

Model Name: GA-H81M-S2H Revision 1.0

SHEET

TITLE

01	COVER SHEET
02	BOM & PCB MODIFY HISTORY
03	BLOCK DIAGRAM
04	CPU_LGA1150-A
05	CPU_LGA1150-B
06	CPU_LGA1150-C
07	DDR III CHANNEL A
08	DDR III CHANNEL B
09	PCH_FDI,DMI,USB,PCIE,NVRAM
10	PCH_DP,CLK BUFFER
11	PCH_HOST,SATA,PCI
12	PCH_GPIO,CTRL,AUDIO
13	PCH_PWR,GND
14	PCI EXPRESS*16 SLOT
15	PCI EXPRESS X1 *2 SLOT
16	PCI SLOT (NA)
17	ITE 8620 LPC IO
18	COM,KB_MS_USB,USB30_20
19	HWM,FAN CTRL,OV
20	DUAL BIOS
21	FP,FUSB,SPK,SATALED
22	Realtek ALC887-VD2
23	REAR AUDIO JACK
24	REALTEK RTL8111G
25	DISCRETE POWER
26	ATX
27	VCORE ISL95812_1

SHEET

TITLE

28	VCORE ISL95812_2
29	RT8120_DDR POWER
30	LPT
31	DVI
32	IT8892E (NA)
33	USB3 VL805

Gigabyte Technology

Cover Sheet

Size Custom	Document Number GA-H81M-S2H	Rev 1.0
Date: Thursday, August 07, 2014	Sheet 1 of 34	

Model Name: GA-H81M-S2H

Component value change history

2013/04/08

[illegible]

Circuit or PCB layout change

[illegible]

PCB : S4VNB (精成,全成信,伊利安達)

S:單文

4: 四層板

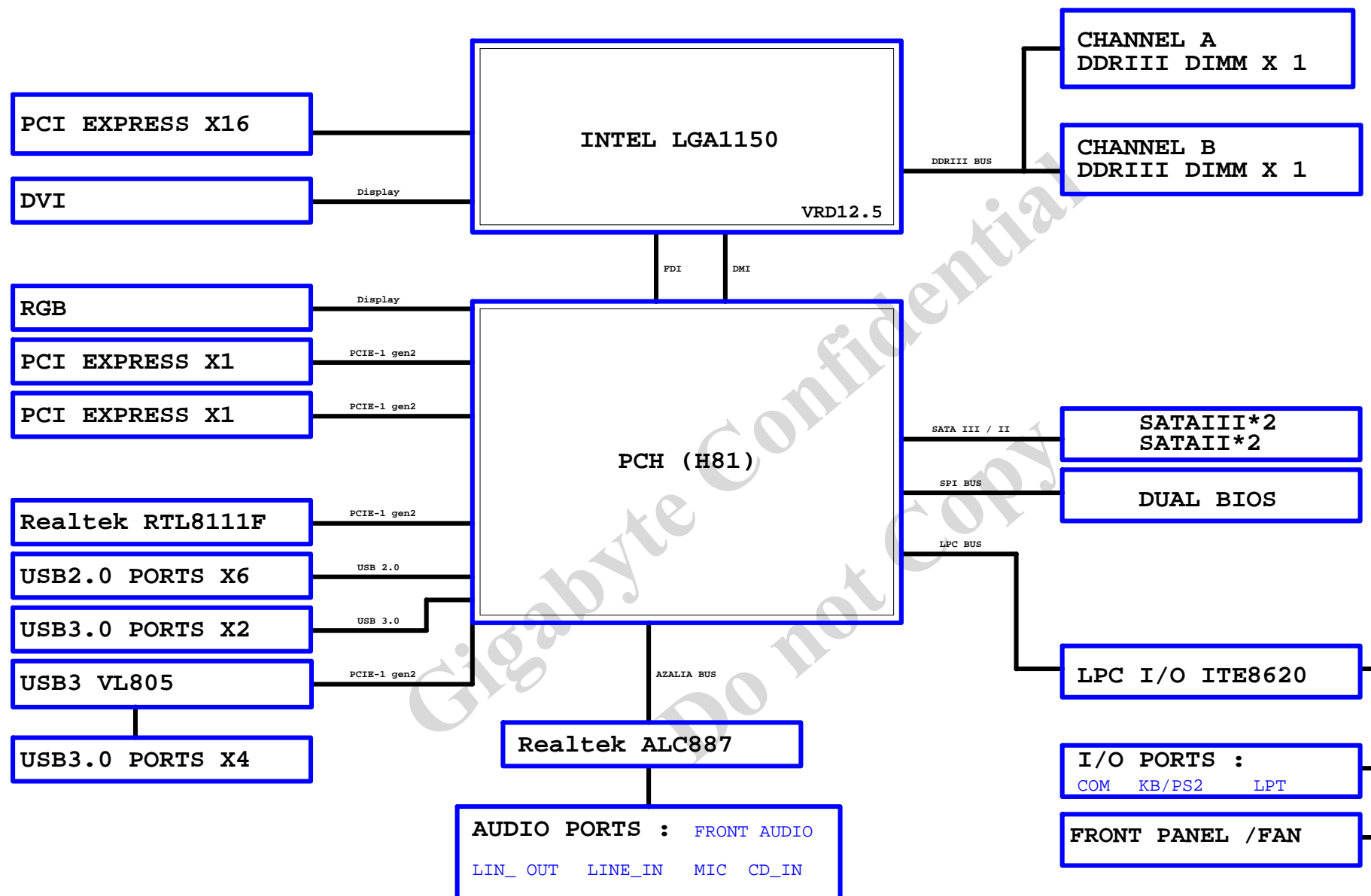
v:第二層是VCC

N:咖啡色

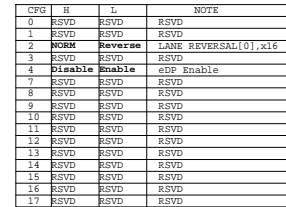
B:製程

<i>Gigabyte Technology</i>			
Title			
BOM & PCB MODIFY HISTORY			
Size Custom	Document Number	GA-H81M-S2H	
			Rev 1.0
Date:	Thursday, August 07, 2014	Sheet	2 of 34

BLOCK DIAGRAM



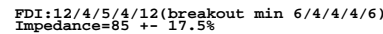
(E)



CFG6	CFG5	PCIE CONFIG
1	1	1x16 , Default
1	0	2X8
0	1	RSVD
0	0	X8,X4,X4

CFG 0-17 all internal PULL-UP

(D)

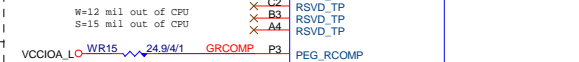


FDI_TXP[0..1] >> FDI_TXP[0..1] (9)

FDI_TXN[0..1] >> FDI_TXN[0..1] (9)

1. CON
(C)

LGA



100

5% PA_EXP_TXP[0..15] >> PA_EXP_TXP[0..15] (14)

PA_EXP_TXN[0..15] >> PA_EXP_TXN[0..15] (14)

PA_EXP_RXP[0..15] >> PA_EXP_RXP[0..15] (14)

PA_EXP_RXN[0..15] >> PA_EXP_RXN[0..15] (14)

-CPURST

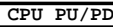
A-CPURST

WBC102
1n4/X7R/50V/K

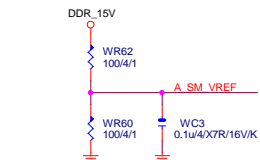
11

For IT8620 Ctrl

CPU SVID



CPU PU/PI



M REF

Size Custom	Document Number GA-H81M-S2H	Rev 1.0
Date: Thursday, August 07, 2014	Sheet 4 of 34	

LGA1150

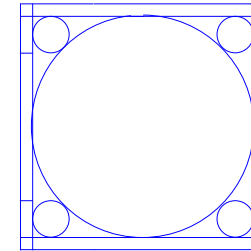
(B)

(CR)

HASWELL/[10SC1-F01150-11R_10SC1-F01150-12R]

HASWELL/[10SC1-F01150-11R_10SC1-F01150-12R]

LGA1150



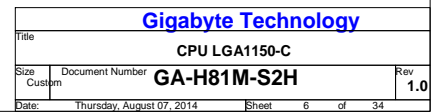
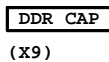
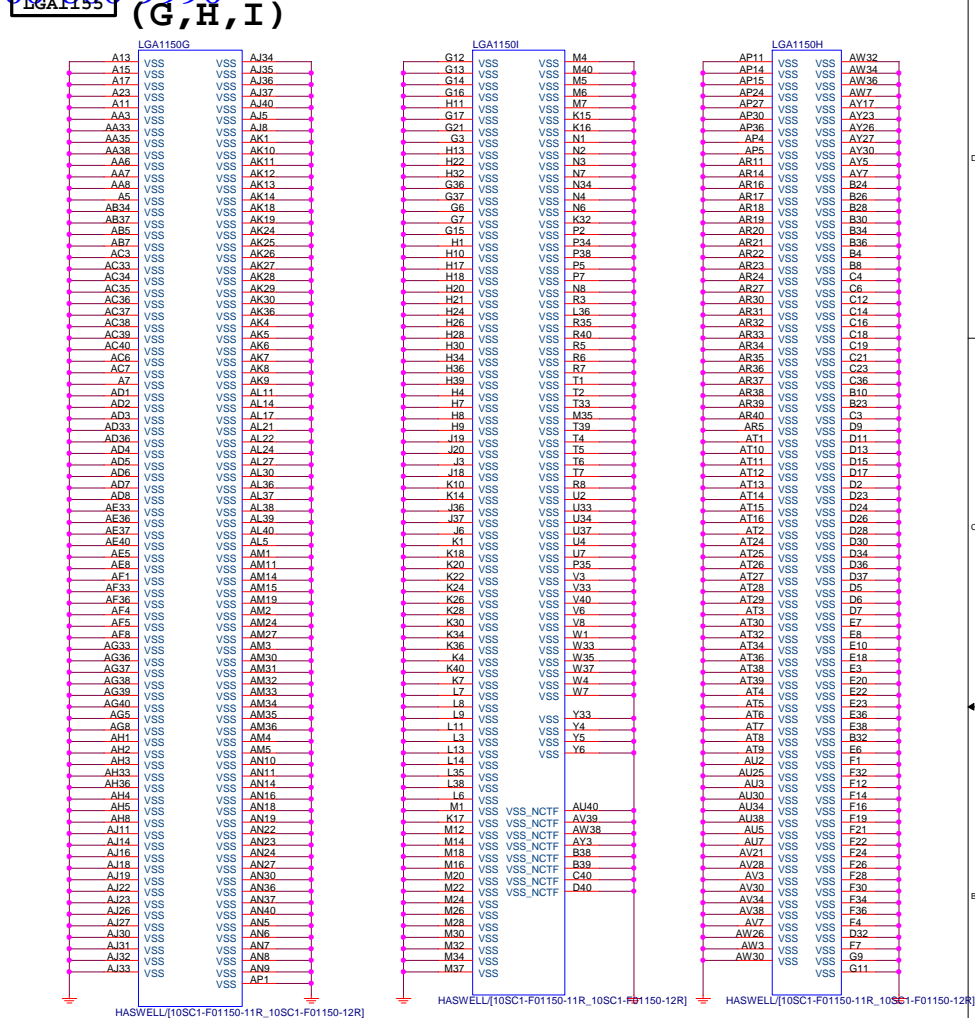
ILM_BP/1156/CSP/ILM_BP/1156/CSP/[12KRC-0F0001-52R_12KRC-0F0001-51R]

DDR BUS

Gigabyte Technology

CPU LGA1150-B

Size Custom	Document Number GA-H81M-S2H	Rev 1.0
Date:	Thursday, August 07, 2014	Sheet 5 of 34



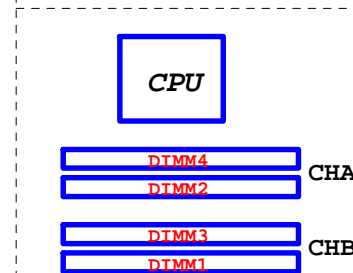
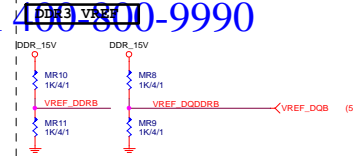
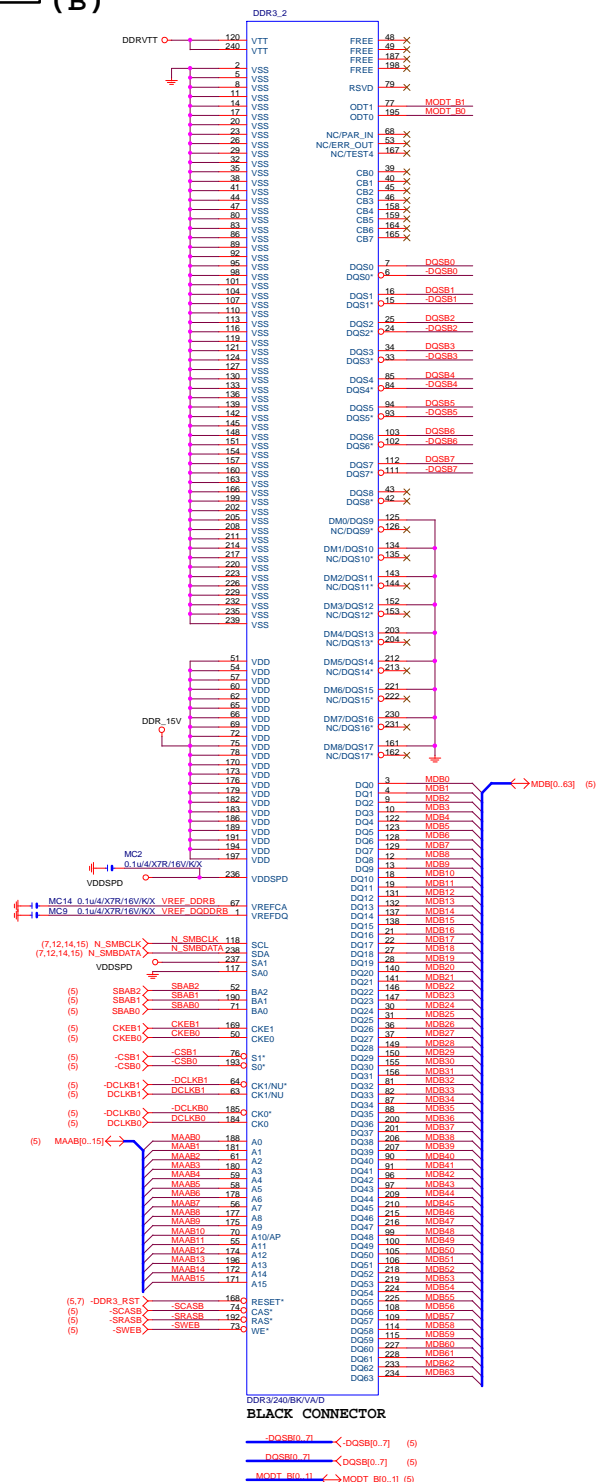


DDR 15V



DDRVTT





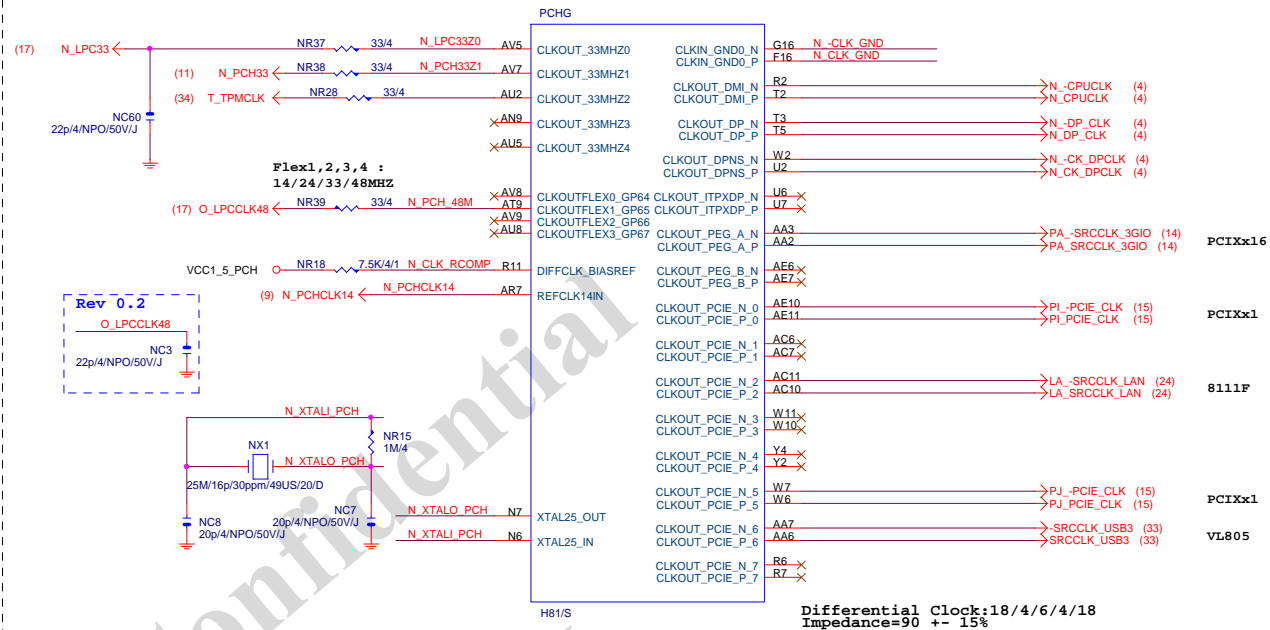
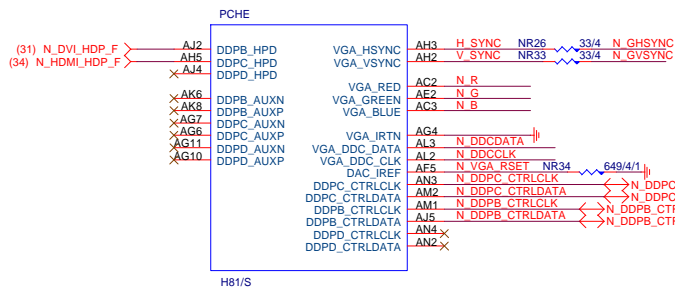
<h1 style="text-align: center;">Gigabyte Technology</h1>			
<h2 style="text-align: center;">Title</h2> <h3 style="text-align: center;">DDRIII CHANNEL B</h3>			
Size	Document Number	GA-H81M-S2H	Rev
Custom			1.0
Date:		Sheet	8 of 34

PCH

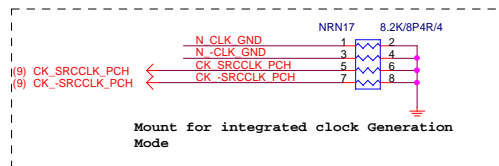
(E)

PCH

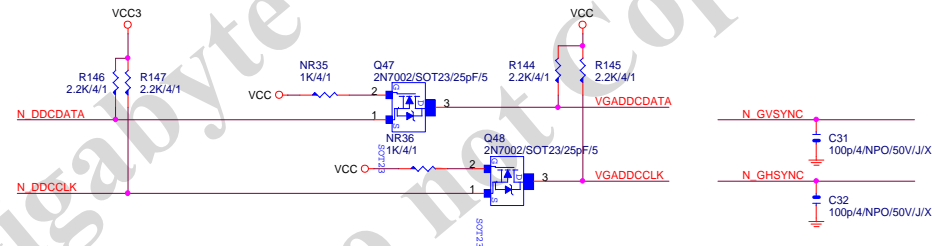
(G)



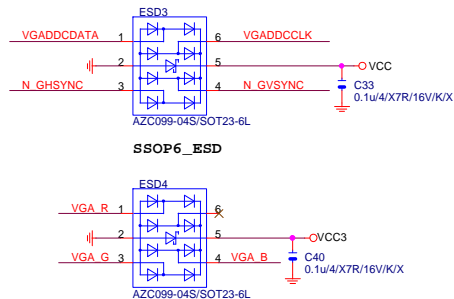
PCH CLK PD



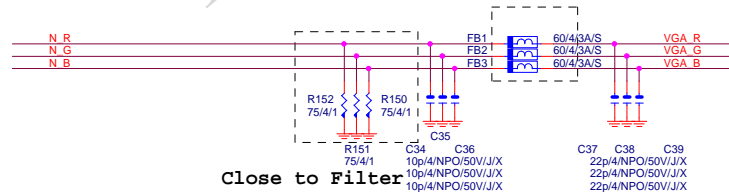
VGA DDC



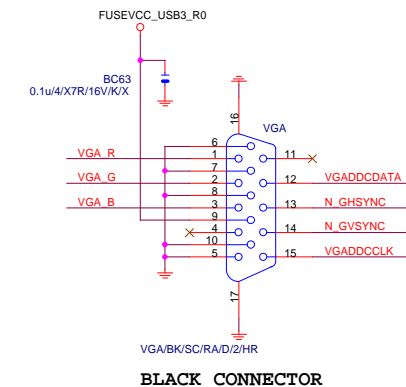
VGA ESD



VGA DDC

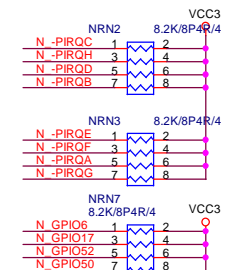
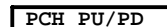
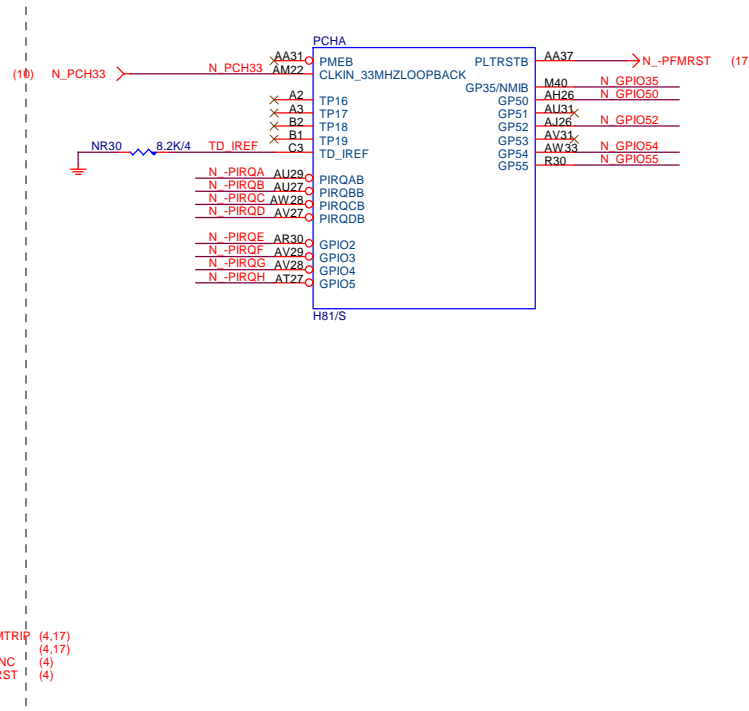


VGA CONNECTOR



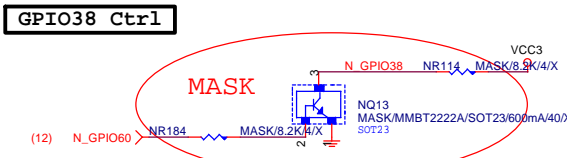
Gigabyte Technology

Title		
PCH DISPLAY, CLK BUFFER		
GA-H81M-S2H		
Size	Document Number	Rev
Custom		1.0
Date:	Thursday, August 07, 2014	Sheet 10 of 34



ME PWROK

GPIO38 Ctrl



Title			
PCH HOST , SATA, PCI			
Size	Document Number		Rev
Custom	GA-H81M-S2H		1.0
Date:	Thursday, August 07, 2014	Sheet	11 of 34

PCH

(D)

(17,34) N_LAD[0..3] << N_LAD[0..3]

ACZ_SDOUT

PCH PU/PD

GP8:Low to enable

PCH Lock chip

N106 1K/4/1

N -JGC_EN

3VDUAL

NRN9

NRN10

NRN20

NRN21

NRN22

NRN23

NRN24

NRN25

NRN26

NRN27

NRN28

NRN29

NRN30

NRN31

NRN32

NRN33

NRN34

NRN35

NRN36

NRN37

NRN38

NRN39

NRN40

NRN41

NRN42

NRN43

NRN44

NRN45

NRN46

NRN47

NRN48

NRN49

NRN50

NRN51

NRN52

NRN53

NRN54

NRN55

NRN56

NRN57

NRN58

NRN59

NRN60

NRN61

NRN62

NRN63

NRN64

NRN65

NRN66

NRN67

NRN68

NRN69

NRN70

NRN71

NRN72

NRN73

NRN74

NRN75

NRN76

NRN77

NRN78

NRN79

NRN80

NRN81

NRN82

NRN83

NRN84

NRN85

NRN86

NRN87

NRN88

NRN89

NRN90

NRN91

NRN92

NRN93

NRN94

NRN95

NRN96

NRN97

NRN98

NRN99

NRN100

NRN101

NRN102

NRN103

NRN104

NRN105

NRN106

NRN107

NRN108

NRN109

NRN110

NRN111

NRN112

NRN113

NRN114

NRN115

NRN116

NRN117

NRN118

NRN119

NRN120

NRN121

NRN122

NRN123

NRN124

NRN125

NRN126

NRN127

NRN128

NRN129

NRN130

NRN131

NRN132

NRN133

NRN134

NRN135

NRN136

NRN137

NRN138

NRN139

NRN140

NRN141

NRN142

NRN143

NRN144

NRN145

NRN146

NRN147

NRN148

NRN149

NRN150

NRN151

NRN152

NRN153

NRN154

NRN155

NRN156

NRN157

NRN158

NRN159

NRN160

NRN161

NRN162

NRN163

NRN164

NRN165

NRN166

NRN167

NRN168

NRN169

NRN170

NRN171

NRN172

NRN173

NRN174

NRN175

NRN176

NRN177

NRN178

NRN179

NRN180

NRN181

NRN182

NRN183

NRN184

NRN185

NRN186

NRN187

NRN188

NRN189

NRN190

NRN191

NRN192

NRN193

NRN194

NRN195

NRN196

NRN197

NRN198

NRN199

NRN200

NRN201

NRN202

NRN203

NRN204

NRN205

NRN206

NRN207

NRN208

NRN209

NRN210

NRN211

NRN212

NRN213

NRN214

NRN215

NRN216

NRN217

NRN218

NRN219

NRN220

NRN221

NRN222

NRN223

NRN224

NRN225

NRN226

NRN227

NRN228

NRN229

NRN230

NRN231

NRN232

NRN233

NRN234

NRN235

NRN236

NRN237

NRN238

NRN239

NRN240

NRN241

NRN242

NRN243

NRN244

NRN245

NRN246

NRN247

NRN248

NRN249

NRN250

NRN251

NRN252

NRN253

NRN254

NRN255

NRN256

NRN257

NRN258

NRN259

NRN260

NRN261

NRN262

NRN263

NRN264

NRN265

NRN266

NRN267

NRN268

NRN269

NRN270

NRN271

NRN272

NRN273

NRN274

NRN275

NRN276

NRN277

NRN278

NRN279

NRN280

NRN281

NRN282

NRN283

NRN284

NRN285

NRN286

NRN287

NRN288

NRN289

NRN290

NRN291

NRN292

NRN293

NRN294

NRN295

NRN296

NRN297

NRN298

NRN299

NRN300

NRN301

NRN302

NRN303

NRN304

NRN305

NRN306

NRN307

NRN308

NRN309

NRN310

NRN311

NRN312

NRN313

NRN314

NRN315

NRN316

NRN317

NRN318

NRN319

NRN320

NRN321

NRN322

NRN323

NRN324

NRN325

NRN326

NRN327

NRN328

NRN329

NRN330

NRN331

NRN332

NRN333

NRN334

NRN335

NRN336

NRN337

NRN338

NRN339

NRN340

NRN341

NRN342

NRN343

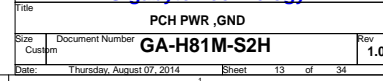
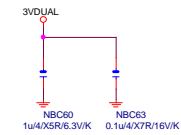
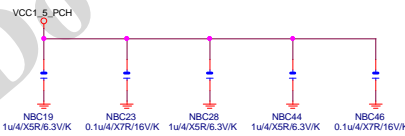
NRN344

NRN345

NRN346

NRN347

NRN348

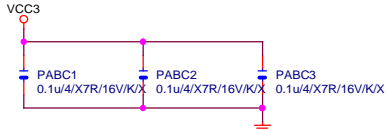


PCIEX16 CAP

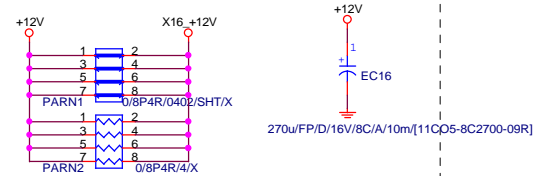
PCIEX16 SLOT

www.xinxunwei.com 400-800-9990

PCIESLOT-164DN-P



PCIEX16 PROTECT SHT

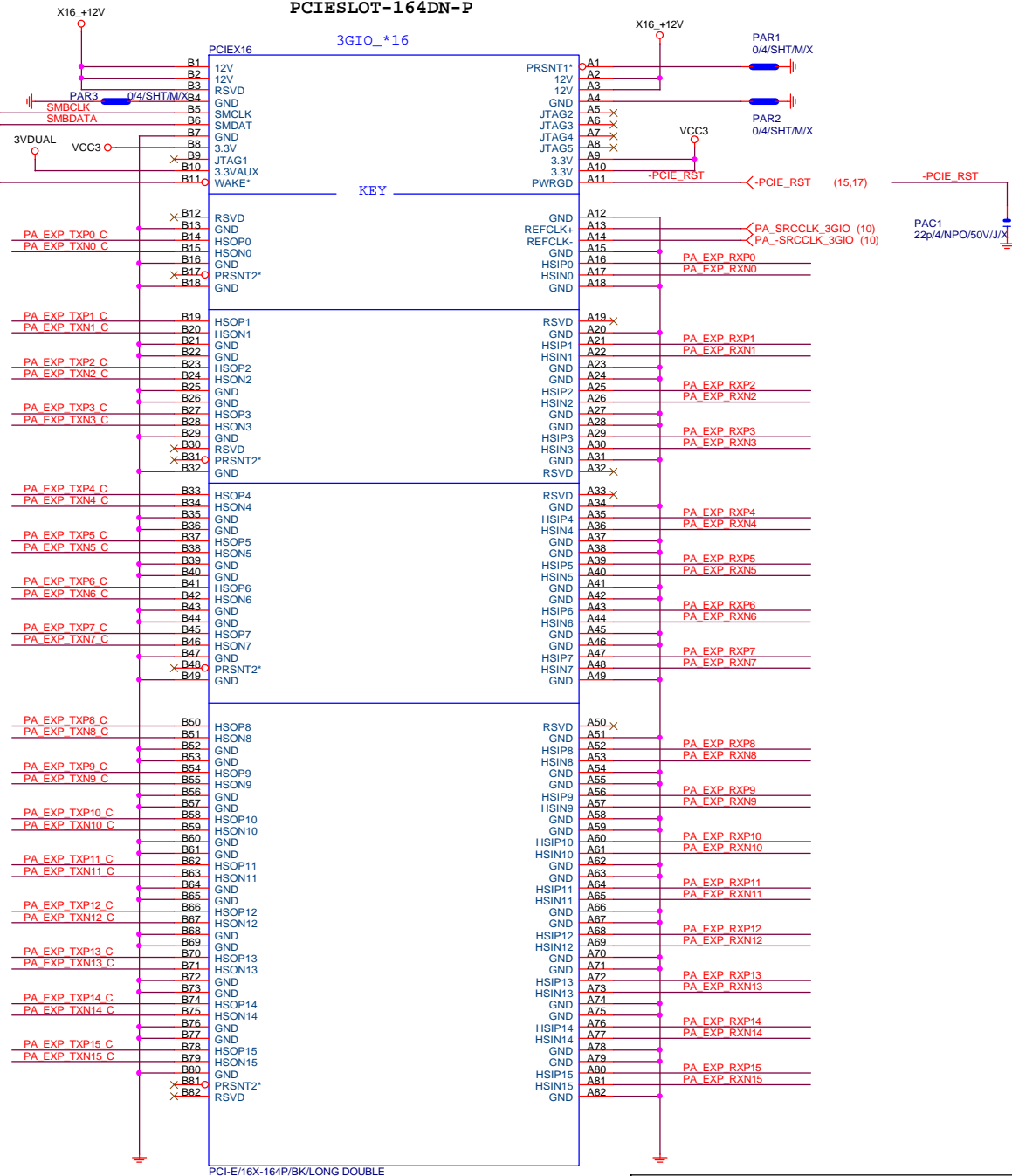


PCIEX16 AC CAP

PA EXP TXP0	PAC5	0.22u4/X5R/6.3V/K	PA EXP TXP0 C
PA EXP TXN0	PAC4	0.22u4/X5R/6.3V/K	PA EXP TXN0 C
PA EXP TXP1	PAC6	0.22u4/X5R/6.3V/K	PA EXP TXP1 C
PA EXP TXN1	PAC7	0.22u4/X5R/6.3V/K	PA EXP TXN1 C
PA EXP TXP2	PAC8	0.22u4/X5R/6.3V/K	PA EXP TXP2 C
PA EXP TXN2	PAC9	0.22u4/X5R/6.3V/K	PA EXP TXN2 C
PA EXP TXP3	PAC10	0.22u4/X5R/6.3V/K	PA EXP TXP3 C
PA EXP TXN3	PAC11	0.22u4/X5R/6.3V/K	PA EXP TXN3 C
PA EXP TXP4	PAC12	0.22u4/X5R/6.3V/K	PA EXP TXP4 C
PA EXP TXN4	PAC13	0.22u4/X5R/6.3V/K	PA EXP TXN4 C
PA EXP TXP5	PAC14	0.22u4/X5R/6.3V/K	PA EXP TXP5 C
PA EXP TXN5	PAC15	0.22u4/X5R/6.3V/K	PA EXP TXN5 C
PA EXP TXP6	PAC16	0.22u4/X5R/6.3V/K	PA EXP TXP6 C
PA EXP TXN6	PAC17	0.22u4/X5R/6.3V/K	PA EXP TXN6 C
PA EXP TXP7	PAC19	0.22u4/X5R/6.3V/K	PA EXP TXP7 C
PA EXP TXN7	PAC18	0.22u4/X5R/6.3V/K	PA EXP TXN7 C
PA EXP TXP8	PAC20	0.22u4/X5R/6.3V/K	PA EXP TXP8 C
PA EXP TXN8	PAC21	0.22u4/X5R/6.3V/K	PA EXP TXN8 C
PA EXP TXP9	PAC22	0.22u4/X5R/6.3V/K	PA EXP TXP9 C
PA EXP TXN9	PAC23	0.22u4/X5R/6.3V/K	PA EXP TXN9 C
PA EXP TXP10	PAC24	0.22u4/X5R/6.3V/K	PA EXP TXP10 C
PA EXP TXN10	PAC25	0.22u4/X5R/6.3V/K	PA EXP TXN10 C
PA EXP TXP11	PAC26	0.22u4/X5R/6.3V/K	PA EXP TXP11 C
PA EXP TXN11	PAC27	0.22u4/X5R/6.3V/K	PA EXP TXN11 C
PA EXP TXP12	PAC28	0.22u4/X5R/6.3V/K	PA EXP TXP12 C
PA EXP TXN12	PAC29	0.22u4/X5R/6.3V/K	PA EXP TXN12 C
PA EXP TXP13	PAC30	0.22u4/X5R/6.3V/K	PA EXP TXP13 C
PA EXP TXN13	PAC31	0.22u4/X5R/6.3V/K	PA EXP TXN13 C
PA EXP TXP14	PAC32	0.22u4/X5R/6.3V/K	PA EXP TXP14 C
PA EXP TXN14	PAC33	0.22u4/X5R/6.3V/K	PA EXP TXN14 C
PA EXP TXP15	PAC34	0.22u4/X5R/6.3V/K	PA EXP TXP15 C
PA EXP TXN15	PAC35	0.22u4/X5R/6.3V/K	PA EXP TXN15 C

PA_EXP_RXP[0..15] >> PA_EXP_RXP[0..15] (4)
PA_EXP_RXN[0..15] >> PA_EXP_RXN[0..15] (4)
PA_EXP_TXP[0..15] >> PA_EXP_TXP[0..15] (4)
PA_EXP_TXN[0..15] >> PA_EXP_TXN[0..15] (4)

The auxillary reset circuit is only required for PCIe Gen3 margining and functional link training



PCI-E/16X-164P/BK/LONG DOUBLE

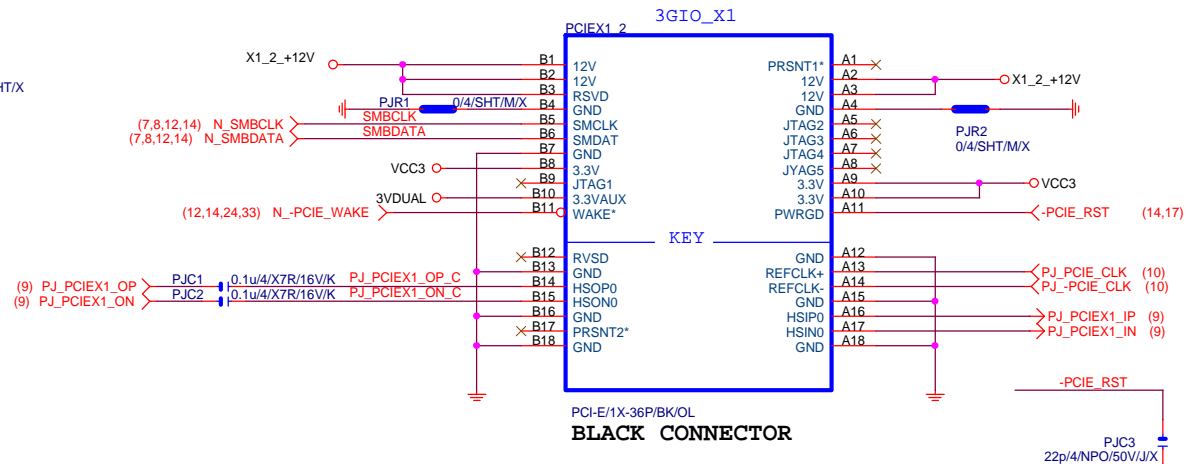
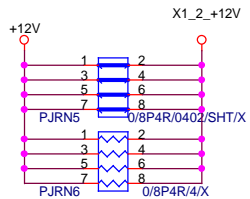
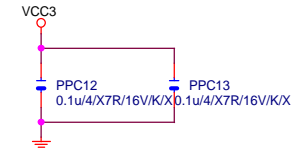
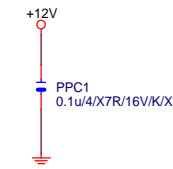
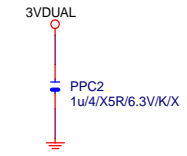
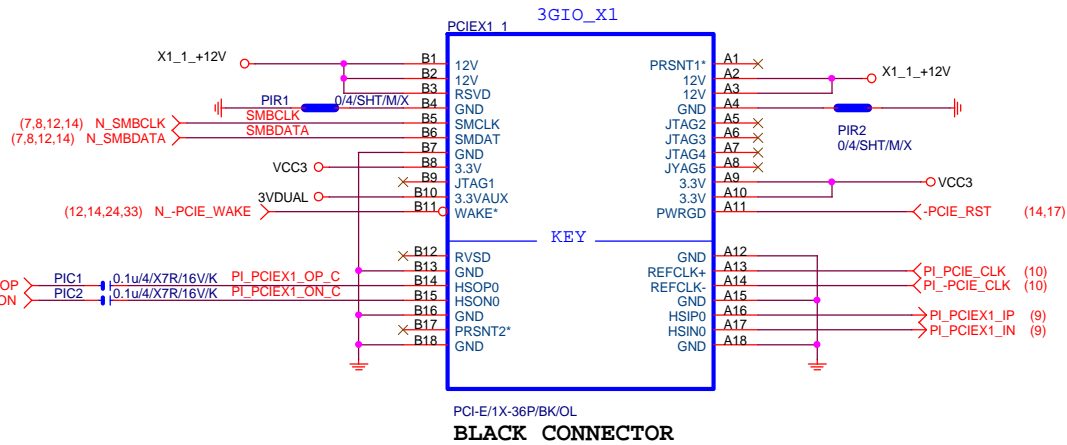
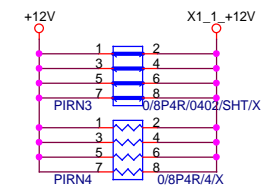
BLACK CONNECTOR

Gigabyte Technology

PCI EXPRESS * 16

Title			
PCI EXPRESS * 16			
Size Custom	Document Number	GA-H81M-S2H	Rev 1.0
Date:	Thursday, August 07, 2014	Sheet 14 of 34	

PCIEX1 SLOT



Gigabyte Technology

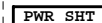
PCI EXPRESS X 1 PORT

Size	Document Number	Rev
Custom	GA-H81M-S2H	1.0

Date: Thursday, August 07, 2014 Sheet 15 of 34

Gigabyte Confidential
Do not Copy

Gigabyte Technology		
Title		
PCI SLOT 1&2		
Size	Document Number	Rev
Custom	GA-H81M-S2H	1.0
Date: Thursday, August 07, 2014		Sheet 16 of 34
2		1

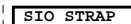
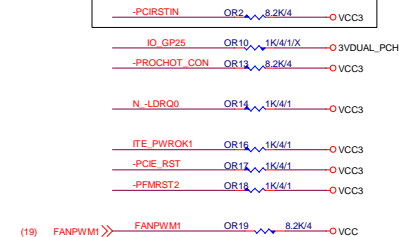


For 8728 EUP function

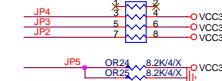
3VDUAL_PCH OR8 0/4/SHT/M/X IT_VCC




新增

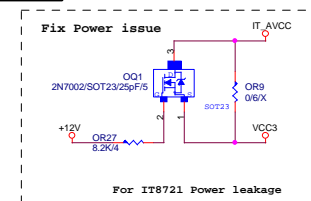
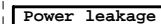


H61M-S2 1.1 JP6 stuff
pull down ORN2 1K/8P4R/4

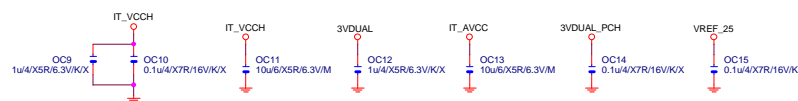
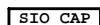
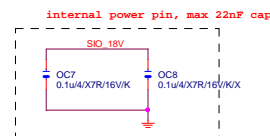
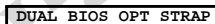


ITE RECOMMENDATION

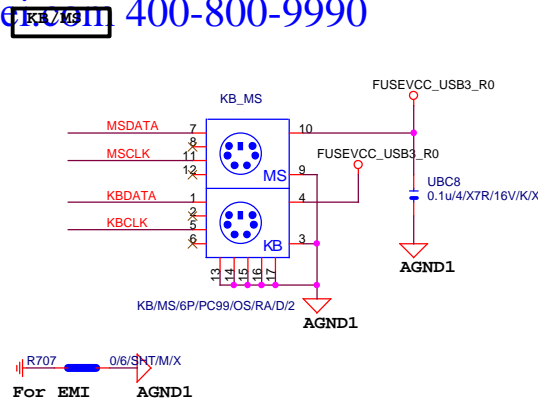
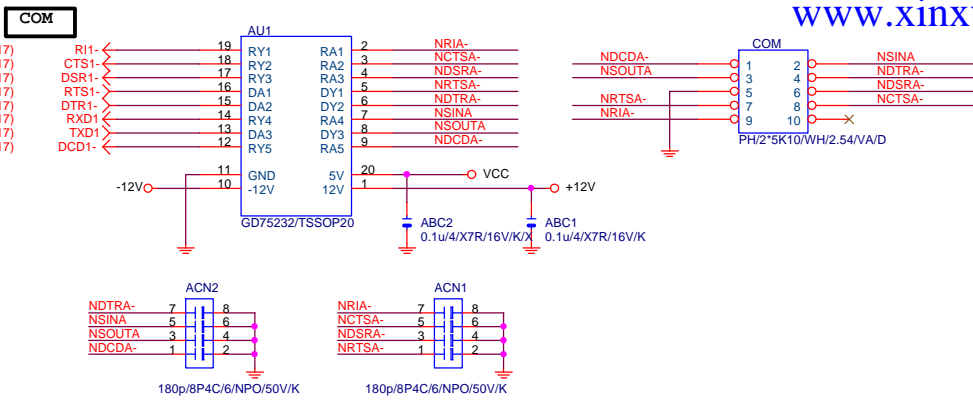
EUP control by PCH
 3VDUAL 
 JP3--- High SPI-Flash Disable
 Low SPI-Flash Enable



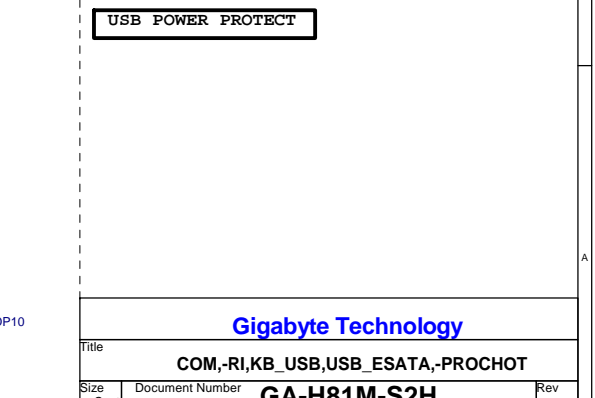
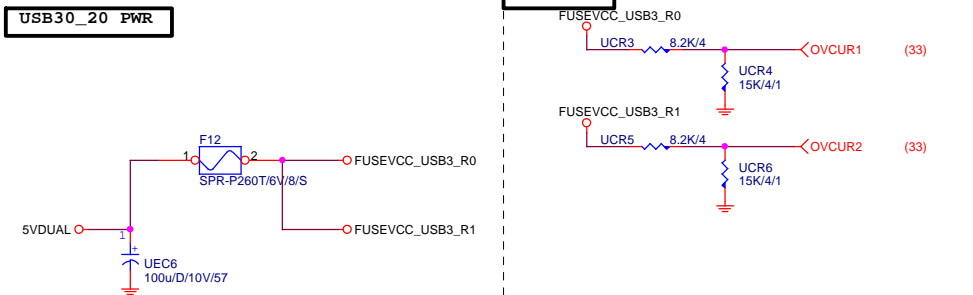
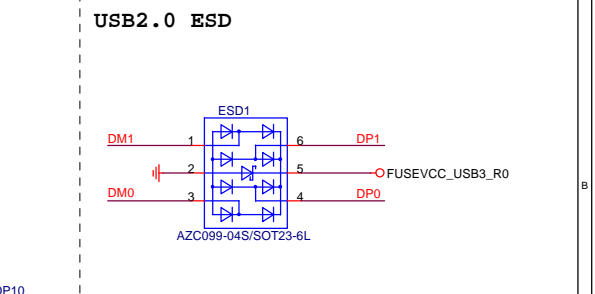
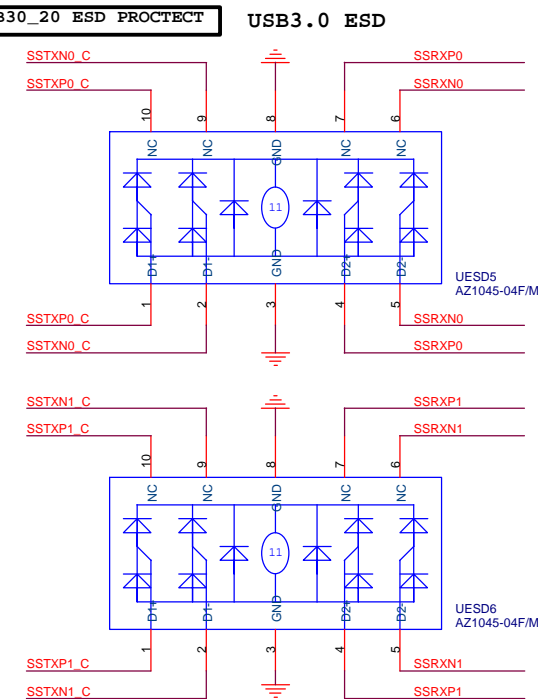
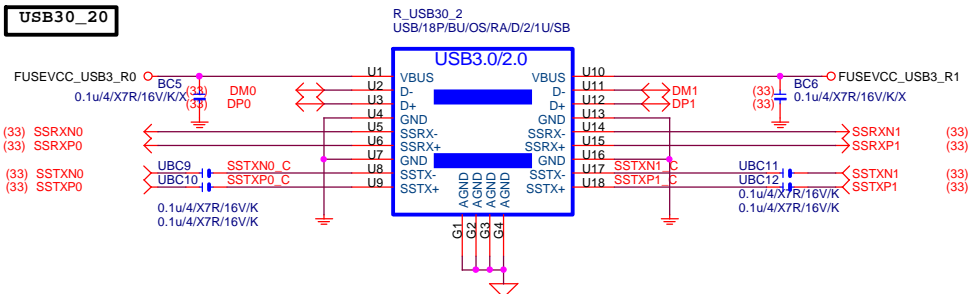
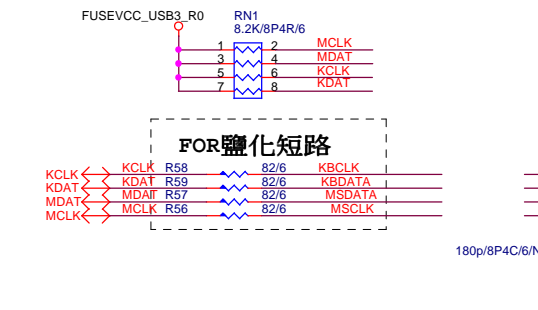
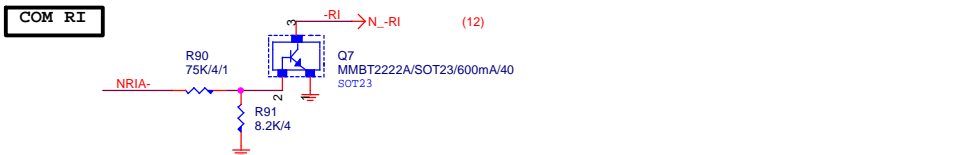
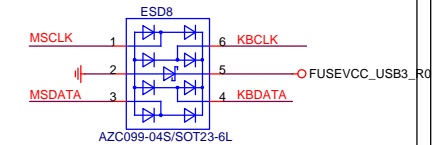
For IT8721 Power leakage



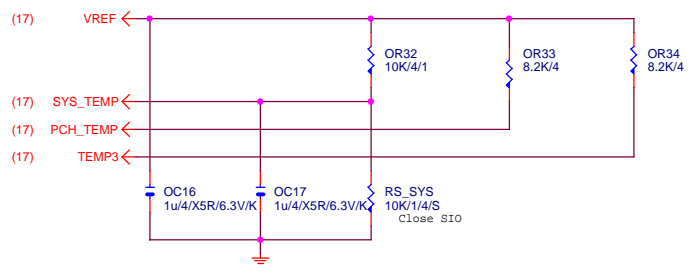
Gigabyte Technology			
Title PCH GPIO , CTRL , AUDIO			
Size C	Document Number GA-H81M-S2H		Rev 1.0
Date:	Thursday, August 07, 2014	Sheet	17 of 34



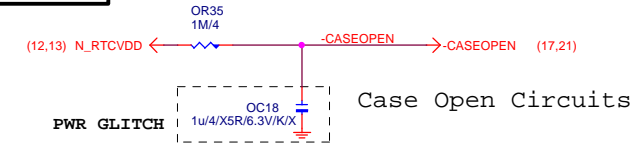
KB/MS ESD



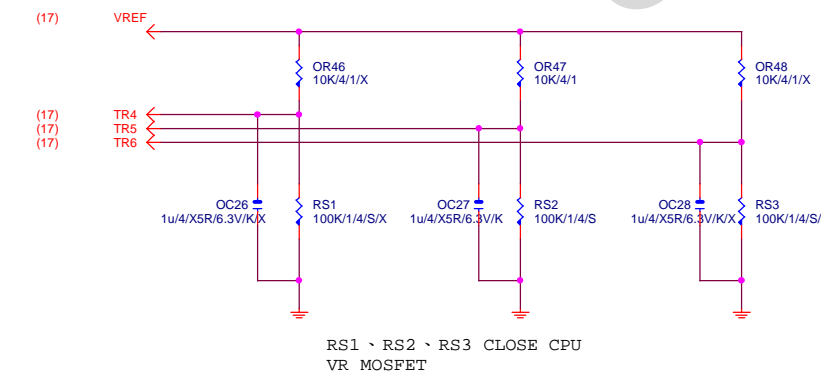
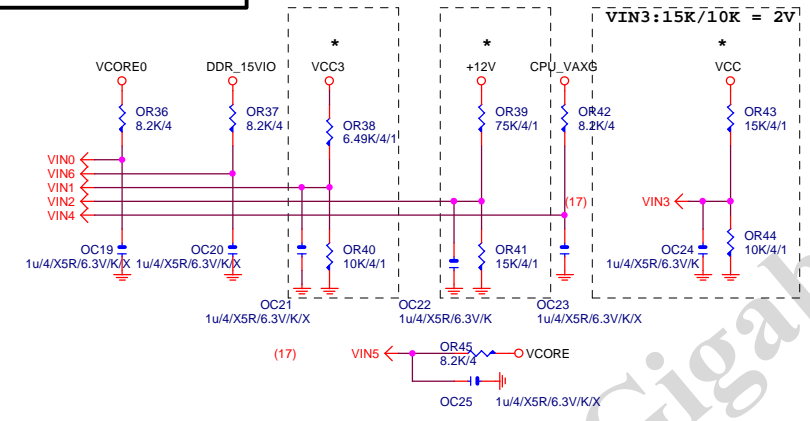
TEMP H/W MONITOR



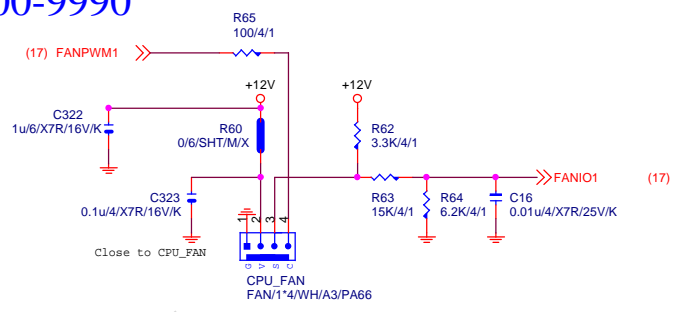
CASE OPEN



VOLTAGE-- H/W MONITOR

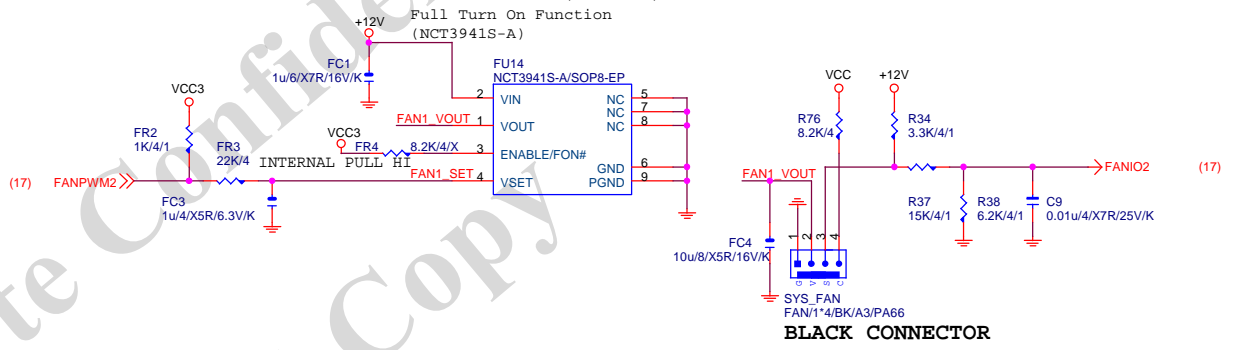


CPU SMART FAN



SYS SMART FAN

Linear SYS_FAN



-PROHOT

NCT3933	0X2A	0X20	0X22
VREF1	DDRVTT	VREF_DDRA_DQ	PCH Core
VREF2	VREF_DDRA_CA	N/A	VCC1_5_PCH
VREF3	VREF_DDRA_CA	VREF_DDRB_DQ	SMREF

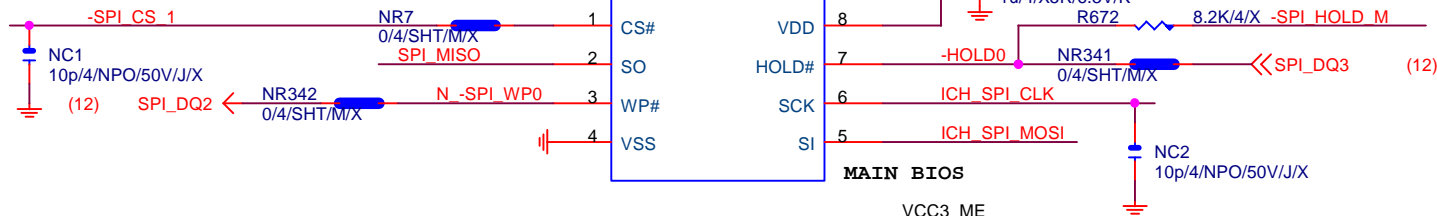
Gigabyte Technology

Title: HWM,FAN CTRL,OV

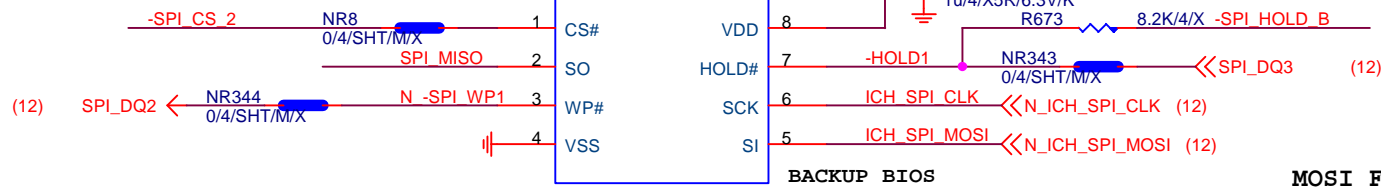
Size: Custom Document Number: GA-H81M-S2H Rev: 1.0

Date: Thursday, August 07, 2014 Sheet: 19 of 34

M_BIOS
32M/SPI/SO8/200mil/S



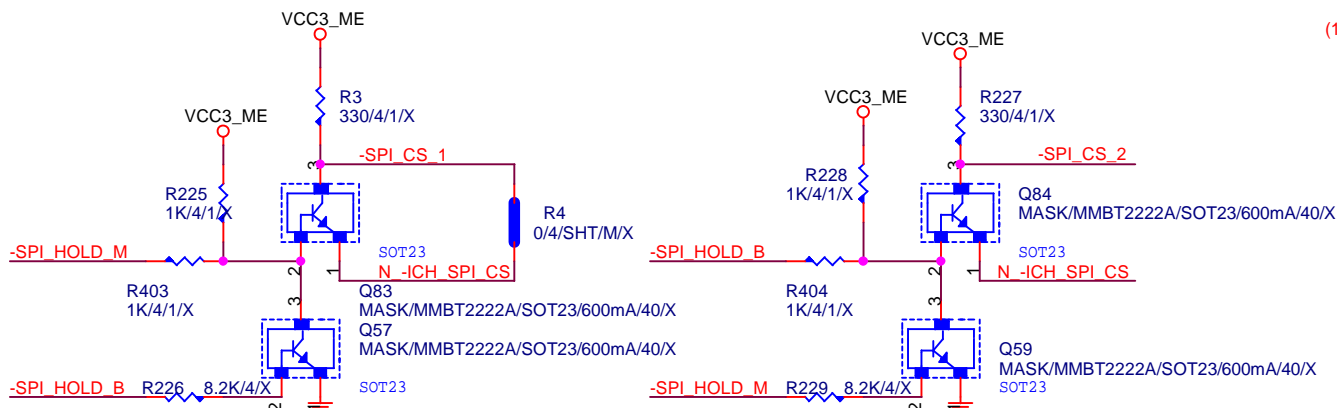
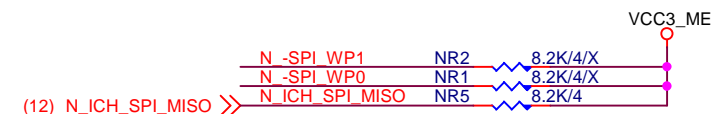
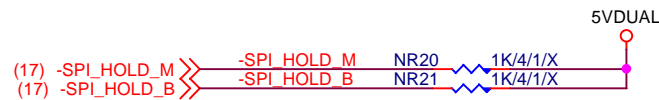
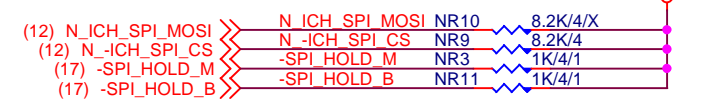
B_BIOS
MASK/32M/SPI/SO8/200mil/S/X



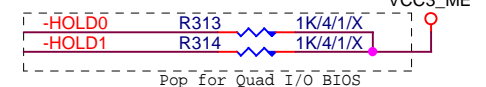
BOOT DEVICE	GNT0	GNT1
LPC	0	0
PCI	0	1
NAND	1	0
SPI	1	1

1 means floating
0 means PD 1K

MOSI For DMI RX Termination Voltage



CHECK



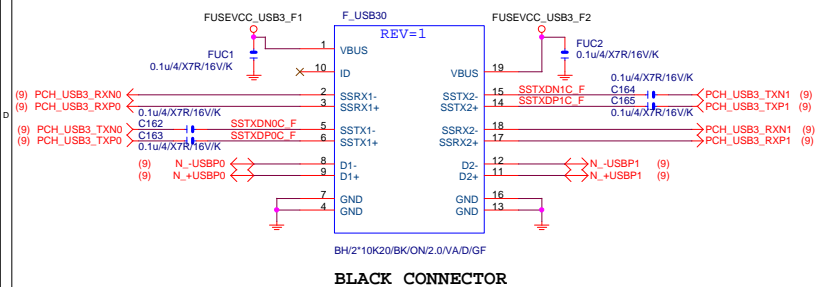
Gigabyte Technology

DUAL BIOS

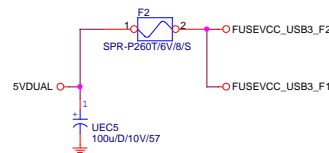
GA-H81M-S2H

Title		
Size	Document Number	Rev
Custom		1.0
Date:	Thursday, August 07, 2014	Sheet 20 of 34

F_USB30



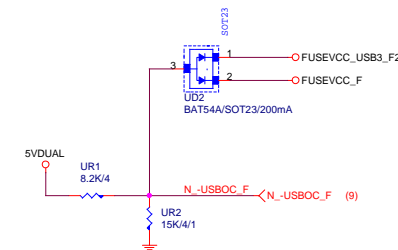
F_USB30 SPKR



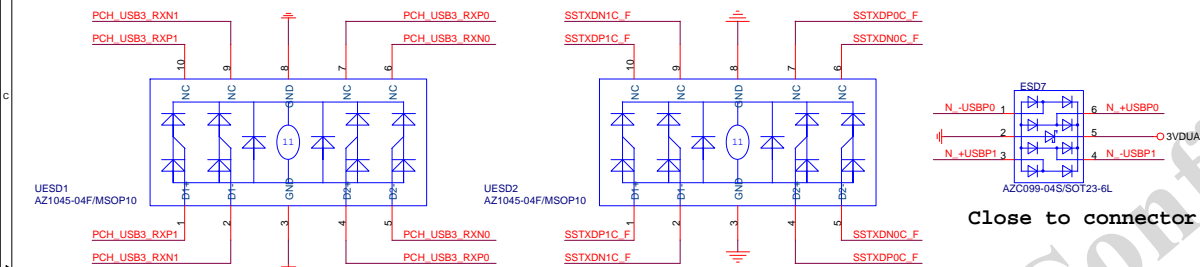
(11) N_SATALED → -HDLED

Remove Level shift

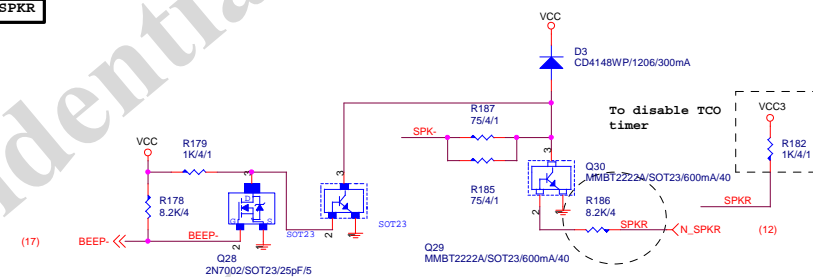
-USB0C_F



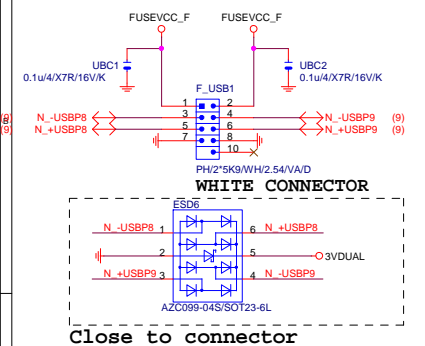
F_USB30 ESD PROTECT



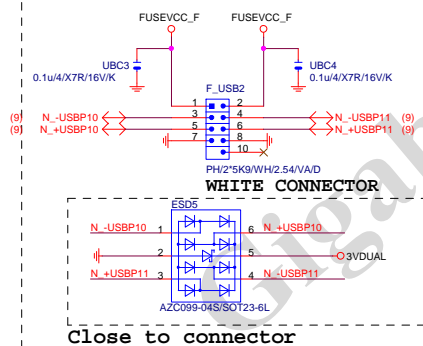
SPKR



FRONT USB1

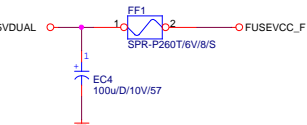


FRONT USB2

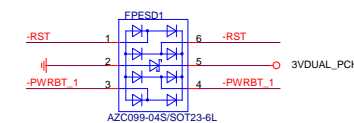
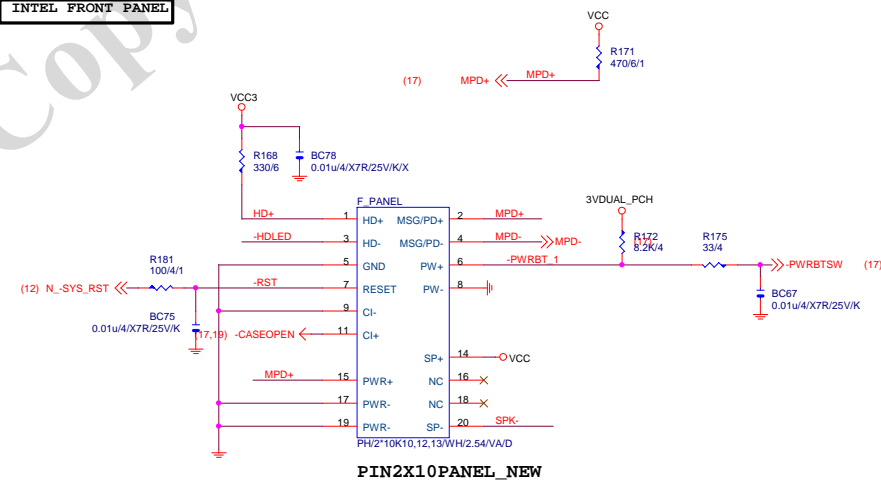


FUSE-0805

F_USB1, F_USB2 4-Port 2.6A



INTEL FRONT PANEL

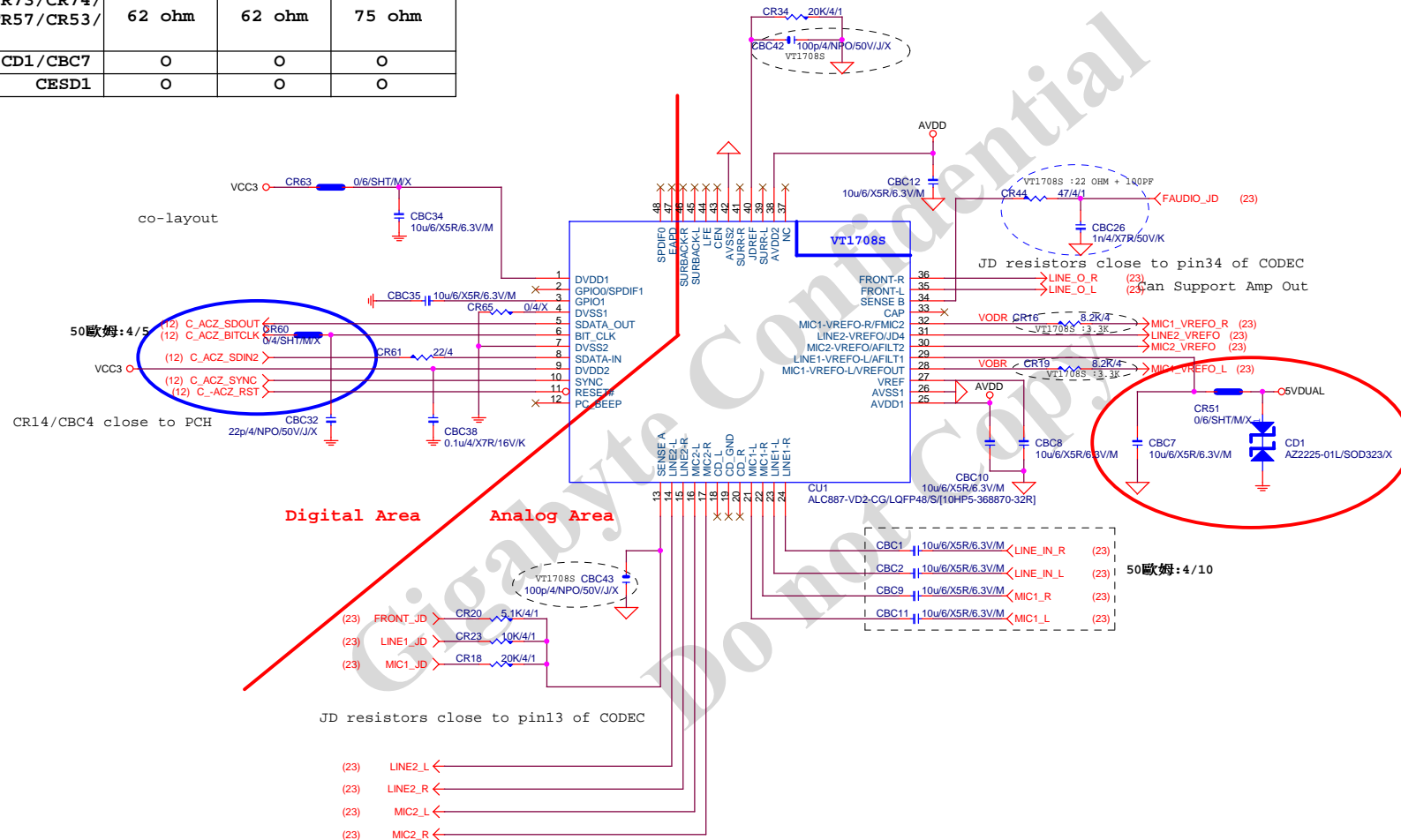


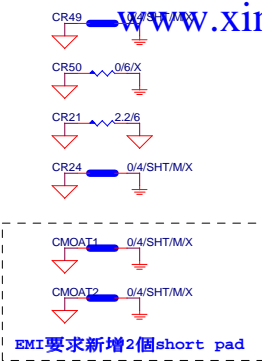
Gigabyte Technology

FP,F_USB,USB PWR,SPKR,SATA LED			
Size	Document Number	GA-H81M-S2H	
Custom			Rev 1.0
Date:	Thursday, August 07, 2014	Sheet 21	of 34

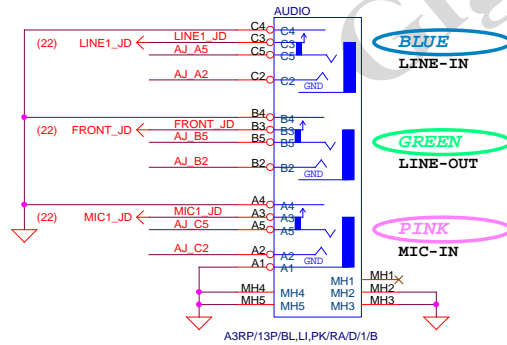
AZALIA CODEC *ALC892/ALC887-VD2/VT1708-CE* Colay

	ALC892	ALC887-VD2	VT1708S-CE
CR44/CBC26	47ohm+1nF	47ohm+1nF	22ohm+100P
CBC42/CBC43	X	X	100P/4
CR6/CR7/CR58/CR54/ CR67/CR68/CR69/CR70	22K/4	22K/4	10K/4/1
CR5/CR8/CR1/CR14/ CR17/CR22/CR73/CR74/ CR13/CR11/CR57/CR53/ CR75/CR76	62 ohm	62 ohm	75 ohm
CR51/CD1/CBC7	O	O	O
CESD1	O	O	O





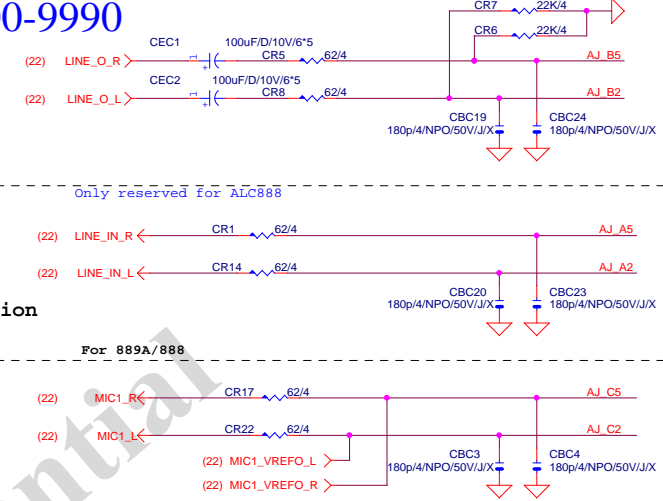
SPDIF_OUT



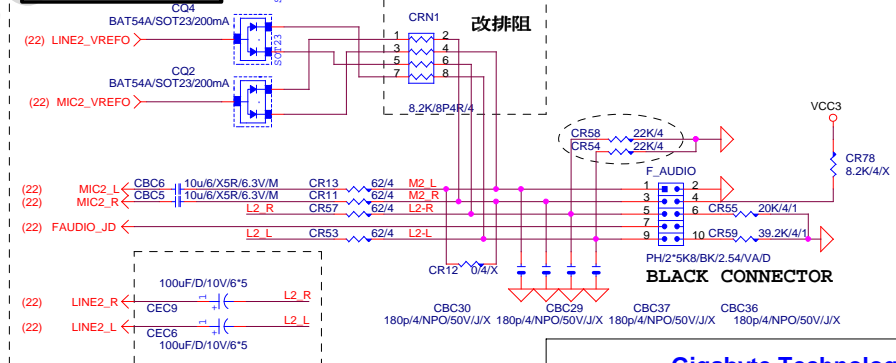
LINE-IN

Verify MIC function
in LINE-in

MIC-IN

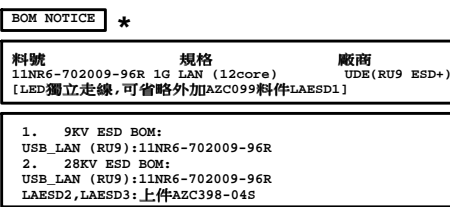
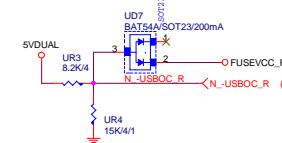
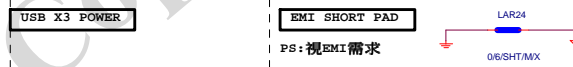
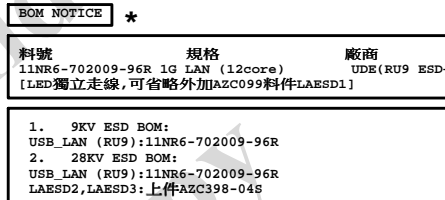
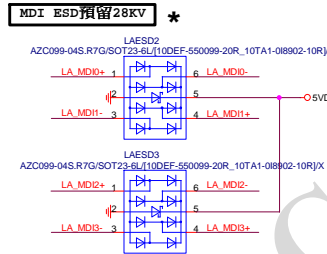


AZALIA FRONT PANEL

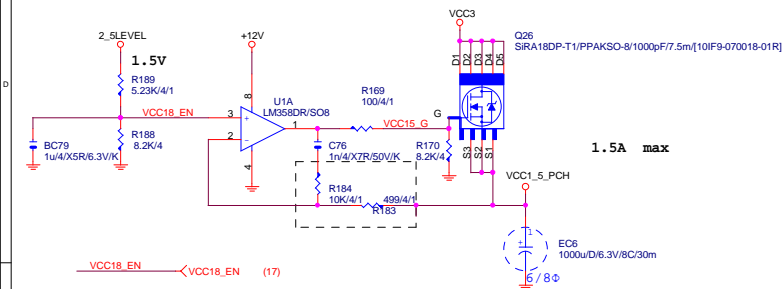


Gigabyte Technology

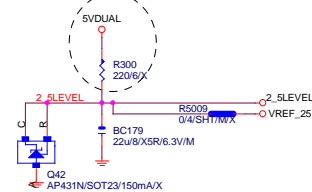
Title			
AUDIO JACK			
Size Custom	Document Number	GA-H81M-S2H	Rev 1.0
Date: Thursday, August 07, 2014	Sheet 23 of 34		



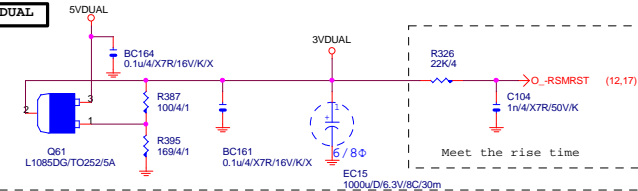
VCC1_8_PCH



ERP

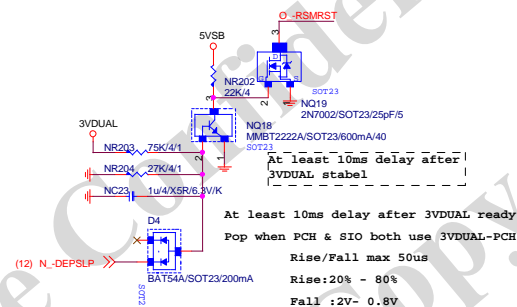
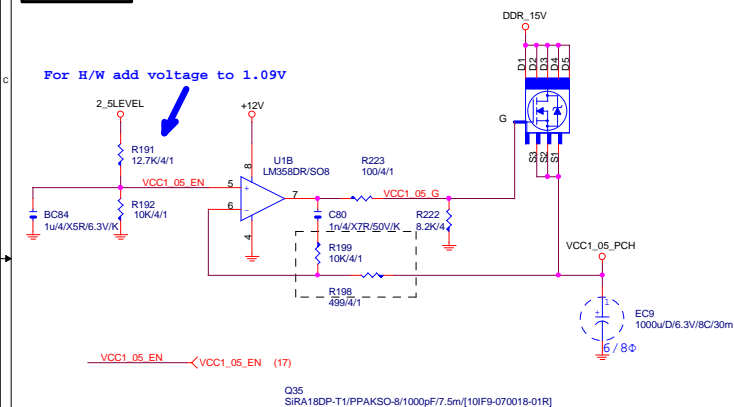


3VDUAL

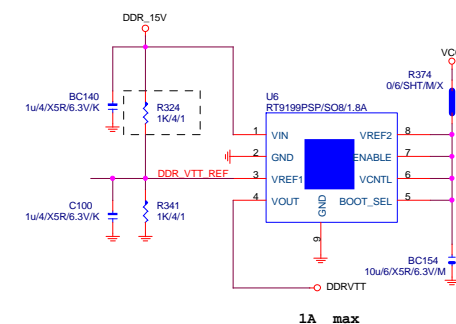


VCC1_05_PCH

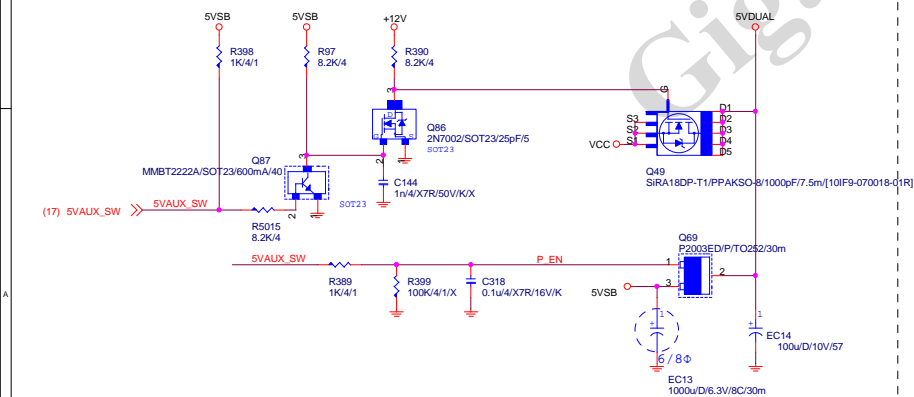
For H/W add voltage to 1.09V



DDRVTT



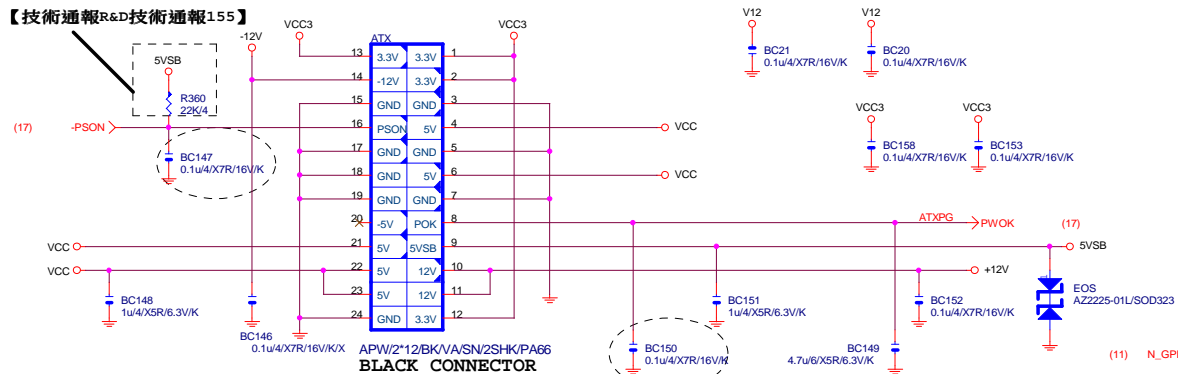
5VDUAL



5VDUAL SHORT PROTECT

ATXX24 POWER CONNECTOR

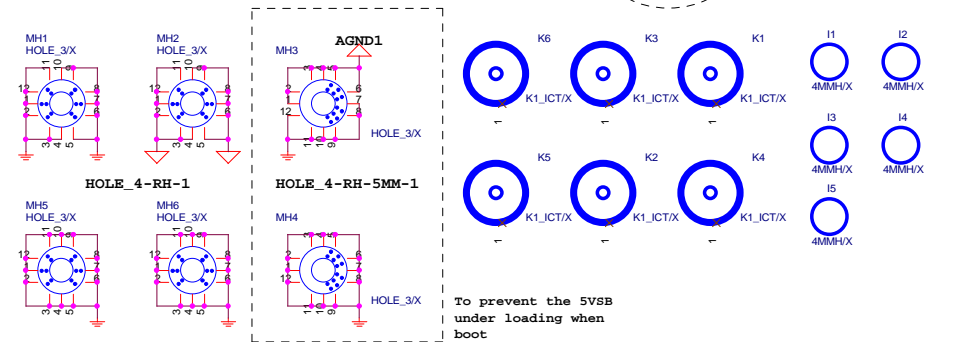
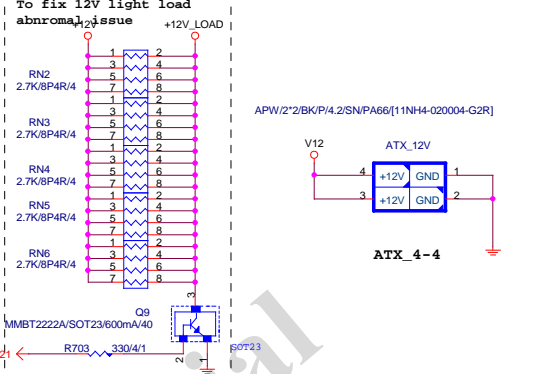
【技術通報R&D技術通報155】



www.xinxunwei.com 400-800-0990

ATXX4 POWER CONNECTOR

【技術通報R&D技術通報158】

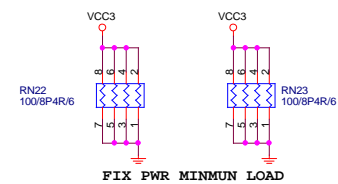


TPM

To prevent the 5VSB under loading when boot

PWOK PATCH

【技術通報R&D技術通報154】



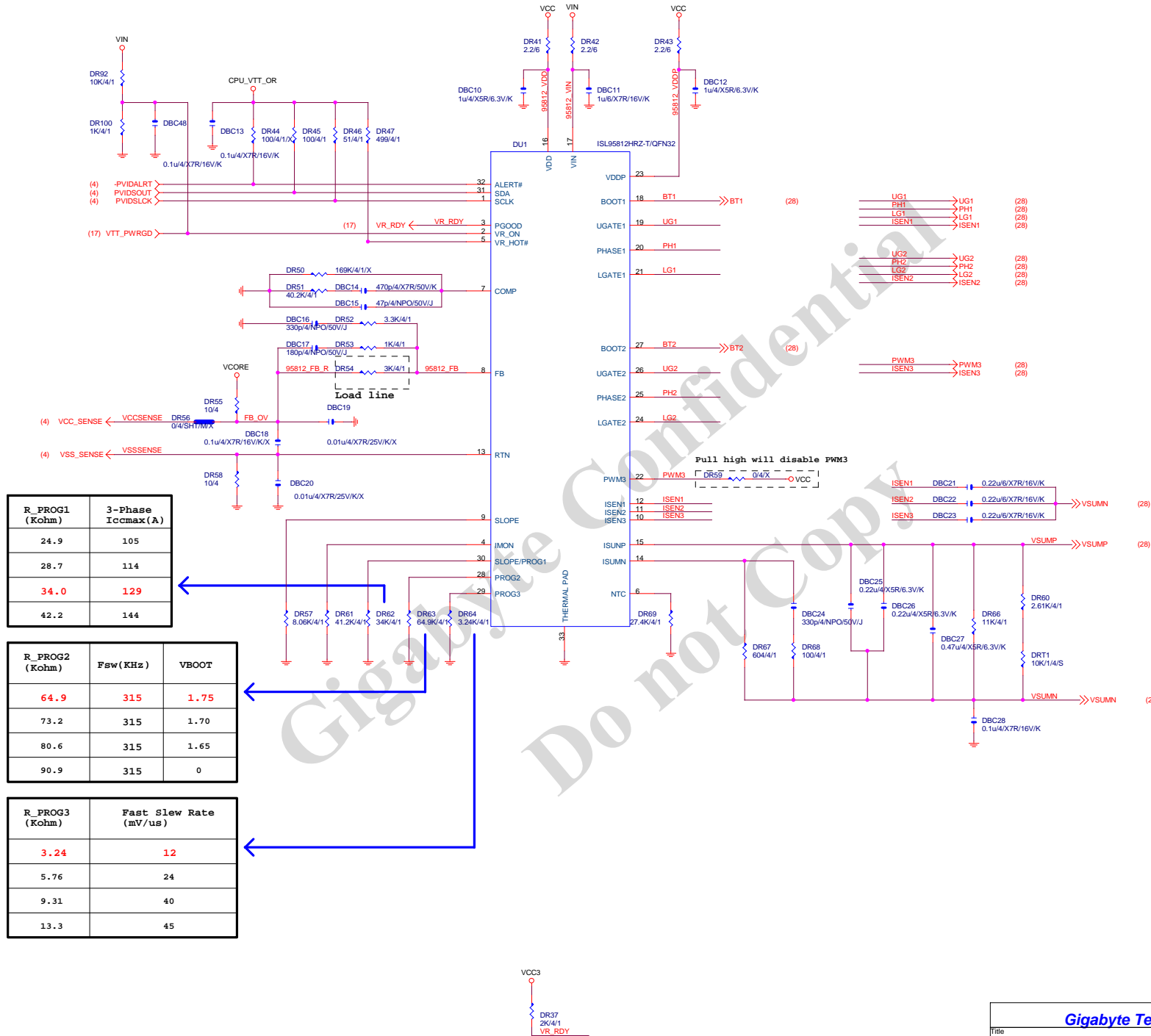
Gigabyte Technology

ATX CONNECTOR

GA-H81M-S2H

Rev 1.0

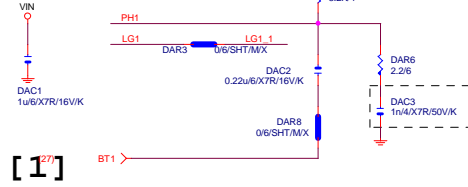
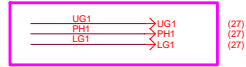
Date: Thursday, August 07, 2014 Sheet 26 of 34



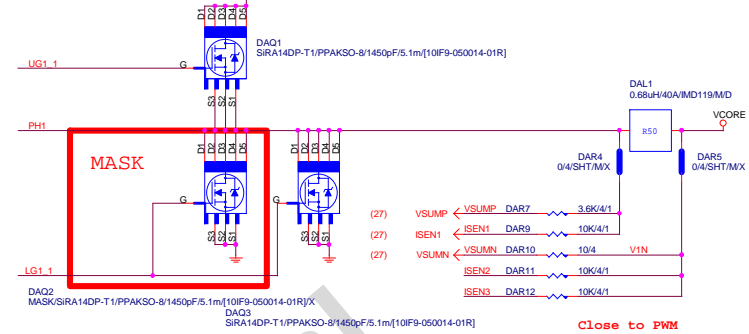
Gigabyte Technology

File			CPU CORE VR-1
Size	Document Number	GA-H81M-S2H	
Custom		Rev	1.0
Date	Thursday, August 07, 2014	Sheet	27 of 34

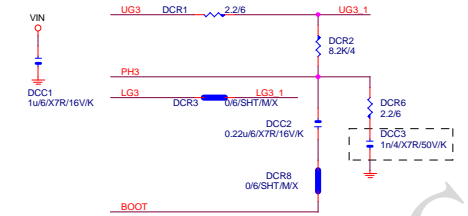
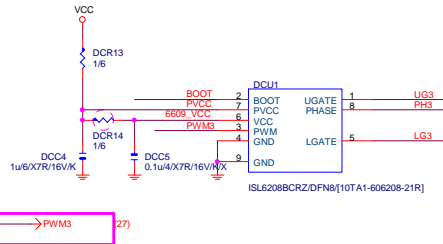
PHASE 1



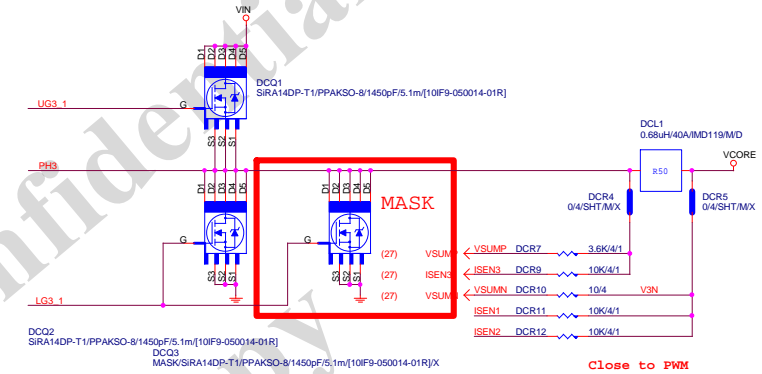
[1]



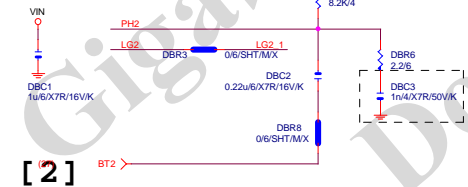
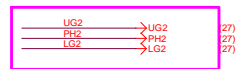
PHASE 3



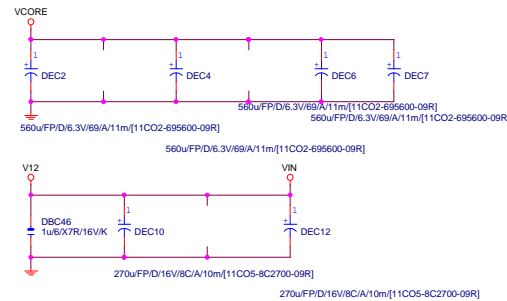
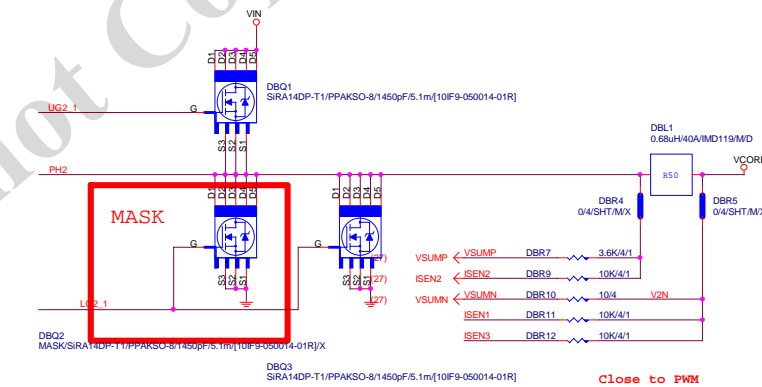
[3]



PHASE 2

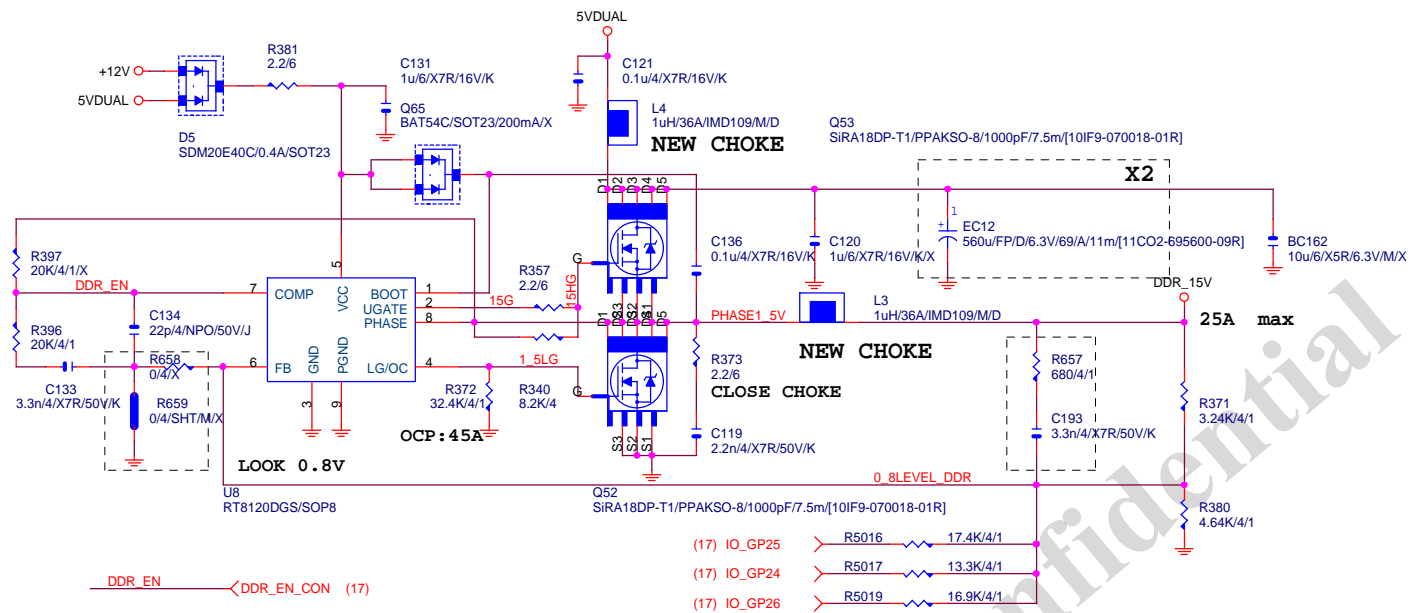


[2]



Gigabyte Technology

Title			CPU CORE VR-2
Size	Document Number	GA-H81M-S2H	
Custom			Rev 1.0
Date	Thursday, August 07, 2014	Sheet	28 of 34




From DDR_15V source
10 mils trace to SIO



VIN=5V, VOUT=1.5V, IOUT=25A, PHASE=1
IRMS=11.45A
560uF/P/D/6.3V/68/8m RIPPLE CURRENT=4.7A
Coefficient=1.7(85°C), 1(105°C)
VIN Ripple current=4.7X1.7=7.99A(85°C)
-->故固態電容須2X7.99=15.98>11.45A

$$\begin{aligned} \text{Rocset} &= (\text{Iocp} * \text{Lgate}, \text{rdson}) / \text{Iocset} \\ \text{Rocset} &= (45\text{A} * 6.7\text{mOhm}) / 10\text{uA} = 30\text{K} \\ \text{Iocset} &= 10\text{uA} \end{aligned}$$

<div style="text-align: center;">  </div>			
Title			
DDR POWER			
Size	Document Number		Rev
Custom	GA-H81M-S2H		1.0
Date:	Thursday, August 07, 2014	Sheet	29 of 34

VCC1_05_ME

【技術通報R&D技術通報156】
(RICHTEK), (NUVOTON), (EMC)做共用
PIN7分壓阻值須做修改為100K以上電阻值

VCC3_ME

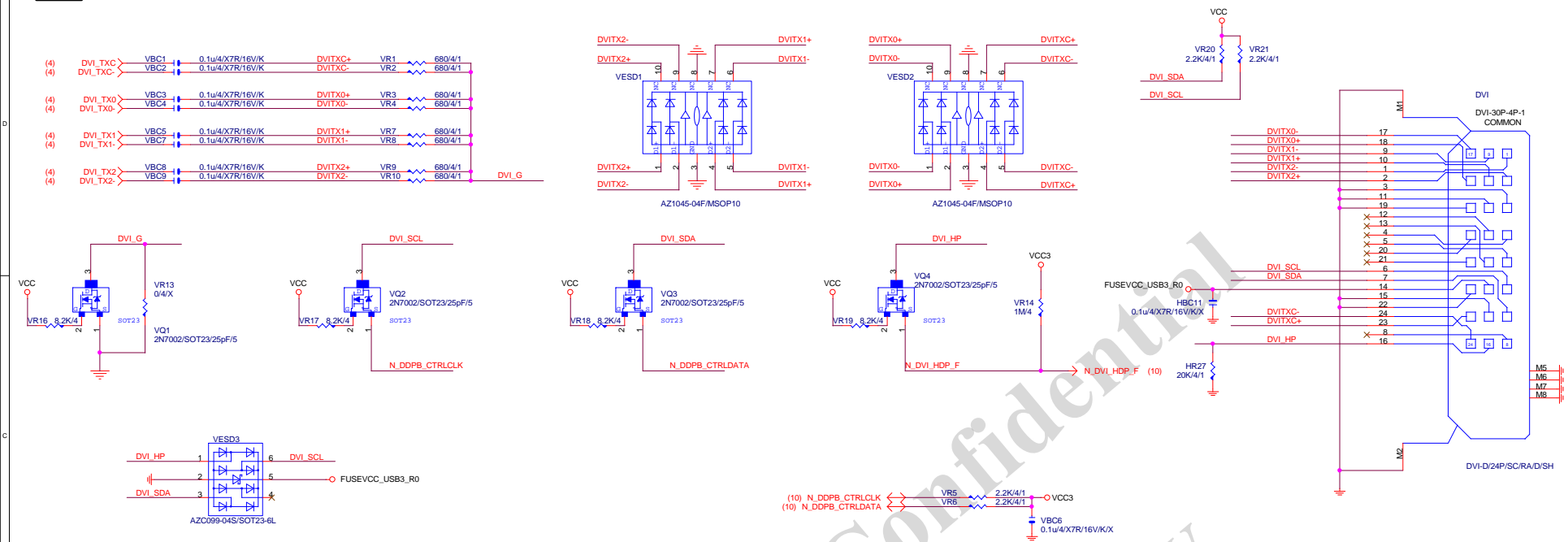
www.xinxunwei.com 400-800-9990

LPT PORT

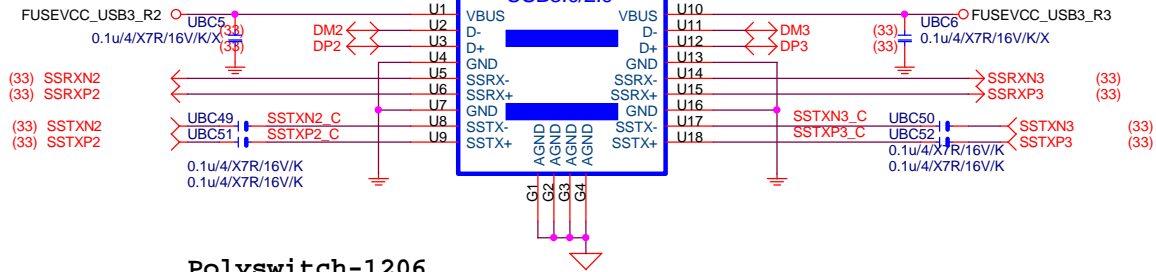
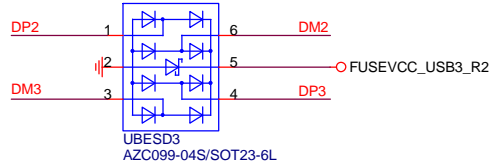
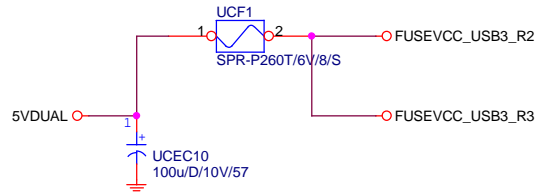
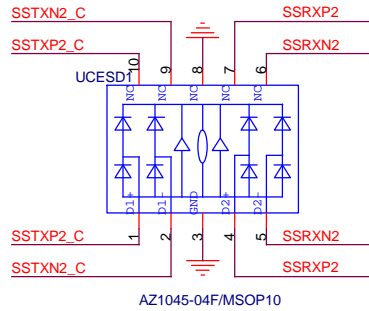
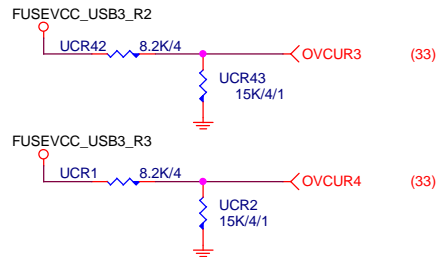
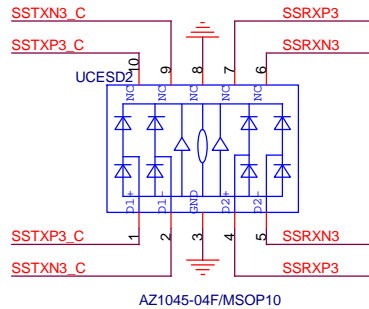
Gigabyte Confidential
Do not Copy

Gigabyte Technology			
Title LPT			
Size Custom	Document Number GA-H81M-S2H		Rev 1.0
Date:	Thursday, August 07, 2014	Sheet 30	of 34

DVI



HDMI LEVEL SHIFT

USB30_20R_USB30_1
USB/18P/BU/OS/RA/D/2/1U/SB**USB3.0/2.0****Polyswitch-1206****USB3.0 1Port - 1Fuse (3.5A)****Close to connector****Close to connector****Gigabyte Technology**

Title

R USB30 2Size
Custom

Document Number

GA-H81M-S2HRev
1.0

Date:

Thursday, August 07, 2014

Sheet

32 of 34

