

TITLE	Page
Cover Sheet	1
Block Diagram	2
CPU-Memory / PEG/ Display	3,4
CPU-Control/MISC/CFG/Audio/Power/GND	5,6,7
DDR4 Slot-DIMMA/B	8,9,10,11
PCH-LPC/SPI/SMBUS/MISC	12
PCH-Audio/Display/Clock	13
PCH-USB/PCIE/DMI/SATA	14
PCH-GPIO/RSVD	15
PCH-Power/GND/Strap	16,17,18
PCIE Slot-X16/X1/X4	19,20,21
M.2 Connector 2	22
SIO NCT6795D	24,25
CPU FAN Controllor	26
SATA Connector	27
USB POWER/PS2/USB2.0/USB3.0	28,29,30,31,32
ASM1142/USB TYPE A+C	33,34
LAN Intel I219	35
ITE6516-VGA/DVI/HDMI Connector	36,37,38
AUDIO ALC887	39
SIO-NTC6795D	40,41,42
CPU FAN/SYS FAN	43,44,45
ATX Power/F_Panel/ACPI-UIP Power	46,47
OV-NCT3933/GPIO-NCT5605	48
RT3606BC VCORE+VGT	49,50,51
CPU Power-VCCIO/VCCSTPLL/VCCSA	52,53,54
DDR4 Power-VCC_DDR/VPP25/VTT_DDR	55,56
PCH Core Power	57
SPI ROM/Clear CMOS	58,59
LED/Manual parts	60,61

MS-7B54

mATX

Ver: 10 (243.84 x 243.84)

Intel -Coffeelake plamform Z370

CPU:

Coffeelake-S LGA1151

Main Memory:

DDR4 * 4

System Chipset:

Z370

Expansion Slots:

PCI Express (X16) Slot * 1

PCI Express (X1) Slot * 2

PCI Express (X4) Slot * 1

Onboard Chipset:

SIO: Nuvoton 6793D

Flash ROM: SPI

Z370: 128Mb

Other:

SATA3.0 * 6

FRONT USB2.0 * 2

FRONT USB3.1 * 4

REAR USB2.0 * 4

REAR TypeA USB3.1 * 4

HD Audio Codec: ALC892

LAN: Intel I219

PWM:

VCORE - UP9508

DDR - RT8125

PCH - RT8125

VCCSA - RT8125

ACPI:

5VDAUL:uP7501

5VDIMM:uP7501

3VDSW:GS7166

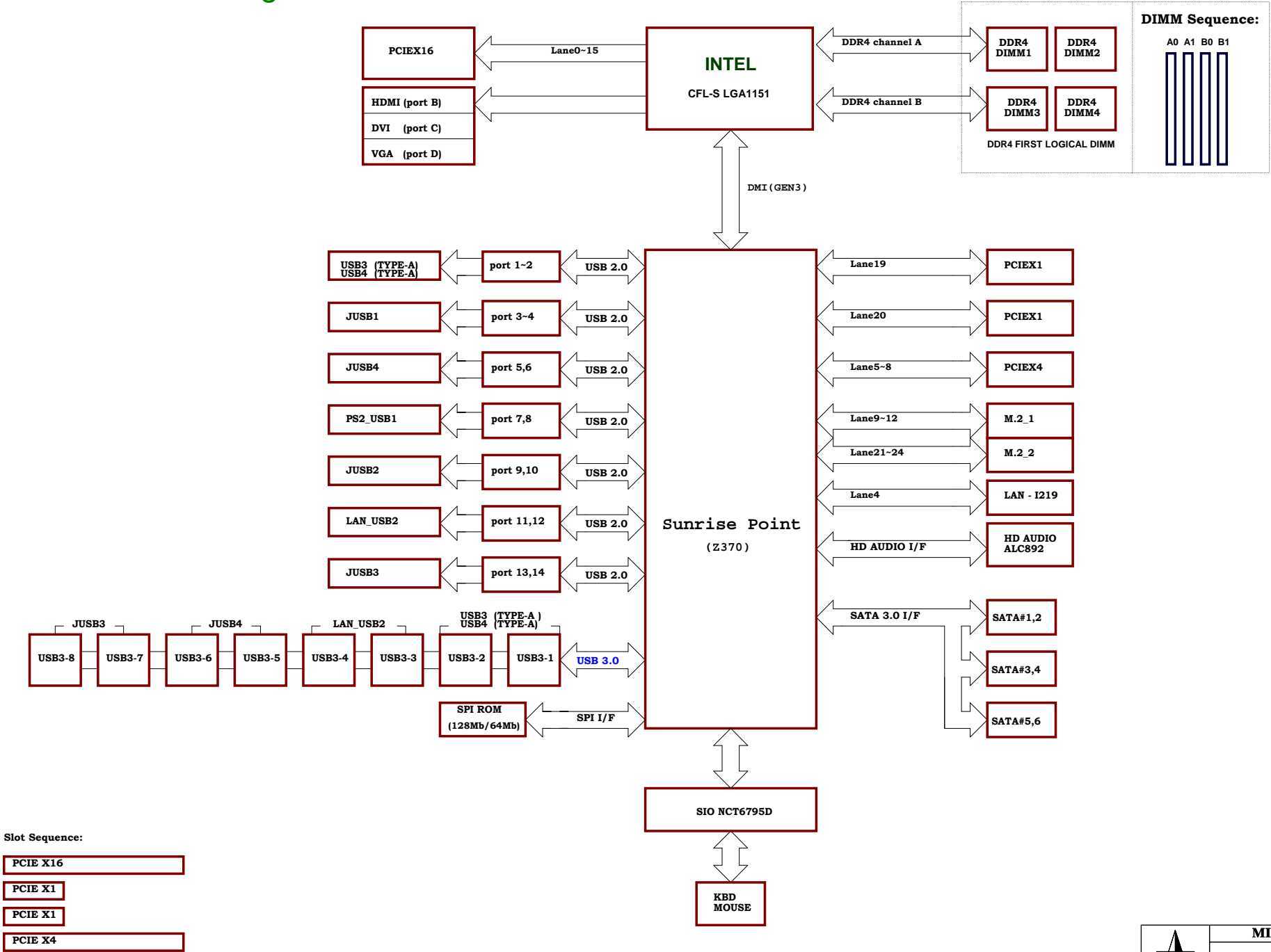
3VSB:GS7166+N MOS

CONVERTER:

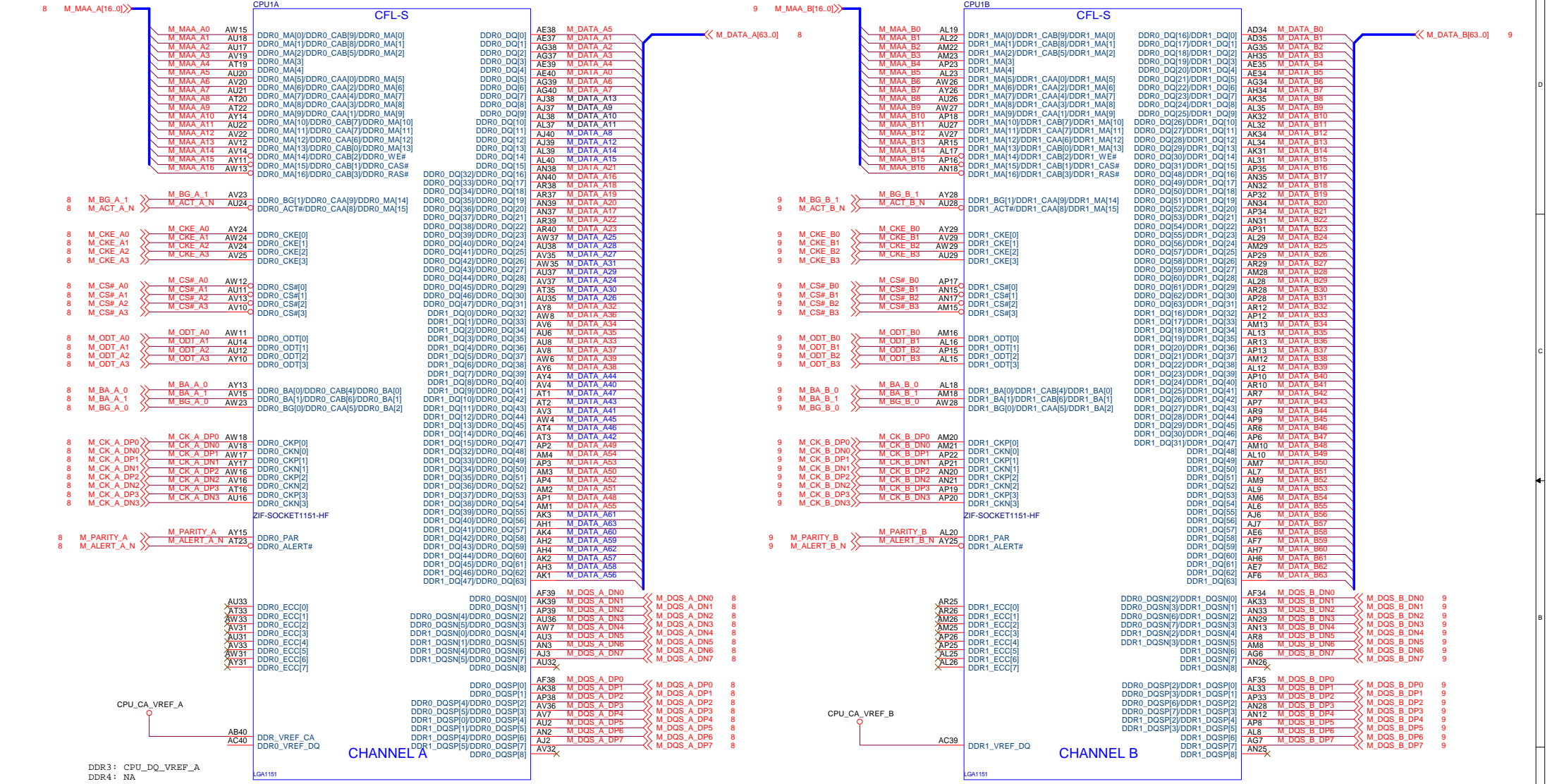
VCCIO - NB685

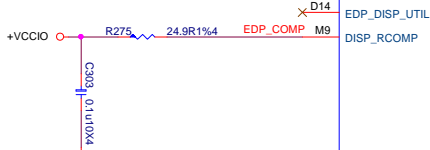
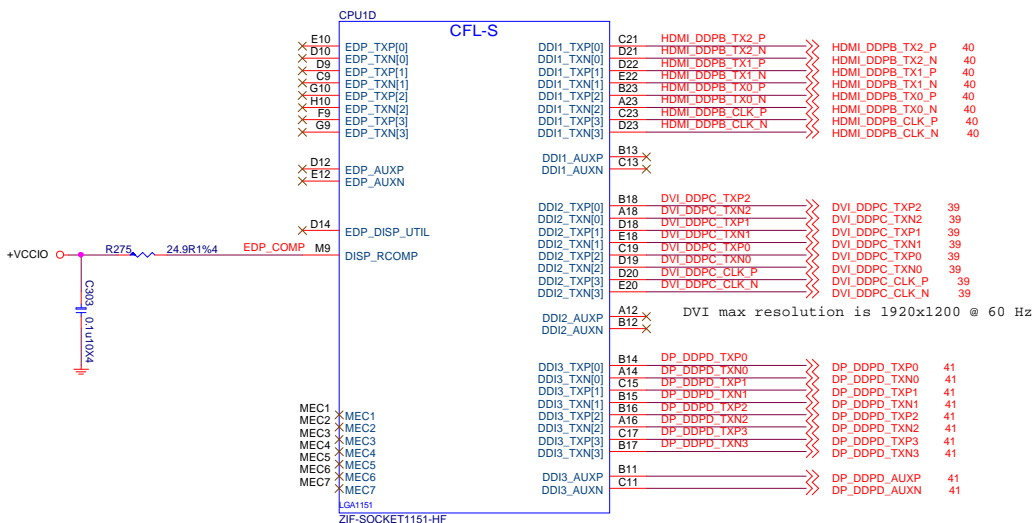
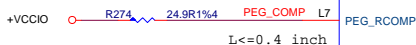
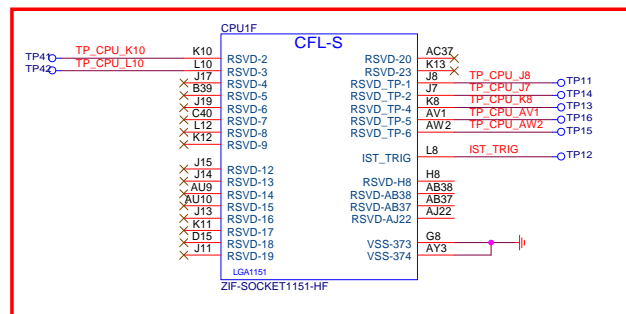
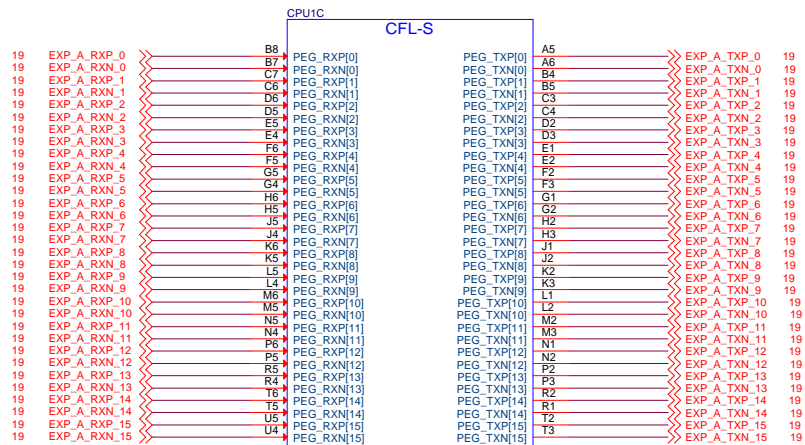
VPP25 - MP2147

MS-7B54 Block Diagram



www.vinaix.com

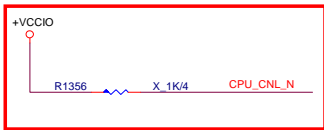
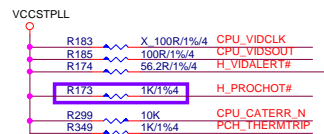




MICRO-STAR INT'L CO.,LTD

MS-7B54

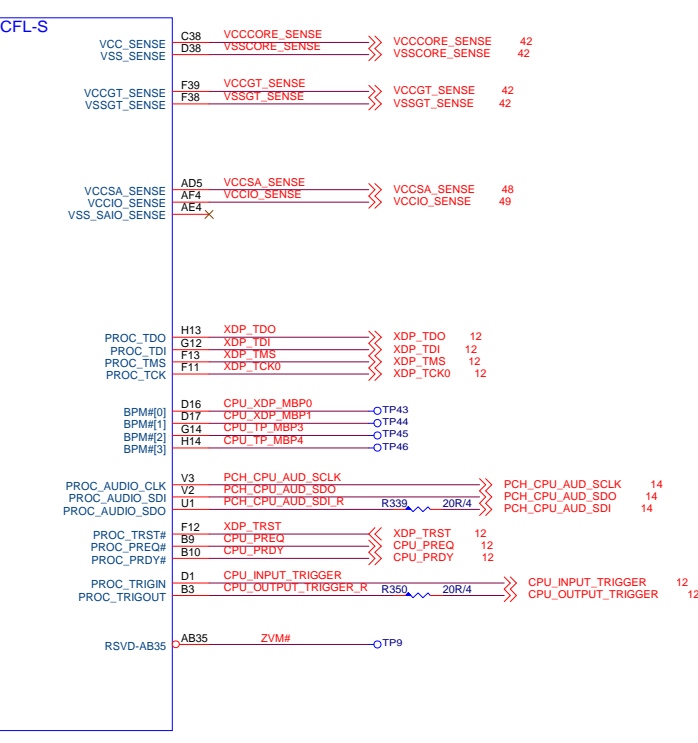
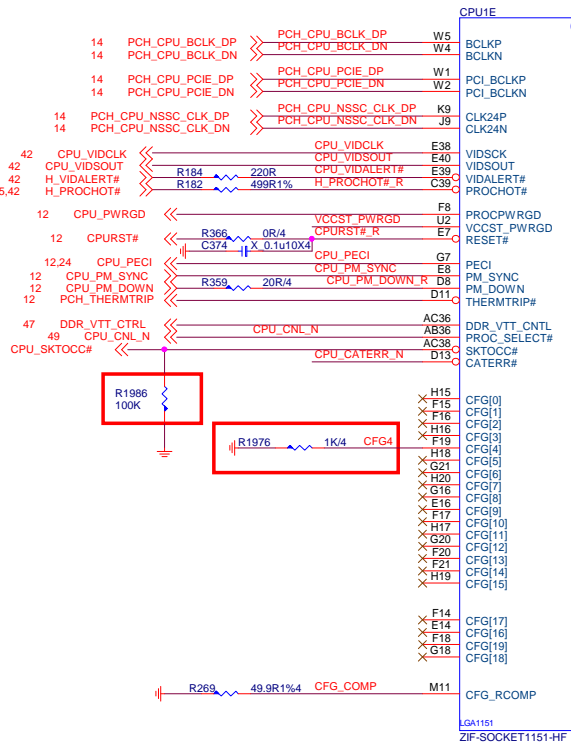
Size	Document Description	Rev
Custom	CPU-PEG/Display	1.0
Date:	Tuesday, August 29, 2017	Sheet 4 of 65



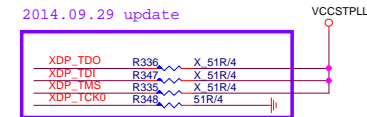
15,24,42,53,55

CFG Strap

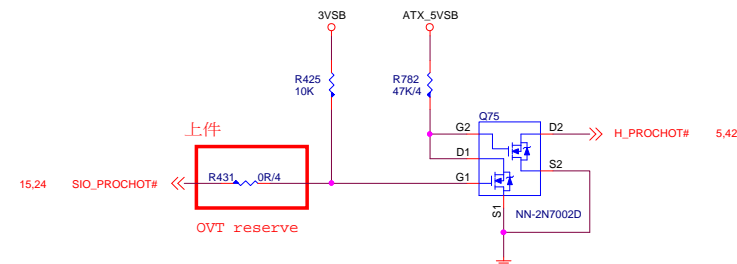
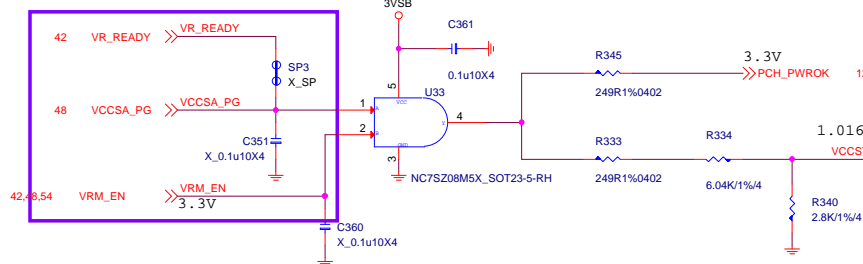
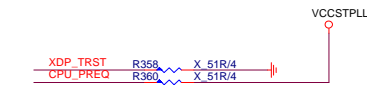
CFG Table		
HIGH	LOW	DESCRIPTION
0	No Lock	Lock
1		RSVD
2	NORM	REVERSE
3		RSVD
4	DISABLE	ENABLE
5	DISABLE	ENABLE
6	DISABLE	ENABLE
7	RESET#	BIOS REQ
8		RSVD
9		RSVD
10		RSVD
11		RSVD
12		RSVD
13		RSVD
14	RSVD	
15	RSVD	



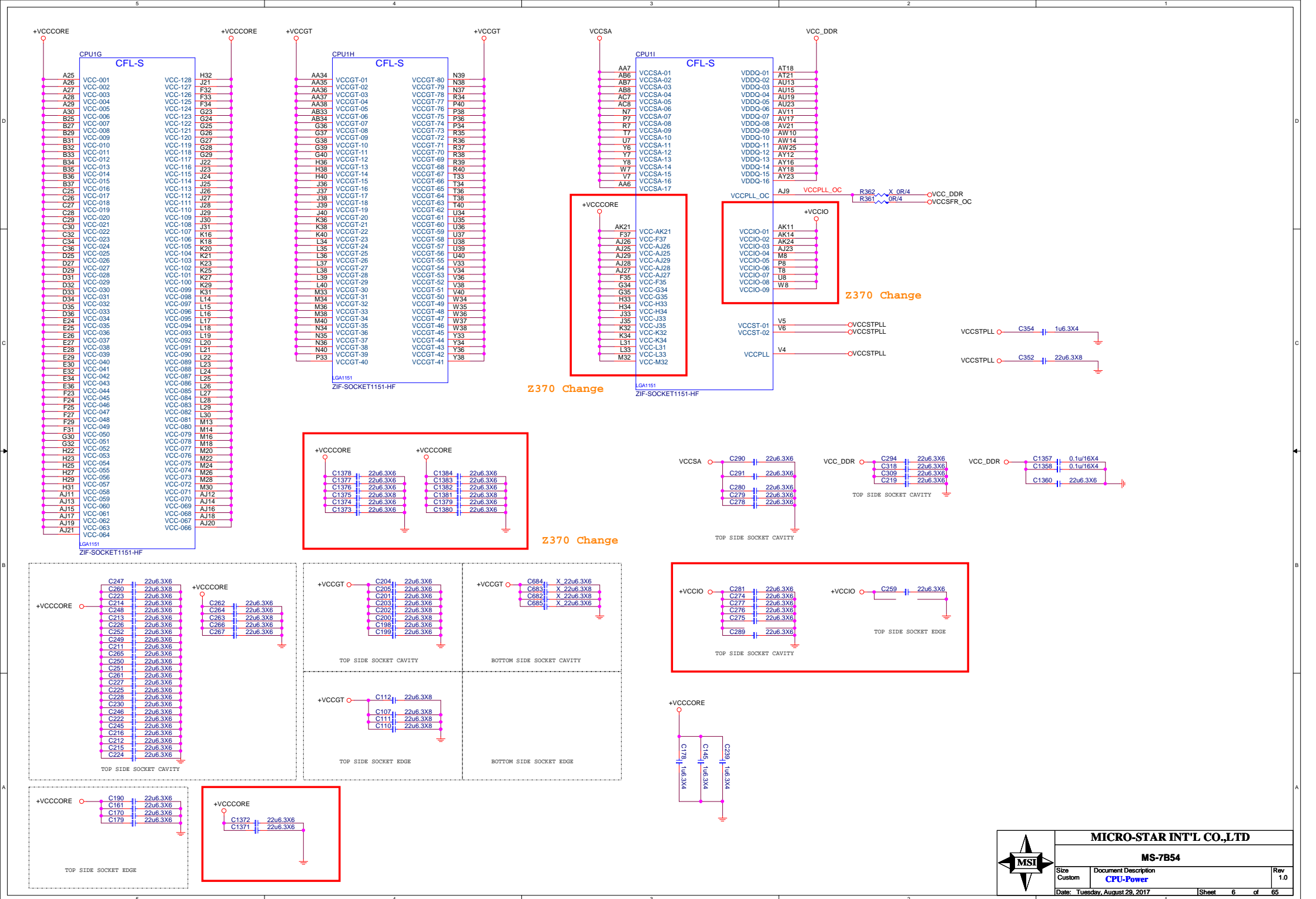
2014.09.29 update

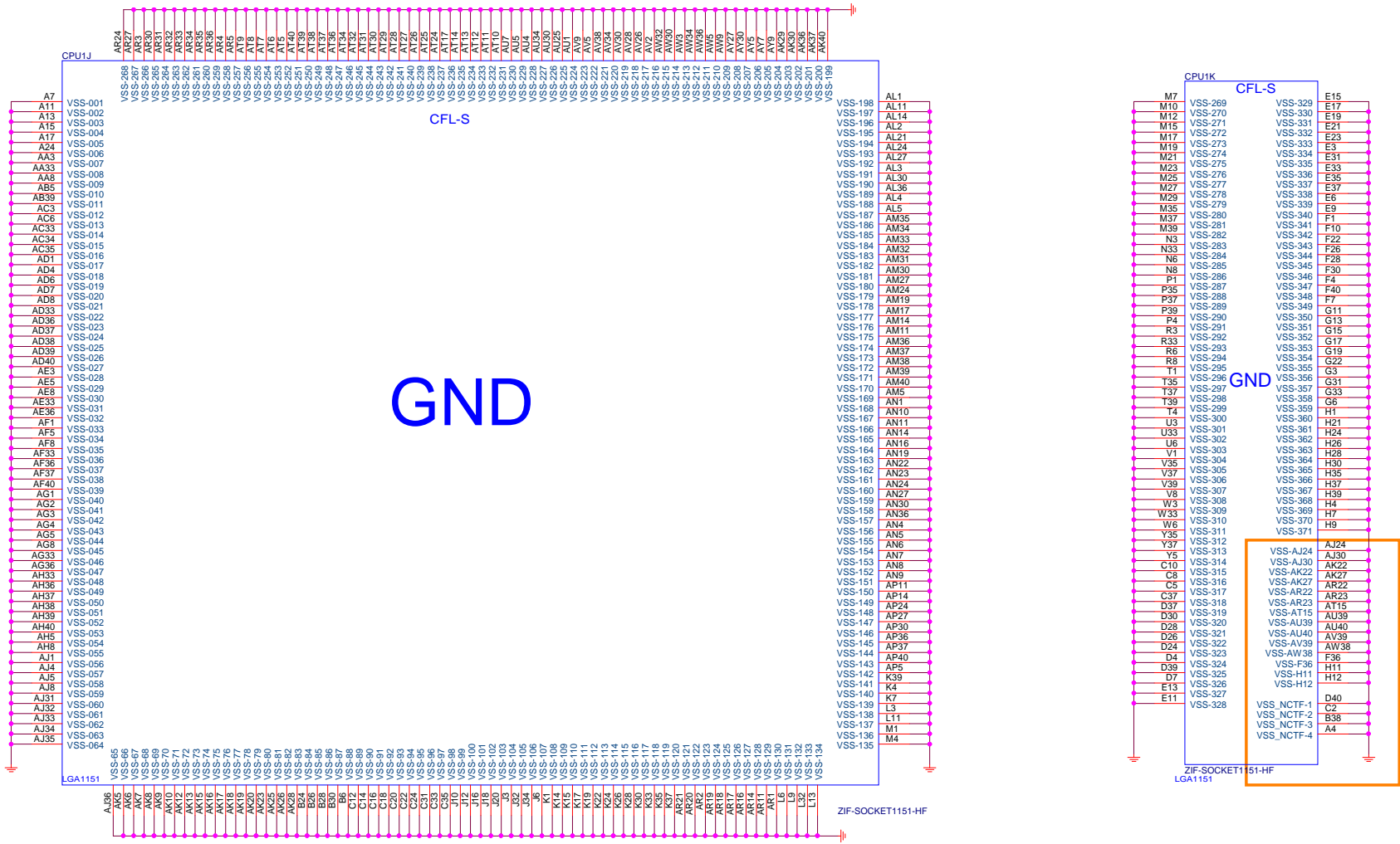


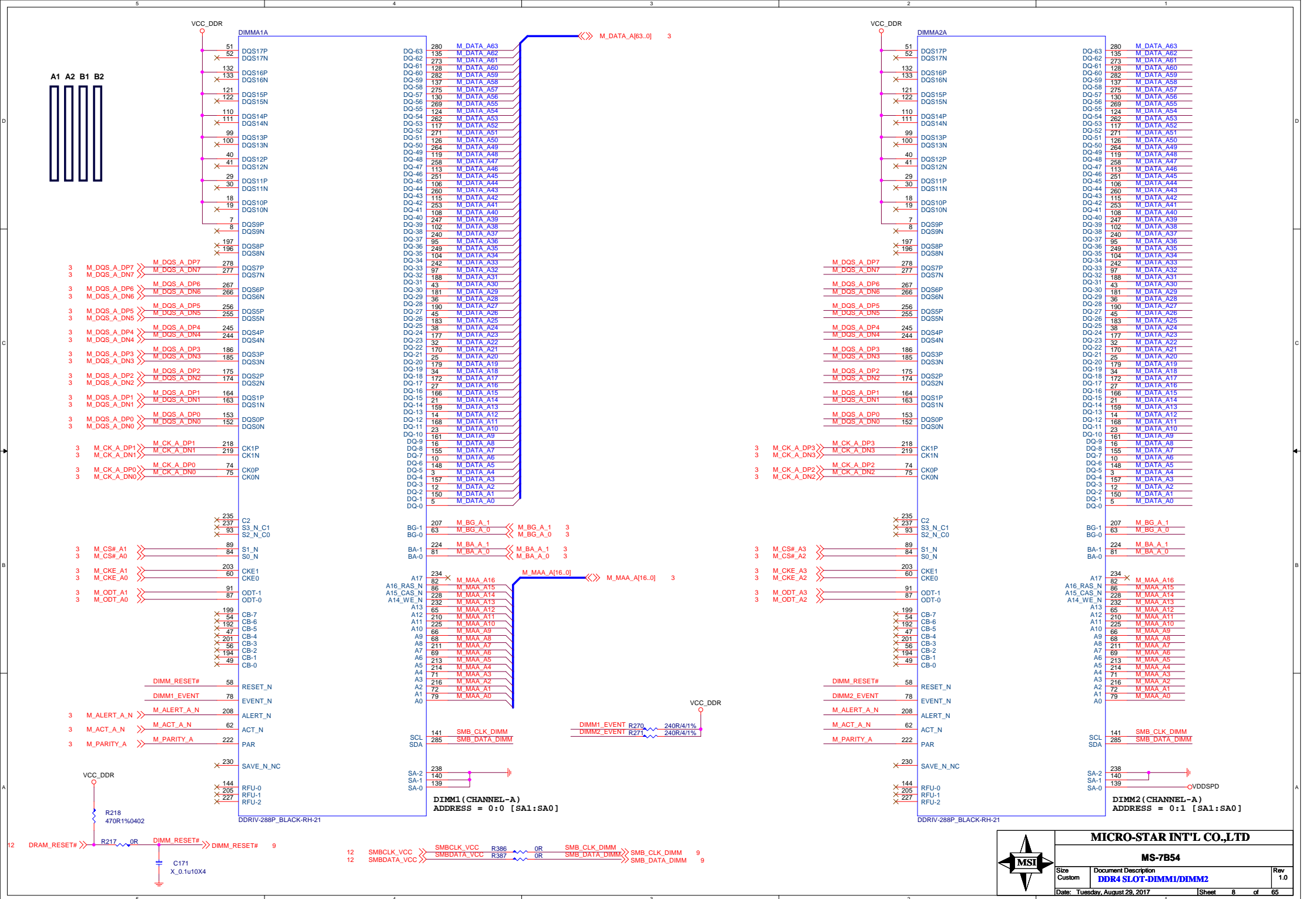
Close CPU <1100 mil
1000 mil < CPU_XDP_MBP0~1 < 6000 mil

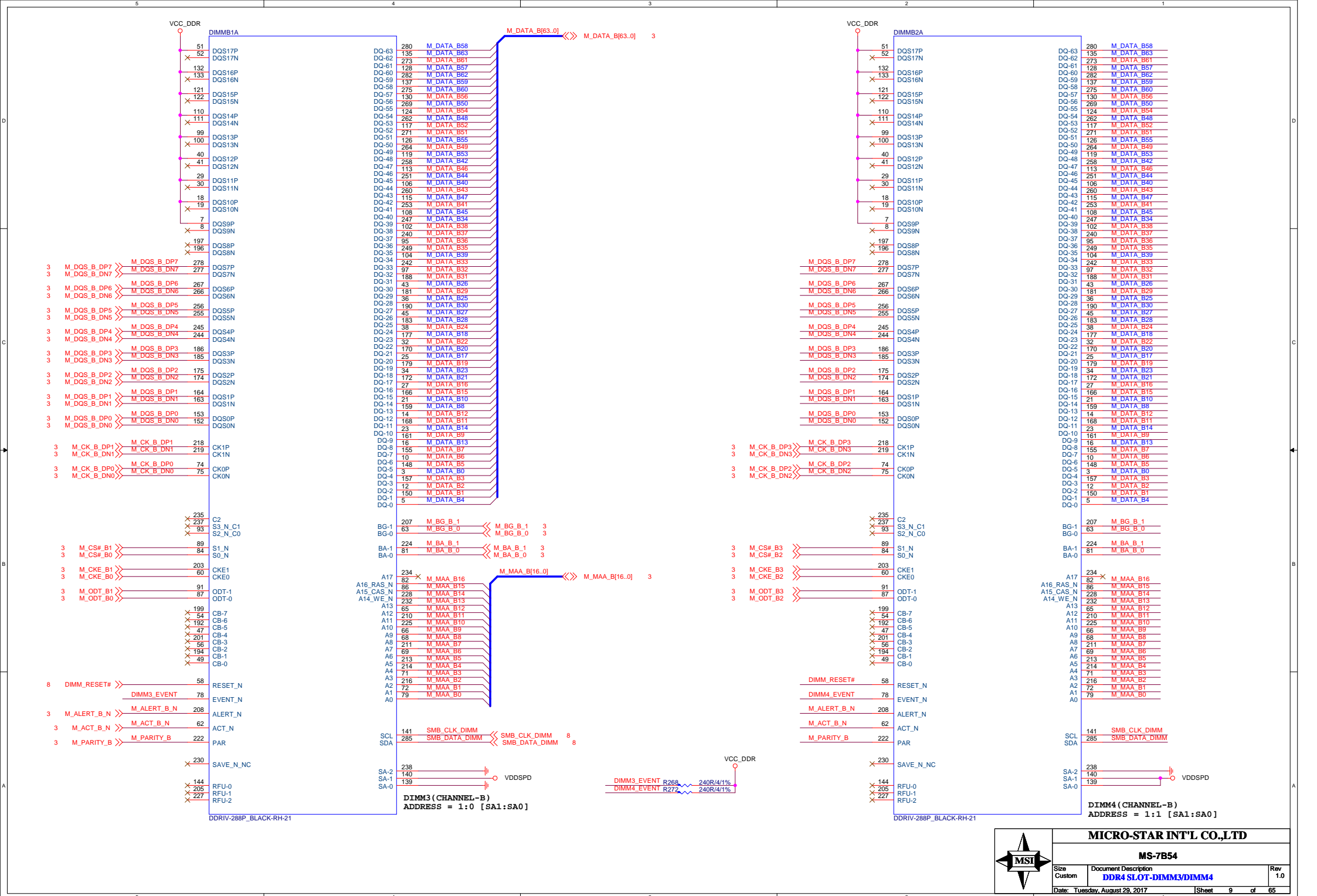


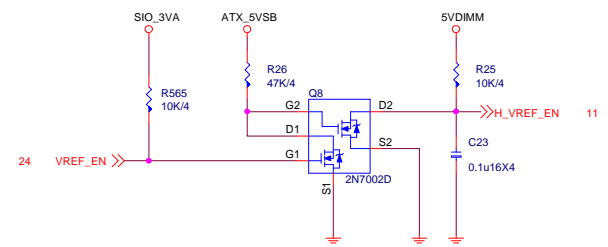
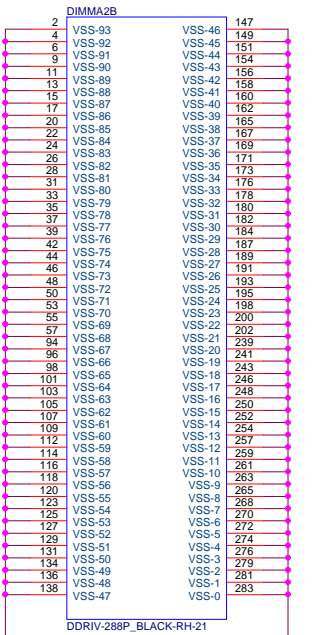
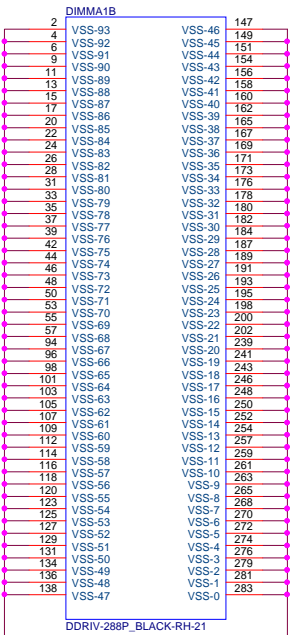
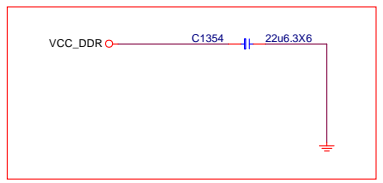
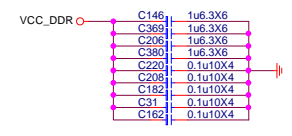
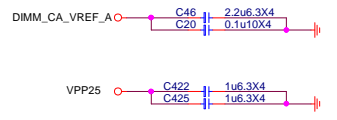
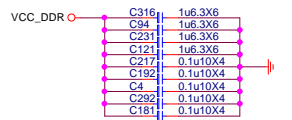
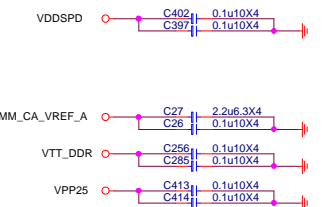
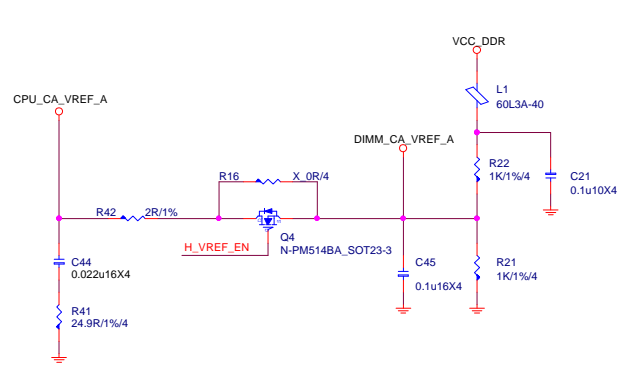
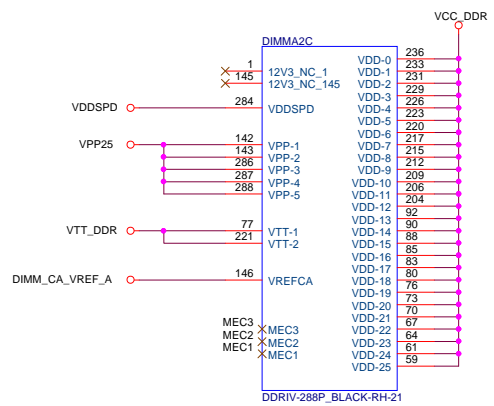
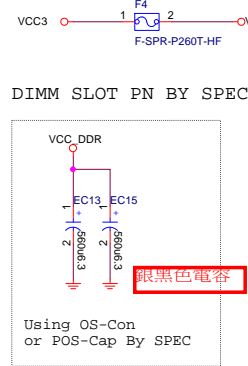
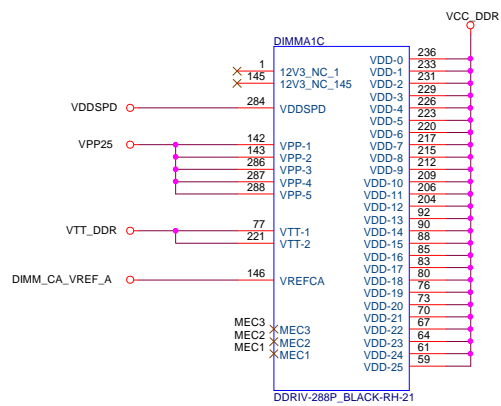
MICRO-STAR INT'L CO.,LTD			
MS-7B54			
Size	Document Description	Rev	
Custom	CPU-Control/MISC/CFG/Audio	1.0	
Date:	Monday, September 04, 2017	Sheet	5 of 65

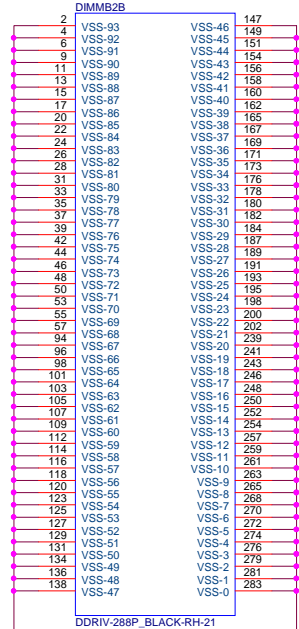
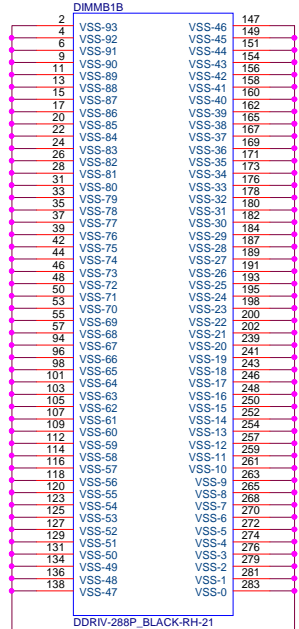
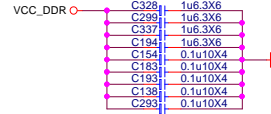
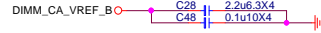
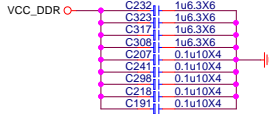
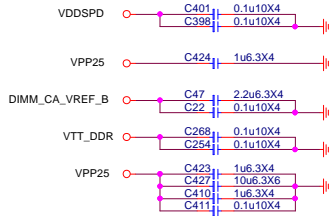
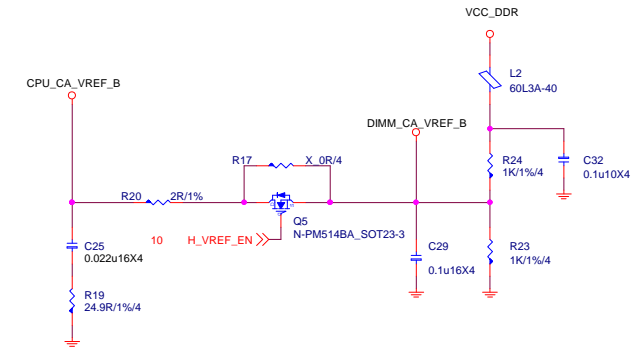
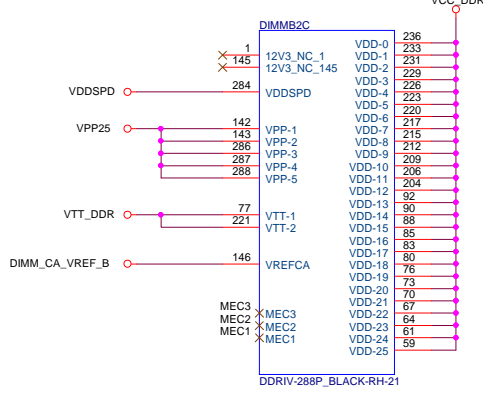
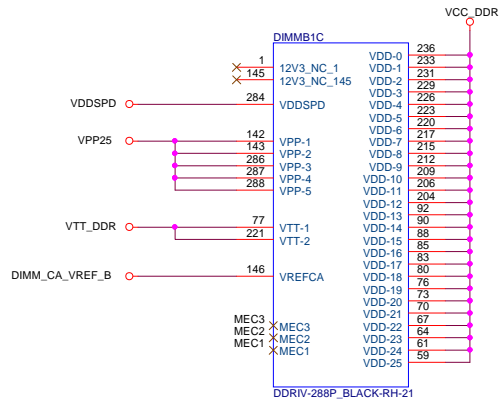


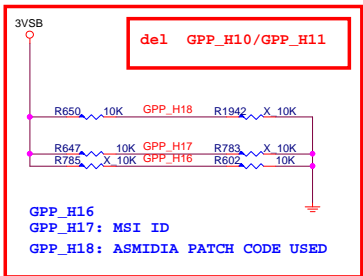
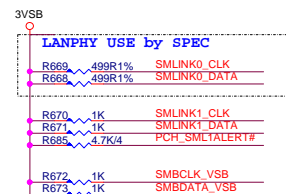




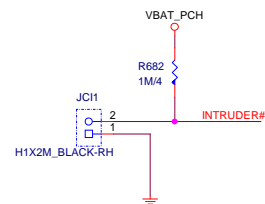




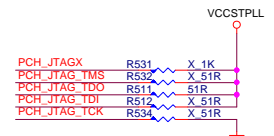
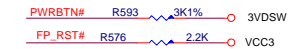
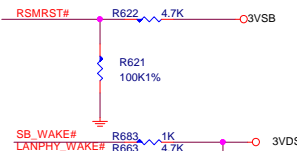
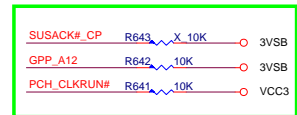
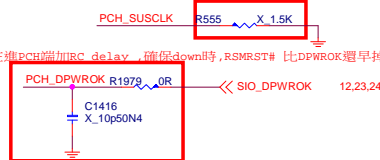
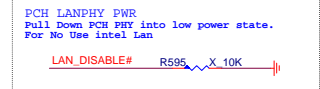
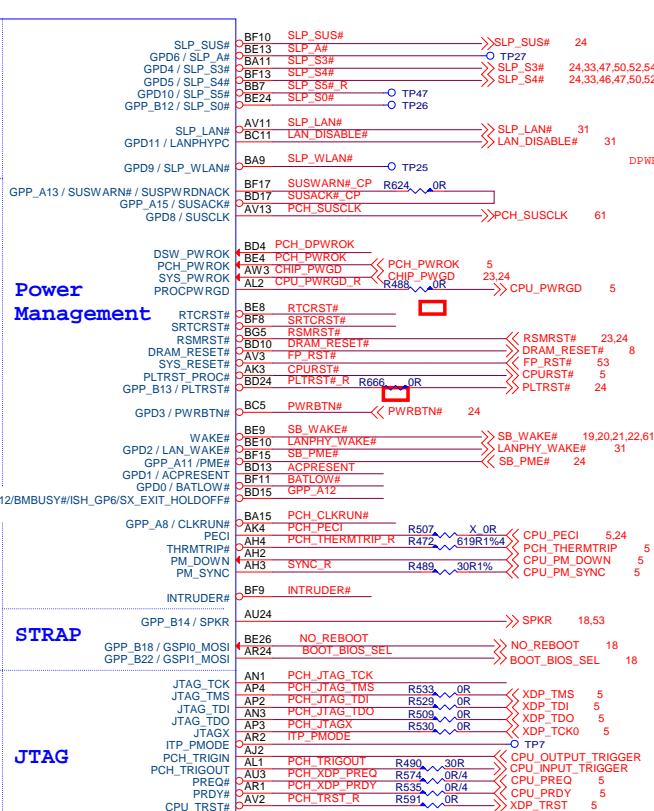
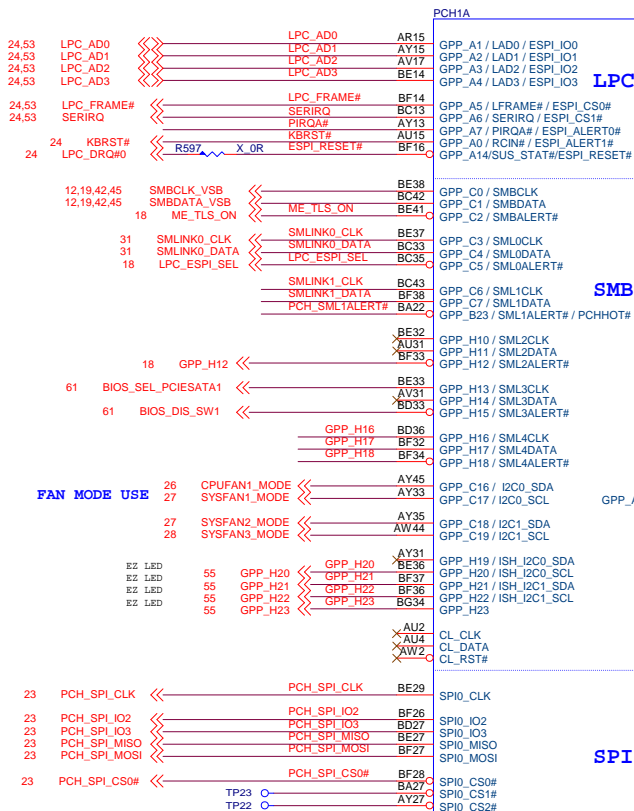
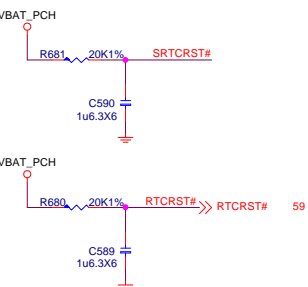




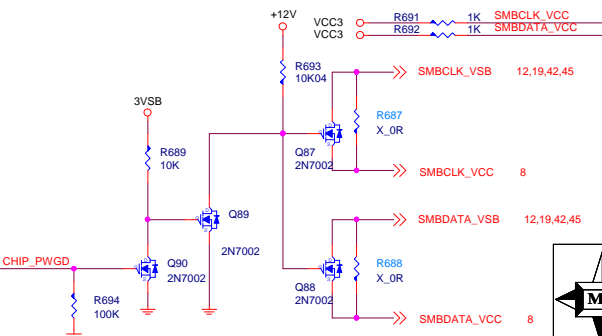
Chassis Intrusion



RTC

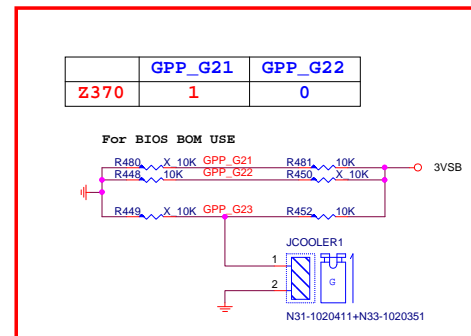
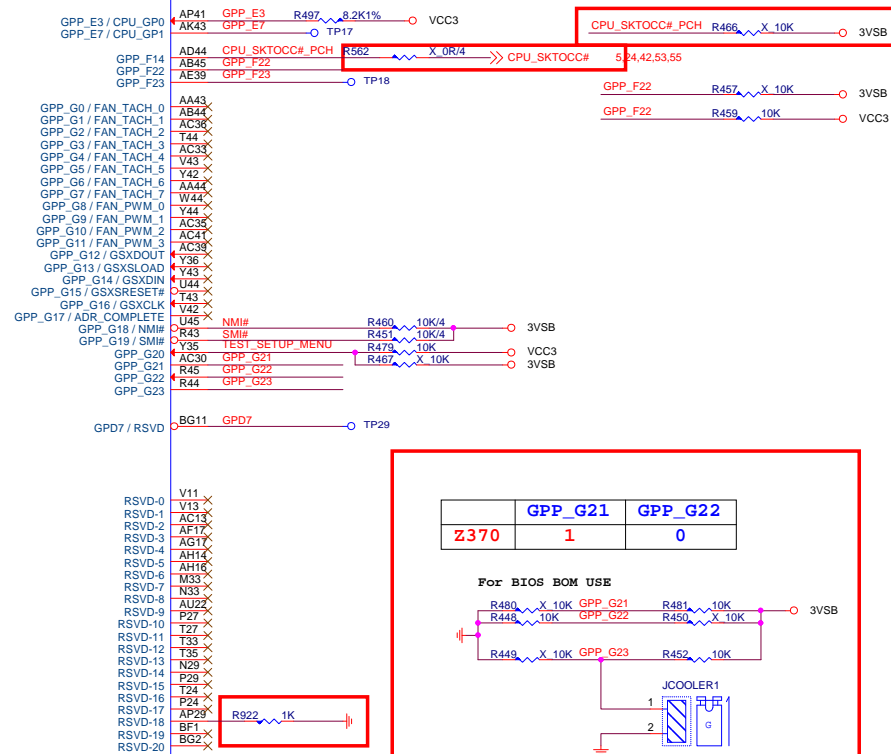


擺在一起 (注意到所有的SMBUS的分枝)



MICRO-STAR INT'L CO.,LTD		
MS-7B54		
Size Custom	Document Description	Rev 1.0
PCH - LPC/SPI/SMBUS/MISC		
Date: Monday, September 04, 2017	Sheet 12	of 65

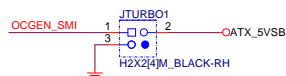
GPIO



	GPP_G23	for SPB SKU
水冷	0	
氣冷	1	拿掉跳帽

拿掉跳帽

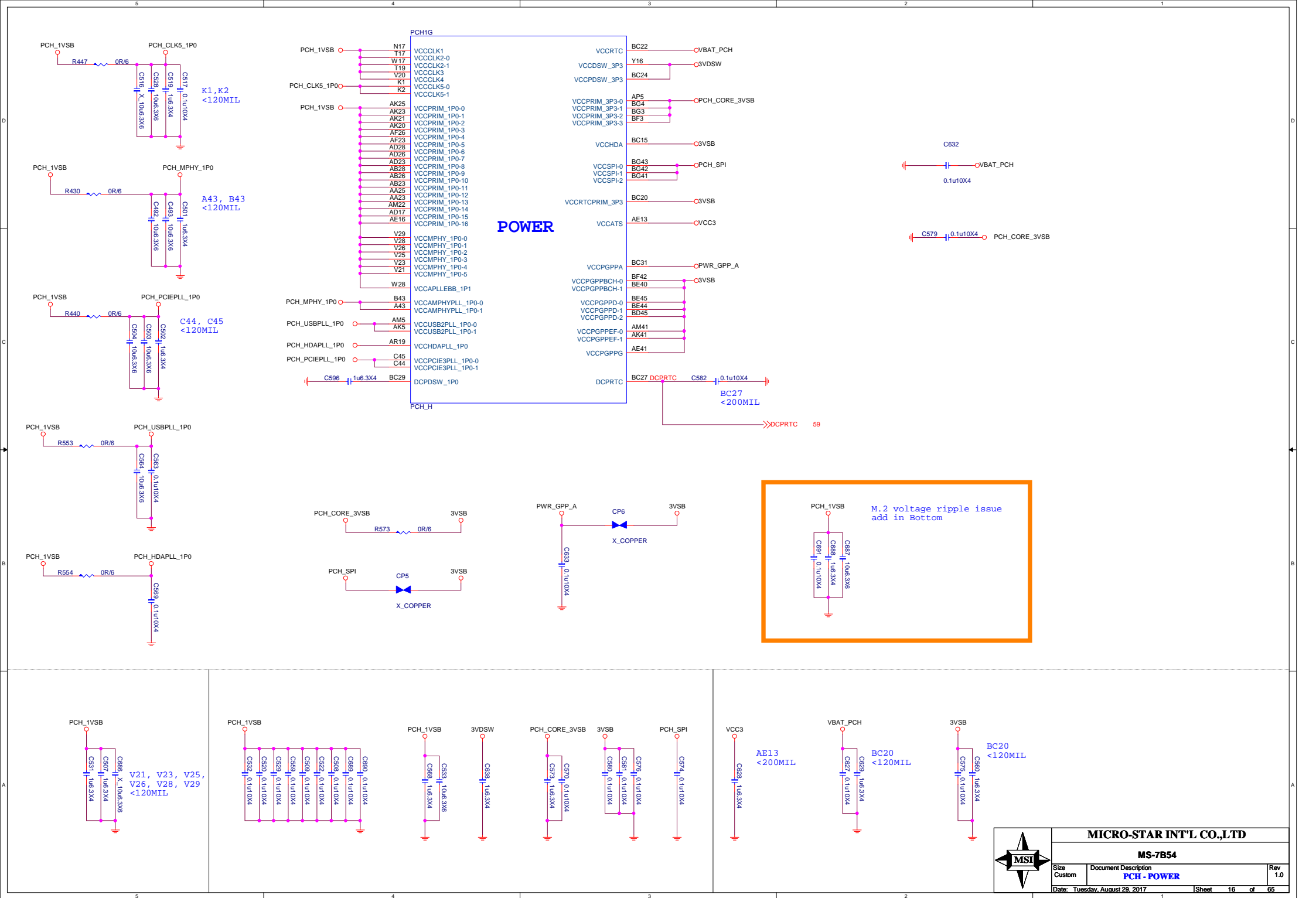
External Turbo switch pin header



MICRO-STAR INT'L CO.,LTD

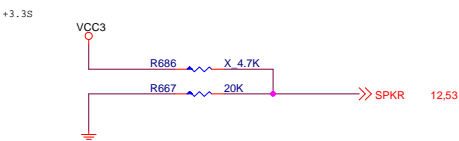
MS-7B54

Size Custom	Document Description PCH - GPIO/RSVD	Rev 1.0
Date: Monday, September 04, 2017		Sheet 15 of 65



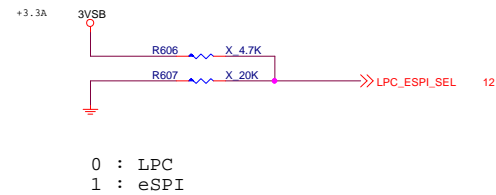
VSS

TOP Swap



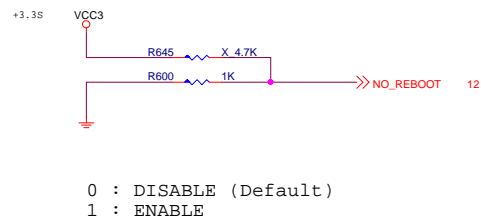
Internal pull-down is disabled after PLTRST#

LPC eSPI Mode



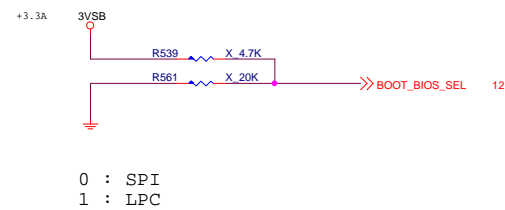
Internal pull-down is disabled after RSMRST

No Reboot



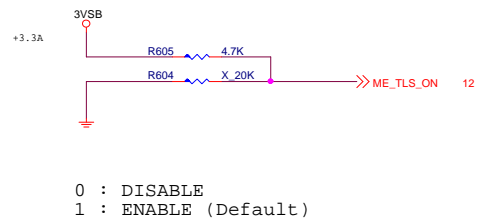
Internal pull-down is disabled after PLTRST#

Boot BIOS



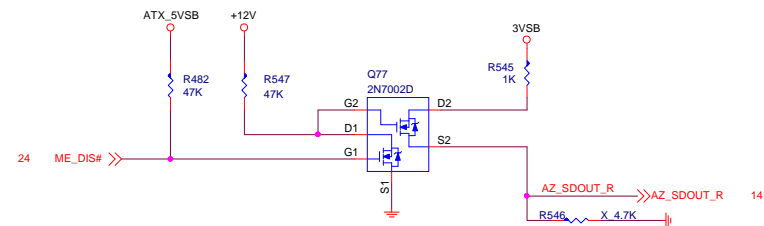
Internal pull-down is disabled after PLTRST

AMT and SBA with confidentiality

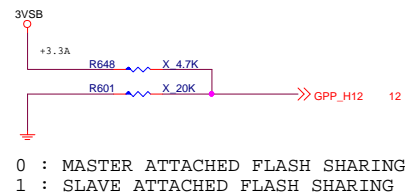


Internal pull-down is disabled after RSMRST

HDA_SDO



ESPI FLASH SHARING MODE



Internal pull-down is disabled after RSMRST



MICRO-STAR INT'L CO.,LTD		
MS-7B54		
Size Custom	Document Description PCH - Strap	Rev 1.0
Date: Tuesday, August 29, 2017		Sheet 18 of 65

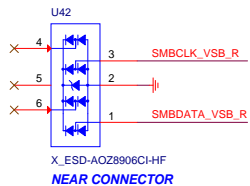
12V - 5.5A
VCC3 - 3A
3VSBV - 375mA

D

C

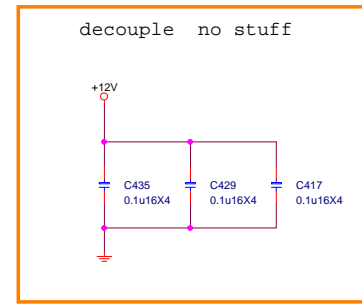
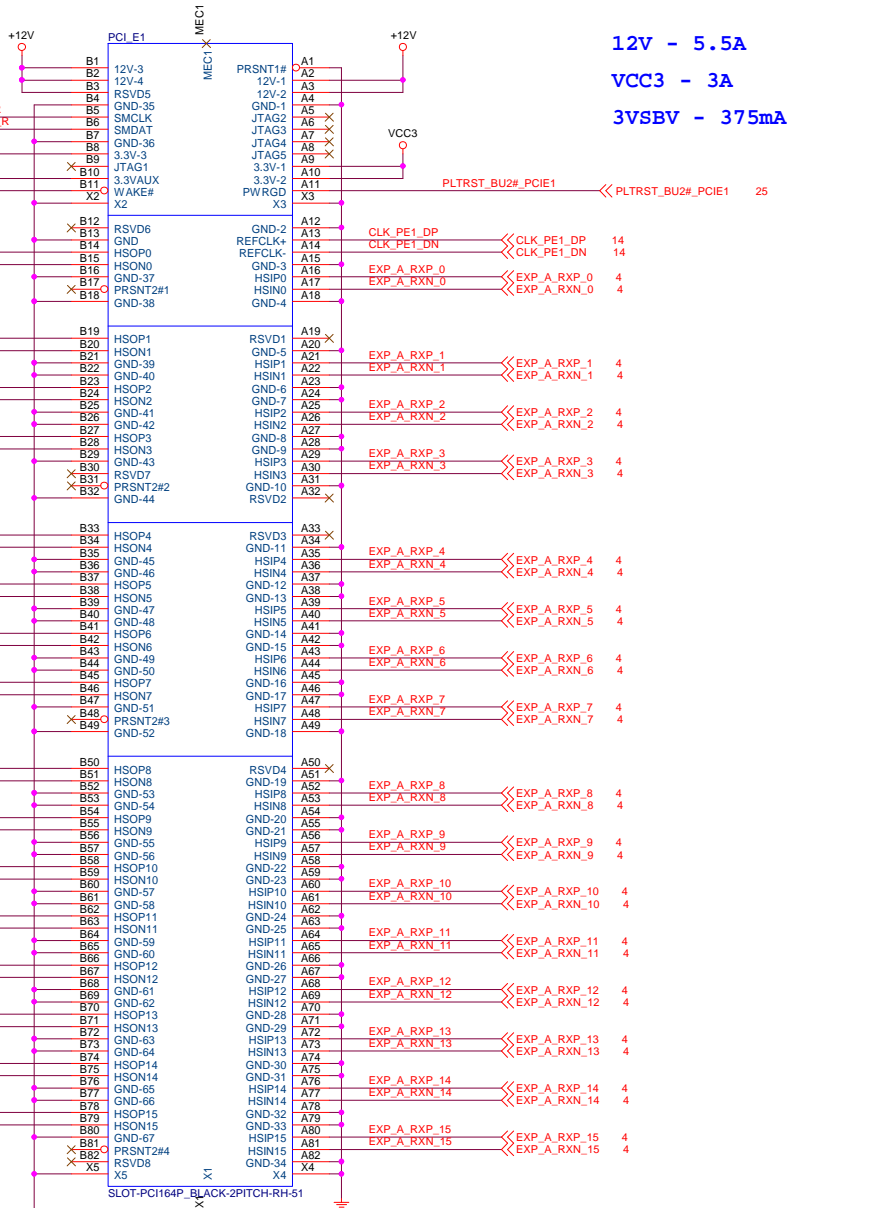
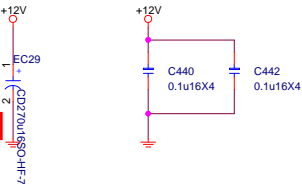
B

1



銀黑色電容

Near PCI_E1

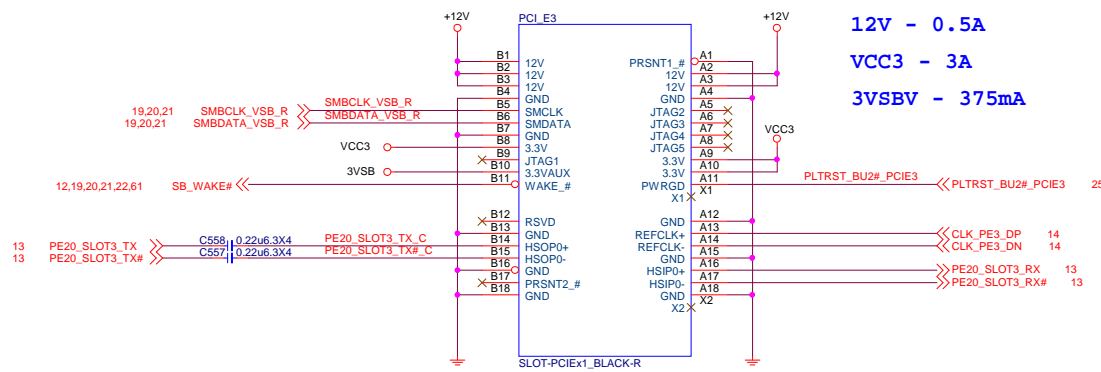
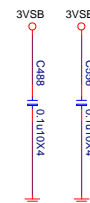
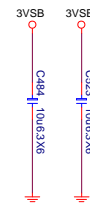
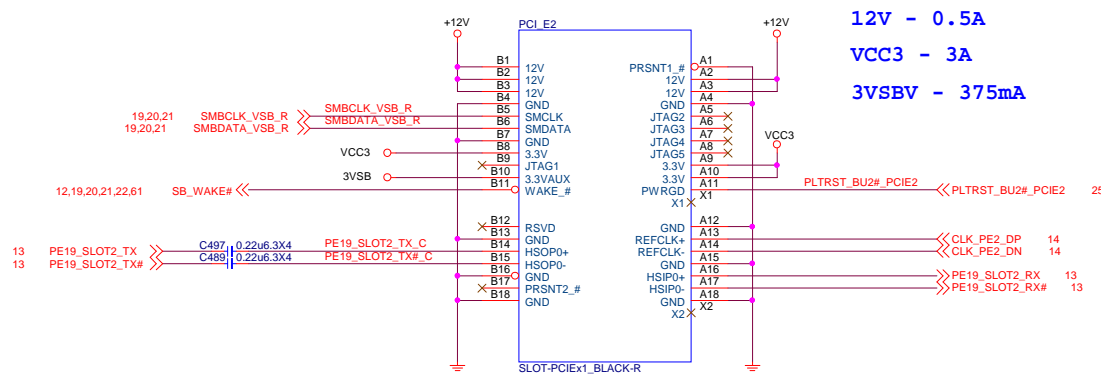


MICRO-STAR INT'L CO.,LTD

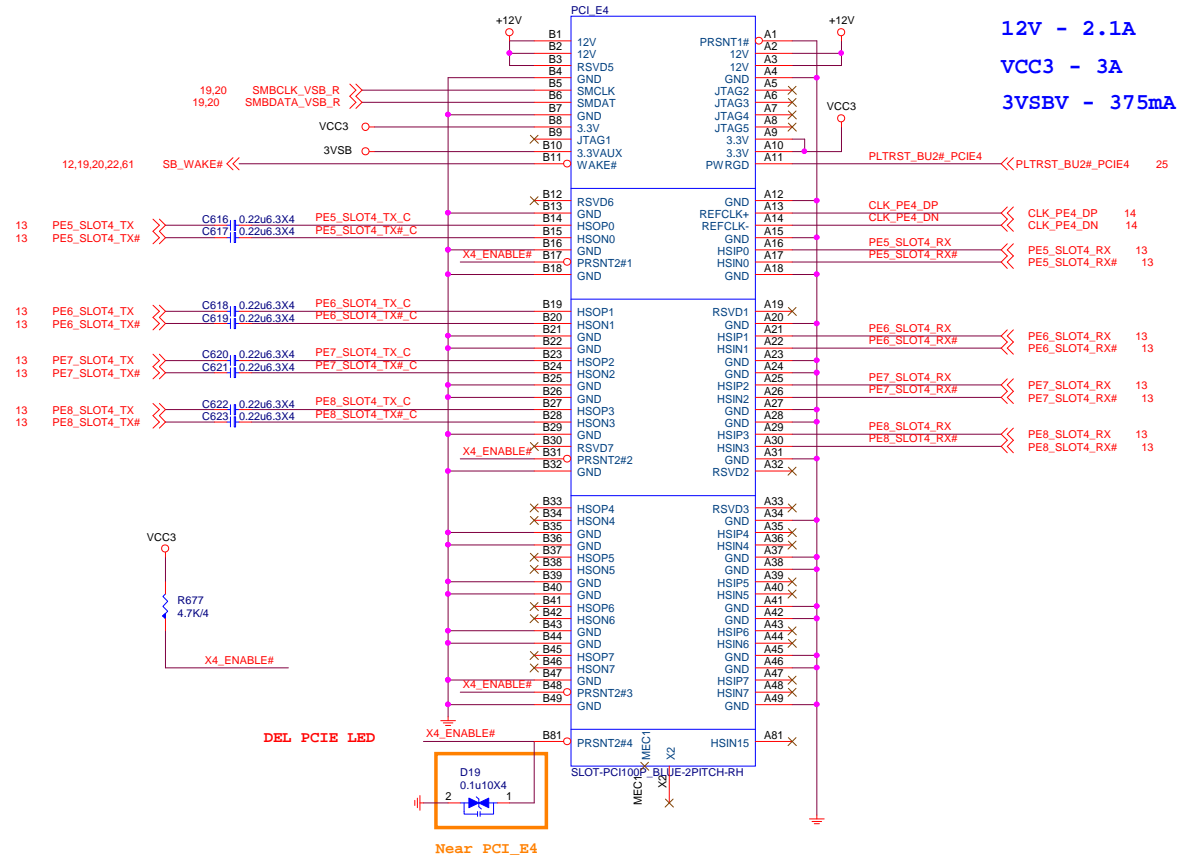
MS-7B54

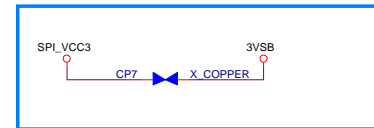
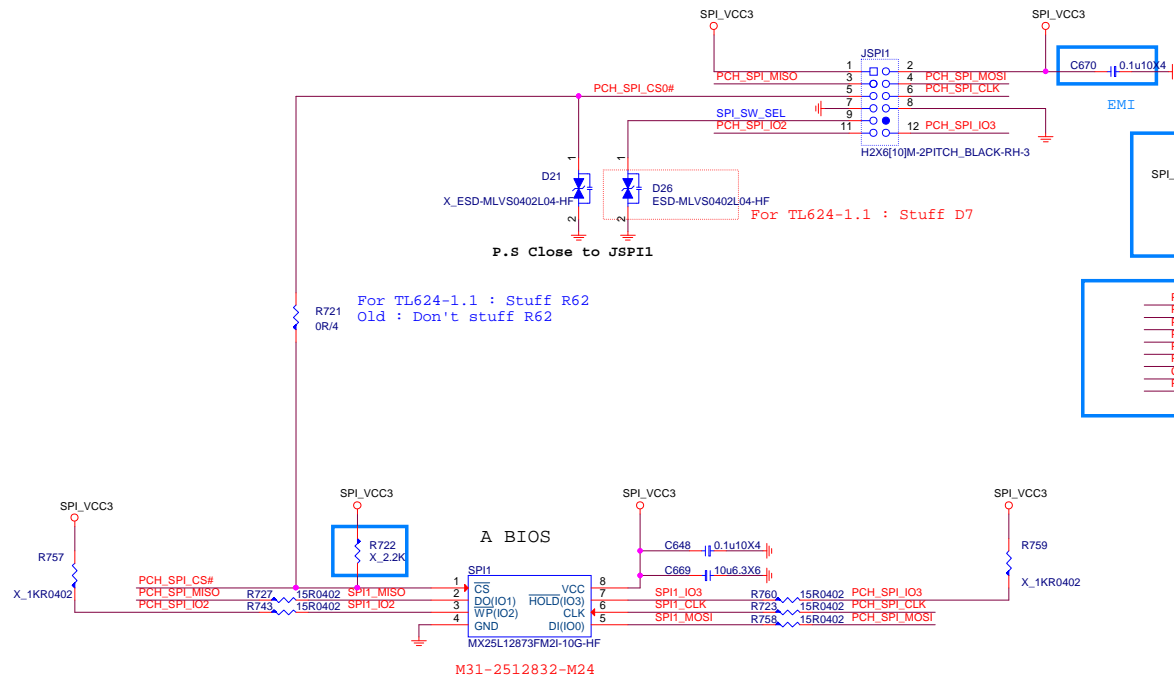
Size Custom	Document Description PCIe SLOT (X16)	Rev 1.0
Date: Tuesday, August 29, 2017		Sheet 19 of 65

PCI Express X1 Slot



PCI Express X4 Slot

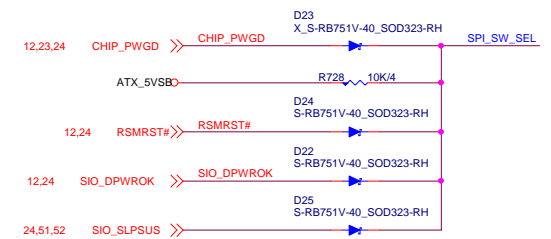




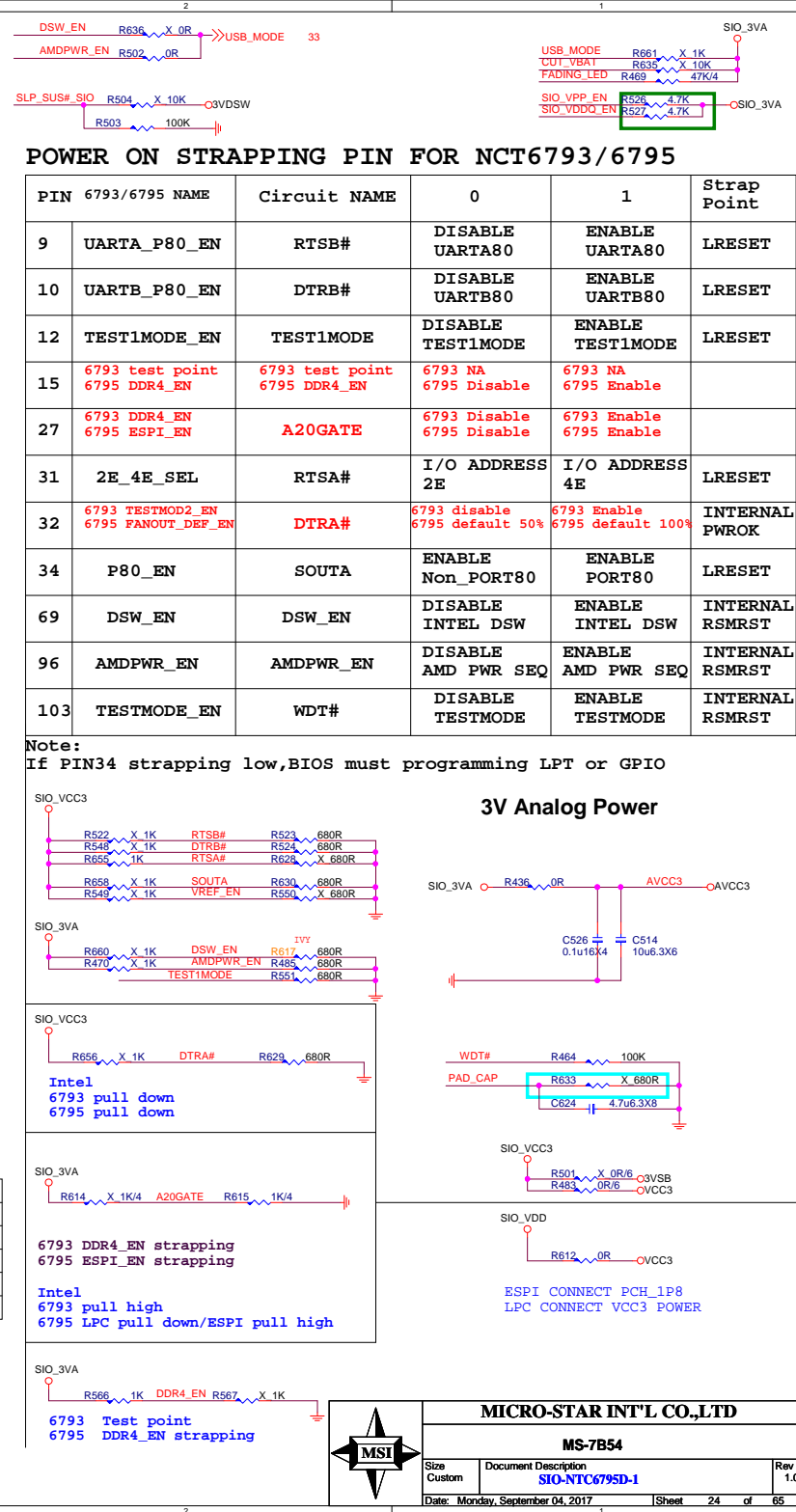
PCH_SPI_CS#	PCH_SPI_CS#	12
PCH_SPI_CLK	PCH_SPI_CLK	12
PCH_SPI_MISO	PCH_SPI_MISO	12
PCH_SPI_MOSI	PCH_SPI_MOSI	12
PCH_SPI_IO2	PCH_SPI_IO2	12
PCH_SPI_IO3	PCH_SPI_IO3	12
CHIP_PWGD	CHIP_PWGD	12,23,24
PCH_PWROK	PCH_PWROK	5,12

Module Stuff CHIP_PWGD,
But PCH_PWROK may ramp up before CHIP_PWGD.

For TL624 1.1



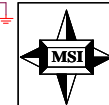
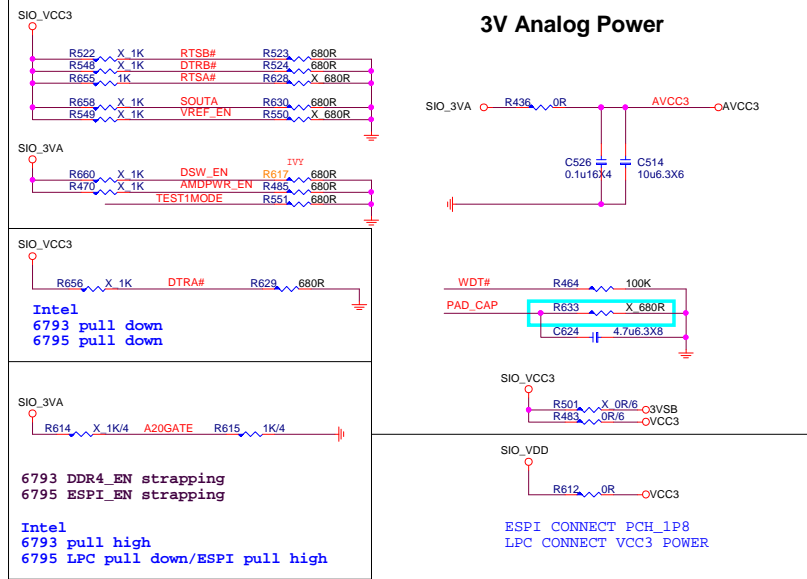
For TL624-1.1
SKYLAKE : Stuff D10/D17/R353
B85/H87 : Stuff D8/D9/R353
Others : Stuff R272



PIN 6793/6795 NAME		Circuit NAME	0	1	Strap Point
9	UARTA_P80_EN	RTSB#	DISABLE UARTA80	ENABLE UARTA80	LRESET
10	UARTB_P80_EN	DTRB#	DISABLE UARTB80	ENABLE UARTB80	LRESET
12	TEST1MODE_EN	TEST1MODE	DISABLE TEST1MODE	ENABLE TEST1MODE	LRESET
15	6793 test point 6795 DDR4_EN	6793 test point 6795 DDR4_EN	6793 NA 6795 Disable	6793 NA 6795 Enable	
27	6793 DDR4_EN 6795 ESPI_EN	A20GATE	6793 Disable 6795 Disable	6793 Enable 6795 Enable	
31	2E_4E_SEL	RTSA#	I/O ADDRESS 2E	I/O ADDRESS 4E	LRESET
32	6793 TESTMOD2_EN 6795 FANOUT_DEF_EN	DTRA#	6793 disable 6795 default 50%	6793 Enable 6795 default 100%	INTERNAL PWROK
34	P80_EN	SOUTA	ENABLE Non_PORT80	ENABLE PORT80	LRESET
69	DSW_EN	DSW_EN	DISABLE INTEL DSW	ENABLE INTEL DSW	INTERNAL RSMRST
96	AMDPWR_EN	AMDPWR_EN	DISABLE AMD PWR SEQ	ENABLE AMD PWR SEQ	INTERNAL RSMRST
103	TESTMODE_EN	WDT#	DISABLE TESTMODE	ENABLE TESTMODE	INTERNAL RSMRST

Note:
If PIN34 strapping low, BIOS must programming LPT or GPIO

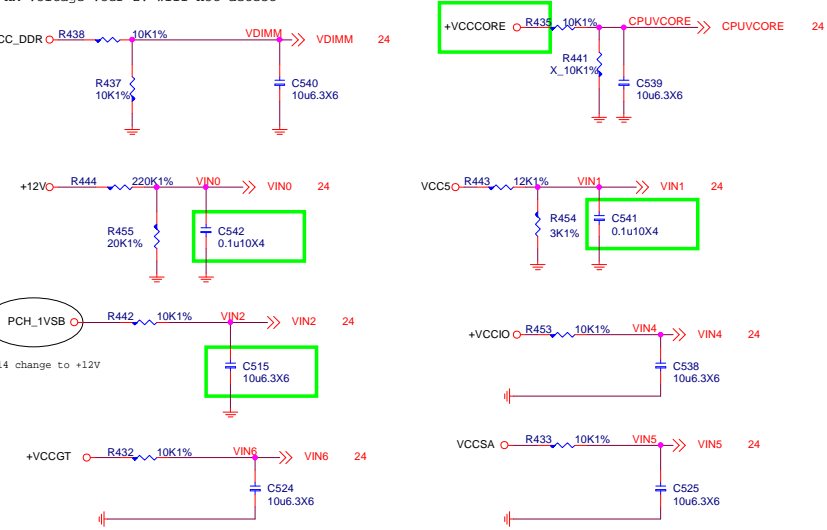
3V Analog Power



MICRO-STAR INT'L CO.,LTD			
MS-7B54			
Size Custom	Document Description SIO-NTC6795D-1	Rev 1.6	
Date: Monday, September 04, 2017		Sheet	24 of 65

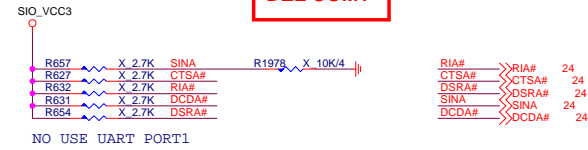
HW Monitor - Voltage

SIO HM Voltage voer 2V will not detect



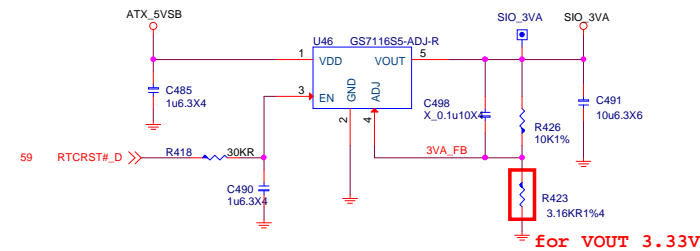
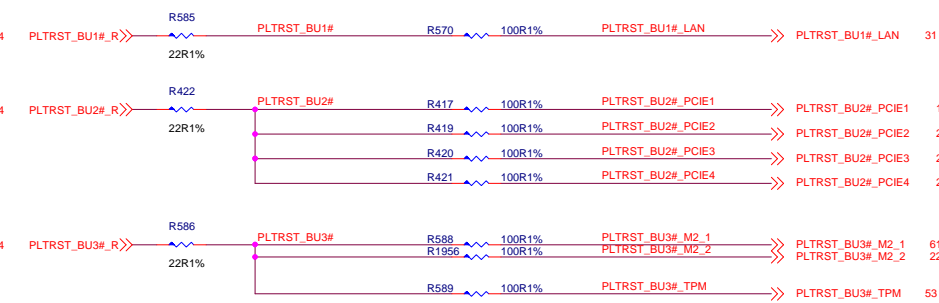
SERIAL PORT 1

DEL COM1



PARALLAL PORT

Thermal Monitor

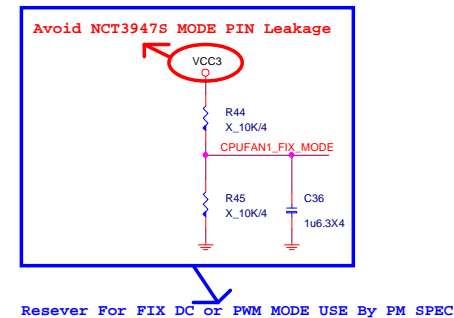


MICRO-STAR INT'L CO.,LTD

MS-7B54

Size	Document Description	Rev
Custom	SIO-NTC6795D-2	1.0
Date:	Tuesday, August 29, 2017	Sheet 25 of 65

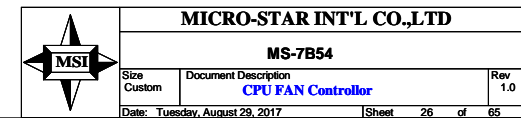
1. PWM/DC/OCF LED (現在是改成R/G/B3色LED)
2. GPIO可以由BIOS切換 PWM/DC MODE
3. OCF拉回GPIO給BIOS認
4. PWM OR DC FAN拉回GPIO給BIOS認
5. FAN轉速加快的時候由SOFTWARE 控制GPIO讓燈的變化



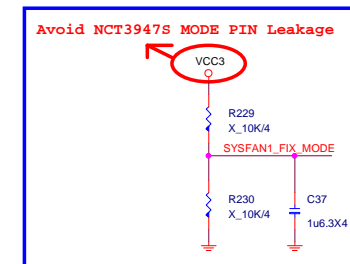
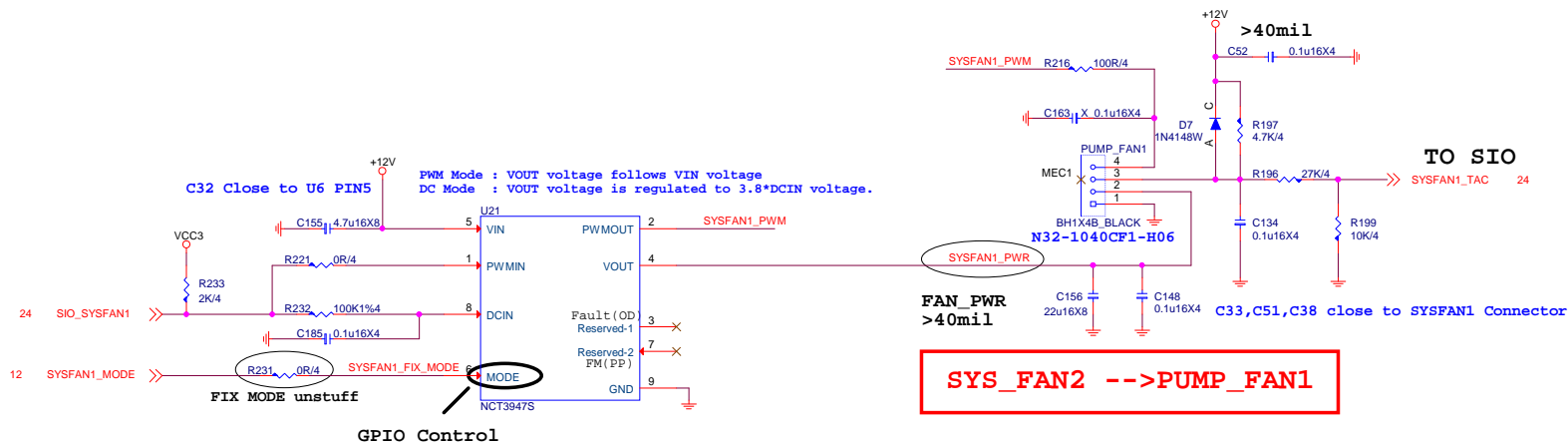
	MODE (PIN7)
PWM MODE	HIGH
DC MODE	LOW
AUTO MODE	GPIO(Floating)

Internall pull up 1.65V

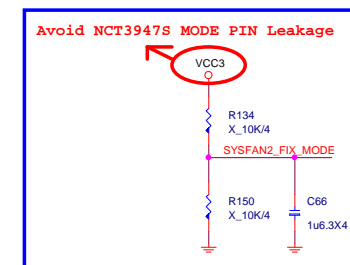
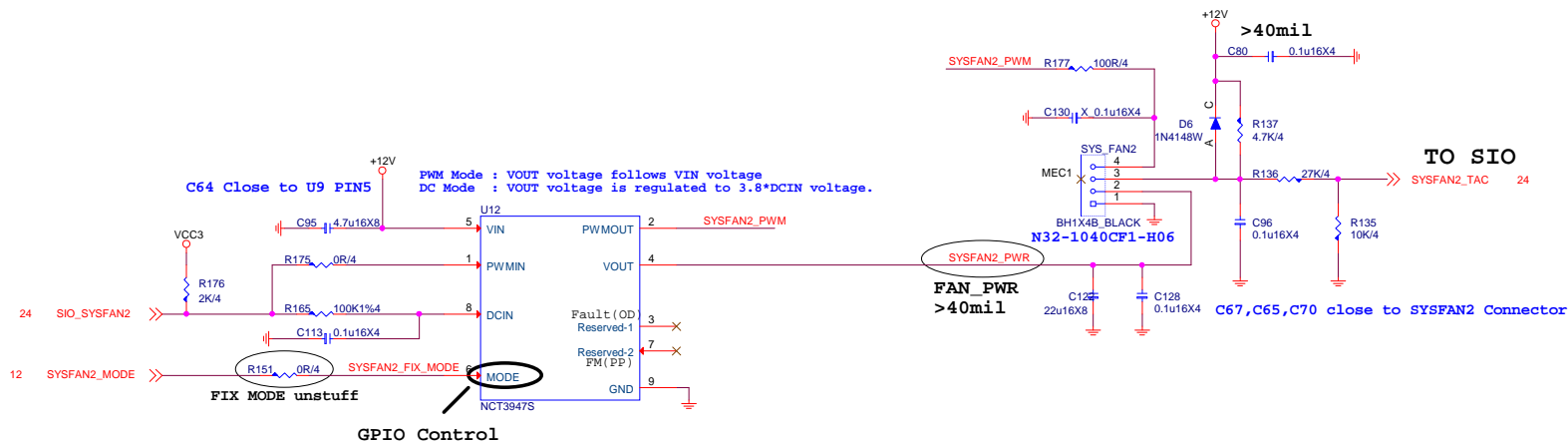
- 1.MODE : USE MODE PIN change FAN MODE(PWM or DC FAN)
2.FAULT : USE FAULT PIN Triger OVT/OC Protection,LOW Atcive (Reserve NEW IC)
3.FM : USE FM PIN For BIOS USE to Detect PWM or DC FAN & Show information(Reserve NEW IC)



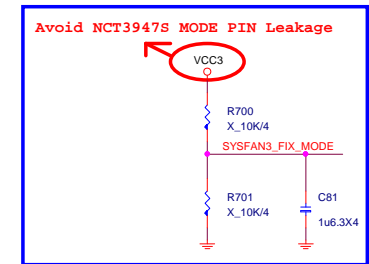
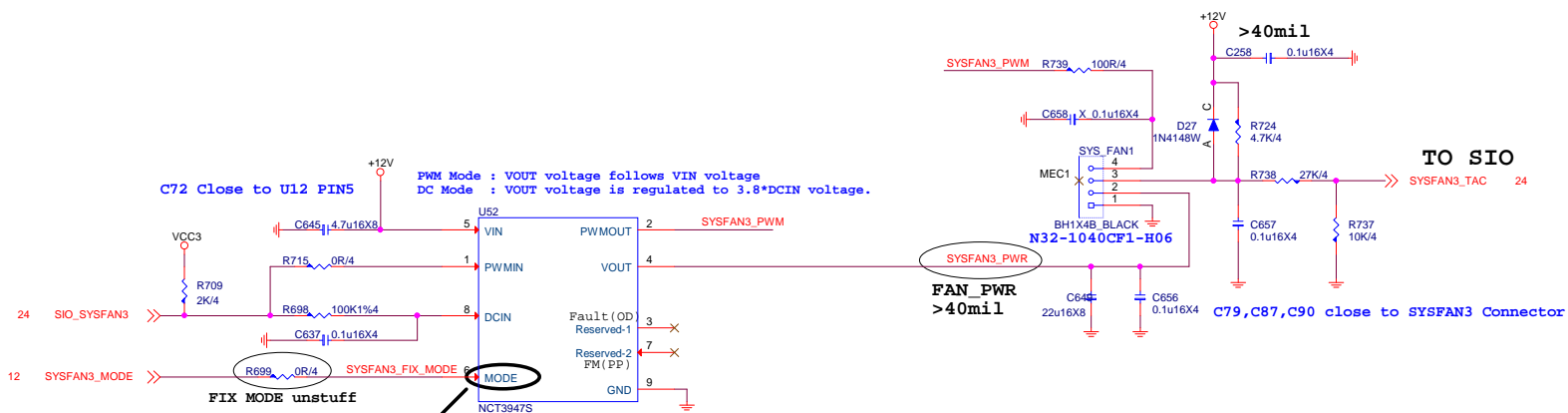
TYPE K : 4 PIN CPU FAN USE NCT3947S USE PCH GPIO CONTROL FAN MODE



TYPE K : 4 PIN CPU FAN USE NCT3947S USE PCH GPIO CONTROL FAN MODE




```
TYPE K : 4 PIN CPU FAN USE NCT3947S USE PCH GPIO CONTROL FAN MODE
```

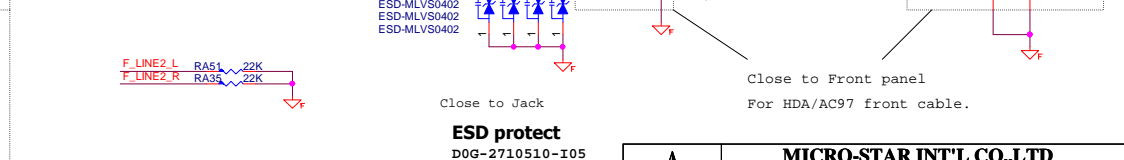
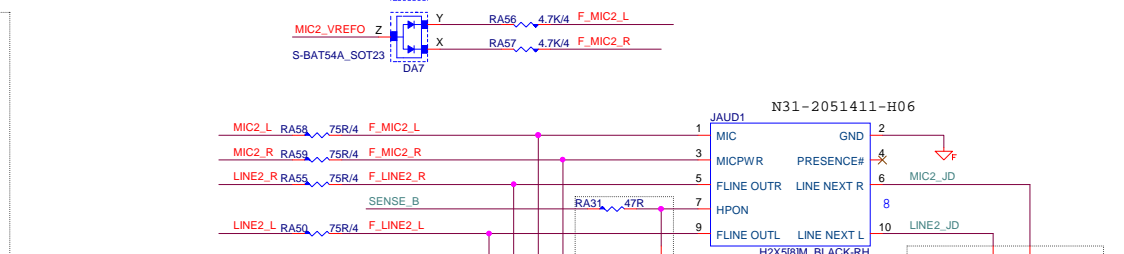
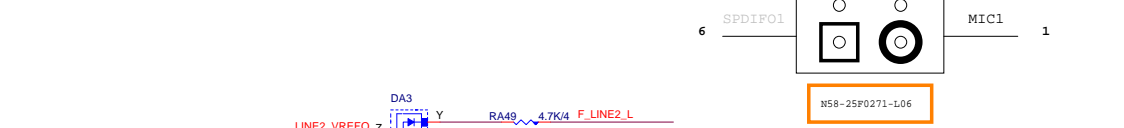
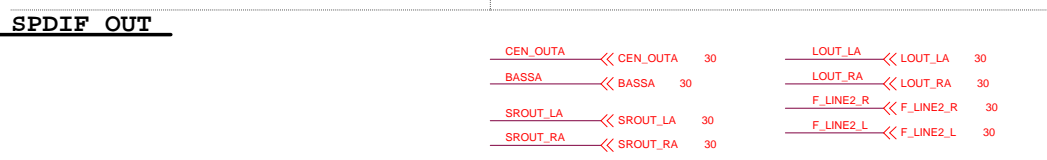
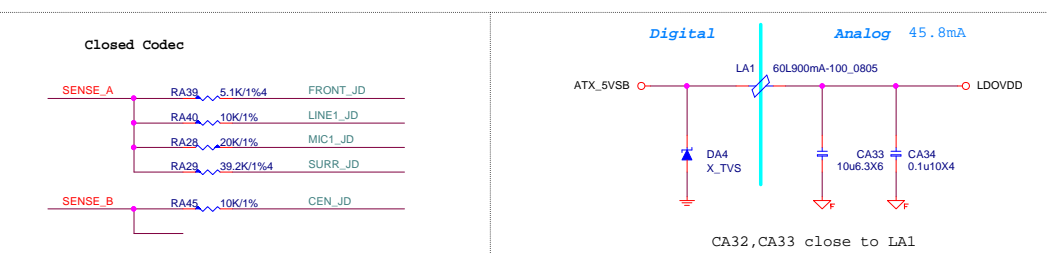
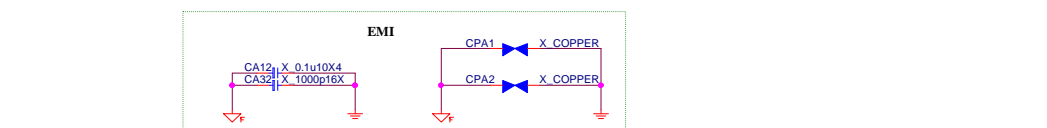
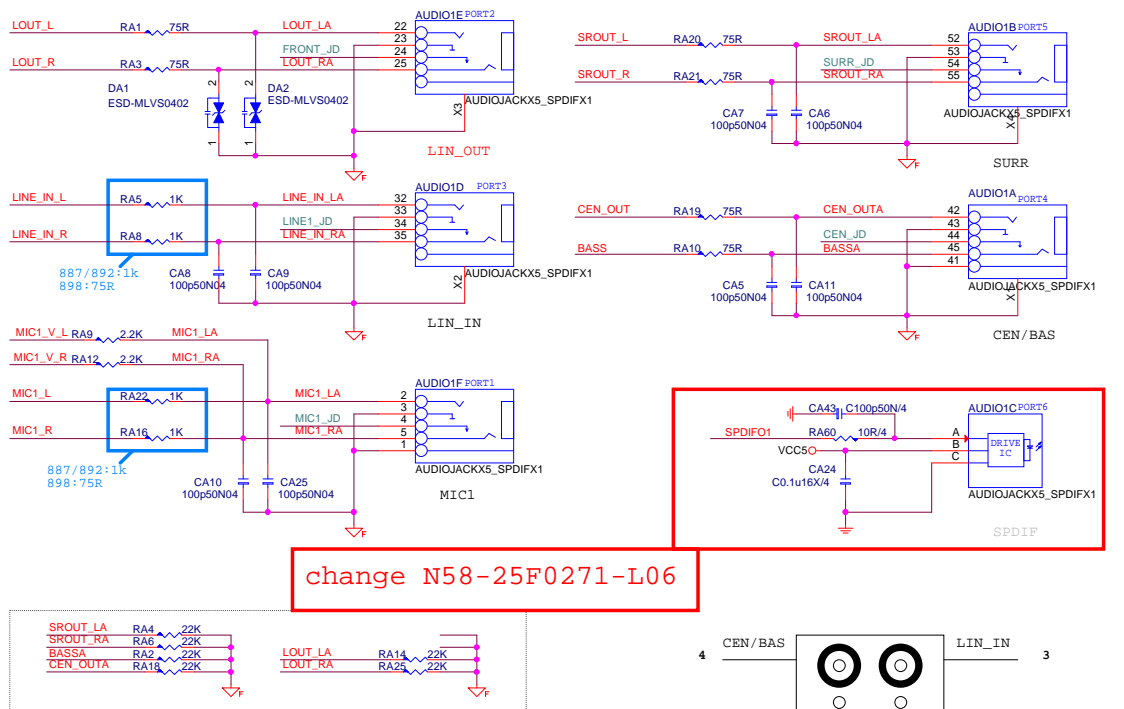
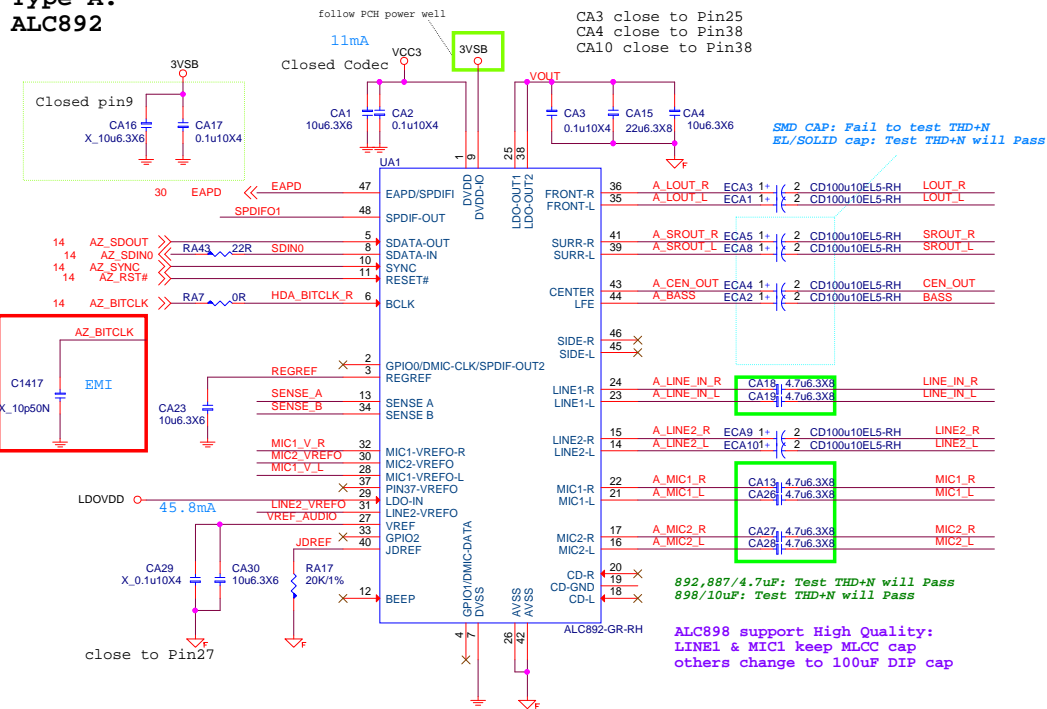


Resever For FIX DC or PWM MODE USE By PM SPEC

GPIO Control	
	MODE(PIN7)
	PWM MODE HIGH
	DC MODE LOW
Default	AUTO MODE GPIO(Floating)

Internall pull up 1.65V

Type A: ALC892

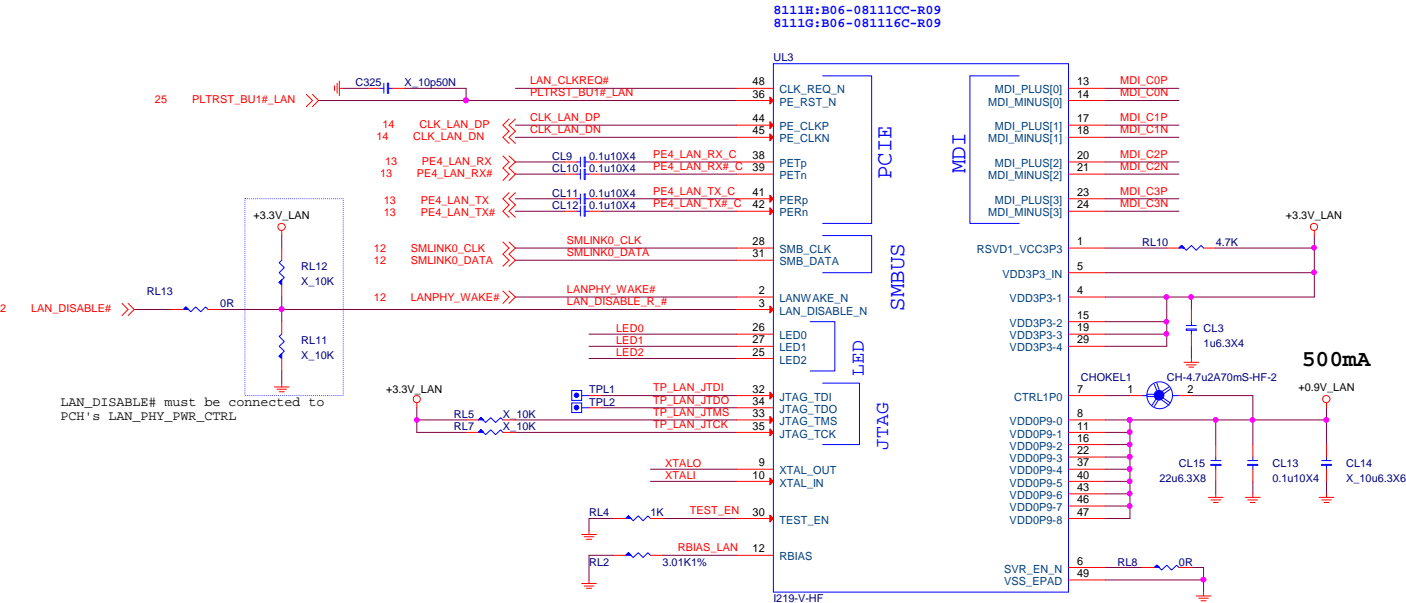


(De-pop circuit for Rear Line out & Front Headphone out)

Daniel 1k-->0 ohm



Intel Lan - I219

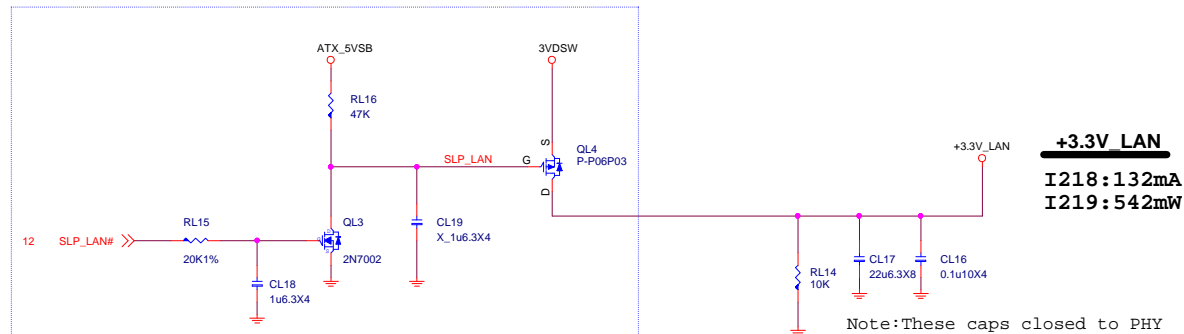


PCH's PCIECLKRQ<n> port must be mapped to PCH's PET/R<n+1>port. If CLK_REQ_N is not used, pin48 is pulled up 10KR to 3.3V_LAN

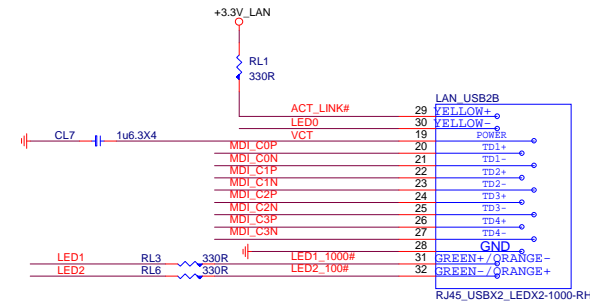


The 10Kohm pull-up resistor (RL18) of CLK_REQ_N is connected to 3.3V Suspend/Core/etc. power well, depending on the power well of PCH's input PCIECLKRQ<n> buffer.

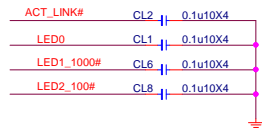
support WOL from Deep Sx:
Power source from 3VA (DSW power) & make sure MAX current is enough to support i218/i219.



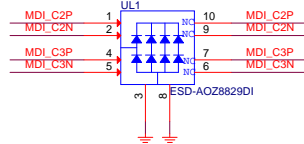
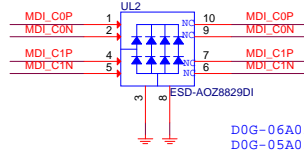
LAN Connector



For EMI



UL2&UL3 close to connector



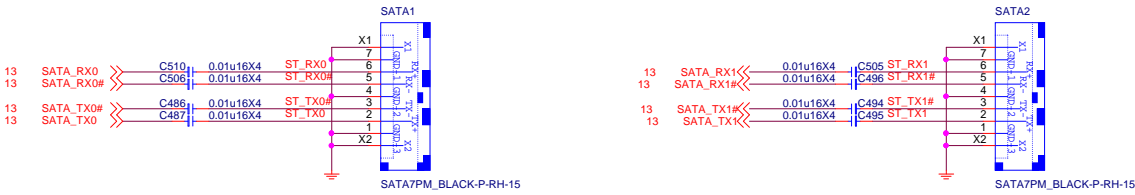
Do not pair MDI0 and MDI1 on the same TVS device (avoid LAN POE connecting issue). Other pairing combination is ok.



MICRO-STAR INT'L CO.,LTD		
MS-7B54		
Size	Document Description	Rev
Custom	Intel Lan - i219	1.0
Date: Tuesday, August 29, 2017		Sheet 31 of 65

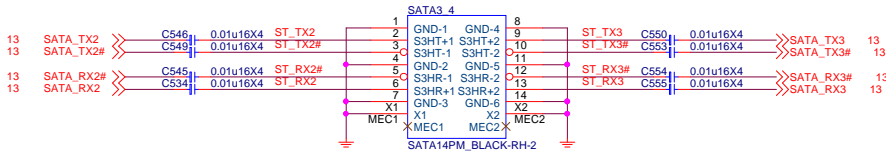
SATA 6G PORT 0,1

3.0 Black 180 degree



SATA 6G PORT 2,3

3.0 Black 90 degree

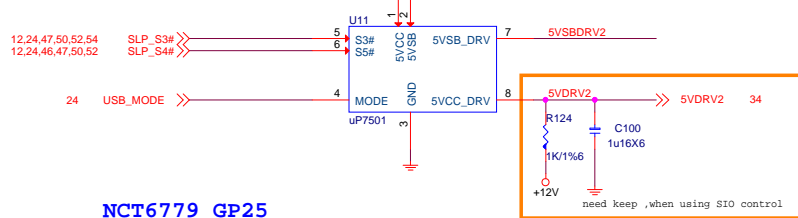


SATA 6G PORT 4,5

3.0 Black 90 degree

DEL SATA 5,6

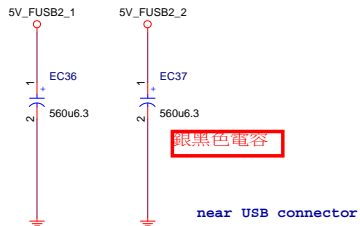
5VDUAL



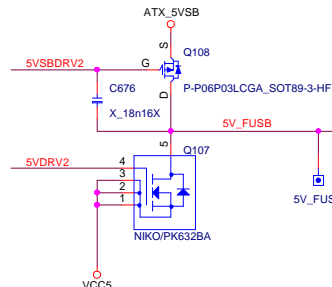
NCT6779 GP25

H:SUPPORT S0/S3/S5
L:SUPPORT S0/S3

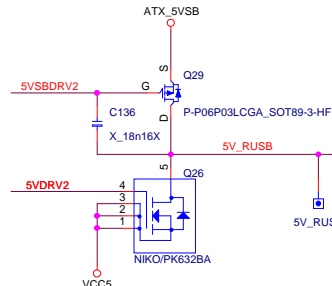
5VDRV2, 5VSBDRV2 width 12mil,
Do NOT route near the edge of a board.



銀黑色電容

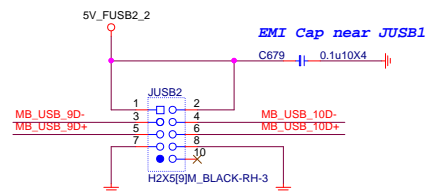
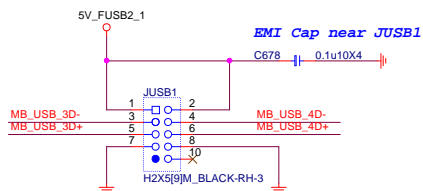
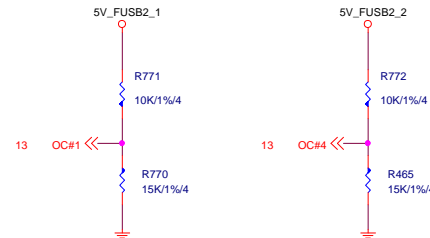
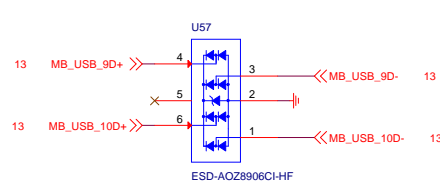
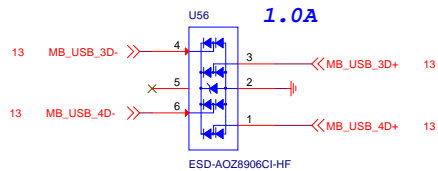
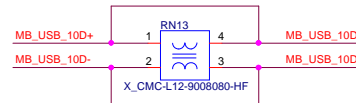
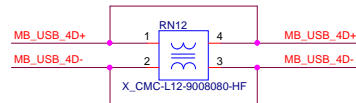
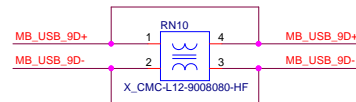
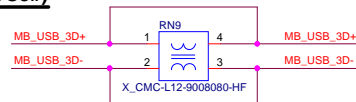


D08-2000400-P16 (Itrip=3.5A; 0.003ohm)
D08-0301000-P16 (Itrip=2.6A; 0.015ohm)



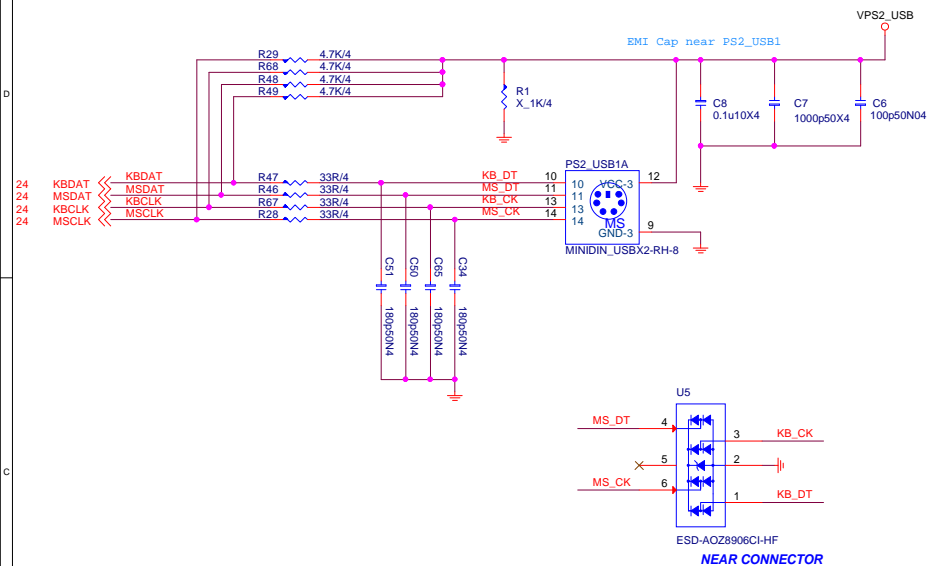
PS2_USB20
TYPE-A USB30
LAN_USB30

REAR USB PORT 3,4 (OC3#)

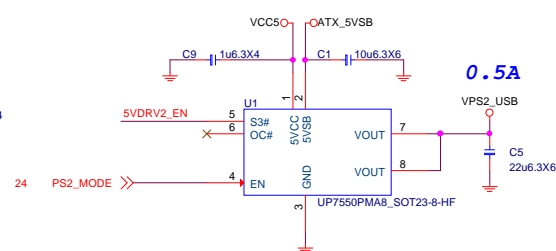


MICRO-STAR INT'L CO.,LTD		
MS-7B54		
Size Custom	Document Description	Rev 1.0
Date: Tuesday, August 29, 2017		Sheet 33 of 65

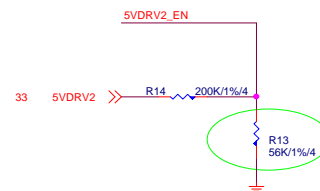
PS2 KEYBOARD & MOUSE CONNECTOR



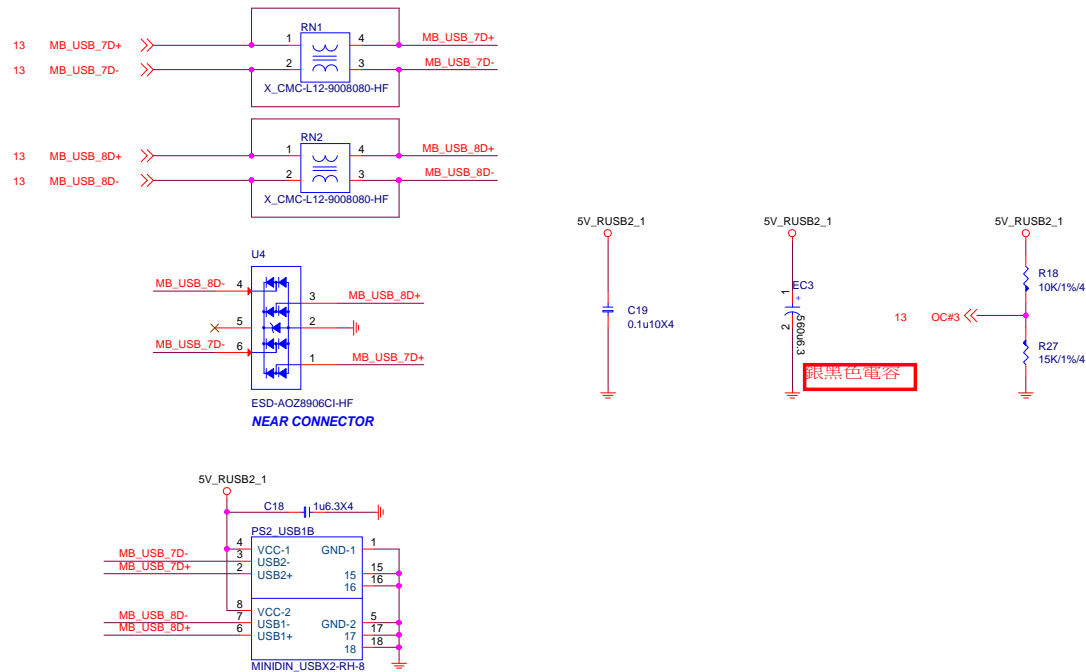
PS2 Power



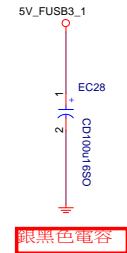
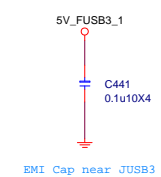
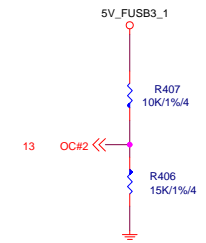
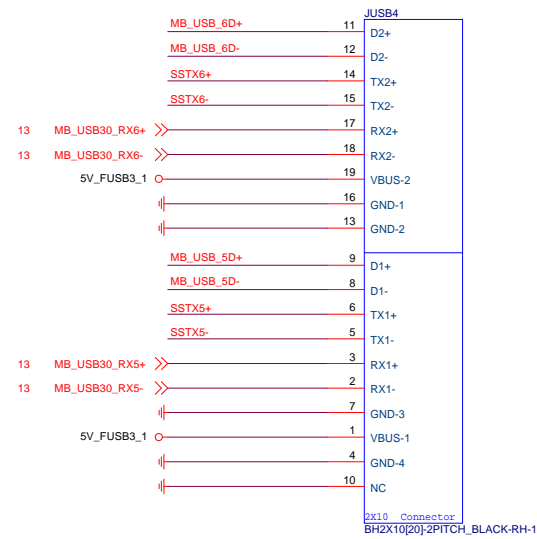
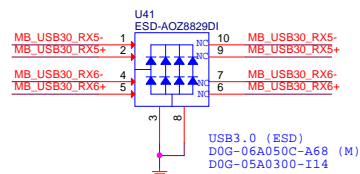
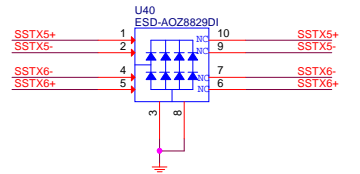
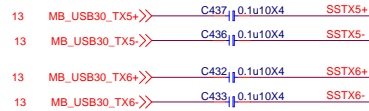
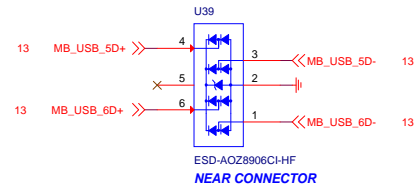
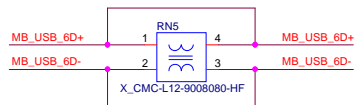
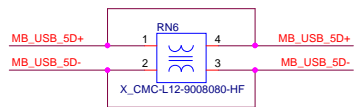
USB MODE



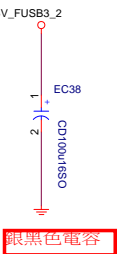
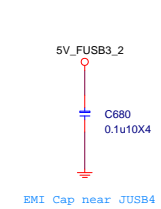
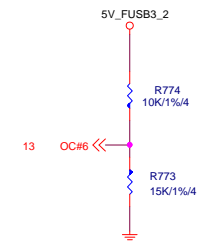
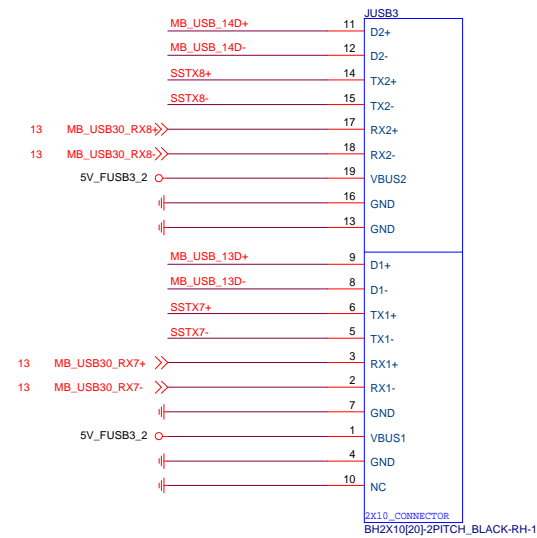
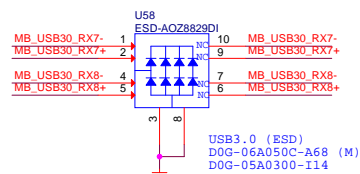
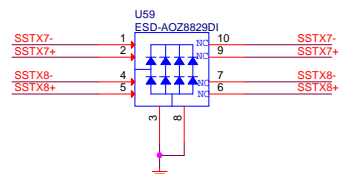
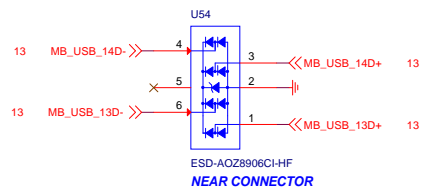
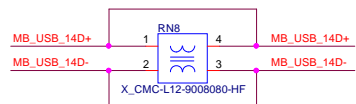
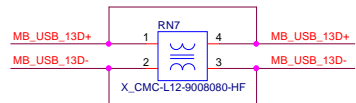
PS2_USB1



FRONT USB3.0 (OC2#)



FRONT USB3.0 (OC6#)

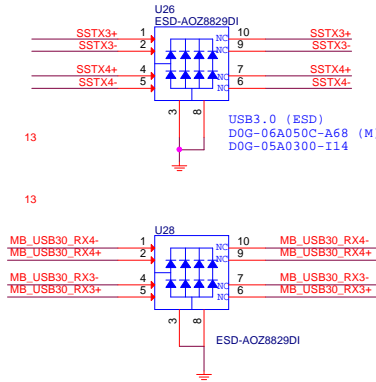
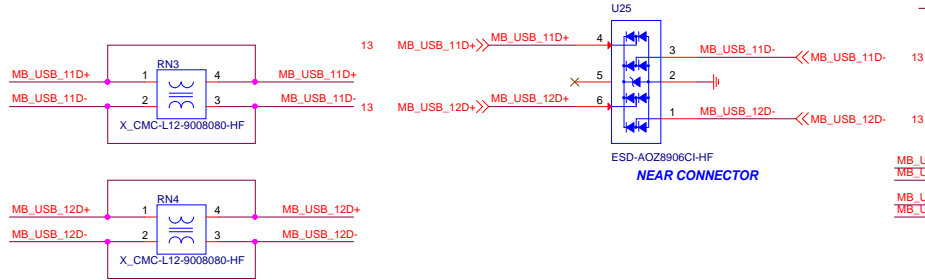


MICRO-STAR INT'L CO.,LTD

MS-7B54

Size Custom	Document Description USB3.0 Connector	Rev 1.0
Date: Tuesday, August 29, 2017		Sheet 35 of 65

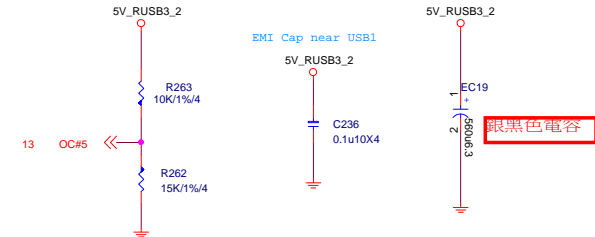
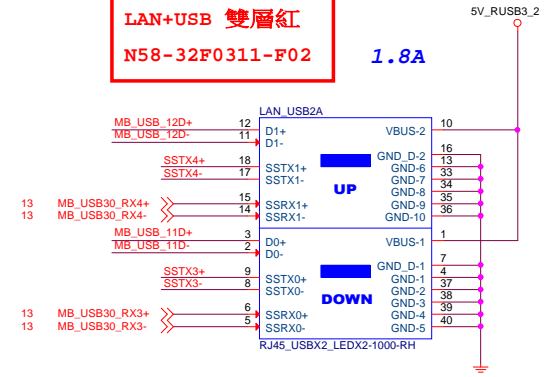
13 MB_USB30_TX3+ >>> C269 0.1u10X4 SSTX3+
13 MB_USB30_TX3- >>> C270 0.1u10X4 SSTX3-
13 MB_USB30_TX4+ >>> C286 0.1u10X4 SSTX4+
13 MB_USB30_TX4- >>> C287 0.1u10X4 SSTX4-



LAN+USB 雙層藍
N58-32F0291-F02

LAN+USB 雙層紅
N58-32F0311-F02

1.8A



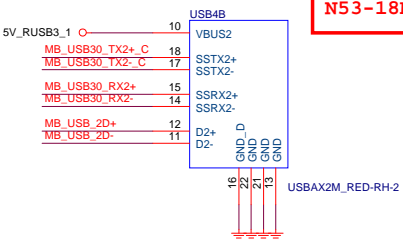
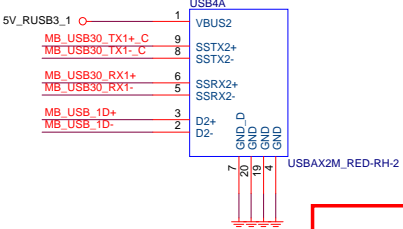
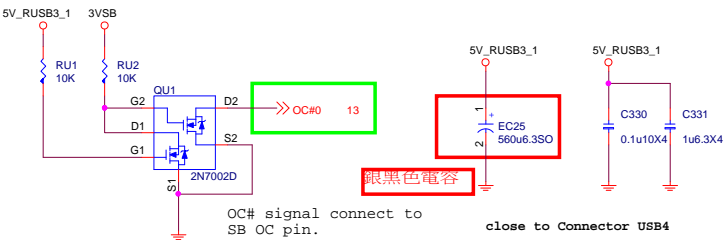
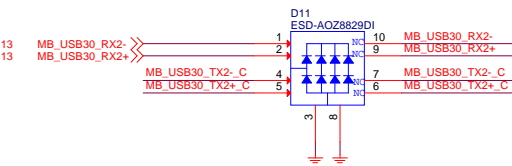
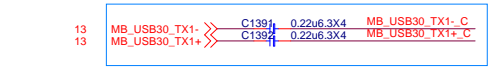
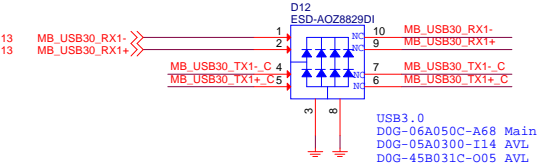
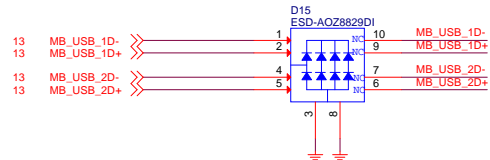
MICRO-STAR INT'L CO.,LTD

MS-7B54

Size	Document Description	Rev
Custom	LAN USB3.0 Connector	1.0
Date:	Tuesday, August 29, 2017	Sheet 36 of 65

TYPE-A


ESD Protection
NEAR CONNECTOR



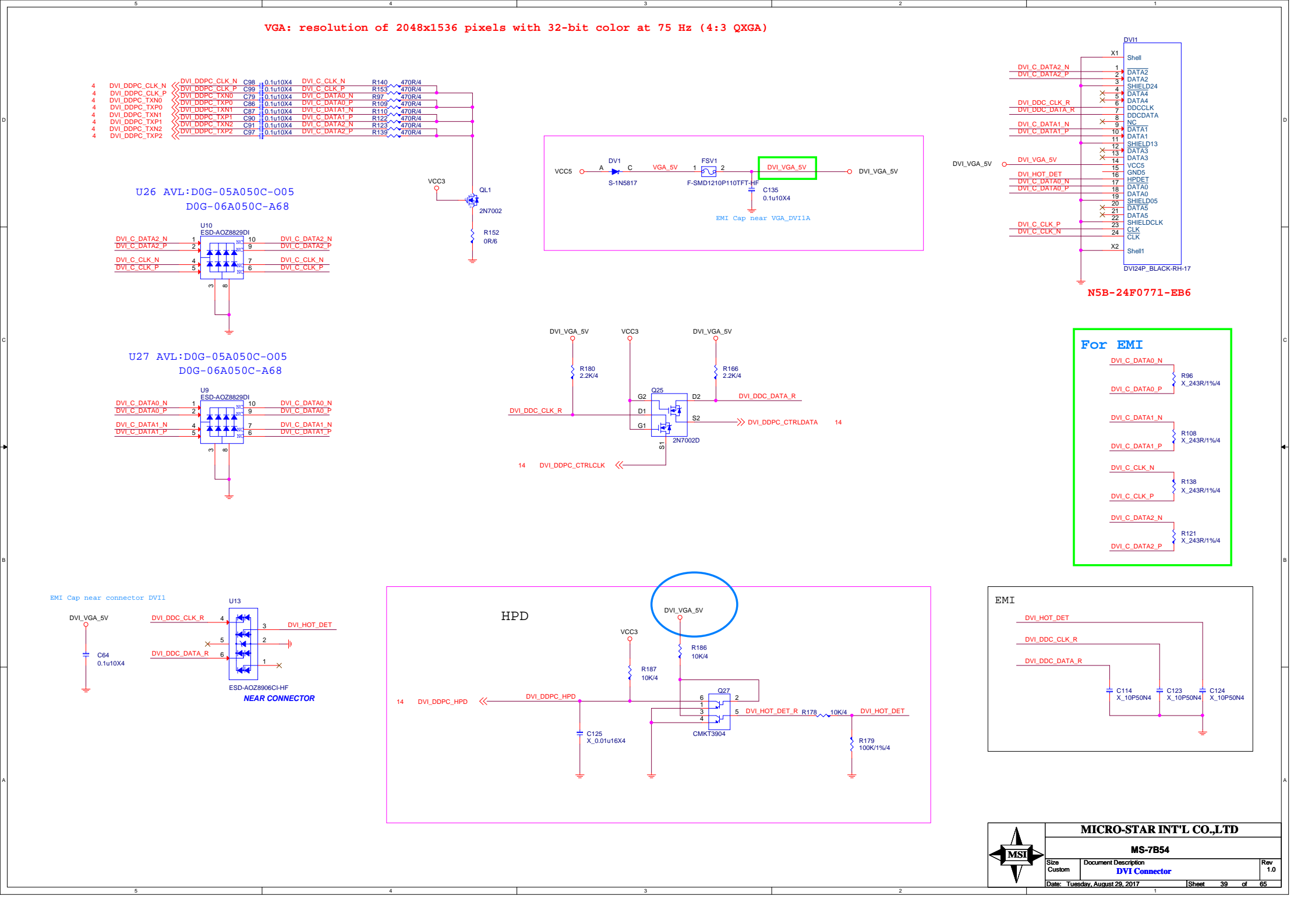
雙層藍
N53-18M0091-F02

雙層紅
N53-18M0201-L06

DEL EDP to VGA



MICRO-STAR INT'L CO.,LTD		
MS-7B54		
Size Custom	Document Description VGA - ITE6516	Rev 1.0
Date: Tuesday, August 29, 2017		Sheet 38 of 65



VGA: resolution of 2048x1536 pixels with 32-bit color at 75 Hz (4:3 QXGA)

U26 AVL:D0G-05A050C-005
D0G-06A050C-A68

U27 AVL:D0G-05A050C-005
D0G-06A050C-A68

EMI Cap near connector DV11

HPD

For EMI

EMI

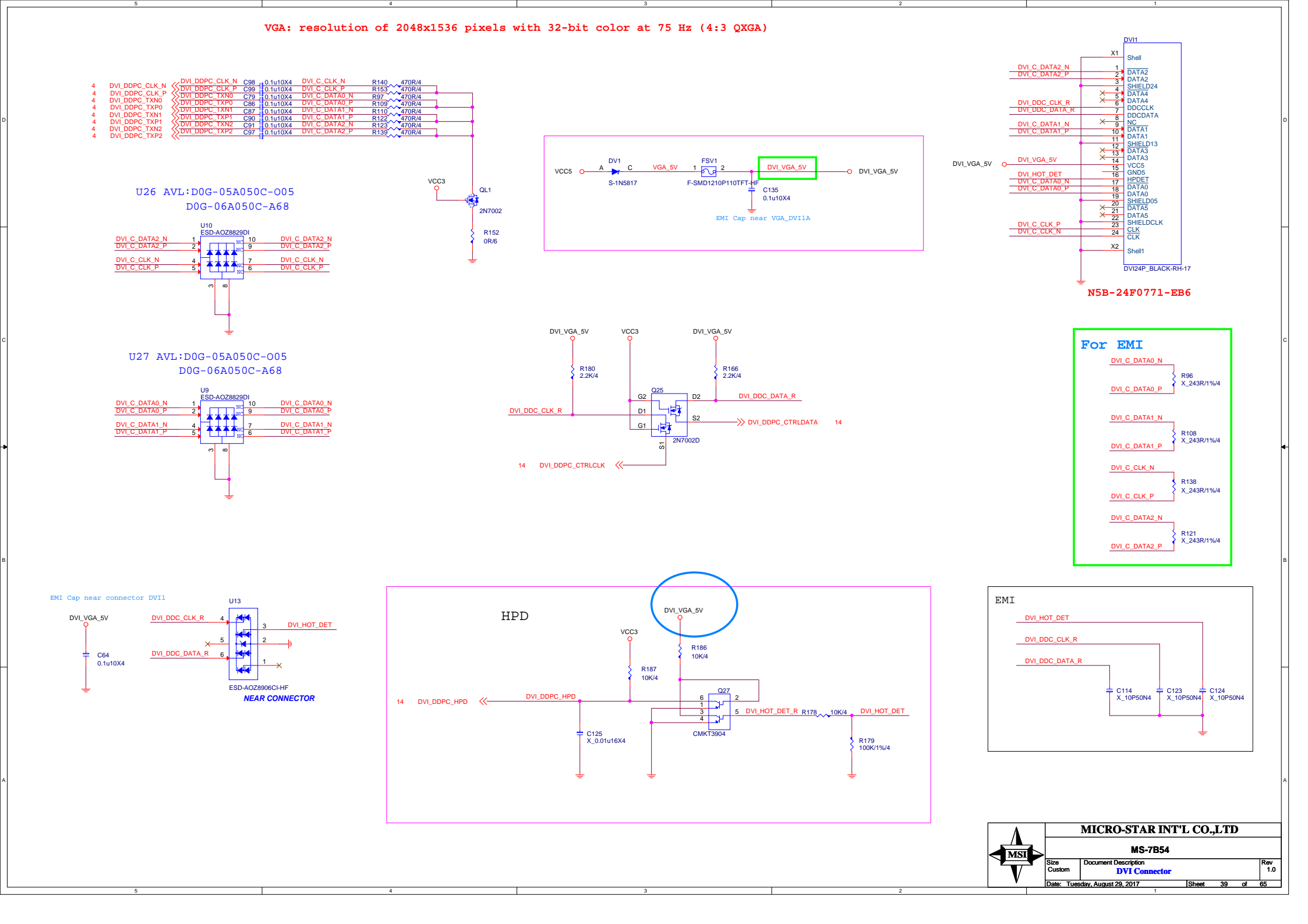
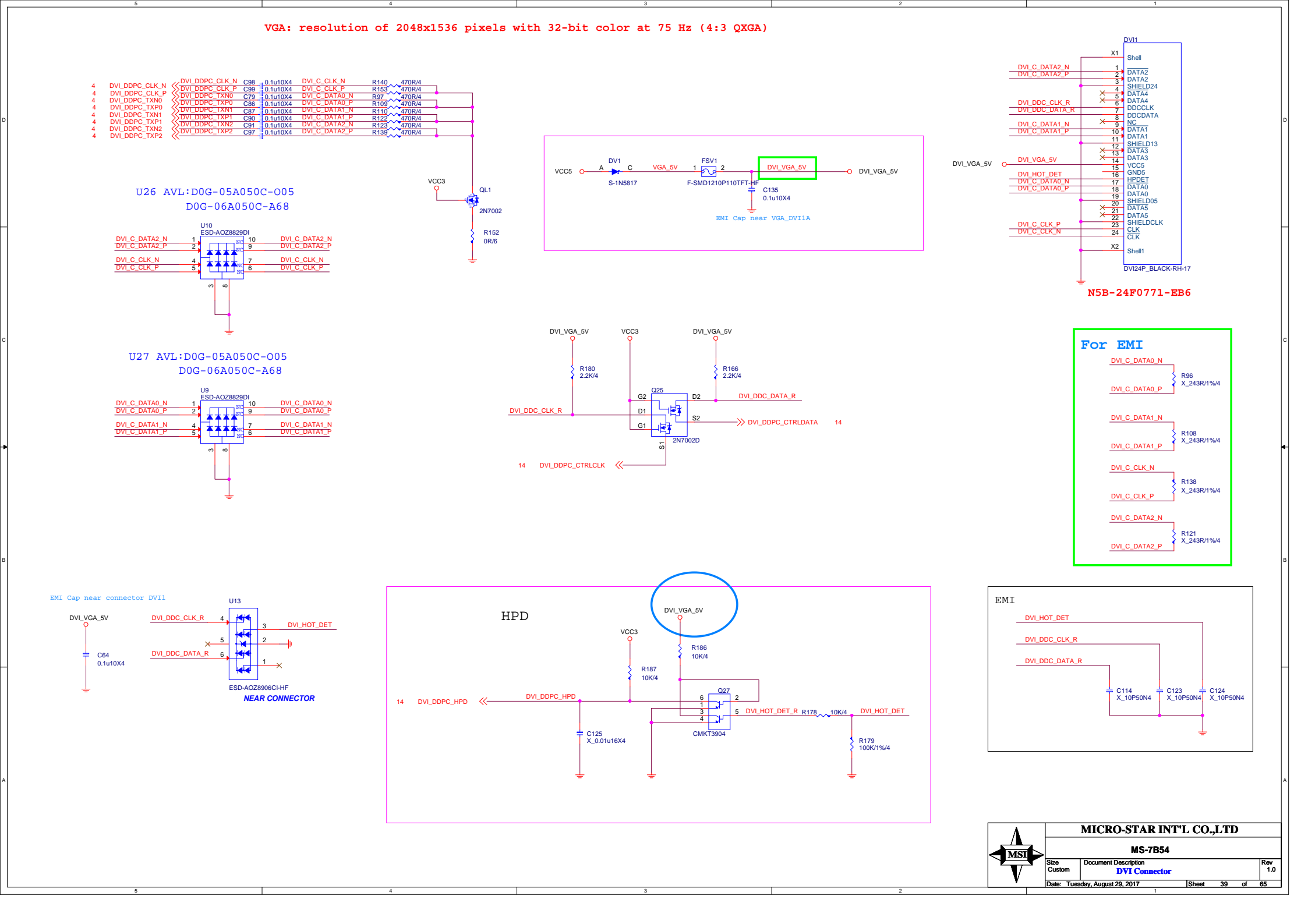
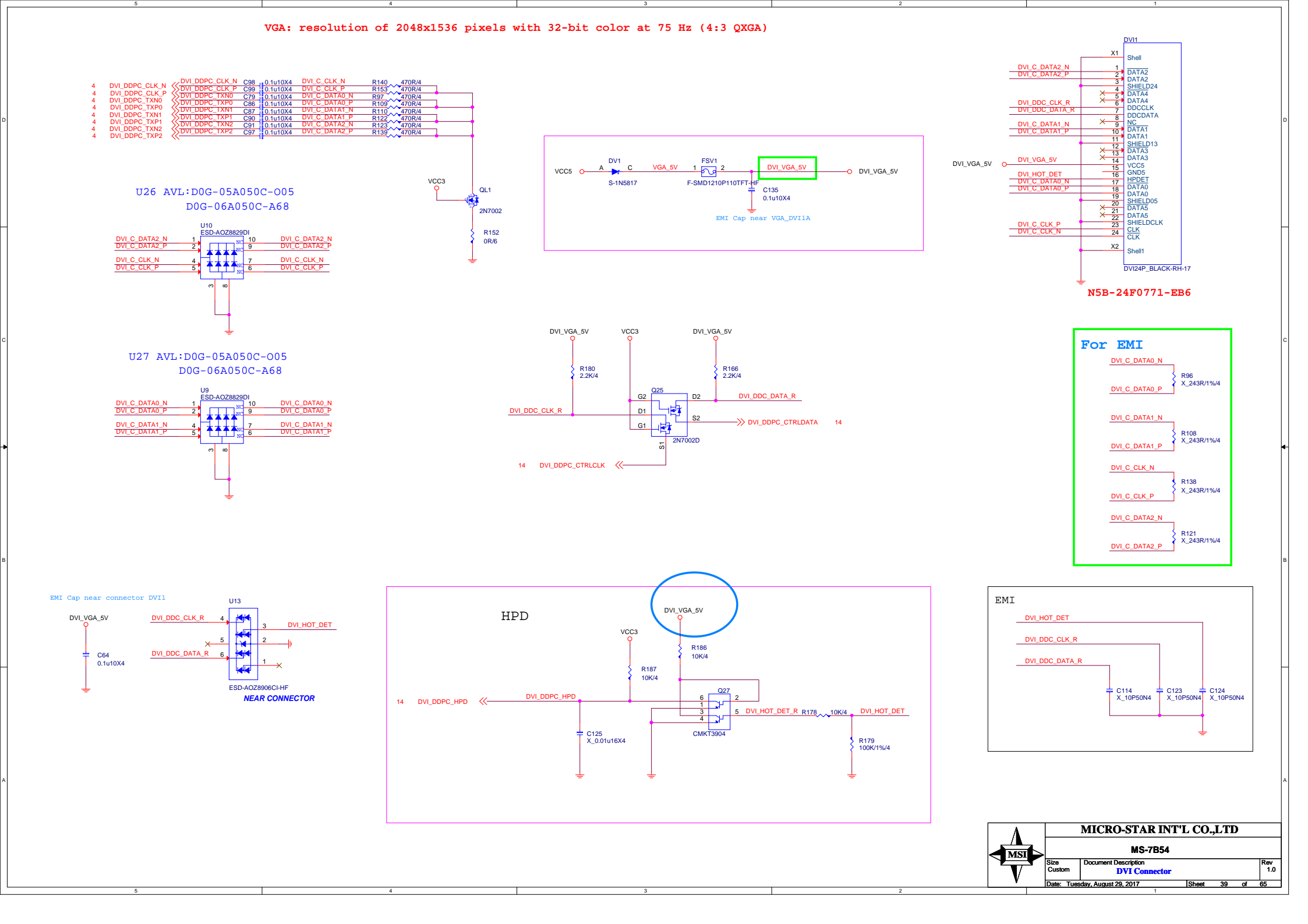
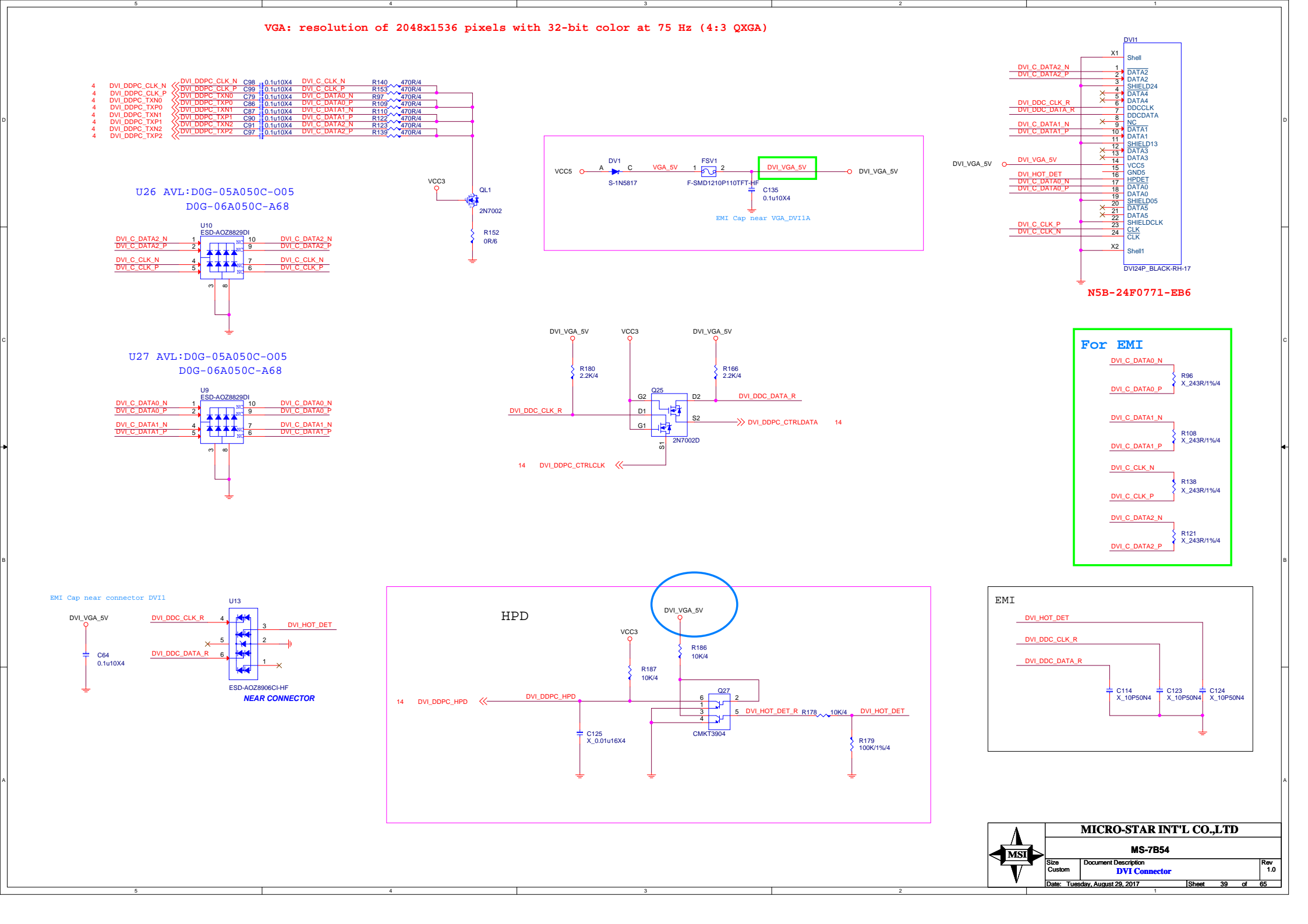
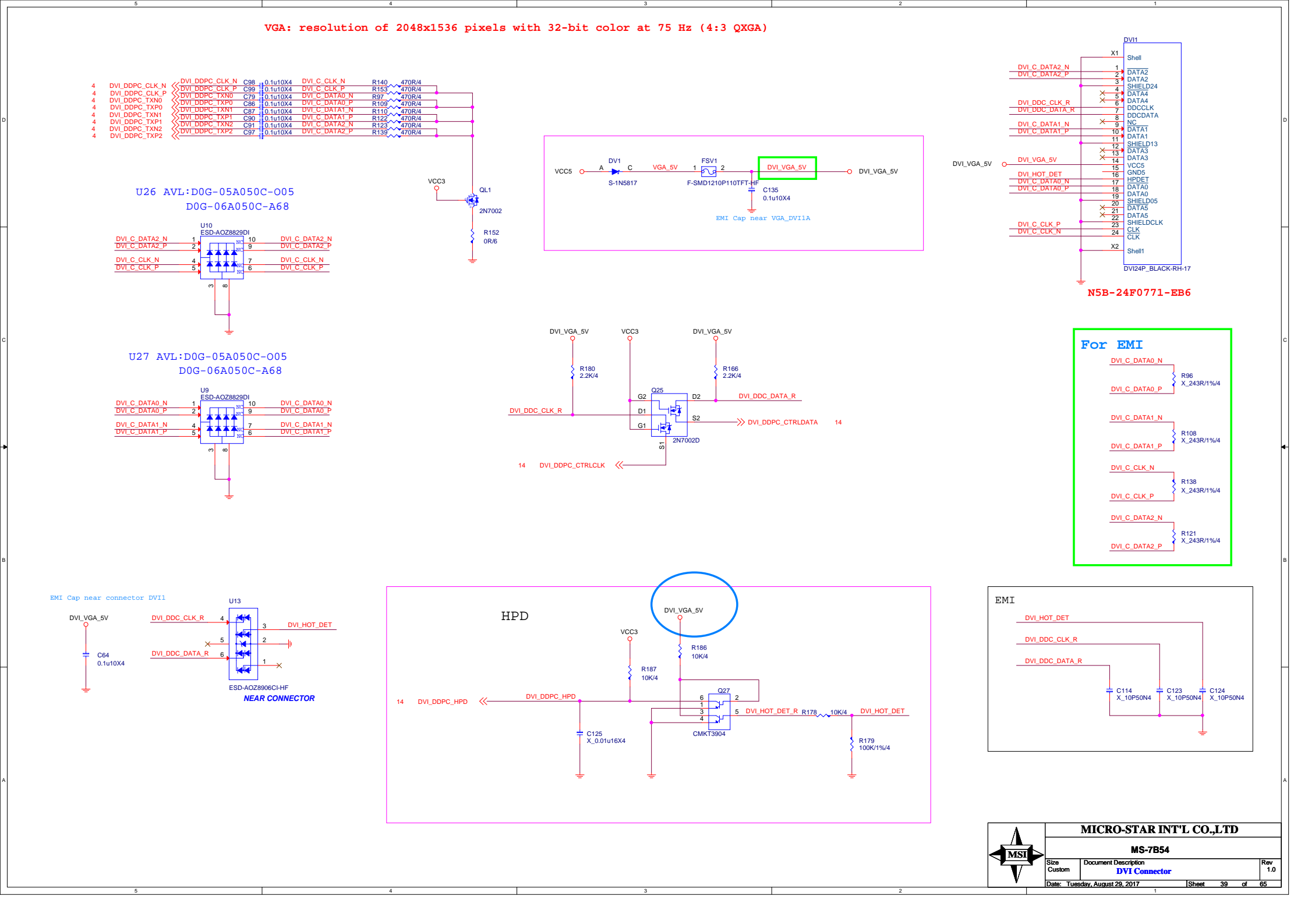
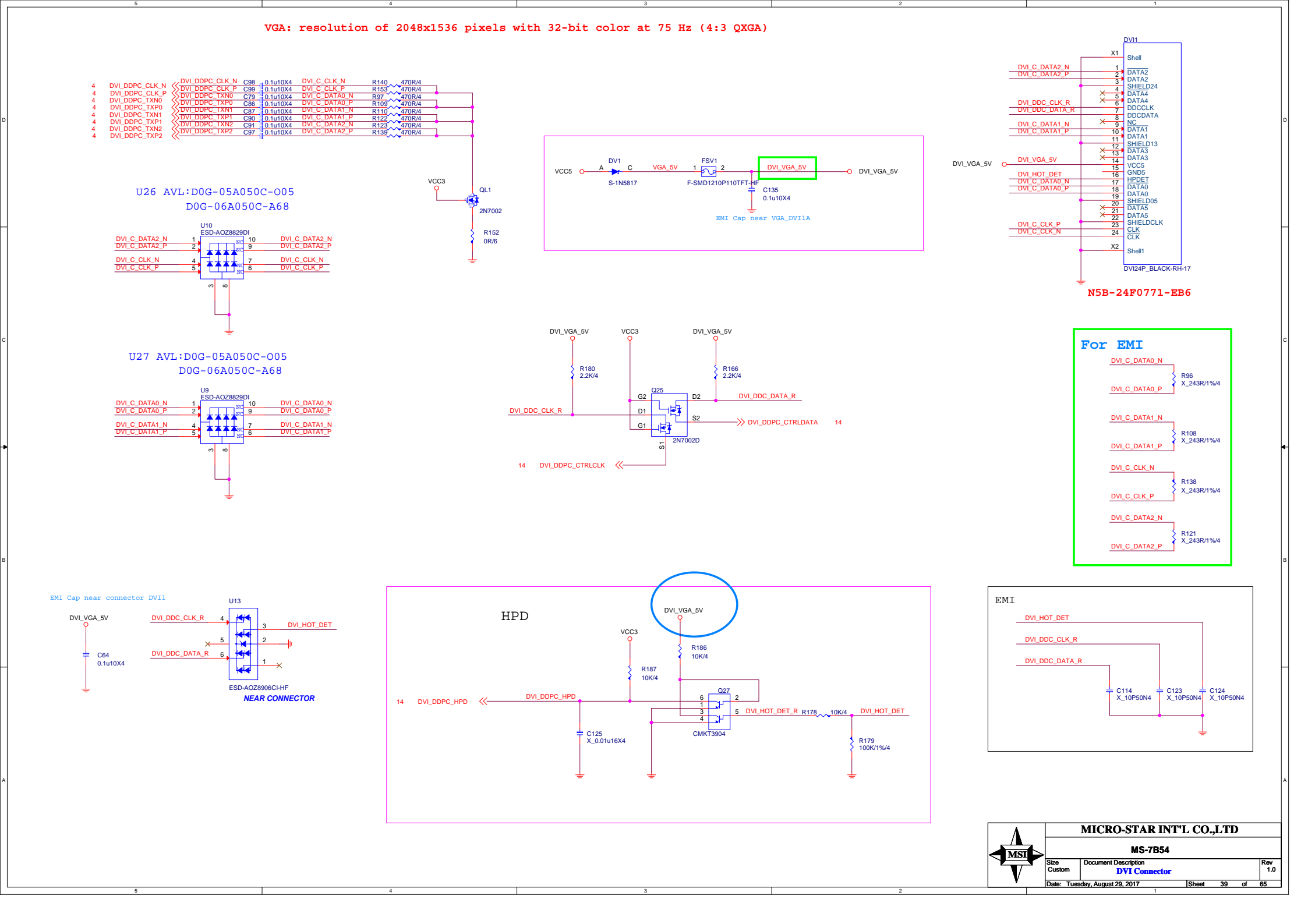
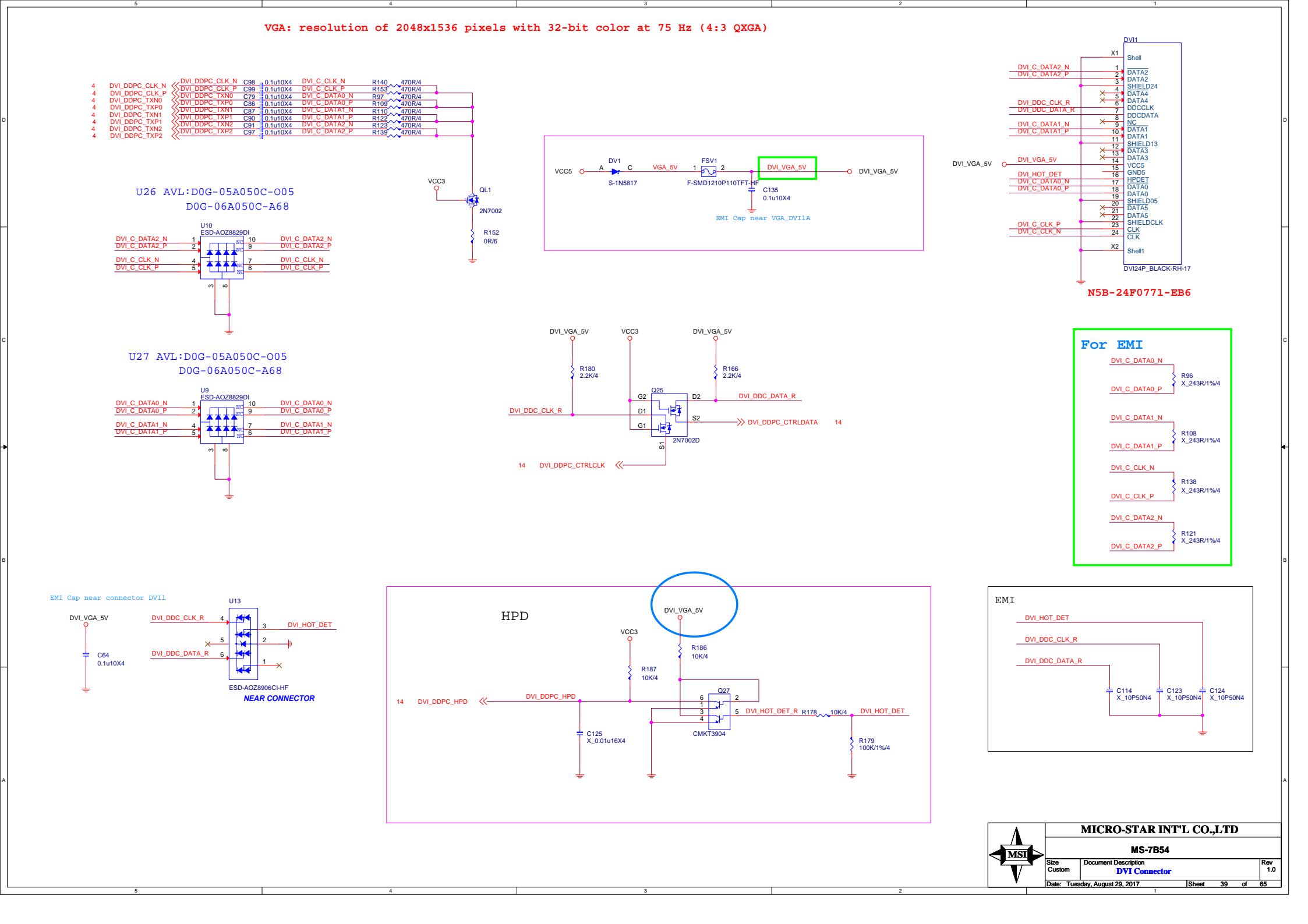
MSI

MICRO-STAR INT'L CO.,LTD

MS-7B54

Size Custom Document Description DVI Connector Rev 1.0

Date: Tuesday, August 29, 2017 Sheet 39 of 65



VGA: resolution of 2048x1536 pixels with 32-bit color at 75 Hz (4:3 QXGA)

U26 AVL:D0G-05A050C-005
D0G-06A050C-A68

U27 AVL:D0G-05A050C-005
D0G-06A050C-A68

EMI Cap near connector DV11

HPD

For EMI

EMI

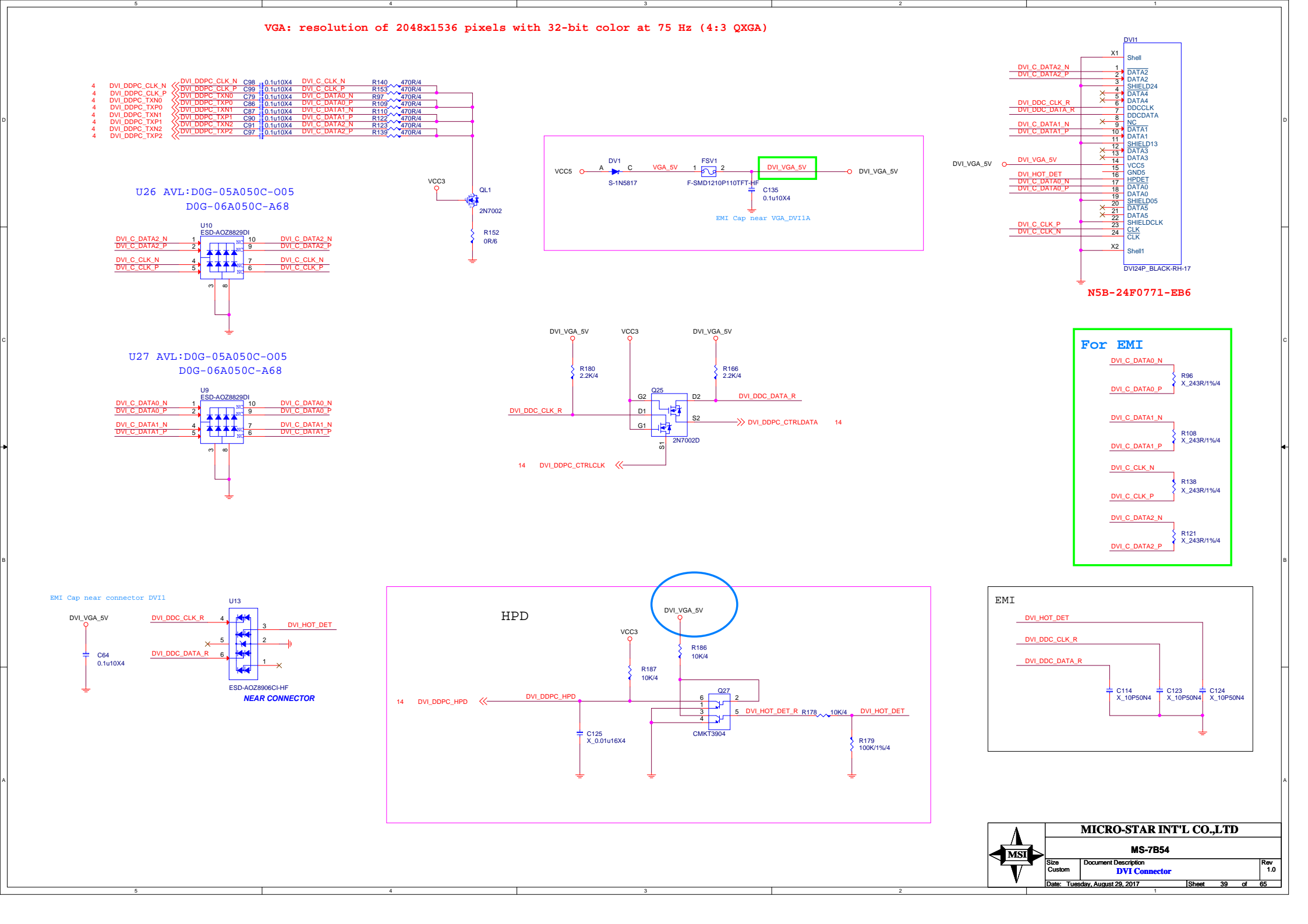
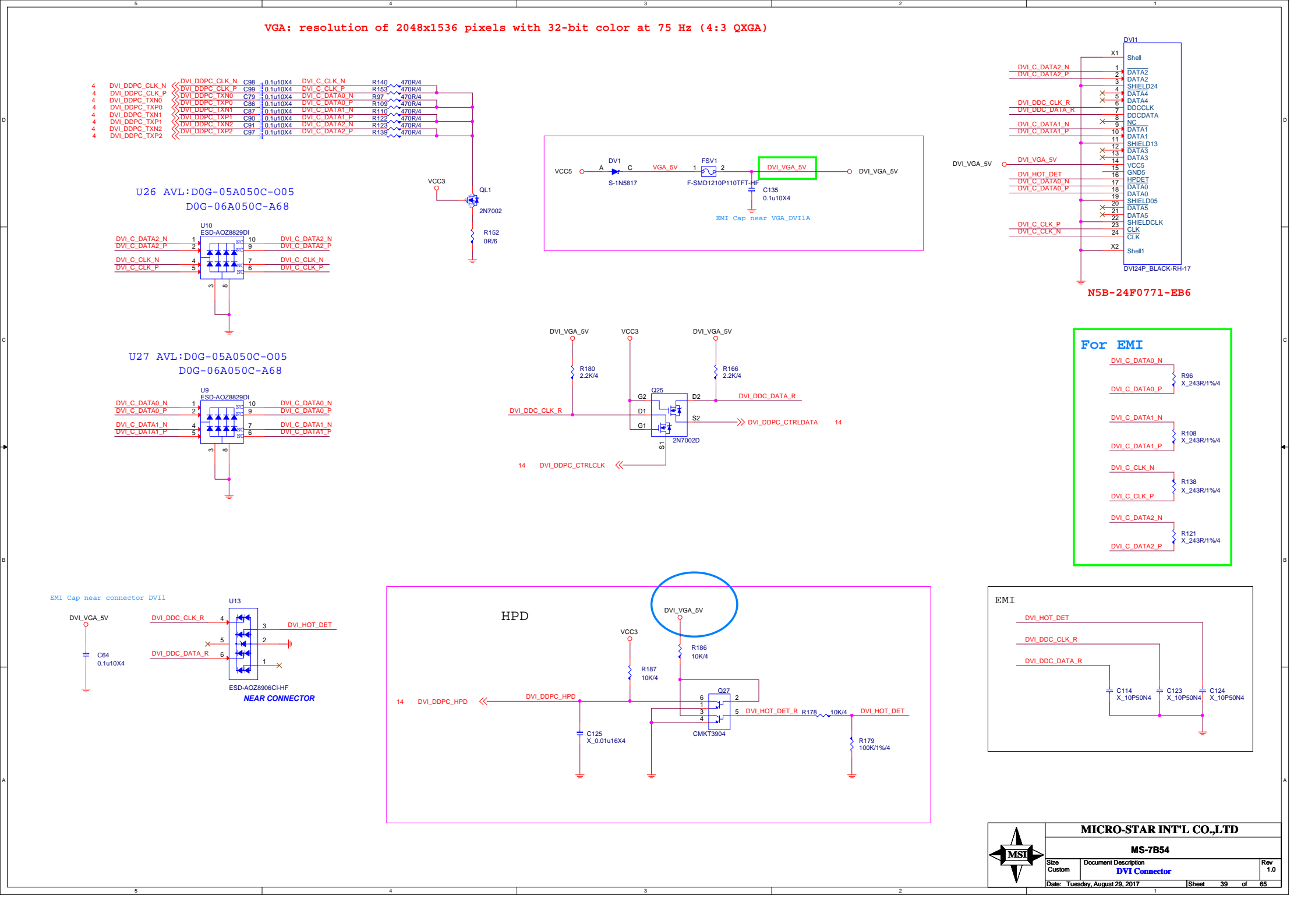
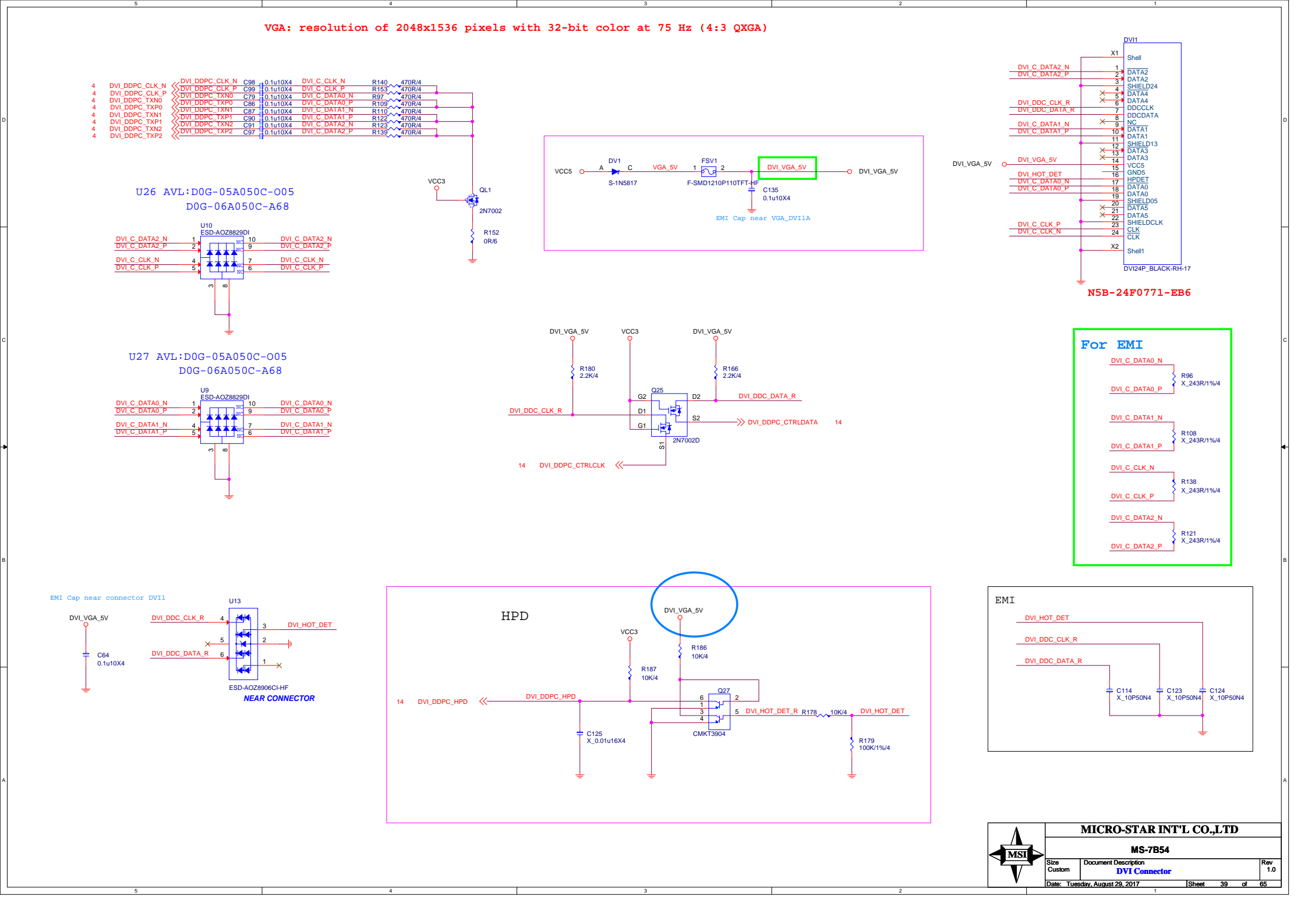
MSI

MICRO-STAR INT'L CO.,LTD

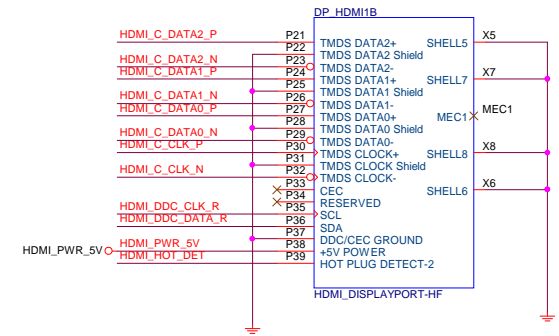
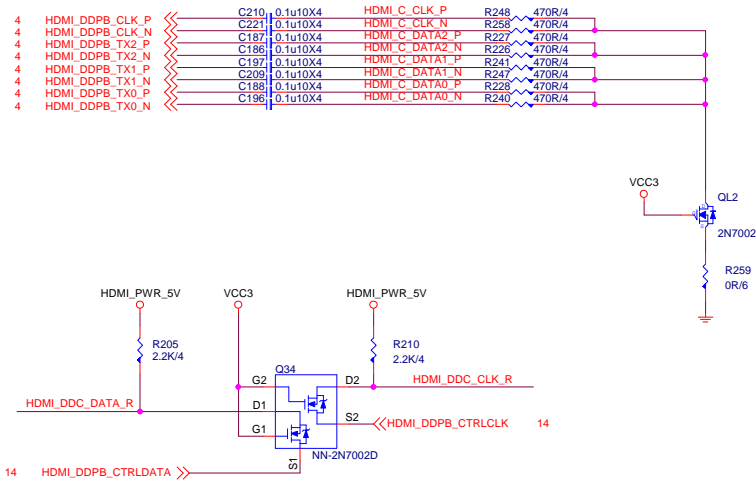
MS-7B54

Size Custom Document Description DVI Connector Rev 1.0

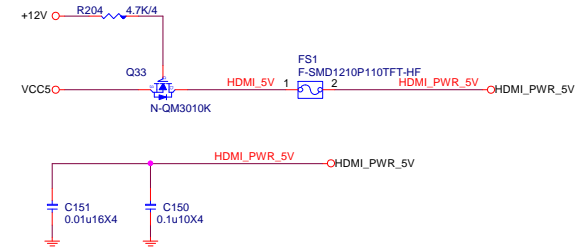
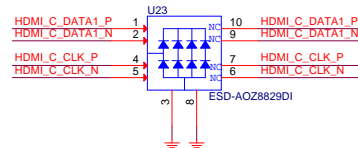
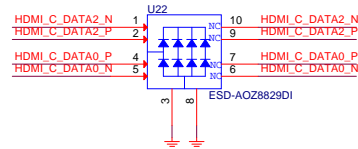
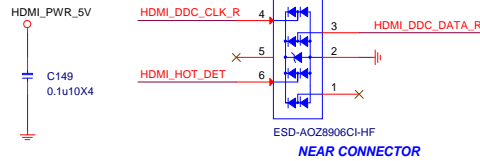
Date: Tuesday, August 29, 2017 Sheet 39 of 65



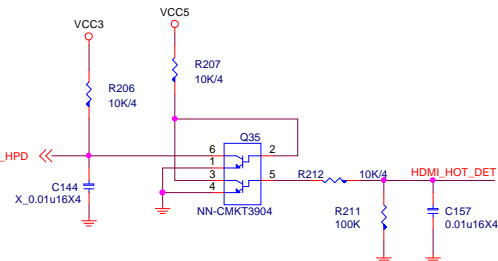
HDMI, DVI : 1920x1200 at 60 Hz (16:10 WUXGA)



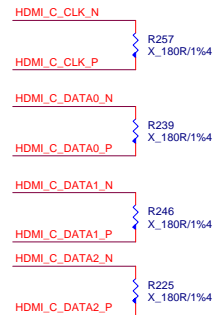
EMI Cap near connector HDMI1

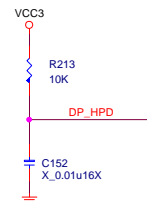
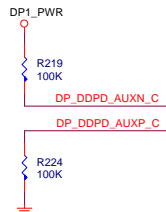
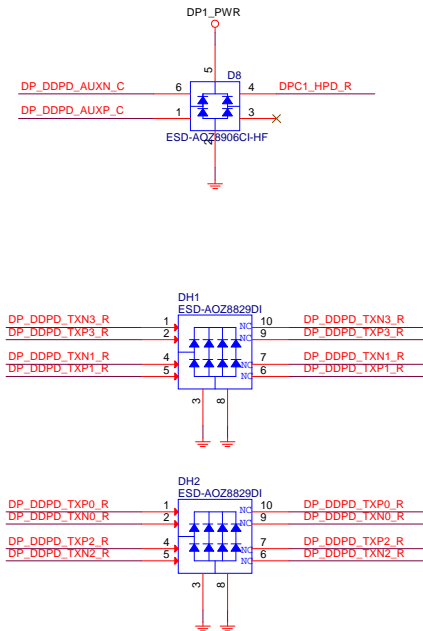


HPD

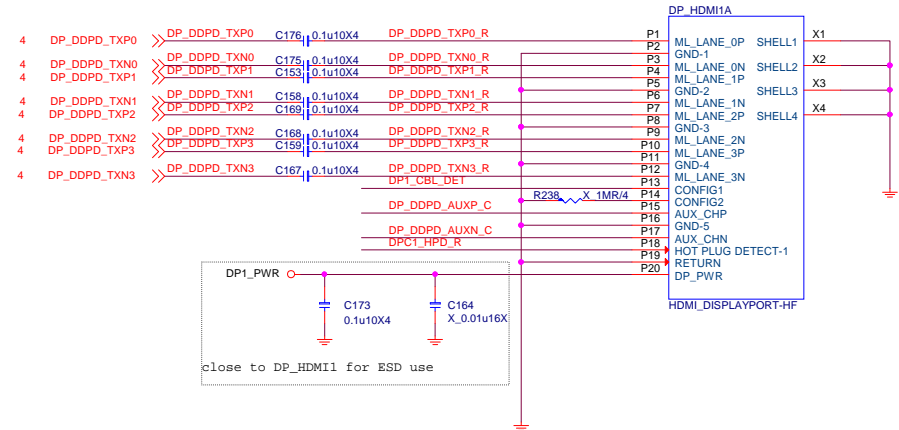


For EMI

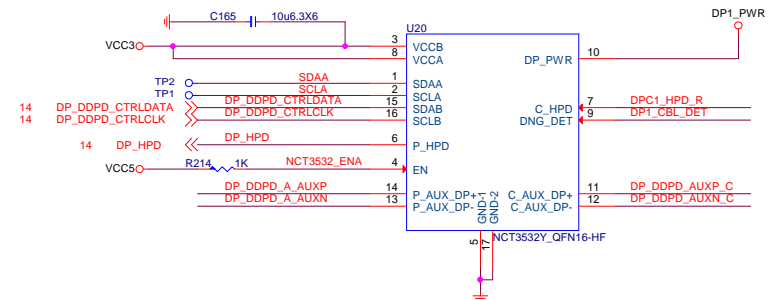




DP1 2015.10.20 Add

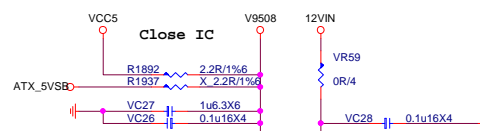


VCCB trace don't less than 30 mil

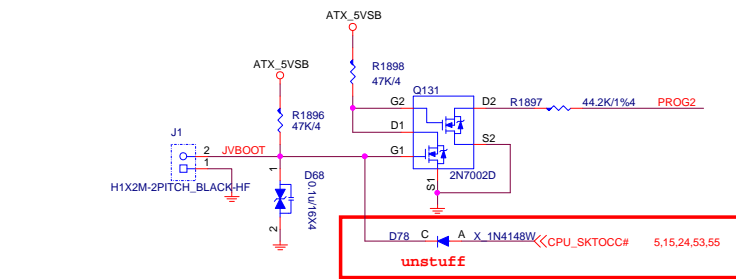
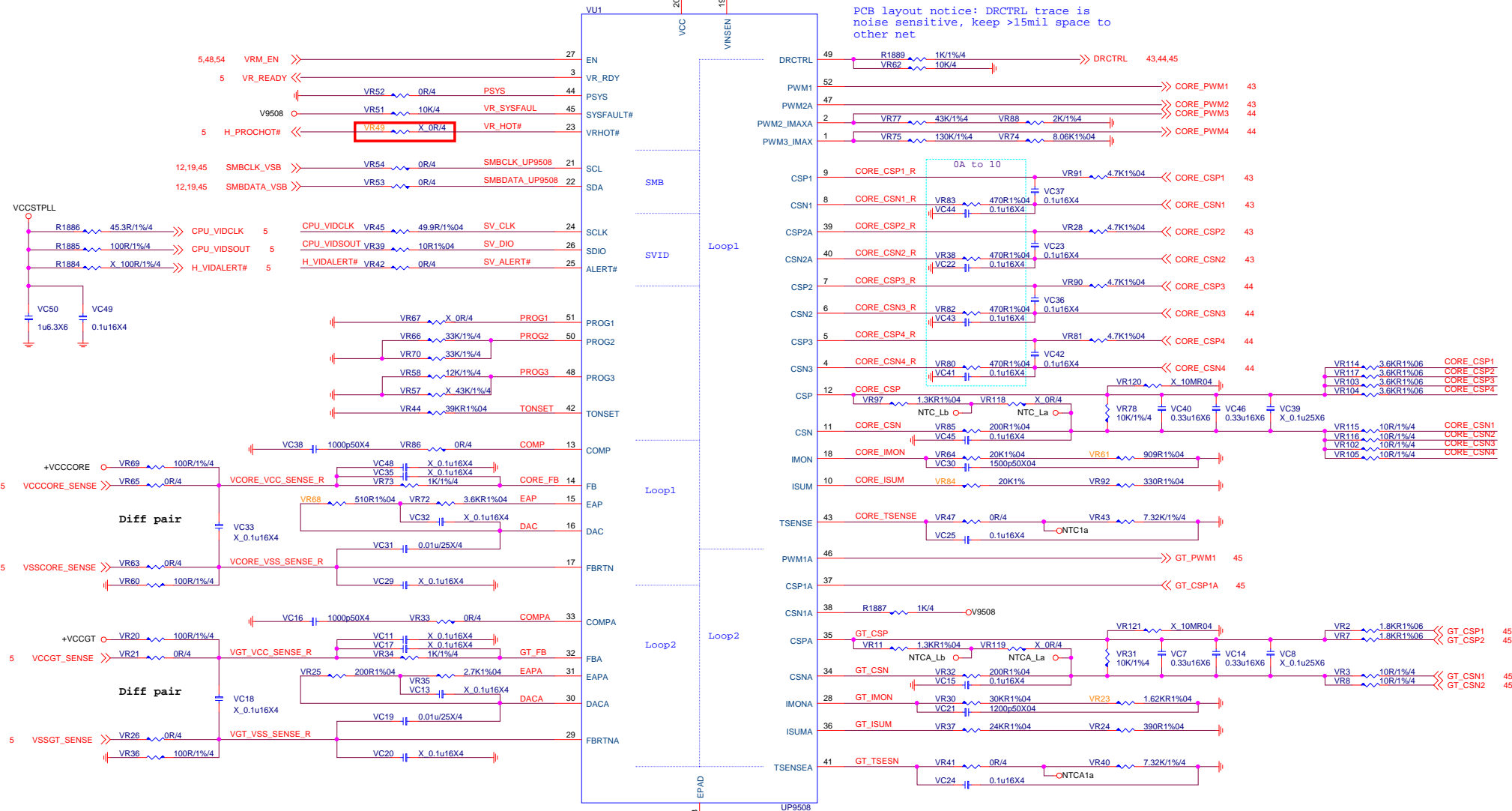


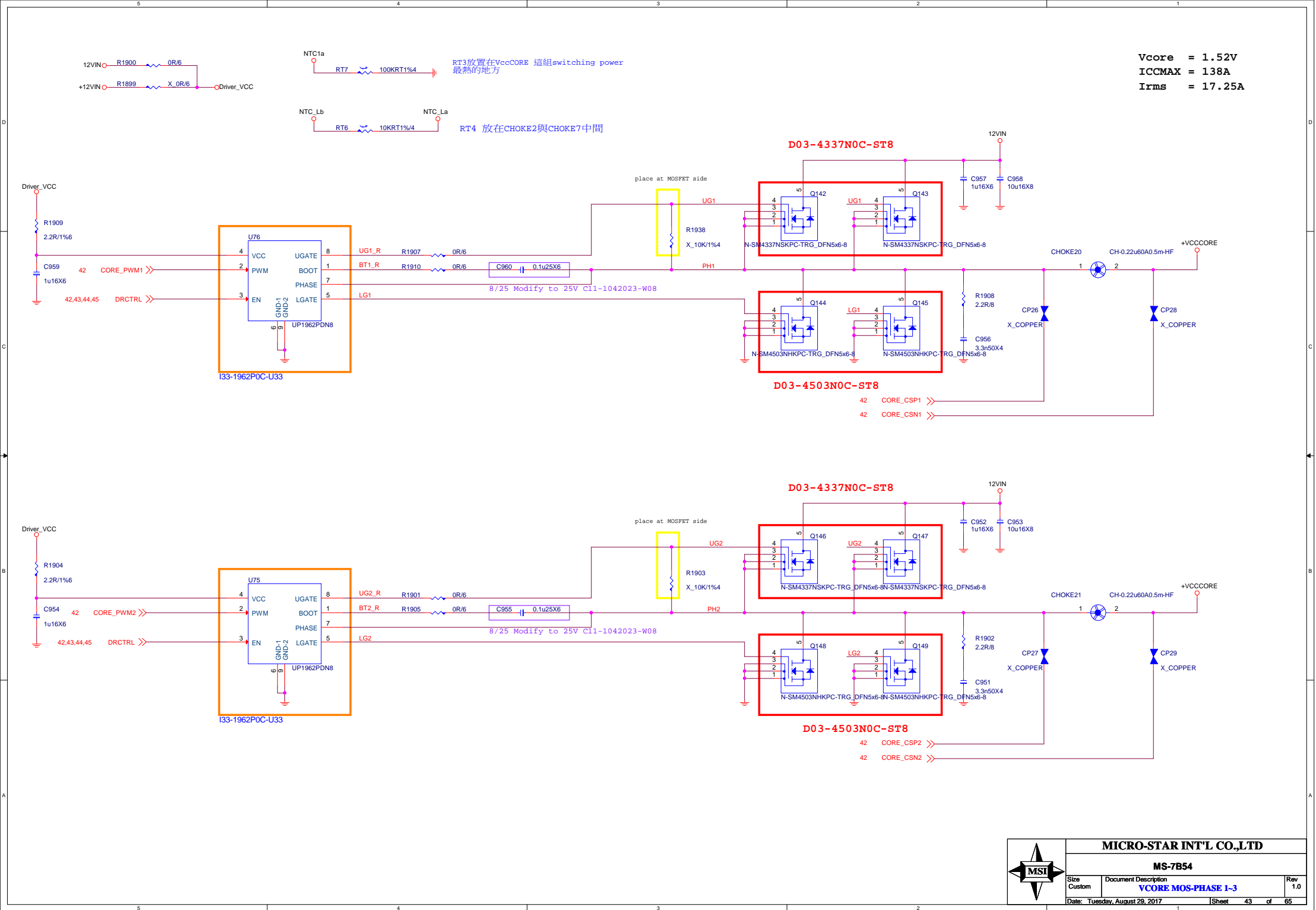
VCCORE: ICC Max 138A
LL: 2.1 mohm
OCP: 200A

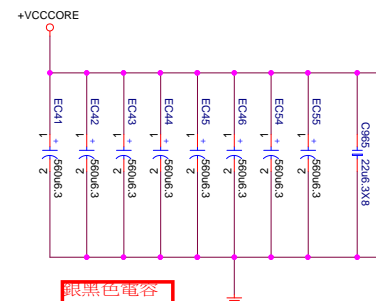
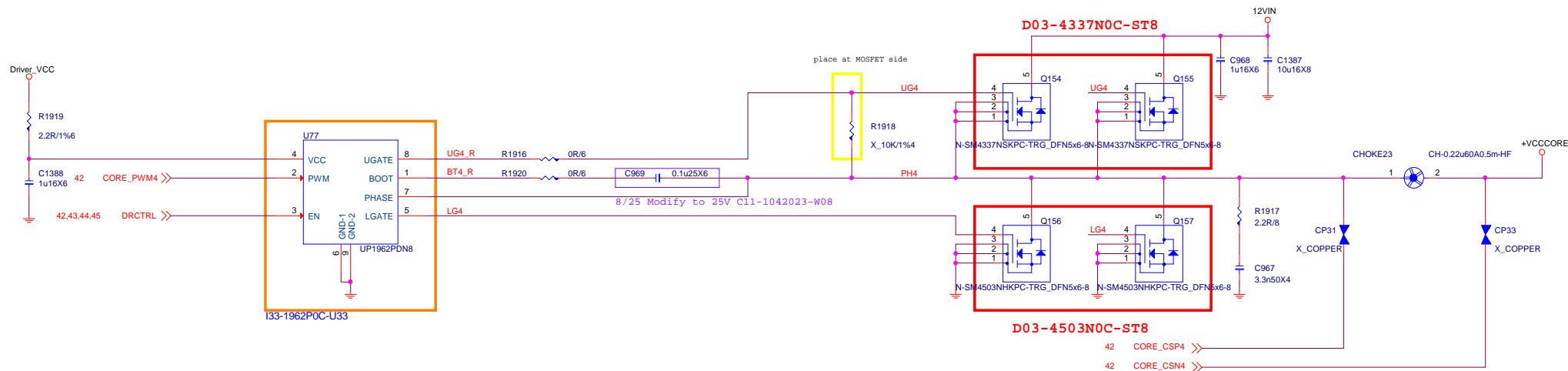
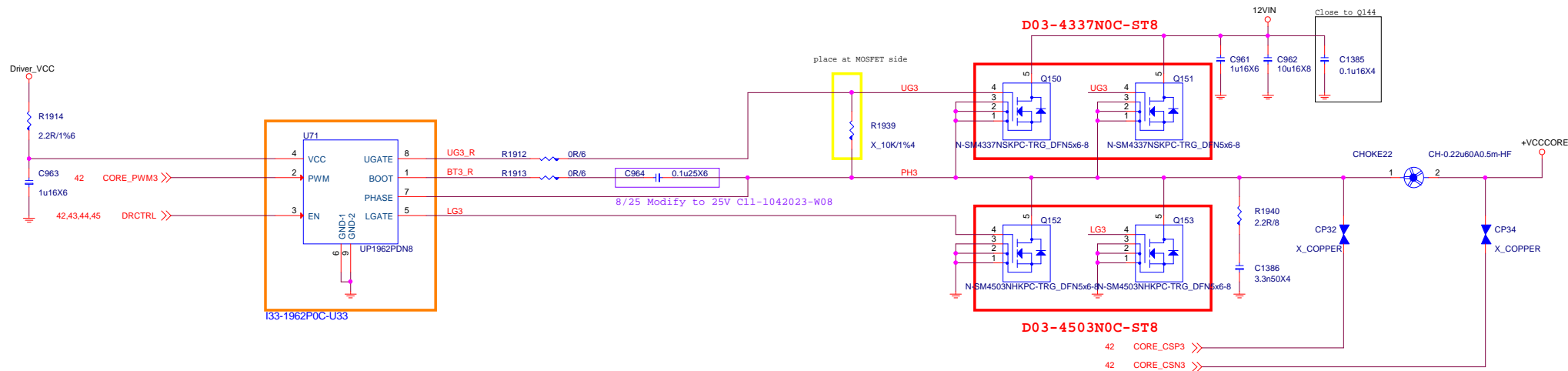
VGT: ICC Max 45A
LL: 3.1 mohm
OCP: 75A



PCB layout notice: DRCTRL trace is noise sensitive, keep >15mil space to other net







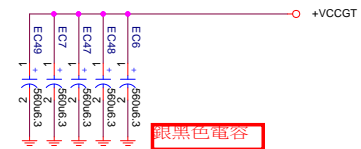
銀黑色電容



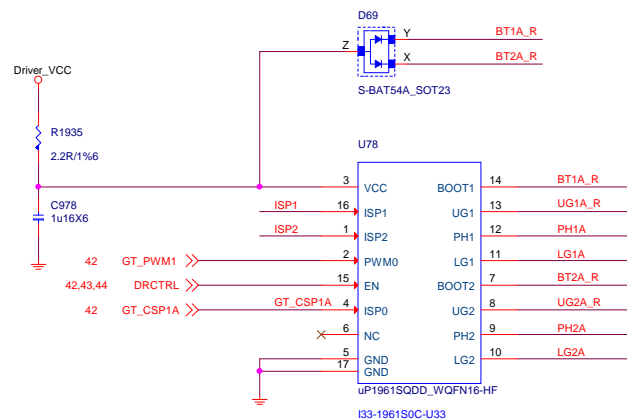
MICRO-STAR INT'L CO.,LTD

MS-7B54

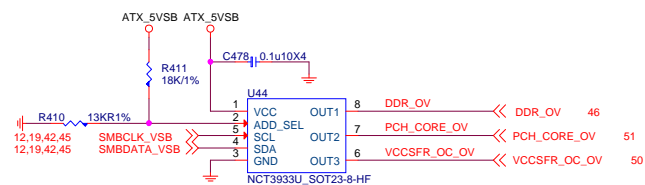
Size	Document Description	Rev
Custom	VCCGT MOS-PHASE 1-2	1.0
Date: Tuesday, August 29, 2017	Sheet 44 of 65	



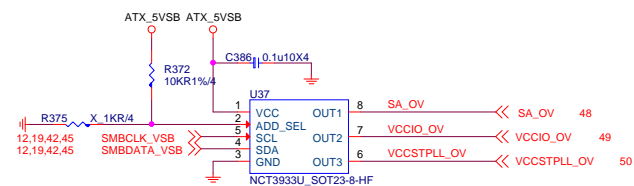
```
Vcore    = 1.52V
ICCMAX   = 45A
Irms     = 9.79A
```



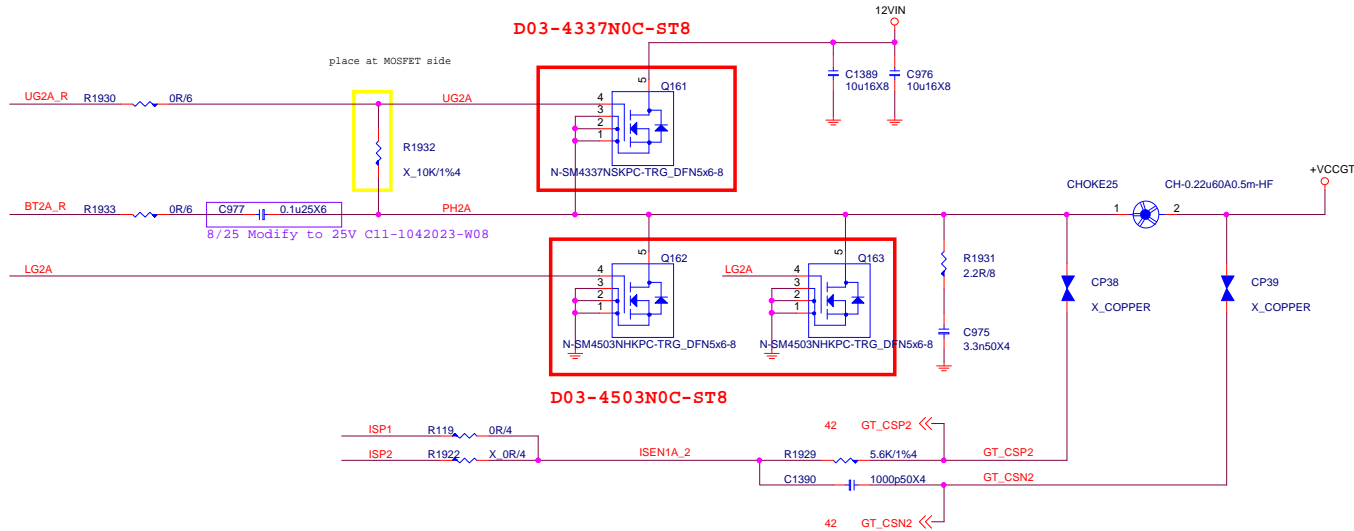
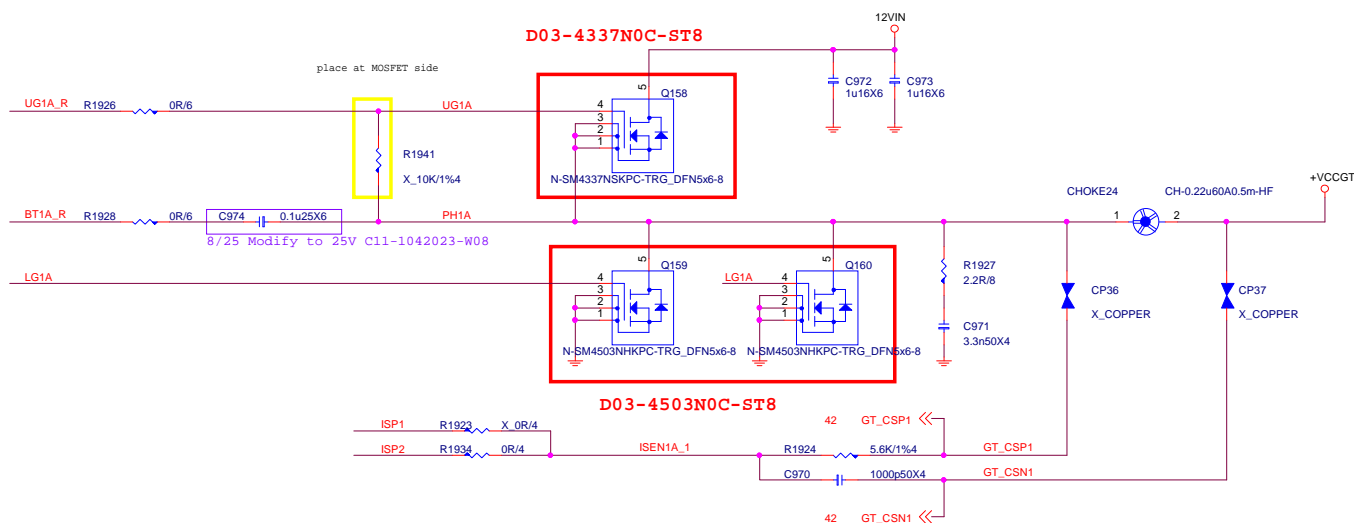
0x26:RH=18K,RL=13K



0x20:RH=10K,RL=OPEN



ADDRESS	0x2A	0x28	0x26	0x24	0x22	0x20
RH (KOhm)	OPEN	3.9	3	2.2	1.3	10
RL (KOhm)	10	1.3	2.3	3	3.9	OPEN
BUS_SEL	0%	25%	40%	60%	75%	100%



MICRO-STAR INT'L CO.,LTD

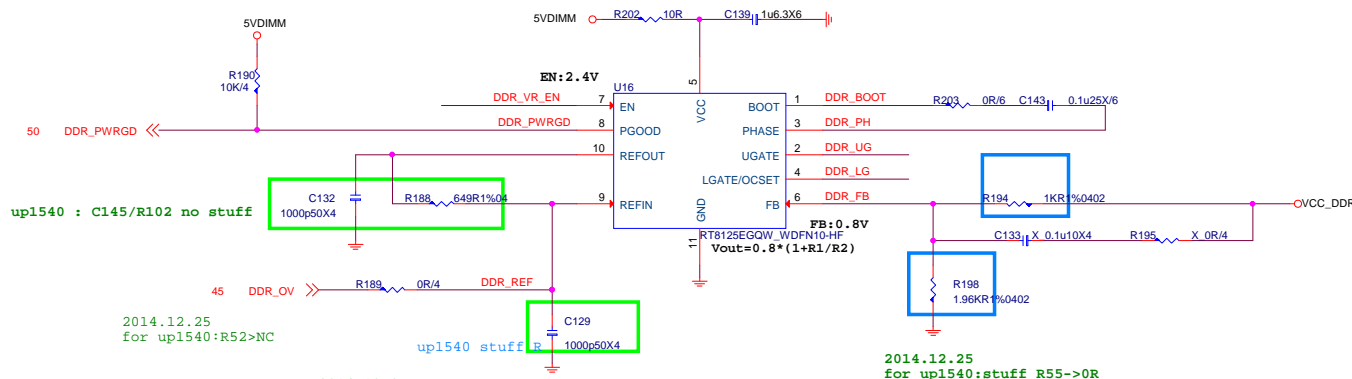
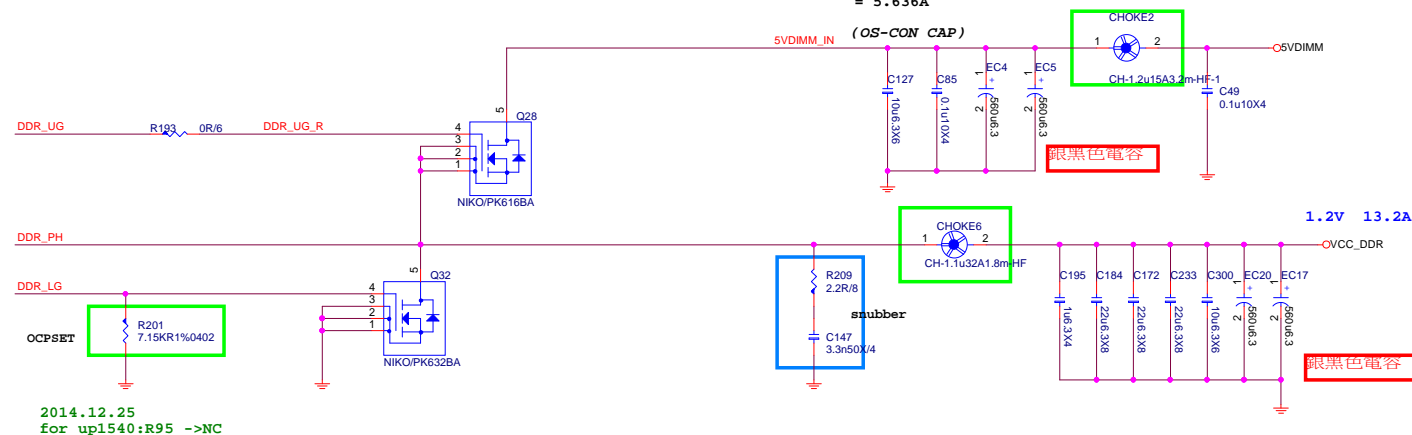
MS-7B54

Size Custom	Document Description OV - NCT3933	Rev 1.0
Date: Tuesday, August 29, 2017		Sheet 45 of 65

1.2A FOR DDR VTT

$$\begin{aligned} OCP &= 13.2A * 1.5 = 19.8A \\ R_{ocs}(R3) &= OCP * R_{ds(on)}[(Low\ side)/2] / 10uA \\ &= 19.8A * (4.6/2)m\Omega / 10uA \\ &= 4.95k\Omega < 5K\ \Omega \end{aligned}$$
$$\begin{aligned} \text{Rocpset} &= 4.3\text{K} \\ \text{OCP} &= \text{Rocpset} * \text{Rdson}(\text{Low side}) / 10\mu\text{A} \\ &= 4.75\text{K} * 4.6\text{mohm} / 10\mu\text{A} \\ &= 21.85\text{A} \end{aligned}$$

```
Rdson(1ow)4.5V
D03-4C05N03-O05 : 5 mohm
D03-632BA0C-N03 : 4.6mohm
D03-3056M00-U47 : 6.2mohm
```


$$\begin{aligned} I_{rms} &= I_{out} * \text{SQRT}\{(V_{out}/V_{in}) * [1 - (V_{out}/V_{in})]\} \\ &= 13.2 * 0.427 \\ &= 5.636A \end{aligned}$$


```
2014.12.25
for up1540:R95 ->NC
```

Datasheet公式計算

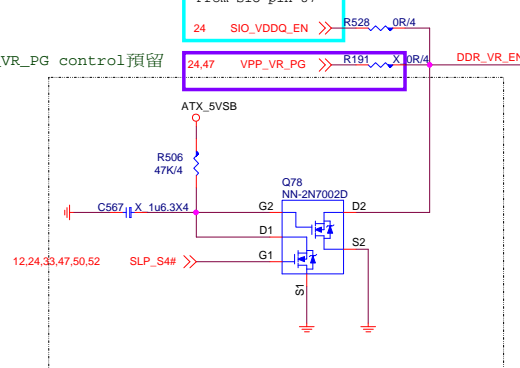
$$\begin{aligned} L_{\min} &= ((V_{\text{in}} - 1.2V) / (F_{\text{sw}} * k * I_{\text{out_max}})) * (V_{\text{out}} / V_{\text{in}}) \\ &= 0.7677\mu\text{H} \quad (K = 30\%) \end{aligned}$$

若帶入CAP ESR計算, $0.2432\mu\text{H} < L < 1.2897\mu\text{H}$

2014.12.17 update

From SIO pin 87

VPP_VR_PG control預留



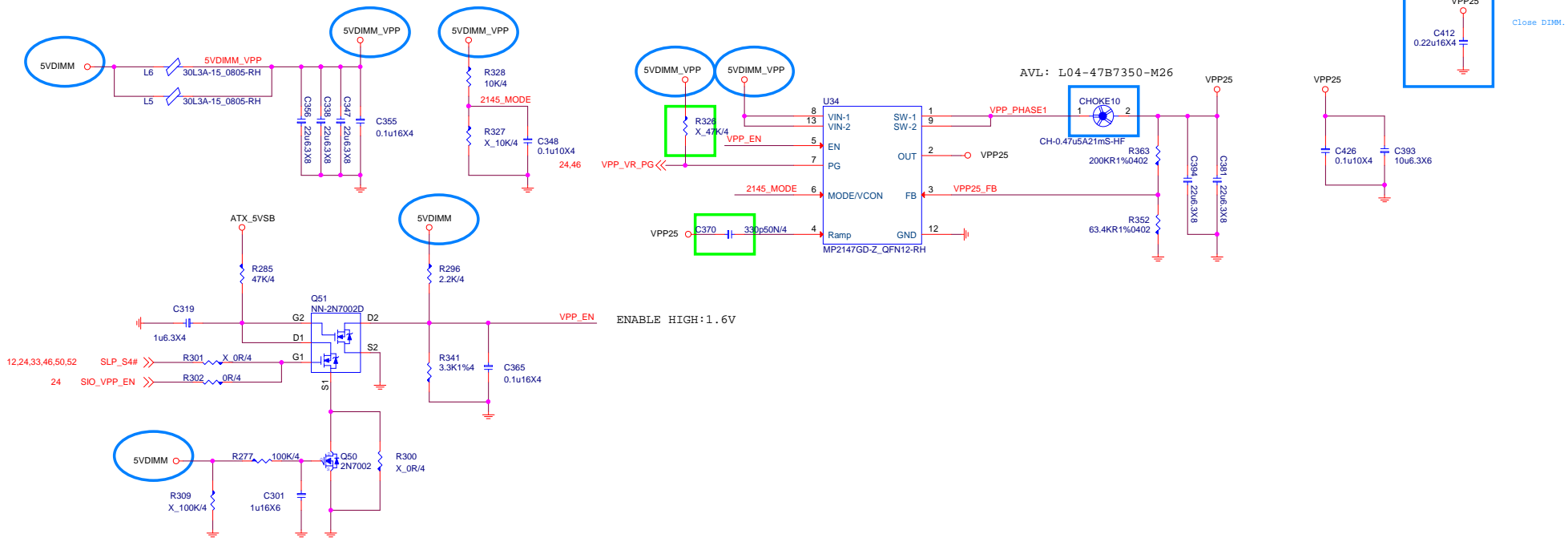
MICRO-STAR INT'L CO.,LTD

MS-7B54

Size Custom	Document Description DDR4 Power - RT8125E	Rev 1.0
Date: Tuesday, August 29, 2017		Sheet 46 of 65

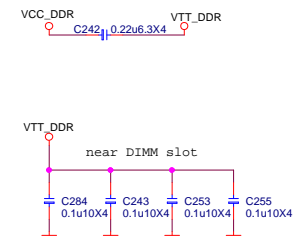
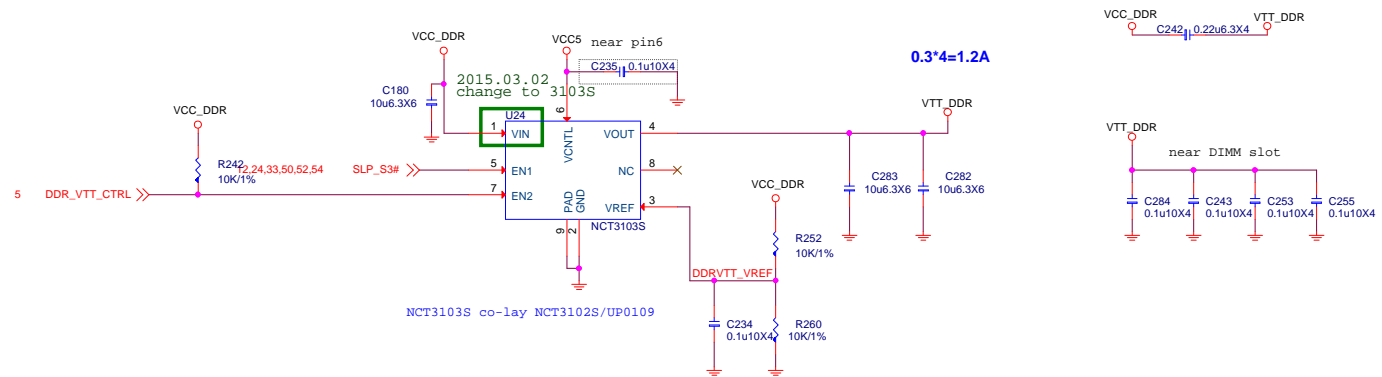
4DIMM :2.24A FOR DDR VPP2.5V

VPP25 Power
2.5V; 2.24A



To make sure VPP EN after 5VDIMM stable

DDR VTT Power



MICRO-STAR INT'L CO.,LTD

MS-7B54

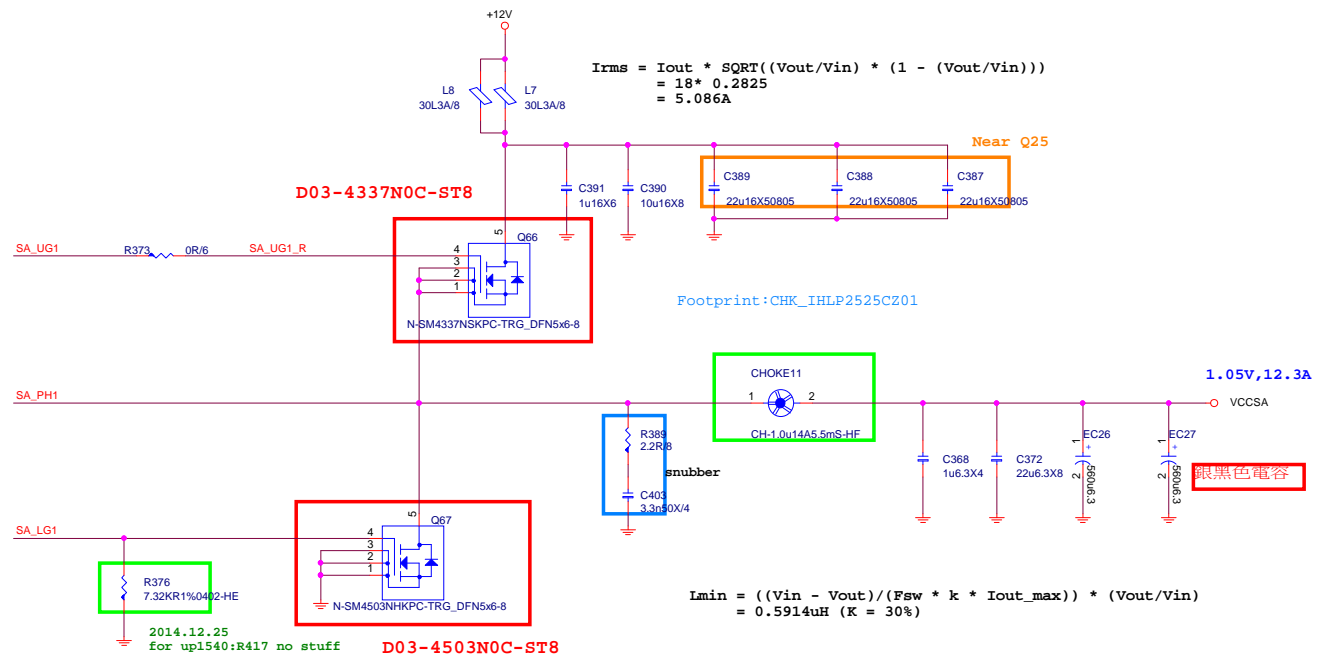
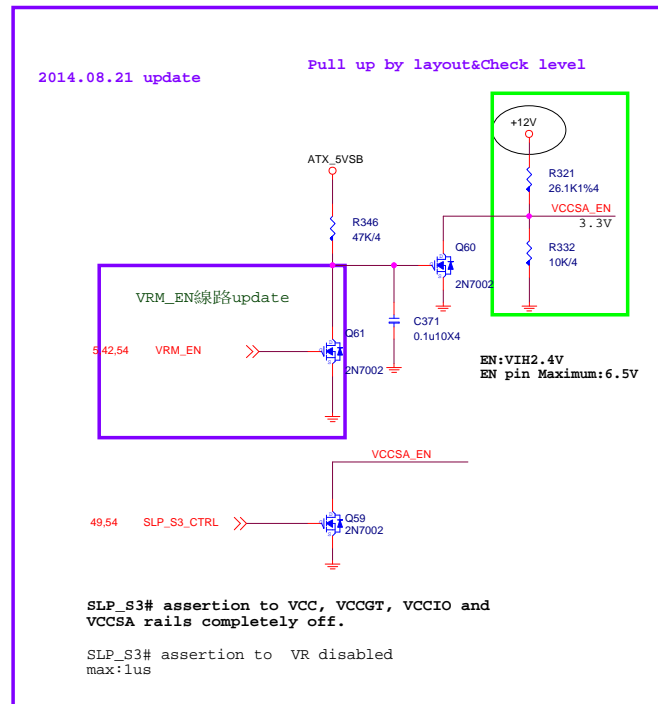
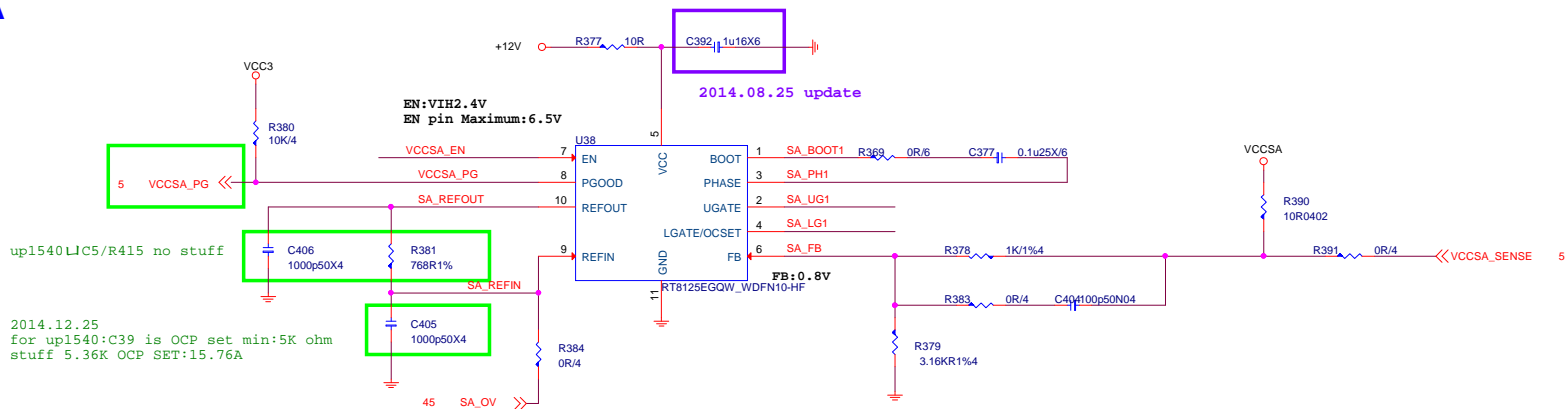
Size Custom	Document Description DDR4 Power - VPP25	Rev 1.0
Date: Tuesday, August 29, 2017		Sheet 47 of 65

SA Power:1.05V,12.3A

Rocpset:5.49K
 OCP=Rocset*Rdson(Low side)/10uA
 =7.32K*2.5mohm/10uA
 =18.3A

Rocs:5.76K, OCP:
 D03-4C05N03-O05 : 16.94A
 D03-632BA0C-N03 : 17.45A
 use UBIQ MOS need Check

Rdson(Low)10V
 D03-4C05N03-O05 : 3.4mohm
 D03-632BA0C-N03 : 3.3mohm
 D03-3056M00-U47 : 4.2mohm



0.95V ; 6.4A

IMAX 10A
ILIMIT=10A~12A
IOC=ILIMIT+40%*IMAX/2=12A~14A.

support OV=>NB685

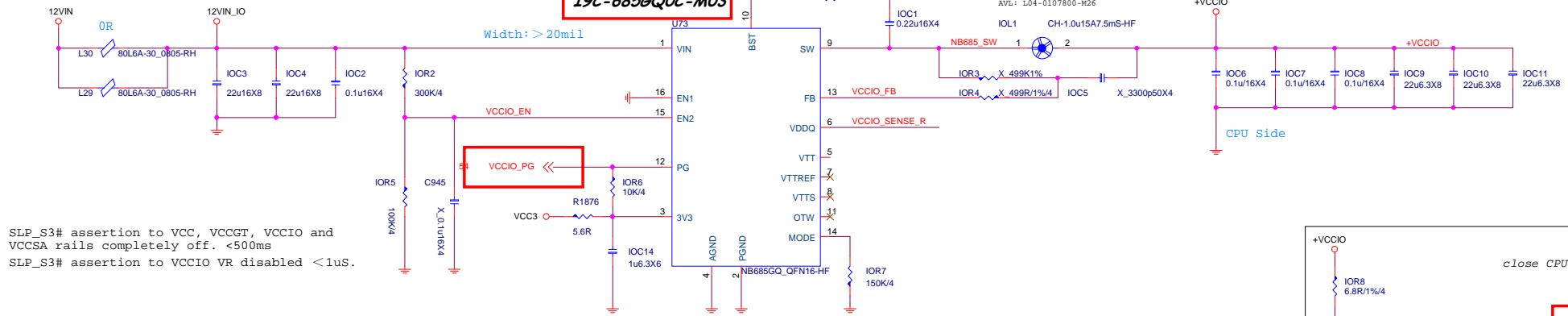
NB681--->NB685

I9C-685GQ0C-M03

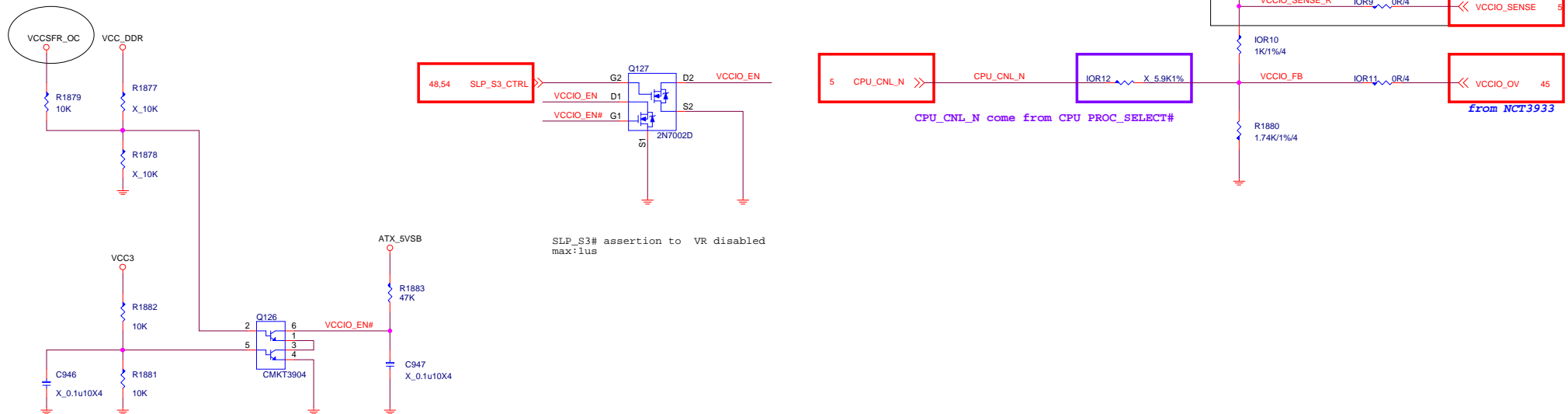
$$0.7776\mu\text{H} < L < 1.1664\mu\text{H}$$

AVL: L04-0107800-M26

IOL1 CH-1.0u15A7.5mS-HF



```
SLP_S3# assertion to VCC, VCCGT, VCCIO and
VCCSA rails completely off. <500ms
SLP_S3# assertion to VCCIO VR disabled <1uS.
```



```
SLP_S3# assertion to VR disabled
max:1us
```



MICRO-STAR INT'L CO.,LTD

MS-7B54

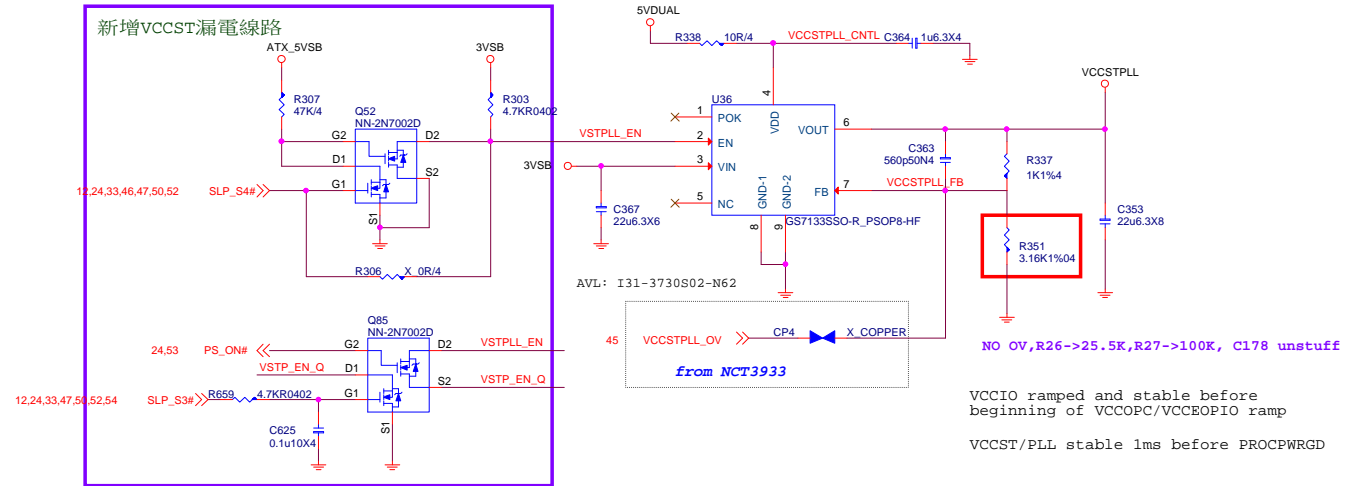
Size Custom	Document Description VCCIO - NB681	Rev 1.0
Date: Tuesday, August 29, 2017		Sheet 49 of 65

VCCSTPLL

1.0V; 250mA

For Cost down VCCST&VCCPLL merge

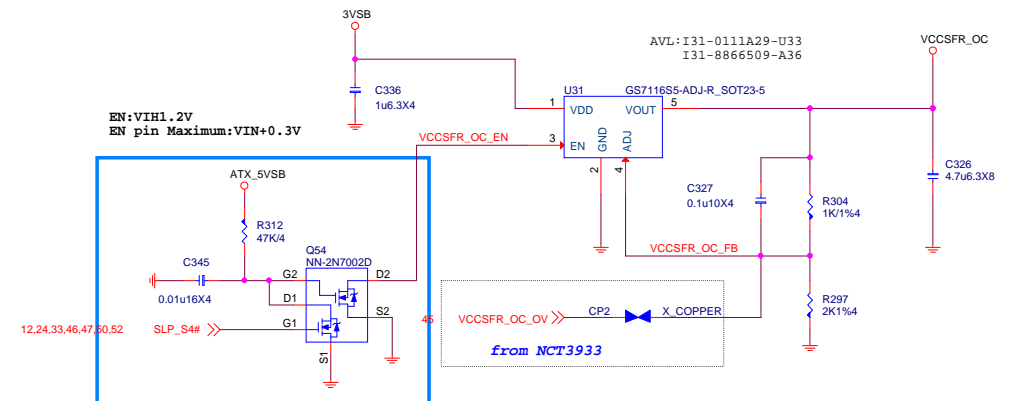
for Gaming3/5, Classic, ECO
and H110



VCCPLL_OC

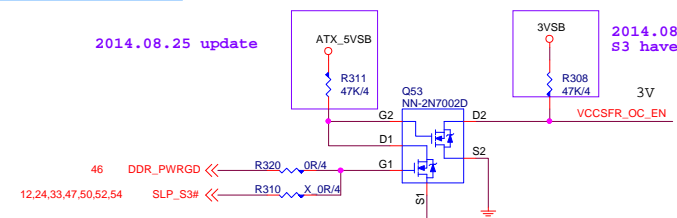
2014.08.21 update

1.2V; 110mA



2014.08.25 update

2014.08.25 update
S3 have power



MICRO-STAR INT'L CO.,LTD

MS-7B54

Size	Document Description	Rev
Custom	VCCST/PLL - GS7133/7116	1.0
Date:	Tuesday, August 29, 2017	Sheet 50 of 65

PCH_1VSB

1.0V; 10.796A

OCP = 16.69A

OCP = $10\mu A * 7.68K / 4.6 \text{ mohm}$
= 16.69 A

Rocs:7.87K,OCP:

D03-4C05N03-O05 : 15.74A

D03-632BA0C-N03 : 17.1A

use UBIQ MOS need Check

Rdson(1ow)4.5V

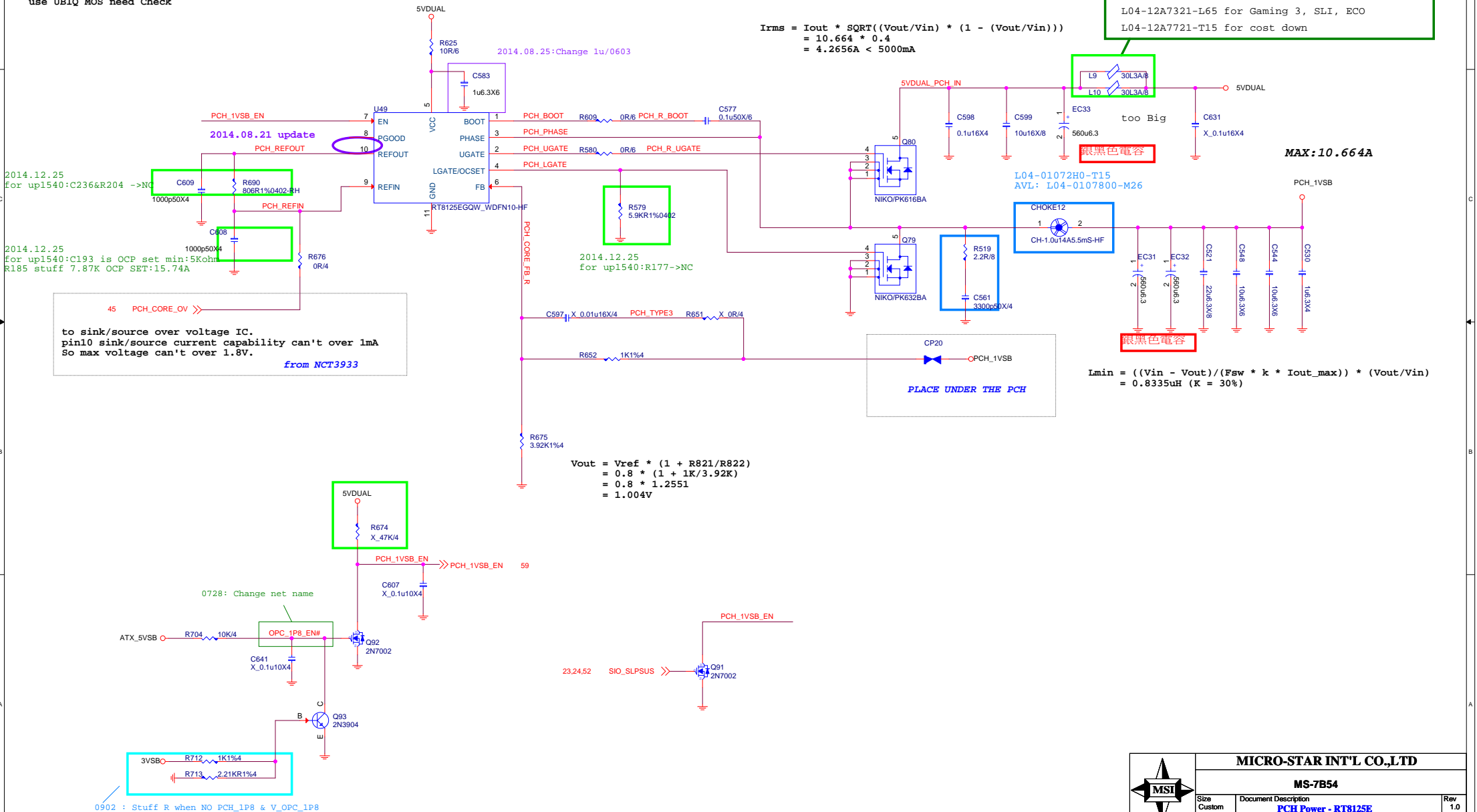
D03-3116M00-U47 : 3.6 mohm

D03-632BA0C-N03 : 4.6mohm

D03-3056M00-U47 : 6.2mohm

$$\begin{aligned} I_{rms} &= I_{out} * \sqrt{(V_{out}/V_{in}) * (1 - (V_{out}/V_{in}))} \\ &= 10.664 * 0.4 \\ &= 4.2656A < 5000mA \end{aligned}$$

L04-47B7730-T15 for OC, Gaming 10, 9, 7, 5
L04-12A7321-L65 for Gaming 3, SLI, ECO
L04-12A7721-T15 for cost down

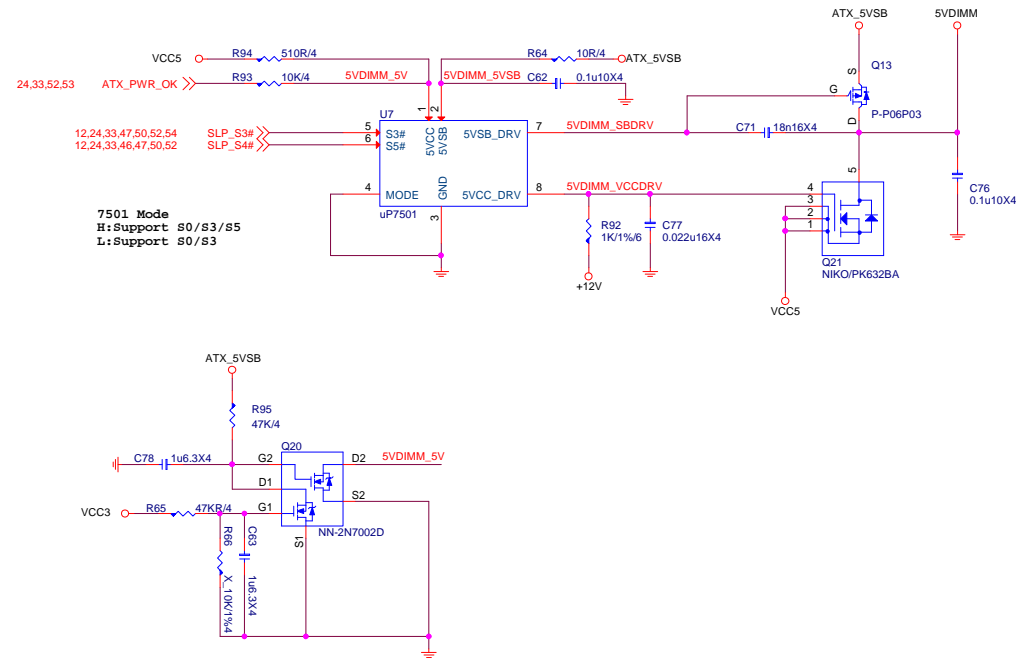


MICRO-STAR INT'L CO.,LTD

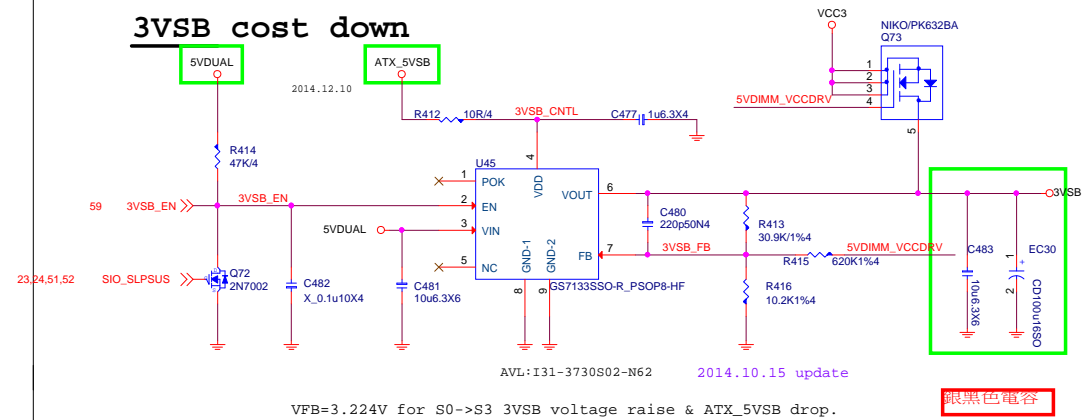
MS-7B54

Size	Document Description	Rev
Custom	PCH Power - RT8125E	1.0
Date: Tuesday, August 29, 2017	Sheet 51 of 65	

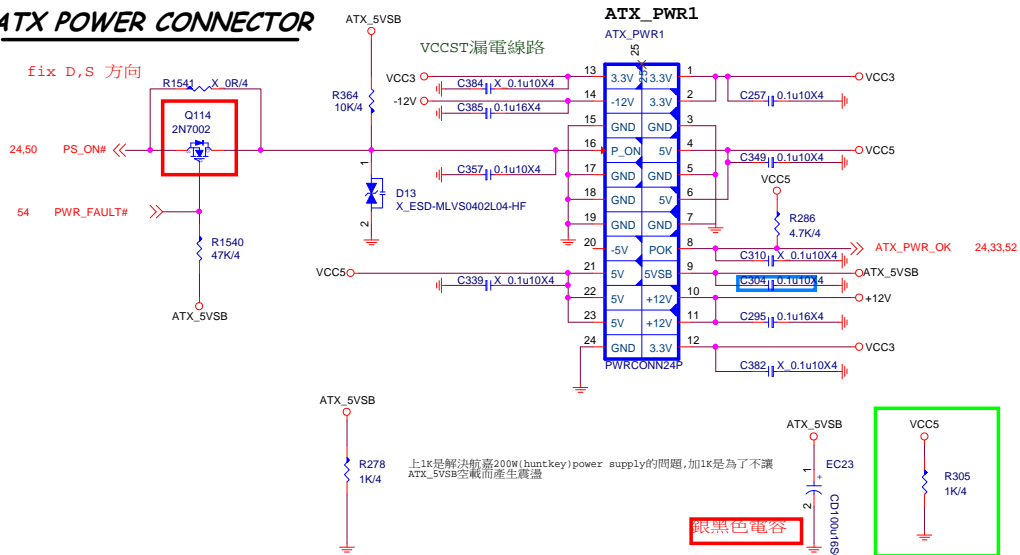
5VDIMM FOR DDR



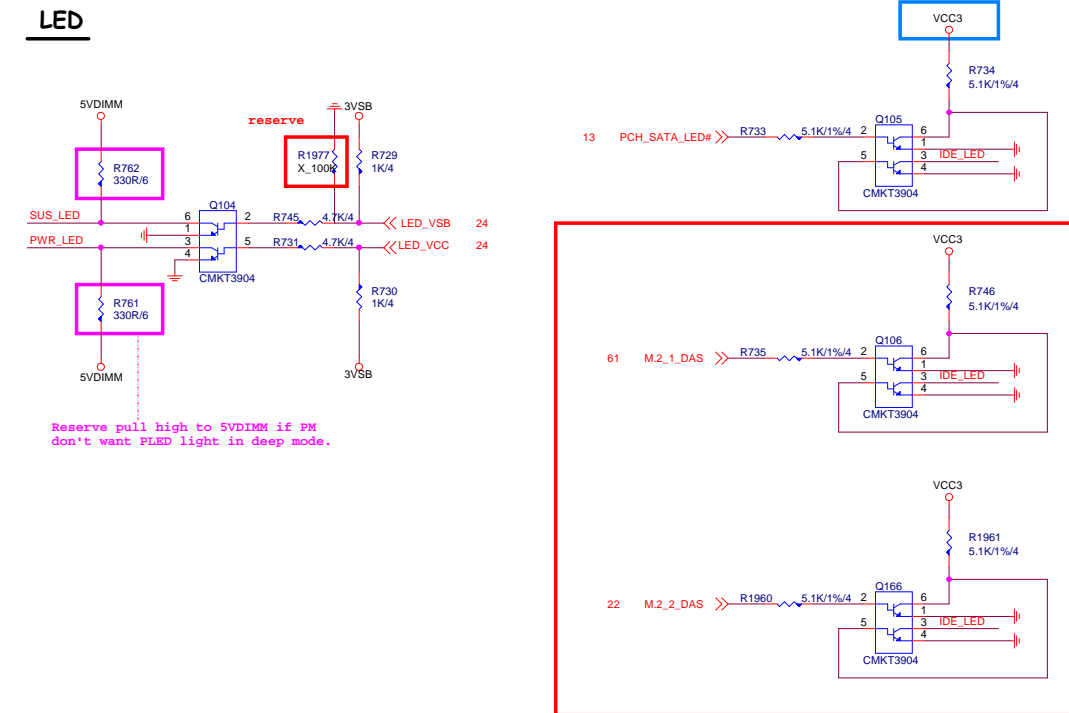
3VSB cost down



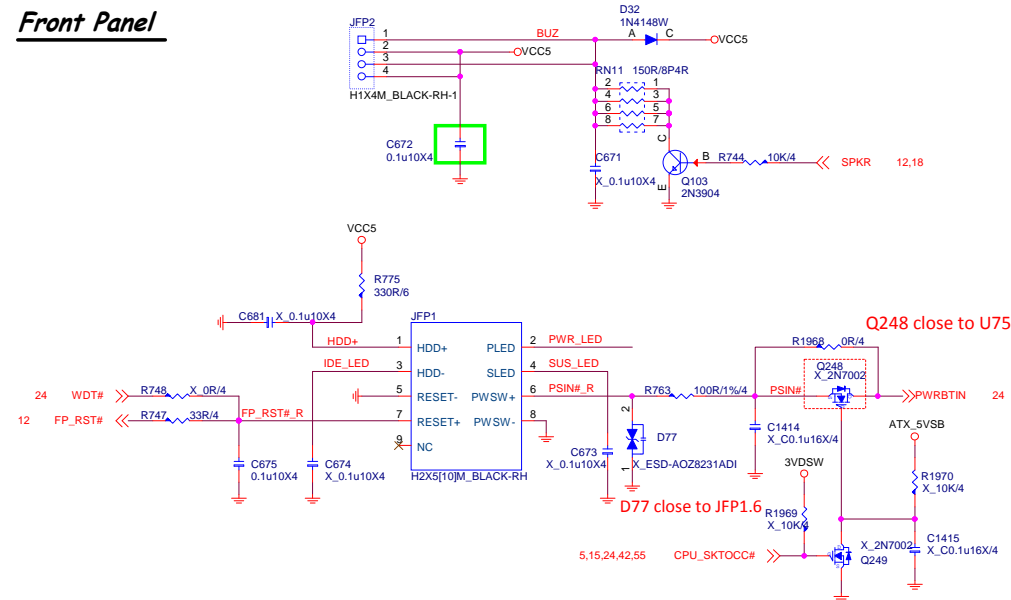
ATX POWER CONNECTOR



LED



Front Panel

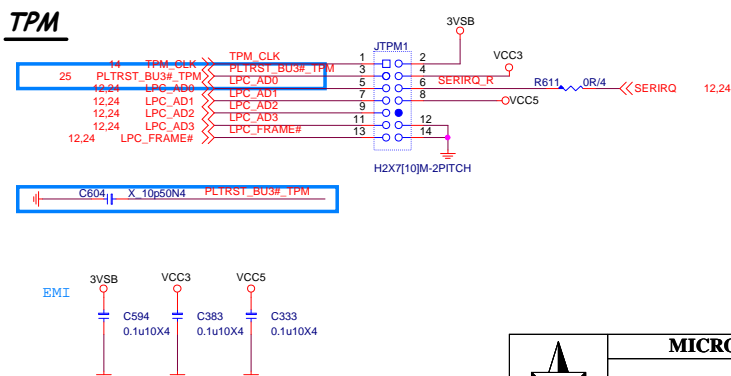


default use only CPU LED			
	SIO SKTOCC#	CUT PSIN#	Only CPU LED
R1968	O	X	O
Q248	X	O	X
C1414	X	O	X
R1969	X	O	O
D77	X	O	X
Q249	X	O	X
R1970	X	O	X
C1415	X	X	X

JTBT

DEL JTBT

TPM



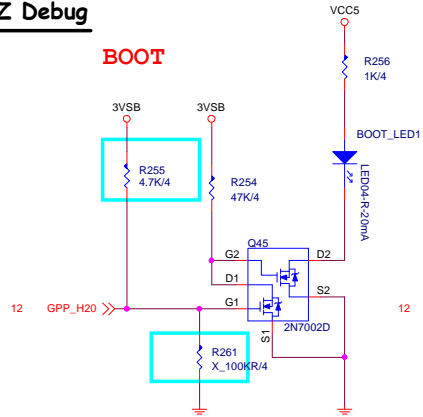
MICRO-STAR INT'L CO.,LTD

MS-7B54

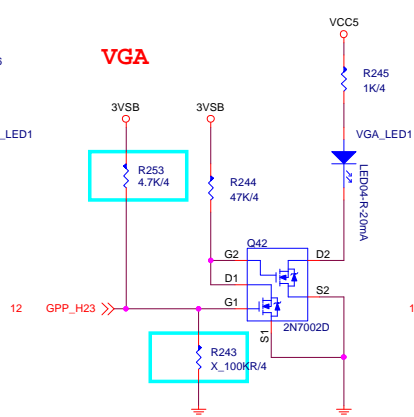
Size Custom	Document Description ATX Power/F_Panel	Rev 1.0
Date: Tuesday, August 29, 2017		Sheet 53 of 65

EZ Debug

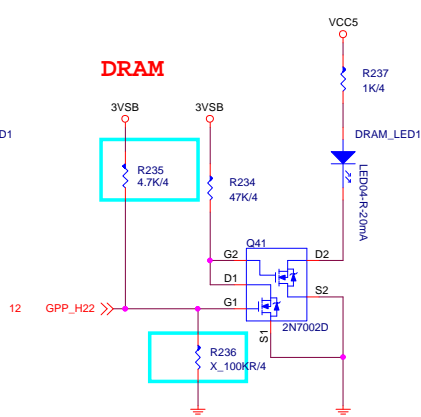
BOOT



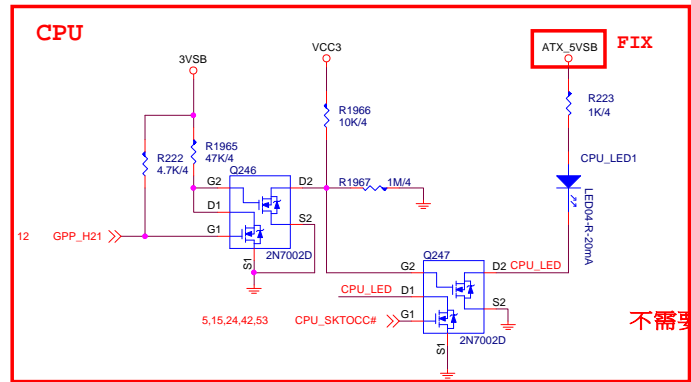
VGA



DRAM



CPU



MCJ SKU
不需要EZ Debug LED
不上件

- 開機斷電狀態下，4個LED先維持default全暗，開機通電後：
1. 首先進行CPU checkCPU LED 亮，check PASS後則CPU LED減掉。
 2. 接著依序進行Memory /memory LED亮check PASS後則memory LED減掉。
 3. VGA的check/VGA LED亮，check PASS後則VGA LED減掉。
 4. 因此最後正常順利開機後，三個LED燈都是減掉的。
- (系統重啟或其他原因造成系統重開機，則LED仍按上述行為動作)

LED

紅 : D0C-040S500-E07
白 : D0C-040S200-E07

DIMM

DEL DIMM LED

PCIE

PCIE SLOT LED

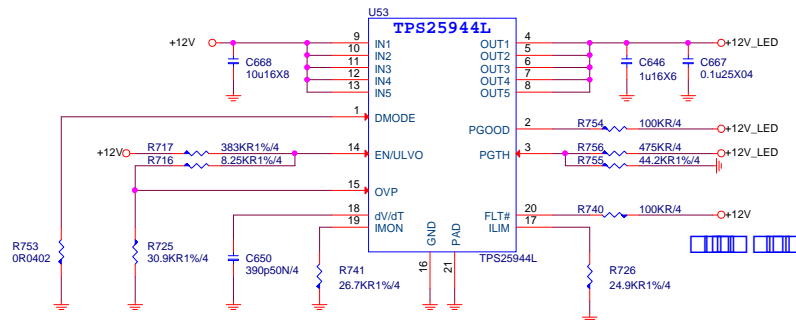
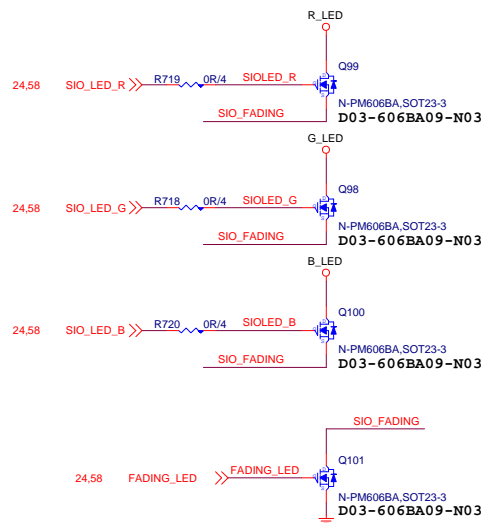
PCIE SLOT LED 命名請以PCIE_LEDn n為數字

DEL PCIE LED

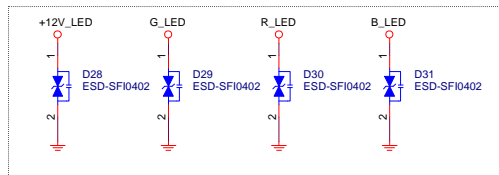
GPIO LED	GPP_C8	GPP_C9
亮	GPO PO HIGH	GPO PO HIGH
滅	GPI (default LOW)	GPI (default LOW)

LED	PCH_GP20	PCH_GP21	PCH_GP22	PCH_GP23
亮	NATIVE PULL HIGH	GPO PULL HIGH	GPO PULL HIGH	NATIVE PULL HIGH
滅	NATIVE LOW	GPO LOW (default LOW)	GPO LOW (default LOW)	GPO LOW (default LOW)

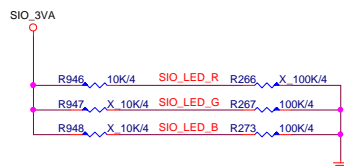
LED Control by SIO



2016.07.06 Use TPS25944L



2016.07.06 only reserve now



Color	SIO_LED_R	SIO_LED_G	SIO_LED_B
RED	1	0	0
GREEN	0	1	0
BLUE	0	0	1
WHITE	1	1	1

PCH HEATSINK LED

PIPE_VCC5 > 20mil

DEL PCH HEATSINK LED

M:D08-0800300-P16

N32-1020CG0-H06

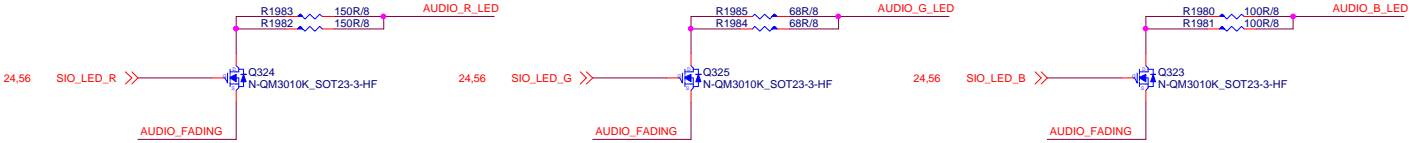
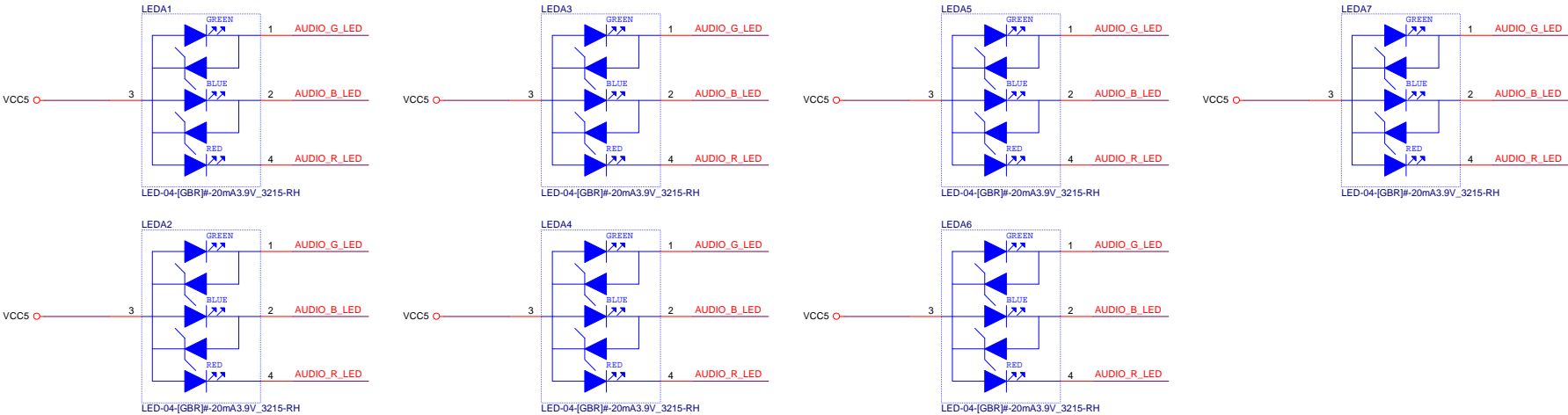
單色 : 電流0.02 A x 總燈數

PIPE_VCC5 please check your Heatsink LED USE

BOTTOM LED

DEL BOTTOM LED

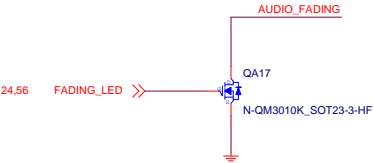
AUDIO_LED



Vf=1.7 V~2.3V
5.05V-1.9V/27.3=0.115A
0.115A*0.115A*27.3=0.36W
PS:實際量測LED Vf=1.9v

Vf=2.7 V~3.45V
5.05V-2.8V/27.3=0.0824A
0.0824A*0.0824A*27.3=0.185W
PS:實際量測LED Vf=2.8v

Vf=2.7 V~3.45V
5.05V-2.9V/27.3=0.0787A
0.0787A*0.0787A*27.3=0.169W
PS:實際量測LED Vf=2.9v



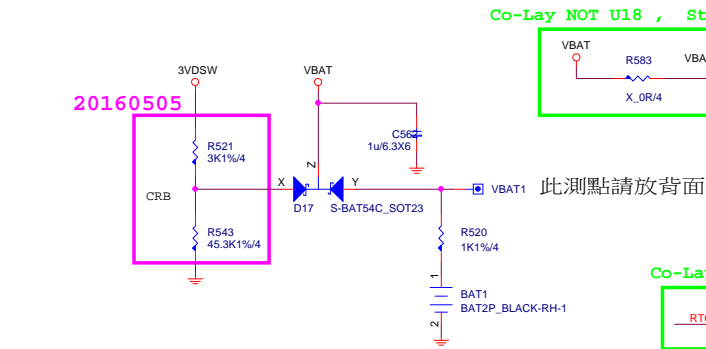
Function 1		
IN		OUT
INPUT1	INPUT2	OUTPUT1
0	1	1
1	0	0
1	1	0
0	0	0

Default

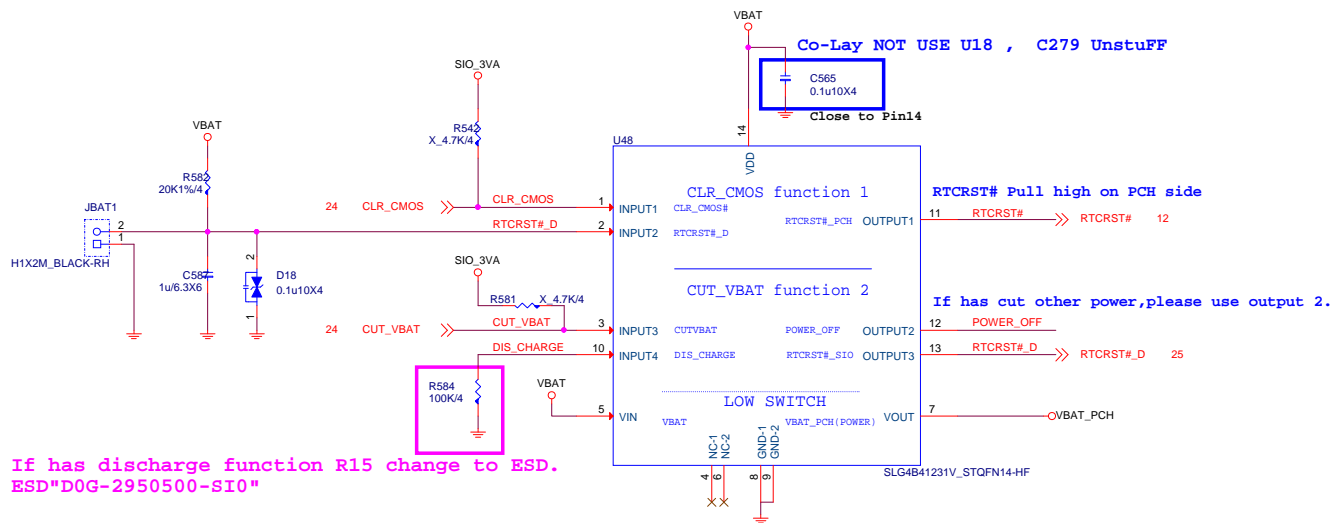
Function 2				
IN		OUT		
INPUT3 & lowswitch EN	INPUT4	OUTPUT2	OUTPUT3	VOUT
0	0	0	1	1
1	0	1	1	0 (discharge)
0	1	1	0	0 (discharge)
1	1	1	0	0 (discharge)

Default

If STUFF R20 Please Check RTCRST# Double Pull High

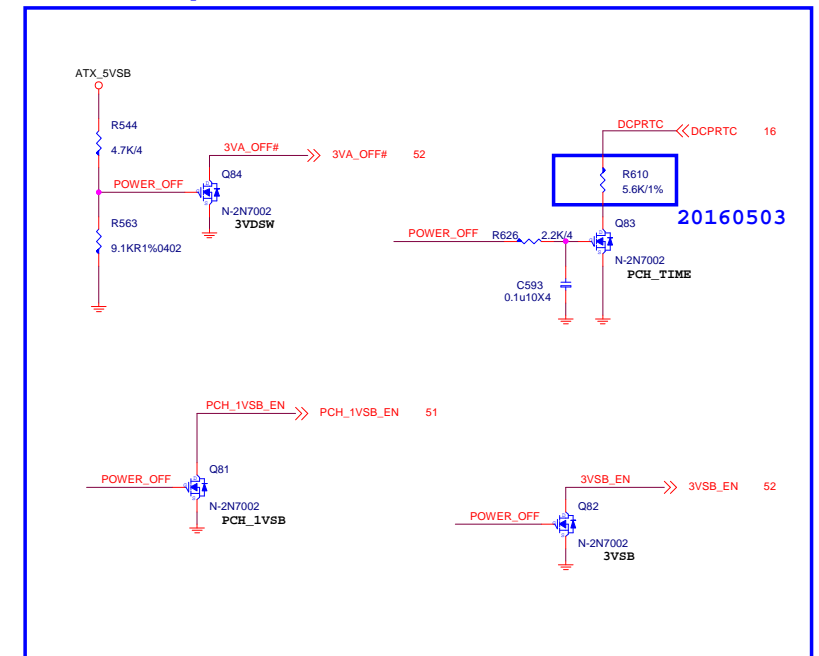


Co-Lay NOT USE U1 , R20 STUFF



If has discharge function R15 change to ESD.
ESD"D0G-2950500-SI0"

Co-Lay NOT USE U1 , ALL UNSTUFF



MICRO-STAR INT'L CO.,LTD

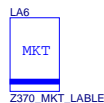
MS-7B54

Size	Document Description	Rev
Custom	Clear CMOS	1.0
Date: Tuesday, August 29, 2017	Sheet 59 of 65	

SPB 系統



MCJ



DEL DIMM_COVER



7B54_10

<New PN>

PD0-07A6910-G37, 精成-深圳, 75, 寶安恩斯邁廠 (MSIS)
PD0-07A6910-E48, 競華, 75, 寶安恩斯邁廠 (MSIS)

CHANNEL/MCJ

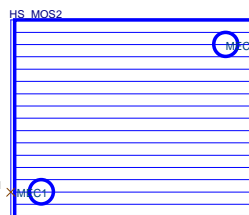
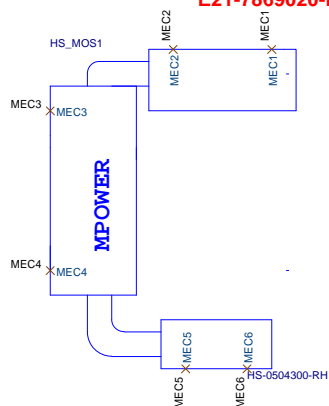


SPB 系統



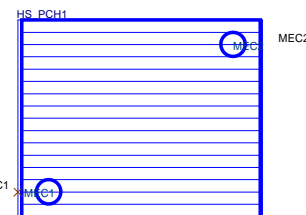
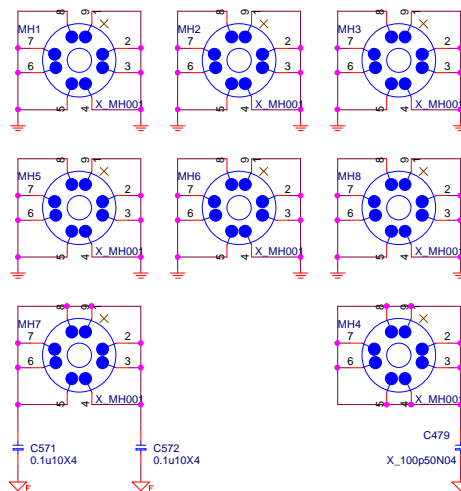
E21-7869020-F02

E21-7557050-L06



E31-0504320-A87

Mounting Holes

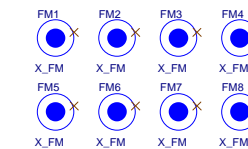


E31-0409330-A87

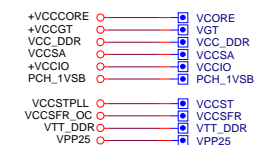
Simulation



Optical Fiducial Marks-120



Test point



MS-7B54-10

OPT	Configure	BOM	Function
STD	Z370	601-7B54-	MS-7A69 0A, Z370, LGAl151, 2DDR3, 2DDR4, 1PCI-Ex16, 2PCI-Ex1, 4SATA3, 6USB3, HD Audio, Gb LAN, DSUB, DVI, HDMI



MICRO-STAR INT'L CO.,LTD

MS-7B54

Size	Document Description	Rev
Custom	Manual parts	1.0
Date: Monday, September 04, 2017	Sheet 60 of 65	

