

TITLE	Page
Cover Sheet	1
Block Diagram	2
CPU-Memory, CPU-PEG/Display	3,4
CPU-Control/MISC/CFG/Audio	5
CPU-Power,CPU-GND	6,7
DDR4 DIMM1&DDR4 DIMM2	8,9,10,11
PCH-USB/PCIE/DMI/SATA	12
PCH-Audio/Display/Clock	13
PCH-GPIO/USBOC#/SATASTRAP	14
PCH-LPC/SPI/SMBUS/MISC	15
PCH-Power,PCH-GND,PCH-Strap	16,17,18
PCIE SLOT-CPU(X16)	19
PCIE SLOT-PCH(X1)	20
SIO-NCT5567D / FAN CONTROLLOR	21,22
AUDIO - ALC887,AUDIO - depop circuit	23,24
LAN - RTL8111H	25
DVI/HDMI/VGA	26,27,28
USB2.0/USB3.0/LAN_USB/SATA connector	29~32
CLR_CMOS circuit/BIOS ROM	33,34
ACPI CONTROLLER	35
PWM-RT3607BC/VCORE 4PHASE/VGT 2PHASE	36,37,38
DDR-RT8231/DDR-PM2143-VPP25	39,40
CPU PWR_ST/PLL/PCH Core power	41,42
VCCSA - POWER/VCCIO - POWER	43,44
ATX F_Panel/TPM/MSI_LED	45
DEBUG LED/EMI CAP/Manial Part	46,47,48
Power Map/Power Sequence/GPIO MAP	49,50,51
Revision History	52

MS-7B33

ATX:226mm*185mm

Ver: 11

Intel -CoffeeLake-S plamform

CPU:

LGA1151

CPU POWER PAK *4Phase

GT POWER PAK *2 Phase

Onboard Chip:

SIO: NCT5567D

HD Audio Codec: ALC887

LAN: RTL8111H

Flash ROM: SPI 64 MB

DP to VGA: RTD2166

Main Memory:

DDR4 * 2 (Dual Channel)

ACPI:

5VDAUL:uP7501

5VDIMM:uP7501

3VSB:MP2147

1P8_VSB:GS7133

3VDSW:GS7116

VCCSTPLL:GS7133

Expansion Slots:

PCI Express (X16) Slot * 1

PCI Express (X1) Slot * 2

System Chipset:

Cannon Lake H310

PWM:

VCORE - RT3607

DDR - RT8231

DDR VPP25- MP2143

PCH(1.05V) - RT8125E

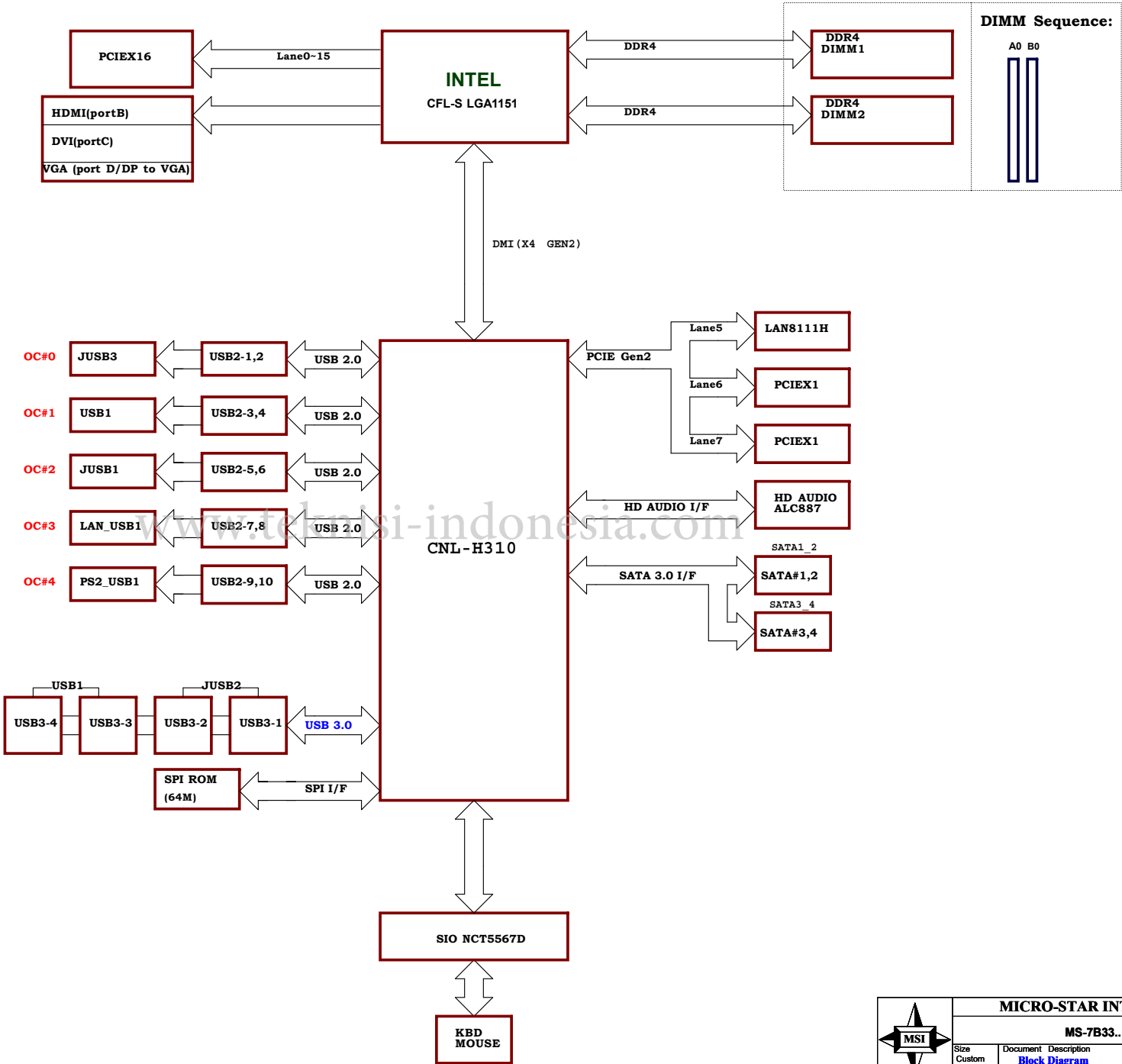
VCCSA - RT8125E

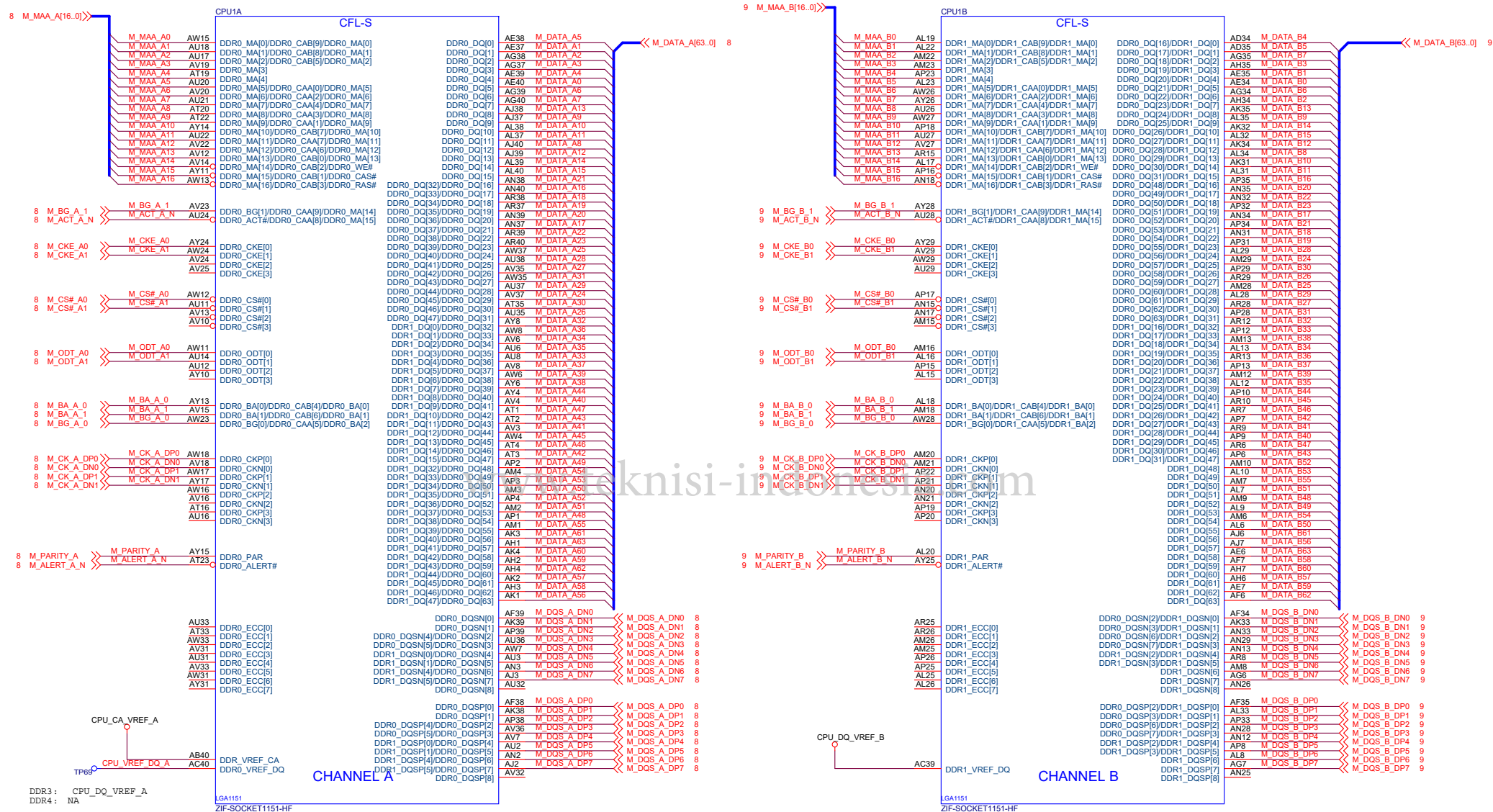
VCCIO - SY8288

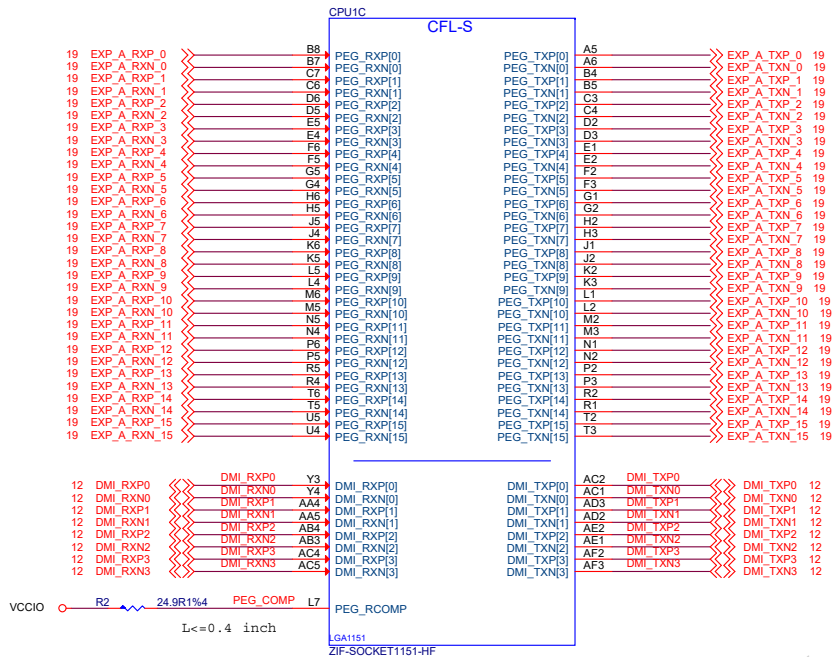


MICRO-STAR INT'L CO.,LTD		
MS-7B33..		
Size Custom	Document Description	Rev 11
Cover Sheet		
Date: Wednesday, January 10, 2018	Sheet 1 of 52	

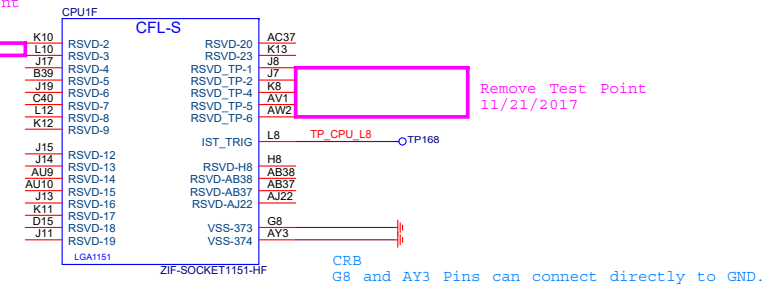
MS-7B33 Block Diagram



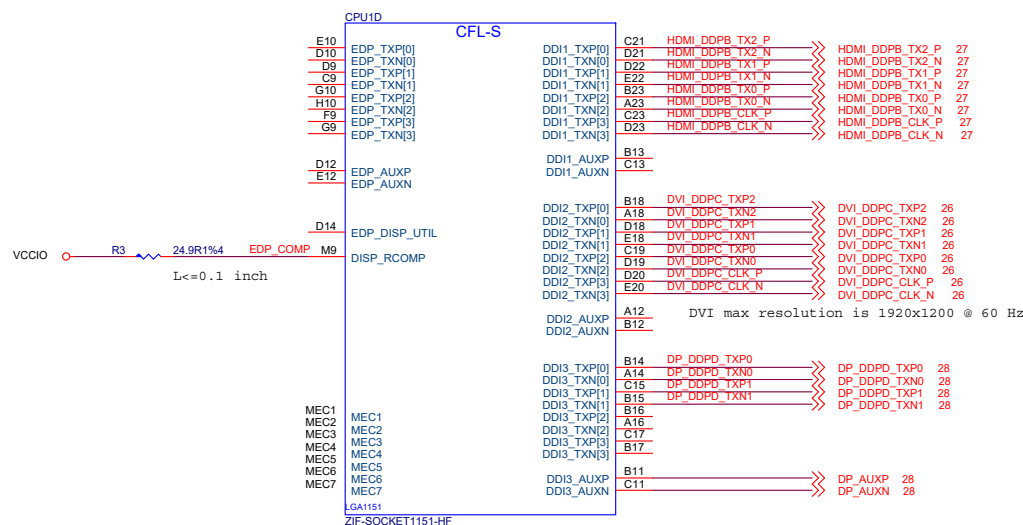
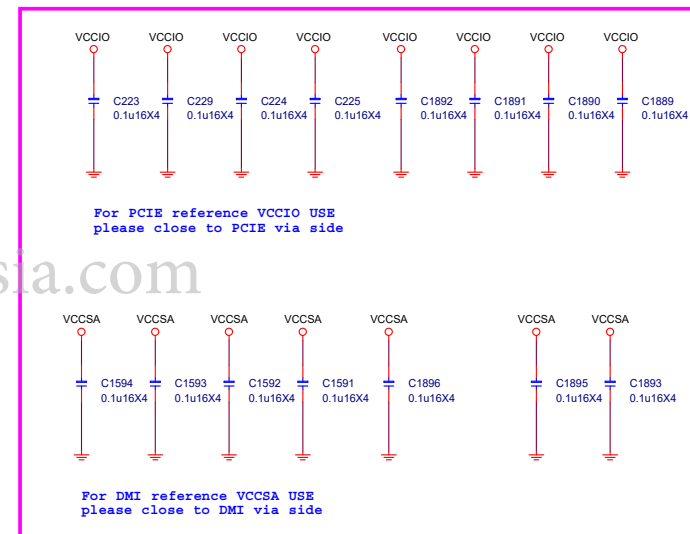


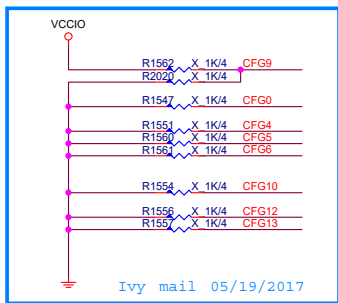
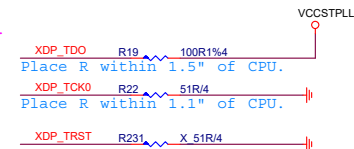
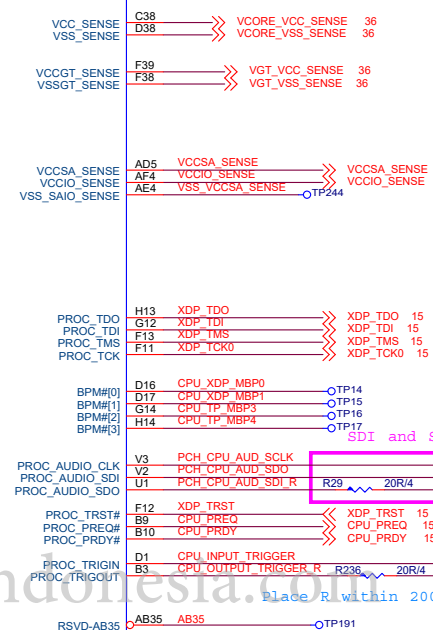
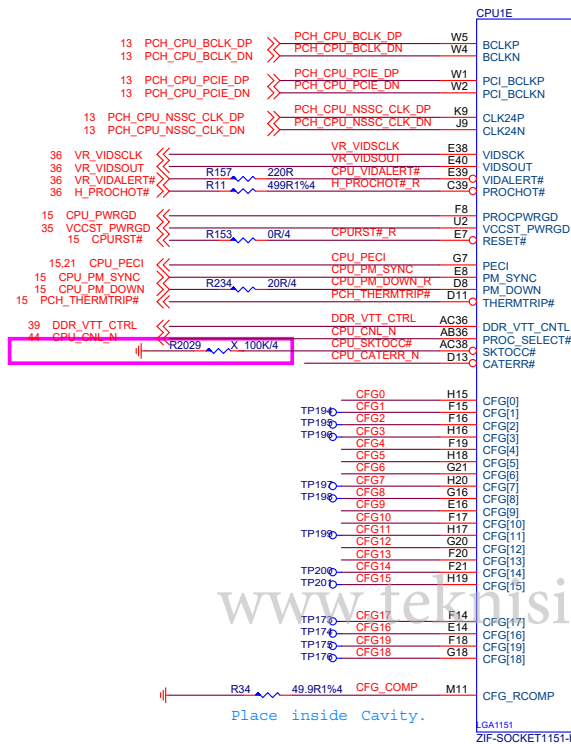
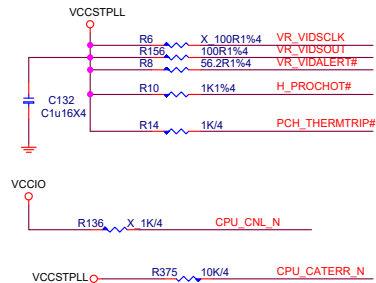


Remove Test Point
11/21/2017

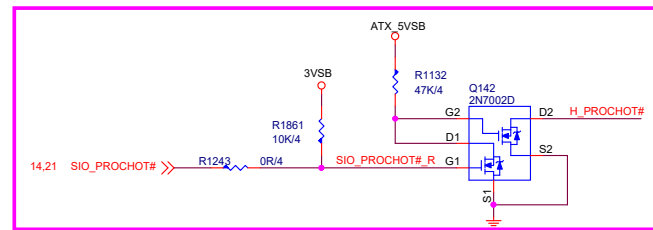


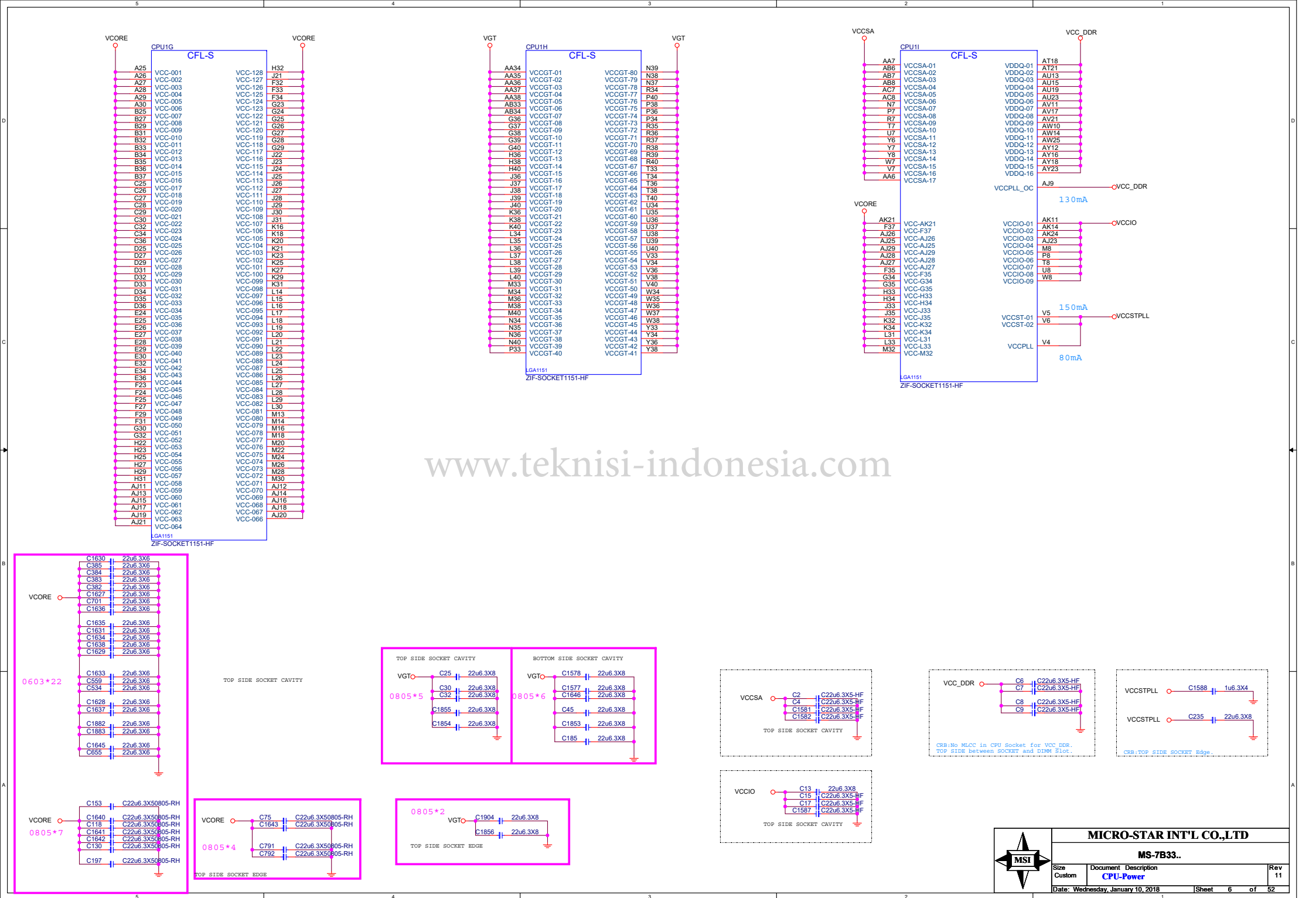
Remove Test Point
11/21/2017





CFG Table			
HIGH	LOW	DESCRIPTION	
0 No Lock	Lock	PCU PLL Lock	
1	RSVD		
2 NORM	REVERSE	FB3 LANE REVERSAL	
3	RSVD		
4 DISABLE	ENABLE	eDP	
5 DISABLE	ENABLE	FB30CFGSEL[0]	
6 DISABLE	ENABLE	FB30CFGSEL[1]	
7 RESET#	BIOS REQ	FB3 DEFER TRAINING	
8	RSVD		
9		RSVD	
10		RSVD	
11		RSVD	
12		RSVD	
13		RSVD	
14 RSVD			
15 RSVD			





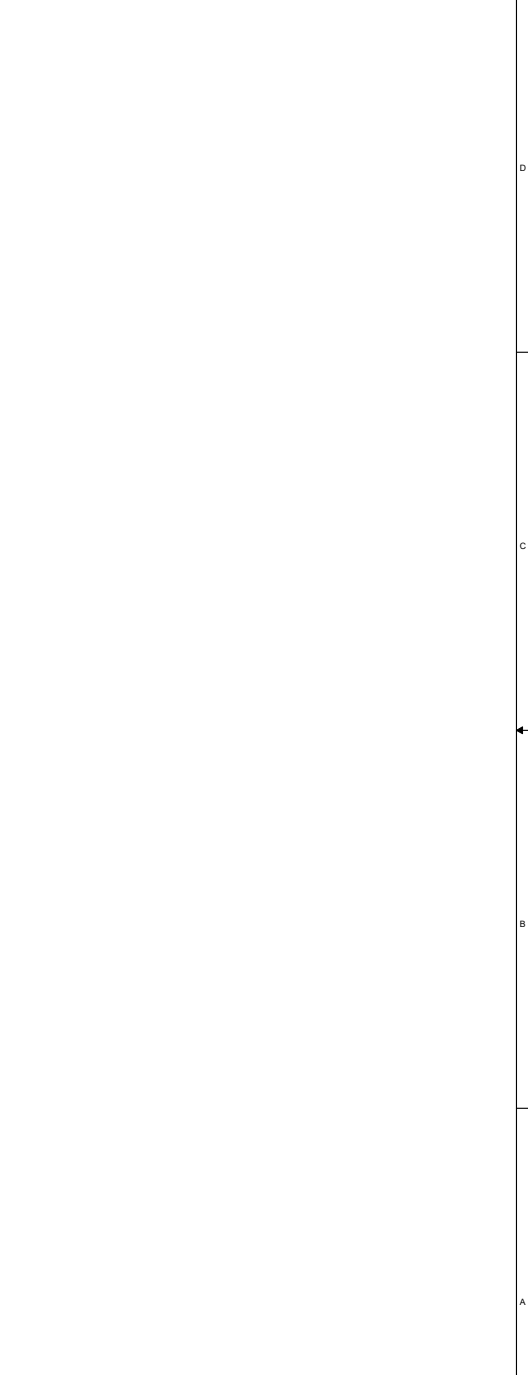
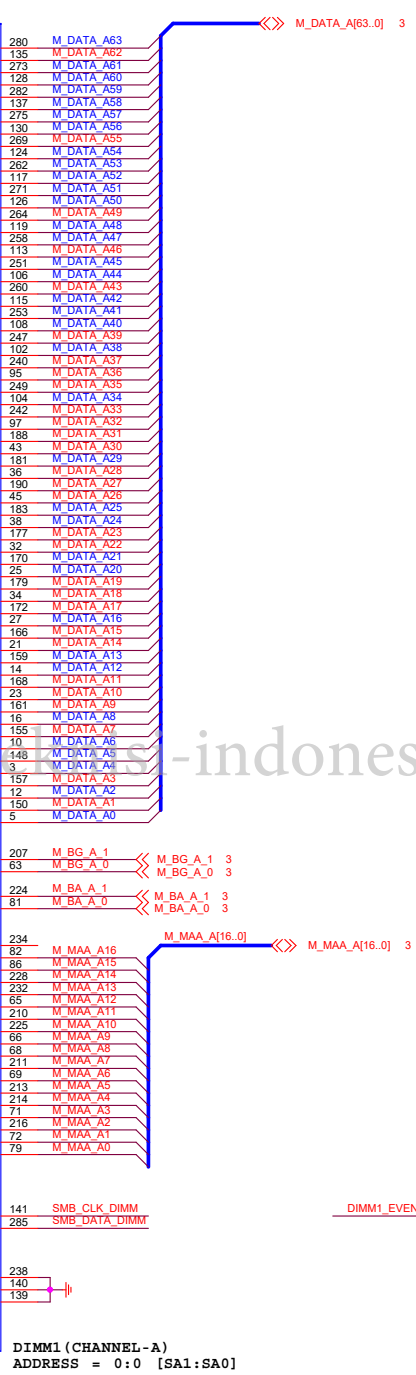
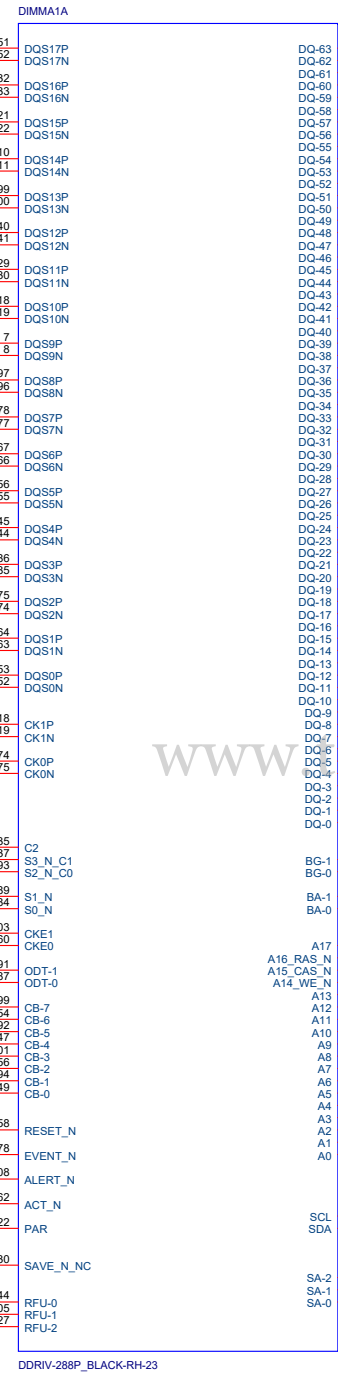
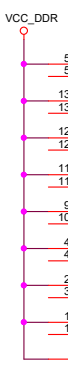
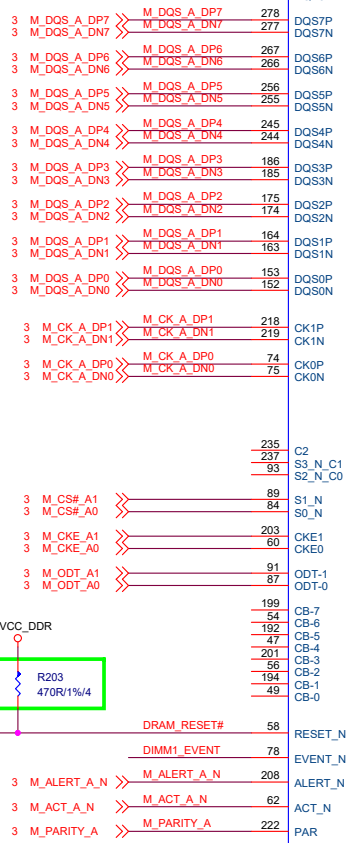
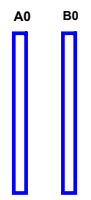
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MS-7B33..

Size	Document	Description	Rev
Custom		CPU-Power	11
Date: Wednesday, January 10, 2018		Sheet 6 of 52	



2014.10.16
For DDR white paper 0.89

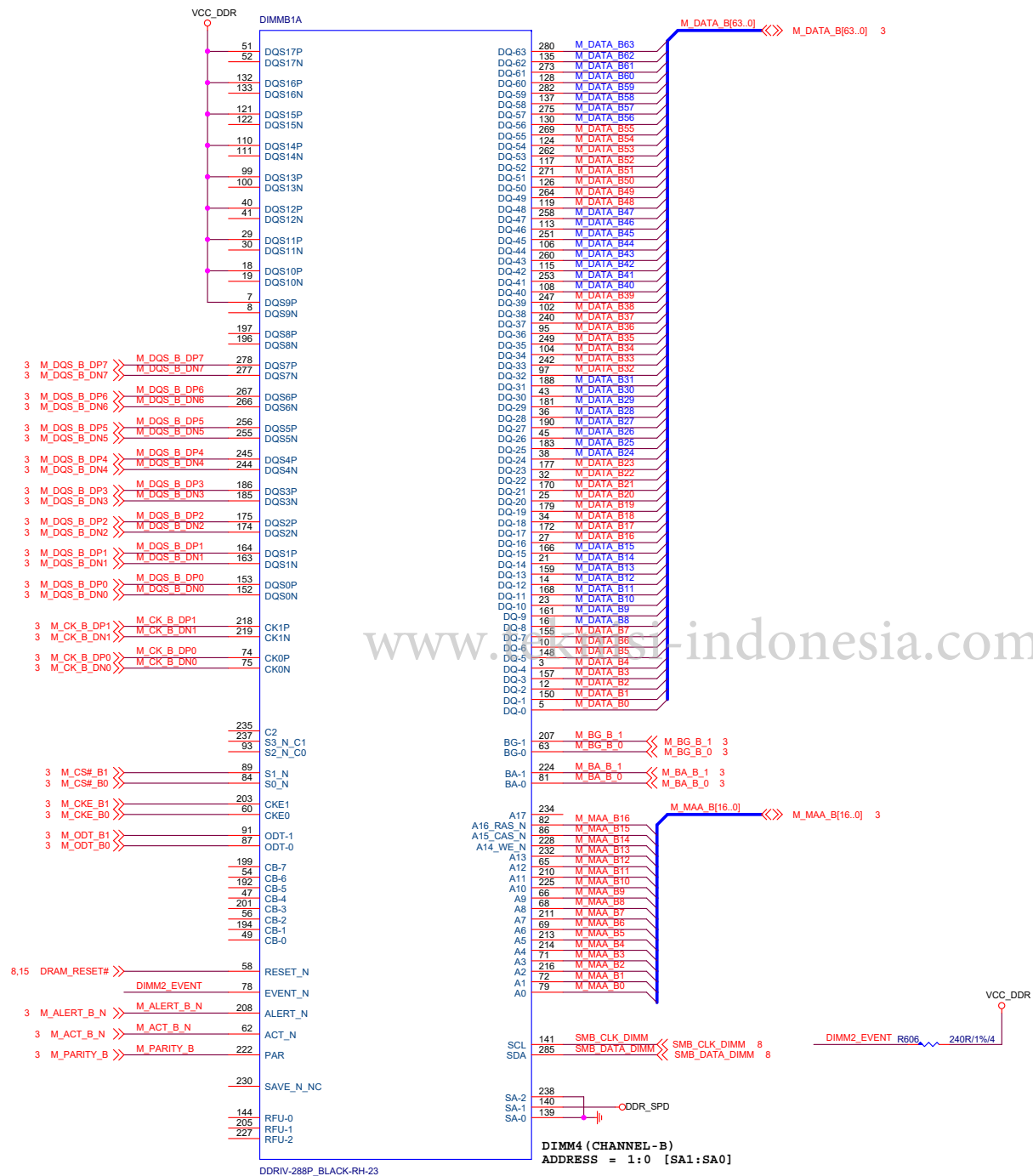
15,21,28 SMBCLK_VCC >> SMBCLK_VCC R238 0R/4 SMB_CLK_DIMM >> SMB_CLK_DIMM 9
15,21,28 SMBDATA_VCC >> SMBDATA_VCC R241 0R/4 SMB_DATA_DIMM >> SMB_DATA_DIMM 9

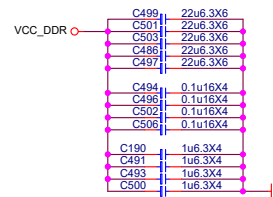
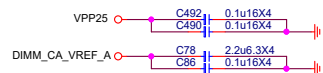
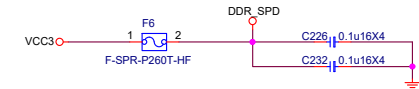
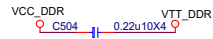
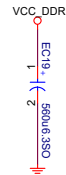
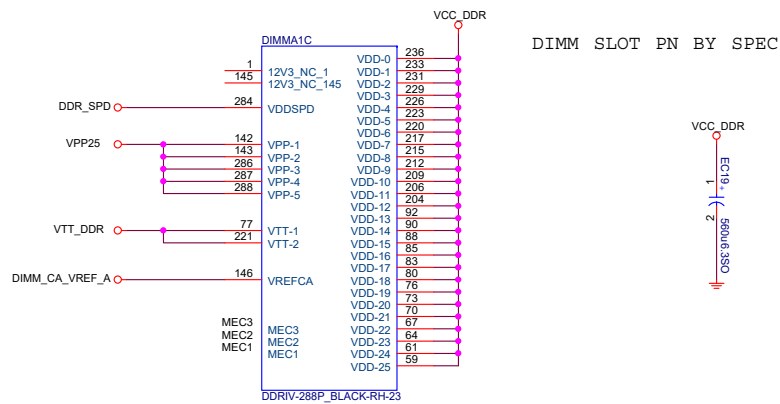
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MS-7B33..

Size	Document	Description	Rev
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Date: Wednesday, January 10, 2018Sheet 8 of 52

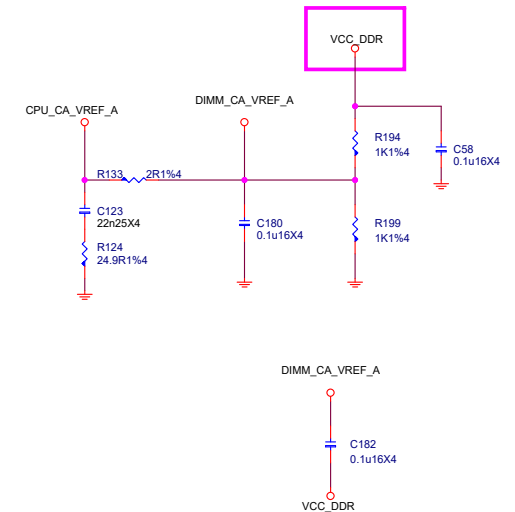
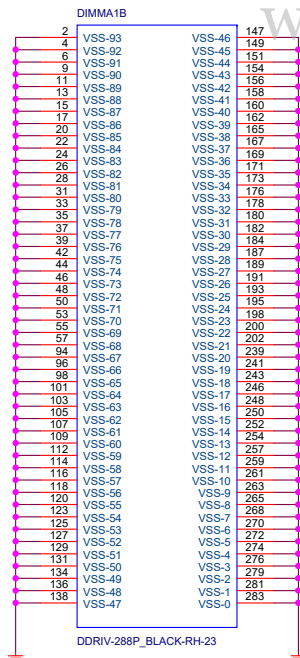
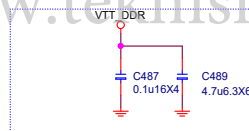




Between CPU Socket and DIMM Slot.



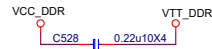
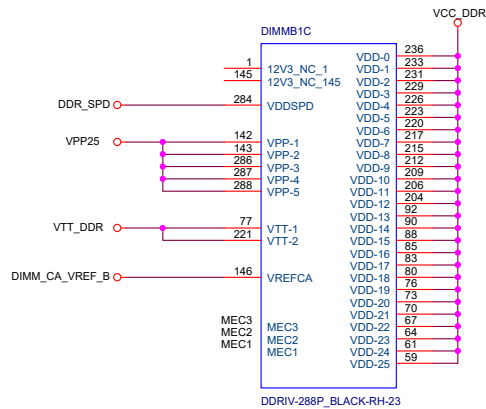
0.1uF x1 per dimm



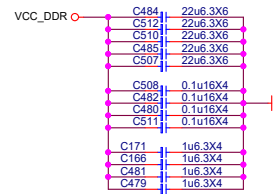
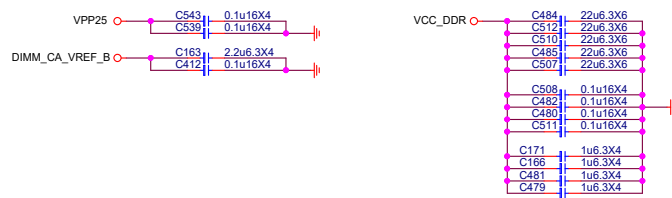
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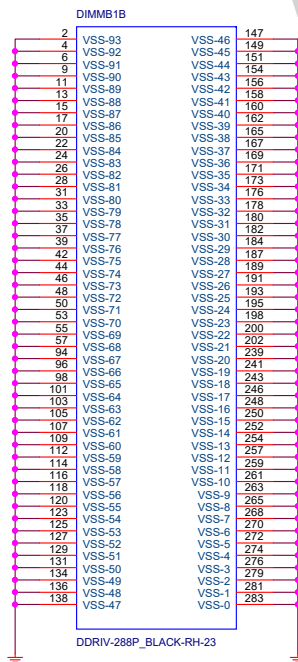
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Date: Wednesday, January 10, 2018	Sheet	10 of 52	



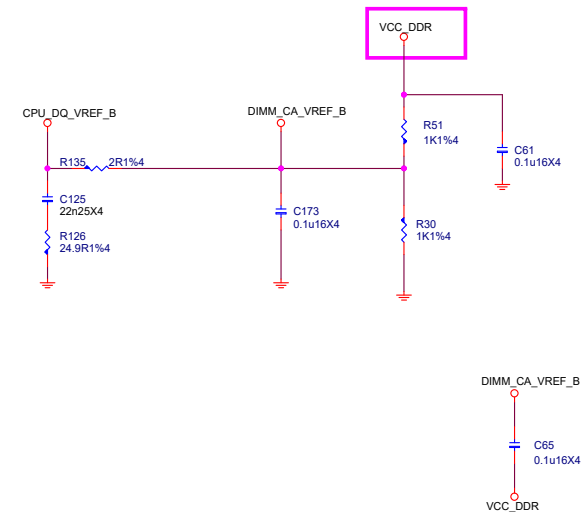
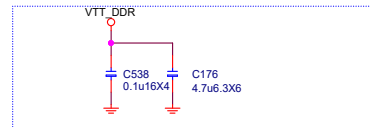
Place close to DIMM2

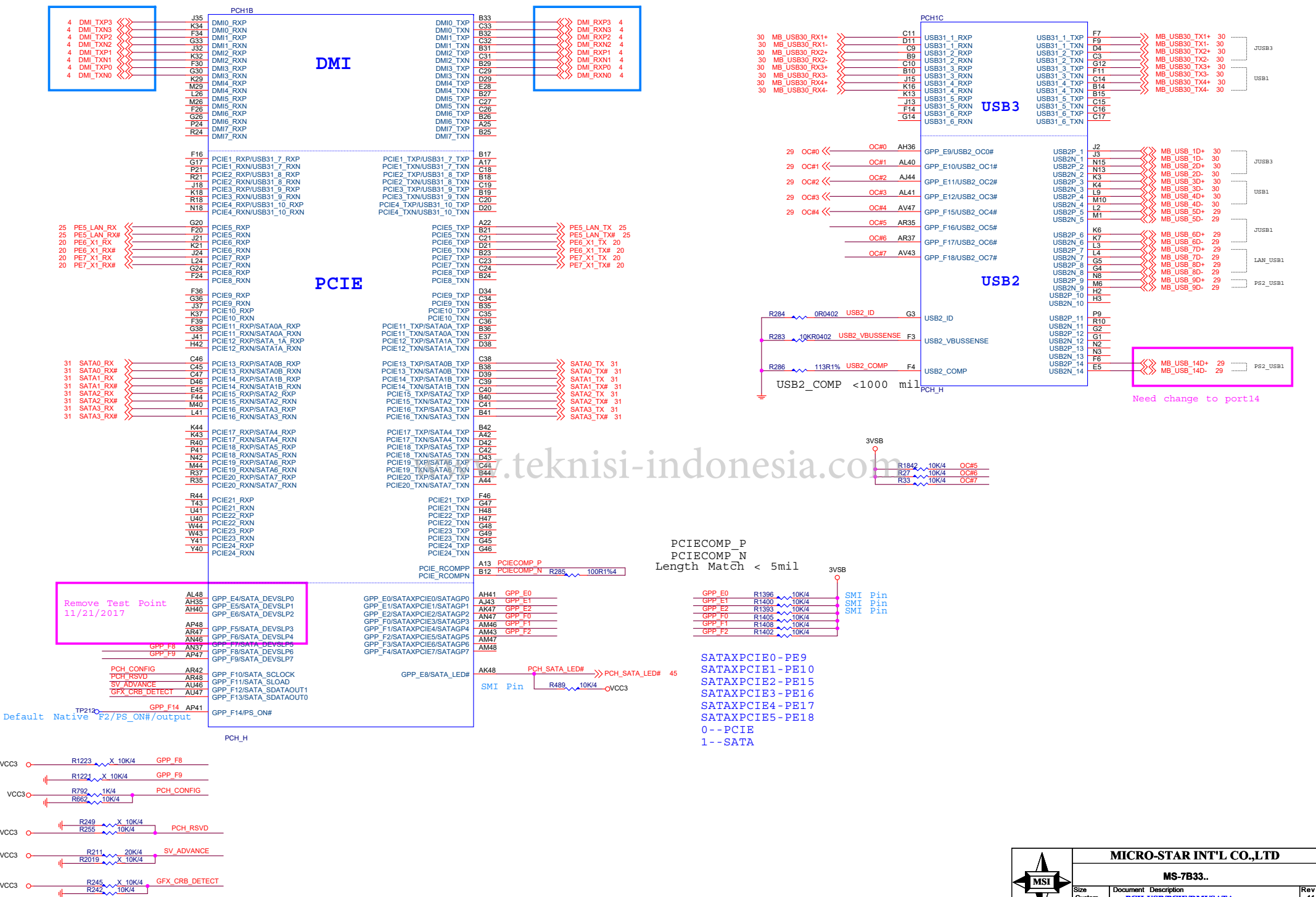


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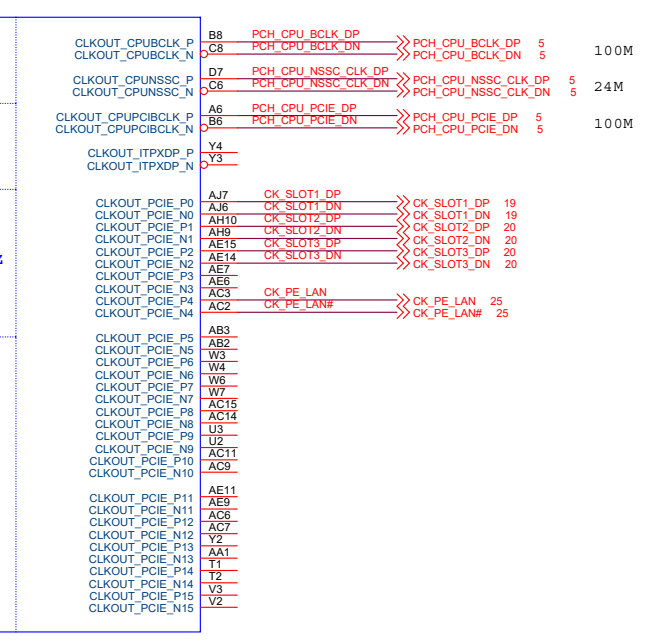
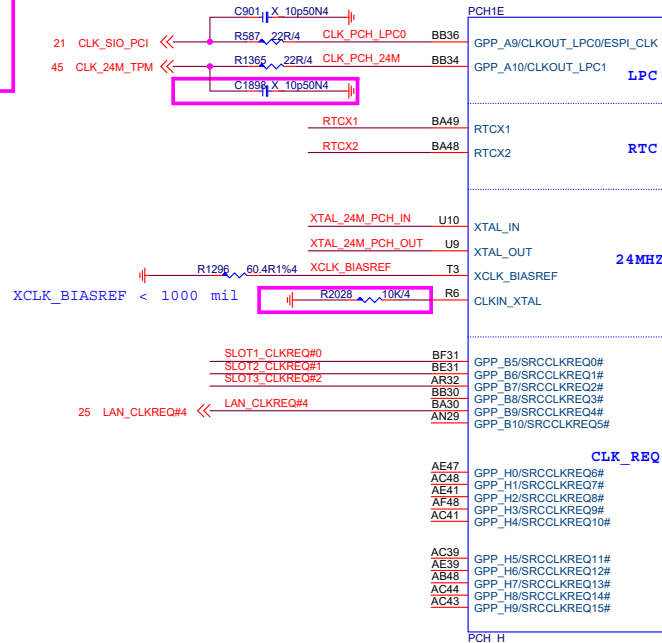
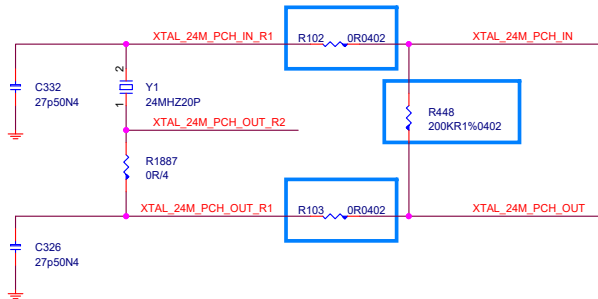
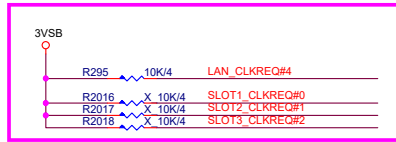
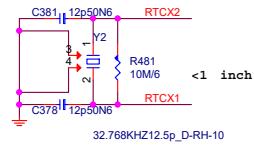
0.1uFxl per dimm



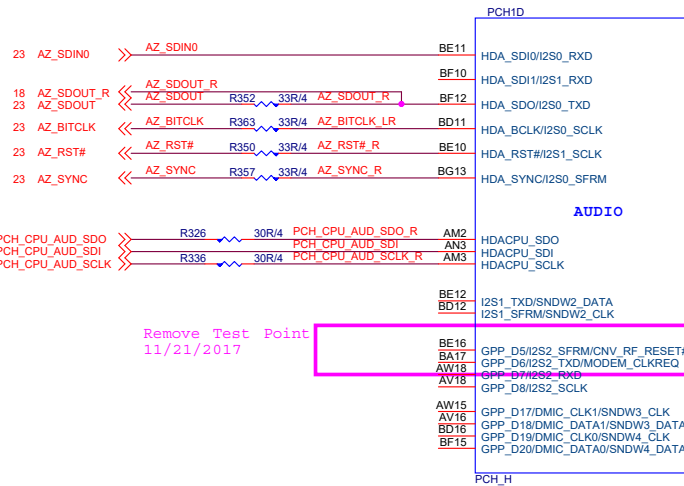
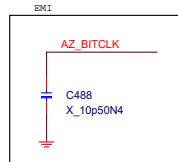


RTC Block

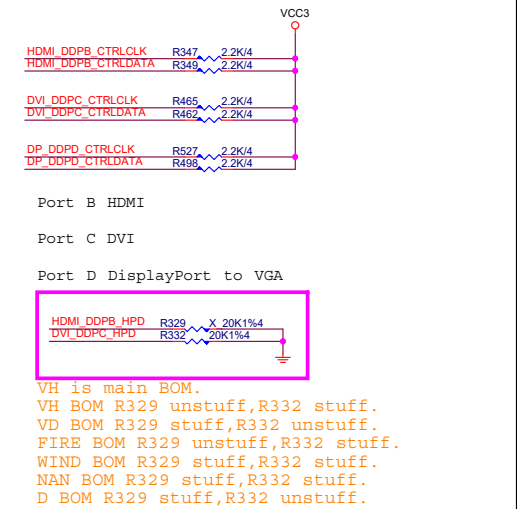
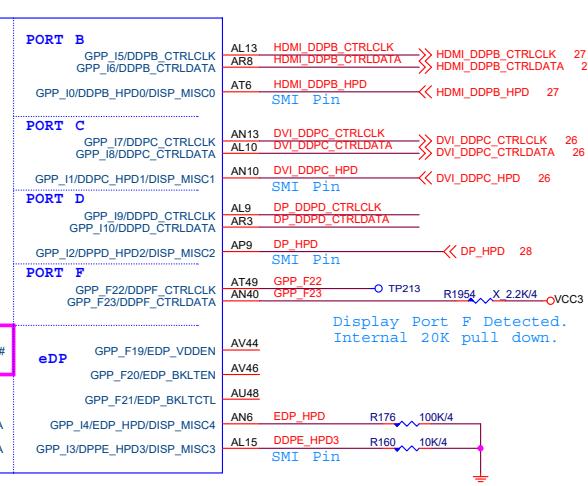
Close to PCH

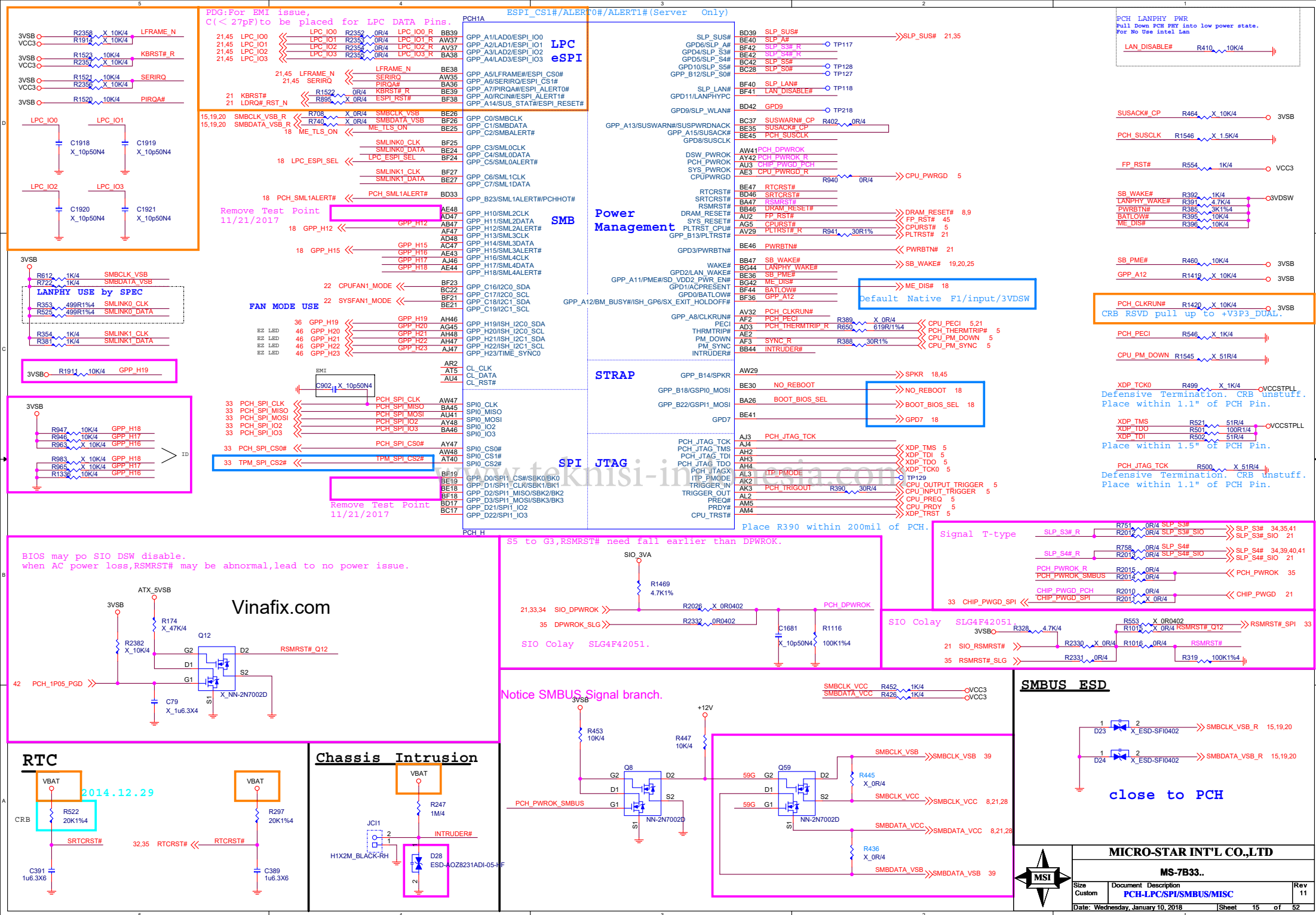


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VSS

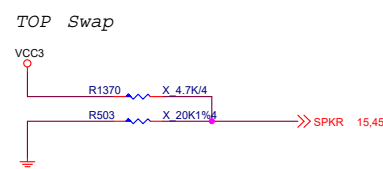
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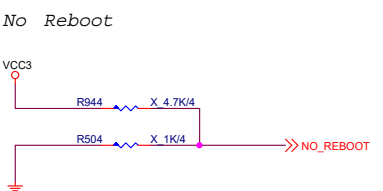
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MS-7B33..

Size	Document	Description	Rev
Custom		PCH-GND	11
Date: Wednesday, January 10, 2018			Sheet 17 of 52



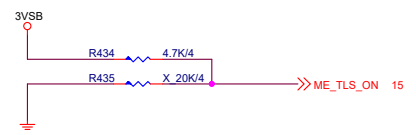
Internal pull-down 20K is disabled after PLTRST#



0 : DISABLE (Default)
1 : ENABLE

Internal pull-down 20K is disabled after PLTRST#

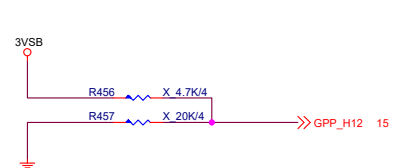
AMT and SBA with confidentiality



0 : DISABLE
1 : ENABLE (Default)

Internal pull-down 20K is disabled after RSMRST

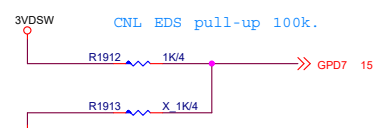
ESPI FLASH SHARING MODE



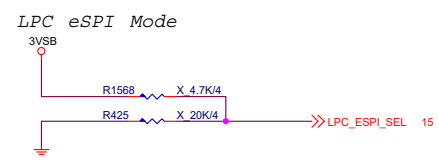
0 : MASTER ATTACHED FLASH SHARING
1 : SLAVE ATTACHED FLASH SHARING

Internal pull-down 20K is disabled after RSMRST

Reserved



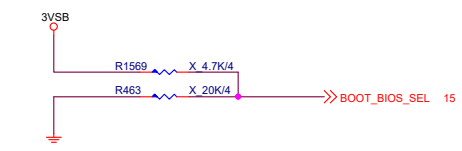
XTAL INPUT MODE
0 = XTAL INPUT IS SINGLE-ENDED
1 = XTAL INPUT IS DIFFERENTIAL
PCH HAS INTERNAL 20K PD



0 : LPC
1 : eSPI

Internal pull-down 20K is disabled after RSMRST

Boot BIOS

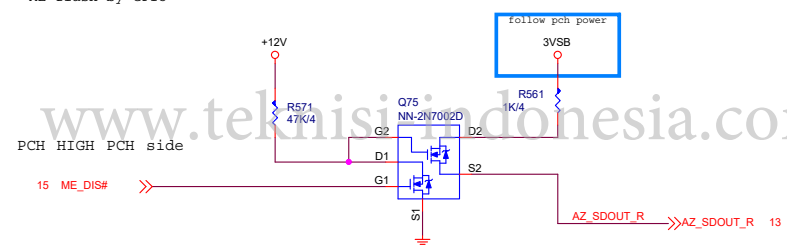


0 : SPI
1 : LPC

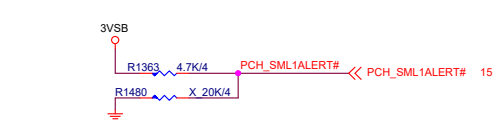
Internal pull-down 20K is disabled after PLTRST#

HDA_SDO

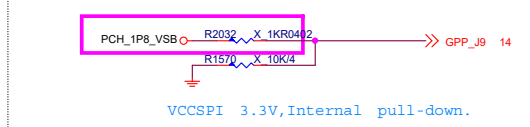
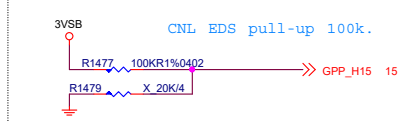
ME flash by GPIO



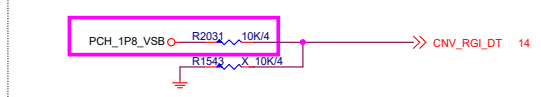
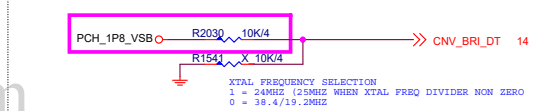
Reserved



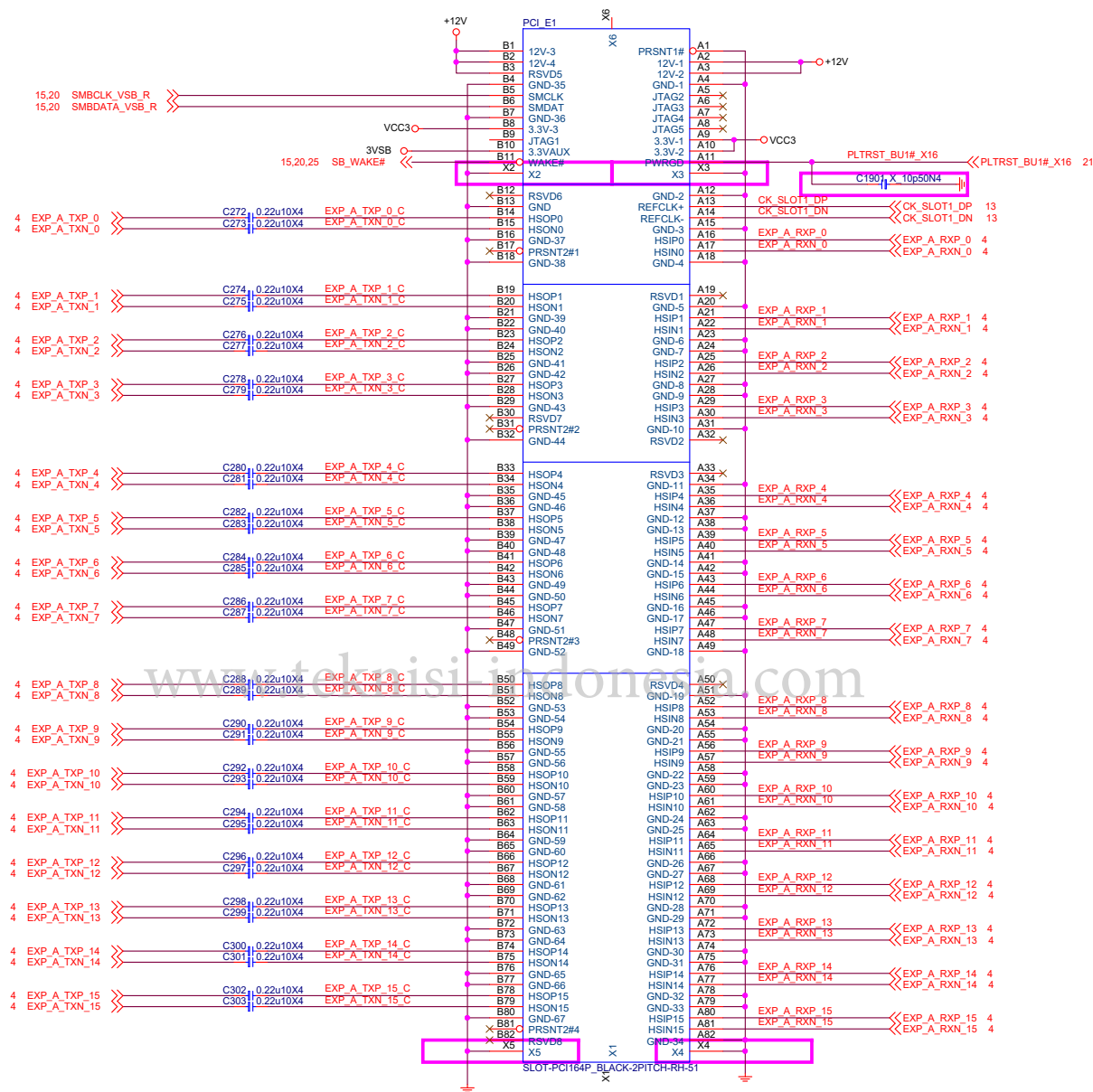
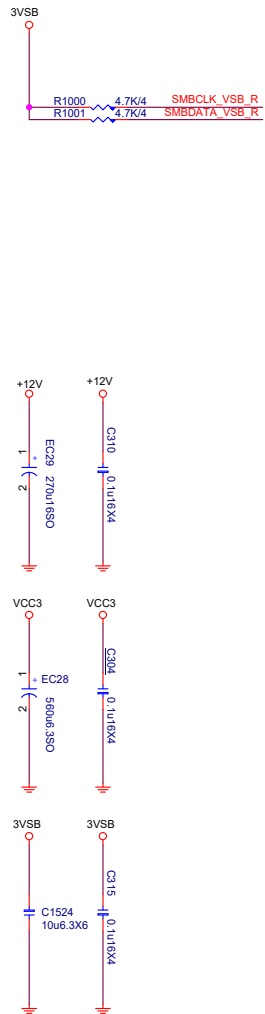
Reserved



SELECT THE SPI BIOS FLASH INTERFACE OPERATING VOLTAGE
0 = VCCPSPI IS CONNECTED TO 3.3V RAIL - DEFAULT
1 = VCCPSPI IS CONNECTED TO 1.8V RAIL
PCH HAS INTERNAL 20K PD

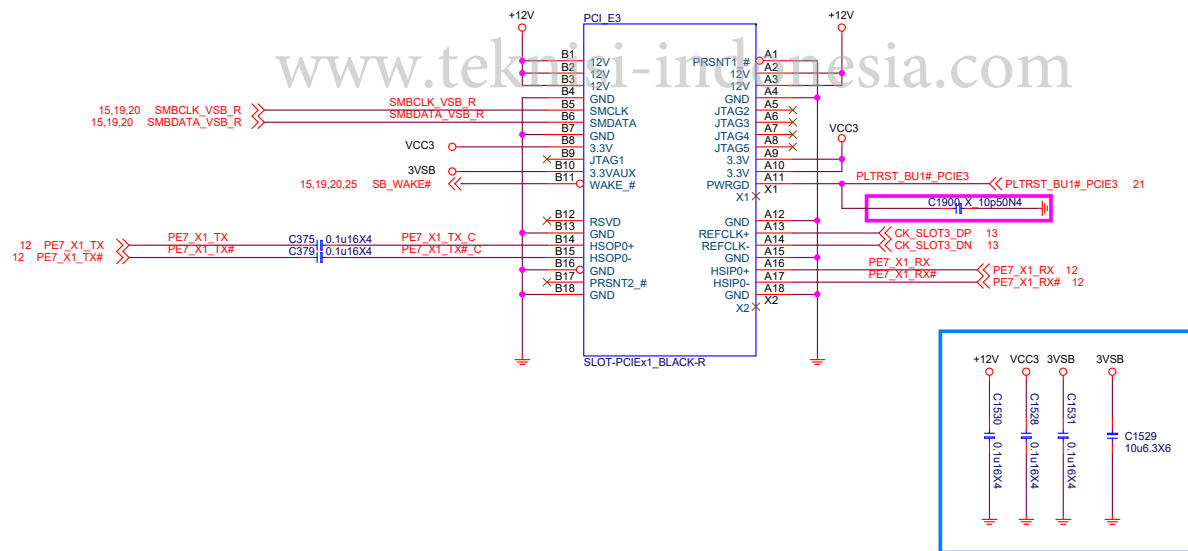
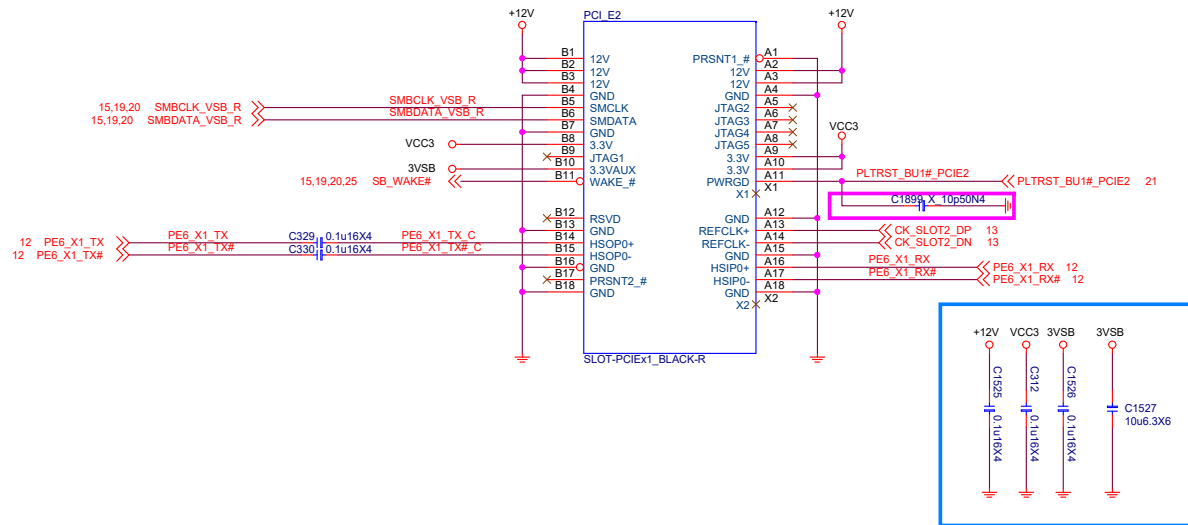


CNL EDS
0 = Integrated CNVi enable
1 = Integrated CNVi disable

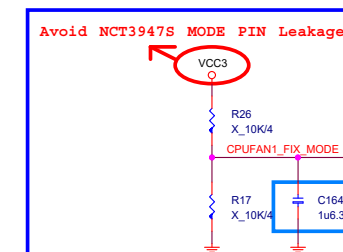


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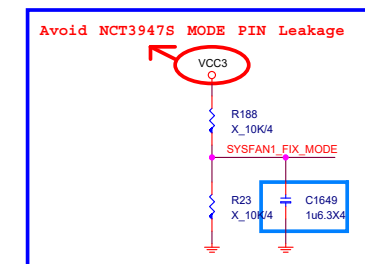
MICRO-STAR INT'L CO.,LTD			
MS-7B33..			
Size	Document	Description	Rev
Custom		PCIE SLOT-CPU(X16)	11
Date: Wednesday, January 10, 2018		Sheet	19 of 52



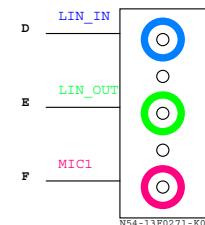
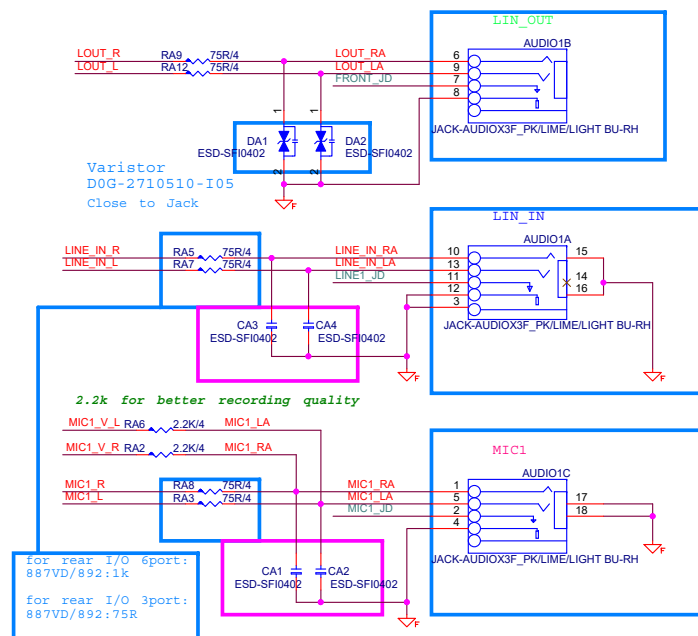
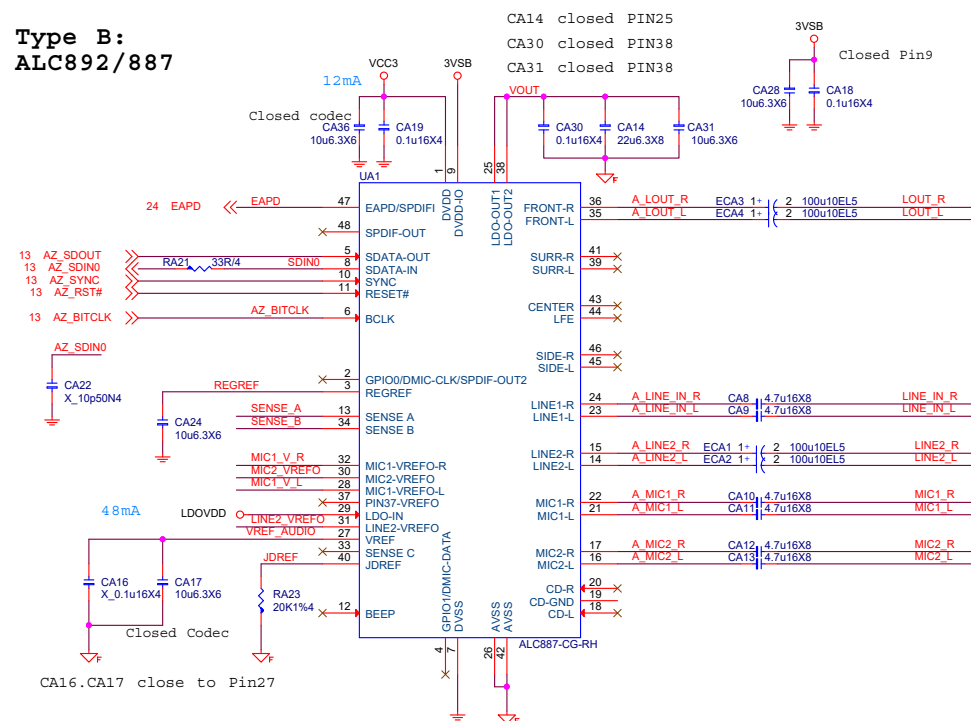
2. GPIO 自由切换 PW M/D C M O D E



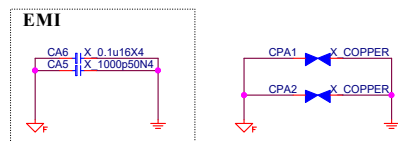
2. GPIO 庫由 B 切換 P W M / D C M O D E



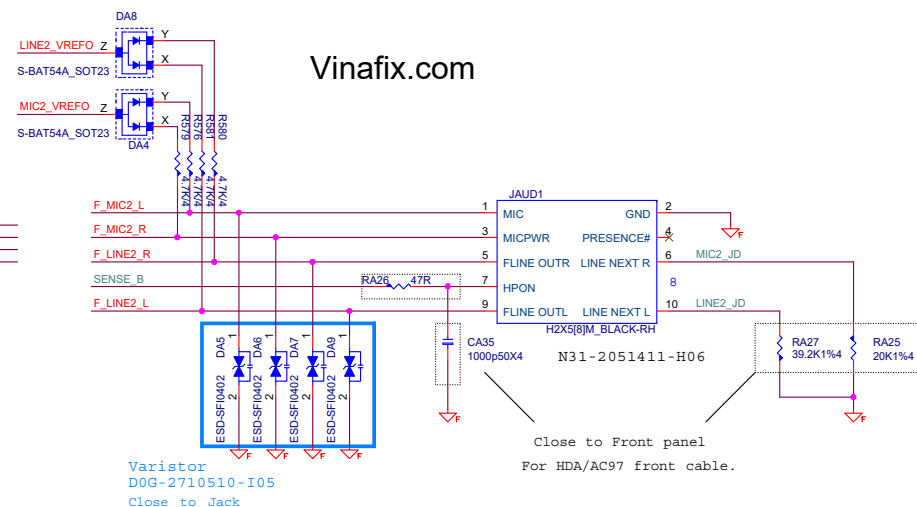
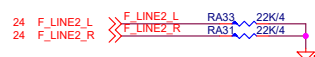
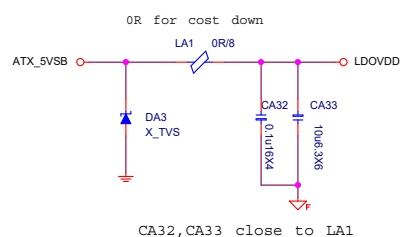
Type B: ALC892/887



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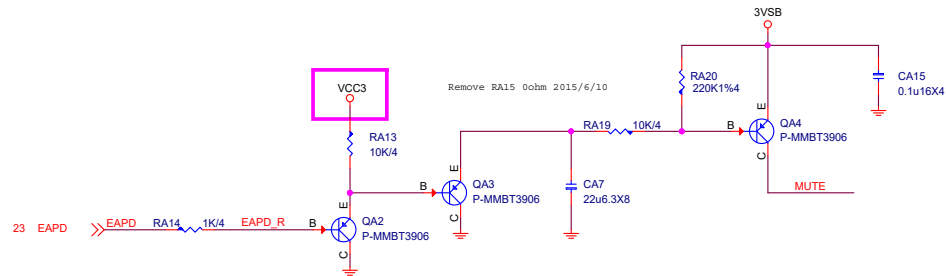
Closed Codec



MICRO-STAR INT'L CO.,LTD			
MS-7B33..			
Size	Document	Description	Rev
Custom		AUDIO - ALC892/887	11
Date: Wednesday, January 10, 2018	Sheet	23	of 52

Rear Line OUT De-POP circuit

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

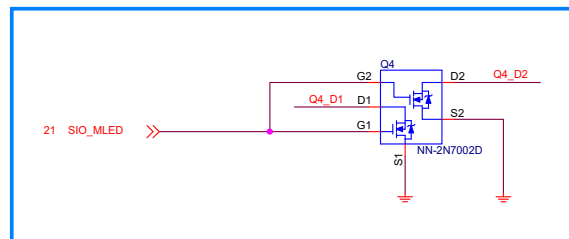
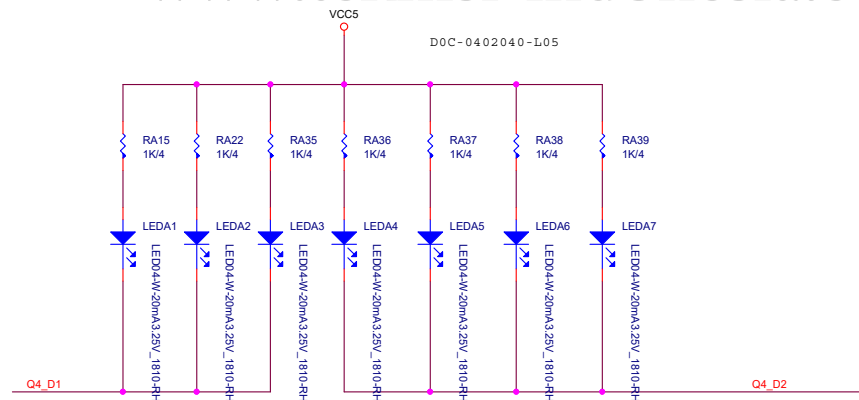


Digital

Analog



Audio LED



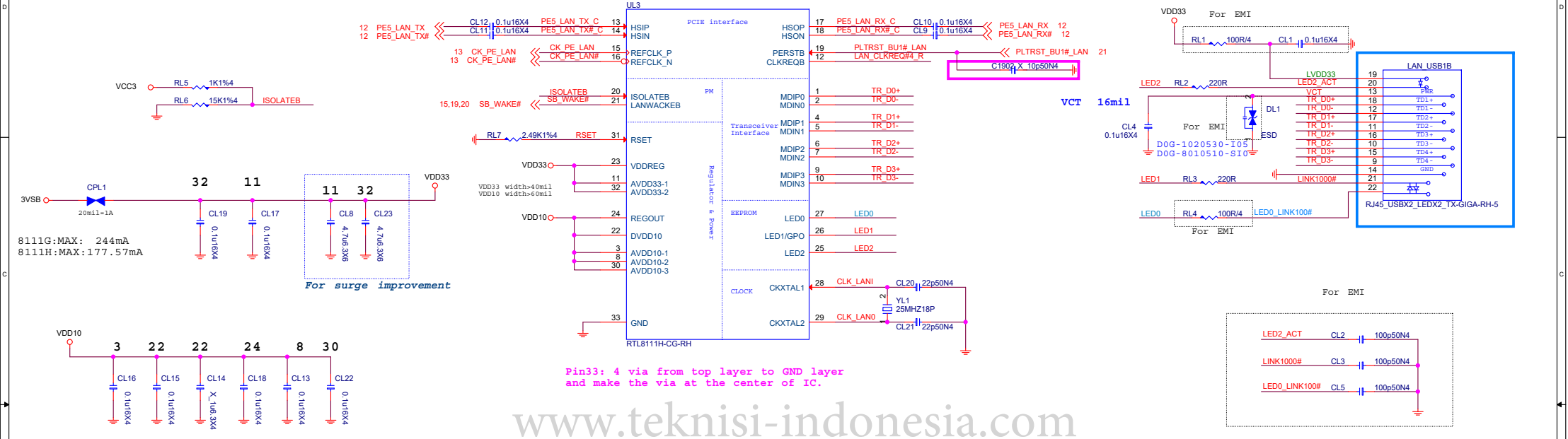
2016.01.12:Modify Q4 to Dual 7002 & Remove 0R

RTL8111G/RTL8111H Giga LAN

8111H:B06-08111CC-R09
8111G:B06-081116C-R09

LAN_CLKREQ#4_R R1014 0R/4 >>> LAN_CLKREQ#4 13

LAN Connector



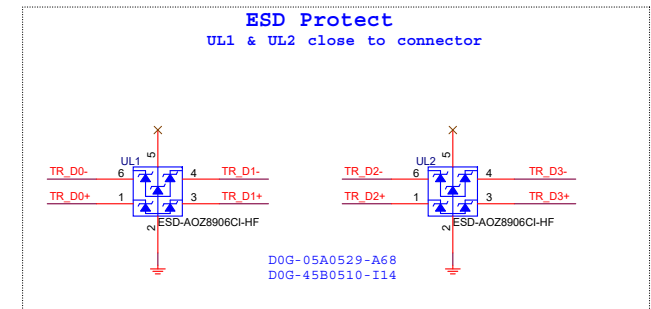
www.teknisi-indonesia.com

8111G POWER Consumption

	3.3V @ mA	mW
10 M Idle/TxRx	17.15/116.7	56.6/385.1
100 M Idle/TxRx	71.45/129.5	235.8/427.4
Giga Idle/TxRx	179.1/243.9	591/804.9
ALDPS	6.41	21.15

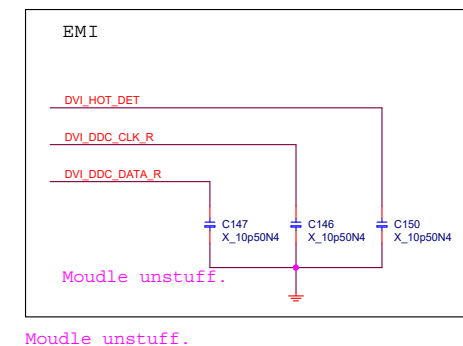
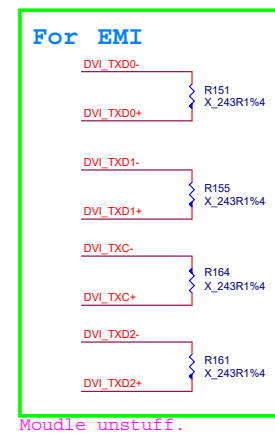
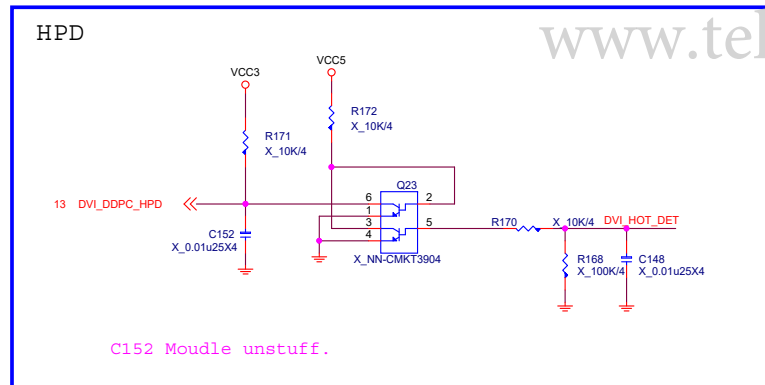
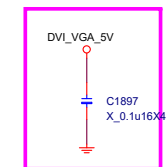
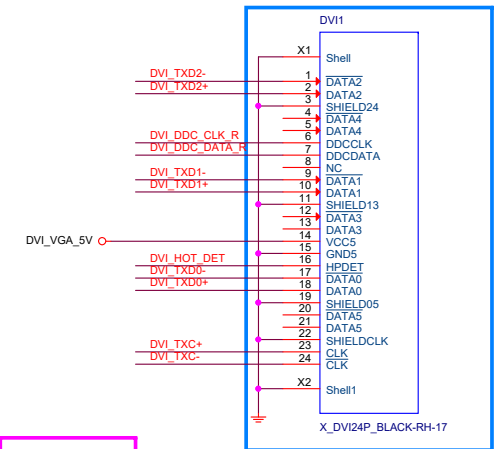
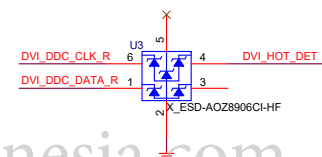
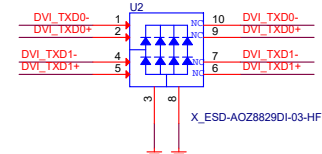
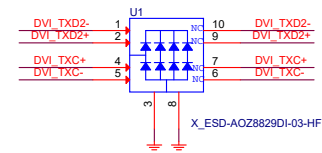
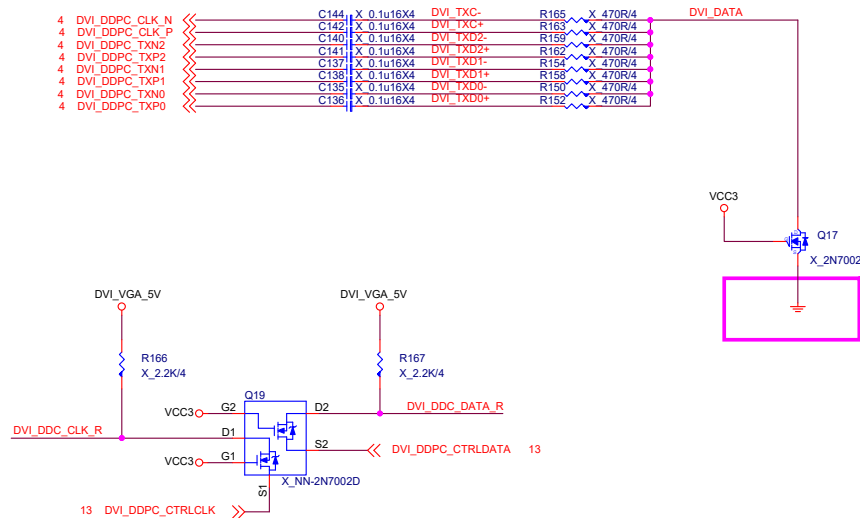
8111H POWER Consumption

	3.3V @ mA	mW
10 M Idle/TxRx	9.9/84.69	32.67/279.48
100 M Idle/TxRx	48.11/92.44	158.76/305.05
Giga Idle/TxRx	124.5/177.57	410.85/585.98
ALDPS	5.50	18.15

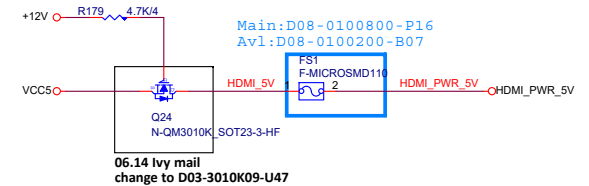
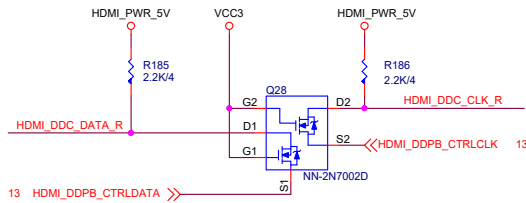
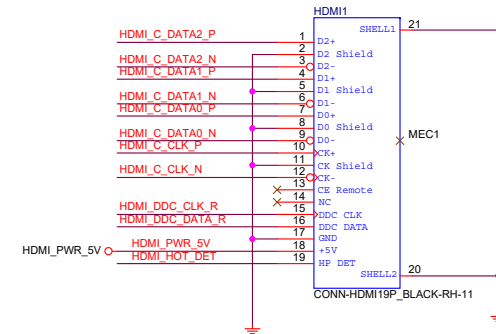
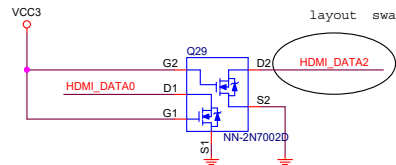
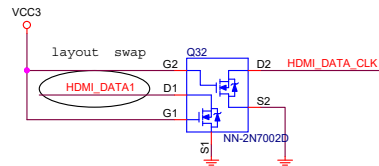
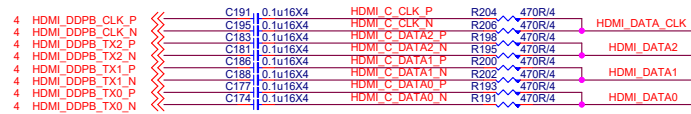


DVI level shifter

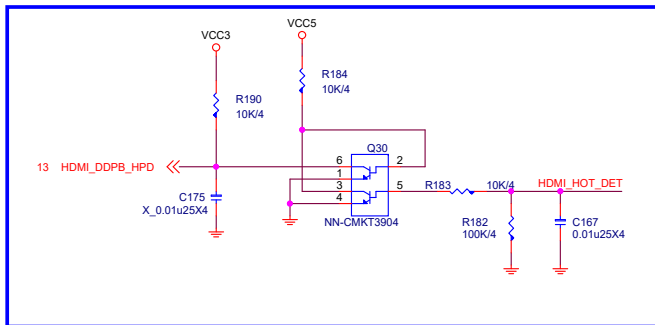
VGA: resolution of 2048x1536 pixels with 32-bit color at 75 Hz (4:3 QXGA)



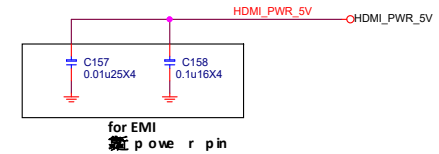
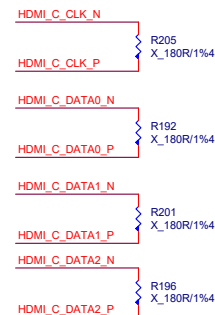
HDMI, DVI : 1920x1200 at 60 Hz (16:10 WUXGA)



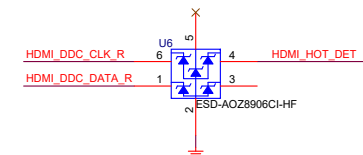
HPD



For EMI



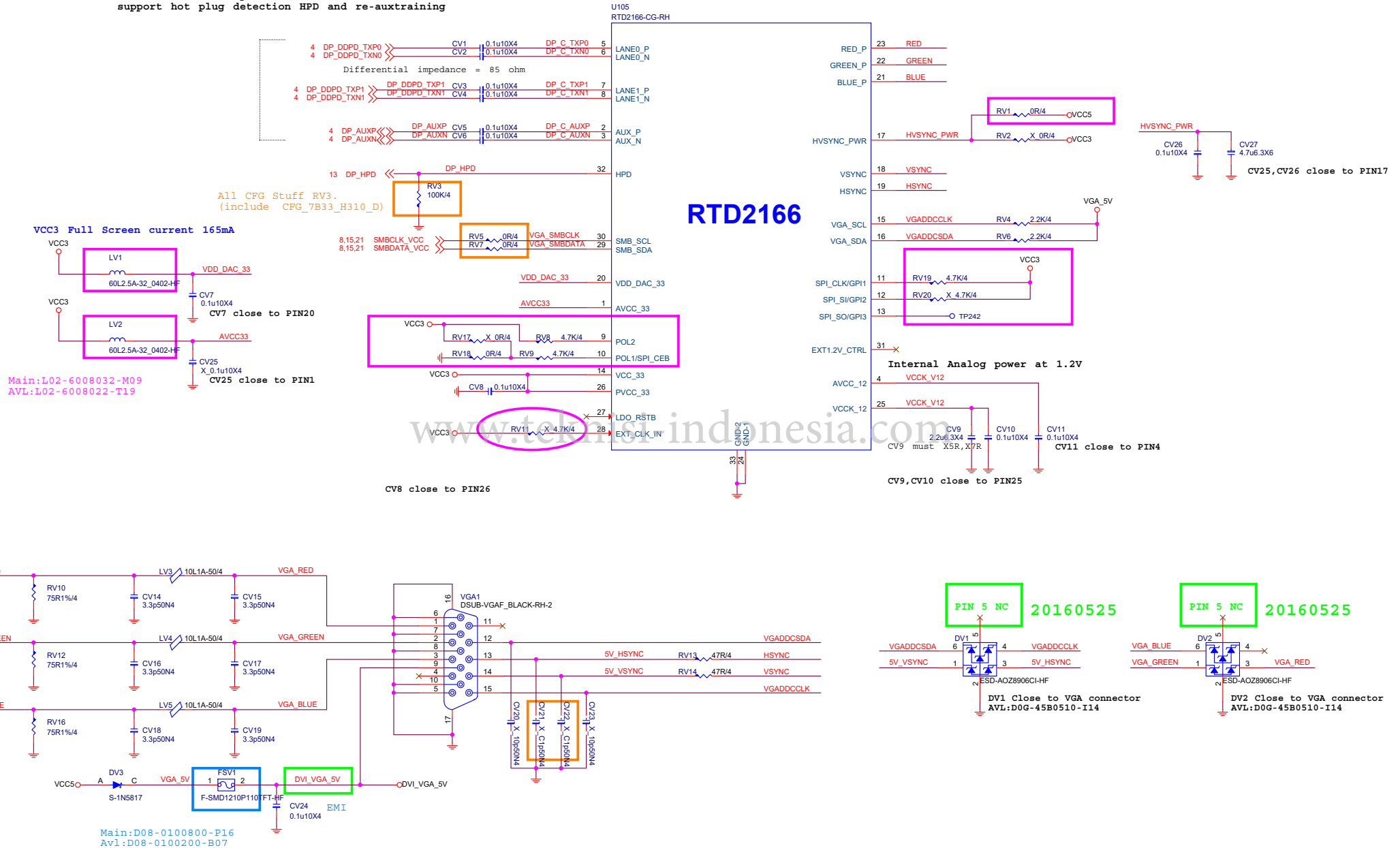
for EMI
power pin

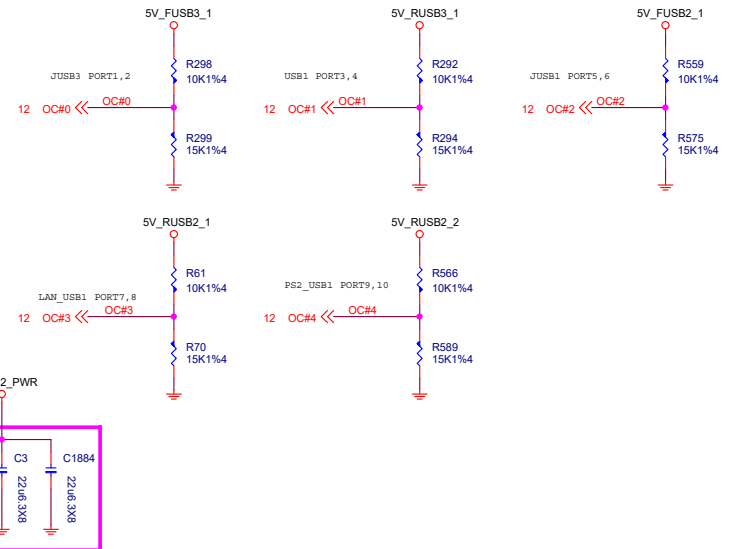
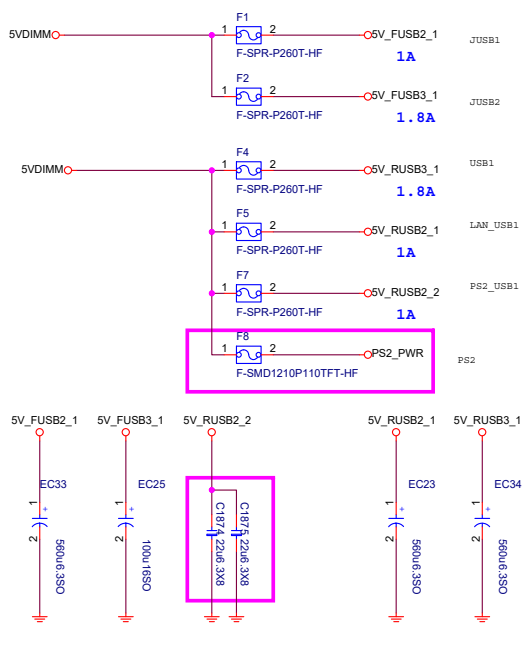


MICRO-STAR INT'L CO.,LTD			
MS-7B33..			
Size	Document	Description	Rev
Custom		HDMI Connector	11
Date: Wednesday, January 10, 2018		Sheet 27 of 52	

Note:

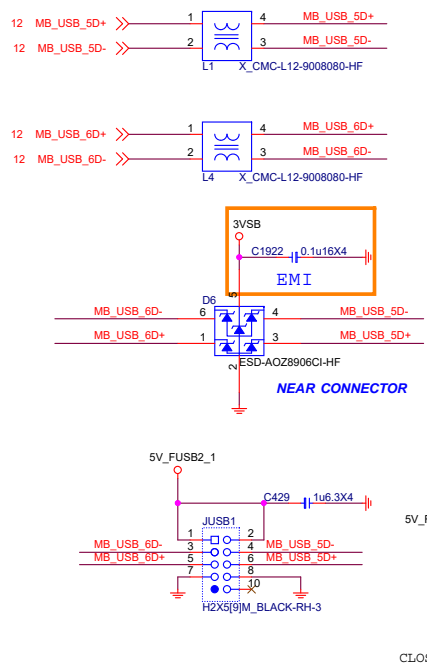
If connect to eDP port, must confirm whether it support hot plug detection HPD and re-auxtraining



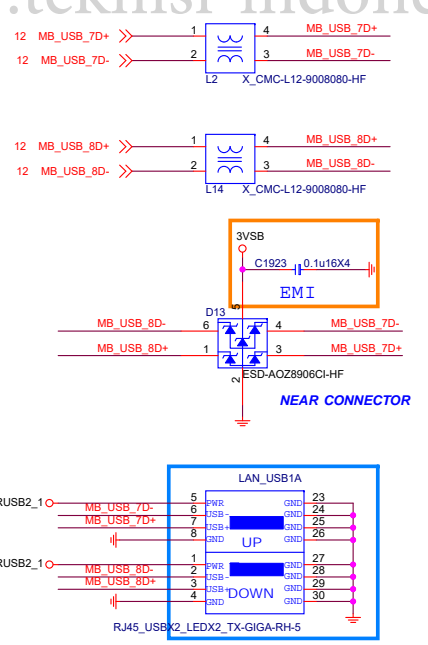


USB CONN	USB POWER	PCH PORT	OC# SIGNAL
JUSB1	5V_FUSB2_1	Port5,6	OC#2
PS2_USB1	5V_RUSB2_2	Port9,14	OC#4
JUSB3	5V_FUSB3_1	Port1,2	OC#0
USB1	5V_RUSB3_1	Port3,4	OC#1
LAN_USB1	5V_RUSB2_1	Port7,8	OC#3

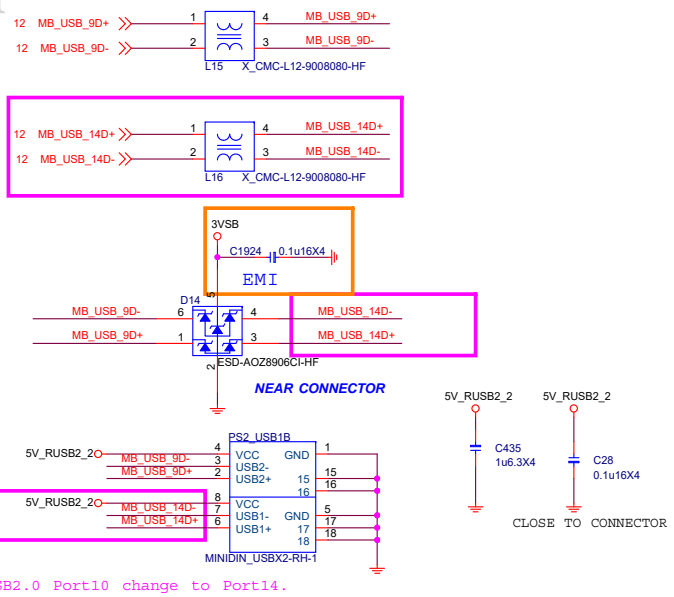
FRONT JUSB2 PORT 5,6



USB1 PORT 7,8



FRONT PS2_USB1 PORT 9,10



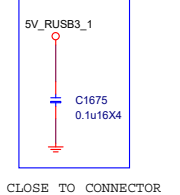
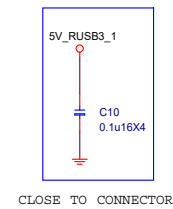
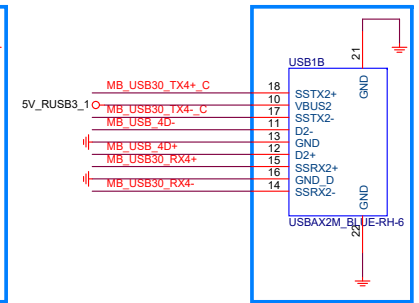
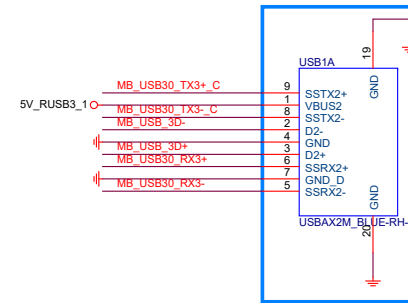
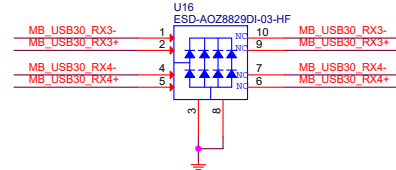
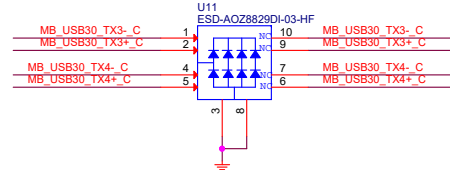
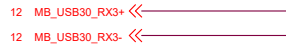
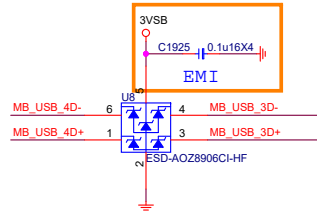
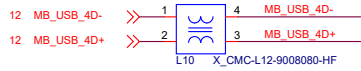
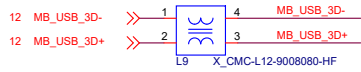
MICRO-STAR INT'L CO.,LTD

MS-7B33..

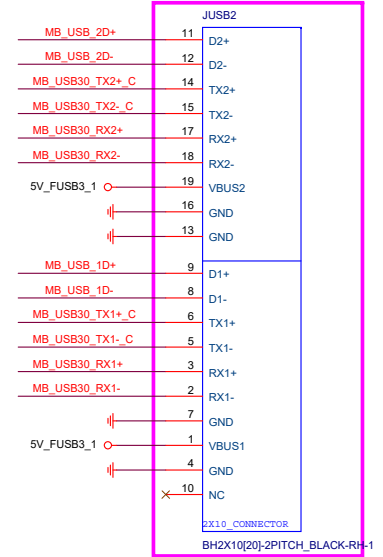
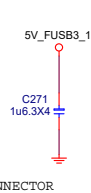
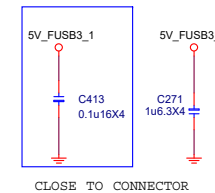
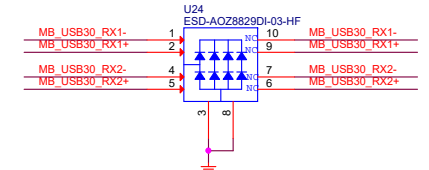
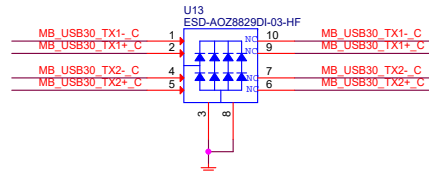
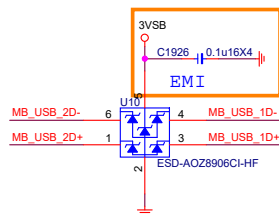
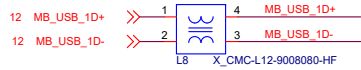
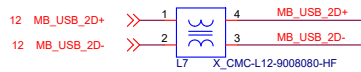
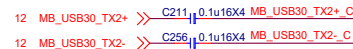
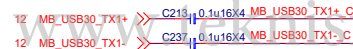
Size	Document	Description	Rev
Custom	Document	USB2.0 Connector	11

Date: Wednesday, January 10, 2018 | Sheet 29 of 52

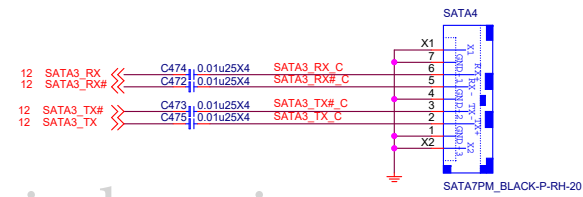
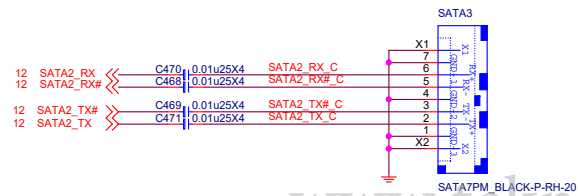
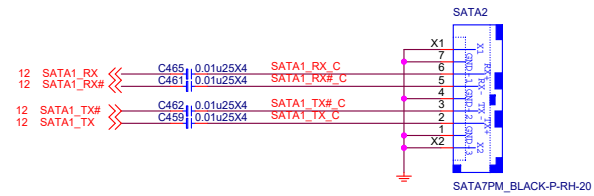
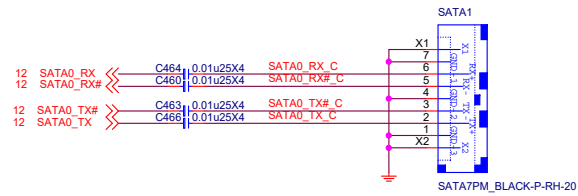
Rear USB1 port 9,10



Front JUSB3 port 1,2

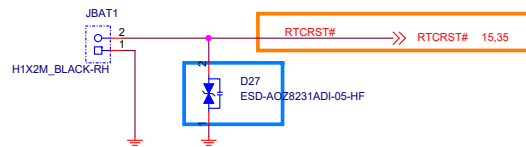
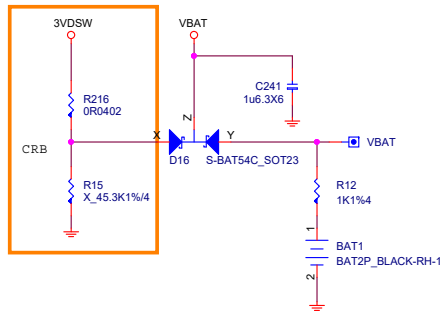


MICRO-STAR INT'L CO.,LTD			
MS-7B33..			
Size	Document	Description	Rev
Custom		Rear USB3 & Front Connector	11
Date:	Wednesday, January 10, 2018	Sheet	30 of 52



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VBAT

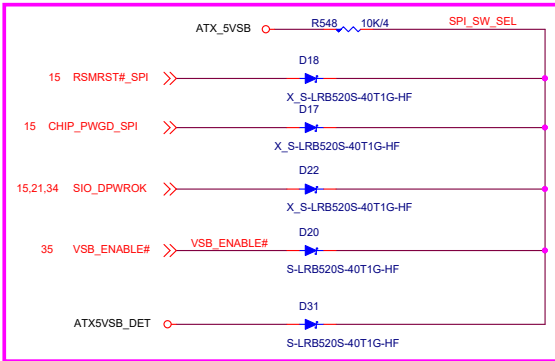


By Ivy's word document.
Main:D0G-130050C-A68
Av1:D0G-3000600-L07/D0G-1200520-I05

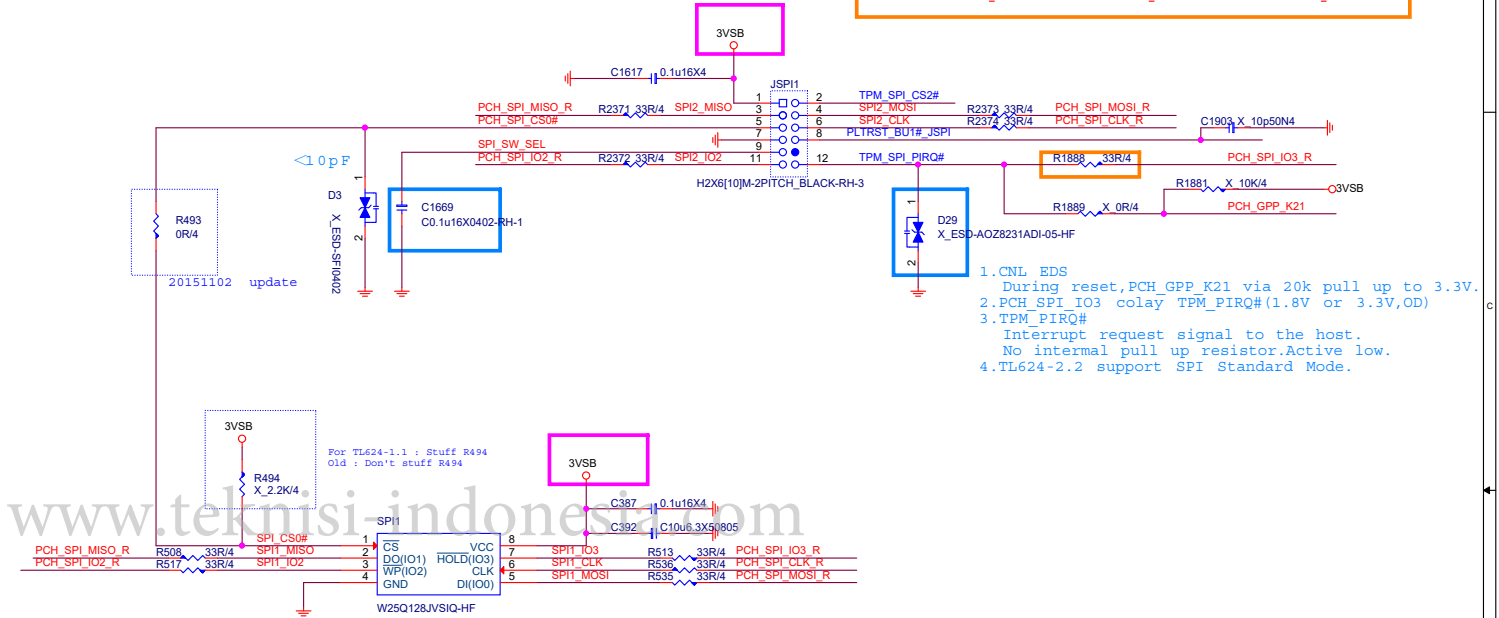
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15	PCH_SPI_MOSI	<<	PCH_SPI_MOSI	R2365	0R0402	PCH_SPI_MOSI_R
15	PCH_SPI_MISO	<<	PCH_SPI_MISO	R2366	0R0402	PCH_SPI_MISO_R
15	PCH_SPI_CLK	<<	PCH_SPI_CLK	R2367	0R0402	PCH_SPI_CLK_R
15	PCH_SPI_CS0#	<<	PCH_SPI_CS0#	R2368	0R0402	PCH_SPI_CS0#_R
15	PCH_SPI_IO2	<<	PCH_SPI_IO2	R2369	0R0402	PCH_SPI_IO2_R
15	PCH_SPI_IO3	<<	PCH_SPI_IO3	R2370	0R0402	PCH_SPI_IO3_R

15	TPM_SPI_CS2#	<<	TPM_SPI_CS2#
21	PLTRST_BU1#_JSPI	>>	PLTRST_BU1#_JSPI
14	PCH_GPP_K21	<<	PCH_GPP_K21

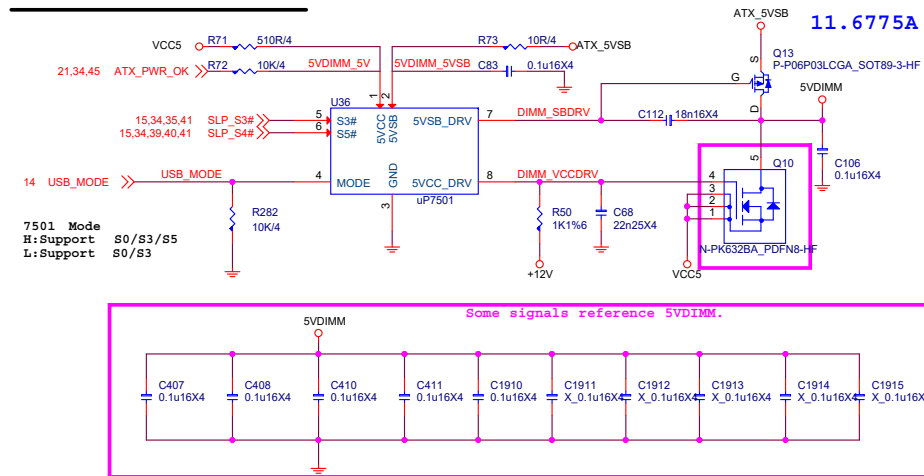


Main:D01-5204000-LA9
Avl:D01-BAS4030-P15



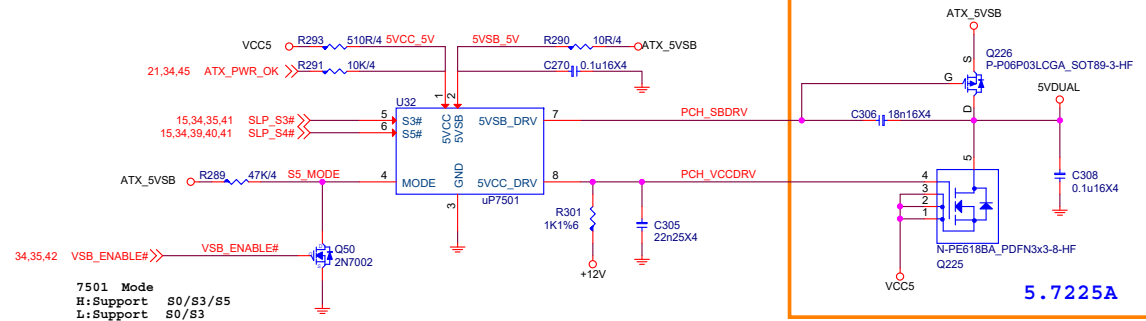
5VDIMM FOR DDR

(3A for DDR, 6.6A for USB)



5VDUAL

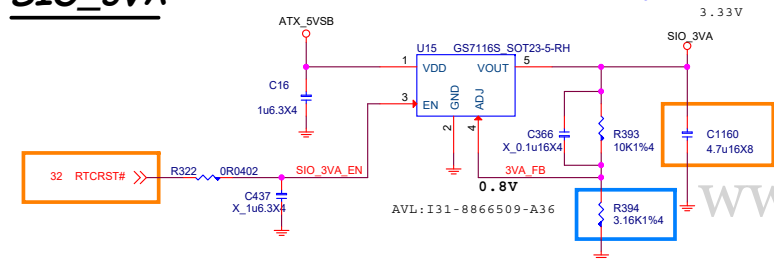
5VDUAL is power source of 1P0SB, 1.8P0SB & 3VSB



Vinafix.com

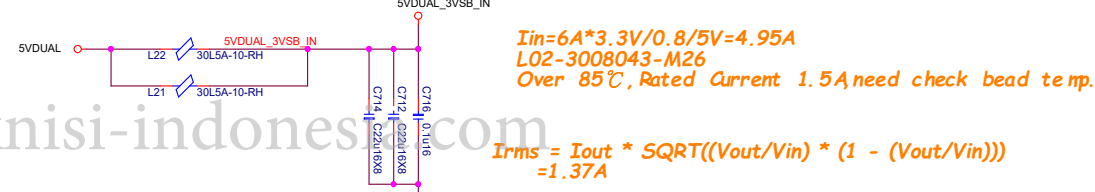
SIO_3VA

20mA



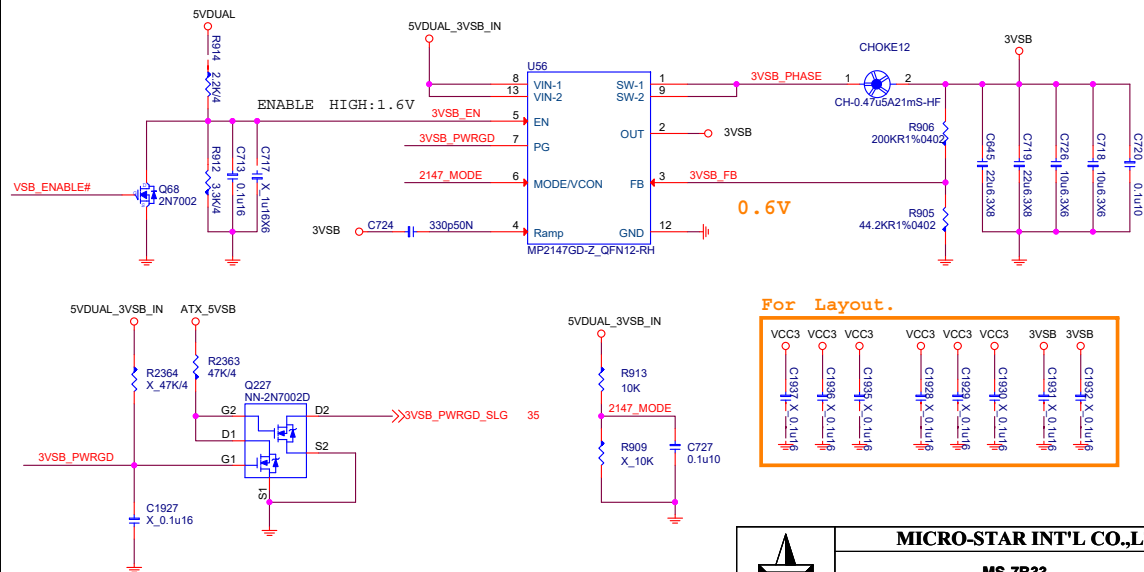
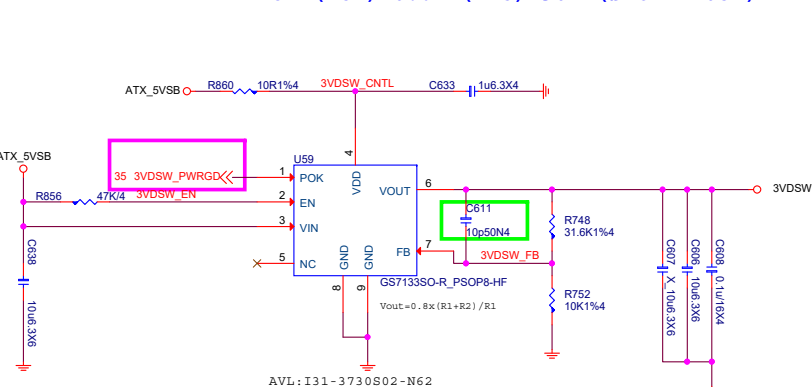
3VSB Power

3.3V; Max 2.9A
Current limit 6A

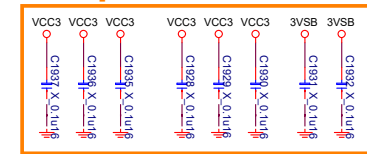


3VDSW

113mA (PCH) + 0.6mA (RTC) + 90mA (SLG4F42051)



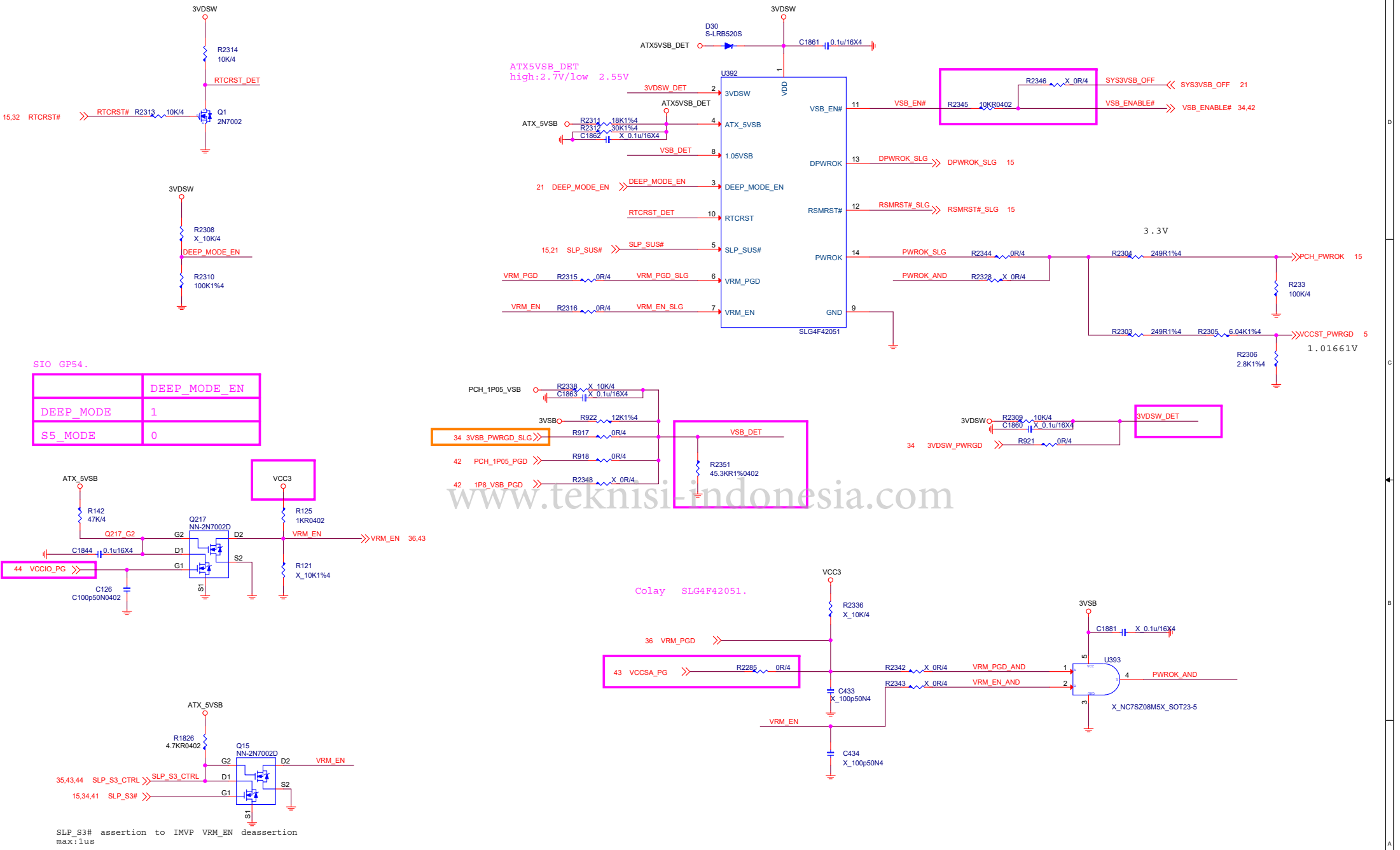
For Layout.



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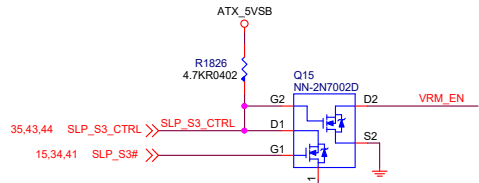
MS-7B33..

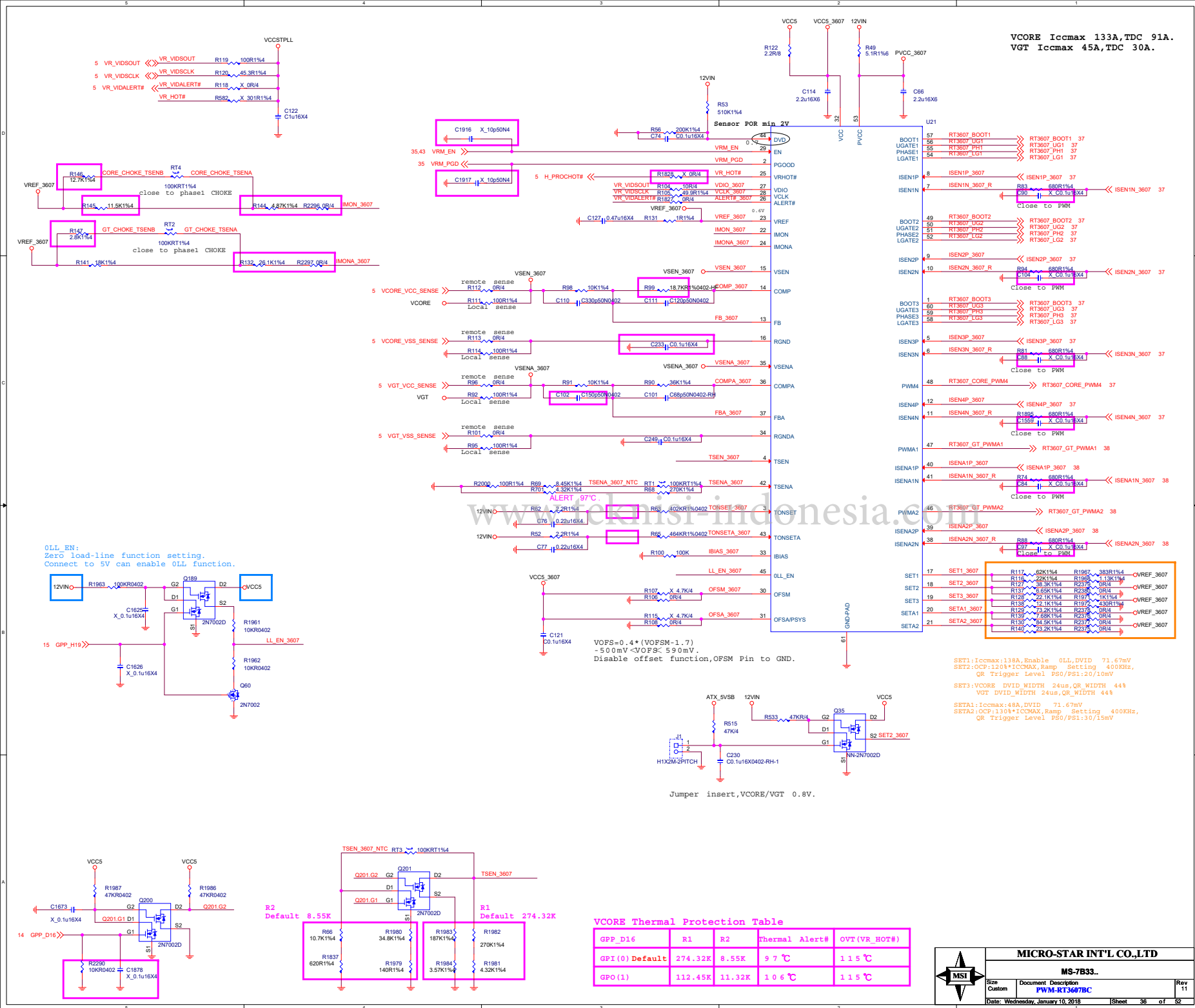
Size	Document	Description	Rev
Custom	ACPI CONTROLLER		11
Date: Wednesday, January 10, 2018		Sheet 34 of 52	

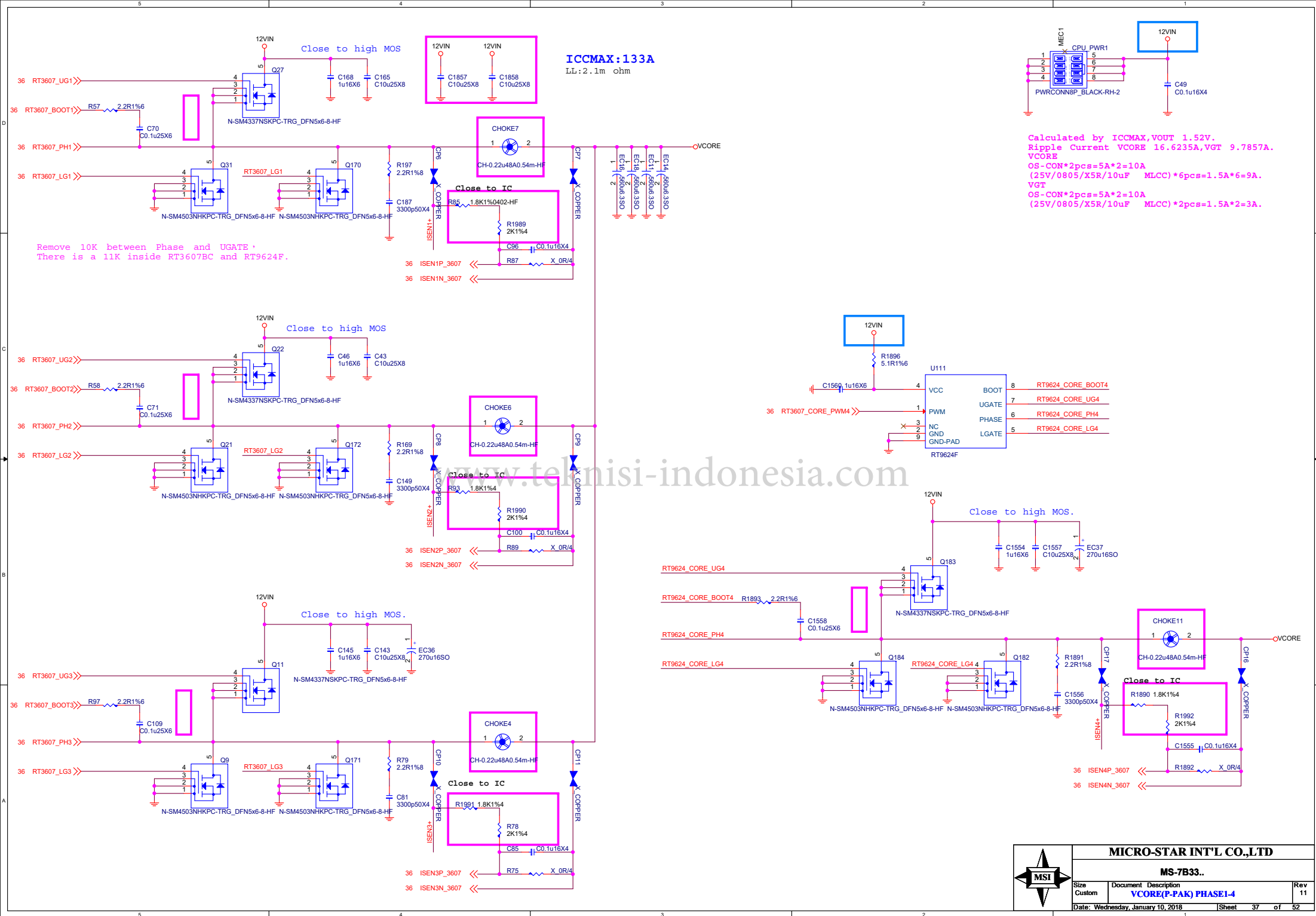


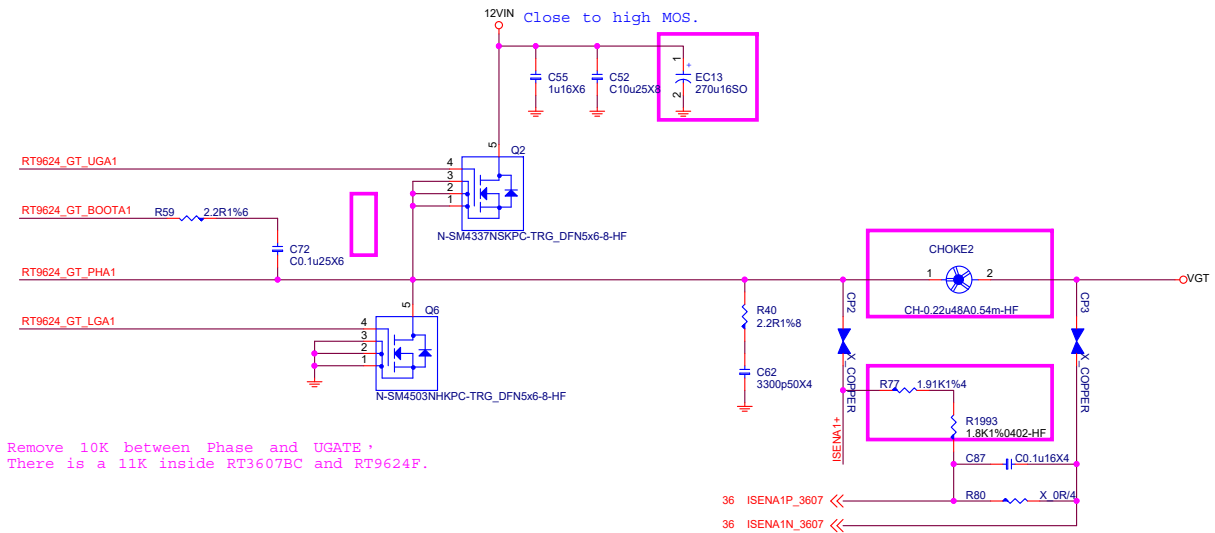
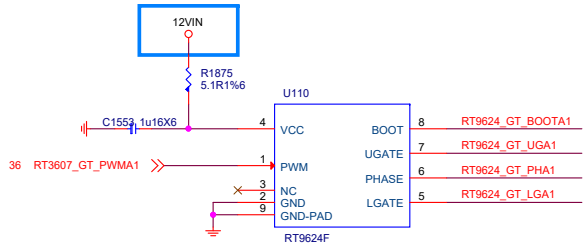
SIO GP54.

	DEEP_MODE_EN
DEEP_MODE	1
S5_MODE	0

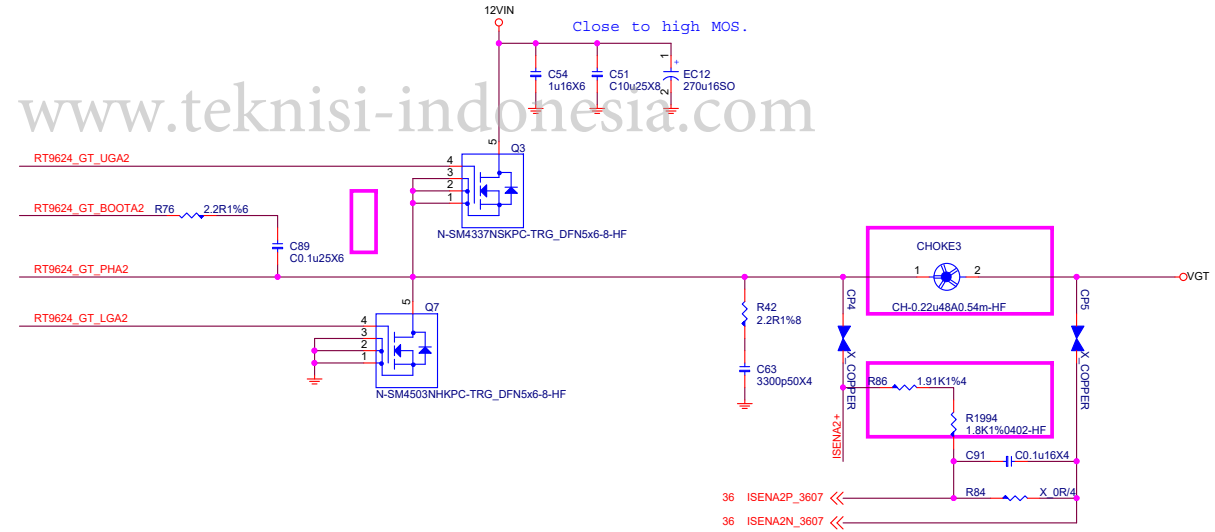
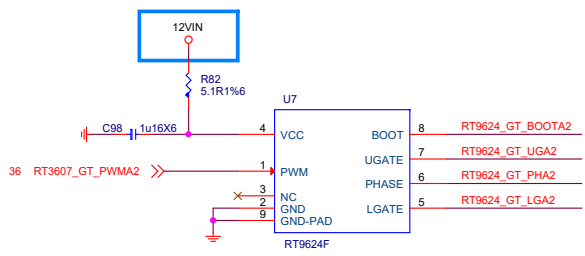




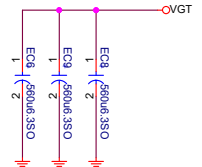




Remove 10K between Phase and UGATE
There is a 11K inside RT3607BC and RT9624F.



ICCMAX: 45A
LL: 3.1m ohm



DDR4_1.2V 3.3A+ 7.85A+0.35A+0.13A=11.63A

3.3A FOR CPU
7.85A FOR 2DIMM DDR4
0.35A FOR VTT_DDR
0.13A FOR VCCPLL_OC

D03-632BA0C-N03 3~4.6mohm/4.5V
Current limit= 140K*5uA/4.6mohm)= 15.217A
Current limit= 140K*5uA/3mohm)=23.333A
Output Choke Isat=32A

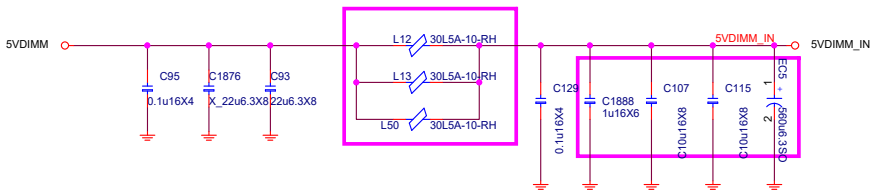
Vcs=140K*5uA=0.7V(Spec:0.4V~3V)

Vout=0.75V/1.65K*(1.65K+1K)=1.204V

NCT3933 source 10uA
Vout=[VREF*(1+R173/R1056)]+10uA*R173
=0.75V*(1+1K/3.16K)+10uA*1K=1.204V+0.010V=1.214V

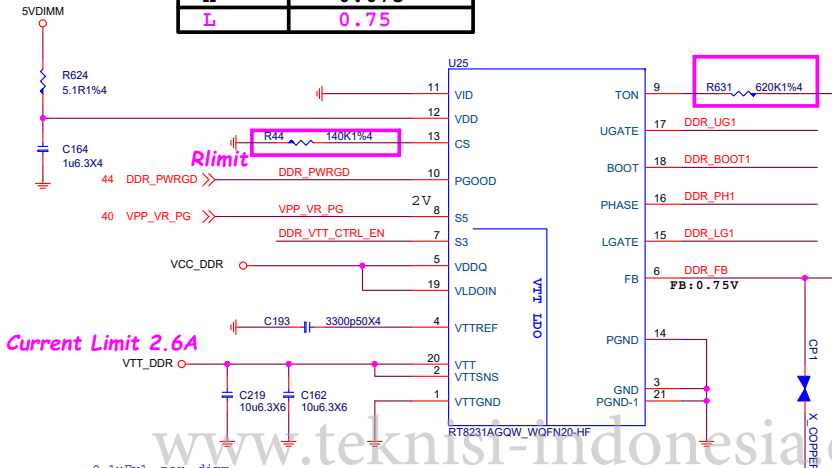
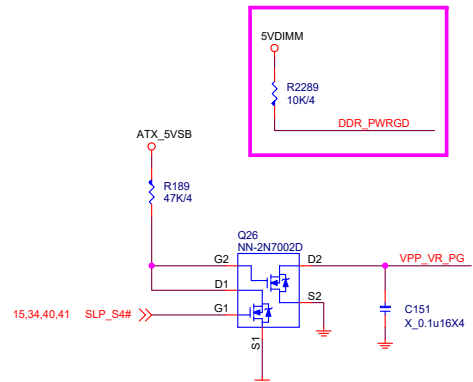
NCT3933 sink 10uA
Vout=[VREF*(1+R173/R1056)]-10uA*R173
=0.75V*(1+1K/3.16K)-10uA*1K=1.204V-0.010V=1.194V

Iin=IOCP*Vout/0.8/Vin
Iin=4.565A~6.9999A
L02-3008043-M26
Over 85°C, Rated Current 1.5A, need check bead temp.



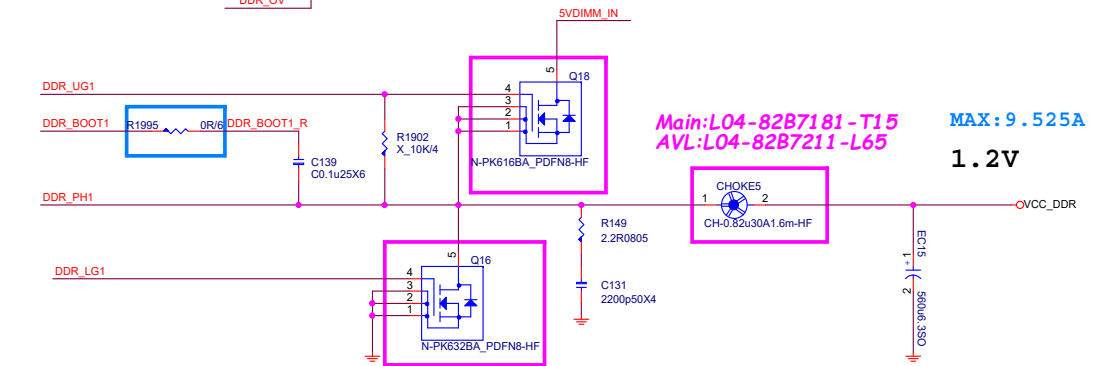
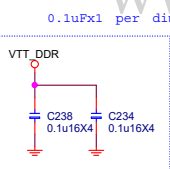
VID Pin	VREF (V)
H	0.675
L	0.75

Irms = Iout * SQRT((Vout/Vin) * (1-(Vout/Vin)))
=9.525 * 0.427
= 4.06797A



f:426.57KHz(Spec:320KHz to 480KHz)
tON:636.4456ns (Spec:100ns to 3us)

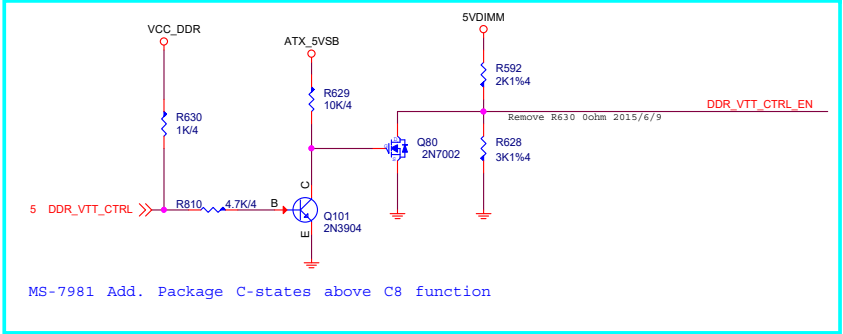
Current Limit 2.6A



Main:L04-82B7181-T15
AVL:L04-82B7211-L65
MAX: 9.525A
1.2V

SLP_S4# de-assertion to VDDQ ramp down start

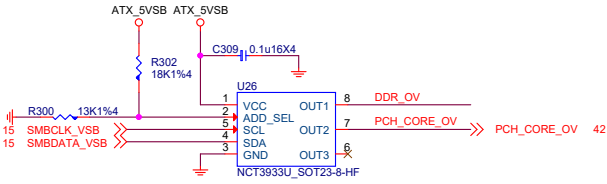
VPP ramp down after VDDQ ramp down



MS-7981 Add. Package C-states above C8 function

UPI VOLTAGE CONSOLE

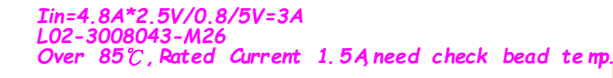
0x26: RH=18K, RL=13K



L=tON*(VIN-VDDQ)/(LIR*ILOAD(MAX))
tON=636.4456ns
LIR:20%~40%
L:0.63uH~1.27uH.

MICRO-STAR INT'L CO.,LTD			
MS-7B33..			
Size	Document	Description	Rev
Custom		DDR-RT8231	11
Date: Wednesday, January 10, 2018		Sheet	39 of 52

Current Limit 4.8A.



$$I_{rms} = I_{out} * \sqrt{(V_{out}/V_{in}) * (1 - (V_{out}/V_{in}))}$$

$$= 0.56A$$



Make Sure VPP EN after 5VDIMM stable



VPP25
0.6V/61.9K*(196K+61.9K)=2.4998V

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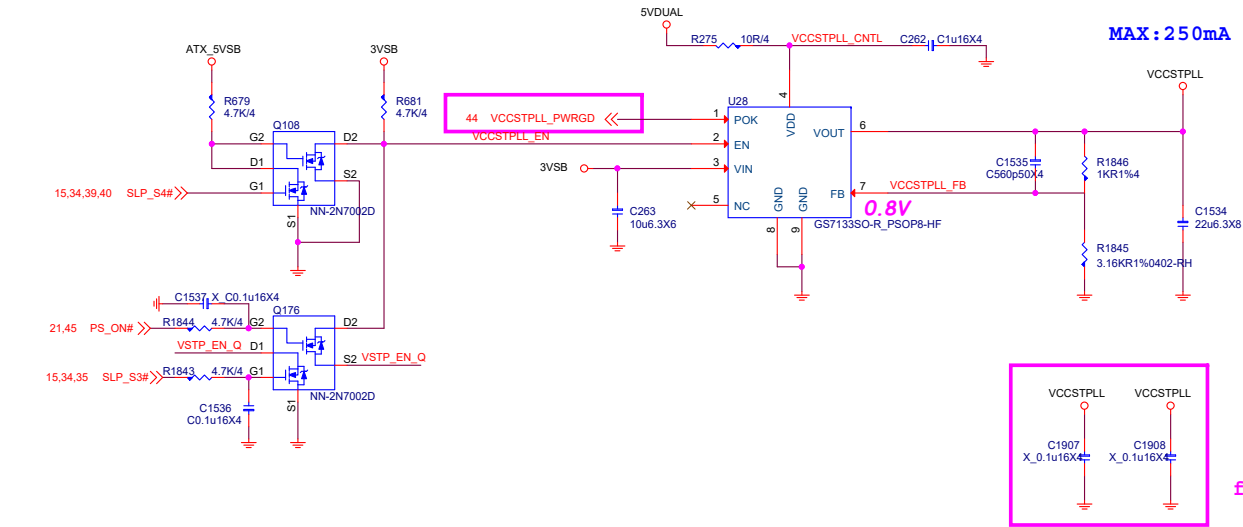


MS-7B33..

Size Custom	Document Description DDR-MP2143-VPP25	Rev 11
Date: Wednesday, January 10, 2018		Sheet 40 of 52

VCCSTPLL

1.05V; 250mA



$VCCSTPLL$
 $0.8V/3.16K*(1K+3.16K)=1.053V$

Current limit 3.8A.

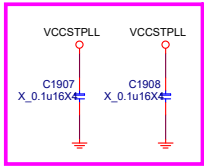
$PD(MAX)=1.33W$

$V_{out} 0.8V\sim1.6V:C1535 470pF\sim1nF,R1846 0\sim10K\Omega$

$VDD 3.0V\sim5.5V,POR 2.4V\sim3.0V.$
 $VIN 1.0V\sim5.5V,POR 0.55V\sim0.95V.$

$EN V_{ih}:1.4V V_{il}:0.6V$

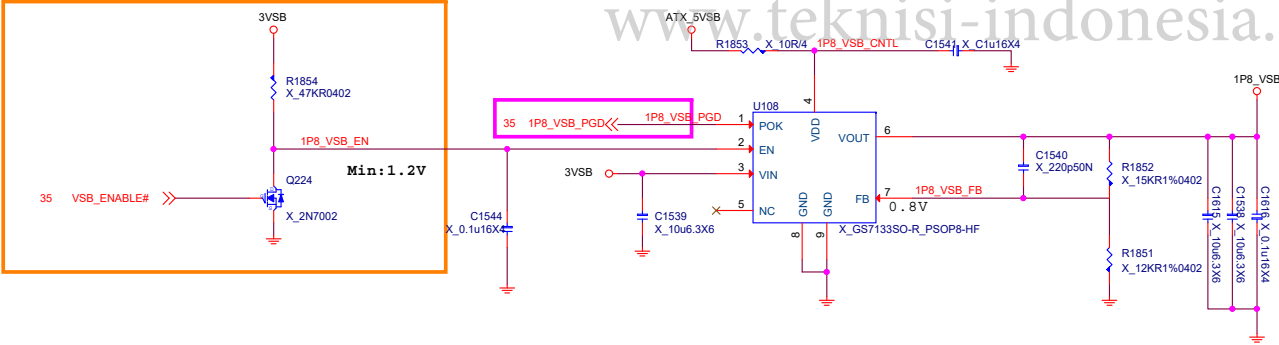
POK:As V_{out} arrives 92% of normal output voltage, then output the POK pin high to indicate the output is OK.



for Layout.

1P8 VSB

1.8V; 500mA



PCH 1VSB

1.05V; 10.743A

D03-632BA0C-N03 3~4.6mohm/4.5V Ciss=2096pF<8nF
Current limit= 6.49K*10uA/4.6mohm)=14.108A
Current limit= 6.49K*10uA/3mohm)=21.633A
CHOKE Isat=18A
From CHOKE I-L Curve,when I=20A, L>0.6uH

$$I_{rms} = I_{out} * \sqrt{(V_{out}/V_{in}) * (1 - (V_{out}/V_{in}))}$$

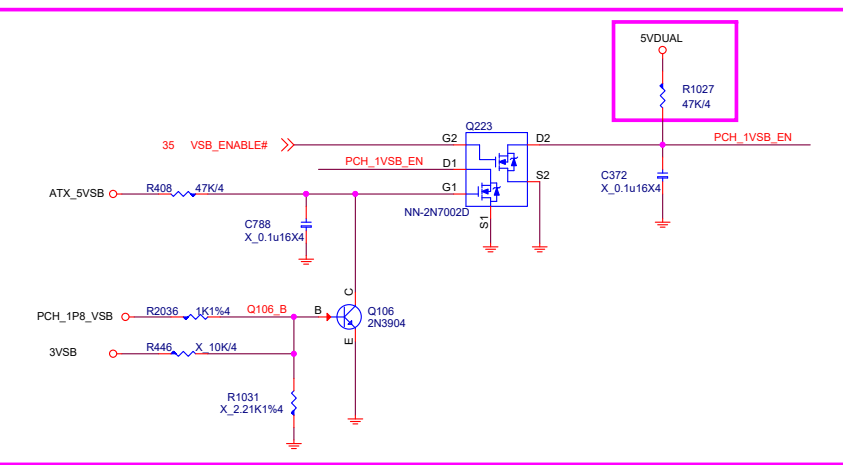
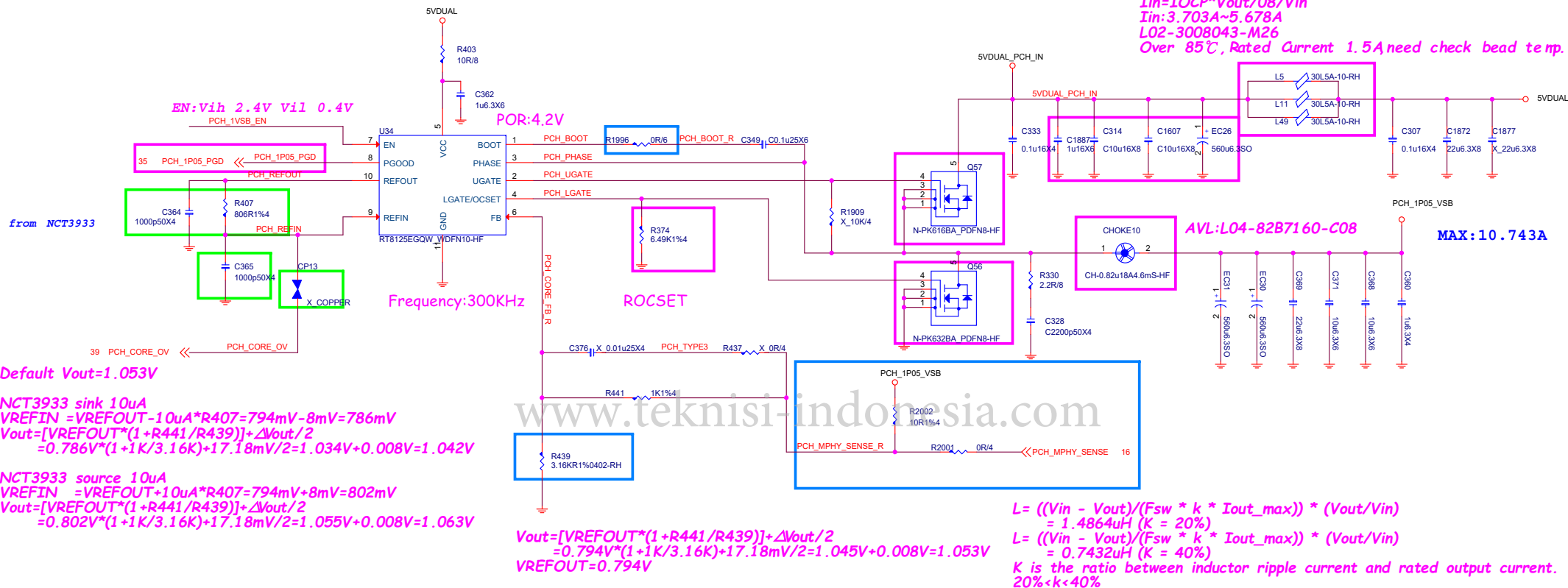
$$= 10.743 * 0.407$$

$$= 4.37571A$$

$$I_{in} = I_{OCP} * V_{out} / 0.8 / V_{in}$$

$$I_{in} = 3.703A \sim 5.678A$$

L02-3008043-M26
Over 85°C, Rated Current 1.5A, need check bead temp.

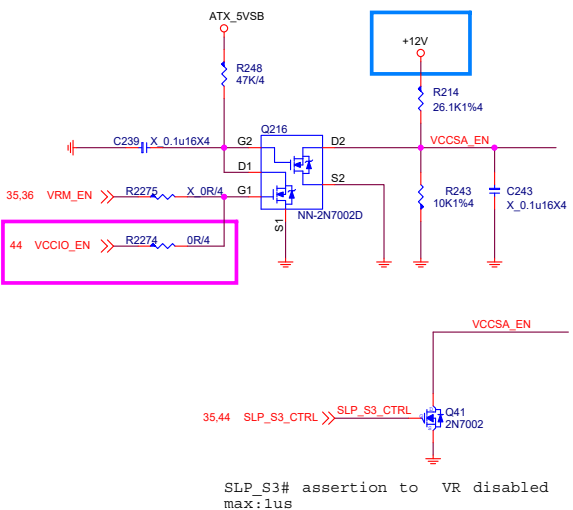


Vinafix.com

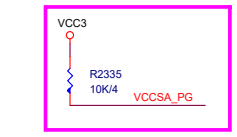
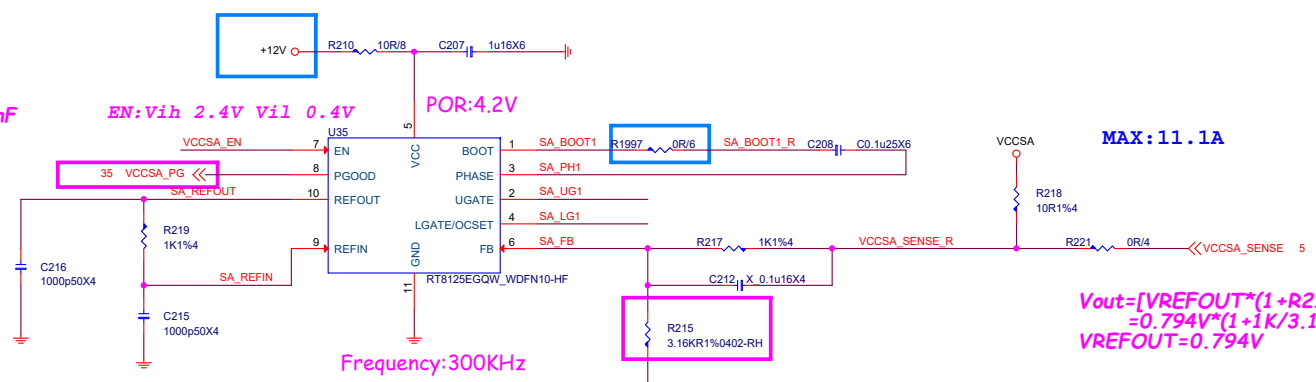
MICRO-STAR INT'L CO.,LTD			
MS-7B33..			
Size	Document	Description	Rev
Custom		PCH Core power	11
Date: Wednesday, January 10, 2018		Sheet	42 of 52

SA Power:1.05V,11.1A

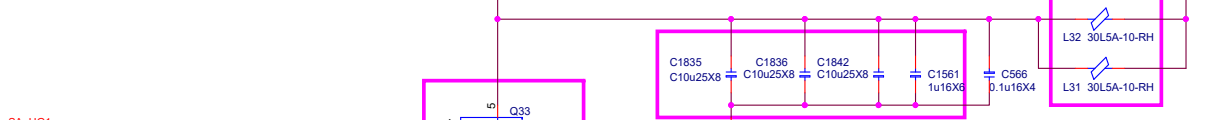
D03-632BA0C-N03 2.1~3.3mohm/10V Ciss=2096pF<8nF
Current limit= 5.1K*10uA/(3.3mohm)=15.455A
Current limit= 5.1K*10uA/(2.1mohm)=24.286A
CHOKE Isat=17A
From CHOKE I-L Curve,when I=25A, L=0.6uH.



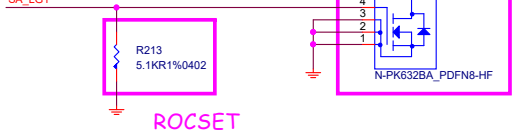
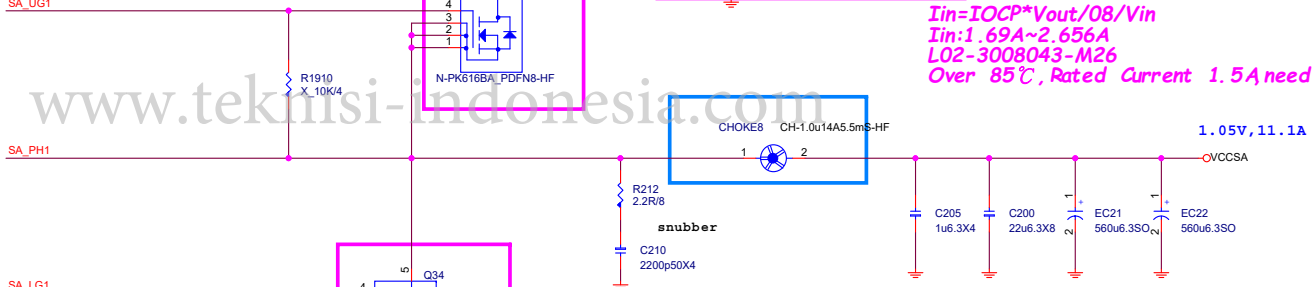
SLP_S3# assertion to VR disabled max: lus



$$I_{rms} = I_{out} * \sqrt{((V_{out}/V_{in}) * (1 - (V_{out}/V_{in})))}$$
$$= 3.13649A$$



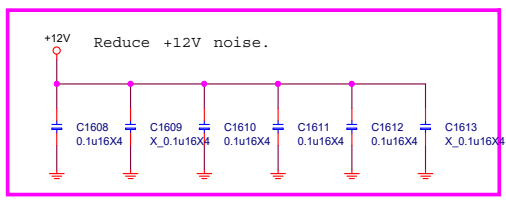
$I_{in} = I_{OCP} * V_{out} / 0.8 / V_{in}$
 $I_{in}: 1.69A \sim 2.656A$
L02-3008043-M26
Over 85°C, Rated Current 1.5A need check bead temp.



$$L = ((V_{in} - V_{out}) / (f_{sw} * k * I_{out_max})) * (V_{out} / V_{in})$$
$$= 1.4386uH (K = 20\%)$$
$$L = ((V_{in} - V_{out}) / (f_{sw} * k * I_{out_max})) * (V_{out} / V_{in})$$
$$= 0.7193uH (K = 40\%)$$

K is the ratio between inductor ripple current and rated output current.
20%<k<40%

$$\Delta V_{out_ESR} = \Delta IL * ESR = 4.0\% * 11.1A * 4m\Omega = 17.76mV$$
$$\Delta V_{out_C} = \Delta IL * 1 / (8 * C_{out} * f_{sw}) = 4.0\% * 11.1A / (8 * 560uF * 2 * 300KHz) = 1.65mV$$
$$V_{out_SAG} = ESR * \Delta I_{out} = 4m\Omega * 11.1A = 44.4mV$$



VCCIO

0.95V; 6.4A

IMAX 8A
ILIMIT=12A
IOC=ILIMIT+40%*IMAX/2=13.6A.
CHOKE Isat=15A

$$I_{rms} = I_{out} * \sqrt{(V_{out}/V_{in}) * (1 - (V_{out}/V_{in}))}$$

$$= 1.72799A$$

$$L = V_{out} * (1 - V_{out}/V_{in}) / (F_{sw} * I_{out} * 40\%)$$

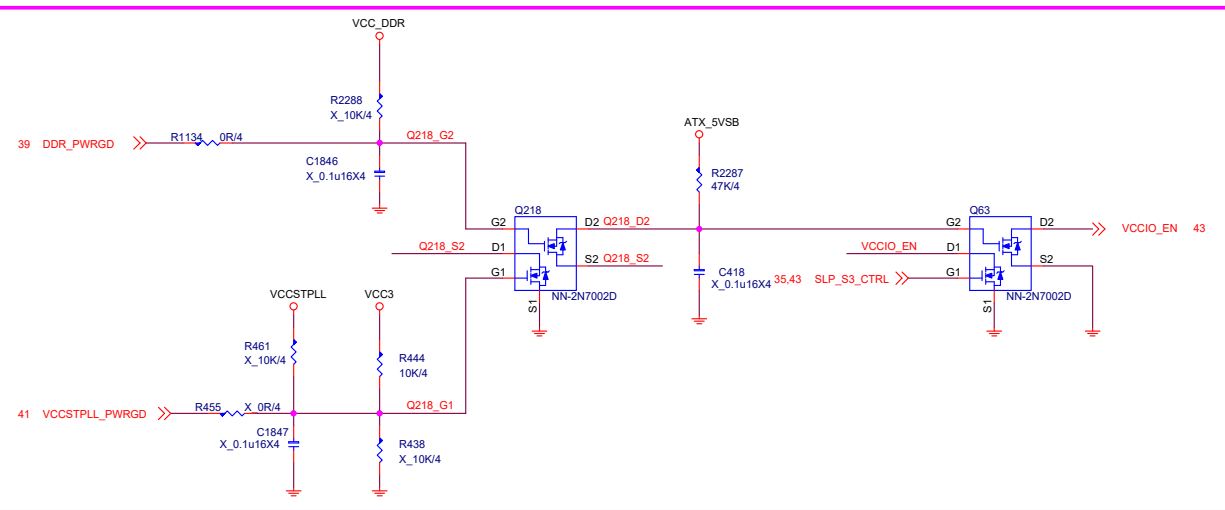
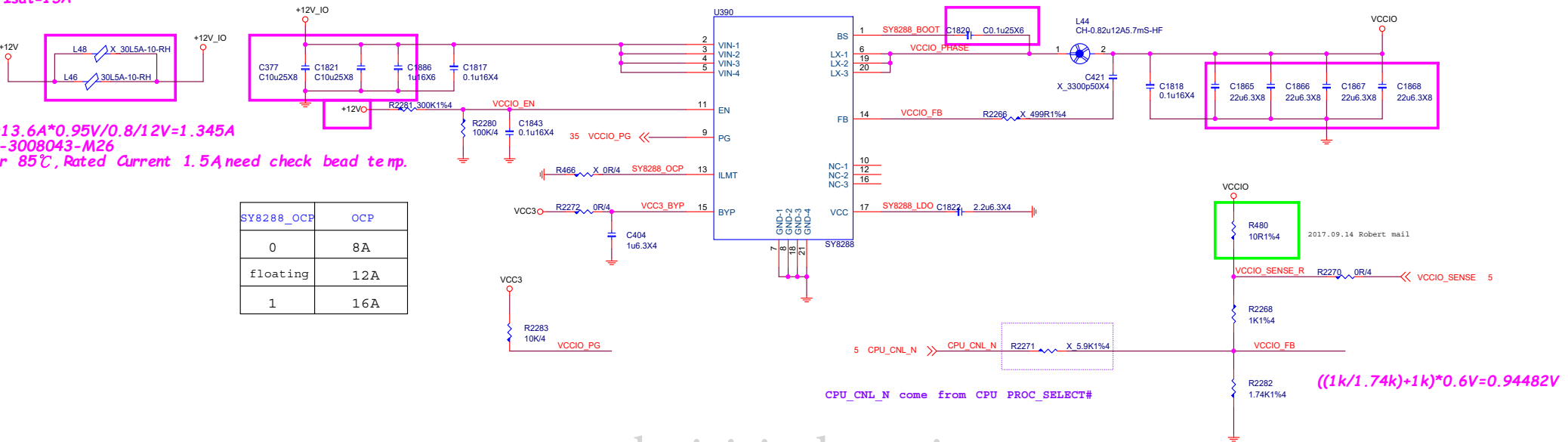
$$= 0.95V * (1 - 0.95V/12V) / (500KHz * 6.4A * 40\%) = 0.68uH.$$

MAX : 6.4A

$I_{in} = 13.6A * 0.95V / 0.8 / 12V = 1.345A$
L02-3008043-M26
Over 85°C, Rated Current 1.5A need check bead temp.

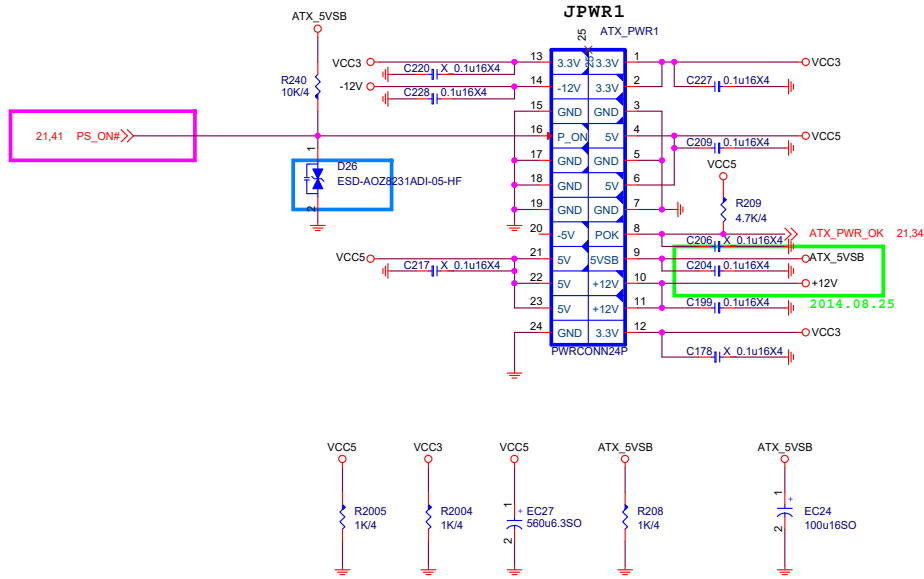
SY8288_OCP	OCP
0	8A
floating	12A
1	16A

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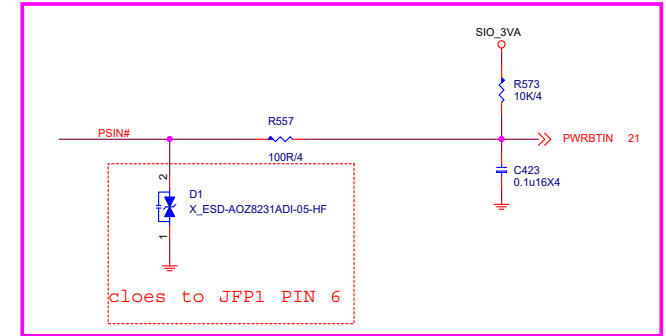
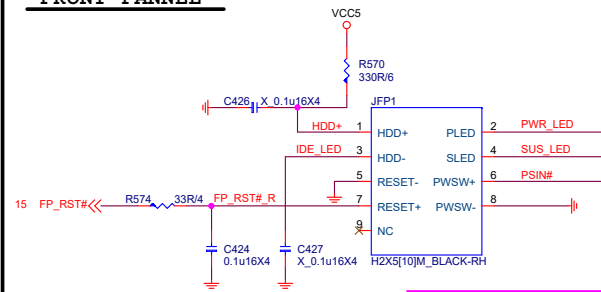
ATX POWER CONNECTOR

D26:By Ivy's word document.
Main:D0G-130050C-A68
Av1:D0G-3000600-L07/D0G-1200520-I05

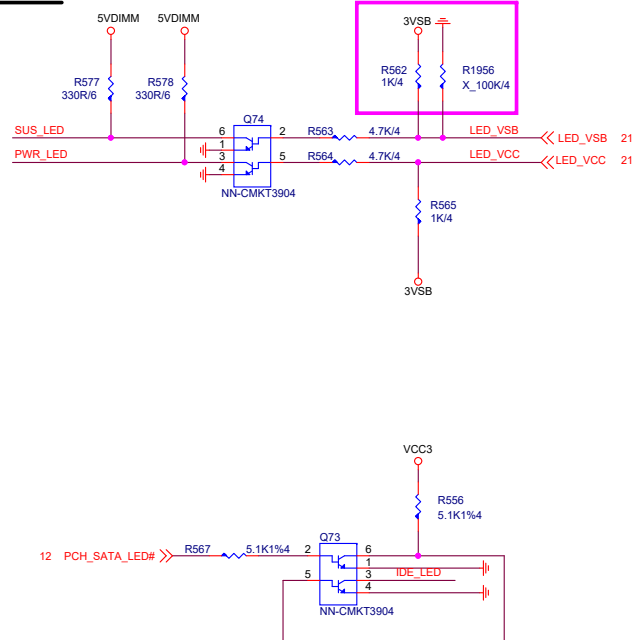


此圖航嘉200W(huntkey)power supply的圖，加載是為了不讓PSB空載而產生震盪

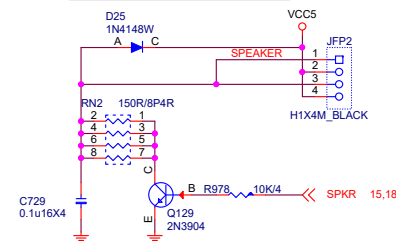
FRONT PANNEL



LED

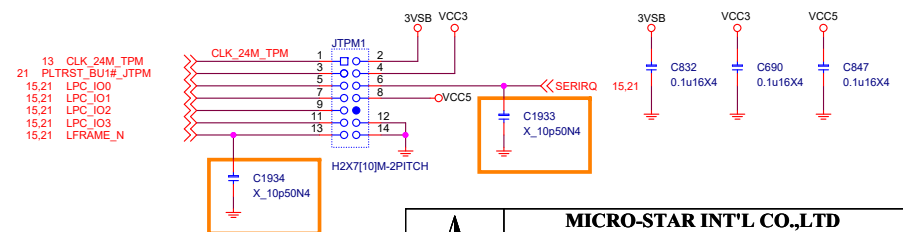


Speaker Pin Header



TPM

Don't colay espi debug.

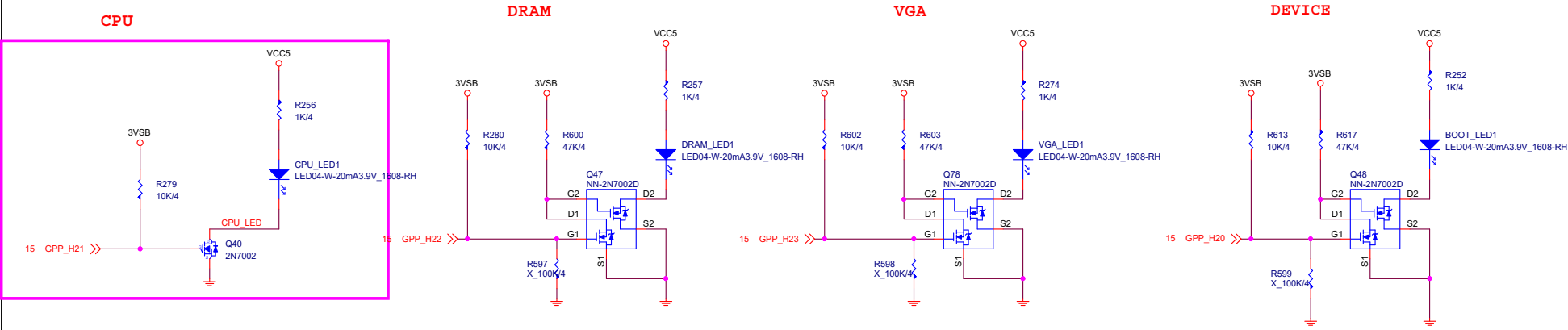


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MS-7B33..

Size	Document	Description	Rev
Custom		ATX F_Panel/TPM/MSI_LED	11
Date: Wednesday, January 10, 2018		Sheet 45 of 52	

DEBUG LED



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
RED:D0C-040P100-H91
AVL:D0C-040S500-E07

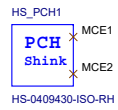
WHI:D0C-040T200-H91
AVL:D0C-040S200-E07

- 開機斷電狀態下，3個LED先維持 default 離開機電：
1. 首先進行 CPU check CPU LED 亮，check PASS 後則 CPU LED 滅掉。
 2. 接著依序進行 Memory / memory LED 亮 check PASS 後則 memory LED 滅掉。
 3. VGA 的 check/VGA LED 亮，check PASS 後則 VGA LED 滅掉。
 4. 因此最後正常順利開機後，三個 LED 燈都是滅掉的。(系統重啟或其他原因造成系統重啟則按鍵動作)

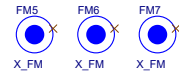
EMI CAP

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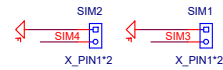
				MICRO-STAR INT'L CO.,LTD	
				MS-7B33..	
Size	Document	Description			Rev
Custom	EMI				11
Date: Wednesday, January 10, 2018				Sheet	47 of 52



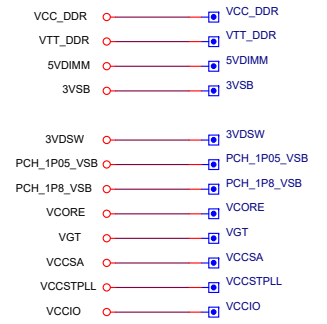
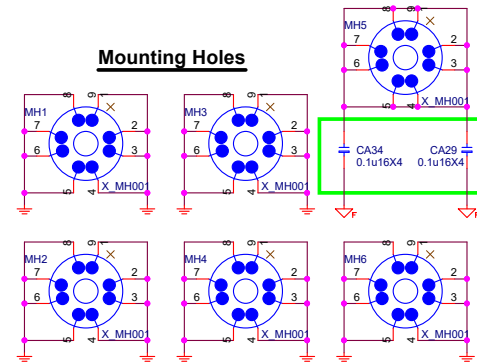
Optical Fiducial Marks-120



Simulation

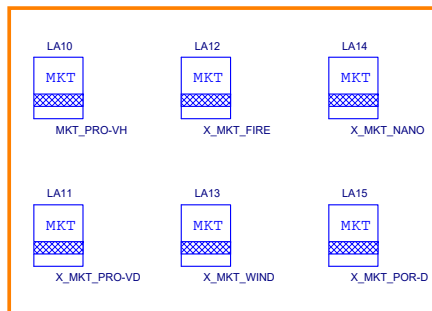


Mounting Holes

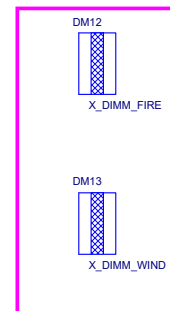


7B33_11
PK0-07B3311-G37

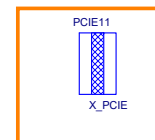
Marketing Name



DIMM Slot



PCIE X16 Slot



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MS-7B33..

Size	Document	Description	Rev
Custom	Manual	Parts	11
Date: Wednesday, January 10, 2018	Sheet	48 of 52	