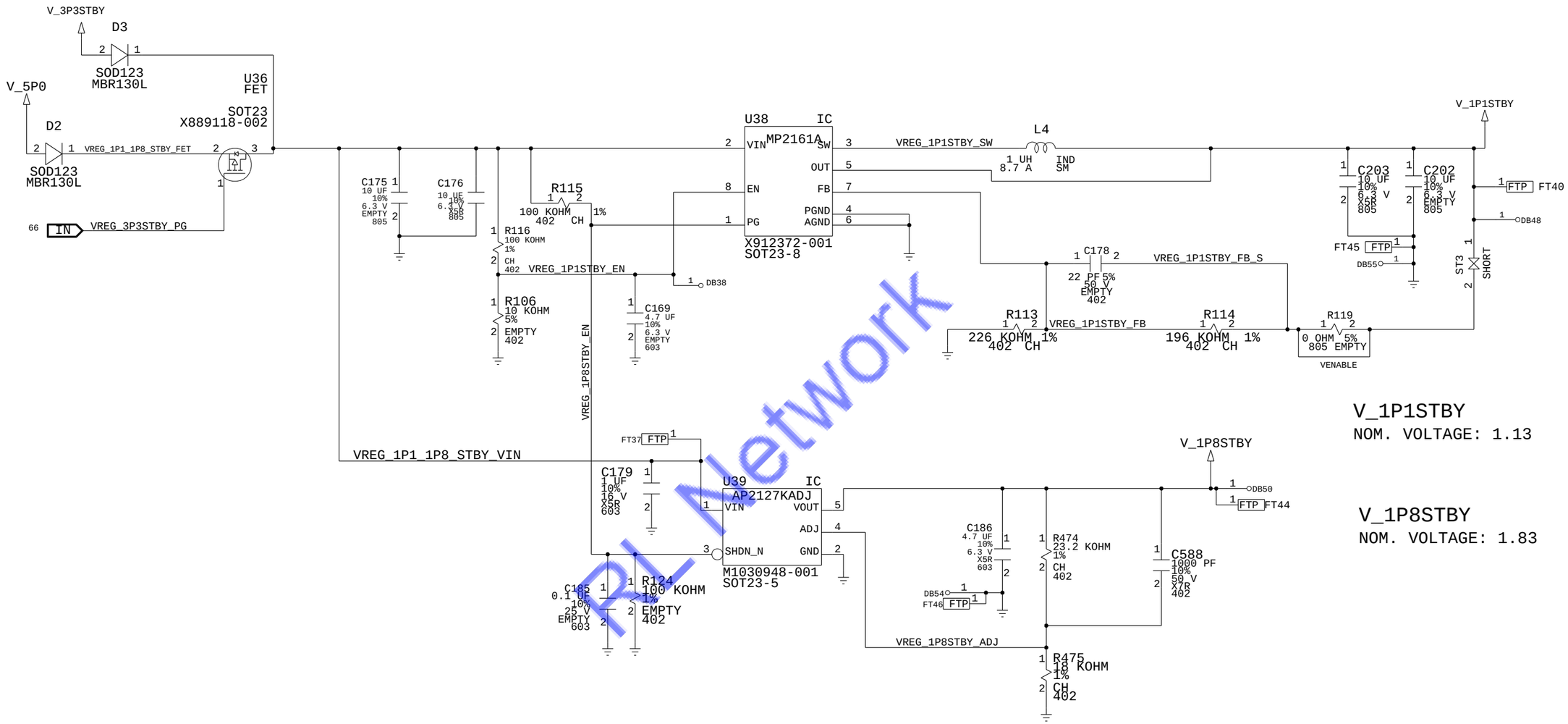
V_3P3STBY
NOM. VOLTAGE: 3.32






| MICROSOFT CONFIDENTIAL | PROJECT NAME | PAGE | CSA PAGE | FAB | VER |
|---|---|---|---|---|---|
| | Cactus | 66/82 | 66/82 | G-R | 0.991 |

# VREGS: V1P1 STANDBY, V1P8 STANDBY




V_1P1STBY
NOM. VOLTAGE: 1.13

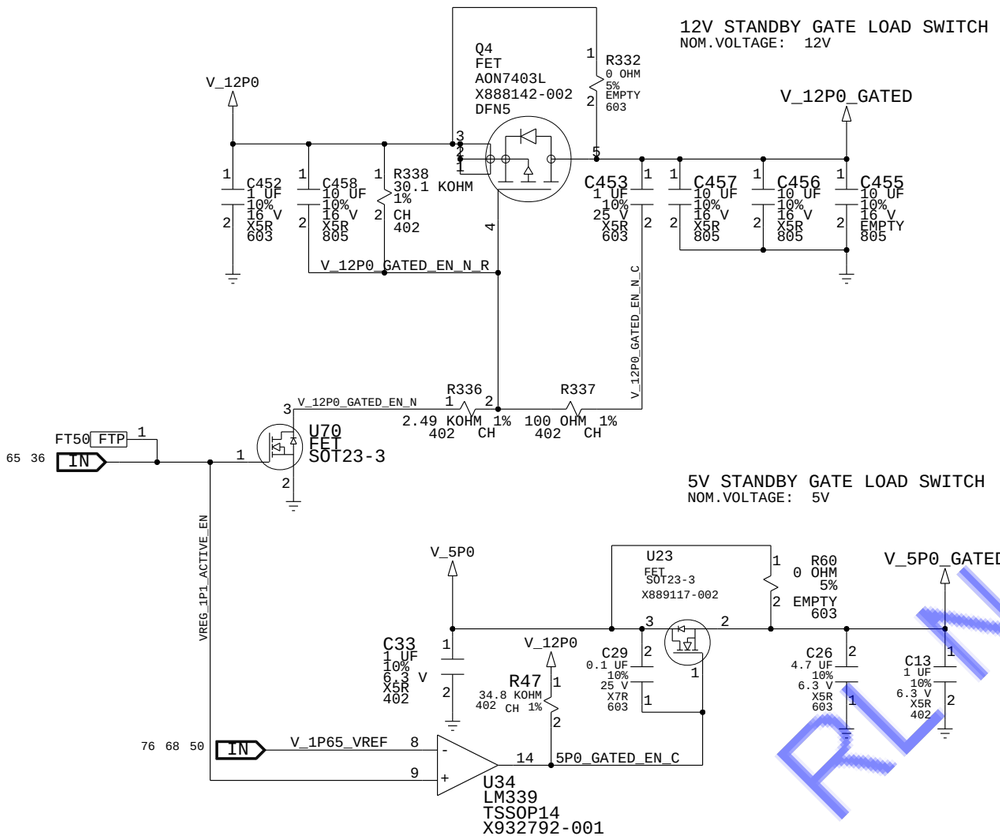
V_1P8STBY
NOM. VOLTAGE: 1.83



| MICROSOFT CONFIDENTIAL | PROJECT NAME | PAGE | CSA PAGE | FAB | VER |
|---|---|---|---|---|---|
| | Cactus | 67/82 | 67/82 | G-R | 0.991 |

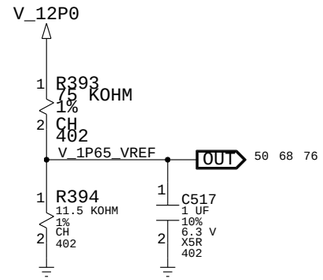
# STANDBY GATES

## 12V STANDBY GATE LOAD SWITCH
NOM.VOLTAGE: 12V




## 5V STANDBY GATE LOAD SWITCH
NOM.VOLTAGE: 5V

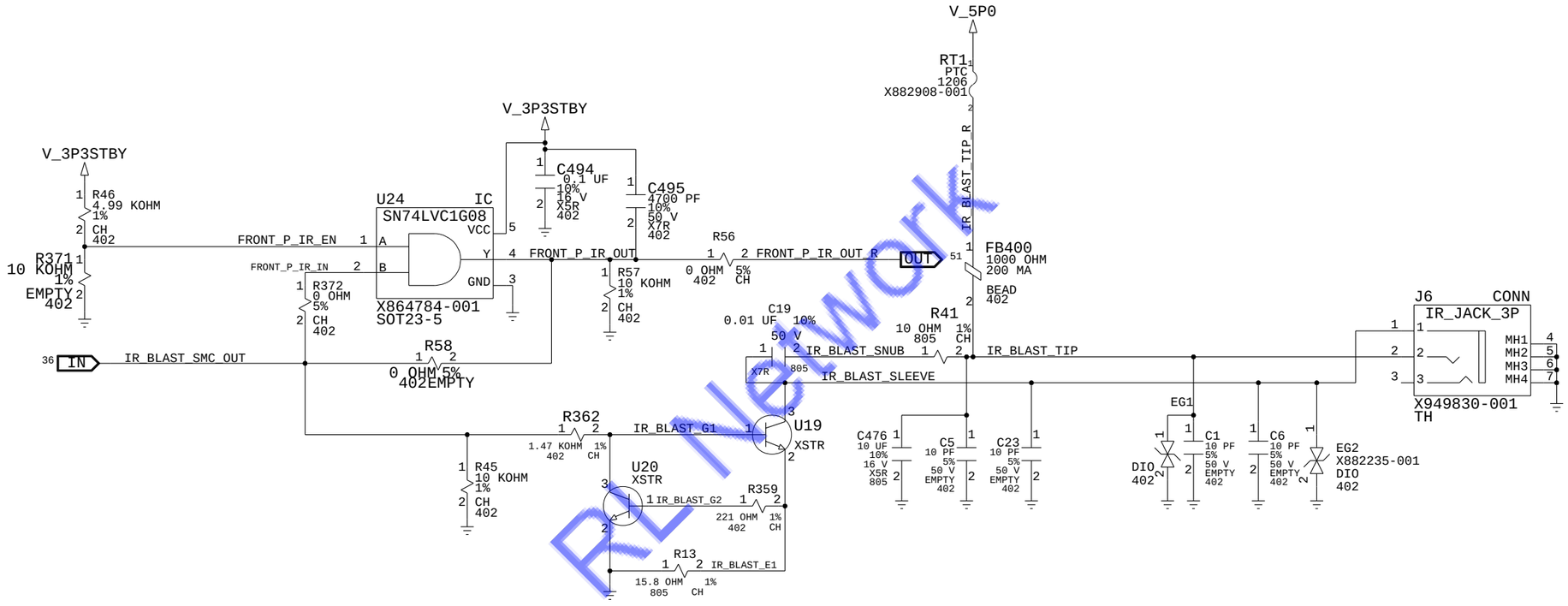





| MICROSOFT CONFIDENTIAL | PROJECT NAME | PAGE | CSA PAGE | FAB | VER |
|---|---|---|---|---|---|
| | Cactus | 68/82 | 68/82 | G-R | 0.991 |

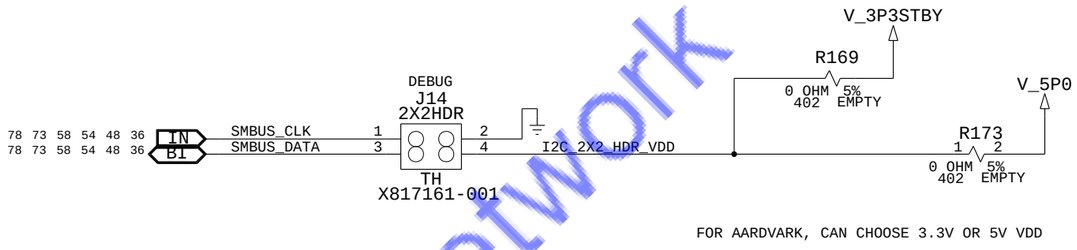
# IR BLASTER






| MICROSOFT CONFIDENTIAL | PROJECT NAME | PAGE | CSA PAGE | FAB | VER |
|---|---|---|---|---|---|
| | Cactus | 69/82 | 69/82 | G-R | 0.99 |

# I2C




FOR AARDVARK, CAN CHOOSE 3.3V OR 5V VDD



| MICROSOFT CONFIDENTIAL | PROJECT NAME | PAGE | CSA PAGE | FAB | VER |
|---|---|---|---|---|---|
| | Cactus | 70/82 | 70/82 | G-R | 0.991 |

MARGIN: SOCPHY,SOC1P8

BLANK

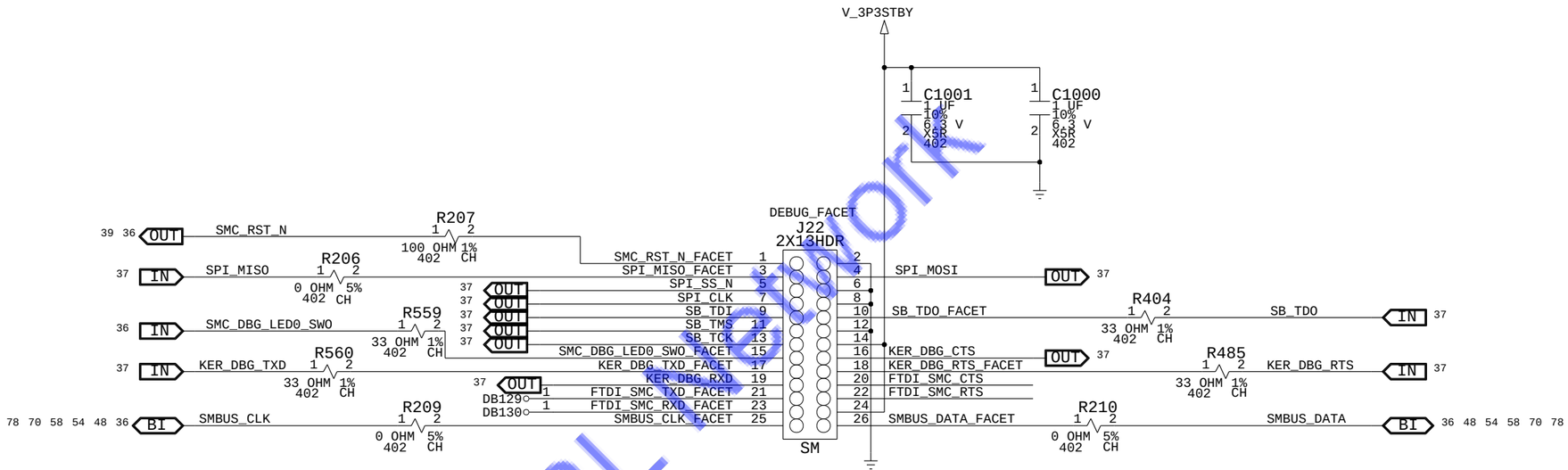
MONITOR: VSOC1P8,VSOCPHY,V12P0

BLANK



| MICROSOFT CONFIDENTIAL | PROJECT NAME | PAGE | CSA PAGE | FAB | VER |
|---|---|---|---|---|---|
| | Cactus | 72/82 | 72/82 | G-R | 0.991 |

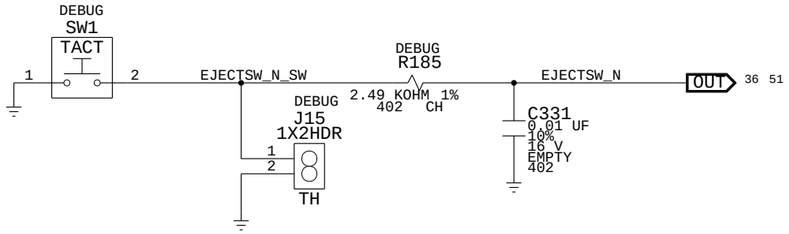
# CONN: FACET BOARD

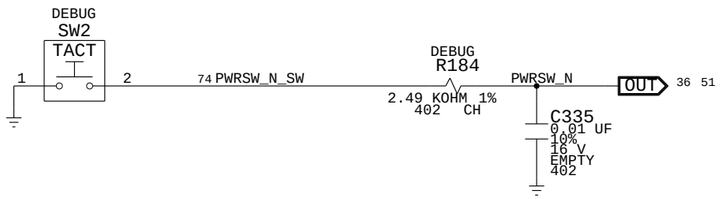


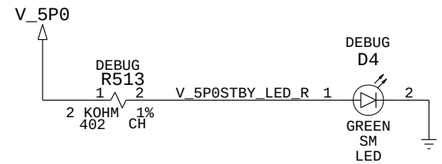


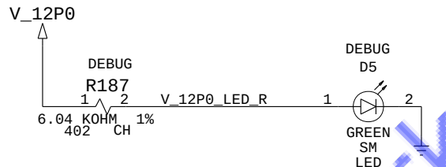

| MICROSOFT CONFIDENTIAL | PROJECT NAME | PAGE | CSA PAGE | FAB | VER |
|---|---|---|---|---|---|
| | Cactus | 73/82 | 73/82 | G-R | 0.991 |

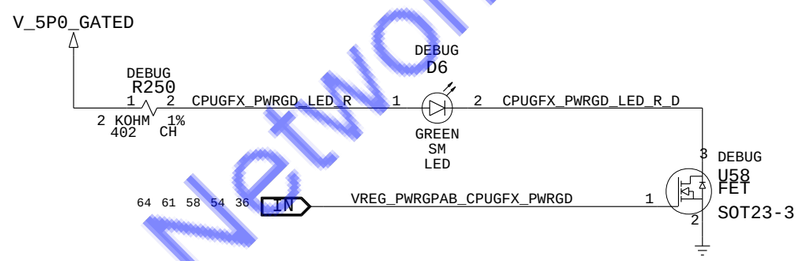
# CONN: SWITCHES

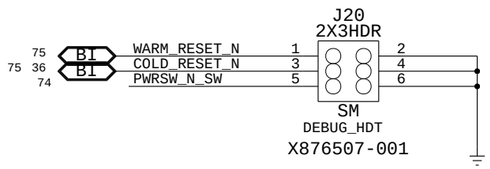





| MICROSOFT CONFIDENTIAL | PROJECT NAME | PAGE | CSA PAGE | FAB | VER |
|---|---|---|---|---|---|
| | Cactus | 74/82 | 74/82 | G-R | 0.991 |

# CONN: HDT

NOTE: INSTALL HEADER IF NEEDED
TITAN POWER CONNECTOR

V_3P3STBY

DEBUG_HDT

J12
1X2HDR
TH
EMPTY

DEBUG_HDT
SW4
TACT
COLD_RESET_N
OUT 36 74

DEBUG_HDT
C370
0.22 UF
10%
6.3 V
X5R
402

V_SOC1P8

DEBUG_HDT
R542
1 KOHM
1%
CH
402

TRST_L
OUT 14

DEBUG_HDT
R534
0 OHM 5%
402 CH

DEBUG_HDT
C740
1 UF
10%
6.3 V
X5R
402

DEBUG_HDT
C840
0.1 UF
10%
16 V
X5R
402

DEBUG_HDT
C710
0.1 UF
10%
16 V
X5R
402

DEBUG_HDT
J13
2x10HDR_HDT
SM

| | | | |
|---|---|---|---|
| 1 | 2 | TCK | |
| 3 | 4 | TMS | |
| 5 | 6 | TDI | |
| 7 | 8 | TDO | |
| 9 | 10 | PWROK_BUF | |
| 11 | 12 | RESET_L_BUF | |
| 13 | 14 | DBRDY | |
| 15 | 16 | DBREQ_L | |
| 17 | 18 | PLLTEST0 | |
| 19 | 20 | PLLTEST1 | |

HDT_TRST
HDT_PIN11
HDT_PIN13
HDT_PIN15

TCK: OUT 14 36
TMS: OUT 14 36
TDI: OUT 14 36
TDO: IN 14 36
DBRDY: IN 14
DBREQ_L: OUT 14
PLLTEST0: OUT 14
PLLTEST1: OUT 14

DEBUG_HDT
R531
10 KOHM
1%
CH
402

DEBUG_HDT
R530
10 KOHM
1%
CH
402

DEBUG_HDT
R526
10 KOHM
1%
CH
402

V_SOC1P8

DEBUG_HDT
R527
1 KOHM
1%
CH
402

DEBUG_HDT
R537
1 KOHM
1%
CH
402

DEBUG_HDT
R538
1 KOHM
1%
CH
402

DEBUG_HDT
R540
1 KOHM
1%
CH
402

FT63 FTP
FT65 FTP

FTP FT67
FTP FT66
FTP FT64

V_SOC1P8

DEBUG_HDT
SW3
TACT
WARM_RESET_N

DEBUG_HDT
R179
47 KOHM
1%
CH
402

DEBUG_HDT
C323
0.22 UF
10%
6.3 V
X5R
402

V_SOC1P8

DEBUG_HDT
U53 IC
SN74AUP1G17
X862374-001
SC70-5

A
NC
VCC
GND
Y

WARM_RESET_N_DEBOUNCE

DEBUG_HDT
C865
0.22 UF
10%
6.3 V
X5R
402

V_SOC1P8

DEBUG_HDT
U49 IC
74LVC1G07
X801758-001
SC70

SOC_RST_N
SOC_PWR_OK
OUT 14 36
IN 36 14 54

V_SOC1P8

DEBUG_HDT
U50 IC
SN74AUP2G07
X865298-001
SC70-6

1A
2A
1Y
2Y
GND
VCC

DEBUG_HDT
C864
0.22 UF
10%
6.3 V
X5R
402

DEBUG_HDT
R535
1 KOHM
1%
CH
402

DEBUG_HDT
R532
1 KOHM
1%
CH
402



| MICROSOFT CONFIDENTIAL | PROJECT NAME | PAGE | CSA PAGE | FAB | VER |
|---|---|---|---|---|---|
| | Cactus | 75/82 | 75/82 | G-R | 0.991 |

# CONN: M.2

MTG5
SPACER_1P
M1008483-001
TH
M2_ONLY
SSD MOUNTING HARDWARE

SSD LOAD SWITCH
NOM.VOLTAGE: 3.3V
PEAK CURRENT: 2.5A

NOTE: R328 AND D8 ARE DEBUG COMPONENTS AND NEED TO BE REMOVED FROM RETAIL CONFIGS

R325 0 OHM 5% 805 EMPTY

Q3 NTTFS4C50N X889324-001 DFN5 FET M2_ONLY

V_3P3STBY

V_12P0

C434 1 UF 10% 6.3 V X5R 402 M2_ONLY

C437 0.1 UF 10% 25 V X7R 603 M2_ONLY

C519 0.1 UF 10% 25 V X7R 603

C450 4.7 UF 10% 6.3 V X5R 603 M2_ONLY

C448 1 UF 10% 6.3 V X5R 402 M2_ONLY

C1075 C1078 1 UF 10% 6.3 V X5R 402 M2_ONLY

C449 1 UF 10% 6.3 V X5R 402 M2_ONLY

C446 22 UF 20% 6.3 V X5R 805 M2_ONLY

V_3P3_M2

R637 10 KOHM 1% CH 402 M2_ONLY

M2_LED

D8 GREEN SM LED

R328 511 OHM 1% 402 CH M2_ONLY

M2_LED_R

M2_ONLY
J32
PCIE_M2_M_RCPT_67P_2MH
M1007401-001
SM

| | | | |
|---|---|---|---|
| PEX_L3_M2_SOC_TN | OUT | 2 | |
| PEX_L3_M2_SOC_TP | OUT | 2 | |
| PEX_L3_SOC_M2_TN_C | IN | 2 | |
| PEX_L3_SOC_M2_TP_C | IN | 2 | |
| PEX_L2_M2_SOC_TN | OUT | 2 | |
| PEX_L2_M2_SOC_TP | OUT | 2 | |
| PEX_L2_SOC_M2_TN_C | IN | 2 | |
| PEX_L2_SOC_M2_TP_C | IN | 2 | |
| PEX_L1_M2_SOC_TN | OUT | 2 | |
| PEX_L1_M2_SOC_TP | OUT | 2 | |
| PEX_L1_SOC_M2_TN_C | IN | 2 | |
| PEX_L1_SOC_M2_TP_C | IN | 2 | |
| PEX_L0_M2_SOC_TN | OUT | 2 | |
| PEX_L0_M2_SOC_TP | OUT | 2 | |
| PEX_L0_SOC_M2_TN_C | IN | 2 | |
| PEX_L0_SOC_M2_TP_C | IN | 2 | |
| M2_PEX_SS_100M_CLKN | IN | 77 | |
| M2_PEX_SS_100M_CLKP | IN | 77 | |

68 50 IN V_1P65_VREF

V_3P3

R634 10 KOHM 1% EMPTY 402

M2_PWR_EN_R

R635 0 OHM 5% 402 CH M2_ONLY

36 42 IN M2_PWR_EN

R636 10 KOHM 1% CH 402

R78 34.8 KOHM 402 CH 1%

M2_ENABLE_C

U34 LM339 TSSOP14 X932792-001

R283 10 KOHM 1% CH 402 M2_ONLY

R293 10 KOHM 1% CH 402 M2_ONLY

M2_PCIE_RESET_N

77 OUT M2_CLKREQ_N

REF CLK CONTROLLED BY SSD TO SUPPORT POWER MODE EXPERIMENTS

U63 FET SOT23-3 M2_ONLY

RST_G_C

42 36 IN PCIE_RST_N

R318 100 OHM 1% 402 CH M2_ONLY

U66 FET SOT23-3 M2_ONLY

C433 0.022 UF 10% 50 V X7R 402 M2_ONLY

R307 100 OHM 1% 402 CH M2_ONLY

RST_G RST_G_R

THE SSD HAS AN INTERNAL PULL-UP ON ITS PCIE RESET INPUT.
ISOLATION OF SIGNAL PCIE_RST_N IS NEEDED TO ISOLATE SOUTHBRIDGE OUTPUT FROM SSD PULLUP



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|---|---|---|---|---|---|
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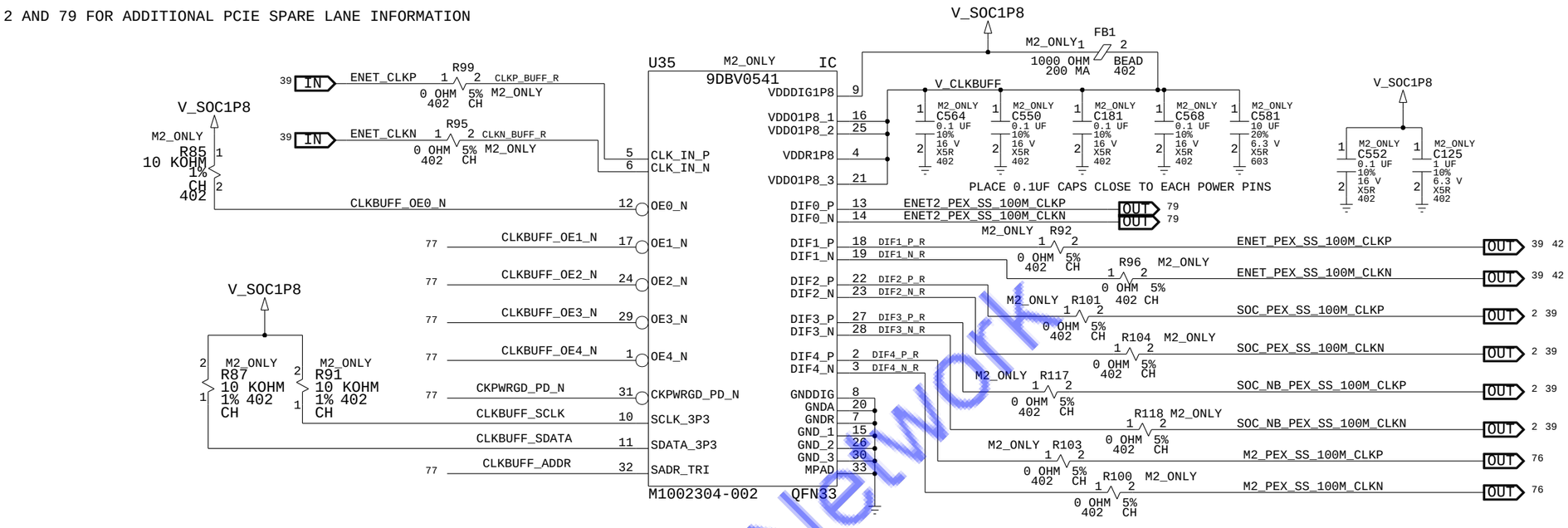
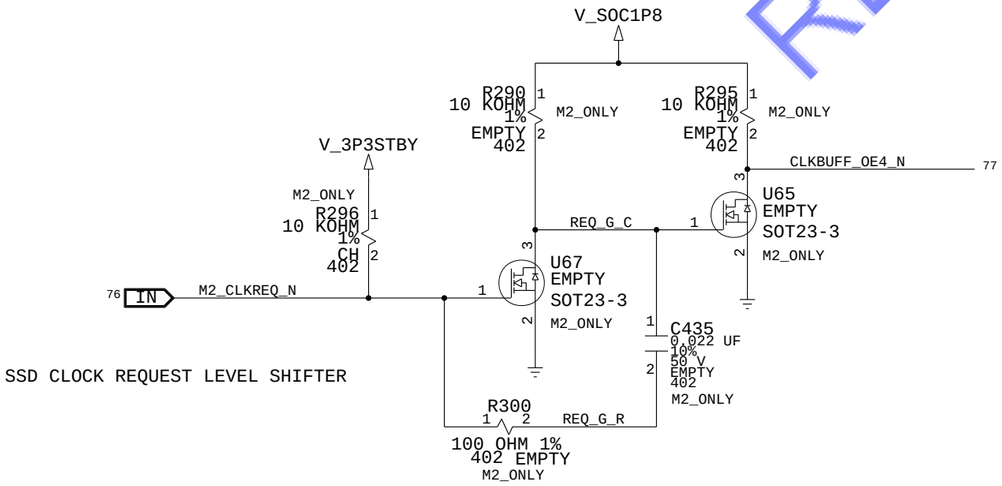
# CLOCK BUFFER

NOTES:

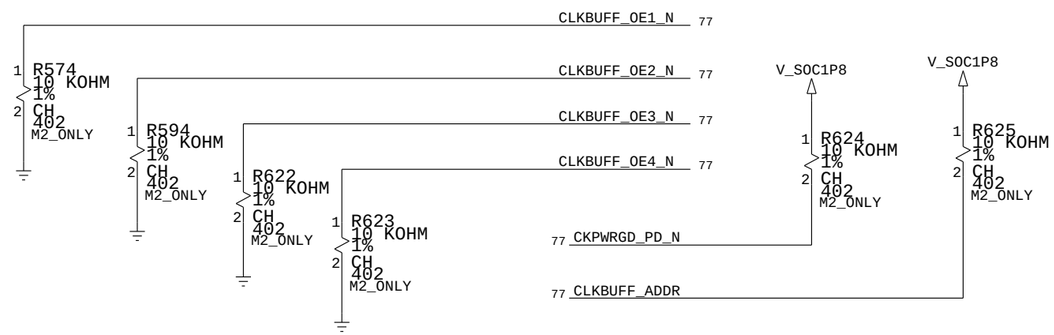
1.TO ENABLE ENET2 CLOCK ON J28 HEADER, UNSTUFF R85. U35 HAS INTERNAL PULL DOWN.

2.SEE PAGES 2 AND 79 FOR ADDITIONAL PCIE SPARE LANE INFORMATION




TO ADDRESS LONG TERM RELIABILITY CONCERNS
PERMANENT PULL UP/DOWN RESISTORS HAVE BEEN ADDED
EVEN THOUGH THIS PART HAS ITS OWN INTERNAL 100K EQUIVALENTS

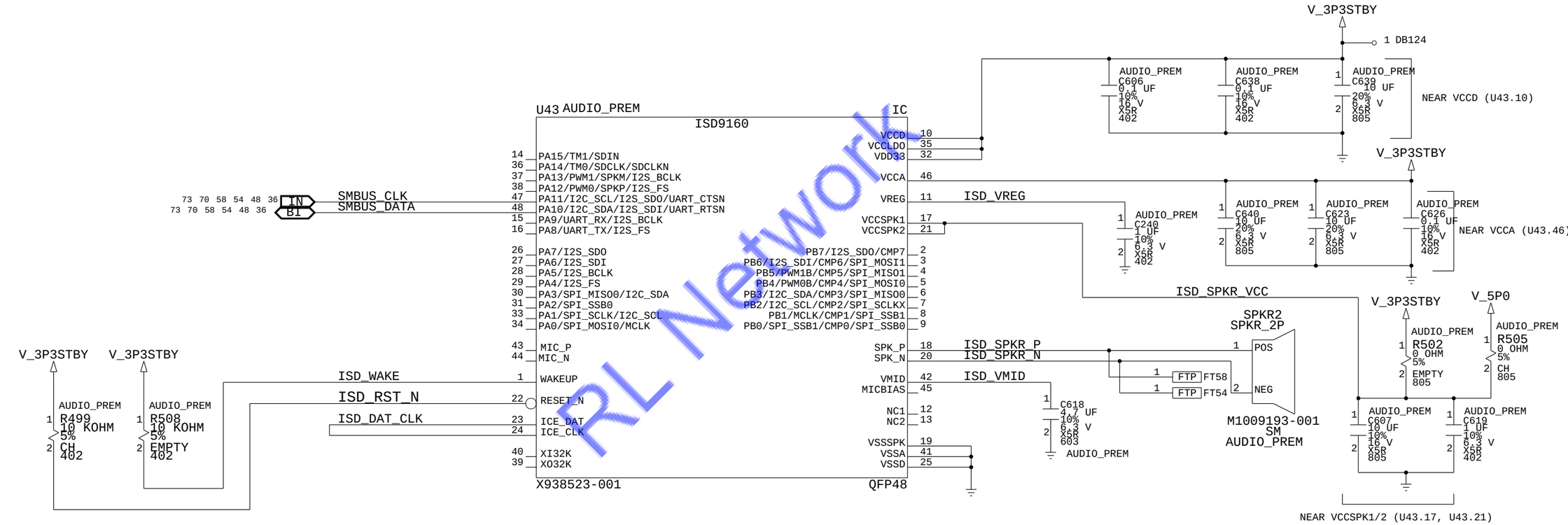





| MICROSOFT CONFIDENTIAL | PROJECT NAME | PAGE | CSA PAGE | FAB | VER |
|---|---|---|---|---|---|
| | Cactus | 77/82 | 77/82 | G-R | 0.991 |

# PREMIUM SPEAKER (SE/LE)

## PREMIUM/SE/LE SKU ONLY

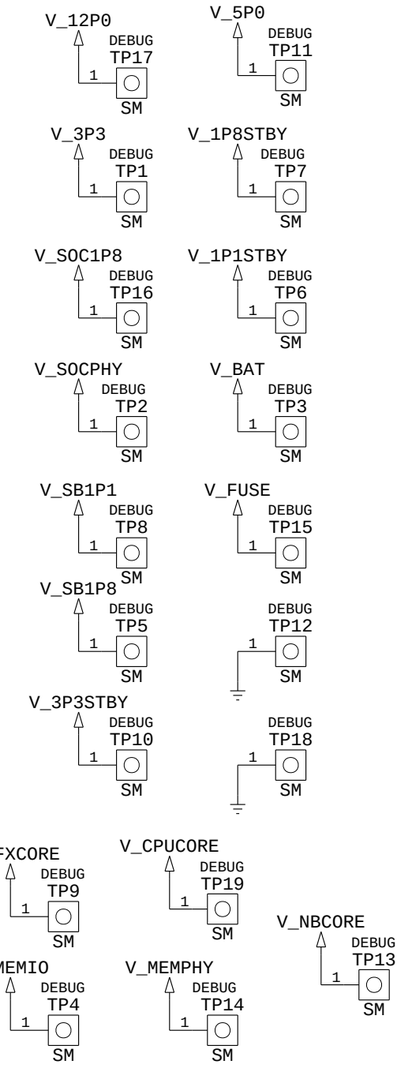



ISD9160FIMS05 - REMOVED CAP TOUCH FUNCTIONALITY



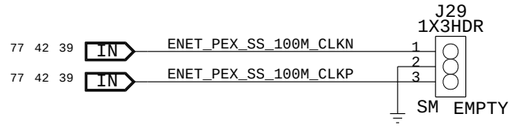
| MICROSOFT CONFIDENTIAL | PROJECT NAME | PAGE | CSA PAGE | VER |
|---|---|---|---|---|
| | Cactus | 78/82 | 78/82 | 0.991 |

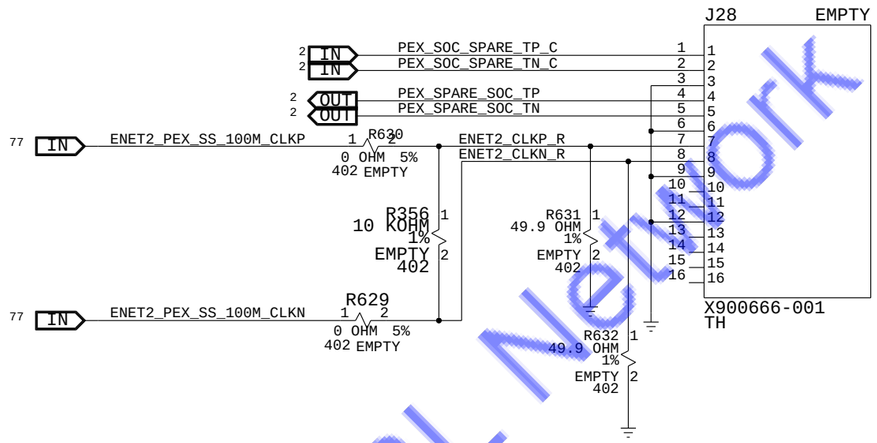
# DEBUG: VR HEADERS, TEST POINTS, CONNECTORS




NOTE: THESE TEST POINTS ARE NOT TO BE USED FOR VOLTAGE REGULATOR QUALIFICATION TEST POINTS

## PCIE CONNECTORS




## NOTES: TO ENABLE 100 MHZ REF CLOCK ON HEADER J28:

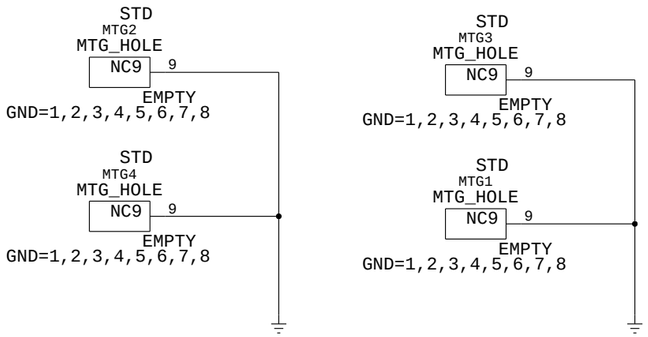
1. WHEN CLOCK BUFFER U35 IS INSTALLED: POPULATE R629 AND R630.
2. WITHOUT CLOCK BUFFER INSTALLED:
   - A. POPULATE R631 AND R632.
   - B. WIRE JUMPER ETHERNET 100 MHZ CLOCK FROM HEADER J29.1 AND J29.3 TO J28.8 AND J28.7 RESPECTIVELY.
3. SEE PAGES 2 AND 77 FOR ADDITIONAL PCIE SPARE LANE INFORMATION.

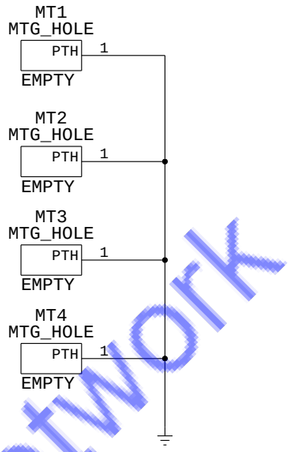


| MICROSOFT CONFIDENTIAL | PROJECT NAME | PAGE | CSA PAGE | FAB | VER |
|---|---|---|---|---|---|
| | Cactus | 79/82 | 79/82 | G-R | 0.991 |

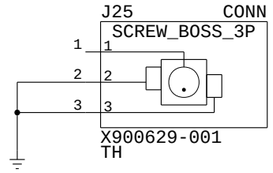
# LABELS AND MOUNTING

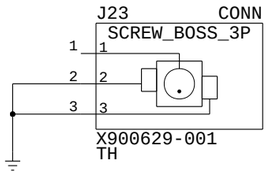
HEAT SINK MOUNTING HOLES



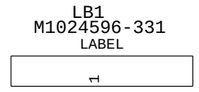




SCREW BOSS

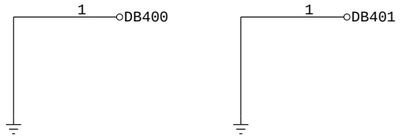



INTELLIGENT SERIAL NUMBER TARGET




GND PADS FOR HEATSINK ALIGNMENT PINS




| MS_PART# | MATL | REF_DES | DESCR. | BOM PROPERTY |
|---|---|---|---|---|
| NA | FR4 | PCB1 | PCB,CACTUS,FAB G RETAIL,8 LAYERS,GI | PCB_GI |
| M1037358-002 | FR4 | PCB1 | PCB,CACTUS,FAB G RETAIL,8 LAYERS,OSP | PCB_OSP |



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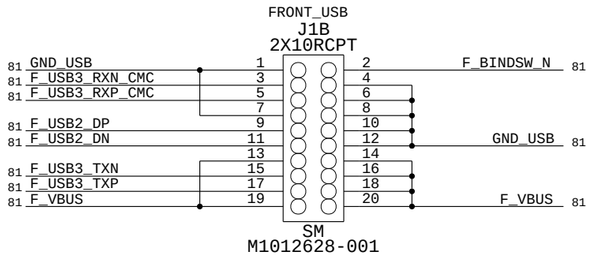
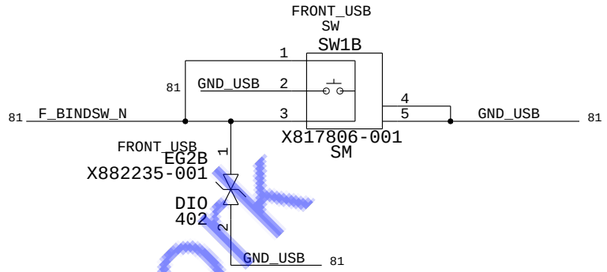
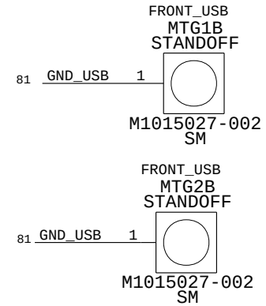
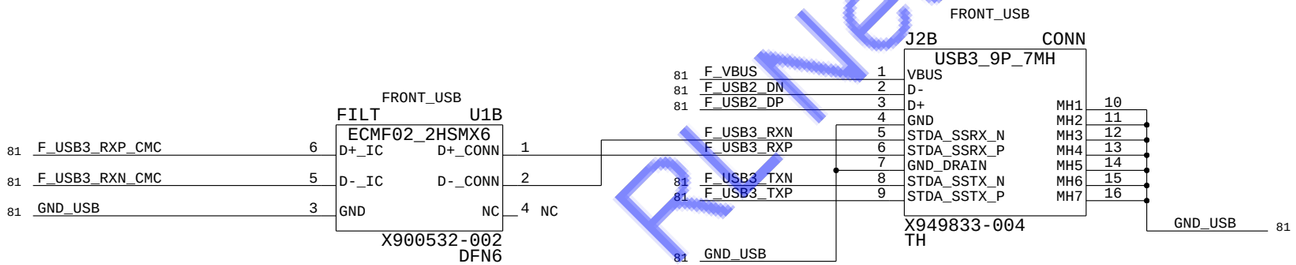
|---|---|---|---|---|
| | Cactus | 80/82 | 80/82 | 0.991 |

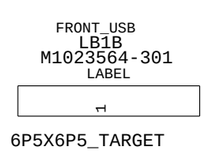
# FRONT PANEL USB - NESTED PCB

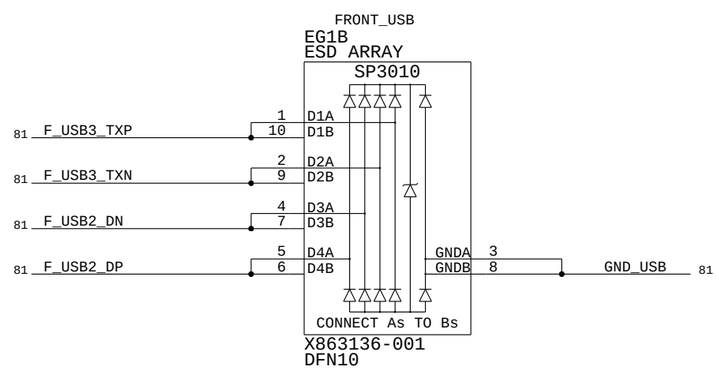



| MS_PART# | MATL | REF_DES | DESCR. | BOM PROPERTY |
|---|---|---|---|---|
| M1033394-001 | FR4 | PCB1B | PCB,CACTUS,FAB E RETAIL,FRONT USB,8 LAYERS,G1 | FRONT_USB |

| MICROSOFT CONFIDENTIAL | PROJECT NAME | PAGE | CSA PAGE | VER |
|---|---|---|---|---|
| | Cactus | 81/82 | 81/82 | 0.991 |

# BOM DEFINITIONS

| BOM | DEFINTION |
|---|---|
| AUDIO | INCLUDES COMPONENTS FOR THE STANDARD AUDIO SOLUTION |
| AUDIO_PREM | INCLUDES COMPONENTS FOR THE PREMIUM SE/LE SPEAKER SOLUTION |
| COMMON | ALL COMPONENTS WITH NO BOM PROPERTY |
| DEBUG | COMPONENTS REQUIRED FOR BRING UP & DEBUG |
| DEBUG_HDT | HDT-RELATED DEBUG COMPONENTS |
| DEBUG_SHUNT | COMPONENTS WHICH ARE ON DEBUG BOARDS, BUT ARE REMOVED/SHORTED ON RETAIL |
| EMMC_BASE | DUMMY PLACE HOLDER FOR EMMC DEVICE & RESISTORS. NEVER USE THIS IN THE RECIPE FILE. SELECT ONE OF THESE INSTEAD: EMMC_HYNIX_16NM, EMMC TOSHIBA_15NM, EMMC SAMSUNG_14NM |
| EMMC_HYNIX_16NM | HYNIX EMMC DEVICE |
| EMMC_SAMSUNG_14NM | SAMSUNG EMMC DEVICE |
| EMMC_TOSHIBA_15NM | TOSHIBA EMMC DEVICE |
| GDDR5_BASE | DUMMY PLACE HOLDER FOR GDDR5. NEVER USE THIS IN THE RECIPE FILE. SELECT ONE OF THESE INSTEAD: EMMC_HYNIX_16NM, EMMC TOSHIBA_15NM, EMMC SAMSUNG_14NM |
| GDDR5_HYNIX | HYNIX GDDR5 MEMORY |
| GDDR5_SAMSUNG | SAMSUNG GDDR5 MEMORY |
| FRONT_USB | COMPONENTS ON THE FRONT PANEL USB |
| KIC_BASE | DUMMY PLACE HOLDER FOR KIC. NEVER USE THIS IN THE RECIPE FILE. USE ONE OF THESE INSTEAD: KIC_DEV OR KIC_RETAIL |
| KIC_DEV | DEBUG VERSION OF KRAKEN |
| KIC_RETAIL | RETAIL VERSION OF KRAKEN |
| M2_ONLY | POPULATE TO SUPPORT AN M.2 INTERFACE |
| NO_M2 | POPULATE WHEN THERE IS NO M2. INTERFACE |
| PCB_GI | FAB TYPE: GOLD |
| PCB_OSP | FAB TYPE: ORGANIC SOLDERABILITY PRESERVATIVE GREEN SOLDERMASK |
| PCB_OSP_BLACK | FAB TYPE: ORGANIC SOLDERABILITY PRESERVATIVE BLACK SOLDERMASK |
| RTC_RETAIL | RTC CIRCUIT IMPLEMENTATION FOR RETAIL BOARDS |
| RTC_XDK | RTC CIRCUIT IMPLEMENTATION FOR XDK BOARDS |
| SOC_BASE | DUMMY PLACE HOLDER FOR SOC. NEVER USE THIS IN THE RECIPE FILE. SELECT ONE OF THESE INSTEAD: EMMC_HYNIX_16NM, EMMC TOSHIBA_15NM, EMMC SAMSUNG_14NM |
| SOC_EMPTY | DOES NOT STUFF ANUBIS |
| SOC_INCLUDE | STUFFS ANUBIS |
| VR_FIXED | SET ALL VRS TO FIXED VOLTAGES (NON-MARGINED). EXCLUDES V_MEMIO. MUST BE USED IN CONJUNCTION WITH NOT VR_MM |
| VR_MM | ALLOWS MOST VRS TO BE MARGINED FOR M&M BOARDS. EXCLUDES V_MEMIO. MUST BE USED IN CONJUNCTION WITH NOT VR_FIXED |