

**Schematics Page Index (Title / Revision / Change Date)**

Page	Title of Schematics Page	Rev.	Date	Page	Title of Schematics Page	Rev.	Date
01	Schematics Page Index	2.0	2007/4/16	41	Flash ROM/XBUS	2.0	2007/4/16
02	Block Diagram	2.0	2007/4/16	42	SATA HDD RAID	2.0	2007/4/16
03	CLOCK GEN (CK505)	2.0	2007/4/16	43	PATA CD-ROM	2.0	2007/4/16
04	MEROM(HOST BUS) 1/2	2.0	2007/4/16	44	PCI (PCI BUS)	2.0	2007/4/16
05	MEROM(HOST BUS) 2/3	2.0	2007/4/16	45	PCI ( ILINK)	2.0	2007/4/16
06	MEROM(Power/Gnd) 3/3	2.0	2007/4/16	46	PCI (MS-STD/DUO/MDC/SD)	2.0	2007/4/16
07	Crestline (HOST) 1/7	2.0	2007/4/16	47	PCI ( PCMCIA)	2.0	2007/4/16
08	Crestline (DMI) 2/7	2.0	2007/4/16	48	Bluetooth	2.0	2007/4/16
09	Crestline (GRAPHIC) 3/7	2.0	2007/4/16	49	Mini-PCIE Card	2.0	2007/4/16
10	Crestline (DDRII) 4/7	2.0	2007/4/16	50	EXPRESS	2.0	2007/4/16
11	Crestline (POWER,VCC) 5/7	2.0	2007/4/16	51	USB2.0	2.0	2007/4/16
12	Crestline (VCC CORE) 6/7	2.0	2007/4/16	52	CIR Reciver	2.0	2007/4/16
13	Crestline (VSS) 7/7	2.0	2007/4/16	53	FAN / HW THERMAL PROTECTION	2.0	2007/4/16
14	DDRII(SO-DIMM_0) 1/3	2.0	2007/4/16	54	Daughter Board Conn.	2.0	2007/4/16
15	DDRII(SO-DIMM_1) 2/3	2.0	2007/4/16	55	CAM/OIDE	2.0	2007/4/16
16	DDRII(Termination) 3/3	2.0	2007/4/16	56	Logo LED	2.0	2007/4/16
17	VGA(PCI-E)	2.0	2007/4/16	57	AUDIO(CODEC & POWER)	2.0	2007/4/16
18	VGA(STRAP)	2.0	2007/4/16	58	AUDIO( AMP & HP & SPK)	2.0	2007/4/16
19	VGA(GDDR)	2.0	2007/4/16	59	AUDIO (MUTE & INTMIC)	2.0	2007/4/16
20	VGA(MULTIUSE)	2.0	2007/4/16	60	AUDIO (Second Codec)	2.0	2007/4/16
21	VGA(LVD/VDAC )	2.0	2007/4/16	61	Audio BOARD conn	2.0	2007/4/16
22	VRAM(GDDR)# 1/2	2.0	2007/4/16	62	Power Design Diagram	2.0	2007/4/16
23	VRAM(GDDR)# 2/2	2.0	2007/4/16	63	DCIN&Charger	2.0	2007/4/16
24	VGA(POWER) 1/3	2.0	2007/4/16	64	SYS Power (+3_3V/+5V)	2.0	2007/4/16
25	VGA(POWER) 2/3	2.0	2007/4/16	65	SYS Power(+1_5V/+1_05V)	2.0	2007/4/16
26	VGA(POWER) 3/3	2.0	2007/4/16	66	DDR2 Power(+1_8V/+0_9V)	2.0	2007/4/16
27	VRAM(BYPASS) 1/2	2.0	2007/4/16	67	CPU_Vcore ---MAX8771	2.0	2007/4/16
28	VRAM(BYPASS) 2/2	2.0	2007/4/16	68	Others power plan	2.0	2007/4/16
29	TVIN and OUT/Semi-PnP#	2.0	2007/4/16	69	OVP protection	2.0	2007/4/16
30	CRT	2.0	2007/4/16	70	VGA POWER(+1_1V/ +1_2V)	2.0	2007/4/16
31	LVDS	2.0	2007/4/16	71	Inverter Boost Circuit	2.0	2007/4/16
32	HDMI	2.0	2007/4/16	72	HOLE & BOSS	2.0	2007/4/16
33	MINI PCI (TV)	2.0	2007/4/16	73	HISTORY(DVT)	2.0	2007/4/16
34	ICH8-M( PCI/USB ) 1/5	2.0	2007/4/16	74	Second Source 01	2.0	2007/4/16
35	ICH8-M(LPC, IDE, SATA) 2/5	2.0	2007/4/16	75	Second Source 02	2.0	2007/4/16
36	ICH8-M( GPIO) 3/5	2.0	2007/4/16	76	Power On Sequerce Block Diagram	2.0	2007/4/16
37	ICH8-M( POWER) 4/5	2.0	2007/4/16	77	Power On Sequerce Timing	2.0	2007/4/16
38	ICH8-M( GND) 5/5	2.0	2007/4/16	78			
39	LAN (88E8055 MARVELL)	2.0	2007/4/16	79			
40	EC+KBC (3910)	2.0	2007/4/16	80			

P. Leader	Check by	Design by

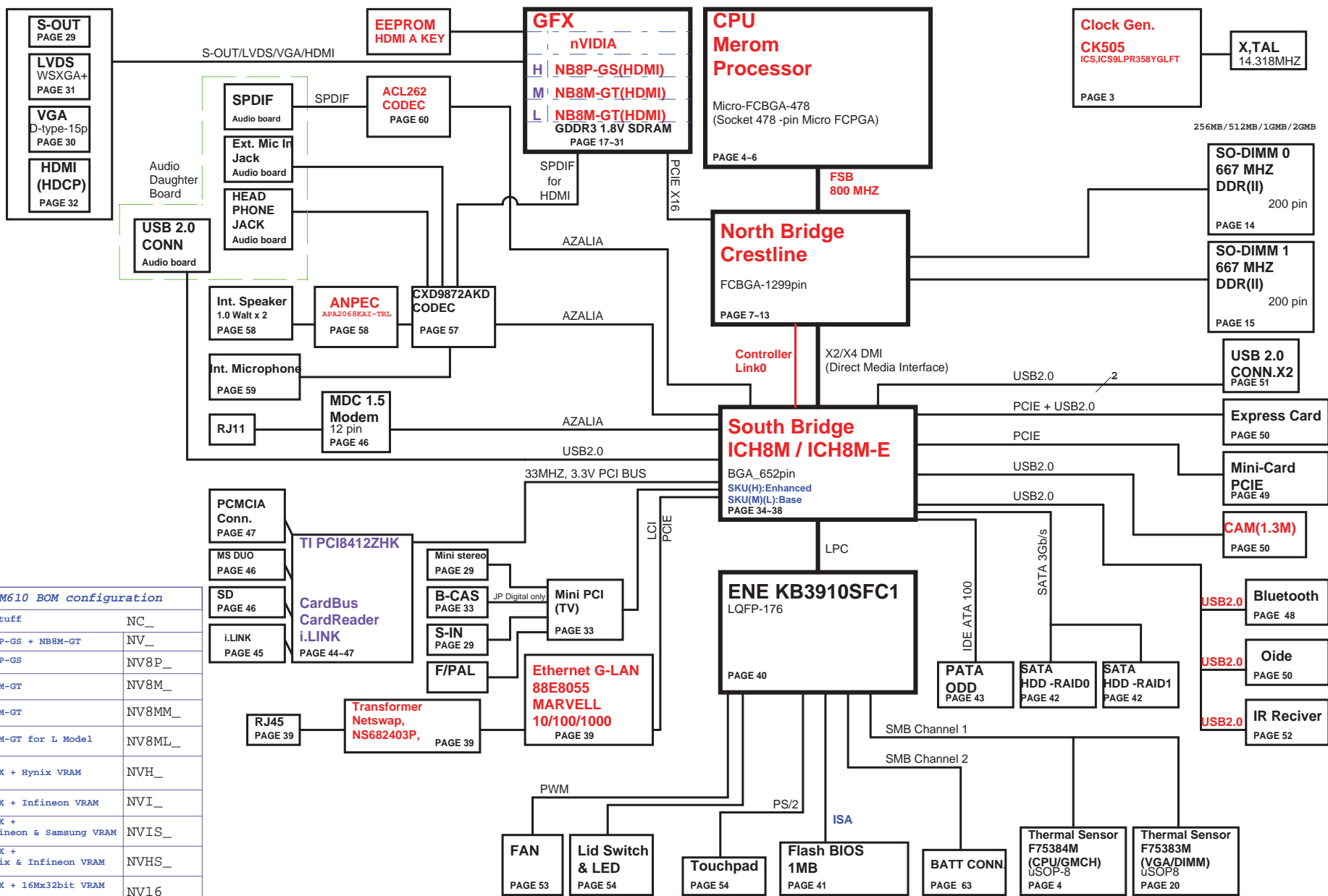
Project Code & Schematics Subject: M610 PVT Main Board

PCB P/N: 黃田 1P-0072100-8010  
翰宇博德 1P-0072500-8010

<b>FOXCONN</b> HON HAI PRECISION IND. CO., LTD. CPBG - R&D Division		
Title	Index Page	
Size A3	Document Number (M610-1-01) MainBoard (MBX-176) 2007.1.4	Rev 2.0
Date:	Thursday, May 10, 2007	Sheet 1 of 77

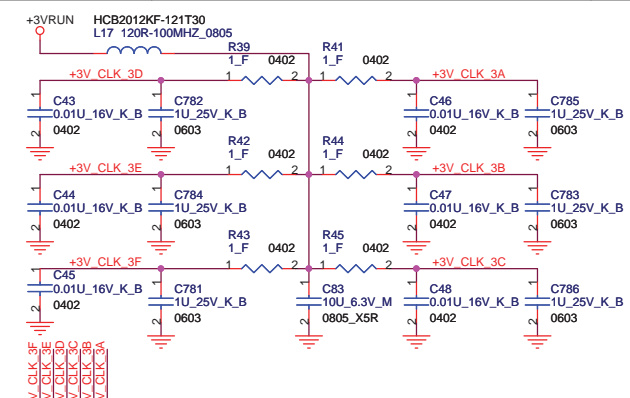
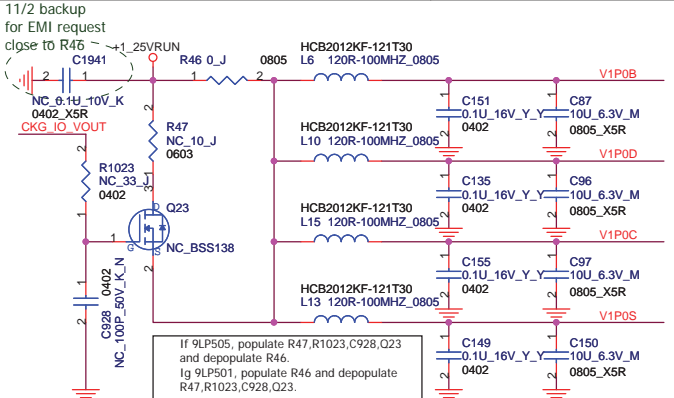
# M610(Beagle Santa Rosa )Block Diagram

Red texts:  
New modified



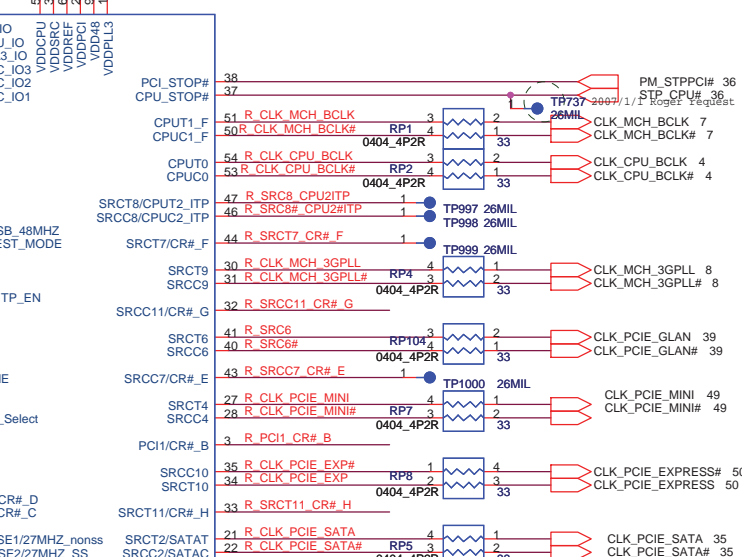
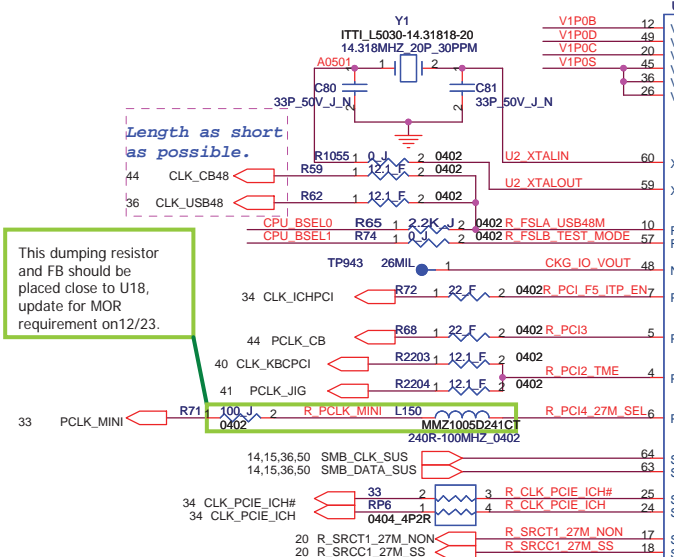
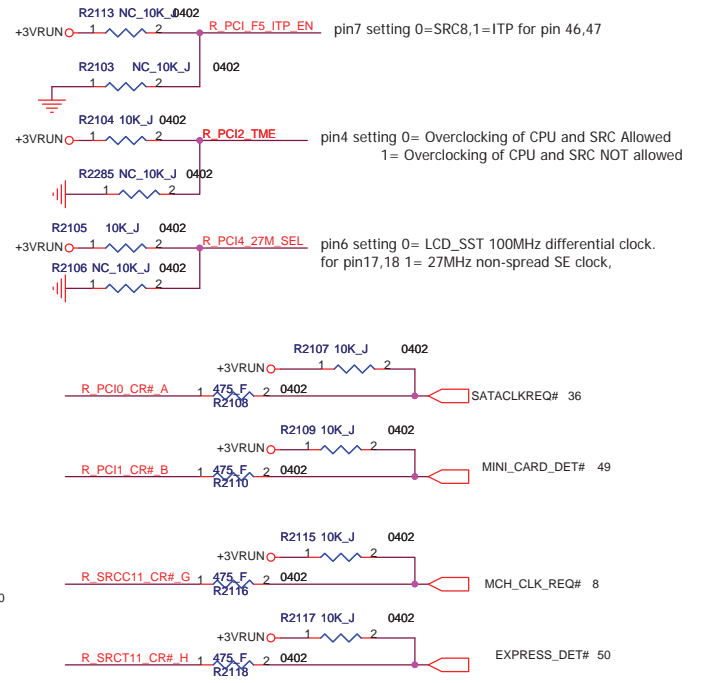
M610 BOM configuration	
unstuff	NC_
NB8P-GS + NB8M-GT	NV_
NB8P-GS	NV8P_
NB8M-GT	NV8M_
NB8M-GT	NV8MM_
NB8M-GT for L Model	NV8ML_
NB8X + Hynix VRAM	NVH_
NB8X + Infineon VRAM	NVI_
NB8X + Infineon & Samsung VRAM	NVIS_
NB8X + Hynix & Infineon VRAM	NVHS_
NB8X + 16Mx32bit VRAM	NV16_
NB8X + 8Mx32bit VRAM	NV8_
*JP Digital TV Tuner SKU unstuff	JDTVNC_
Mini PCI CONN, BT CONN, IR CONN, FeliCa CONN unstuff for L Model	LNC_

<http://hobi-elektronika.net>



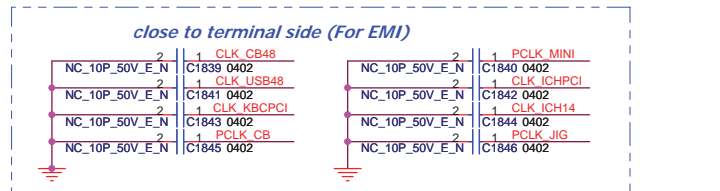
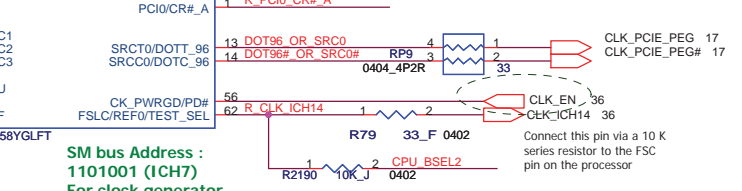
**FSB Frequency Table:**

FSLC	FSLB	FSLA	CPU SRC[7:0]	PCI	FSB
1	0	1	100	100	33 /
0	0	1	133	100	33 /
0	1	1	166	100	33 667
0	1	0	200	100	33 800
0	0	0	266	100	33 /
1	0	0	333	100	33 /
1	1	0	400	100	33 /
1	1	1	(Reserved)		



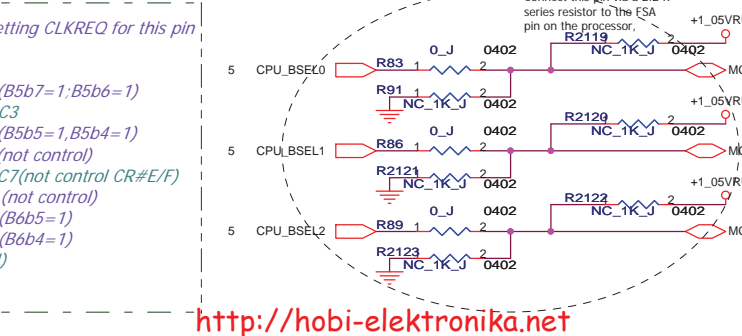
**33 MHz Port**

PCI0 (pin1)	NC	MS90
PCI1 (pin3)	NC	NC
PCI2 (pin4)	Debug card/EC(KBC)	Debug card
PCI3 (pin5)	PCI8402	PCI8402
PCI4 (pin6)	TV tuner	EC(KBC)
PCI5-F (pin7)	ICH8	ICH8



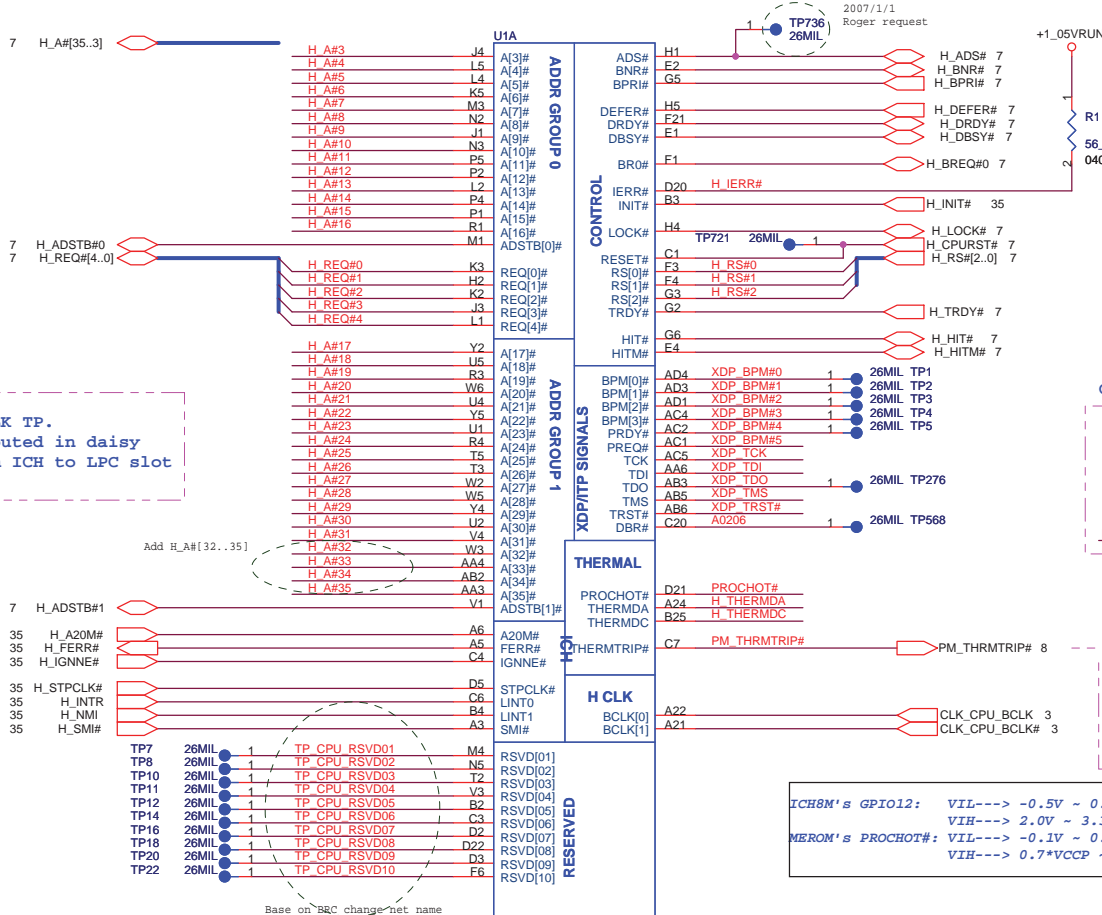
**100 MHz Port**

SRC0 (pin13,14)	M610 setting configuration	S/W Setting this pin type (B2b0=0) for use SRC0	S/W Setting CLKREQ for this pin
SRC1 (pin17,18)	GFX PCIE_PEG		
SRC2 (pin21,22)	(SRC0 /SRC1 only either one)		
SRC3 (pin24,25)	PCIE SATA		CR#A (B5b7=1; B5b6=1)
SRC4 (pin27,28)	PCIE ICH8	(B4b7=1; B5b3=0; B5b1=0) for use SRC3	CR#B (B5b5=1; B5b4=1)
SRC6 (pin40,41)	PCIE MINI	(B2b1=0) for use SRC4	CR#E (not control)
SRC7 (pin43,44)	PCIE G-LAN	(B3b3=1; B6b7=0; B6b6=0) for use SRC7(not control CR#E/F)	CR#F (not control)
SRC8 (pin46,47)	NC		CR#G (B6b5=1)
SRC9 (pin30,31)	NC		CR#H (B6b4=1)
SRC10 (pin34,35)	MCH 3GPLL		
SRC11 (pin32,33)	PCIE EXPRESS		
	CR#G(MCH)/CR#H(EXPRESS)	(B3b7=0; B3b6=0) for use CLKREQ_G, H)	



Check List 1.301  
 \* CFG[2:0] do not have internal pullups or pull downs. Please refer to the latest Crestline EDS volume 1 for configuration options  
 \* 1k pull-up or pull-down or direct connect from processor.  
 MS90  
 8 only MCH\_BSEL[0..2] pull down 1K

<b>FOXCONN</b>		HON HAI PRECISION IND. CO., LTD.	
CPBG - R&D Division			
Title: <b>CLOCK GEN(CK505)</b>			
Size A3	Document Number (M610-1-01) MainBoard (MBX-176)	2007.1.4	Rev 2.0
Date:	Thursday, May 10, 2007	Sheet 3	of 77



**Layout note:**  
no stub on H\_STPCLK TP.  
H\_STPCLK# to be routed in daisy chain fashion from ICH to LPC slot and then to CPU.

Add H\_A#[32..35]

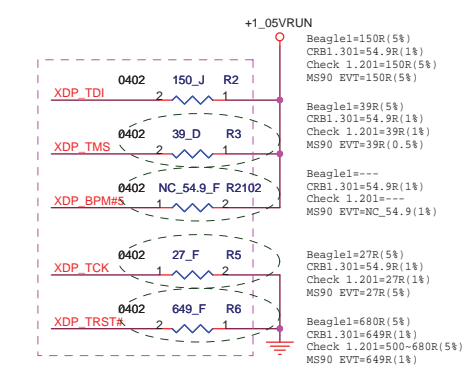
Base on "BRC\_change" net name

2007/1/1  
Roger request

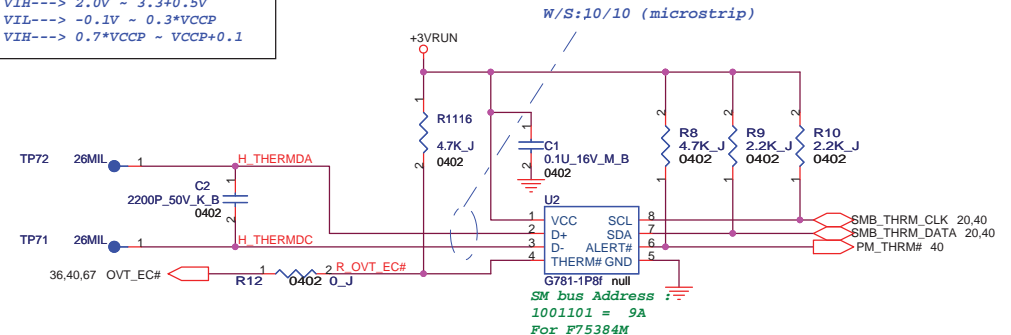
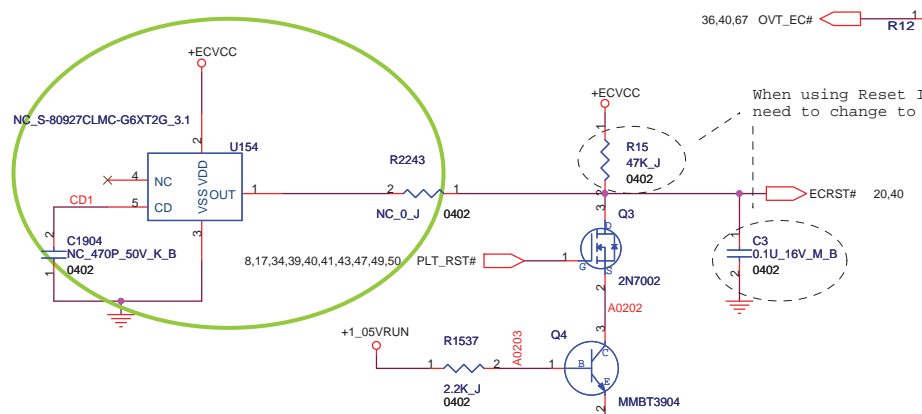
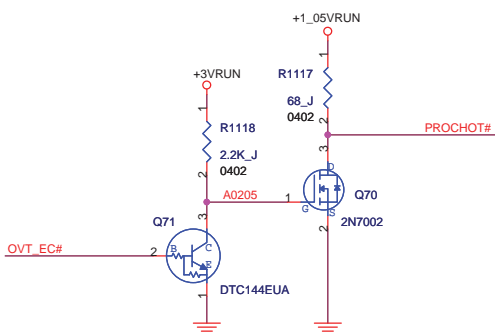
Close to CPU side

PM\_THRMTRIP# should connect to ICH7-M and GMCH without T-ing (No stub)

ICH8M's GPIO12: VIL---> -0.5V ~ 0.8V  
VIH---> 2.0V ~ 3.3+0.5V  
MEROM's PROCHOT#: VIL---> -0.1V ~ 0.3\*VCCP  
VIH---> 0.7\*VCCP ~ VCCP+0.1



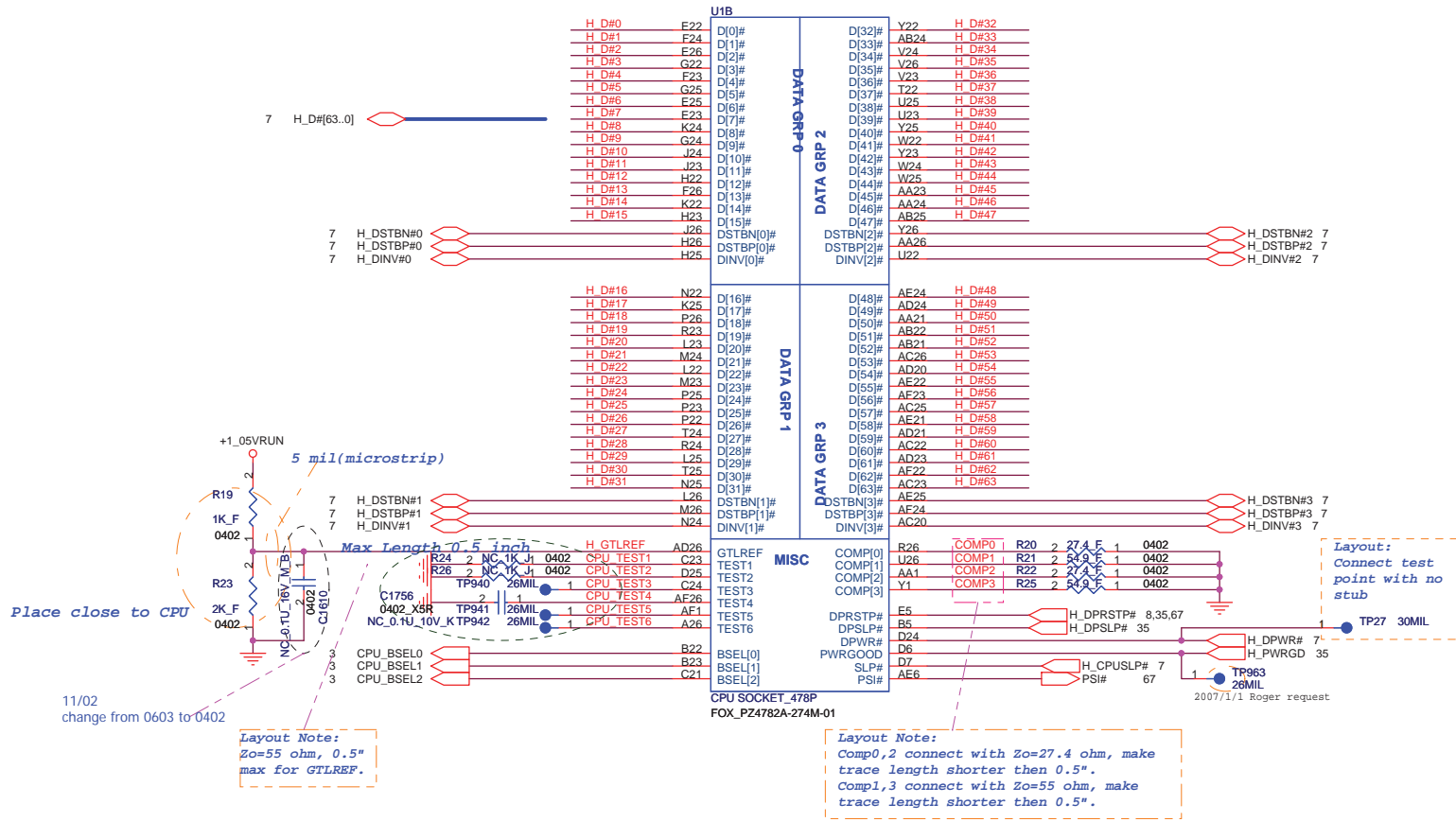
Debug port not used . resistors close to CPU.



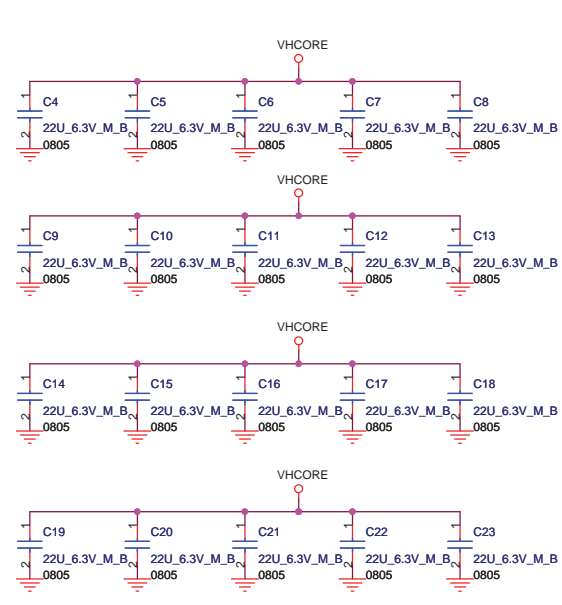
Place Thermal-Sensor near CPU & GMCH.

11/16 change part from F75384M (15-F75384M-0000) to G781-1P8f (15-G7811P8-0000)

<b>FOXCONN</b>		HON HAI PRECISION IND. CO., LTD.	
File		CPBG - R&D Division	
<b>Merom(HOST BUS)1/3</b>			
Size	Document Number	Rev	
A3	(M610-1-01) MainBoard (MBX-176) 2007.1.4	2.0	
Date:	Thursday, May 10, 2007	Sheet	4 of 77

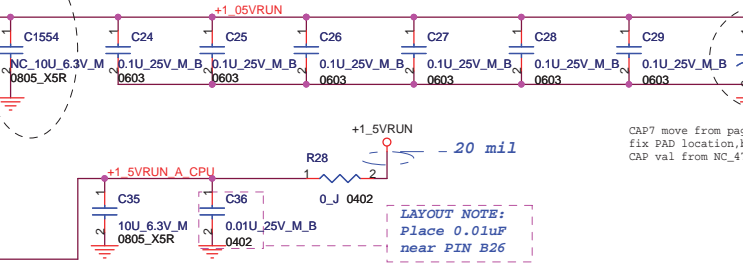


CPU\_VCCA----->130mA  
 CPU\_VCCP----->4.5A  
 CPU\_VCC----->44A

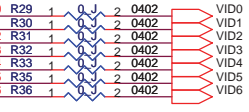


U1C	U1D
A7	VCC[001]
A9	VCC[002]
A10	VCC[003]
A12	VCC[004]
A13	VCC[005]
A15	VCC[006]
A17	VCC[007]
A18	VCC[008]
A20	VCC[009]
B7	VCC[010]
B9	VCC[011]
B10	VCC[012]
B12	VCC[013]
B14	VCC[014]
B15	VCC[015]
B17	VCC[016]
B18	VCC[017]
B20	VCC[018]
C9	VCC[019]
C10	VCC[020]
C12	VCC[021]
C13	VCC[022]
C15	VCC[023]
C17	VCC[024]
D9	VCC[025]
D10	VCC[026]
D12	VCC[027]
D14	VCC[028]
D15	VCC[029]
D17	VCC[030]
D18	VCC[031]
E7	VCC[032]
E9	VCC[033]
E10	VCC[034]
E12	VCC[035]
E13	VCC[036]
E15	VCC[037]
E17	VCC[038]
E18	VCC[039]
E20	VCC[040]
F7	VCC[041]
F9	VCC[042]
F10	VCC[043]
F12	VCC[044]
F14	VCC[045]
F15	VCC[046]
F17	VCC[047]
F18	VCC[048]
F20	VCC[049]
AA7	VCC[050]
AA9	VCC[051]
AA10	VCC[052]
AA12	VCC[053]
AA13	VCC[054]
AA16	VCC[055]
AA17	VCC[056]
AA18	VCC[057]
AA20	VCC[058]
AB9	VCC[059]
AB10	VCC[060]
AB12	VCC[061]
AB14	VCC[062]
AB15	VCC[063]
AB17	VCC[064]
AB18	VCC[065]
AB18	VCC[066]
AB18	VCC[067]

Beagle1=10U  
 CRB1.301=NO  
 2hccR 1.201=NO  
 MS90 EV7=NO

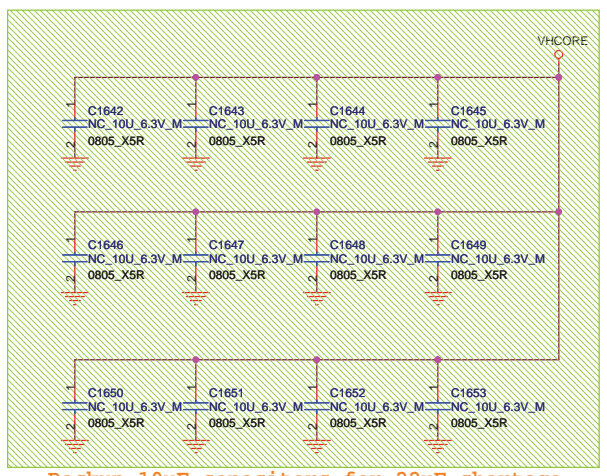


LAYOUT NOTE:  
 Place 0.01uF near PIN B26

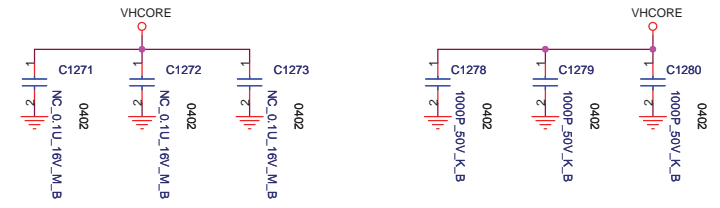


Same Length

Layout Note: Route VCCSENSE traces at 27.4 Ohms with 50 mil spacing. Place PU and PD within 1 inch of cpu.  
 width=18 mil  
 spacing=7 mil



Backup 10uF capacitors for 22uF shortage.



MS90 check

U1D	U1D	U1D
A4	VSS[001]	P6
A8	VSS[002]	P21
A11	VSS[003]	P24
A14	VSS[004]	R2
A16	VSS[005]	R5
A23	VSS[006]	R22
A23	VSS[006]	R25
AF2	VSS[007]	T1
B6	VSS[008]	T4
B8	VSS[009]	T23
B11	VSS[010]	T26
B13	VSS[011]	U3
B16	VSS[012]	U6
B19	VSS[013]	U21
B21	VSS[014]	U24
B24	VSS[015]	V2
C5	VSS[017]	V5
C8	VSS[018]	V22
C11	VSS[019]	V25
C14	VSS[020]	W1
C16	VSS[021]	W4
C19	VSS[022]	W23
C2	VSS[023]	W26
C22	VSS[024]	Y3
C25	VSS[025]	Y6
D1	VSS[026]	Y21
D4	VSS[027]	Y24
D8	VSS[028]	AA2
D11	VSS[029]	AA5
D13	VSS[030]	AA8
D19	VSS[031]	AA11
D23	VSS[032]	AA14
D26	VSS[033]	AA19
E3	VSS[034]	AA22
E6	VSS[036]	AA25
E8	VSS[038]	AB1
E11	VSS[038]	AB4
E14	VSS[038]	AB8
E16	VSS[039]	AB11
E19	VSS[040]	AB13
E21	VSS[042]	AB16
E24	VSS[043]	AB19
E5	VSS[044]	AB23
E8	VSS[045]	AB26
F11	VSS[046]	AC3
F13	VSS[047]	AC6
F16	VSS[048]	AC8
F19	VSS[049]	AC11
F2	VSS[050]	AC14
F22	VSS[051]	AC16
F25	VSS[052]	AC19
G4	VSS[053]	AC21
G1	VSS[054]	AC24
G23	VSS[055]	AD2
G26	VSS[056]	AD5
H3	VSS[057]	AD8
H6	VSS[058]	AD11
H21	VSS[059]	AD13
H24	VSS[060]	AD16
J2	VSS[061]	AD19
J5	VSS[062]	AD22
J22	VSS[063]	AD25
J25	VSS[064]	AE1
K1	VSS[065]	AE4
K4	VSS[066]	AE8
K23	VSS[067]	AE11
K26	VSS[068]	AE14
L3	VSS[069]	AE16
L6	VSS[070]	AE19
L21	VSS[071]	AE23
L24	VSS[072]	AE26
M2	VSS[073]	A2
M5	VSS[074]	A6
M22	VSS[075]	A13
M25	VSS[076]	A16
N1	VSS[077]	A19
N4	VSS[078]	A21
N23	VSS[079]	A25
N26	VSS[080]	AF2
P3	VSS[081]	AF5

CPU SOCKET\_478P  
 FOX\_PZ4782A-274M-01

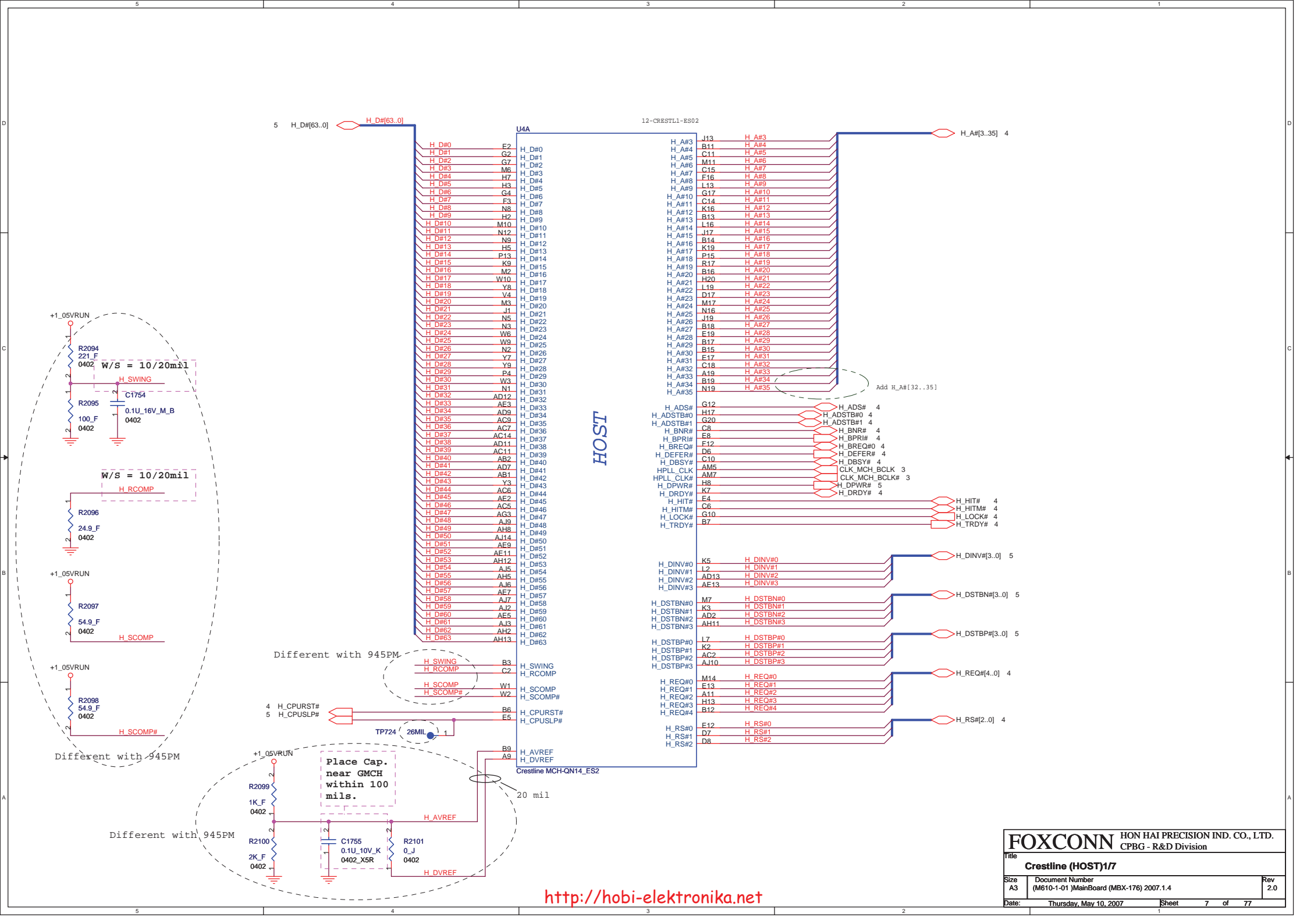
(Design check 1.301) 2006.9.3  
 No Stuff 27.4 ± 1% pull-down to GND near Intel MVP 6 controller for testing purposes.

**FOXCONN** HON HAI PRECISION IND. CO., LTD.  
 CPBG - R&D Division

Title: **Merom(POWER/GND)**

Size A3 Document Number (M610-1-01) MainBoard (MBX-176) 2007.1.4 Rev 2.0

Date: Thursday, May 10, 2007 Sheet 6 of 77



TP881	26MIL	1	MCH_RSVD_1	P36	RSVD1
TP882	26MIL	1	MCH_RSVD_2	P37	RSVD2
TP883	26MIL	1	MCH_RSVD_3	R35	RSVD3
TP884	26MIL	1	MCH_RSVD_4	N35	RSVD4
TP885	26MIL	1	MCH_RSVD_5	AR12	RSVD5
TP902	26MIL	1	MCH_RSVD_7	AM12	RSVD6
TP886	26MIL	1	MCH_RSVD_8	AN13	RSVD7
TP887	26MIL	1	MCH_RSVD_9	J12	RSVD8
TP888	26MIL	1	MCH_RSVD_10	AR37	RSVD9
TP889	26MIL	1	MCH_RSVD_11	AM36	RSVD10
TP890	26MIL	1	MCH_RSVD_12	AL36	RSVD11
TP891	26MIL	1	MCH_RSVD_13	AM37	RSVD12
TP892	26MIL	1	MCH_RSVD_14	D20	RSVD13
TP893	26MIL	1	MCH_RSVD_14	D20	RSVD14

TP894	26MIL	1	MCH_RSVD_20	H10	RSVD20
TP895	26MIL	1	MCH_RSVD_21	B51	RSVD21
TP896	26MIL	1	MCH_RSVD_22	BJ20	RSVD22
TP897	26MIL	1	MCH_RSVD_23	BK22	RSVD23
TP898	26MIL	1	MCH_RSVD_24	BF19	RSVD24
TP899	26MIL	1	MCH_RSVD_25	BH20	RSVD25
TP900	26MIL	1	MCH_RSVD_27	B118	RSVD26
TP901	26MIL	1	MCH_RSVD_28	BF23	RSVD27
TP903	26MIL	1	MCH_RSVD_29	BK18	RSVD28
TP904	26MIL	1	MCH_RSVD_29	BG23	RSVD29
TP905	26MIL	1	MCH_RSVD_30	BC23	RSVD30
TP906	26MIL	1	MCH_RSVD_31	BD24	RSVD31
TP907	26MIL	1	MCH_RSVD_34	BH39	RSVD34
TP908	26MIL	1	MCH_RSVD_35	AW20	RSVD35
TP909	26MIL	1	MCH_RSVD_36	BK20	RSVD36
TP976	26MIL	1	GM_ODD_RXIN3	C48	RSVD38
TP977	26MIL	1	GM_ODD_RXIN3	D47	RSVD39
TP910	26MIL	1	MCH_RSVD_40	C44	RSVD40
TP911	26MIL	1	MCH_RSVD_41	A35	RSVD41
TP912	26MIL	1	MCH_RSVD_42	B37	RSVD42
TP913	26MIL	1	MCH_RSVD_43	B36	RSVD43
TP914	26MIL	1	MCH_RSVD_44	B34	RSVD44
TP915	26MIL	1	MCH_RSVD_45	C34	RSVD45

MCH\_CFG\_9  
(PCIe  
Graphics  
Lane)

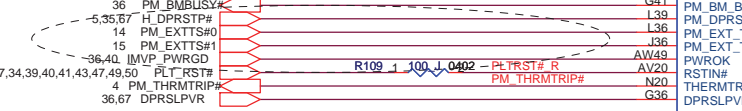
Low = Reverse Lane  
operation  
High = Normal  
operation

For layout convenience

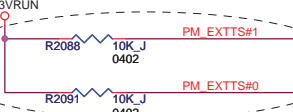
CFG[2:0]  
010 = FSB 800 MHz  
011 = FSB 667 MHz

3	MCH_BSEL0	P27	CFG0		
3	MCH_BSEL1	N27	CFG1		
3	MCH_BSEL2	N24	CFG2		
TP978	26MIL	1	MCH_CFG_3	C21	CFG3
TP979	26MIL	1	MCH_CFG_4	C23	CFG4
TP980	26MIL	1	MCH_CFG_5	E23	CFG5
TP881	26MIL	1	MCH_CFG_6	N23	CFG6
TP882	26MIL	1	MCH_CFG_7	G23	CFG7
TP883	26MIL	1	MCH_CFG_8	J20	CFG8
TP884	26MIL	1	MCH_CFG_9	C20	CFG9
TP885	26MIL	1	MCH_CFG_10	R24	CFG10
TP886	26MIL	1	MCH_CFG_11	L23	CFG11
TP887	26MIL	1	MCH_CFG_12	J23	CFG12
TP888	26MIL	1	MCH_CFG_13	E23	CFG13
TP889	26MIL	1	MCH_CFG_14	E20	CFG14
TP890	26MIL	1	MCH_CFG_15	K23	CFG15
TP891	26MIL	1	MCH_CFG_16	M20	CFG16
TP892	26MIL	1	MCH_CFG_17	L32	CFG17
TP893	26MIL	1	MCH_CFG_18	M24	CFG18
TP894	26MIL	1	MCH_CFG_19	N33	CFG19
TP895	26MIL	1	MCH_CFG_20	L35	CFG20

Wait to confirm with Page 13 / CRB



Design check 1.201  
DDR2 Connect to PM\_EXT\_TSS#0/1 pins  
of GMCH, pull up with 10K to Vcc3\_3



20.40 DDR\_ALERT# R1143 10K\_J 0402  
Form (U8)thermal sanser & (EC) 0402

U4B

RSVD

DDR MUXING

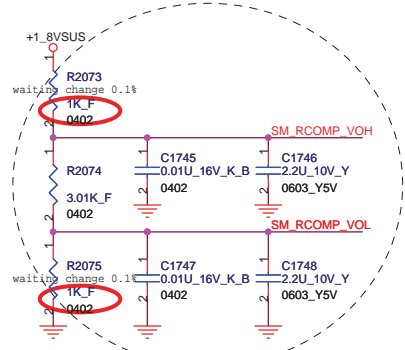
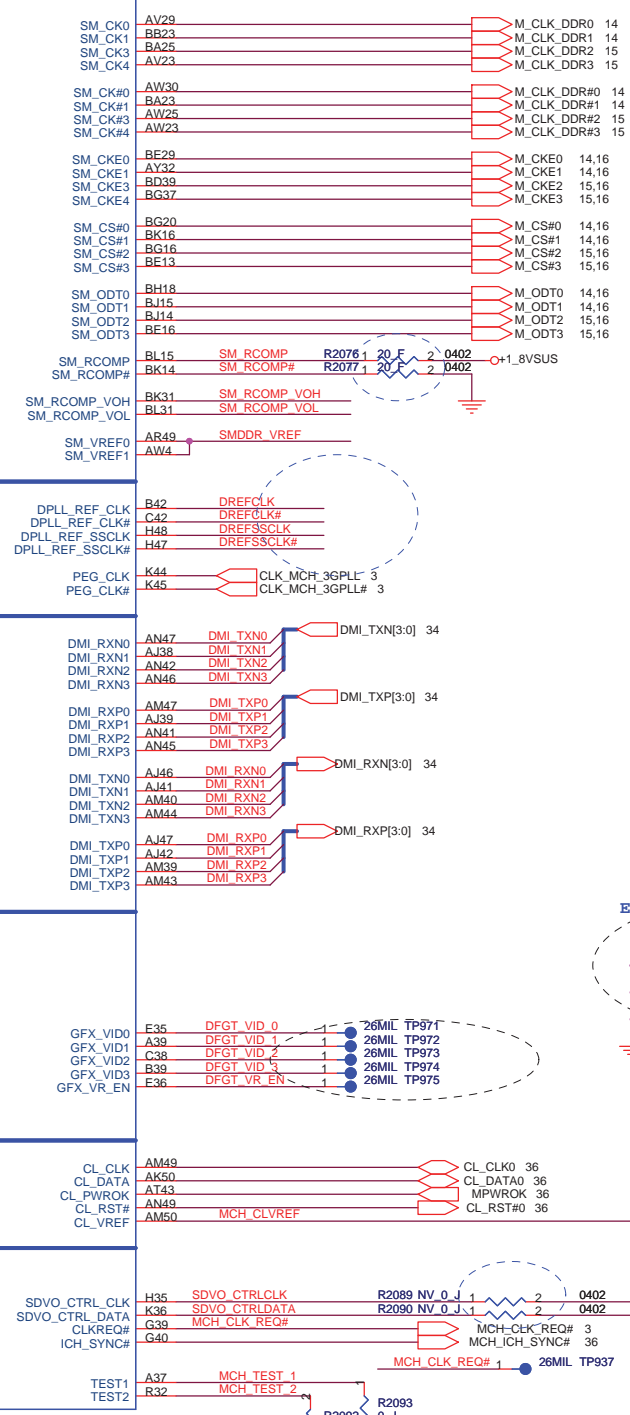
CLK

DMI

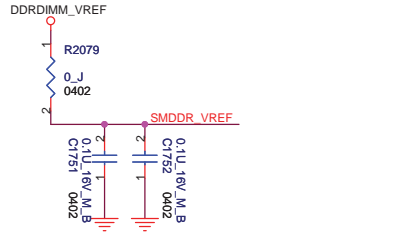
GRAPHICS VID

MISC

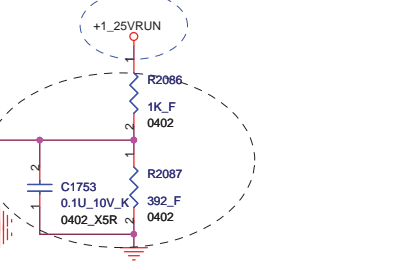
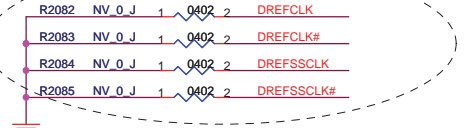
MISC



Note: If the voltage regulator for the system memory interface already supplies a VREF output and meets the voltage tolerance and current requirements for these pins, then a voltage divider would not be needed.



External Graphics (GMCH CRT/TVOUT Disable)



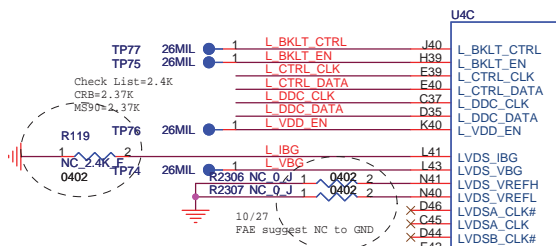
**FOXCONN** HON HAI PRECISION IND. CO., LTD.  
CPBG - R & D Division

Title: Crestline (DMI)Z7

Size: A3 Document Number: (M610-1-01) MainBoard (MBX-176) 2007.1.4 Rev: 2.0

Date: Thursday, May 10, 2007 Sheet: 8 of 77





- L\_BKLT\_CTRL J40
- L\_BKLT\_EN H39
- L\_CTRL\_CLK E39
- L\_CTRL\_DATA E40
- L\_DDC\_CLK C37
- L\_DDC\_DATA D35
- L\_VDD\_EN K40
- L\_IBG L41
- L\_VBG L43
- LVDS\_IBG N41
- LVDS\_VBG N40
- LVDS\_VREFH D46
- LVDS\_VREFL D44
- LVDSA\_CLK# D42
- LVDSB\_CLK# D44
- LVDSB\_CLK# D42

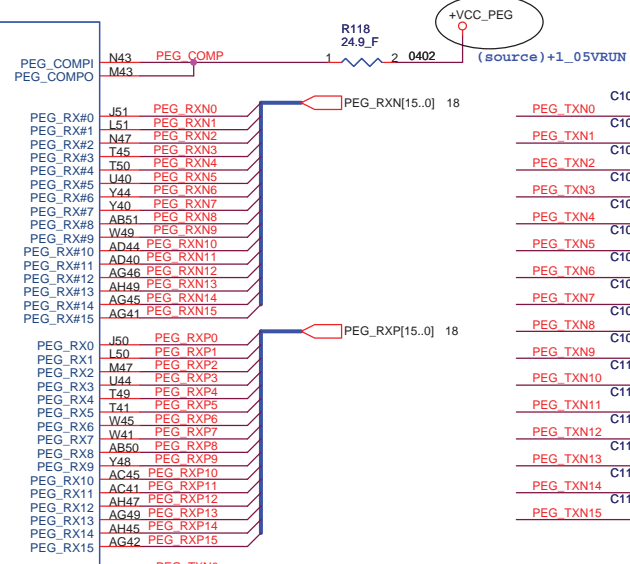
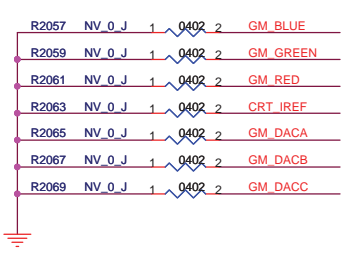
- LVDSA\_DATA#0 XG51
- LVDSA\_DATA#1 XE51
- LVDSA\_DATA#2 XF49
- LVDSA\_DATA0 XG50
- LVDSA\_DATA1 XE50
- LVDSA\_DATA2 XF48
- LVDSB\_DATA#0 XG44
- LVDSB\_DATA#1 XB47
- LVDSB\_DATA#2 XB45
- LVDSB\_DATA0 XF44
- LVDSB\_DATA1 XA47
- LVDSB\_DATA2 XA45

- GM DACA E27
- GM DACB G27
- GM DACC K27
- TVA\_DAC F27
- TVB\_DAC J27
- TV\_C\_DAC L27
- TV\_DCONSEL0 M35
- TV\_DCONSEL1 P33

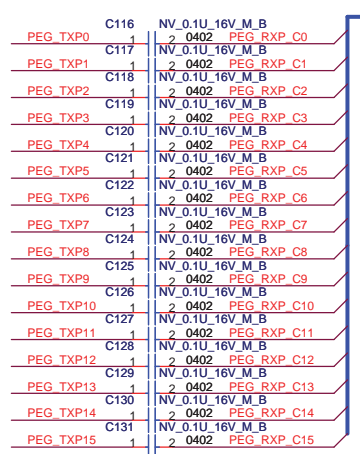
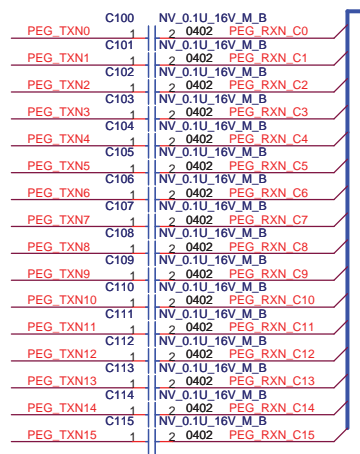


- CRT\_BLUE H32
- CRT\_BLUE# G32
- CRT\_GREEN K29
- CRT\_GREEN# J29
- CRT\_RED F29
- CRT\_RED# E29
- CRT\_DDC\_CLK K33
- CRT\_DDC\_DATA G35
- CRT\_HSYNC F33
- CRT\_IREF C32
- CRT\_VSYNC E33

External Graphics (GMCH CRT/TVOUT Disable)

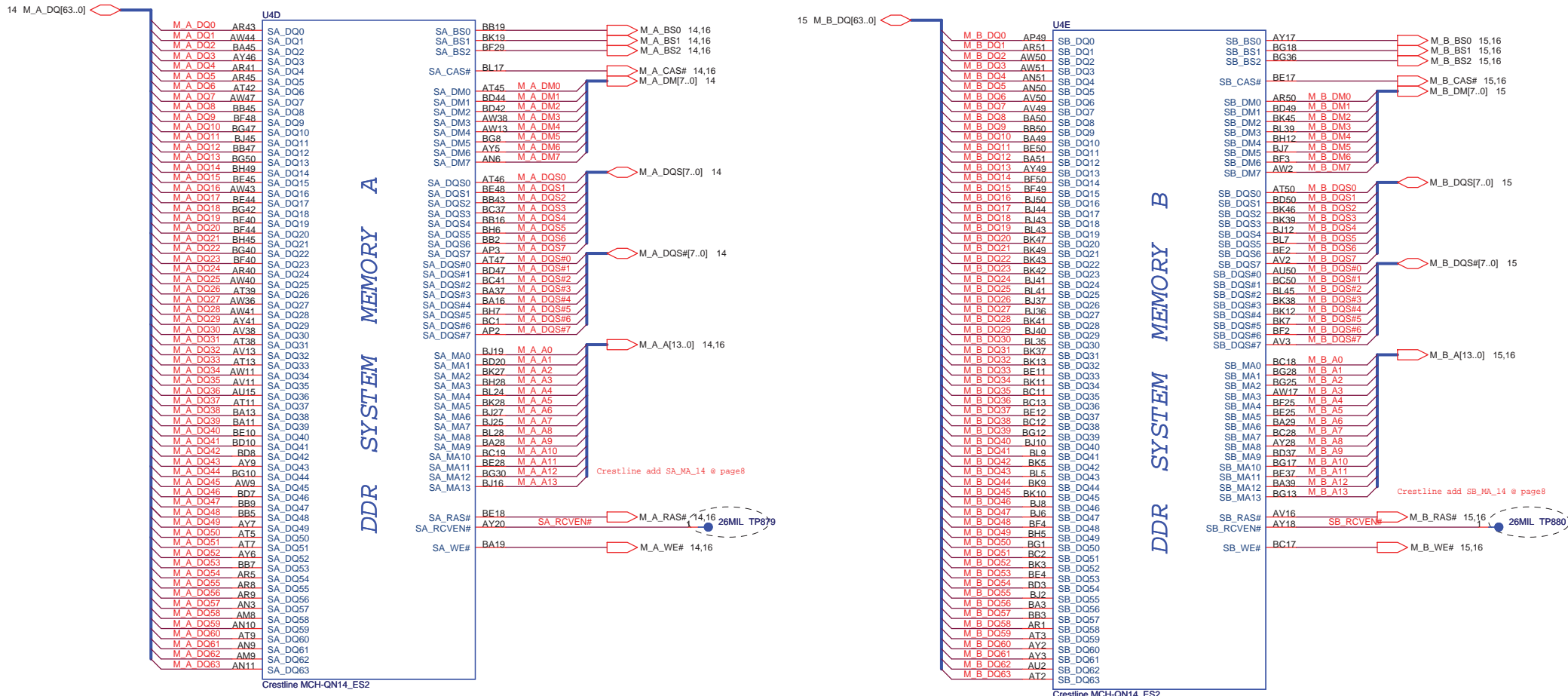


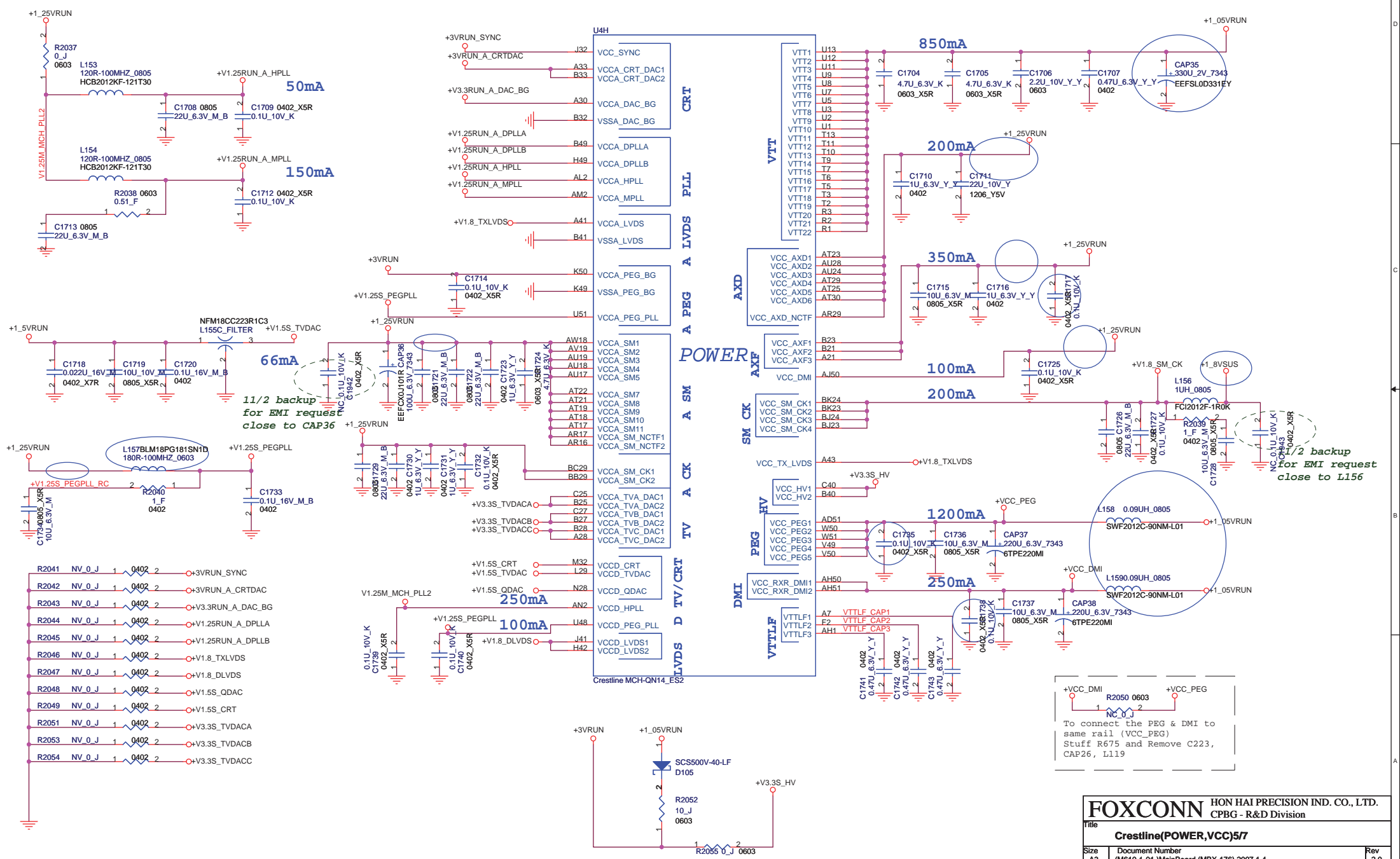
- PEG\_RX#0 J51
- PEG\_RX#1 L51
- PEG\_RX#2 N47
- PEG\_RX#3 T45
- PEG\_RX#4 T50
- PEG\_RX#5 U40
- PEG\_RX#6 Y44
- PEG\_RX#7 Y40
- PEG\_RX#8 AB51
- PEG\_RX#9 W49
- PEG\_RX#10 AD44
- PEG\_RX#11 AD40
- PEG\_RX#12 AG48
- PEG\_RX#13 AH49
- PEG\_RX#14 AG45
- PEG\_RX#15 AG41
- PEG\_RX#0 J50
- PEG\_RX#1 L50
- PEG\_RX#2 M47
- PEG\_RX#3 U44
- PEG\_RX#4 T49
- PEG\_RX#5 T41
- PEG\_RX#6 W45
- PEG\_RX#7 W41
- PEG\_RX#8 AB50
- PEG\_RX#9 Y48
- PEG\_RX#10 AC45
- PEG\_RX#11 AC41
- PEG\_RX#12 AH47
- PEG\_RX#13 AG49
- PEG\_RX#14 AH45
- PEG\_RX#15 AG42



Base on below document:  
 Mobile Merom Processor and Crestline Chipset  
 - Santa Rosa Platform Design Guide-21112,1.0  
 .pvd.pdf (May 2006/ Rev 1.0)page 193  
 Table 82. External Graphics (GMCH Integrated Graphics Disable)  
 Connect these signals to GND

<b>FOXCONN</b> HON HAI PRECISION IND. CO., LTD. CPBG - R&D Division		
Title <b>Crestline(GRAPHIC)3/7</b>		
Size A3	Document Number (M610-1-01)MainBoard (MBX-176) 2007.1.4	Rev 2.0
Date: Thursday, May 10, 2007	Sheet 9	of 77



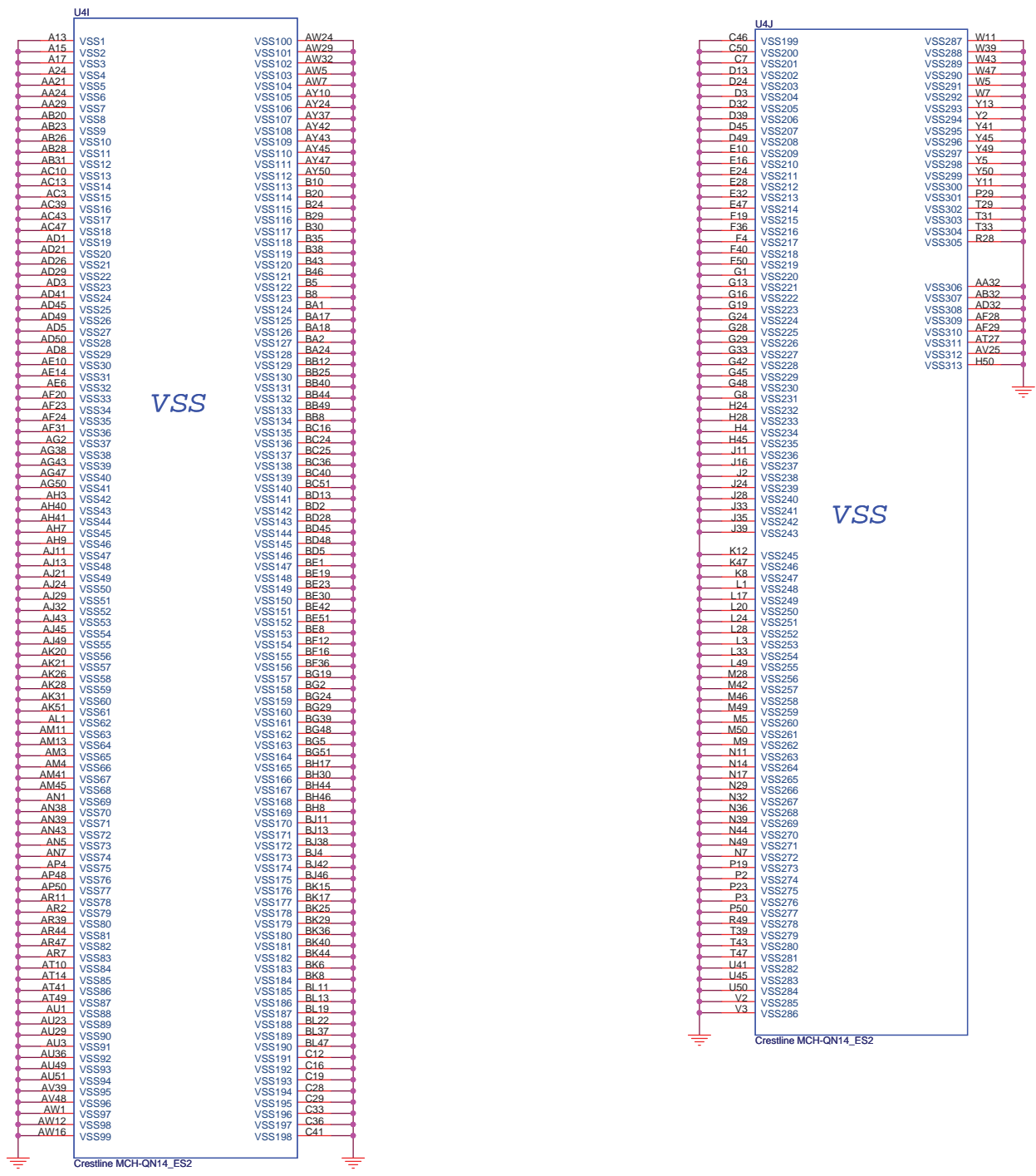


<http://hobi-elektronika.net>

+VCC\_DMI R2050 0603 +VCC\_PEG  
 To connect the PEG & DMI to same rail (VCC\_PEG) Stuff R675 and Remove C223, CAP26, L119

<b>FOXCONN</b> HON HAI PRECISION IND. CO., L.TD.		
Crestline(Power,VCC)/57		
Size A3	Document Number (M610-1-01) MainBoard (MBX-176) 2007.1.4	Rev 2.0
Date: Thursday, May 10, 2007	Sheet 11	of 77

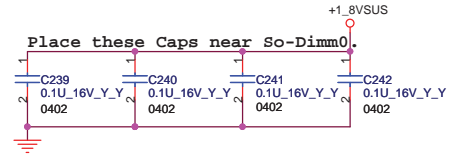
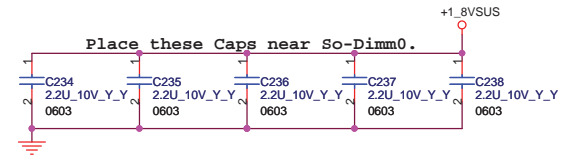
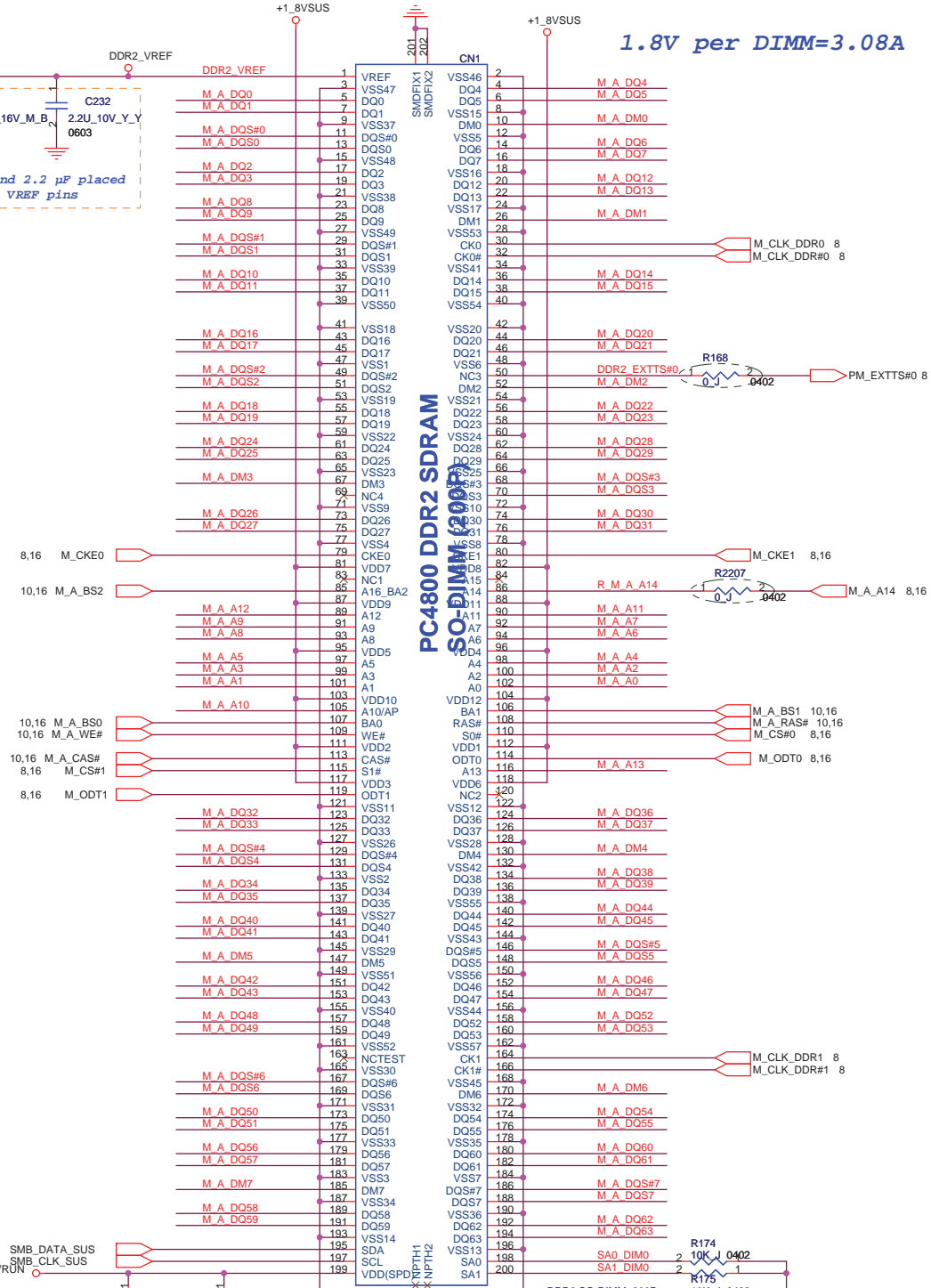
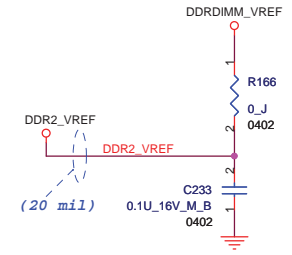
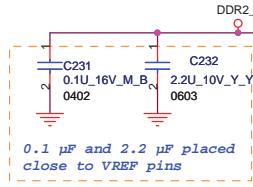
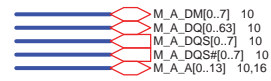




<http://hobi-elektronika.net>

<b>FOXCONN</b> HON HAI PRECISION IND. CO., LTD. CPBG - R&D Division		
<b>Crestline (VSS)7/7</b>		
Size: B	Document Number (M1610-1-01) MainBoard (MBX-176) 2007.1.4	Rev 2.0
Date:	Thursday, May 10, 2007	Sheet 13 of 77

1.8V per DIMM=3.08A



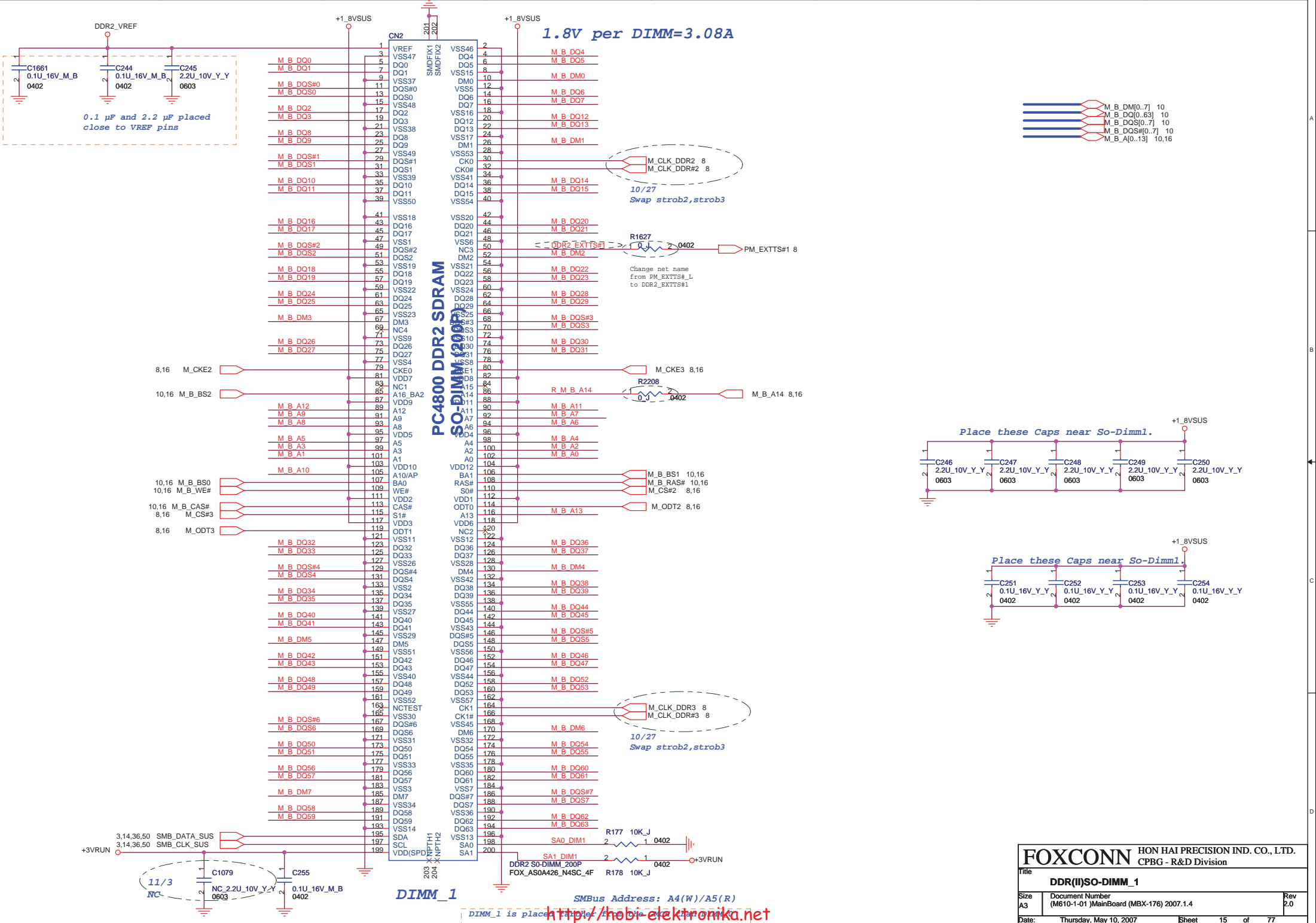
**FOXCONN** HON HAI PRECISION IND. CO., LTD.  
CPBG - R&D Division

Title: **DDR2(H)SO-DIMM\_0**

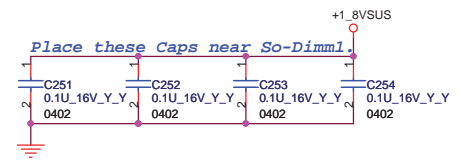
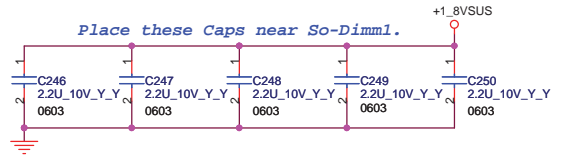
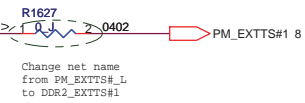
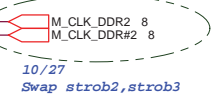
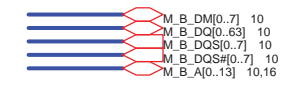
Size A3 Document Number (M610-1-01) MainBoard (MBX-176) 2007.1.4 Rev 2.0

Date: Thursday, May 10, 2007 Sheet 14 of 77

SMBus Address: A0(W)/A1(R)  
<http://hobi-elektronika.net>



1.8V per DIMM=3.08A

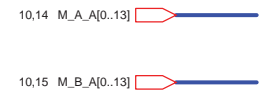
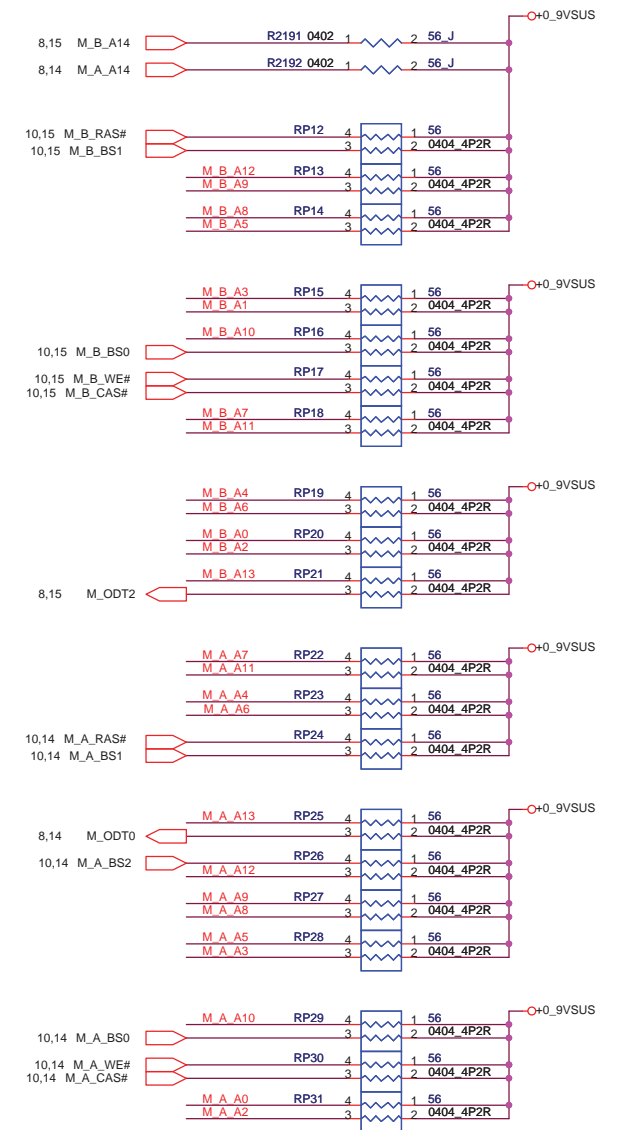
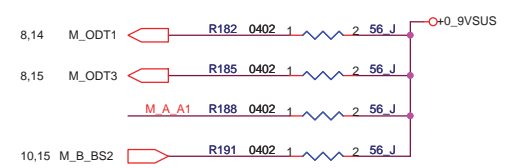
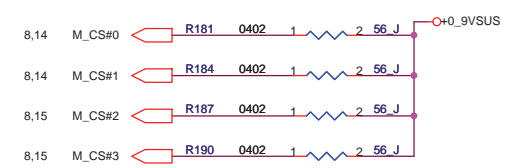
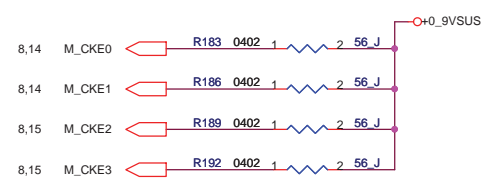
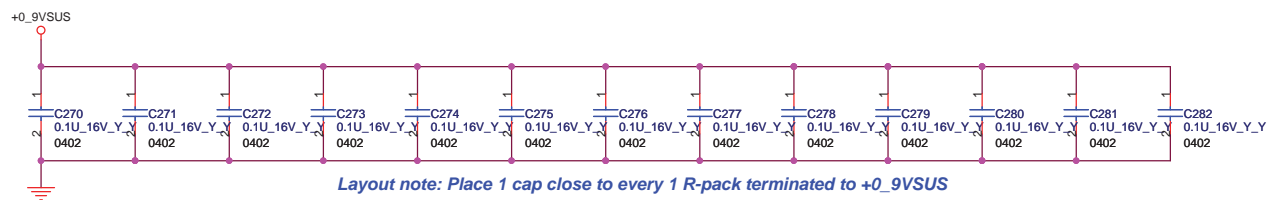
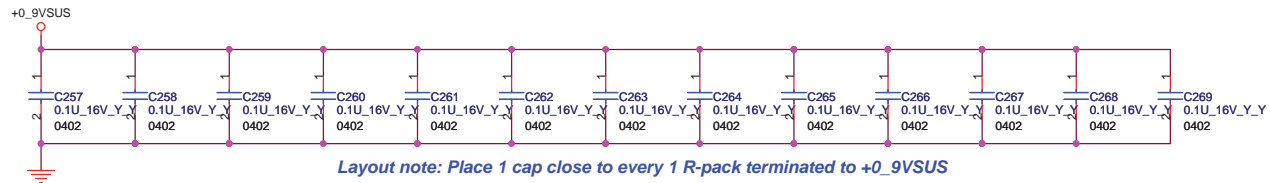


DIMM\_1

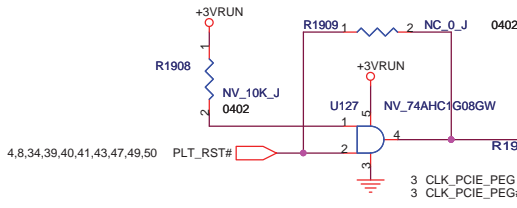
SMBus Address: A4(W)/A5(R)

DIMM\_1 is placed here <http://hobi-elektronika.net>

<b>FOXCONN</b> HON HAI PRECISION IND. CO., LTD. CPBG - R&D Division		
File	<b>DDR2(SO-DIMM)_1</b>	
Size A3	Document Number (M610-1-01) MainBoard (MBX-176) 2007.1.4	Rev 2.0
Date:	Thursday, May 10, 2007	Sheet 15 of 77



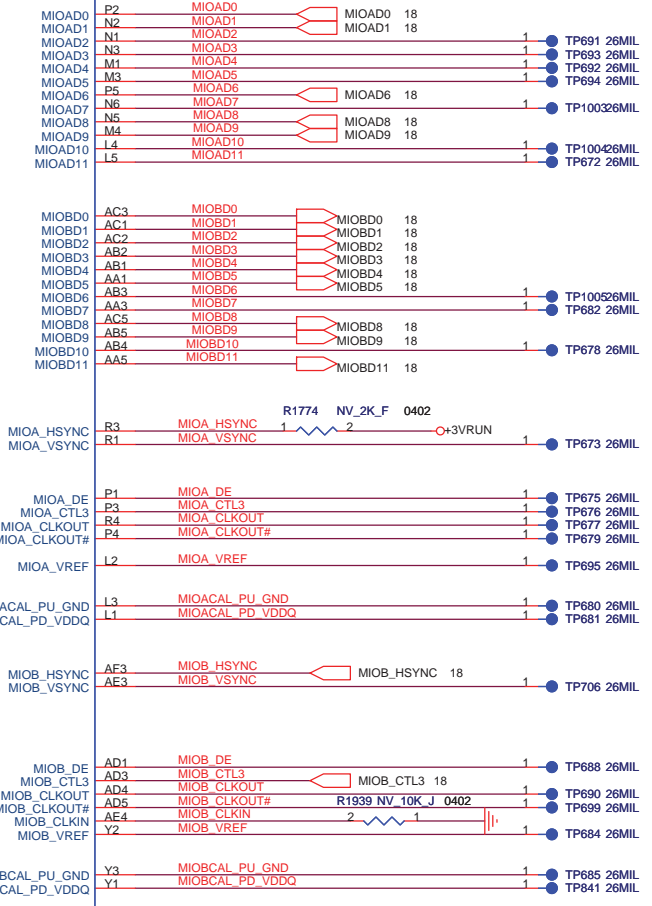




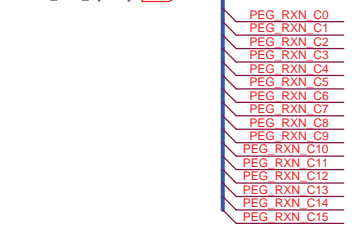
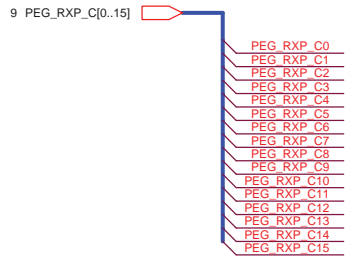
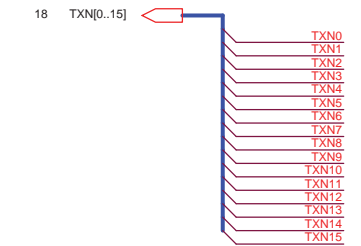
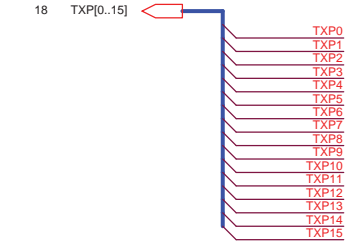
TXP0	AJ15	PEX_TX0
TXN0	AK15	PEX_TX0#
TXP1	AJ16	PEX_TX1
TXN1	AK16	PEX_TX1#
TXP2	AG16	PEX_TX2
TXN2	AG17	PEX_TX2#
TXP3	AJ17	PEX_TX3
TXN3	AG18	PEX_TX3#
TXP4	AJ18	PEX_TX4
TXN4	AK18	PEX_TX4#
TXP5	AJ19	PEX_TX5
TXN5	AK19	PEX_TX5#
TXP6	AG20	PEX_TX6
TXN6	AH20	PEX_TX6#
TXP7	AG21	PEX_TX7
TXN7	AH21	PEX_TX7#
TXP8	AK21	PEX_TX8
TXN8	AJ21	PEX_TX8#
TXP9	AJ22	PEX_TX9
TXN9	AH22	PEX_TX9#
TXP10	AG23	PEX_TX10
TXN10	AH23	PEX_TX10#
TXP11	AK24	PEX_TX11
TXN11	AJ24	PEX_TX11#
TXP12	AJ25	PEX_TX12
TXN12	AH25	PEX_TX12#
TXP13	AG26	PEX_TX13
TXN13	AK26	PEX_TX13#
TXP14	AK27	PEX_TX14
TXN14	AJ27	PEX_TX14#
TXP15	AJ28	PEX_TX15
TXN15	AH27	PEX_TX15#
PEG_RXP_C0	AK13	PEX_RX0
PEG_RXN_C0	AK14	PEX_RX0#
PEG_RXP_C1	AM14	PEX_RX1
PEG_RXN_C1	AM15	PEX_RX1#
PEG_RXP_C2	AL15	PEX_RX2
PEG_RXN_C2	AL16	PEX_RX2#
PEG_RXP_C3	AK16	PEX_RX3
PEG_RXN_C3	AK17	PEX_RX3#
PEG_RXP_C4	AL17	PEX_RX4
PEG_RXN_C4	AL18	PEX_RX4#
PEG_RXP_C5	AM18	PEX_RX5
PEG_RXN_C5	AM19	PEX_RX5#
PEG_RXP_C6	AK19	PEX_RX6
PEG_RXN_C6	AK20	PEX_RX6#
PEG_RXP_C7	AL20	PEX_RX7
PEG_RXN_C7	AL21	PEX_RX7#
PEG_RXP_C8	AM21	PEX_RX8
PEG_RXN_C8	AM22	PEX_RX8#
PEG_RXP_C9	AK22	PEX_RX9
PEG_RXN_C9	AK23	PEX_RX9#
PEG_RXP_C10	AL23	PEX_RX10
PEG_RXN_C10	AL24	PEX_RX10#
PEG_RXP_C11	AM24	PEX_RX11
PEG_RXN_C11	AM25	PEX_RX11#
PEG_RXP_C12	AK25	PEX_RX12
PEG_RXN_C12	AK26	PEX_RX12#
PEG_RXP_C13	AL26	PEX_RX13
PEG_RXN_C13	AL27	PEX_RX13#
PEG_RXP_C14	AM27	PEX_RX14
PEG_RXN_C14	AM28	PEX_RX14#
PEG_RXP_C15	AL28	PEX_RX15
PEG_RXN_C15	AL29	PEX_RX15#

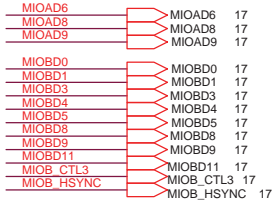
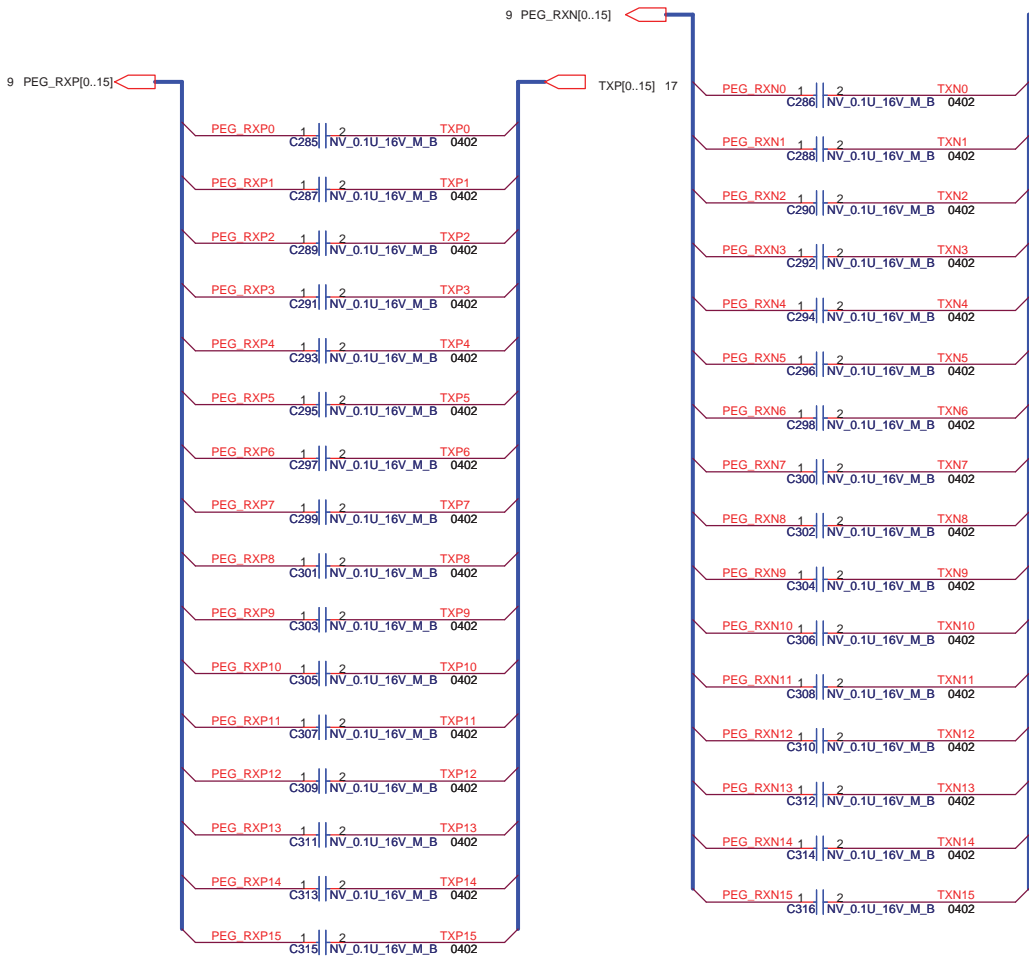
NV\_NB8P-GS

PCI EXPRESS  
MULTI-USE I/O INTERFACE



[MIOA\_HSYNC : SLOT\_CLOCK\_CFG]  
0 GPU and MCH share a common reference clock  
1 GPU and MCH do not share a common reference clock





**NB8X Strap for GDDR3-136ball**  
 0001 16Mx32Infineon  
 0010 16Mx32Hynix  
 0011 16Mx32Samsung  
 0101 8Mx32Infineon  
 0110 8Mx32Hynix  
 0111 8Mx32Samsung

**SUB\_VENDOR**  
 0 (USE SYSTEM BIOS)  
 1 (USE EXTERNAL ROM)

**MIOAD0** is used to set the PCI Express PLL termination enable.  
 DEFAULT "0"

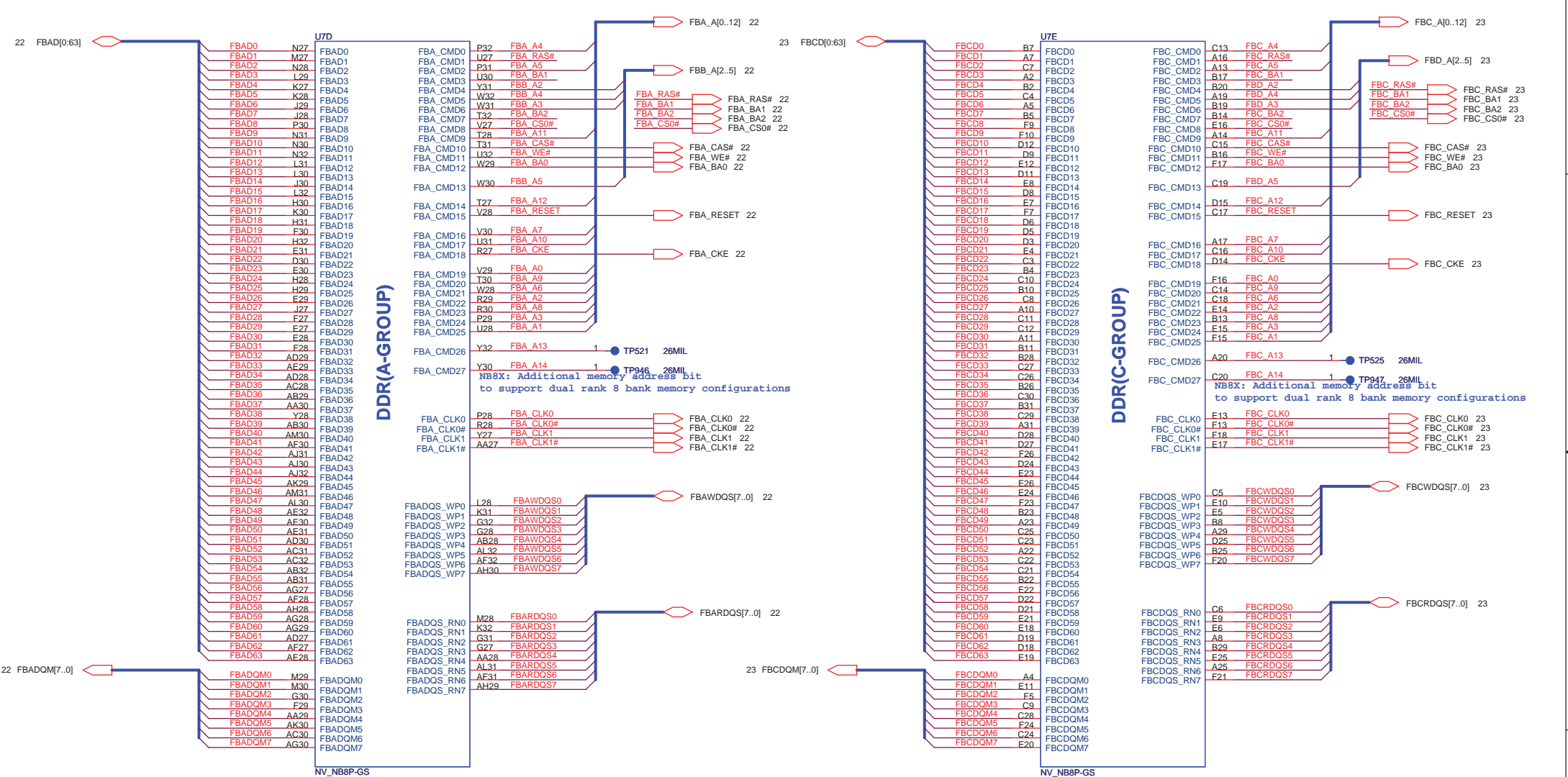
**NB8X 3GIO\_PADCFG[3:0]**  
 0001

*NB8M-GT Device ID setting mismatch between VBIOS and H/W Straps  
 Change R231 value from NC\_ to NV8M\_  
 Change R232 value from NV\_ to NV8P\_*

**NB8X PCI\_DEVID[4:0]**  
 NB8P-GS X0111 "X7"  
 NB8M-GT X0110 "X6"

**CRYSTAL(NB8X)**  
 0 (27M Hz)  
 1 (Reserved)



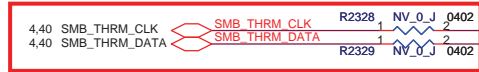


**DDR(A-GROUP)**

**DDR(C-GROUP)**

- U7D**
- FBA\_CMD0 P32 FBA A4
  - FBA\_CMD1 U27 FBA RAS#
  - FBA\_CMD2 P31 FBA A5
  - FBA\_CMD3 U30 FBA BA1
  - FBA\_CMD4 Y31 FBB A2
  - FBA\_CMD5 W32 FBB A4
  - FBA\_CMD6 W31 FBB A3
  - FBA\_CMD7 T32 FBA BA2
  - FBA\_CMD8 V27 FBA CS0#
  - FBA\_CMD9 T28 FBA A11
  - FBA\_CMD10 T31 FBA CAS#
  - FBA\_CMD11 U32 FBA WE#
  - FBA\_CMD12 W29 FBA BA0
  - FBA\_CMD13 W30 FBB A5
  - FBA\_CMD14 T27 FBA A12
  - FBA\_CMD15 V28 FBA RESET
  - FBA\_CMD16 V30 FBA A7
  - FBA\_CMD17 U31 FBA A10
  - FBA\_CMD18 R27 FBA CKE
  - FBA\_CMD19 V29 FBA A0
  - FBA\_CMD20 T30 FBA A9
  - FBA\_CMD21 W28 FBA A6
  - FBA\_CMD22 R29 FBA A2
  - FBA\_CMD23 R30 FBA A8
  - FBA\_CMD24 P29 FBA A3
  - FBA\_CMD25 U28 FBA A1
  - FBA\_CMD26 Y32 FBA A13
  - FBA\_CMD27 Y30 FBA A14
- FBA Signals**
- FBA\_CLK0 P28 FBA CLK0
  - FBA\_CLK0# R28 FBA CLK0#
  - FBA\_CLK1 Y27 FBA CLK1
  - FBA\_CLK1# AA27 FBA CLK1#
- FBAWDQS Signals**
- FBAWDQS[7..0] L28 FBAWDQS0
  - K31 FBAWDQS1
  - G32 FBAWDQS2
  - G28 FBAWDQS3
  - AB28 FBAWDQS4
  - AL32 FBAWDQS5
  - AF32 FBAWDQS6
  - AH30 FBAWDQS7
- FBARDQS Signals**
- FBARDQS[7..0] M28 FBARDQS0
  - K32 FBARDQS1
  - G31 FBARDQS2
  - G27 FBARDQS3
  - AA28 FBARDQS4
  - AL31 FBARDQS5
  - AF31 FBARDQS6
  - AH29 FBARDQS7
- FBCD[0:63]**
- FBCD0 B7
  - FBCD1 A7
  - FBCD2 C7
  - FBCD3 A2
  - FBCD4 B2
  - FBCD5 A4
  - FBCD6 C5
  - FBCD7 A5
  - FBCD8 B5
  - FBCD9 E9
  - FBCD10 D12
  - FBCD11 D9
  - FBCD12 E12
  - FBCD13 D11
  - FBCD14 E8
  - FBCD15 D8
  - FBCD16 E7
  - FBCD17 F7
  - FBCD18 D6
  - FBCD19 D5
  - FBCD20 E4
  - FBCD21 C4
  - FBCD22 B3
  - FBCD23 B3
  - FBCD24 C10
  - FBCD25 B10
  - FBCD26 C8
  - FBCD27 A10
  - FBCD28 C11
  - FBCD29 C12
  - FBCD30 A11
  - FBCD31 B11
  - FBCD32 B28
  - FBCD33 C27
  - FBCD34 C26
  - FBCD35 B26
  - FBCD36 C30
  - FBCD37 B31
  - FBCD38 C29
  - FBCD39 A31
  - FBCD40 D28
  - FBCD41 D27
  - FBCD42 F26
  - FBCD43 D24
  - FBCD44 E23
  - FBCD45 E26
  - FBCD46 F24
  - FBCD47 B23
  - FBCD48 B23
  - FBCD49 A23
  - FBCD50 C25
  - FBCD51 C23
  - FBCD52 A22
  - FBCD53 C22
  - FBCD54 C21
  - FBCD55 B22
  - FBCD56 E22
  - FBCD57 D22
  - FBCD58 D21
  - FBCD59 E21
  - FBCD60 E18
  - FBCD61 D19
  - FBCD62 D18
  - FBCD63 E19
- FBC Signals**
- FBC\_CLK0 E13 FBC CLK0
  - FBC\_CLK0# E13 FBC CLK0#
  - FBC\_CLK1 E18 FBC CLK1
  - FBC\_CLK1# E17 FBC CLK1#
- FBCWDQS Signals**
- FBCWDQS[7..0] C5 FBCWDQS0
  - E10 FBCWDQS1
  - E5 FBCWDQS2
  - B8 FBCWDQS3
  - A29 FBCWDQS4
  - D25 FBCWDQS5
  - B25 FBCWDQS6
  - F20 FBCWDQS7
- FBCRDQS Signals**
- FBCRDQS[7..0] C6 FBCRDQS0
  - E9 FBCRDQS1
  - E6 FBCRDQS2
  - A8 FBCRDQS3
  - B29 FBCRDQS4
  - E25 FBCRDQS5
  - A25 FBCRDQS6
  - F21 FBCRDQS7

Use GPU internal thermal sensor  
Change R2328, R2329 form NC to mount

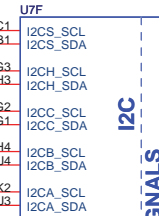
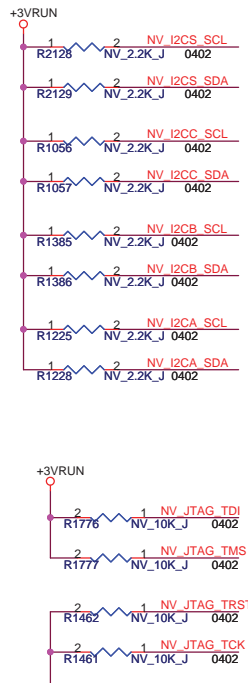


**HDCP**

**Backup**

**HDMI DDC**

**CRT DDC**



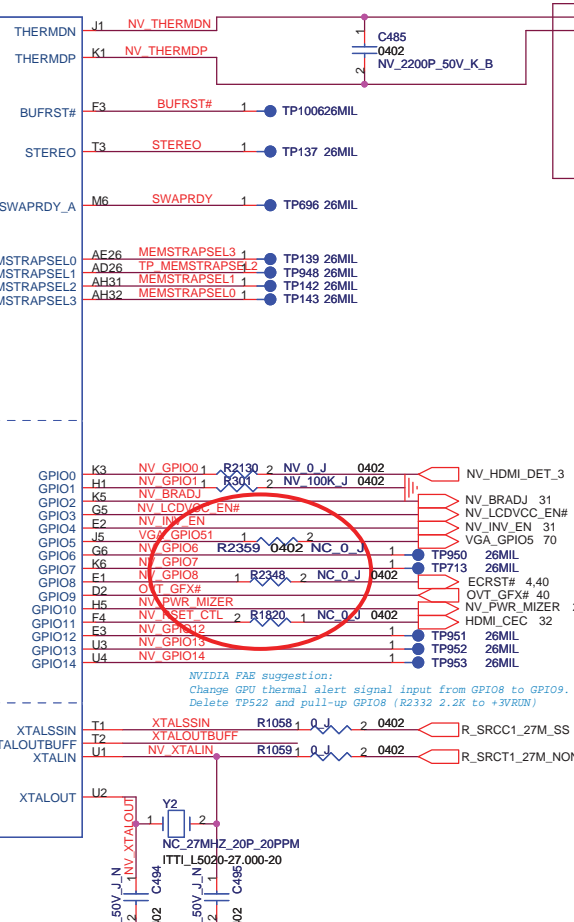
**ROM**

**GENERAL SIGNALS**

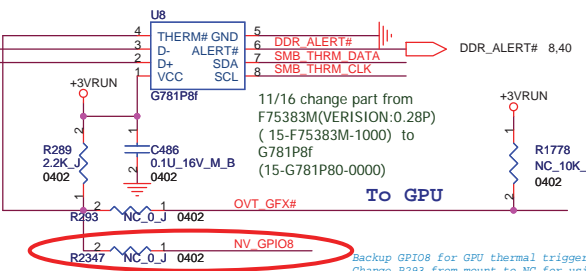
**TEST SIGNAL**

**CRYSTAL**

**GPIO**



SM bus Address :  
1001100(EC)  
For F75383M



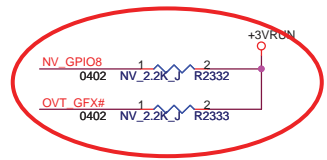
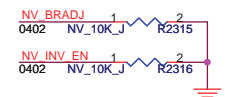
11/16 change part from F75383M(VERSION:0.28P) (15-F75383M-1000) to G781P8F (15-G781P80-0000)  
Backup GPIO8 for GPU thermal trigger signal  
Change R293 from mount to NC for using internal thermal sensor

From EC

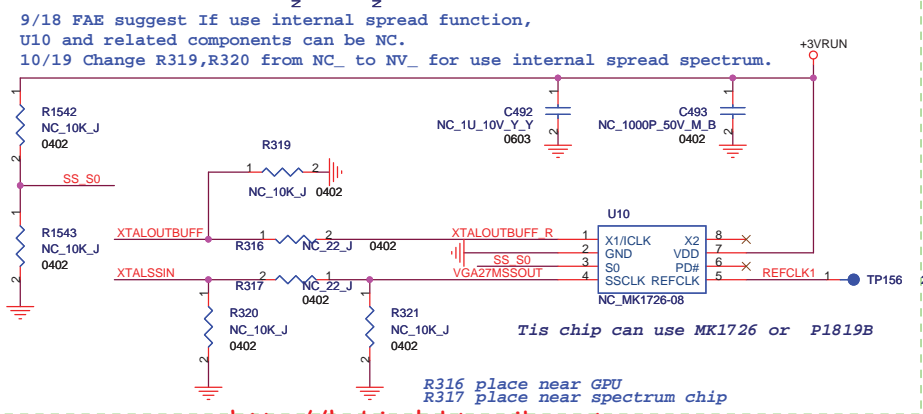
**2007/1/4 Update**

GPIO	I/O	Internal pull low	GPIO TABLE	
GPIO0	I	Yes	HDMI Hot Plug Detect 0(HPD0)	Active High
GPIO1	I	Yes	DVI Hot Plug Detect 1(HPD1)	Active High
GPIO2	O	Yes	LCD BL Brightness(LCD0_BL_PWM)	Active High
GPIO3	O	No	Panel Power(LCD0_VDD)	Active Low
GPIO4	O	Yes	LCD Backlight enable(LCD0_BL_EN)	Active High
GPIO5	O	Yes	GPU Power Downgrade for NV_VDD	Active Low
GPIO8	O	No	Thermal Alert Output (>125 Degree)	Active Low
GPIO9	I	No	System Power Limit Alert Input	Active Low
GPIO10	O	No	Memory Vref switch(MEM_VREF)	Active High
GPIO11	I/O	No	HDMI CEC Function Backup	

NVIDIA FAB suggestion:  
Change GPU thermal alert signal input from GPIO8 to GPIO9.  
Delete TP522 and pull-up GPIO8 (R2332 2.2K to +3VRUN)



**02/12/07 PVT Change**



9/18 FAE suggest If use internal spread function, U10 and related components can be NC.  
10/19 Change R319, R320 from NC\_ to NV\_ for use internal spread spectrum.

Tis chip can use MK1726 or P1819B

R316 place near GPU  
R317 place near spectrum chip

Change R2333 from NC to mount for using internal thermal sensor

SPREAD SPECTRUM SETTING FOR MK

S0	SPREAD DIRECTION	Spread Percentage(%)
0	DOWN	-1.8
M	DOWN	-0.6
1	DOWN	-2.5

SPREAD SPECTRUM SETTING FOR P1819B

SRS	SPREAD DIRECTION	Spread Percentage(%)
0	DOWN	-1.25
1	DOWN	-1.75

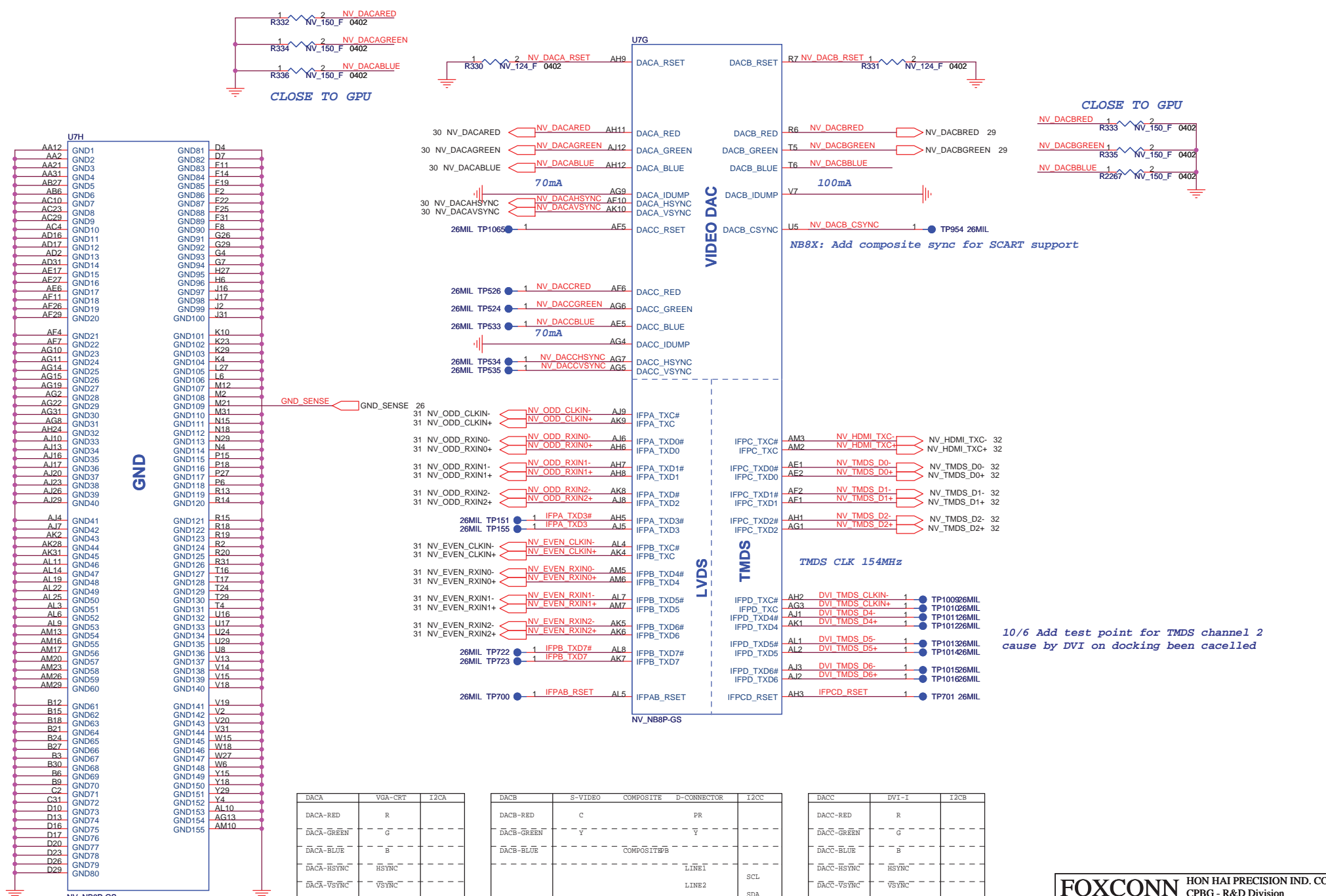
nVidia support Down -1.25%

0 = connect to GND  
M= unconnected  
1 = connect directly to VDD

**FOXCONN** HON HAI PRECISION IND. CO., LTD.  
CPBG - R&D Division

Title: **VGA (POWER) 7 OF 8**

Size A3	Document Number (M610-1-01) MainBoard (MBX-176) 2007.1.4	2.0	Rev
Date: Thursday, May 10, 2007	Sheet 20	of 77	



DACA	VGA-CRT	I2CA
DACA-RED	R	
DACA-GREEN	G	
DACA-BLUE	B	
DACA-HSYNC	HSYNC	
DACA-VSYNC	VSYNC	
	VGA-DDCLK	SCL
	VGA-DDCDATA	SDA

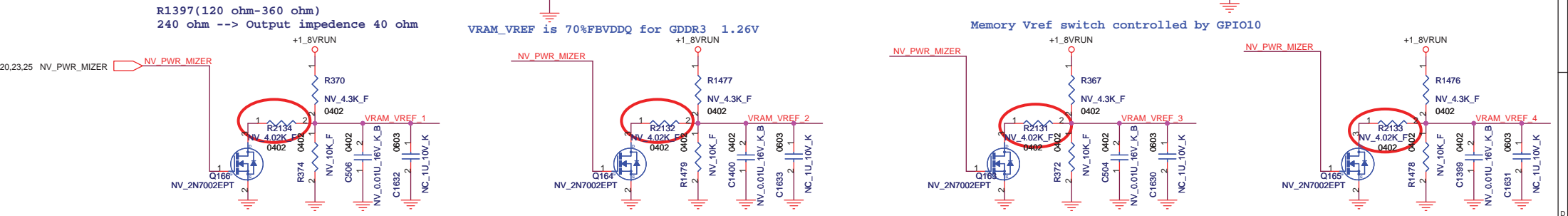
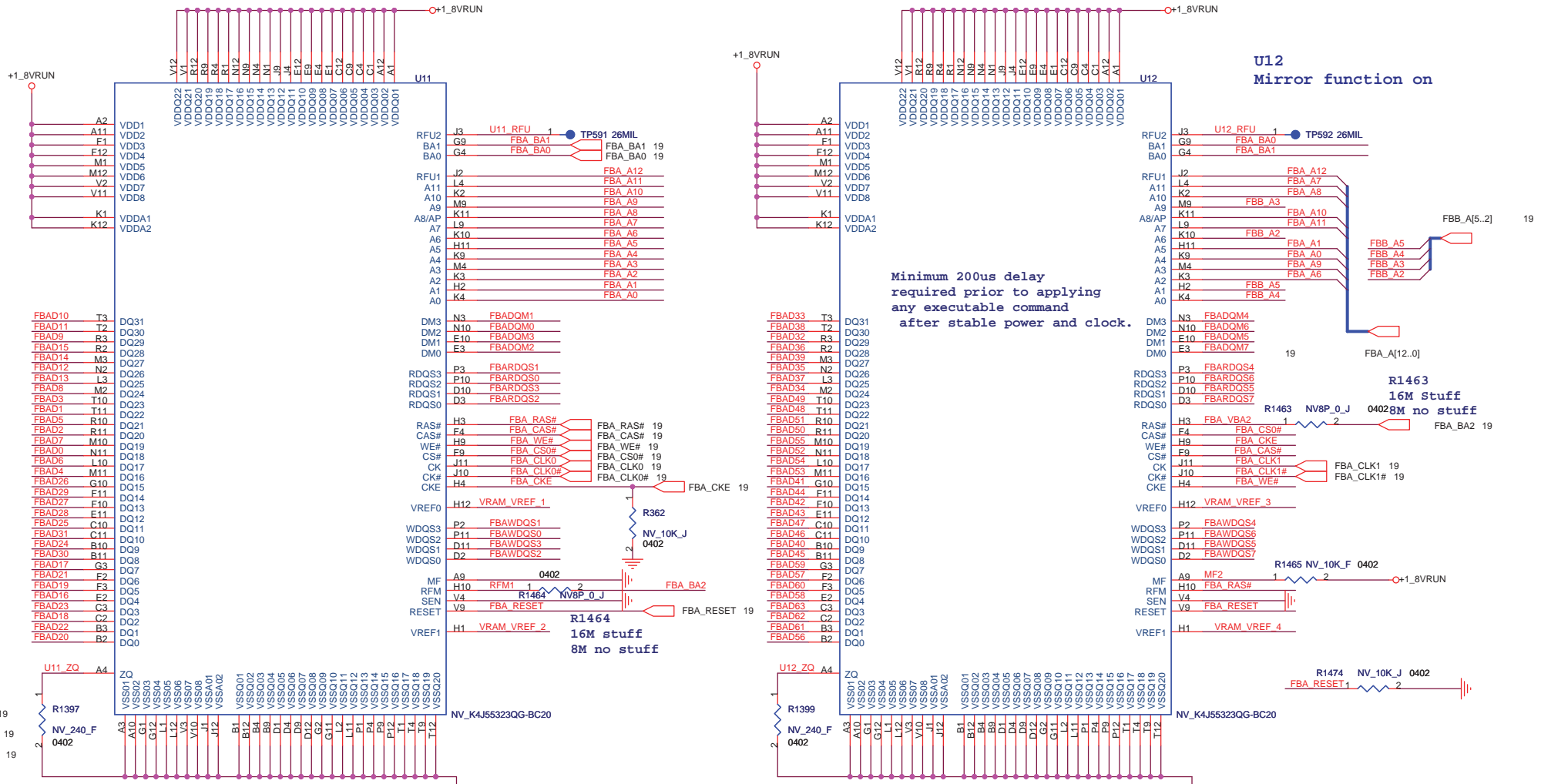
DACB	S-VIDEO	COMPOSITE	D-CONNECTOR	I2CB
DACB-RED	C		FR	
DACB-GREEN	Y		Y	
DACB-BLUE			COMPOSITE	
			LINE1	SCL
			LINE2	SDA
			LINE3	

DACC	DVI-I	I2CB
DACC-RED	R	
DACC-GREEN	G	
DACC-BLUE	B	
DACC-HSYNC	HSYNC	
DACC-VSYNC	VSYNC	
	DVI-DDCLK	SCL
	DVI-DDCDATA	SDA

**FOXCONN** HON HAI PRECISION IND. CO., LTD.  
CPBG - R&D Division

**Title**  
**VGA (POWER) 8 OF 8**

Size A3	Document Number (M610-1-01) MainBoard (MBX-176) 2007.1.4	Rev 2.0
Date:	Thursday, May 10, 2007	Sheet 21 of 77



	DDR3 (NBBX)
R1896, R1897, R1898, R1899	243 ohm
C1608, C1809	0.01uF

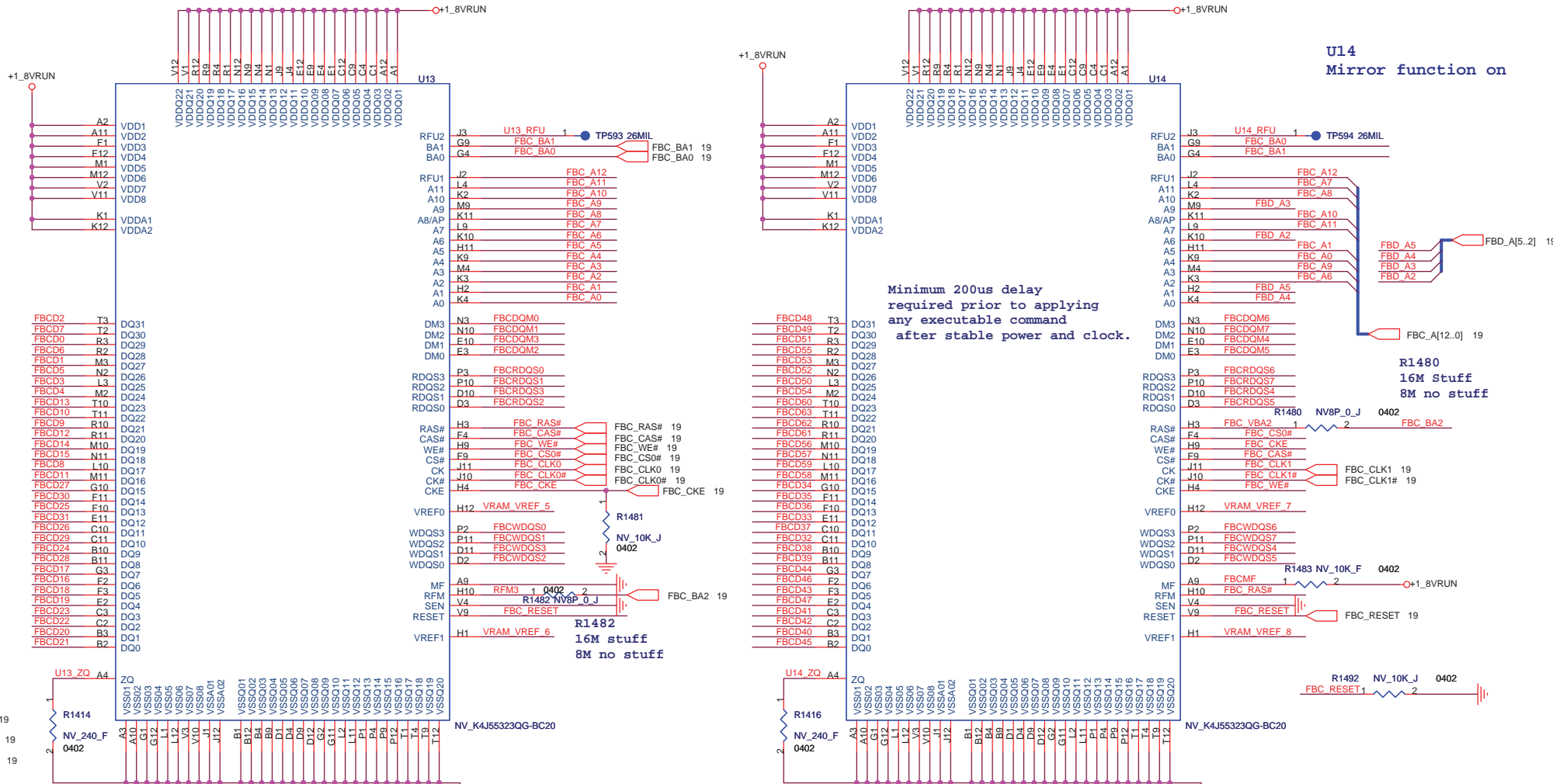


**FOXCONN** HON HAI PRECISION IND. CO., LTD.  
 CPBG - R&D Division

Title: **VRAM (GDDR) 1 OF 4**

Size A3 Document Number (M610-1-01) MainBoard (MBX-176) 2007.1.4 Rev 2.0

Date: Thursday, May 10, 2007 Sheet 22 of 77



U14  
Mirror function on

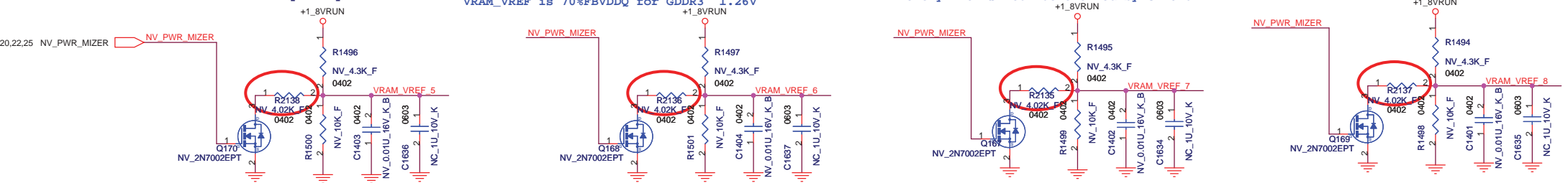
Minimum 200us delay  
required prior to applying  
any executable command  
after stable power and clock.

R1480  
16M stuff  
8M no stuff

R1414(120 ohm-360 ohm)  
240 ohm --> Output impedance 40 ohm

VRAM\_VREF is 70%FBVDDQ for GDDR3 1.26V

Memory Vref switch controlled by GPIO10



DDR3 (NB8X)	
R1502, R1503, R1873, R1874	243 ohm
C1582, C1583	0.01uF



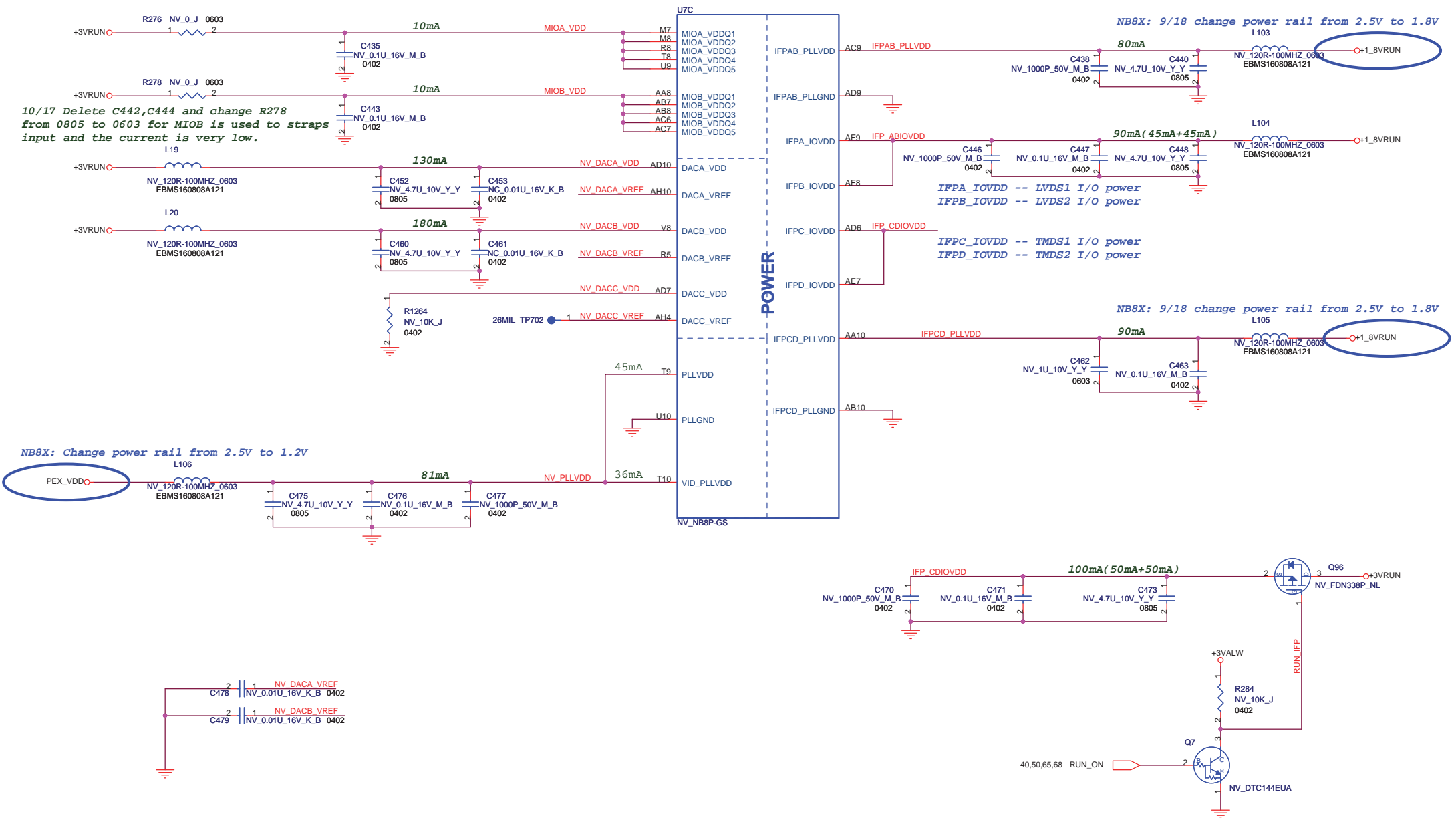
<http://hobi-elektronika.net>

**FOXCONN** HON HAI PRECISION IND. CO., LTD.  
CPBG - R&D Division

Title: **VRAM (GDDR) 1 OF 4**

Size A3 Document Number (M610-1-01 )MainBoard (MBX-176) 2007.1.4 2.0 Rev

Date: Thursday, May 10, 2007 Sheet 23 of 77



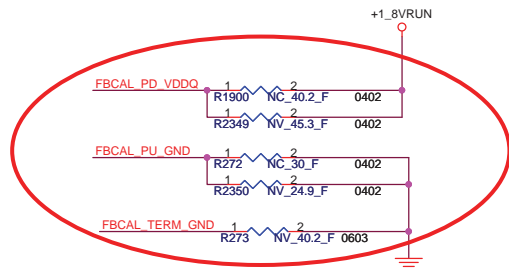
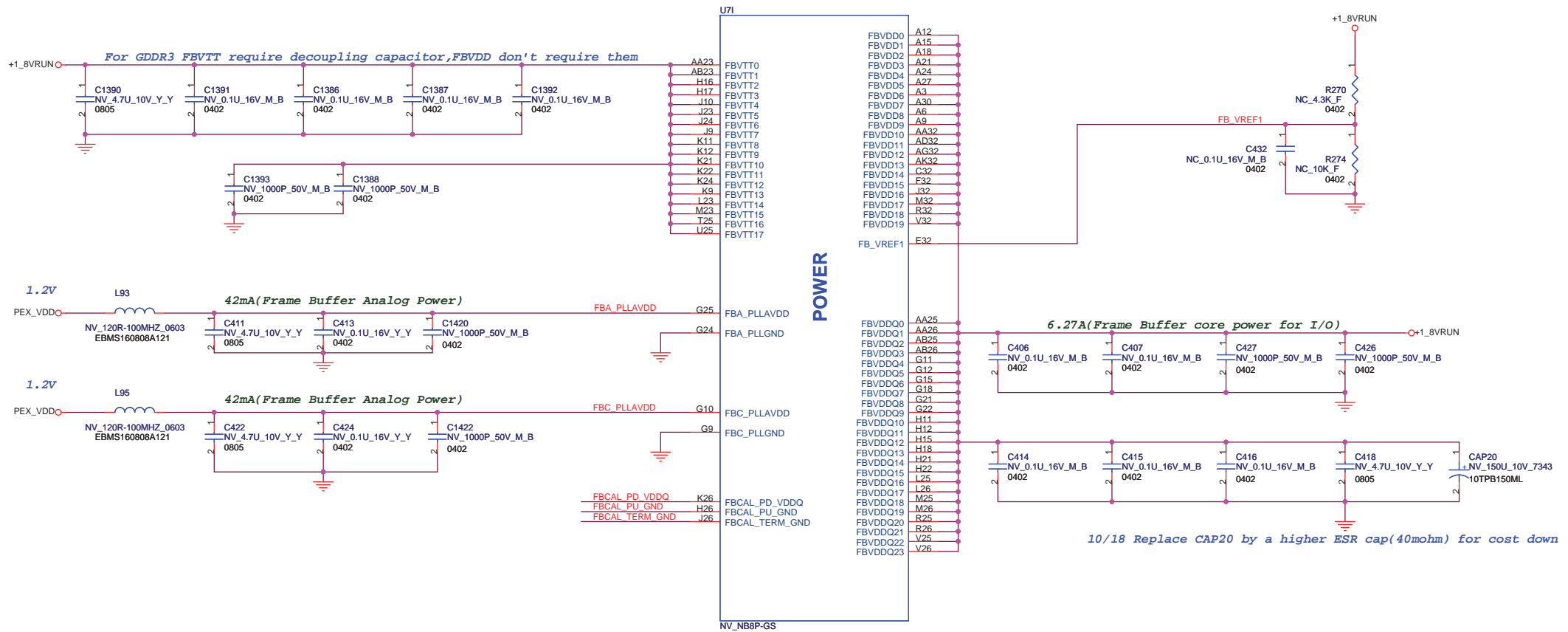
10/17 Delete C442, C444 and change R278 from 0805 to 0603 for MIOB is used to straps input and the current is very low.

NB8X: Change power rail from 2.5V to 1.2V

NB8X: 9/18 change power rail from 2.5V to 1.8V

NB8X: 9/18 change power rail from 2.5V to 1.8V

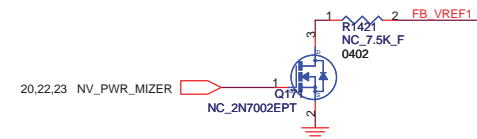




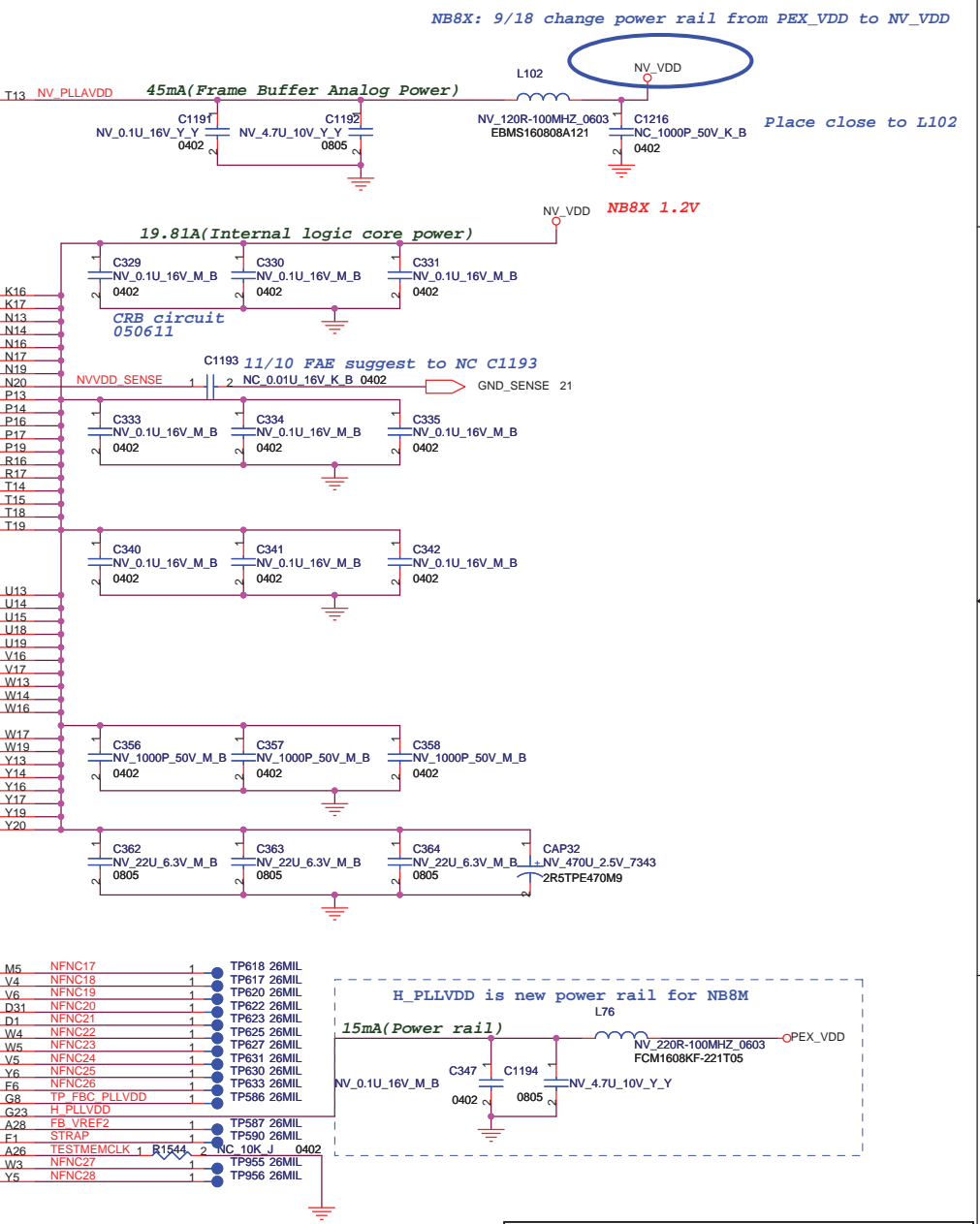
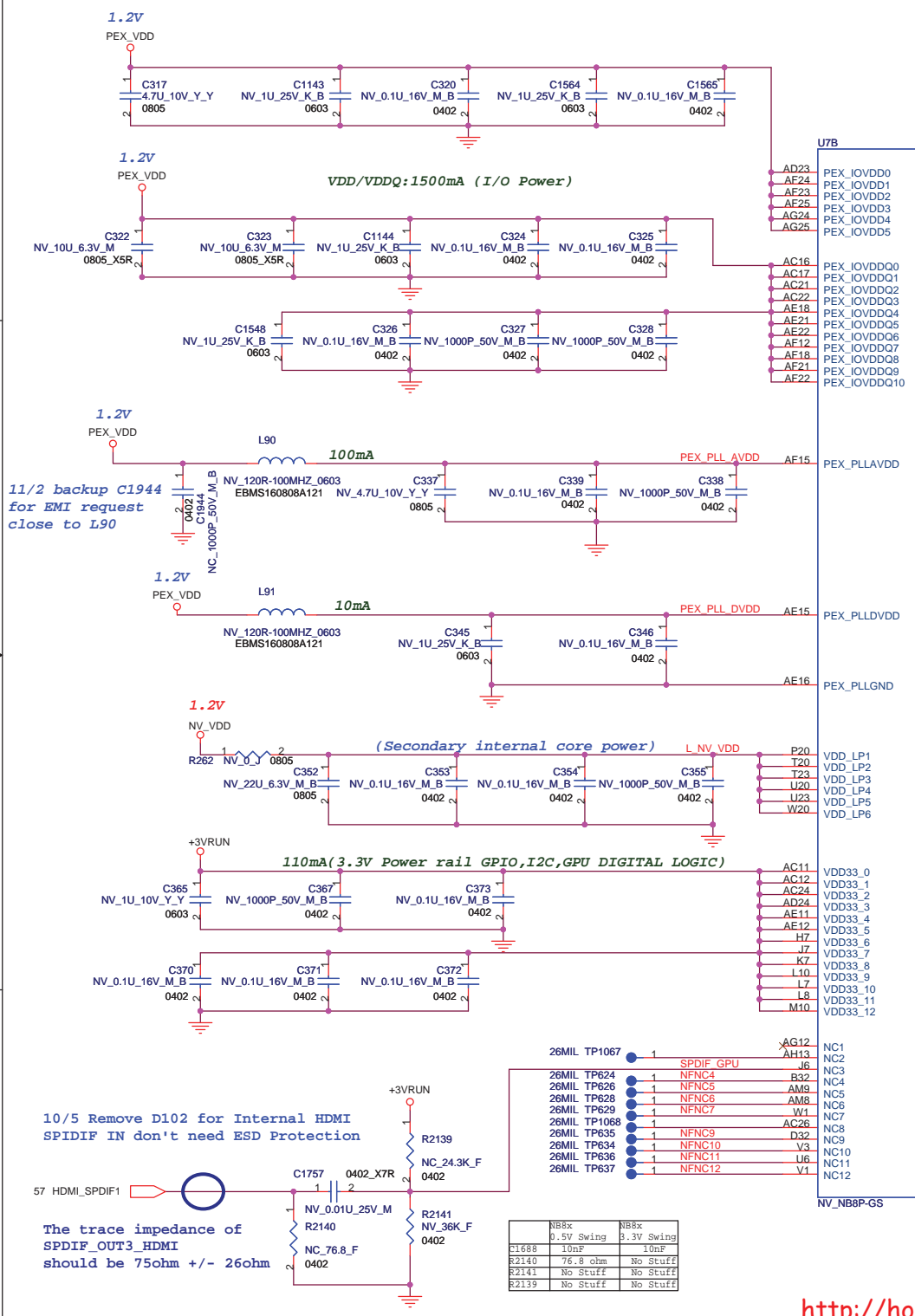
NVIDIA update NB8M VRAM termination value  
 FBCAL\_PD\_VDDQ 45.3 Ω  
 FBCAL\_PU\_GND 24.9 Ω  
 FBCAL\_TERM\_GND 40.2 Ω

**NVIDIA 07/1/5 update**

	DDR3(NB8M-GT)	DDR3(NB8P-GS)
FBCAL_PD_VDDQ	45.3 ohm	45.3 ohm
FBCAL_PU_GND	24.9 ohm	24.9 ohm
FBCAL_TERM_GND	40.2 ohm	40.2 ohm

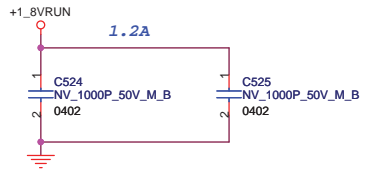
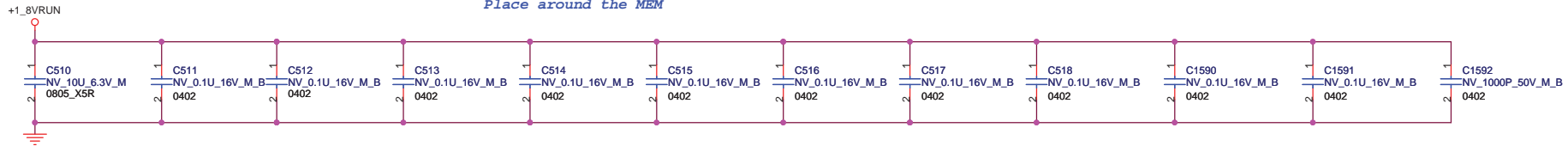


Memory Vref switch controlled by GPIO10



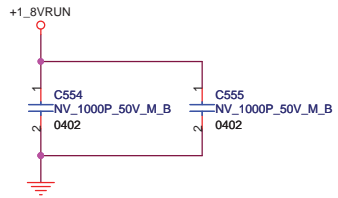
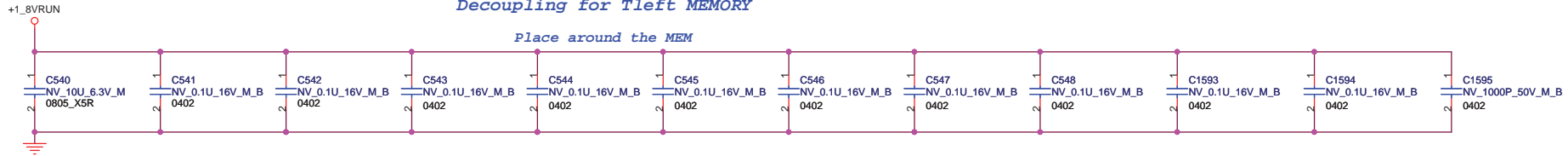
Decoupling for Tright MEMORY

Place around the MEM



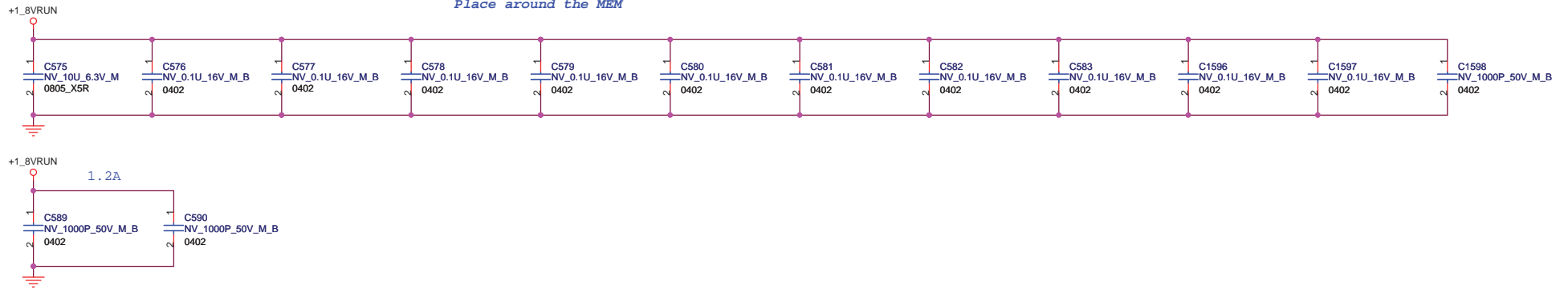
Decoupling for Tleft MEMORY

Place around the MEM



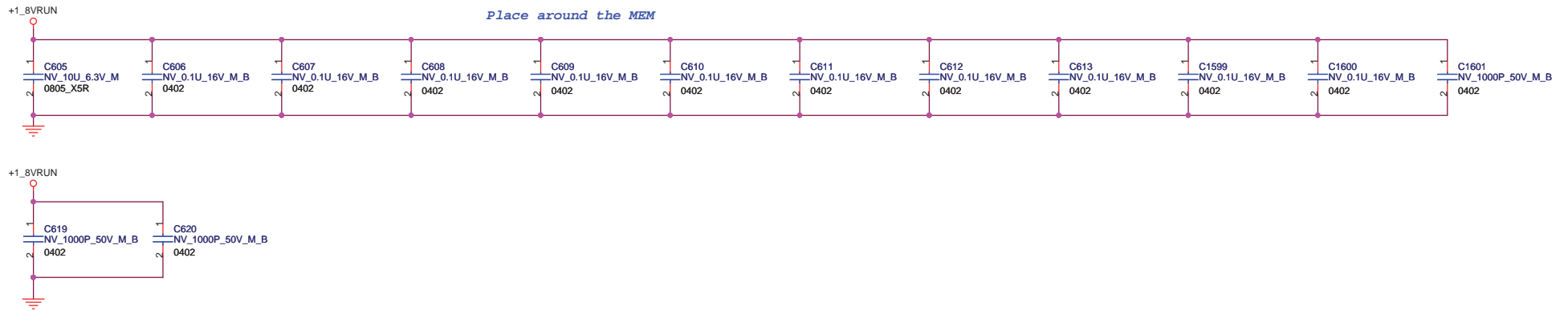
Decoupling for Bright MEMORY

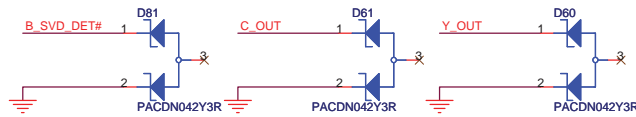
Place around the MEM



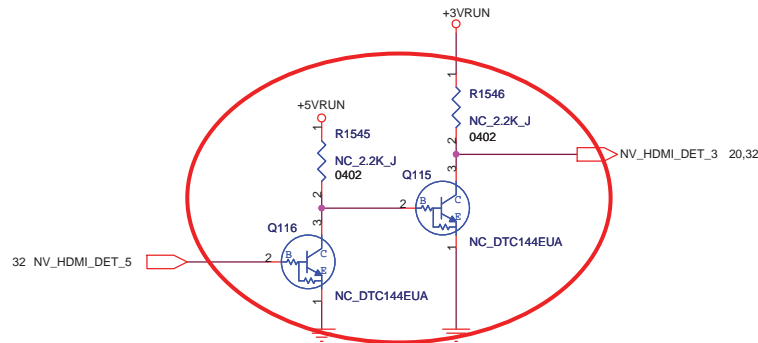
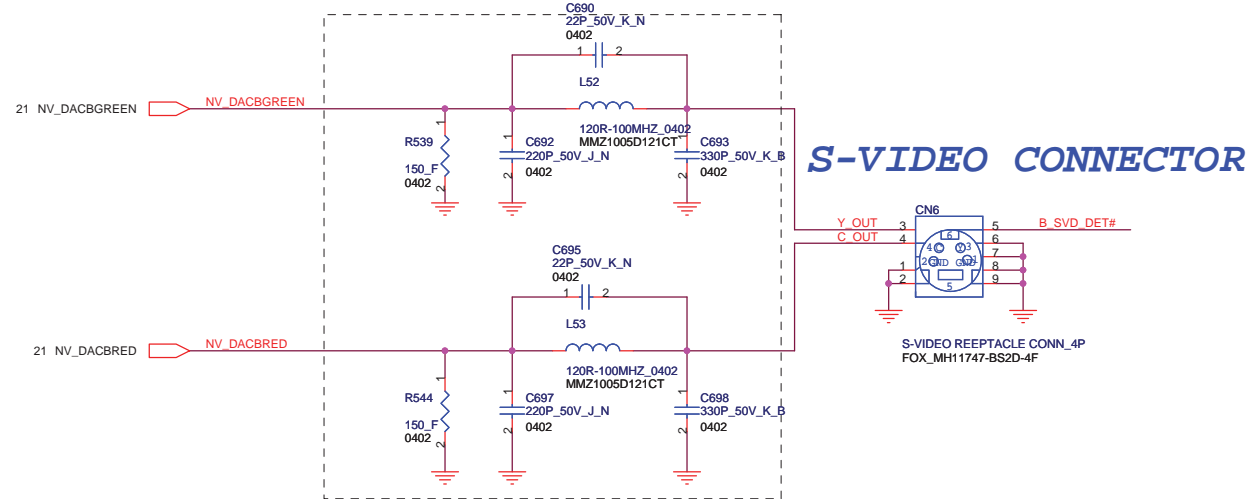
Decoupling for Bleft MEMORY

Place around the MEM



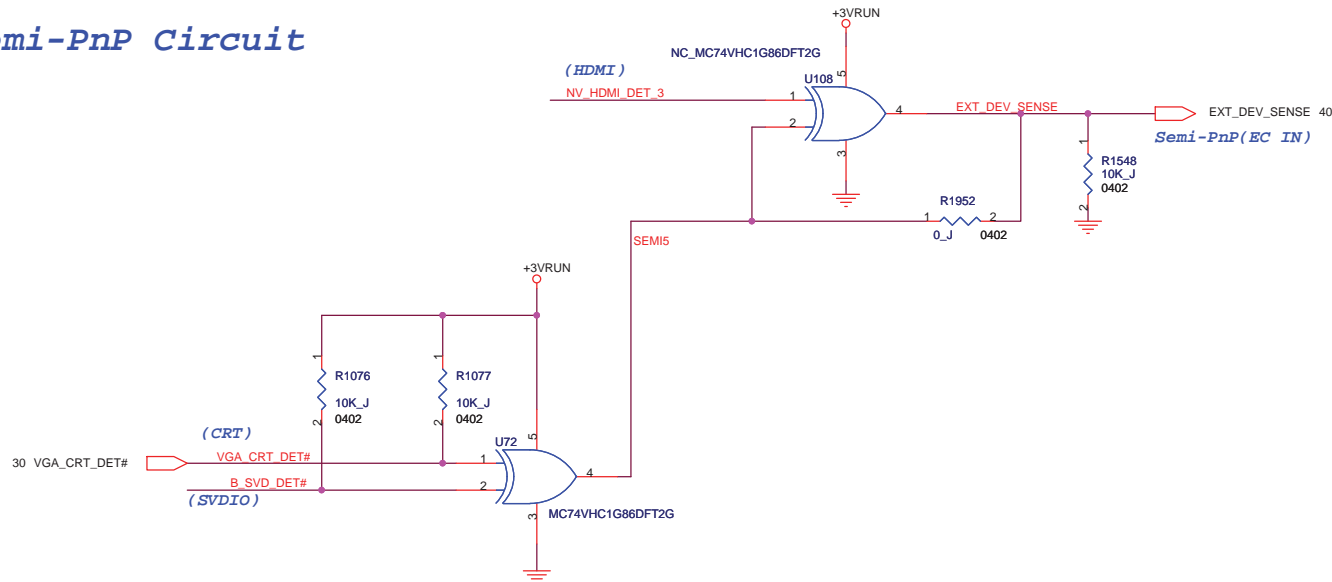


These component close to S-Video connector within 700 mil

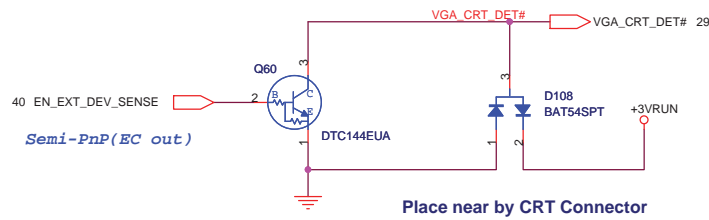


PS101 HPD has level shift function, so backup this circuit  
Change Q115, Q116, R1545, R1546 to NC

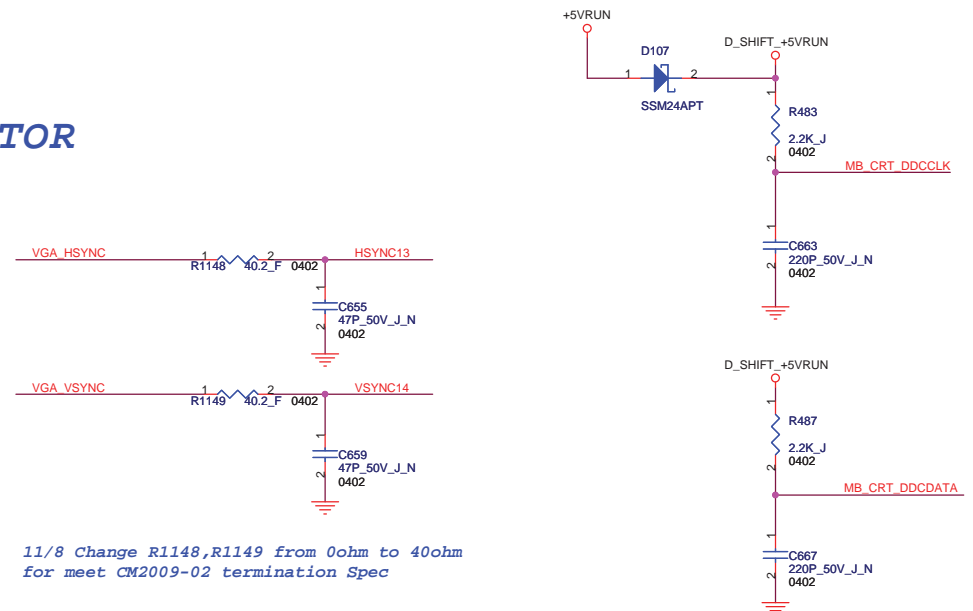
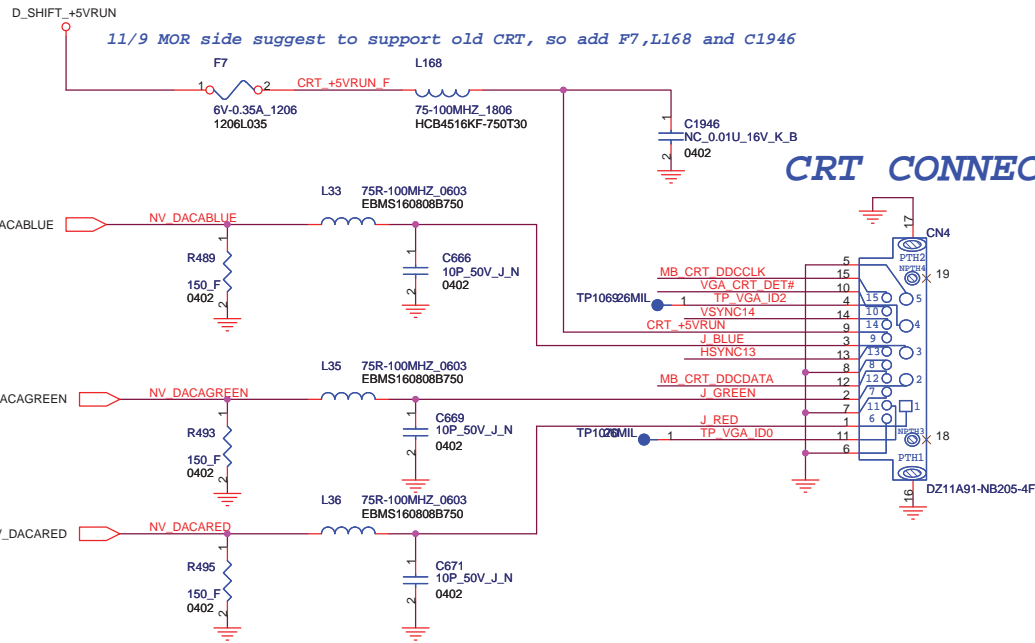
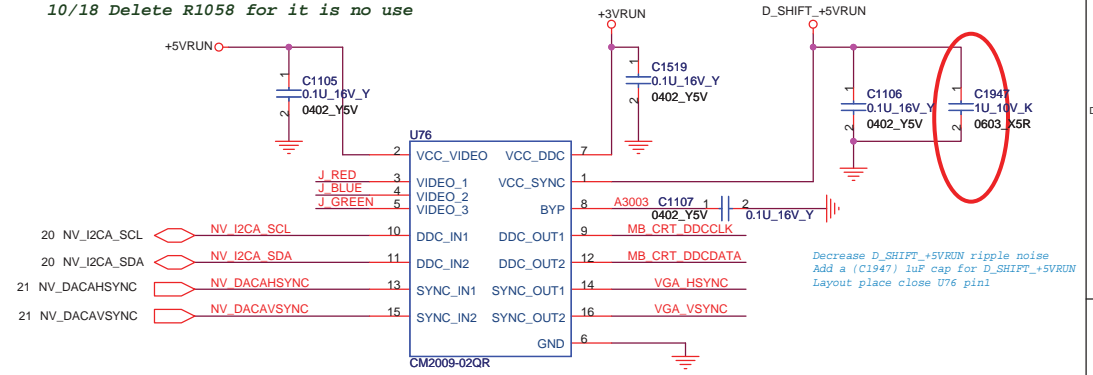
### Semi-PnP Circuit



<b>FOXCONN</b> HON HAI PRECISION IND. CO., LTD.	
CPBG - R&D Division	
Title: <b>S-VIDEO/Semi-PnP</b>	
Size A3	Document Number (M610-1-01 )MainBoard (MBX-176) 2007.1.4
Date: Thursday, May 10, 2007	Sheet 29 of 77



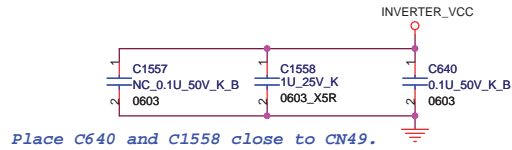
10/18 Delete R1058 for it is no use



11/8 Change R1148, R1149 from 0ohm to 40ohm for meet CM2009-02 termination Spec

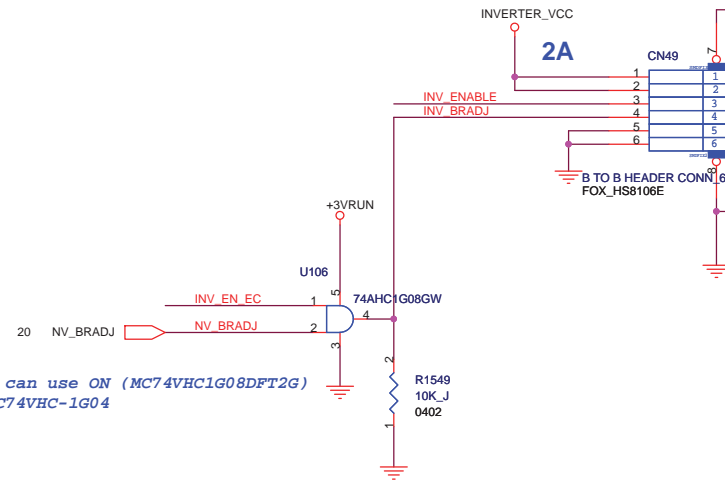
# LVDS CONNECTOR

## INVERTER CONNECTOR

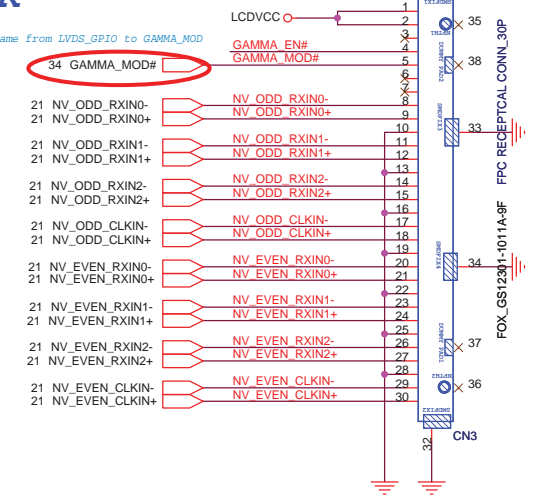


Backup Inverter boost circuit and use DCBATOUT as INVERTER\_VCC  
Change R2308 from NC to mount  
Change R2309 from mount to NC

U106, U15, U16 can use ON (MC74VHC1G08DFT2G)  
H.H. PN:14-MC74VHC-1G04

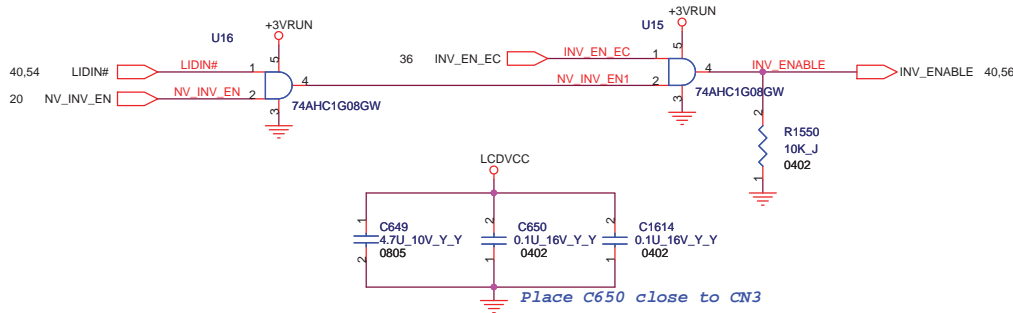


Change net name from LVDS\_GPIO to GAMMA\_MOD



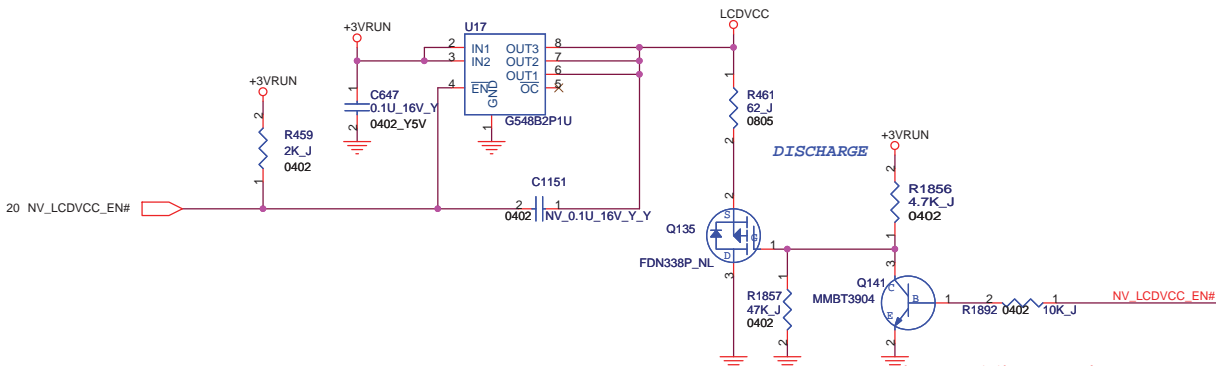
Use H/W selection to enable GAMMA function.  
Change R1937, R1938 from 4.7K to 0ohm

H: GAMMA Disable  
L: GAMMA Enable

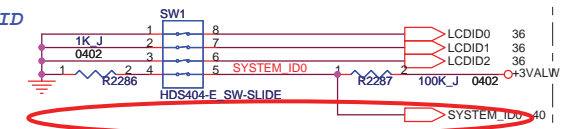


Place C650 close to CN3

Current limit is from 1.1A to 2.1A.



## PANEL ID



Add R2286, R2287 for Instant On function been used again

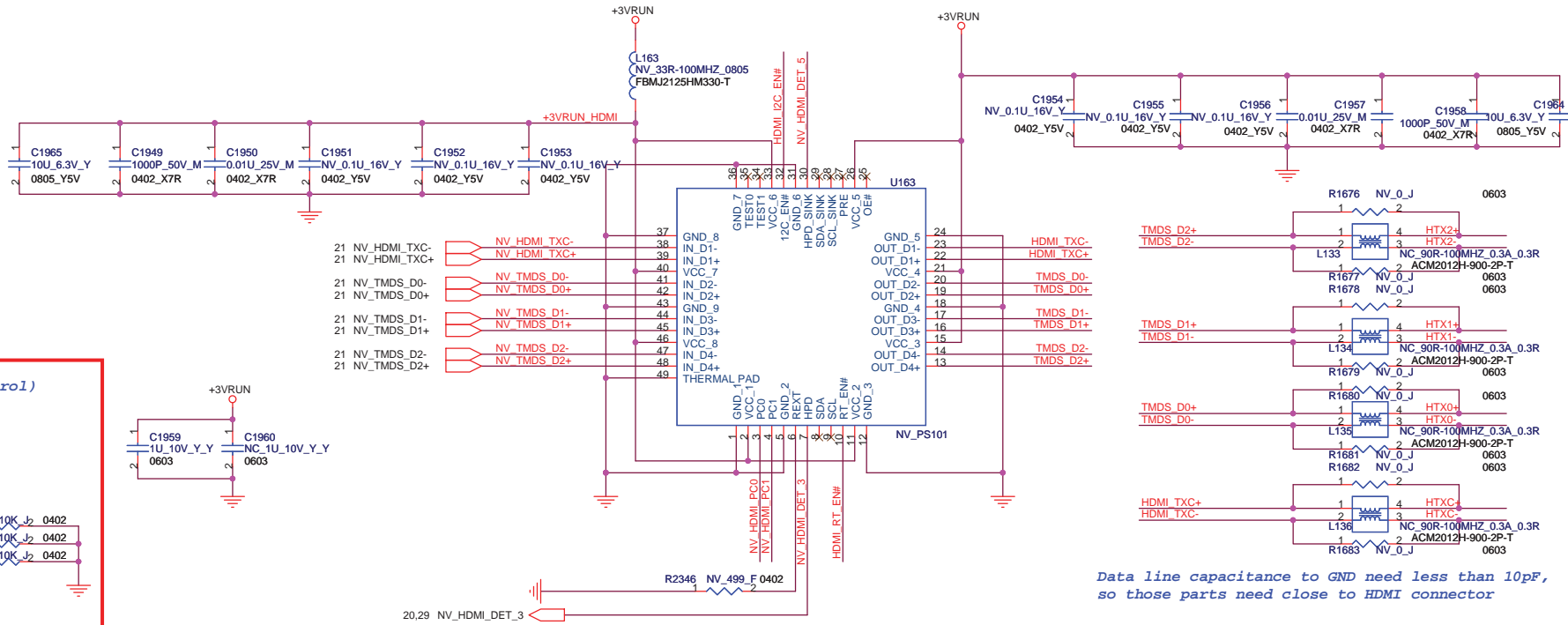
Type	WXGA+	WXGA+	WUXGA	WUXGA
Size	17" wide	17" wide	17" wide	17" wide
Vender	LG. PHILIPS	LG. PHILIPS	SHARP	SHARP
Device Name	LPI17LWP74-TLA	LP171WP7-TLA	LQ170M11LA4G	LQ170M11LA4G
Panel ID Check[2..0]	010	001	100	101

**FOXCONN** HON HAI PRECISION IND. CO., LTD.  
CPBG - R&D Division

Title: **LVDS**

Size A3 Document Number (M610-1-01) MainBoard (MBX-176) 2007.1.4 2.0 Rev

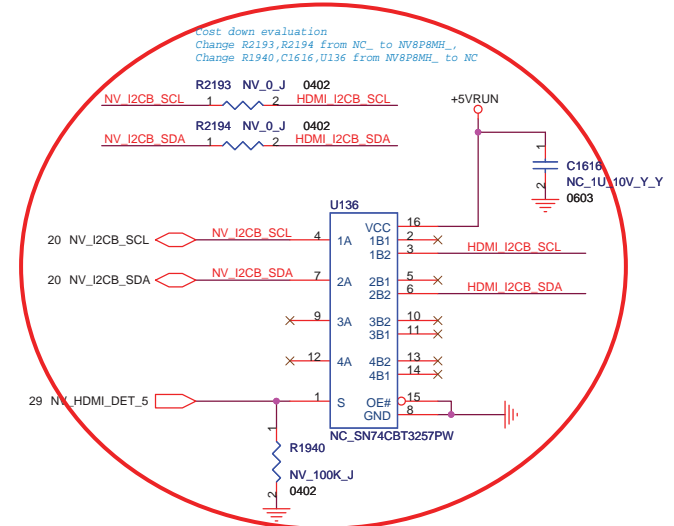
Date: Thursday, May 10, 2007 Sheet 31 of 77



(TMDs inputs equalization control)  
 PC1,PC0 Configuration  
 00: 8 dB,  
 01: 4 dB,  
 10: 12 dB,  
 11: 0 dB

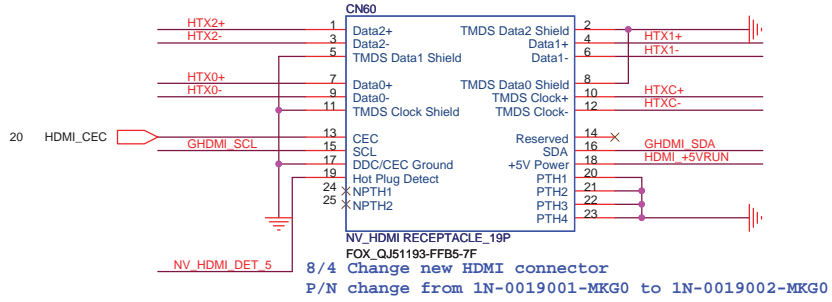
Data line capacitance to GND need less than 10pF,  
 so those parts need close to HDMI connector

Add HDMI equalizer for M610 long trace issue

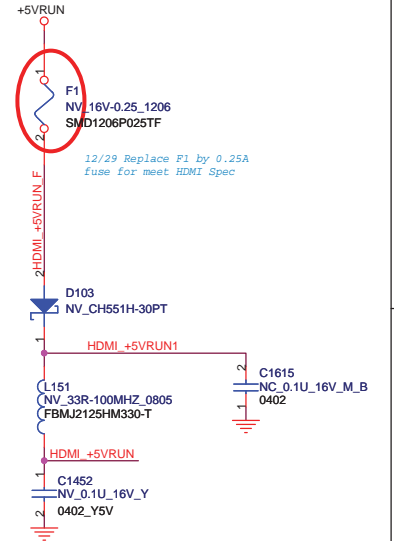
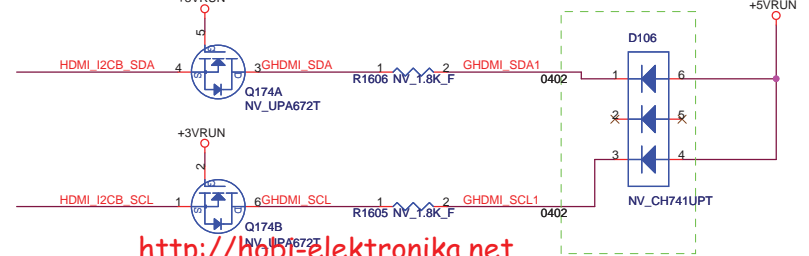


HDMI DDC capacitance to GND need less than 50pF, so those parts need close to HDMI connector

### HDMI CONNECTOR



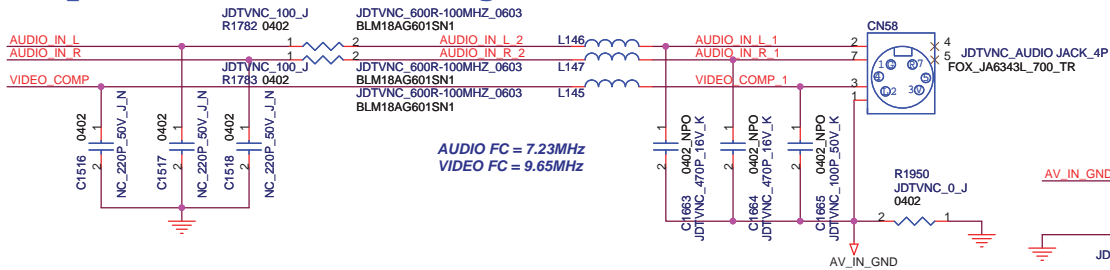
### PVT Change to 16-CH741UP-T000



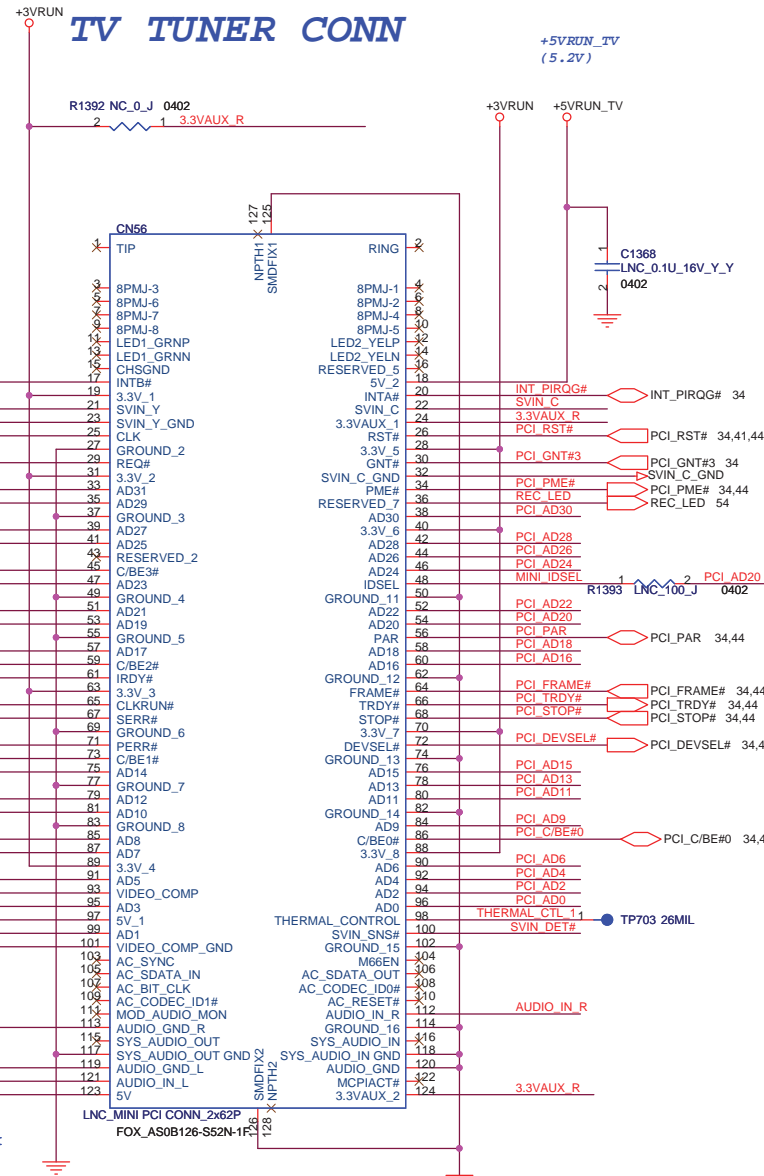
<b>FOXCONN</b> HON HAI PRECISION IND. CO., LTD. CPBG - R&D Division		
Title <b>HDMI</b>		
Size 43	Document Number (M610-1-01) MainBoard (MBX-176) 2007.1.4	Rev 2.0
Date: Thursday, May 10, 2007	Sheet 32	of 77



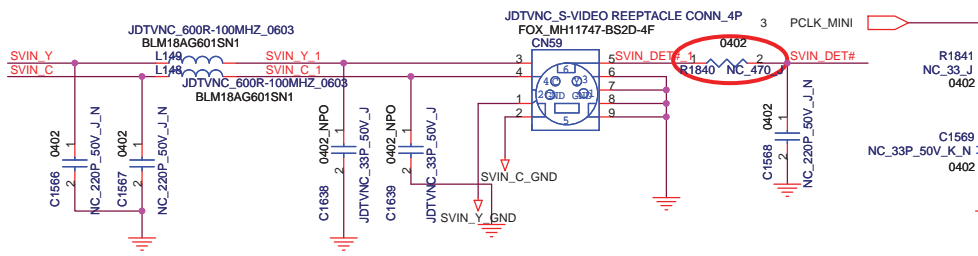
# Special mini stereo jack



# TV TUNER CONN

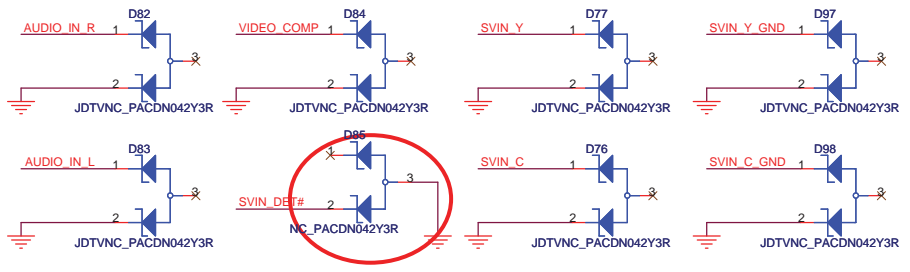


# S-VIDEO IN



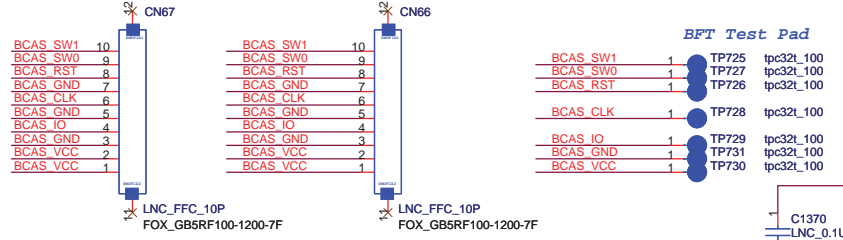
TV-TUNER not support CLKRUN

TV tuner "SVIN\_DET#" signal no use.  
Change R1840, D85 to NC



# B-CAS connentor (Close to TV Tuner)

# FFC CONNECT TO TV TUNER BOARD (FOR JP DIGITAL)

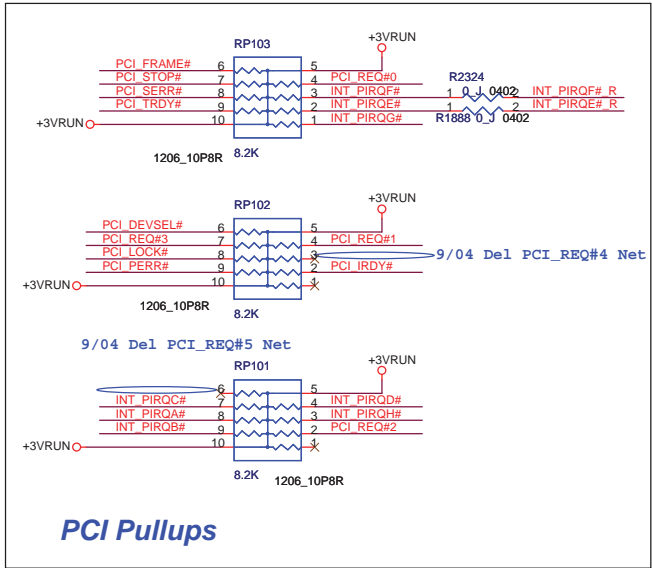


**FOXCONN** HON HAI PRECISION IND. CO., LTD.  
CPBG - R&D Division

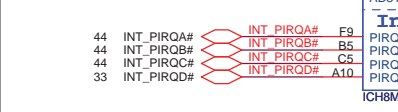
Title: **MINI-PCI CONN.**

Size: 43 Document Number: (M610-1-01) MainBoard (MBX-176) 2007.1.4 Rev: 2.0

Date: Thursday, May 10, 2007 Sheet: 33 of 77

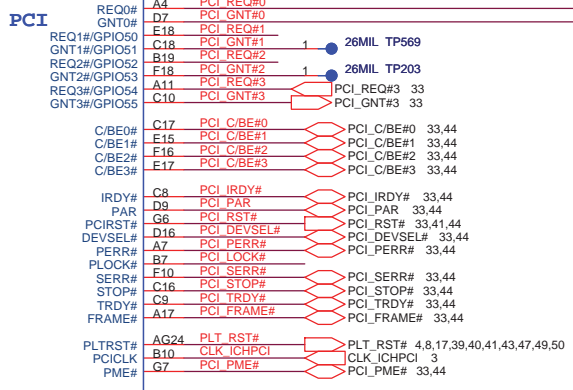


PCI Pullups



ICH8M-QM73\_ES1

Difference ICH7&ICH8  
 1. Del REQ4/GNT4, REQ5/GNT5  
 2. Change Strap Pin station(GNT4#-->GNT0#)



GNT0# is Strap Pin  
 For Boot BIOS Selection.  
 It's used Integrated pull\_up

9/4 ICH8 Strap Pin change from ICH7 GNT4#

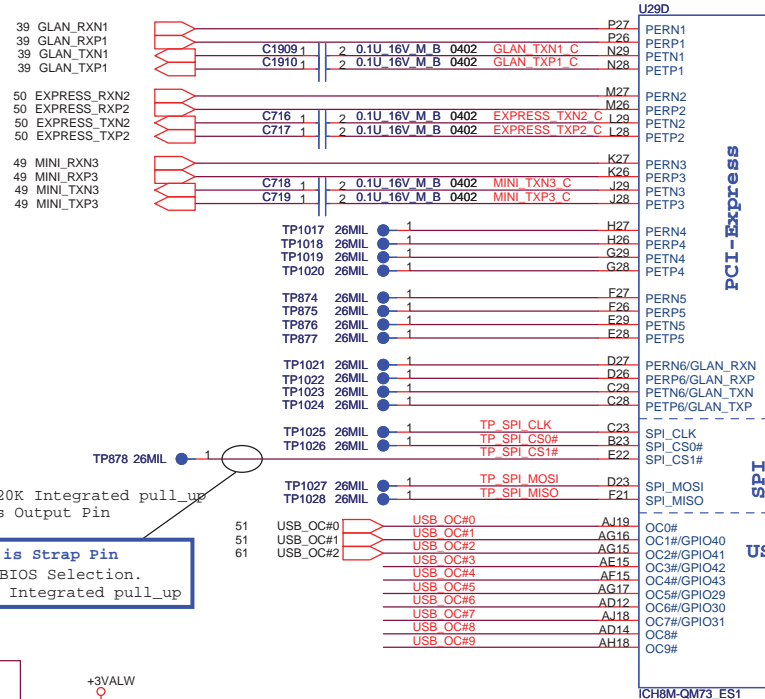
Strap for Boot-BIOS

	GNT0#	SPI_CS1#
EPC(Default)	H1	H1
PCI	H1	LOW
SPI	LOW	H1

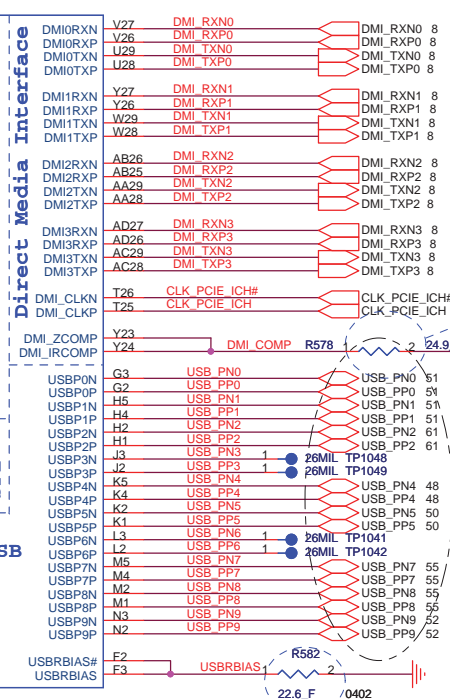
07/01/04 Change LVDS\_GPIO Net to GAMMA\_Control



11/08 New add High SKU SHARP panel GAMMA function  
 12/28 Change R2325 to no stuff



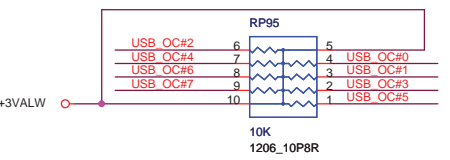
ICH8M-QM73\_ES1



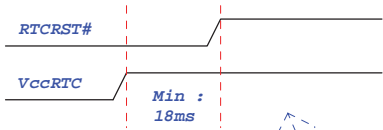
Place within 500 mils of ICH

USB Port0 -- USB Port0  
 USB Port1 -- USB Port1  
 USB Port2 -- USB Port2(Audio Board)  
 USB Port3 -- X  
 USB Port4 -- Bluetooth  
 USB Port5 -- Express Card  
 USB Port6 -- X  
 USB Port7 -- Camera (10/26 modify)  
 USB Port8 -- OIDE  
 USB Port9 -- CIR  
 11/3 update base on MOR side suggest

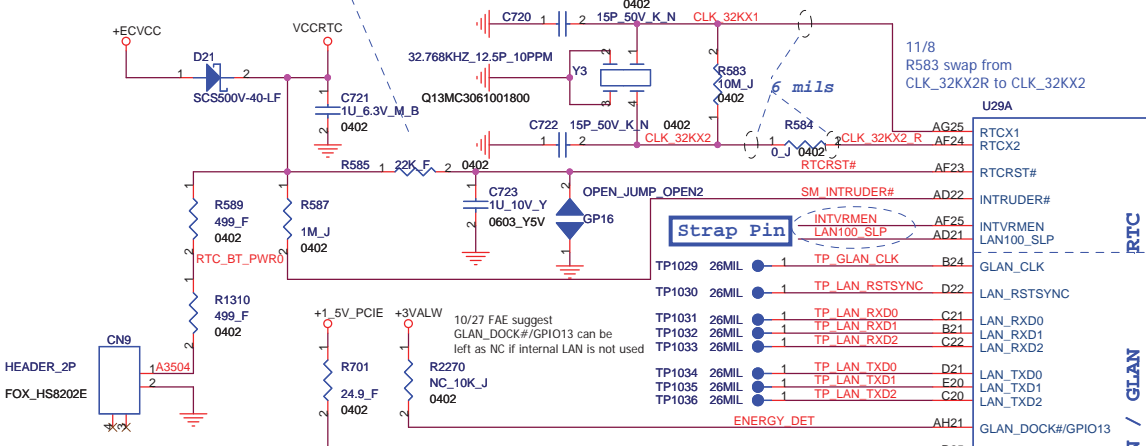
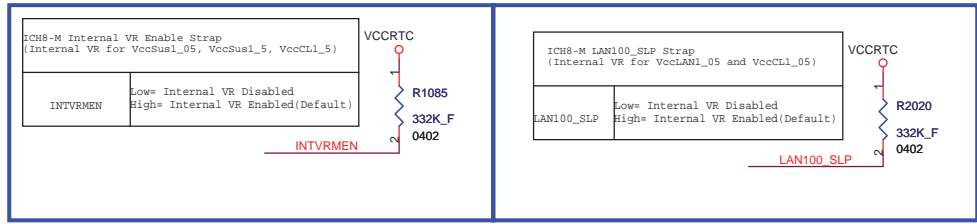
Place within 500 mils of ICH and don't routing next to high speed signals



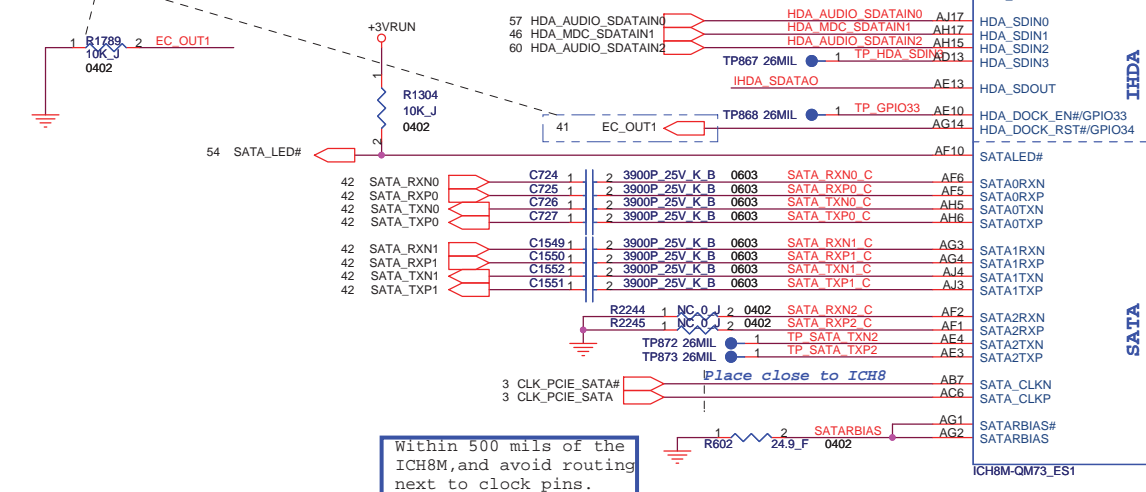
SPI\_CS1# is Strap Pin  
 For Boot BIOS Selection.  
 It's used Integrated pull\_up



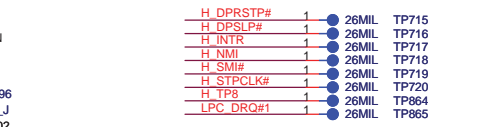
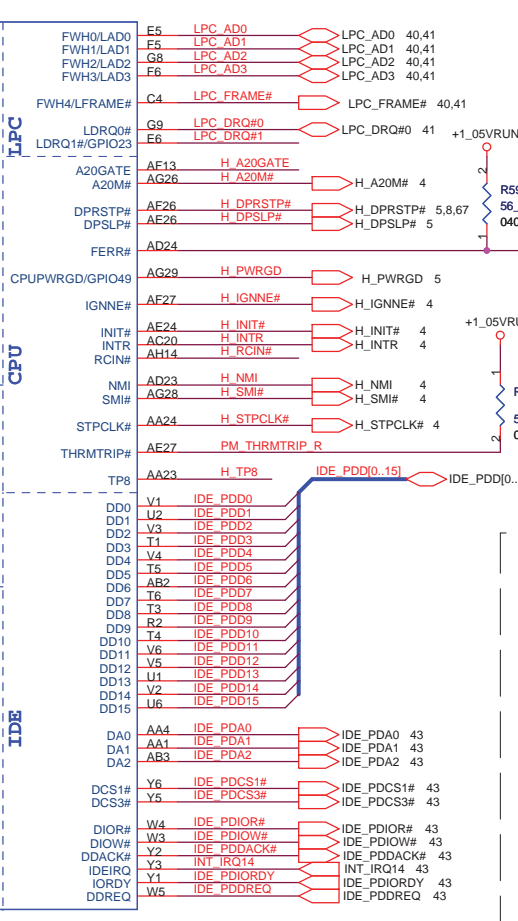
The traces inside this block should be wider.  
No digital signals routed under XTAL



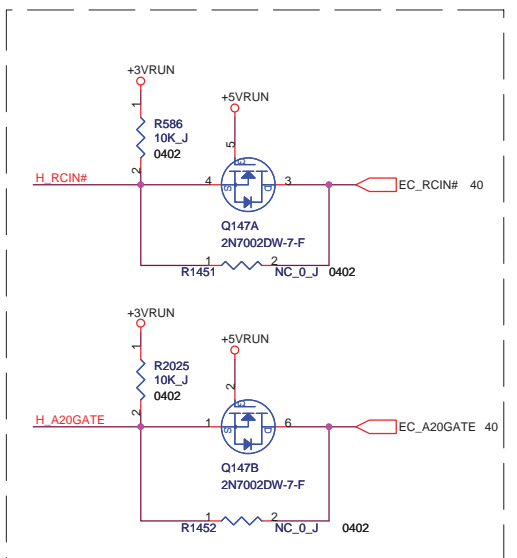
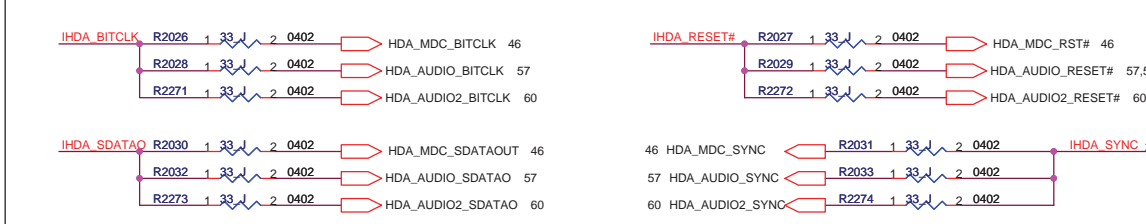
ICH8 datasheet error, GPIO34 is not truer GPIO Pin, BIOS can't control it's action  
Change EC\_OUT from ICH8 GPIO26 to GPIO34  
ICH8 pin AH27(GPIO26) add TP1051  
ICH8 pin AG14(GPIO34) del TP869, link to X-BUS conn.



Within 500 mils of the ICH8M, and avoid routing next to clock pins.



### AUDIO Signal 1 to 3 Circuit

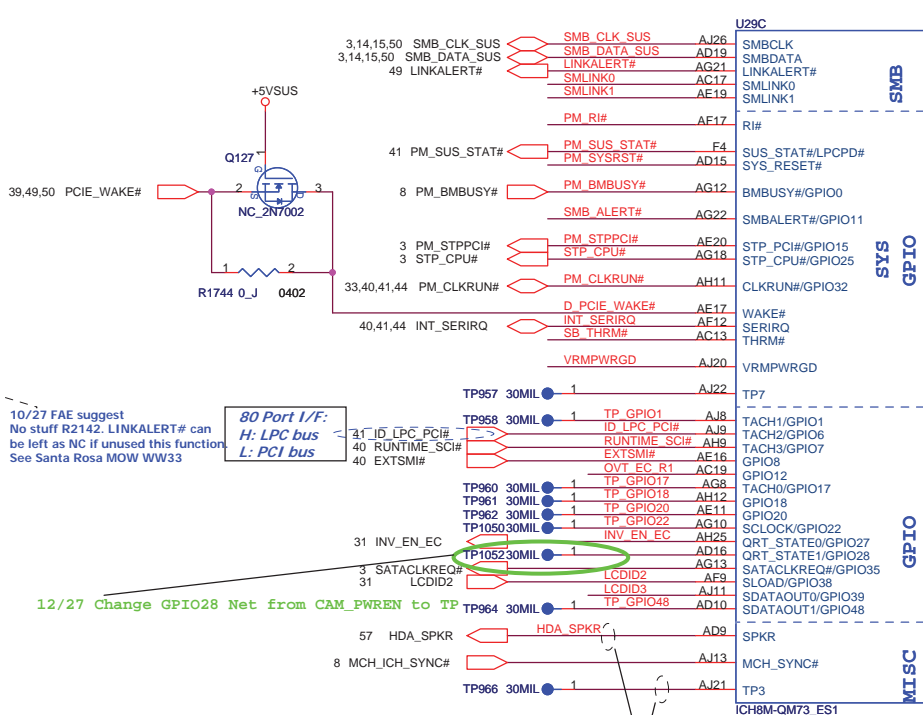
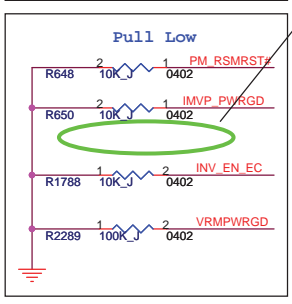
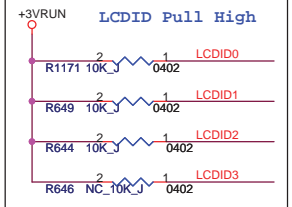
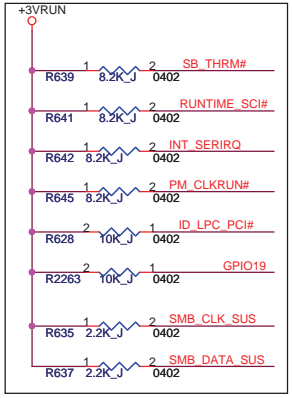
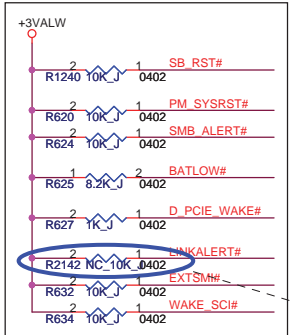
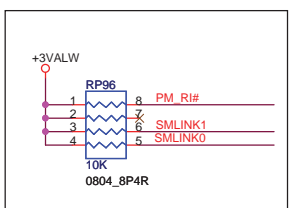


**FOXCONN** HON HAI PRECISION IND. CO., LTD.  
CPBG - R&D Division

Title: **ICH8-M(LPC,IDE,SATA)2/5**

Size: A3 Document Number: (M610-1-01)MainBoard (MBX-176) 2007.1.4 Rev: 2.0

Date: Thursday, May 10, 2007 Sheet: 35 of 77

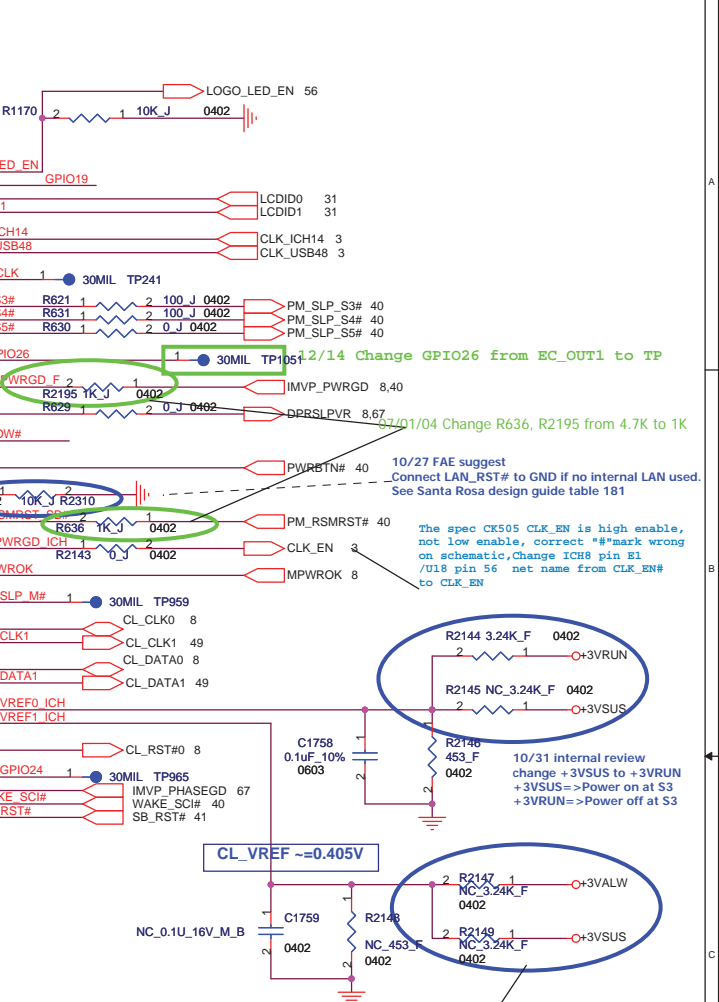
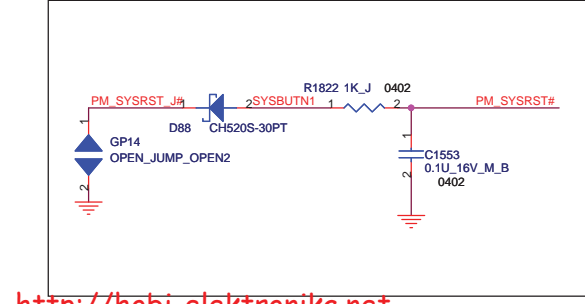
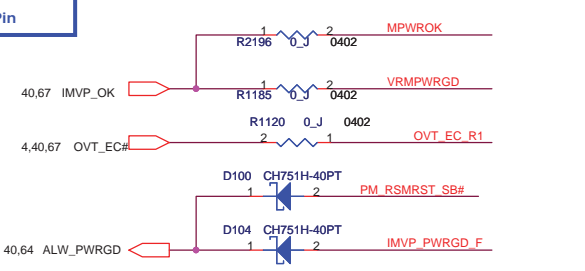
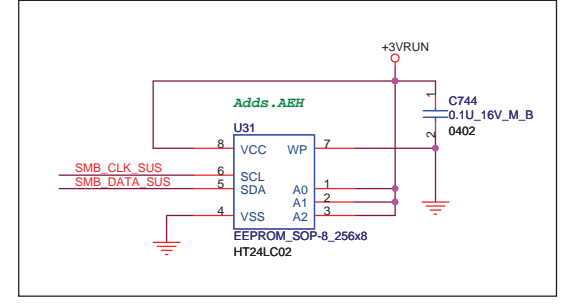


10/27 FAE suggest  
No stuff R2142. LINKALERT# can  
be left as NC if unused this function.  
See Santa Rosa MOW WW33

80 Part I/F:  
H: LPC bus  
L: PCI bus

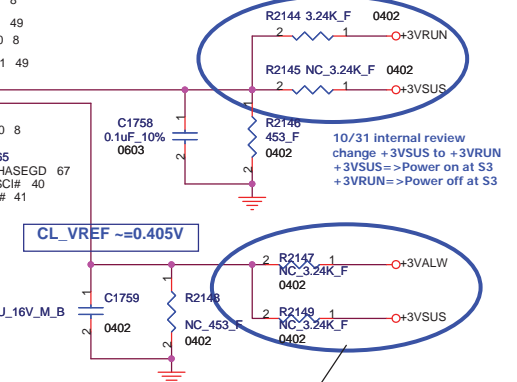
12/27 Change GPIO28 Net from CAM\_PWREN to TP

12/27 Delete R1787



10/27 FAE suggest  
Connect LAN\_RST# to GND if no internal LAN used.  
See Santa Rosa design guide table 181

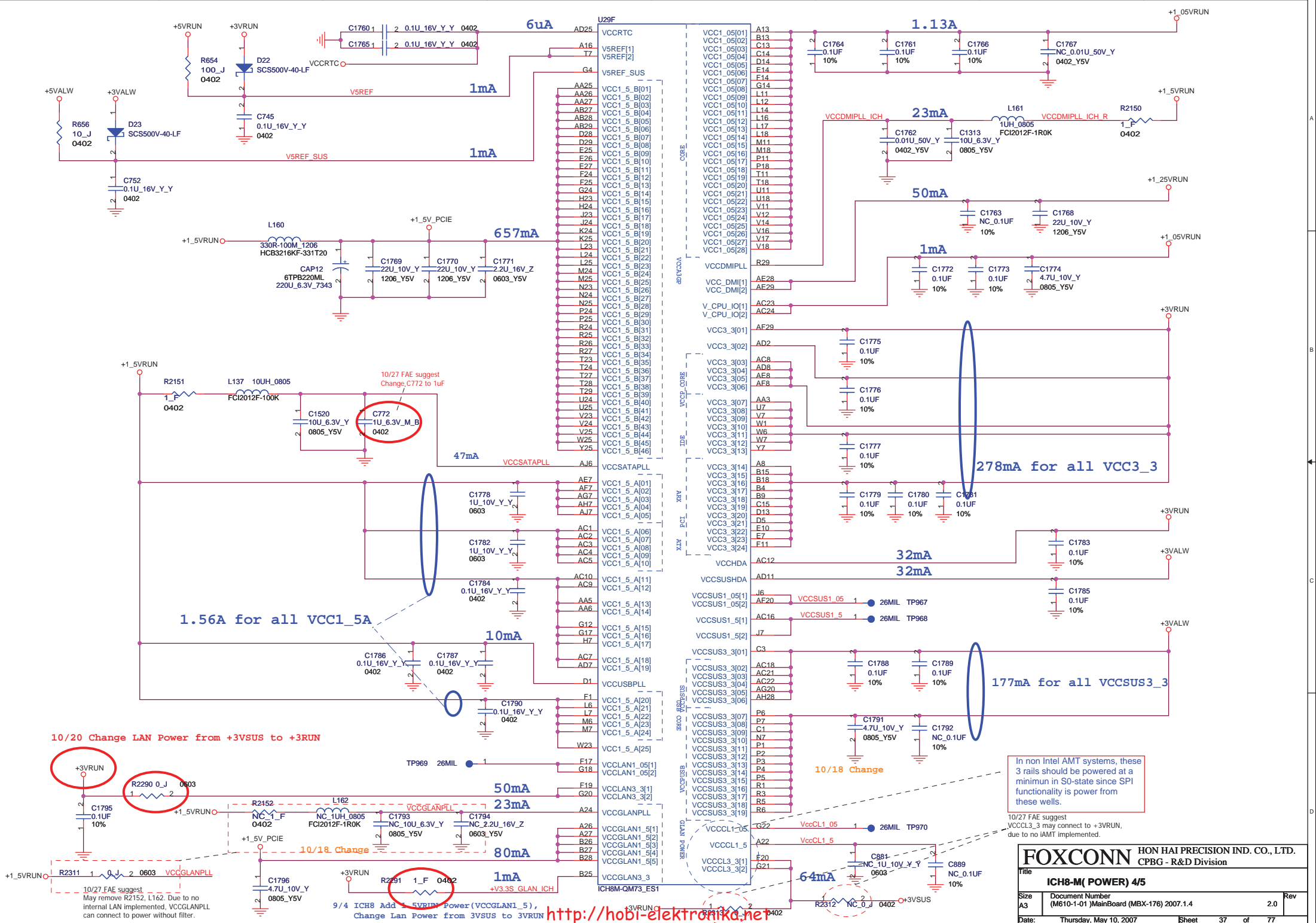
The spec CK505 CLK\_EN is high enable,  
not low enable, correct "\*" mark wrong  
on schematic, Change ICH8 pin E1  
/U18 pin 56 net name from CLK\_EN#  
to CLK\_EN



Beagle not support AMT  
9/25 Change +3VRUN to +3VAWL

<http://hobi-elektronika.net>

<b>FOXCONN</b> HON HAI PRECISION IND. CO., LTD. CPBG - R&D Division			
Title	<b>ICH8-M (GPIO) 3/5</b>		
Size	Document Number		Rev
A3	(M610-1-01) MainBoard (MBX-176) 2007.1.4		2.0
Date:	Thursday, May 10, 2007	Sheet	36 of 77

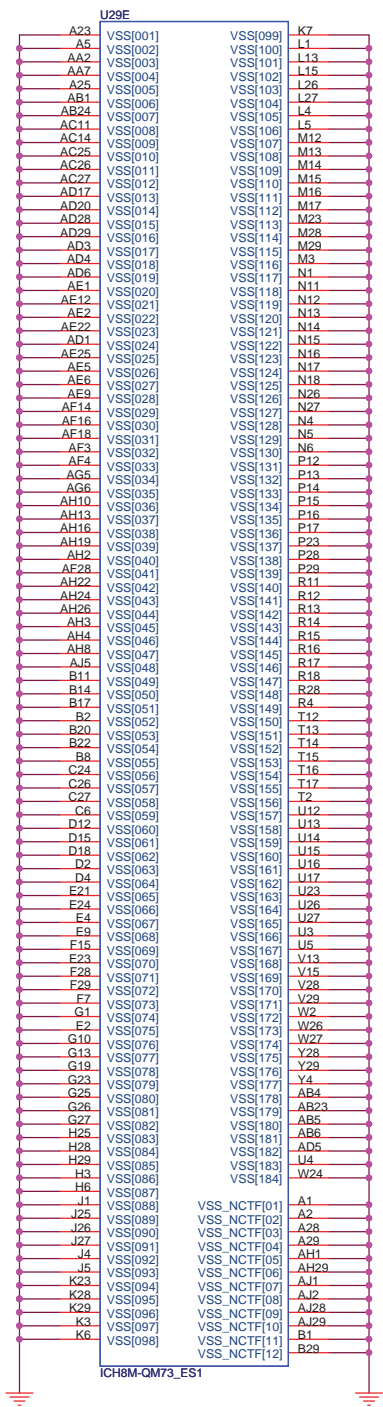


<http://hobi-elektronika.net>

In non Intel AMT systems, these 3 rails should be powered at a minimum in S0-state since SPI functionality is power from these wells.

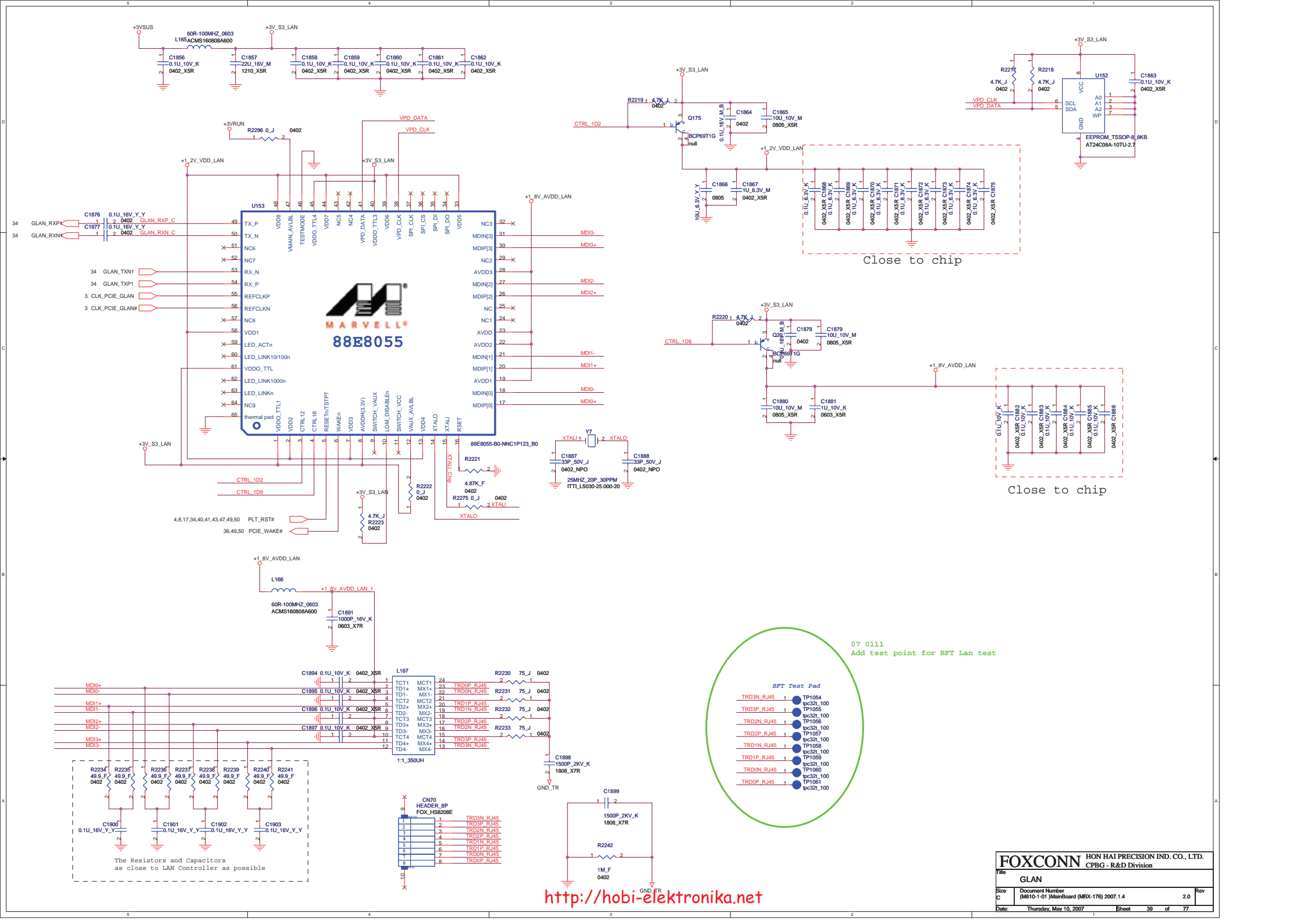
10/27 FAE suggest VCCCL3\_3 may connect to +3VRUN, due to no IAMT implemented.

<b>FOXCONN</b>		HON HAI PRECISION IND. CO., LTD. CPBG - R&D Division	
Title <b>ICH8-M (POWER) 45</b>			
Size A3	Document Number (M610-1-01) MainBoard (MBX-176) 2007.1.4	2.0	Rev
Date:	Thursday, May 10, 2007	Sheet	37 of 77



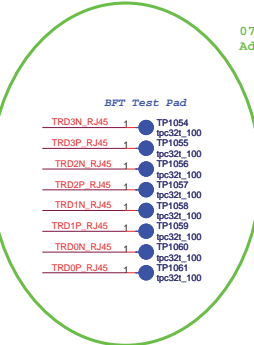
<http://hobi-elektronika.net>

<b>FOXCONN</b> HON HAI PRECISION IND. CO., LTD.		
CPBG - R&D Division		
Title		
<b>ICH8-M(GND) 5/5</b>		
Size	Document Number	Rev
	(M610-1-01)MainBoard (MBX-176) 2007.1.4	2.0
Date:	Thursday, May 10, 2007	Sheet 38 of 77



Close to chip

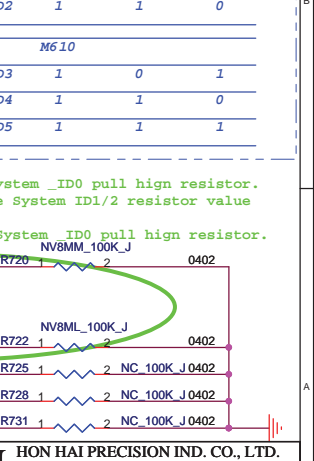
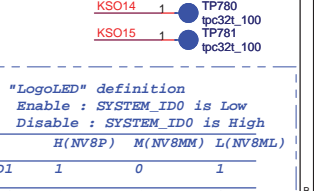
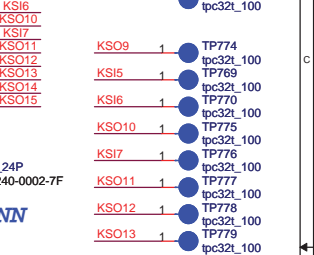
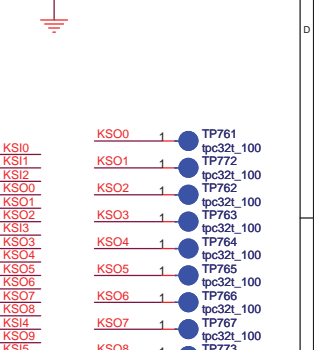
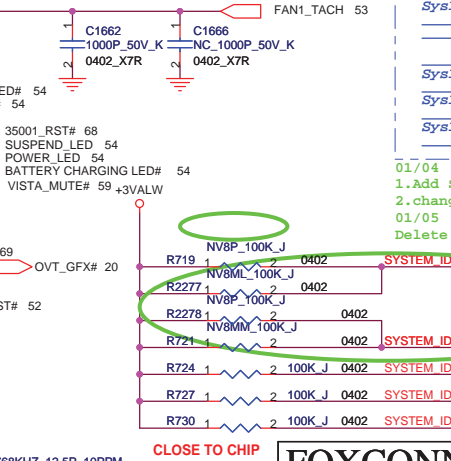
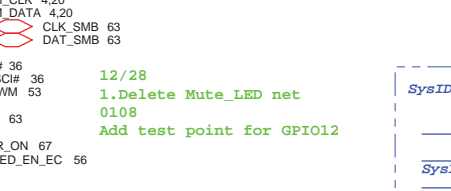
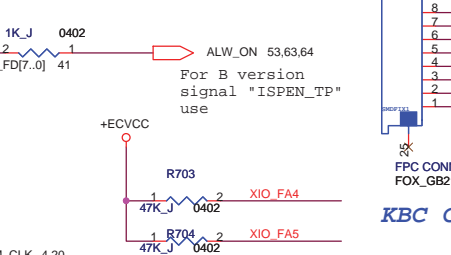
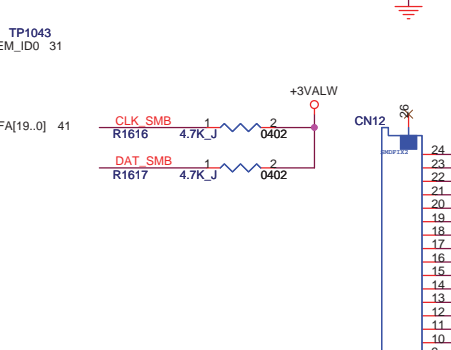
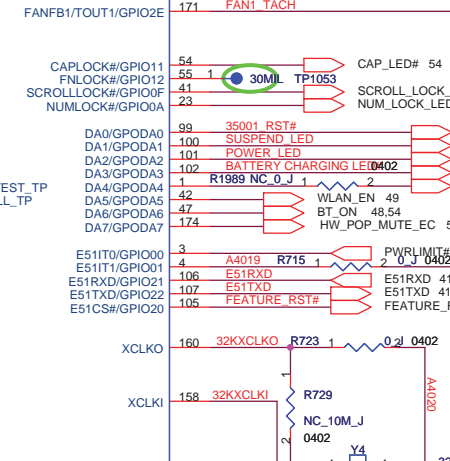
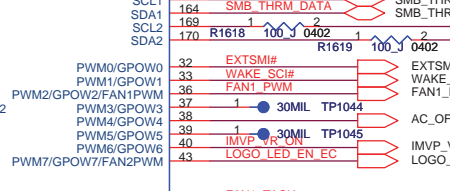
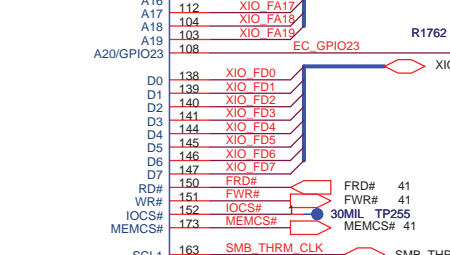
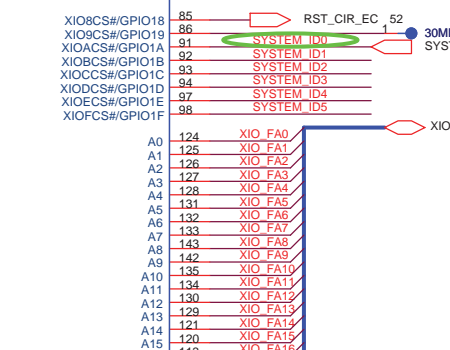
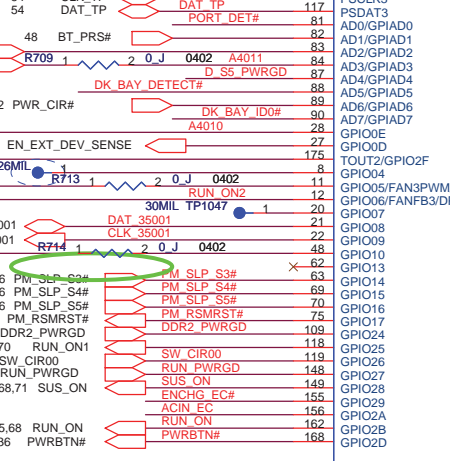
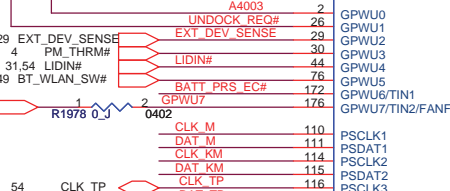
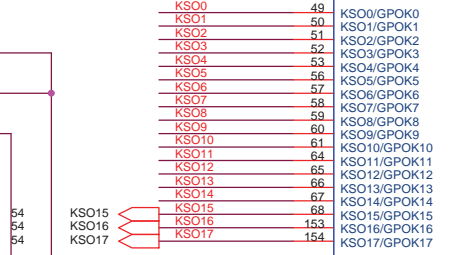
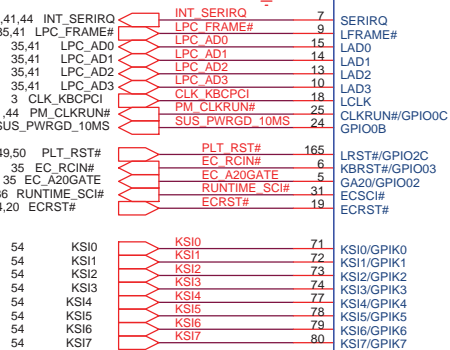
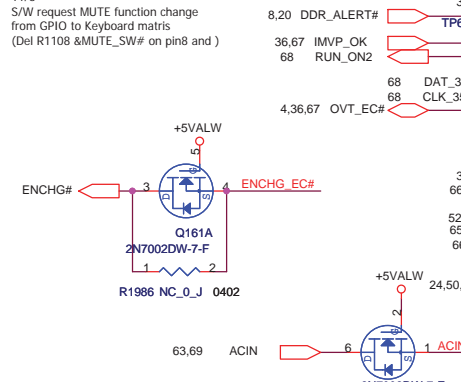
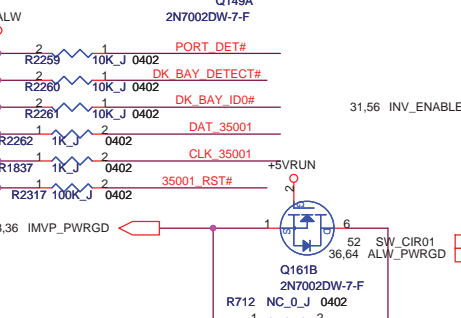
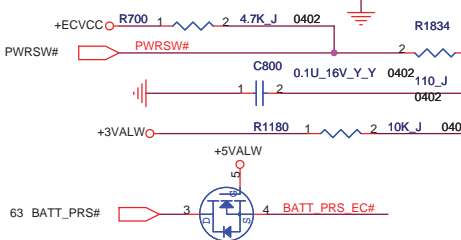
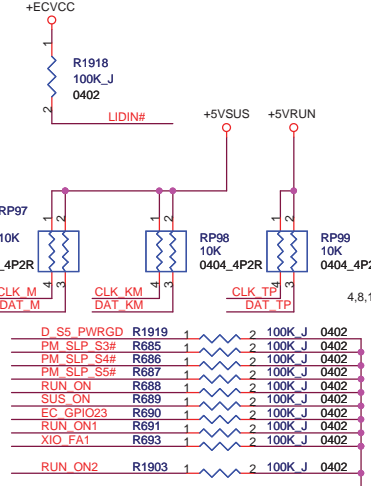
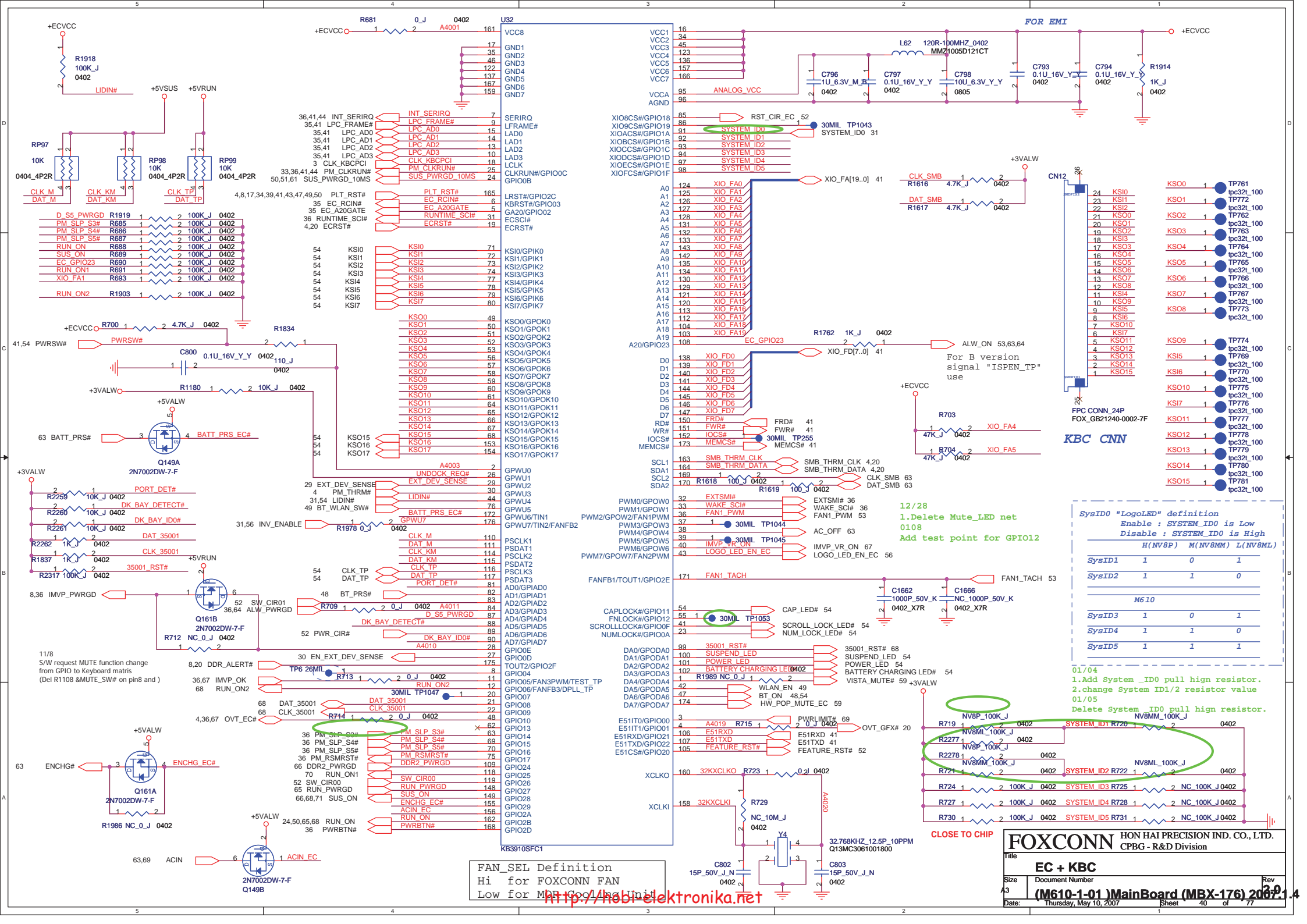
Close to chip



07 0111  
Add test point for BFT Lan test

The Resistors and Capacitors as close to LAN Controller as possible

<http://hobi-elektronika.net>



FAN\_SEL Definition  
 Hi for FOXCONN FAN  
 Low for M&P Cooling Unit  
<http://hob-elektronika.net>

SysID0 "LogoLED" definition

Enable : SYSTEM\_ID0 is Low  
 Disable : SYSTEM\_ID0 is High

	H(NV8P)	M(NV8MM)	L(NV8ML)
SysID1	1	0	1
SysID2	1	1	0
SysID3	1	0	1
SysID4	1	1	0
SysID5	1	1	1

M610

- 01/04
- 1. Add System\_ID0 pull high resistor.
- 2. change System ID1/2 resistor value
- 01/05
- Delete System\_ID0 pull high resistor.

**FOXCONN** HON HAI PRECISION IND. CO., LTD.  
 CPBG - R&D Division

Title: **EC + KBC**

Size: Document Number

Date: Thursday, May 10, 2007

Sheet 40 of 77

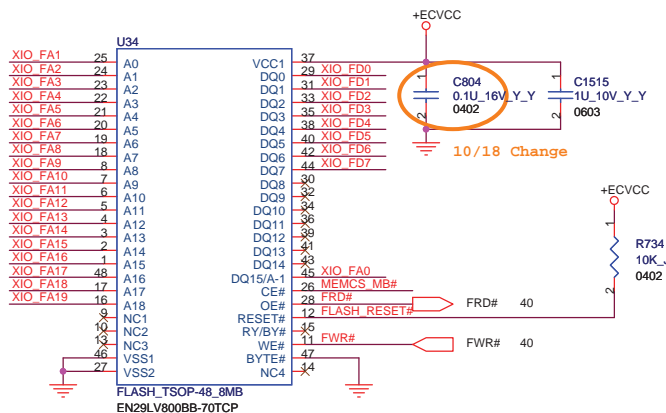
Rev: 2.1

(M610-1-01) MainBoard (MBX-176) 2007.1.4

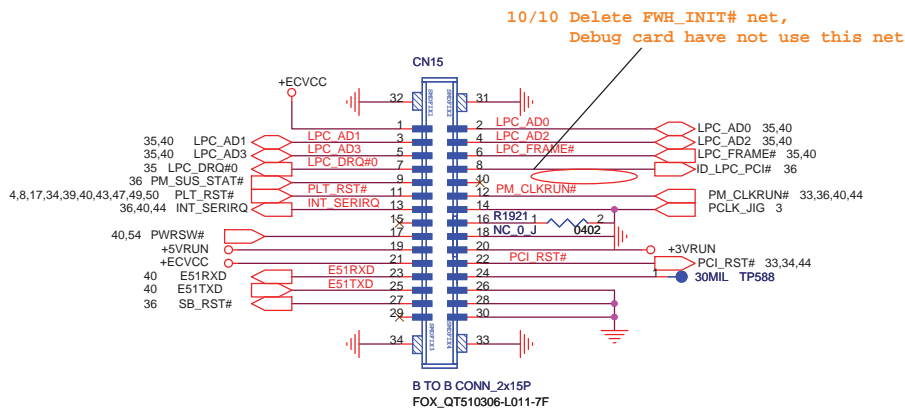


# FLASH BIOS

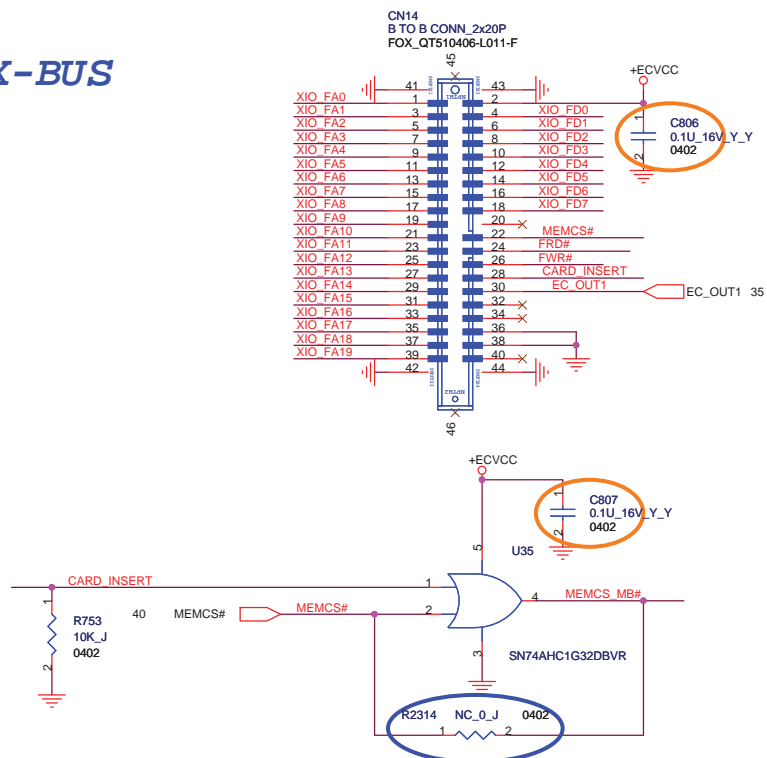
40 XIO\_FA[19..0]  
40 XIO\_FD[7..0]



# JIG-120



# X-BUS

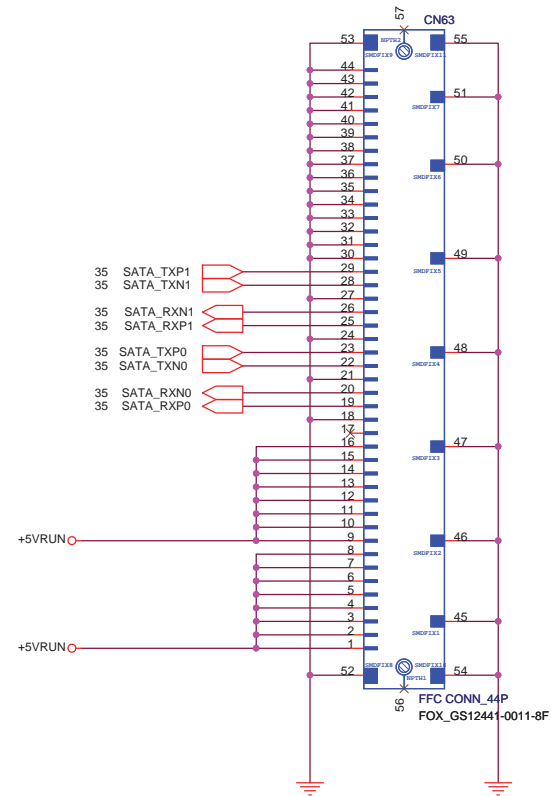
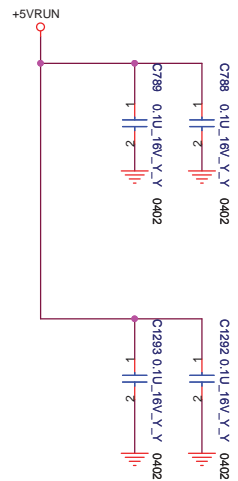


10/31  
 At M610 MP don't use X-BUS  
 CN14,U35,R753,C807 need NC  
 R2314 need stuff

FOXCONN HON HAI PRECISION IND. CO., LTD.  
 CPBG - R&D Division

Flash ROM + Jig-120 + XBUS

Size 43  
 Date: Thursday, May 10, 2007  
 Document Number  
 (M610-1-01) MainBoard (MBX-176) 2007.1.4  
 Sheet 41 of 77

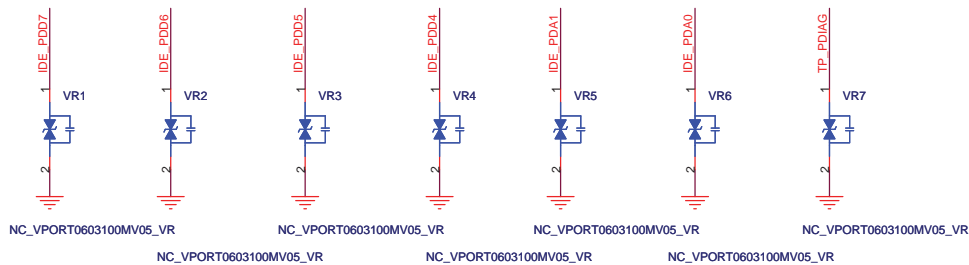
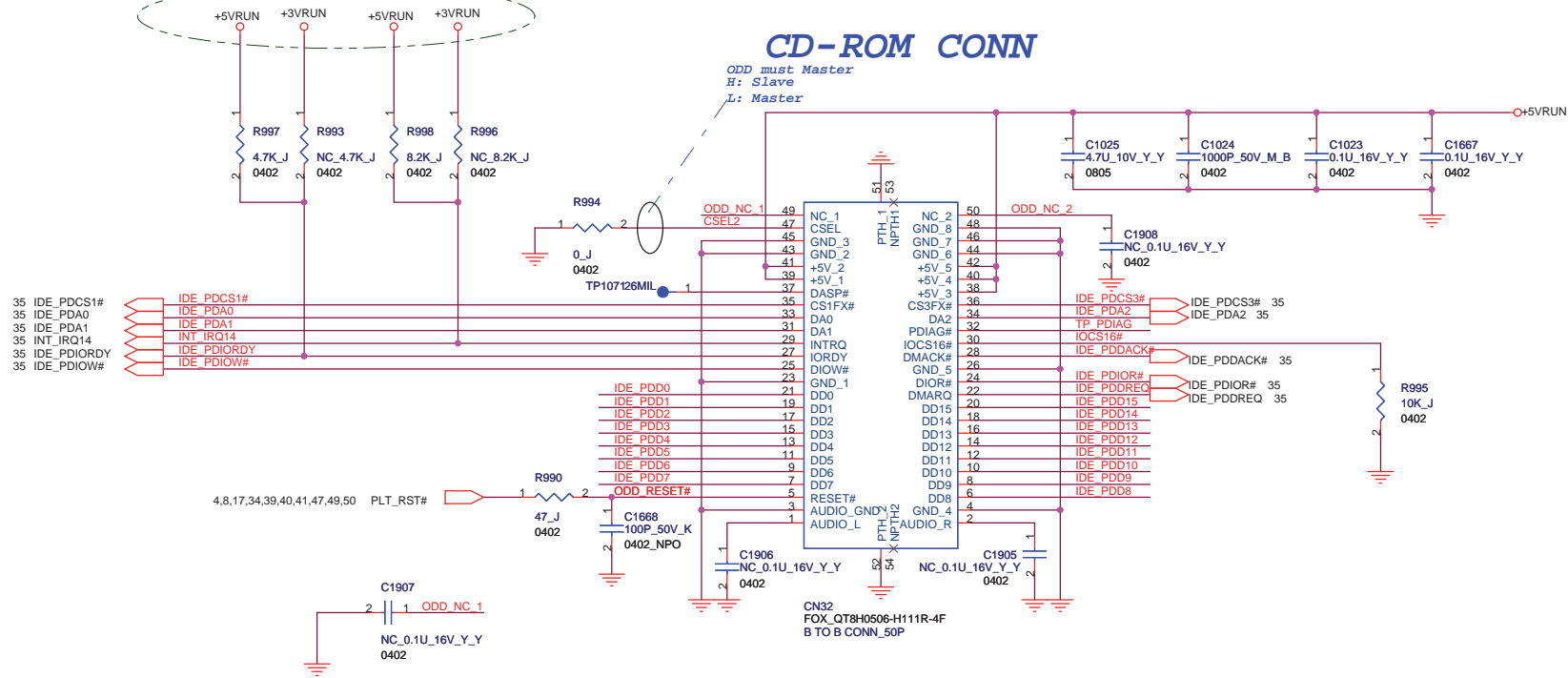


11/3  
MOR side suggest IRQ and IORDY pin  
add pull up resistance by +5VRUN  
(NC: R993 and R996)  
Refer to MS90 schematics.

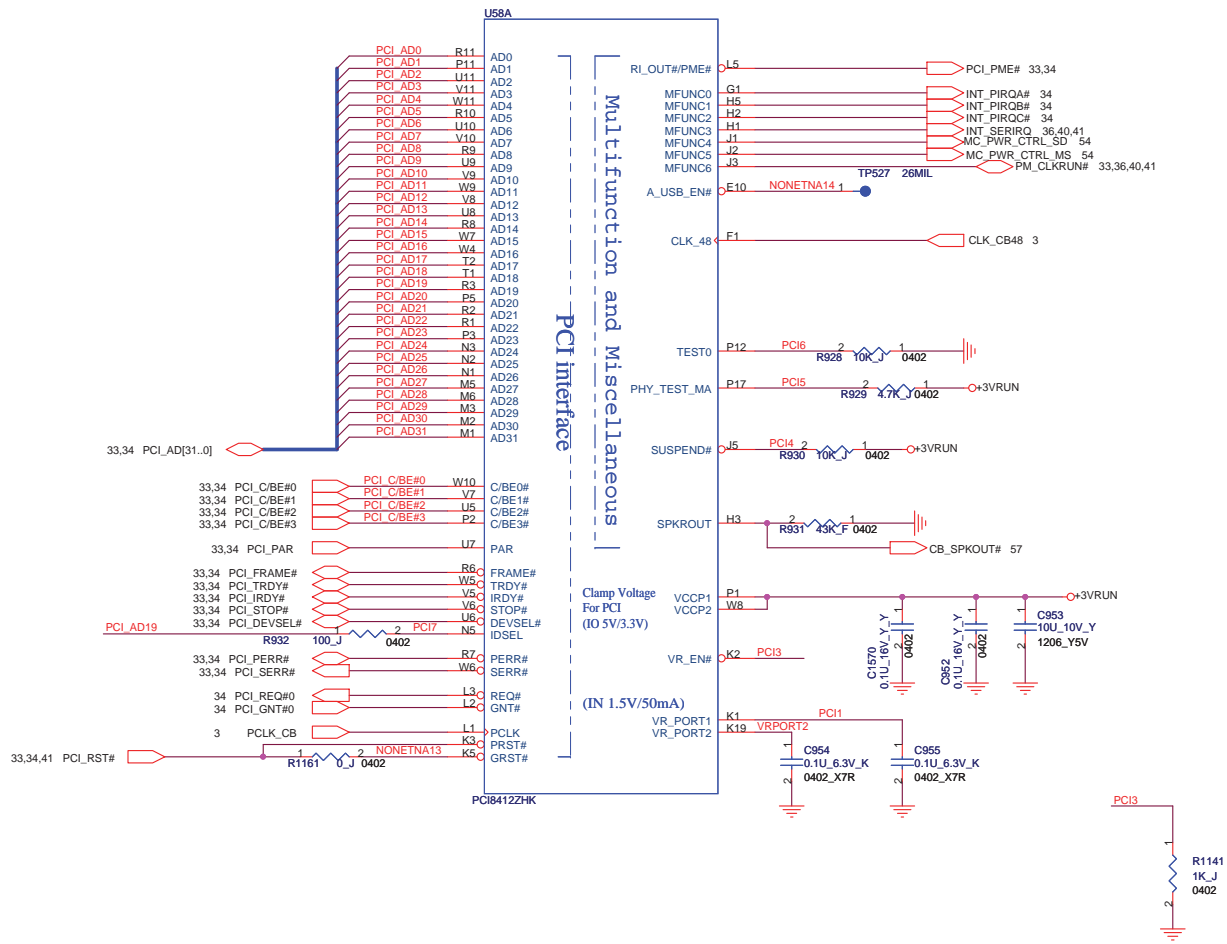
35 IDE\_PDD[0..15]  IDE\_PDD[0..15]

### CD-ROM CONN

ODD must Master  
H: Slave  
L: Master

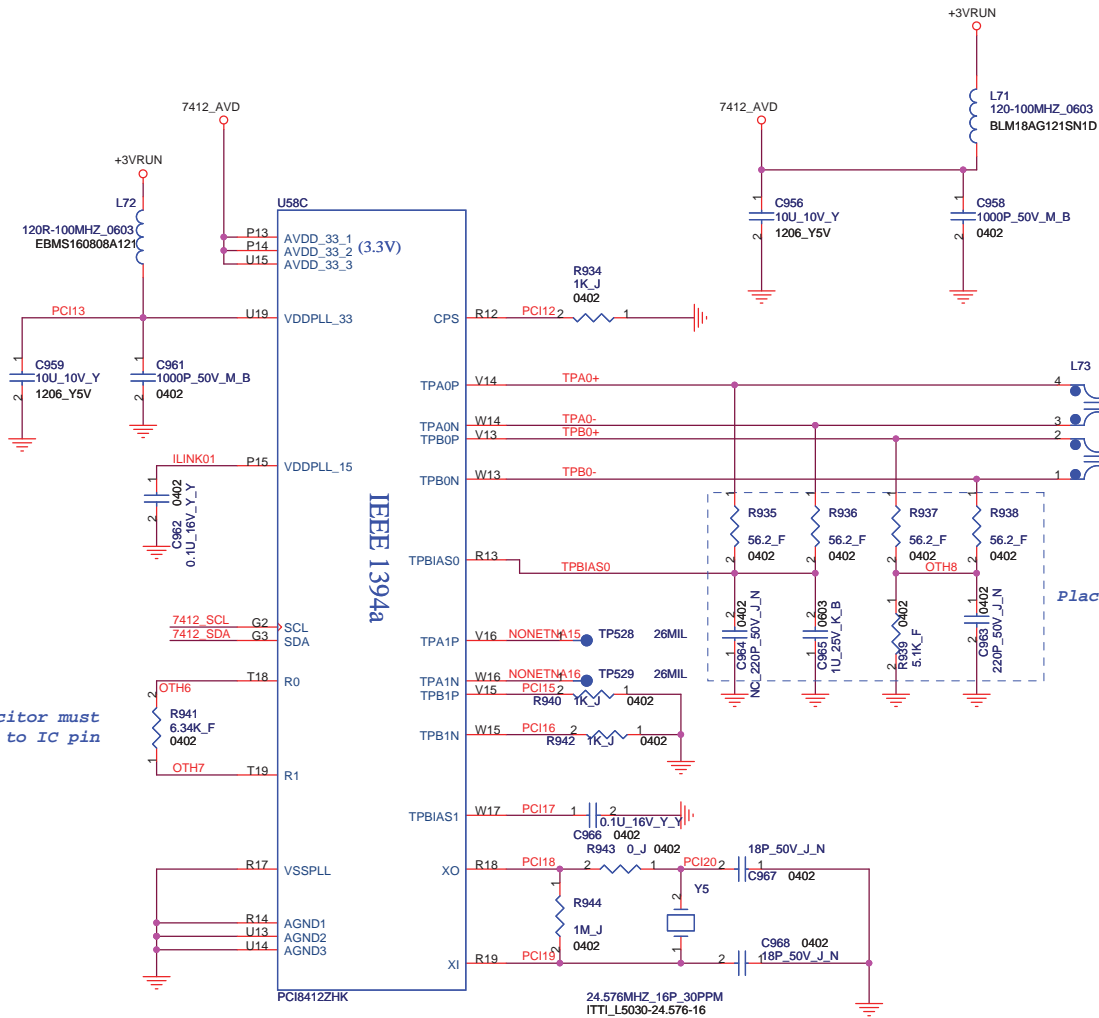


<b>FOXCONN</b> HON HAI PRECISION IND. CO., LTD. CPBG - R&D Division	
Title: <b>PATA CD-ROM</b>	
Size: A3	Document Number: (M610-1-01 )MainBoard (MBX-176) 2007.1.4
Date: Thursday, May 10, 2007	Rev: 2.0
Sheet: 43	of 77



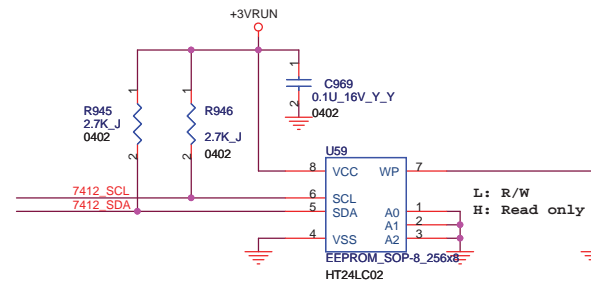
<b>FOXCONN</b> HON HAI PRECISION IND. CO., LTD.			
CPBG - R&D Division			
<b>PCI (PCI BUS)</b>			
Title	PCI (PCI BUS)		
Size	Document Number	Rev	
Custom	(M610-1-01) MainBoard (MBX-176) 2007.1.4	2.0	
Date:	Thursday, May 10, 2007	Sheet	44 of 77

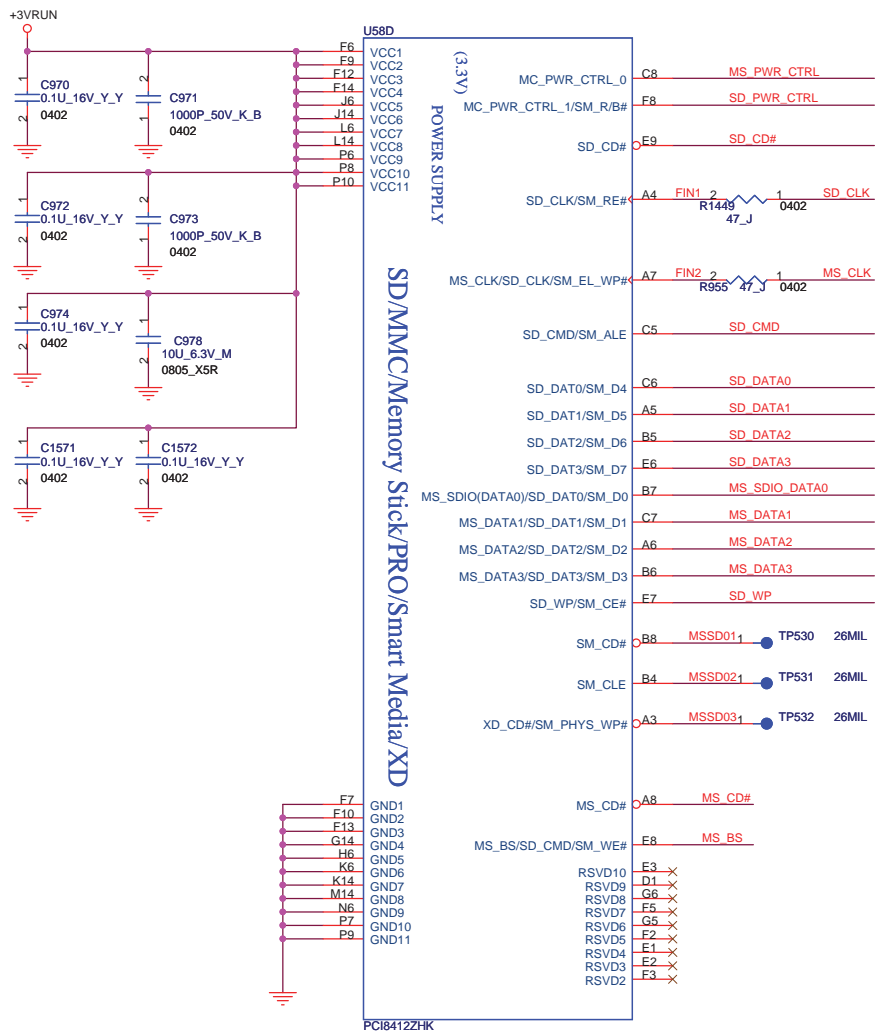
This capacitor must be placed to IC pin



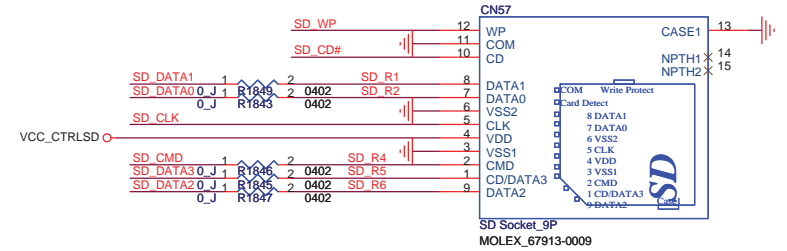
*iLink CONN.*

Place near PCI7412.

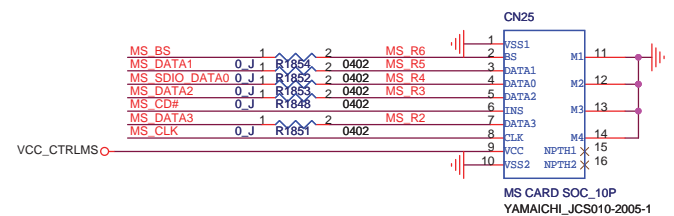




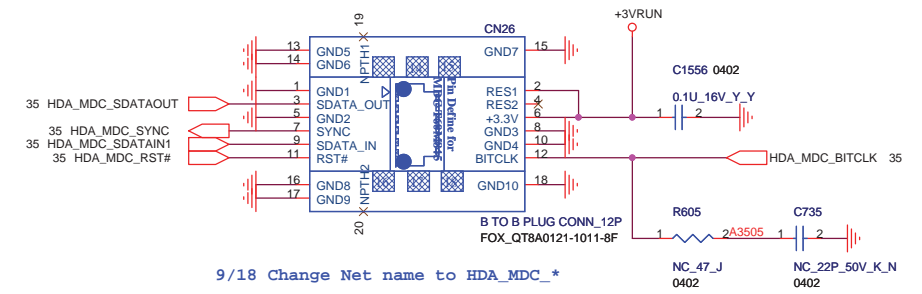
### SD CONN.



### MS STD/DUO CONN.

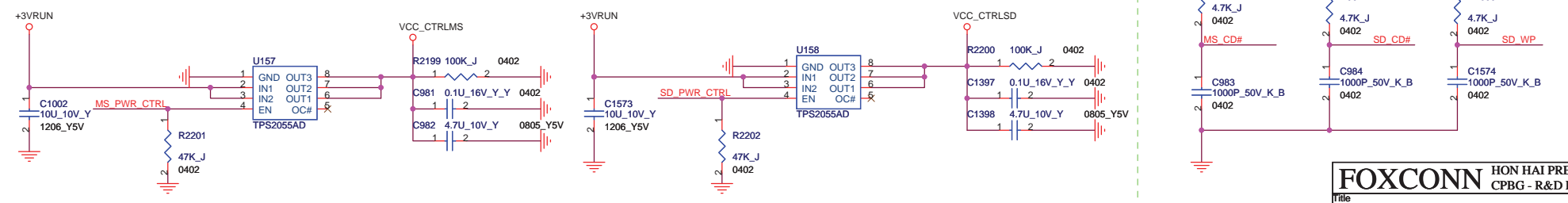


### MDC CONN.



9/18 Change Net name to HDA\_MDC\_\*

02/12/07 PVT Change MS Power switch to TPS2055



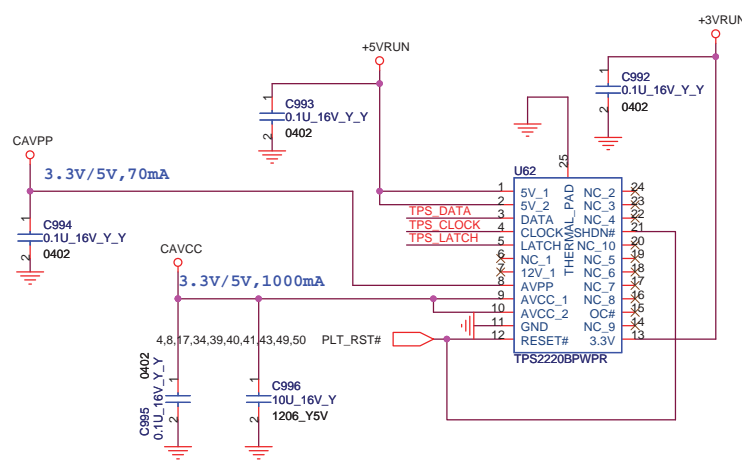
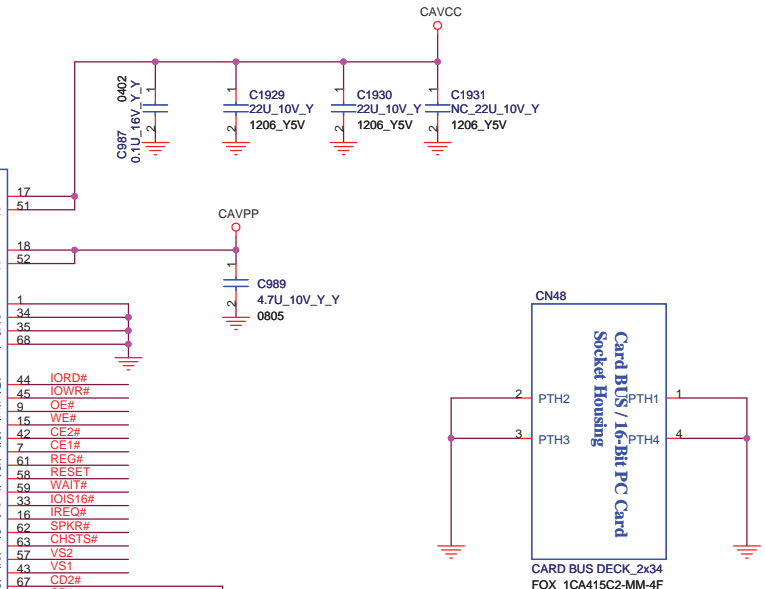
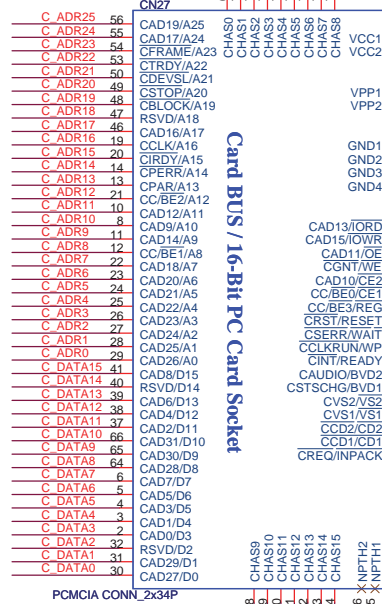
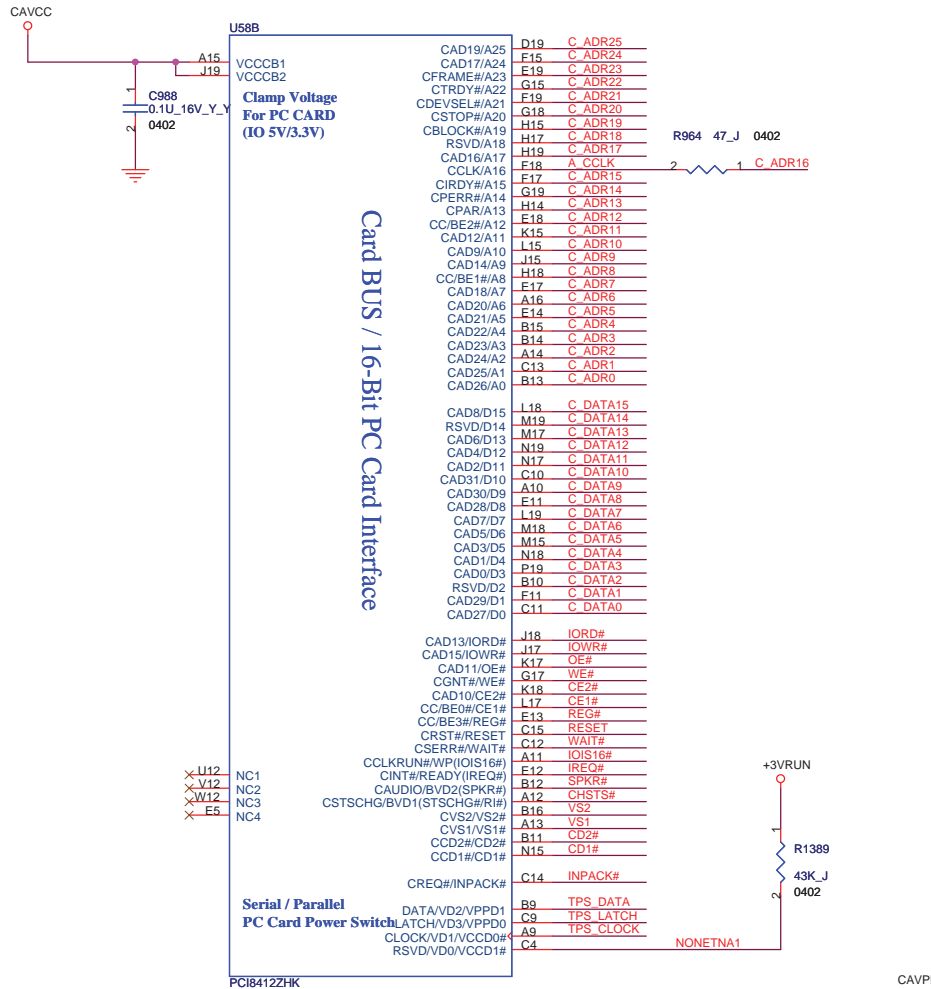
**FOXCONN** HON HAI PRECISION IND. CO., LTD.  
CPBG - R&D Division

Title: **PCI (MS-DUO/MDC)**

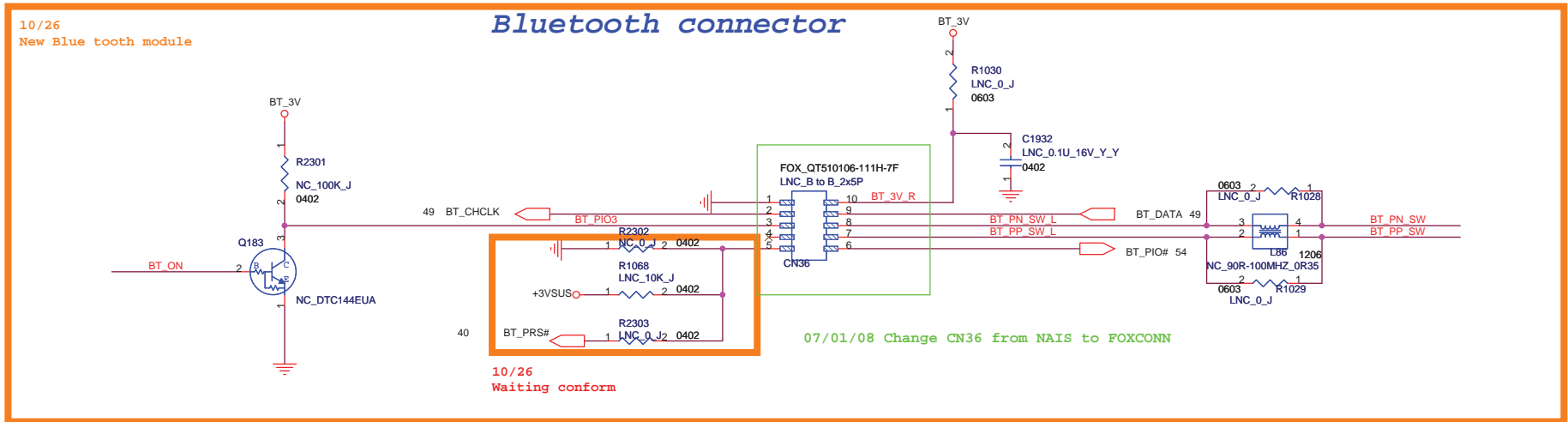
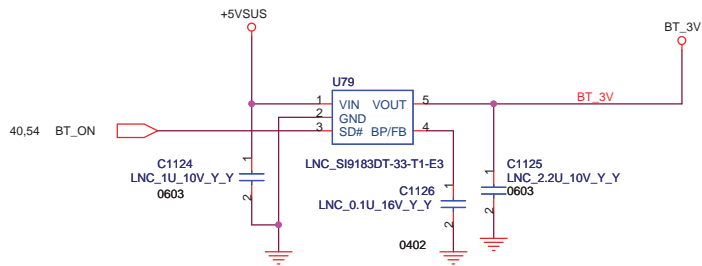
Size A3 Document Number (M610-1-01 )MainBoard (MBX-176) 2007.1.4 2.0 Rev

Date: Thursday, May 10, 2007 Sheet 46 of 77

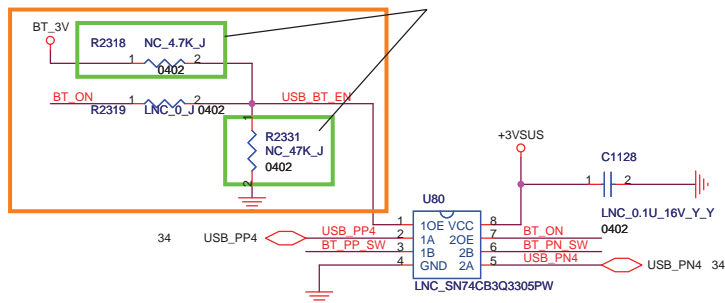
# PCMCIA CONN.



<b>FOXCONN</b>		HON HAI PRECISION IND. CO., LTD.	
		CPBG - R&D Division	
File	<b>PCI ( PCMCIA )</b>		
Size	Document Number		Rev
A3	(M610-1-01 )MainBoard (MBX-176) 2007.1.4		2.0
Date:	Thursday, May 10, 2007	Sheet	47 of 77



- 11/04 Change U80 Enable from BT\_ON to BT\_3V
- U79 LDO Ton Max is 1000us
- U80 BUS Switch Ton Max is 5ns
- 12/27 Change Bluetooth circuit Value to LNC\_\* for M610 DVT I SKU
- 12/14 Change R2318 from 1K to 4.7K, Add one 47K pull up resistance



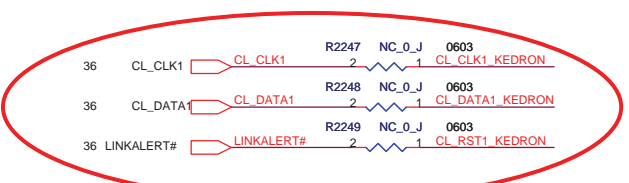
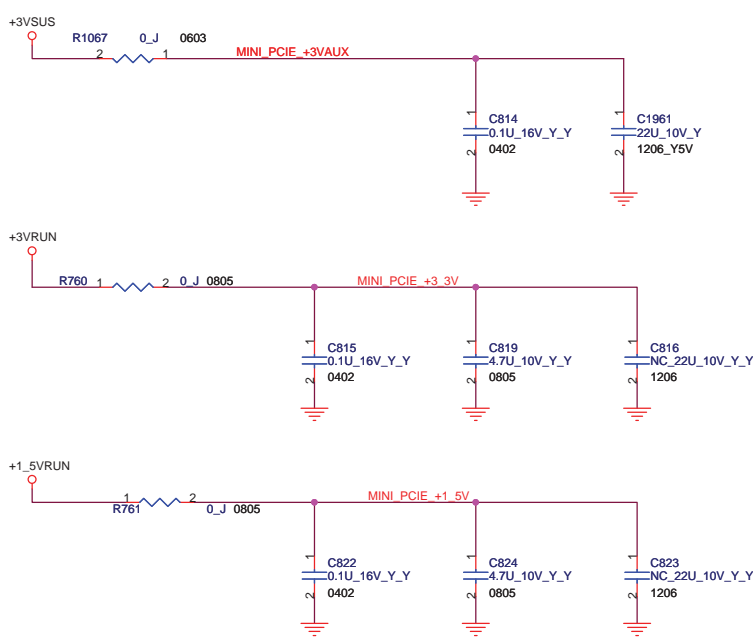
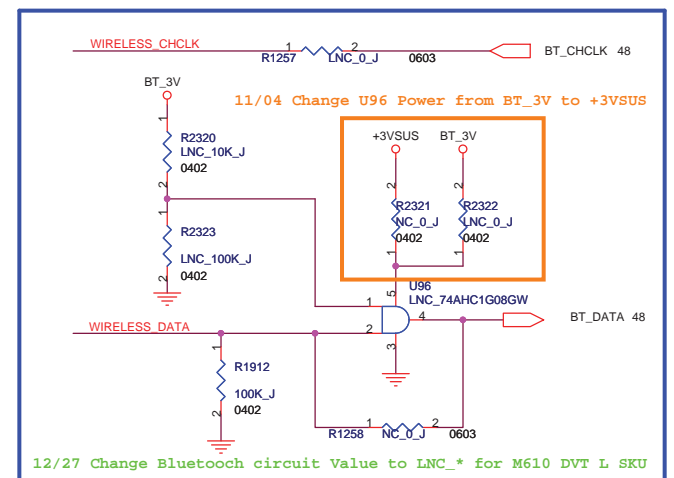
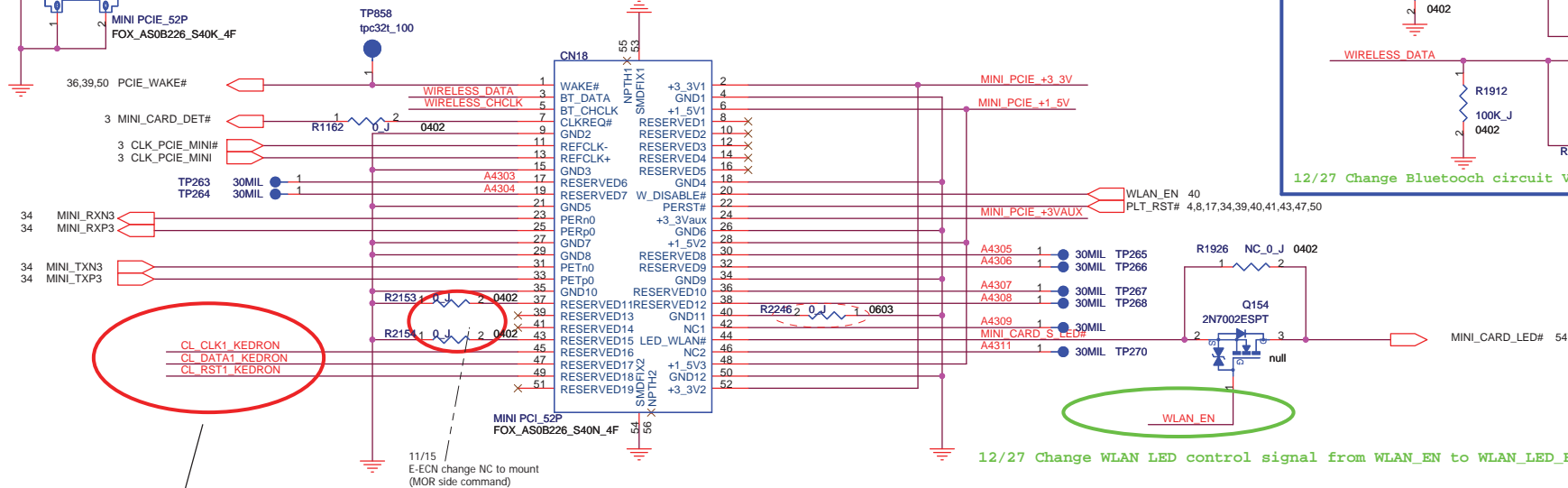
To solve U80 enable pin (net name USB\_BT\_EN) floating during U79 (BT\_3V from LDO) BT\_ON disable, Add Pull low 47K(R2331) at net USB\_BT\_EN, Change R2318 from 10K to 1K.

<b>FOXCONN</b> HON HAI PRECISION IND. CO., LTD.	
CPBG - R&D Division	
Title: <b>FAN/Bluetooth</b>	
Size A3	Document Number (M610-1-01) MainBoard (MBX-176) 2007.1.4
Date: Thursday, May 10, 2007	Sheet 48 of 77



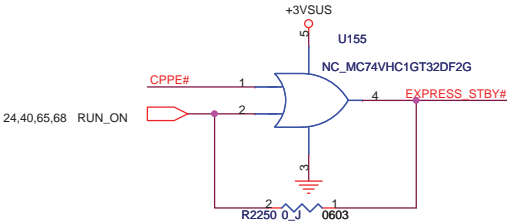
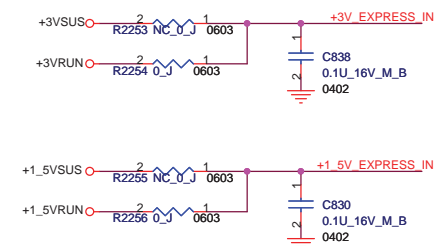
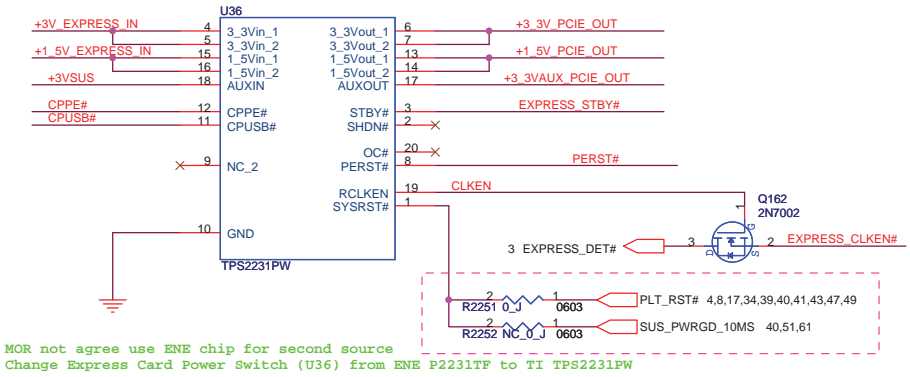


## Mini-PCIE Card connector

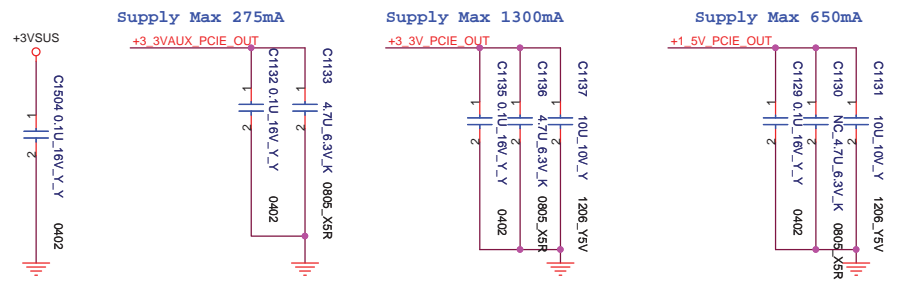
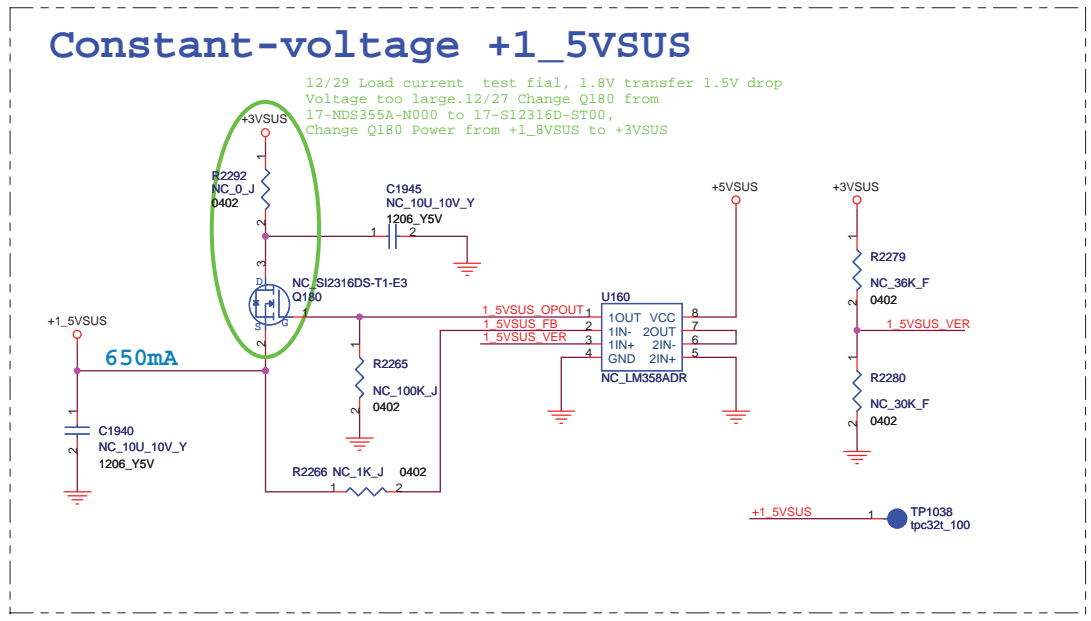
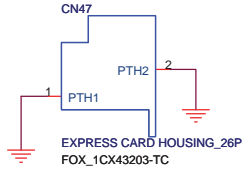
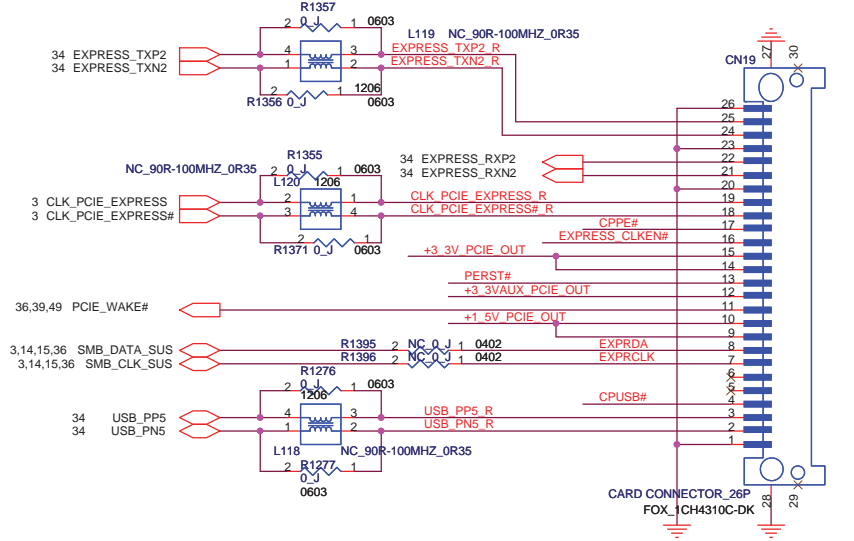


<b>FOXCONN</b> HON HAI PRECISION IND. CO., LTD. CPBG - R&D Division			
File: <b>Mini-PCIE Card</b>			
Size: A3	Document Number: (M610-1-01) MainBoard (MBX-176) 2007.1.4	Rev: 2.0	
Date: Thursday, May 10, 2007	Sheet: 49	of: 77	

VOLTAGE INPUTS <sup>(1)</sup>						LOGIC INPUTS			VOLTAGE OUTPUTS <sup>(2)</sup>			MODE <sup>(3)</sup>
AUXIN	3.3VIN	1.5VIN	SHDN	STBY	CP <sup>(4)</sup>	AUXOUT	3.3VOUT	1.5VOUT				
Off	x	x	x	x	x	Off	Off	Off	Off	Off	Off	OFF
On	x	x	0	x	x	GND	GND	GND	GND	Off	Off	Shutdown
On	x	x	1	x	1	GND	GND	GND	GND	Off	Off	No Card
On	On	On	1	0	0	On	Off	Off	Off	Off	Off	Standby
On	On	On	1	1	0	On	On	On	On	On	On	Card Inserted

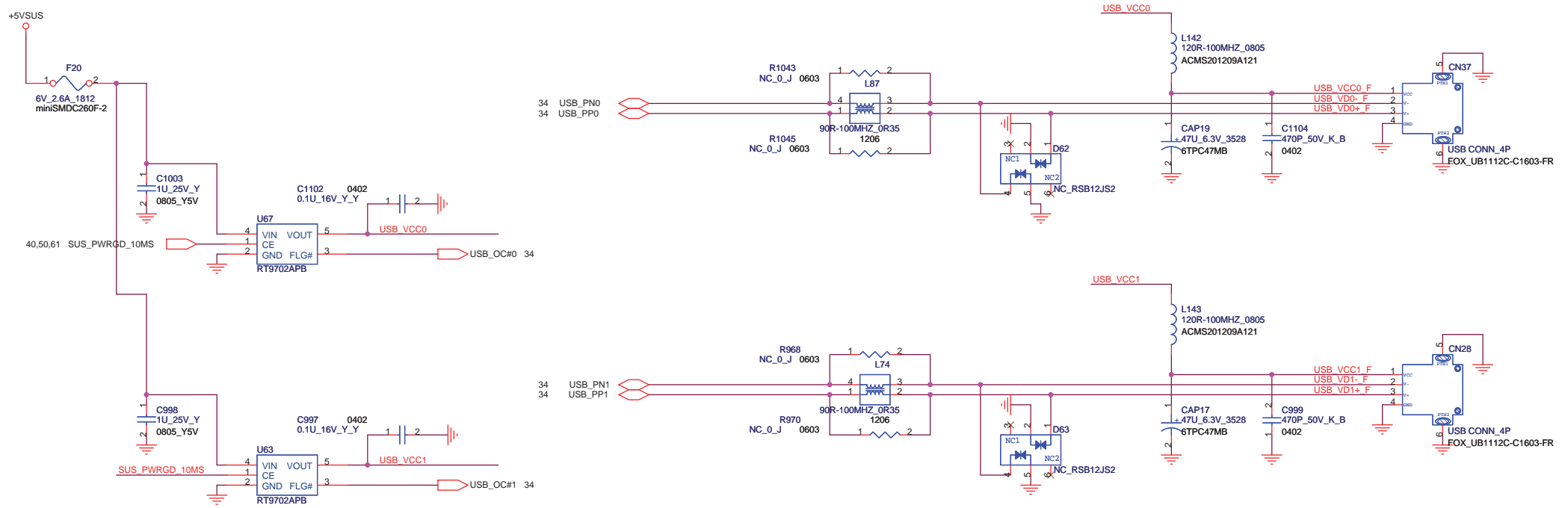


# EXPRESS Card



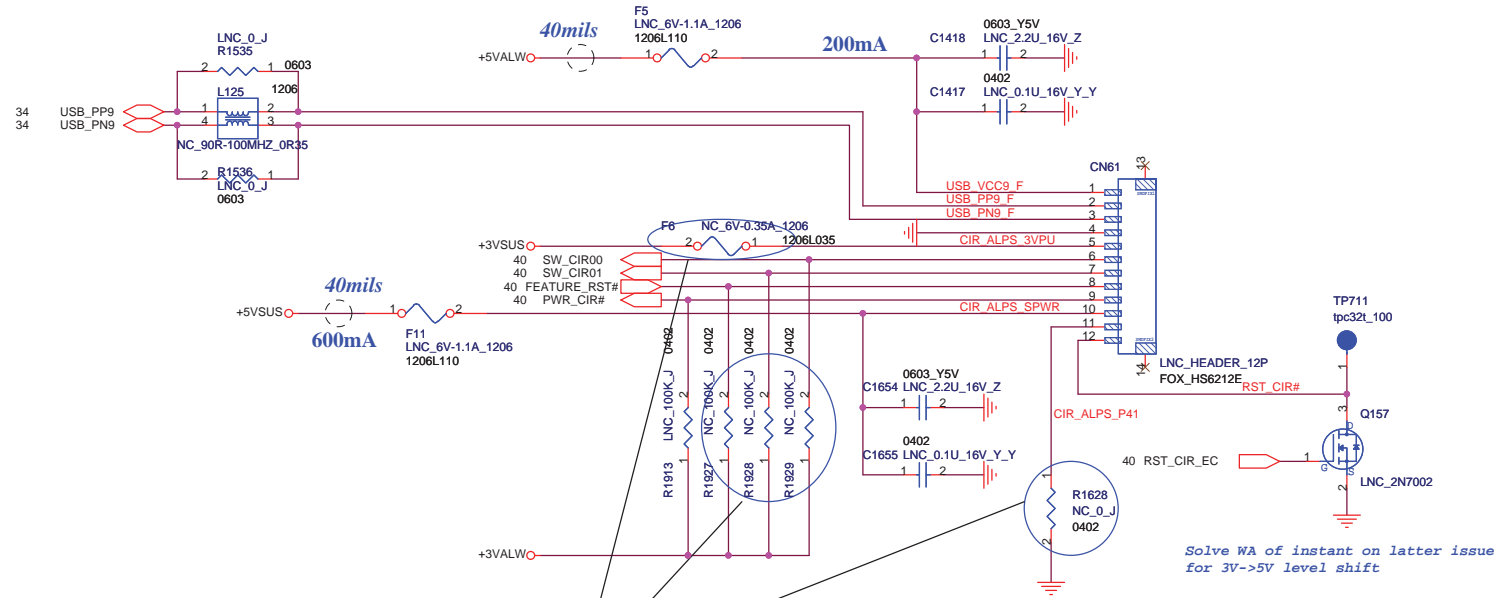
<b>FOXCONN</b>		HON HAI PRECISION IND. CO., LTD.	
		CPBG - R&D Division	
File	<b>EXPRESS CARD</b>		
Size	Document Number		Rev
A3	(M610-1-01) MainBoard (MBX-176) 2007.1.4		2.0
Date:	Thursday, May 10, 2007	Sheet	50 of 77

# USB connector #2



<b>FOXCONN</b> HON HAI PRECISION IND. CO., LTD. CPBG - R&D Division		
File: <b>USB2.0/DOCKING CONN.</b>		
Size: A3	Document Number: (M610-1-01) MainBoard (MBX-176) 2007.1.4	Rev: 2.0
Date: Thursday, May 10, 2007	Sheet: 51	of 77

# IR Receiver connector



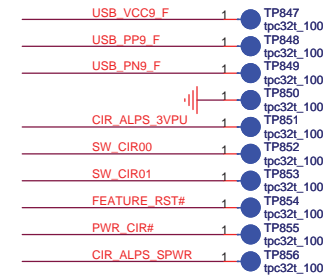
Button		SW1	SW0
VAIO button	Kick Instant On	L	L
Green button	Kick Windows	L	H
Shortcut button	Kick Windows	H	L
Standby button	Kick Windows	H	H

Num	Signal Name	I/O	Comment	Difference from ALPS.
1	+5VALW	VCC		<-
2	USB+	I/O		<-
3	USB-	I/O		<-
4	GND	GND		<-
5	+3VSUS	-	Not for use. Because SMK's IC use internal pull up resistor for D-	ALPS's IC use this signal as a pull up plane of D- for low speed detection.
6	SW0	O	Use for detecting of the remote button. 3.3V CMOS output.	3.3V open drain output.
7	SW1	O	Use for detecting of the remote button. 3.3V CMOS output.	3.3V open drain output.
8	FEATURE_RST#	I	Software reset signal. (3.3V internal pull up resistor.)	Use for detecting of the remote button. 3.3V open drain output.
9	PWR#	O	Power on request signal. Open drain output.	<-
10	SPWR	I	Power OK signal. 5V input.	<-
11	EN	-	Not for use.	Low: Disable instant on feature Open or High: Enable instant on feature (3.3V internal pull up resistor.)
12	hardRST#	I	Hardware reset.	<-

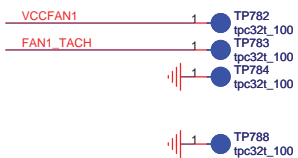
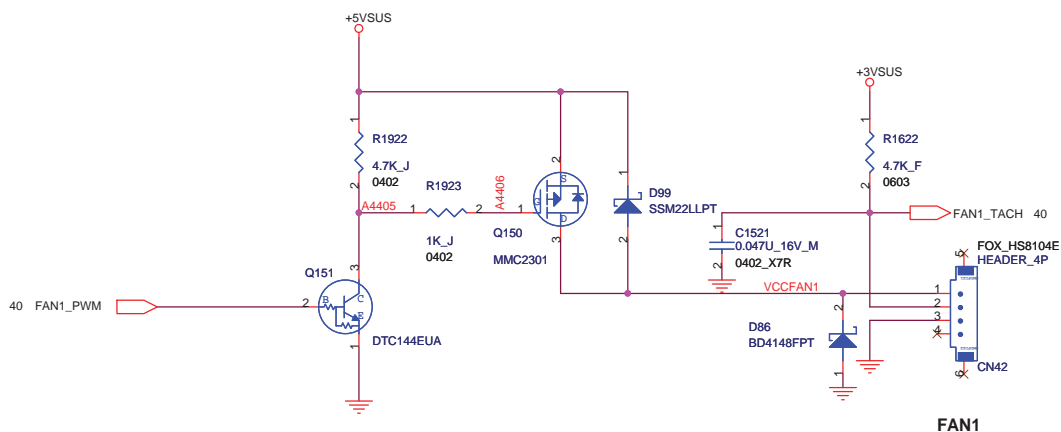
9/26 FOR NEW SMK IR module compatiy  
 1.Change stuff to NC:F6,R1927,R1928,R1929,  
 2.EC Page GPIO20(105),GPIAD2(83) pin swape

12/27 Change CIR circuit Value to LNC\_\* for M610 DVT L SKU

At Only USB Internal CIR, it's USB Power

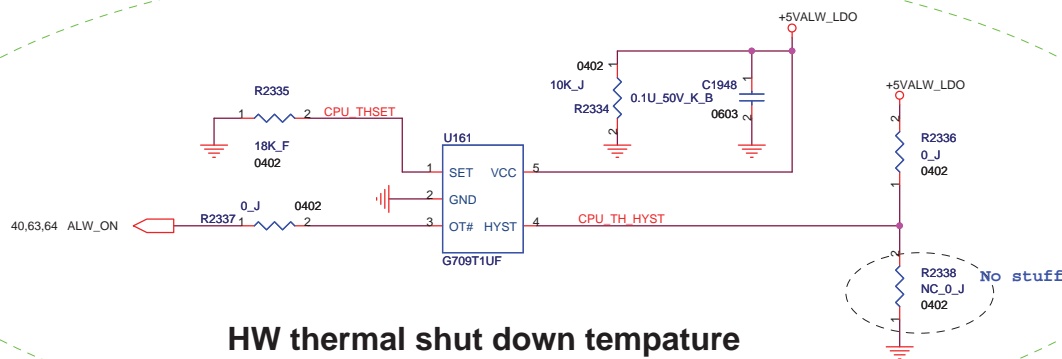


# FAN circuit



# HW THERMAL PROTECTION

07/01/09 Change HW THERMAL PROTECTION circuit to stuff



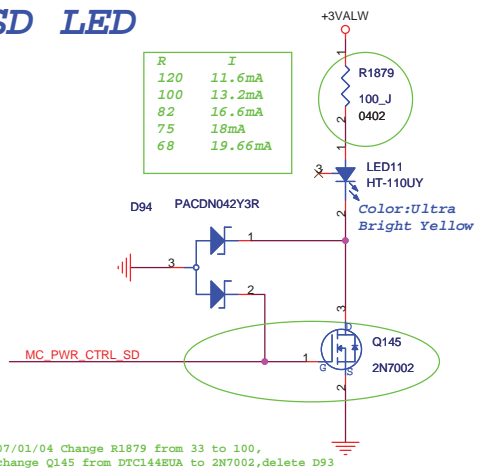
HW thermal shut down temperature setting 95 degree . Put Near CPU .

Base on MOR side request to add HW thermal protection circuit

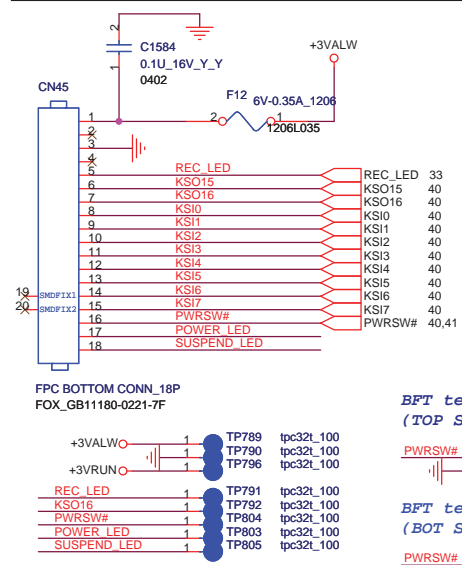
<http://hobi-elektronika.net>

<b>FOXCONN</b>		HON HAI PRECISION IND. CO., LTD.	
		CPBG - R&D Division	
Title			
<b>FAN / HW THERMAL PROTECTION</b>			
Size	Document Number		Rev
43	<b>(M610-1-01) MainBoard (MBX-176) 2007</b>		<b>4.0</b>
Date:	Thursday, May 10, 2007	Sheet	53 of 77

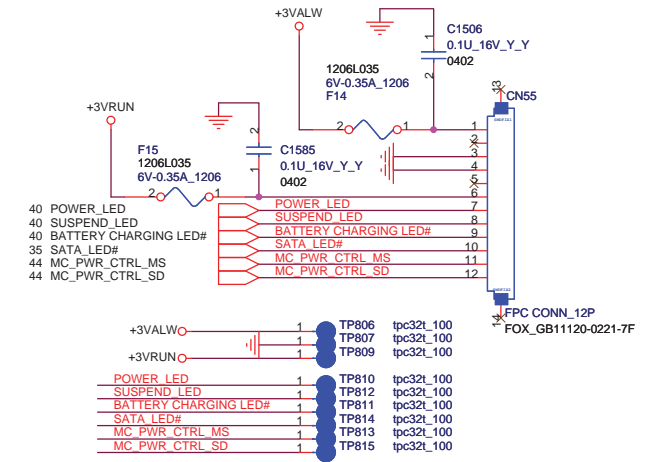
# SD LED



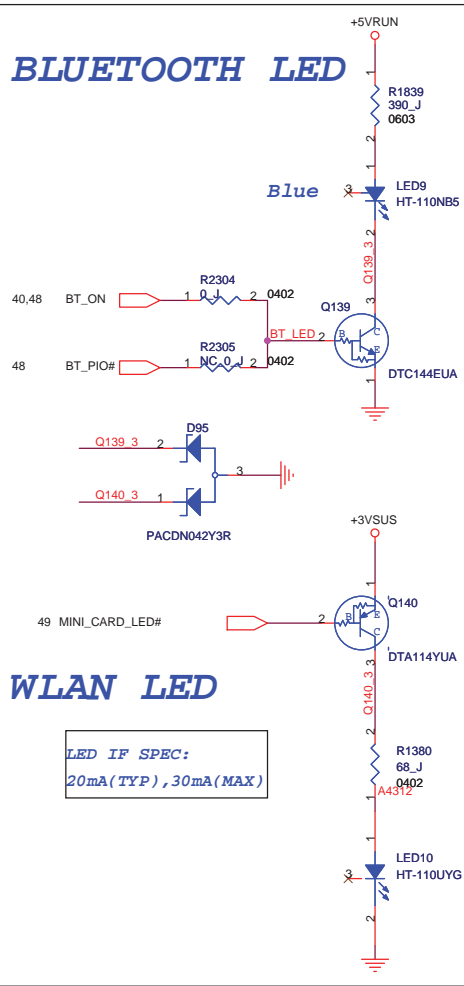
# To Power Button Board Connector



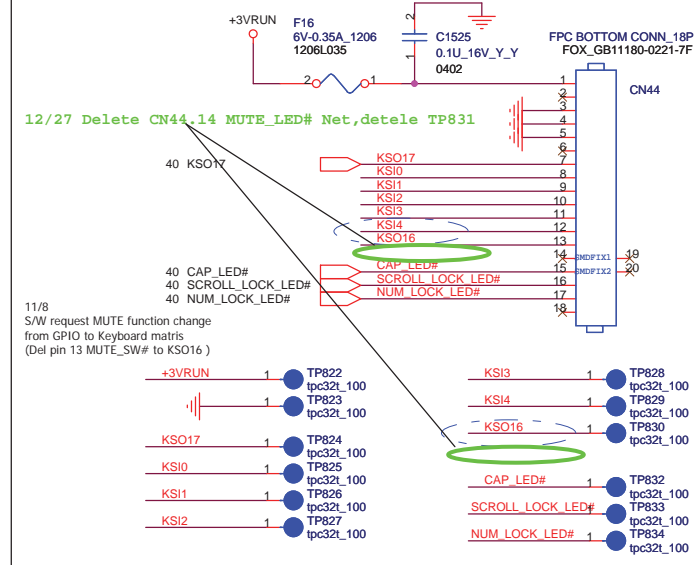
# To LED Board Connector



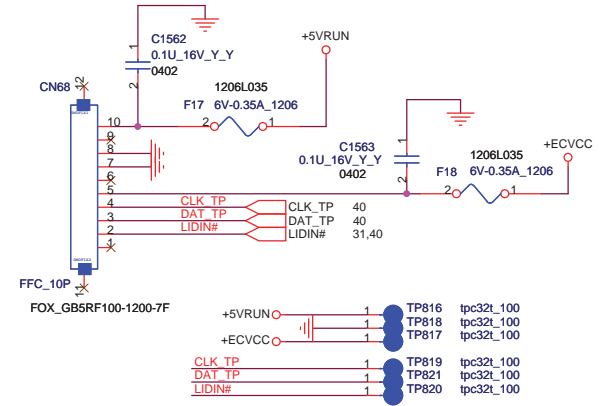
# BLUETOOTH LED



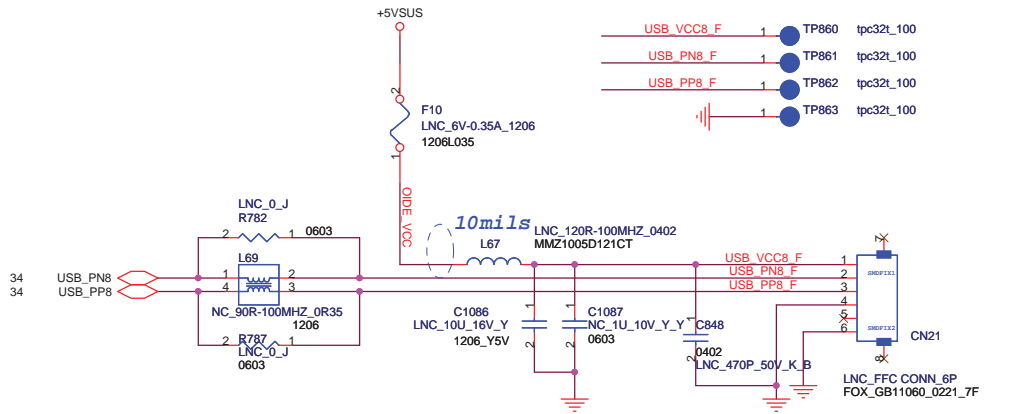
# To AV Function Board Connector



# To Touch Pad Board Connector



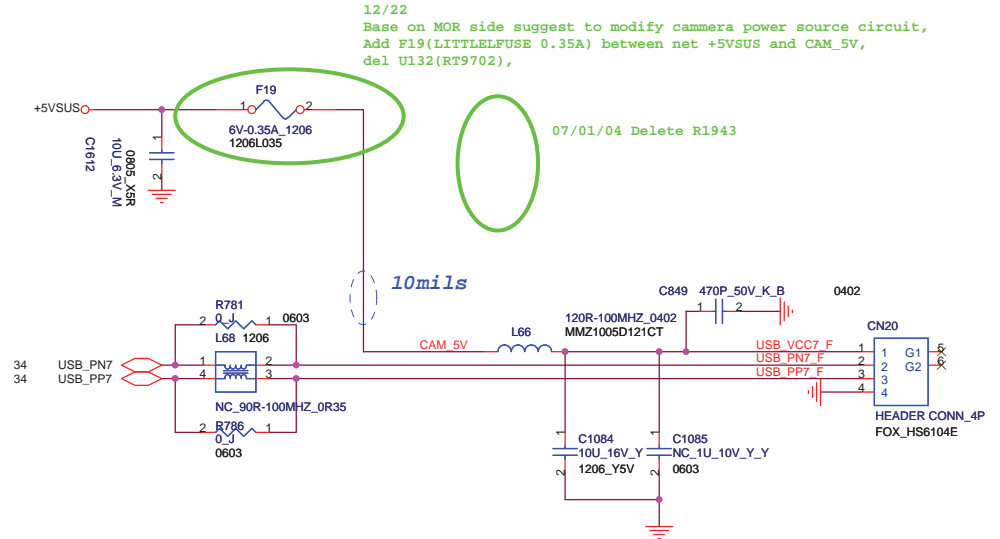
# OIDE Connector



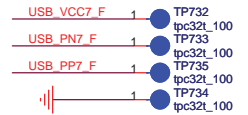
2006.1.4pin swape for ME request

12/27 Change Felica circuit Value to LNC\_\* for M610 DVT L SKU

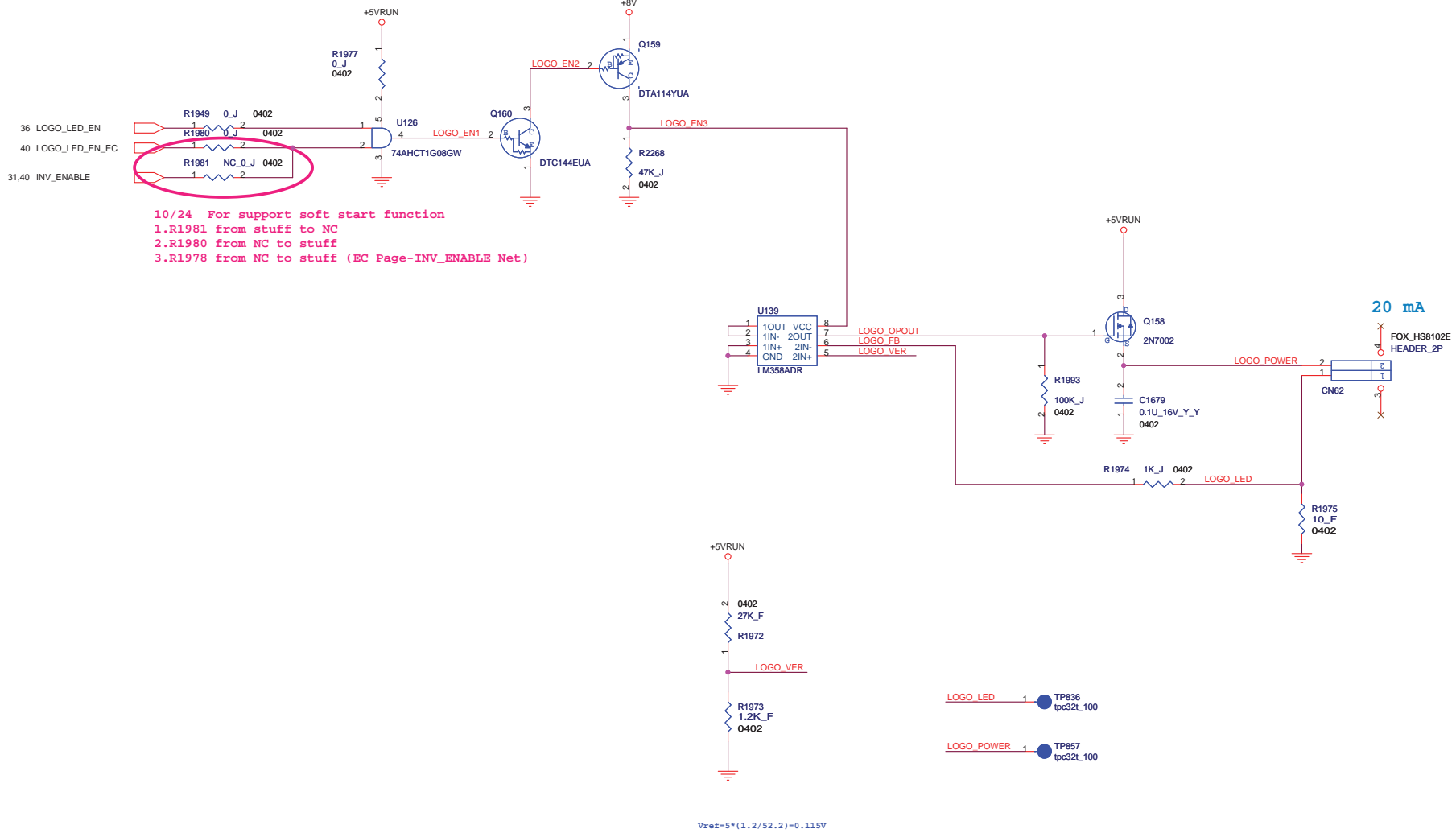
# CAMERA Connector



12/21 BFT Test Pad

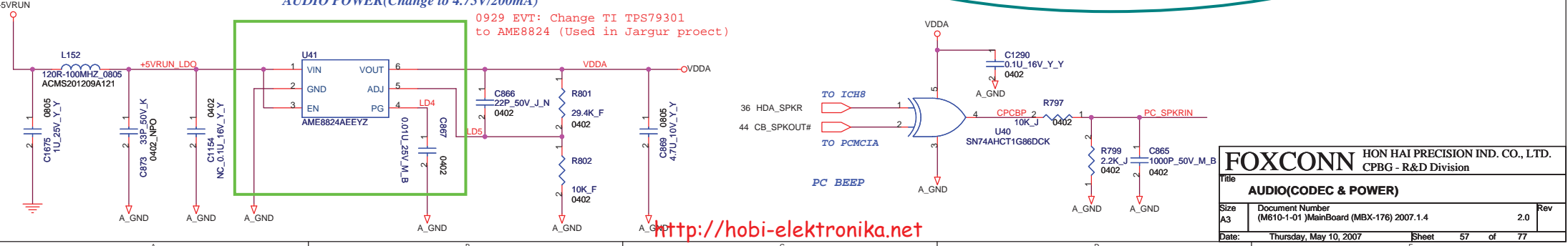
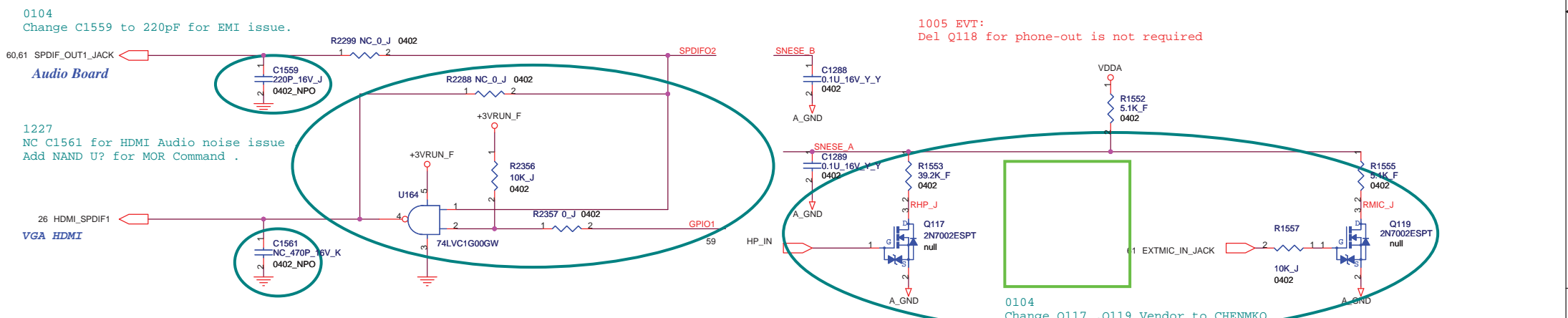
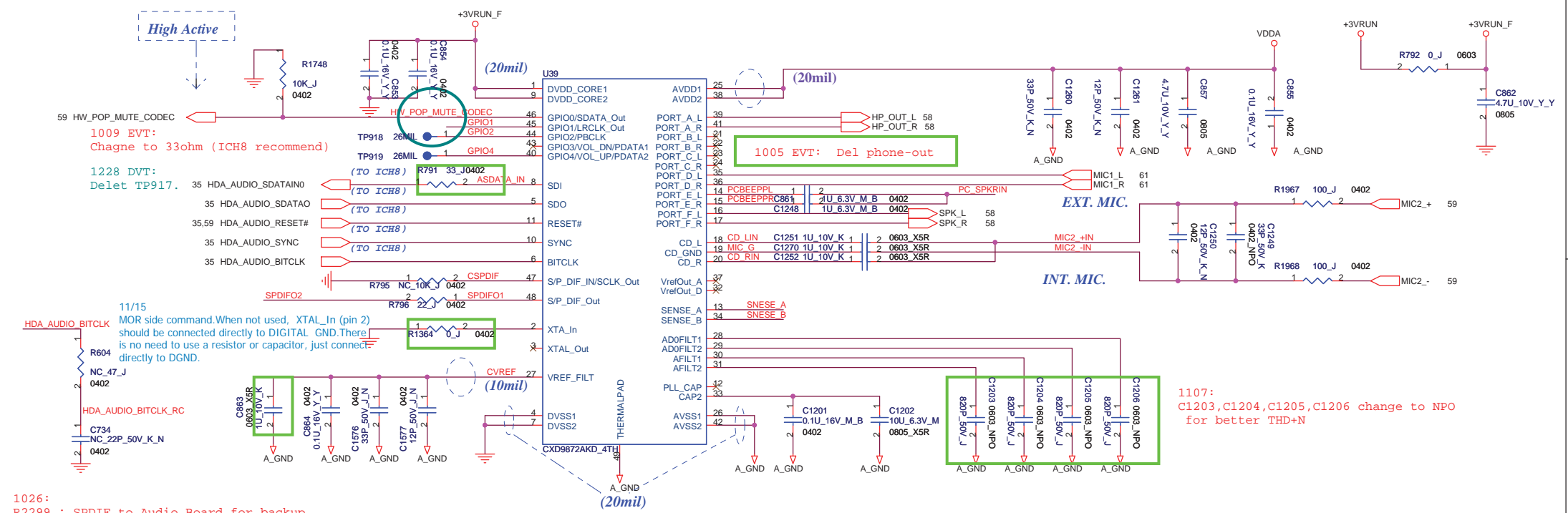


# Constant-Current SONY LOGO LED



<b>FOXCONN</b> HON HAI PRECISION IND. CO., LTD. CPBG - R&D Division			
Title <b>Logo LED / +1_5VSUS</b>			
Size	Document Number		Rev
Custom	(M610-1-01)MainBoard (MBX-176) 2007.1.4	2.0	
Date:	Thursday, May 10, 2007	Sheet	56 of 77

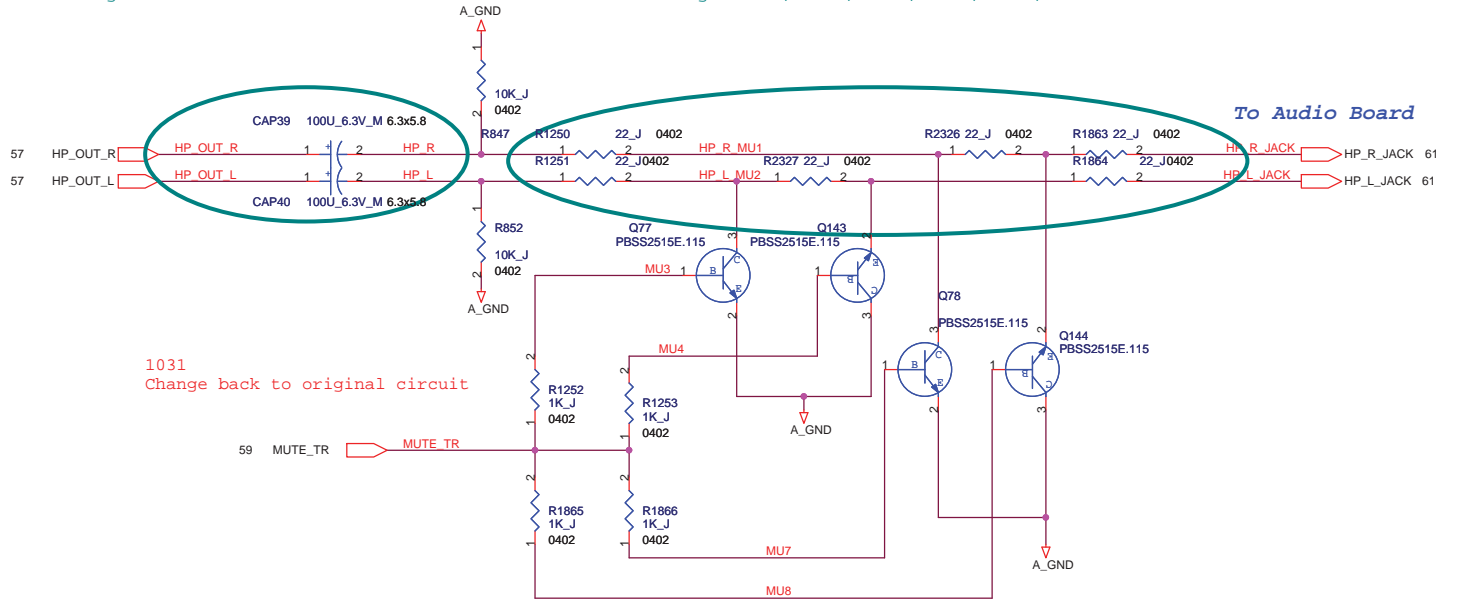
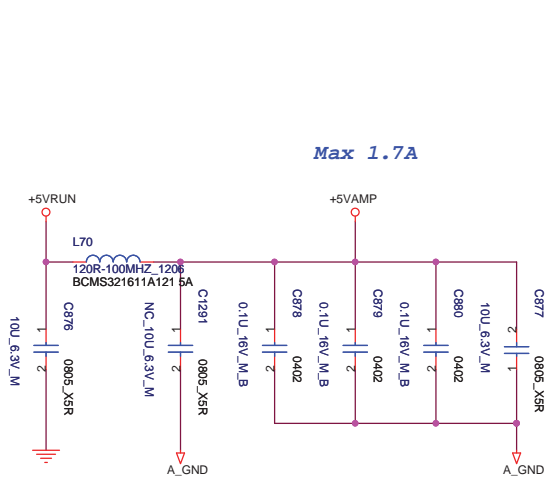




<b>FOXCONN</b> HON HAI PRECISION IND. CO., LTD.			
CPBG - R&D Division			
Title <b>AUDIO(CODEC &amp; POWER)</b>			
Size A3	Document Number (M610-1-01) MainBoard (MBX-176)	2007.1.4	Rev 2.0
Date: Thursday, May 10, 2007	Sheet 57	of 77	

0920  
 Add 2PCS CAP39,CAP40 100\_6.3V\_M  
 Delet CAP24,CAP25  
 1103  
 Change CAP39 and CAP40 Vendor from NIPPON CHEMI-CON to LELON

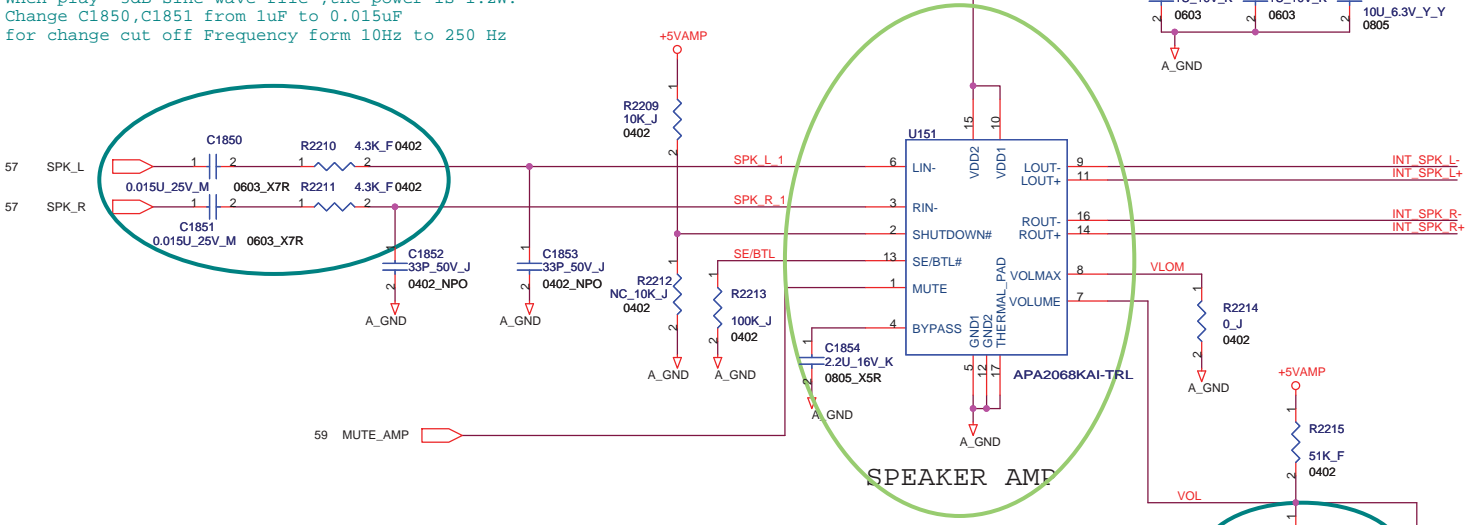
1228  
 Change CAP39 and CAP40 Vendor from LELON to Panasonic  
 1229  
 Change R1250,R1251,R2326,R2327,R1863,R1864 to 22 ohm.



1031  
 Change back to original circuit

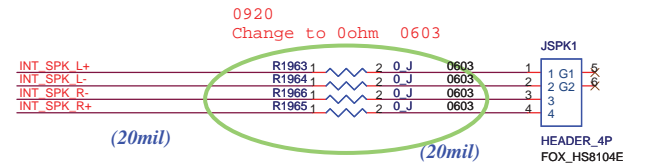
1211  
 Change damping resistor to 4.3K  
 When play -3dB sine wave file ,the power is 1.2W.  
 Change C1850,C1851 from 1uF to 0.015uF  
 for change cut off Frequency form 10Hz to 250 Hz

0920  
 Change speaker AMP from TI to APA2068

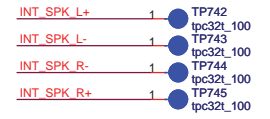


1209  
 Change gain setting to 14dB ,R2216 from 3.3K to 4.7K.  
 When play -3dB sine wave file ,the power is 1.2W.

### INTERNAL SPEAKER



### BFT Test Pad



### Gain setting table

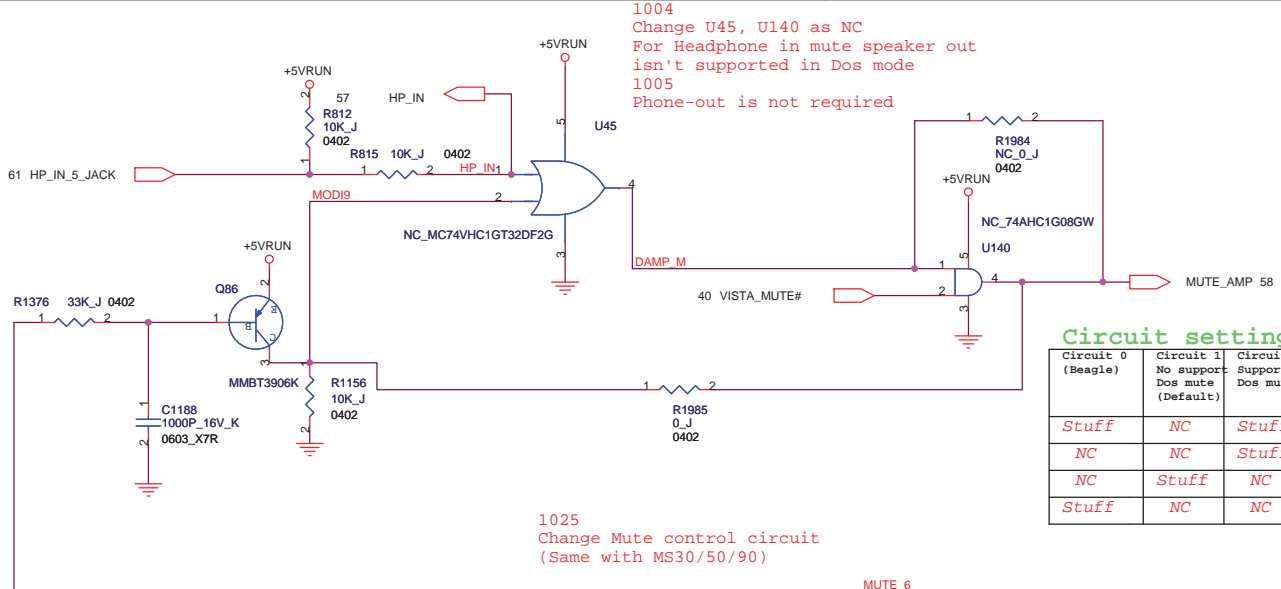
Gain	R2216	Voltage
8dB	9.1K	0.77V
10dB	7.68K	0.65V
12dB	6.2K	0.54V
14dB	4.7K	0.43V
16dB	3.3K	0.31V

**FOXCONN** HON HAI PRECISION IND. CO., LTD.  
 CPBG - R&D Division

Title: **AUDIO( AMP & HP & SPK )**

Size A3 Document Number (M610-1-01 )MainBoard (MBX-176) 2007.1.4 2.0 Rev

Date: Thursday, May 10, 2007 Sheet 58 of 77

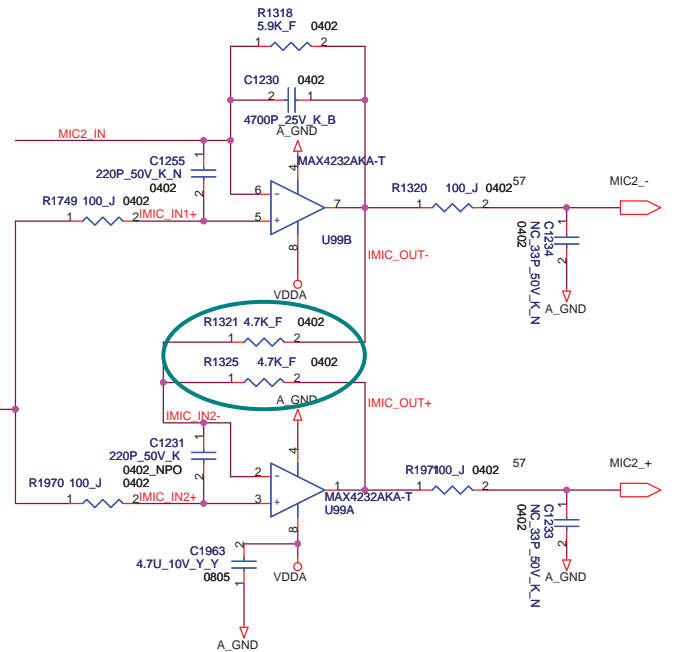


1004  
Change U45, U140 as NC  
For Headphone in mute speaker out  
isn't supported in Dos mode  
1005  
Phone-out is not required

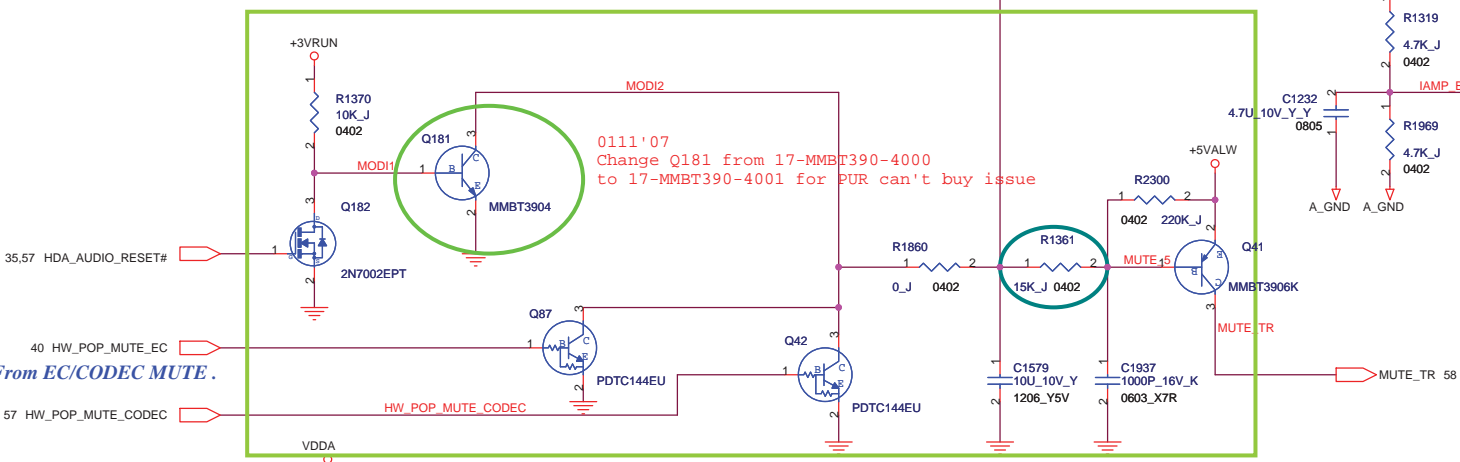
1025  
Change Mute control circuit  
(Same with MS30/50/90)

**Circuit setting table**

Circuit 0 (Beagle)	Circuit 1 No support Dos mute (Default)	Circuit 2 Support Dos mute	component
Stuff	NC	Stuff	U45
NC	NC	Stuff	U140
NC	Stuff	NC	R1985
Stuff	NC	NC	R1984



1227  
Change R1321 and R1325 from 4.7k\_J to 4.7K\_F  
for MOR Side Command.

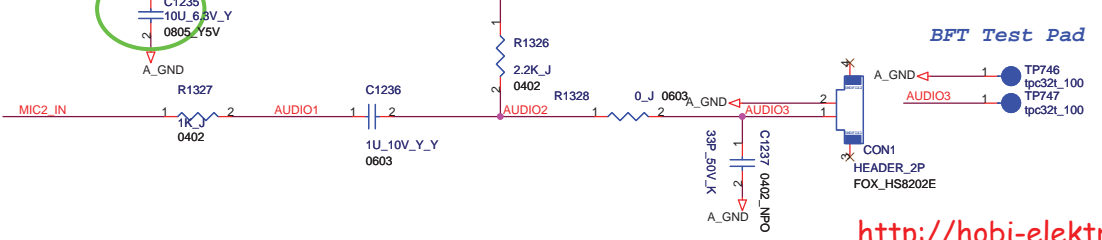


0111'07  
Change Q181 from 17-MMBT390-4000  
to 17-MMBT390-4001 for PUR can't buy issue

0104  
Change R1361 From 33k to 22k For improve Mute\_TR signal quality well.

1005  
Del phone-out mute circuit  
for phone-out is not required

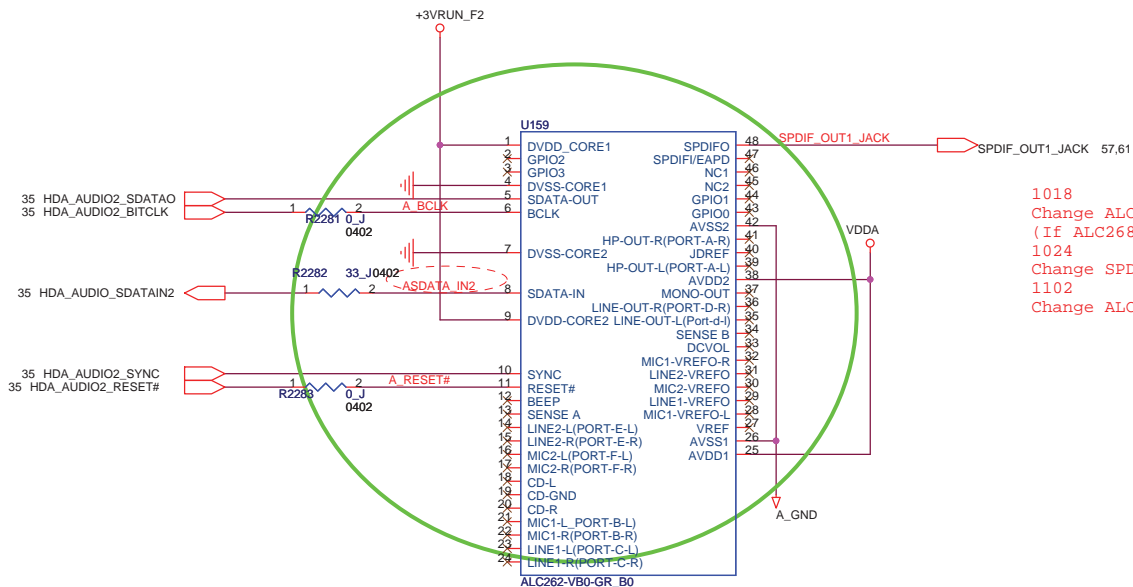
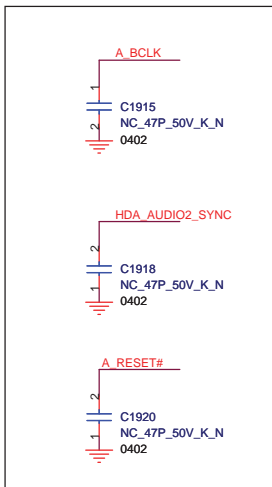
### INTERNAL MIC(Non)



BFT Test Pad

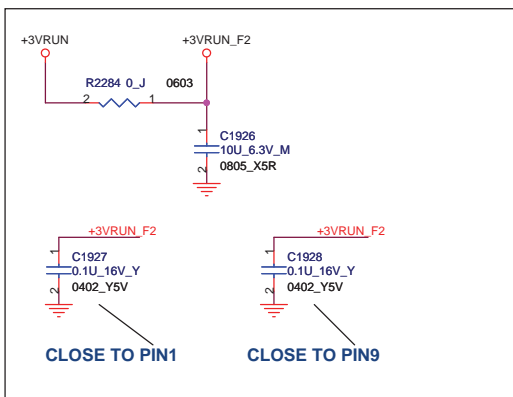
<http://hobi-elektronika.net>

Anti-Glitch

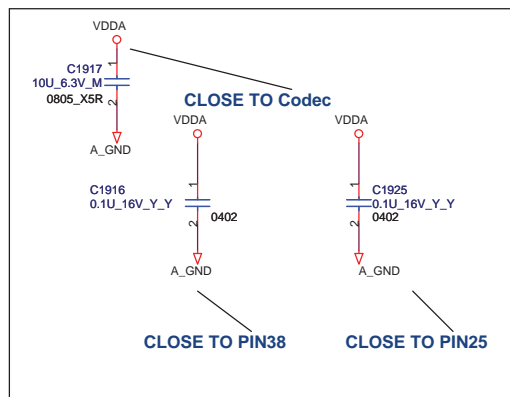


1018  
 Change ALC262 to ALC268.  
 (If ALC268 sample schedule delay, change to ALC262)  
 1024  
 Change SPDIF of Second codec to MB optical out  
 1102  
 Change ALC268 to ACL262

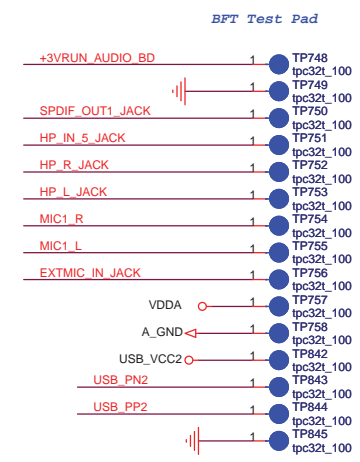
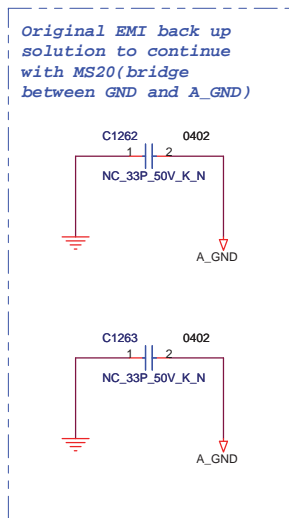
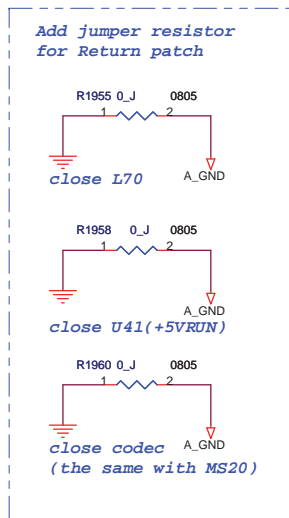
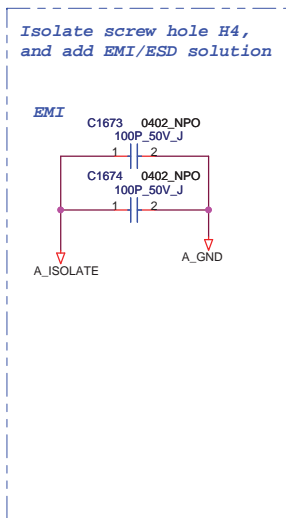
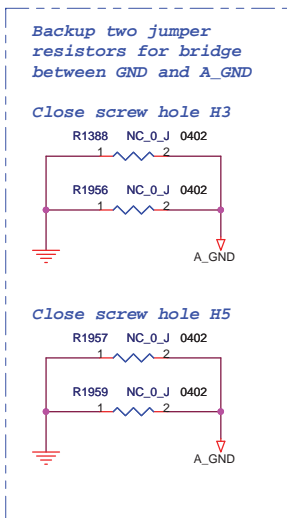
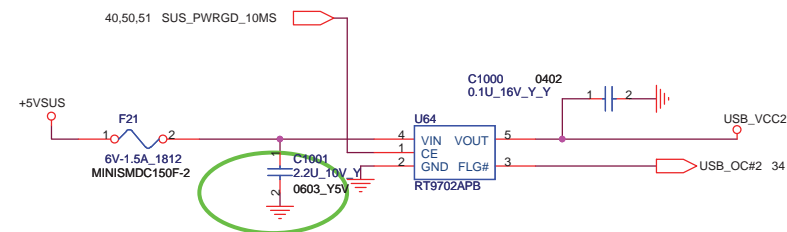
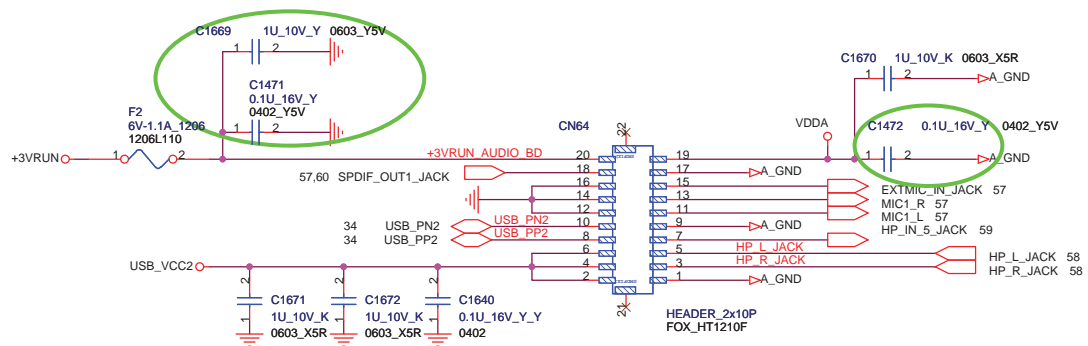
Decoupling Caps, place close to power pin.



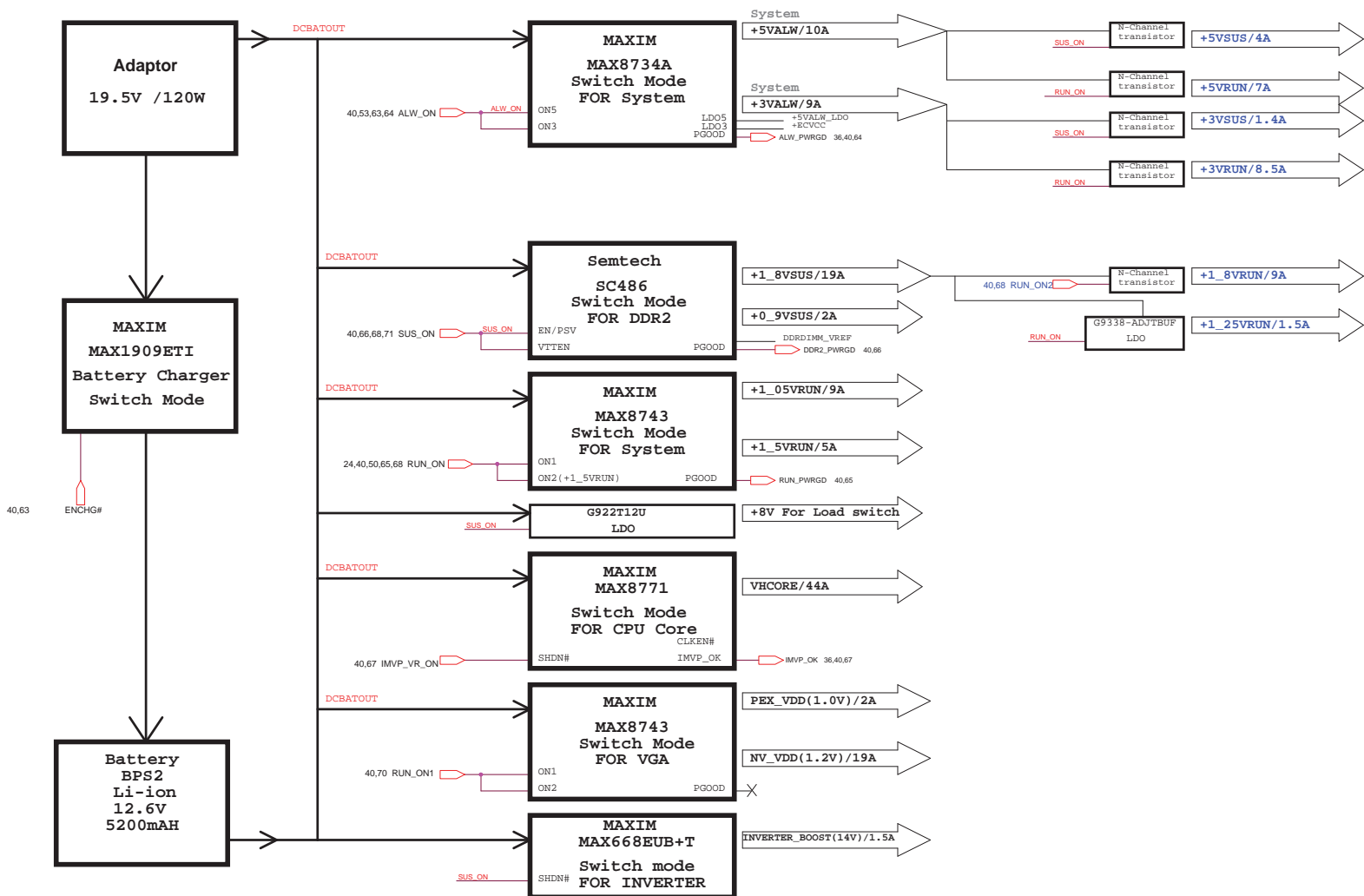
Decoupling Caps, place close to power pin.

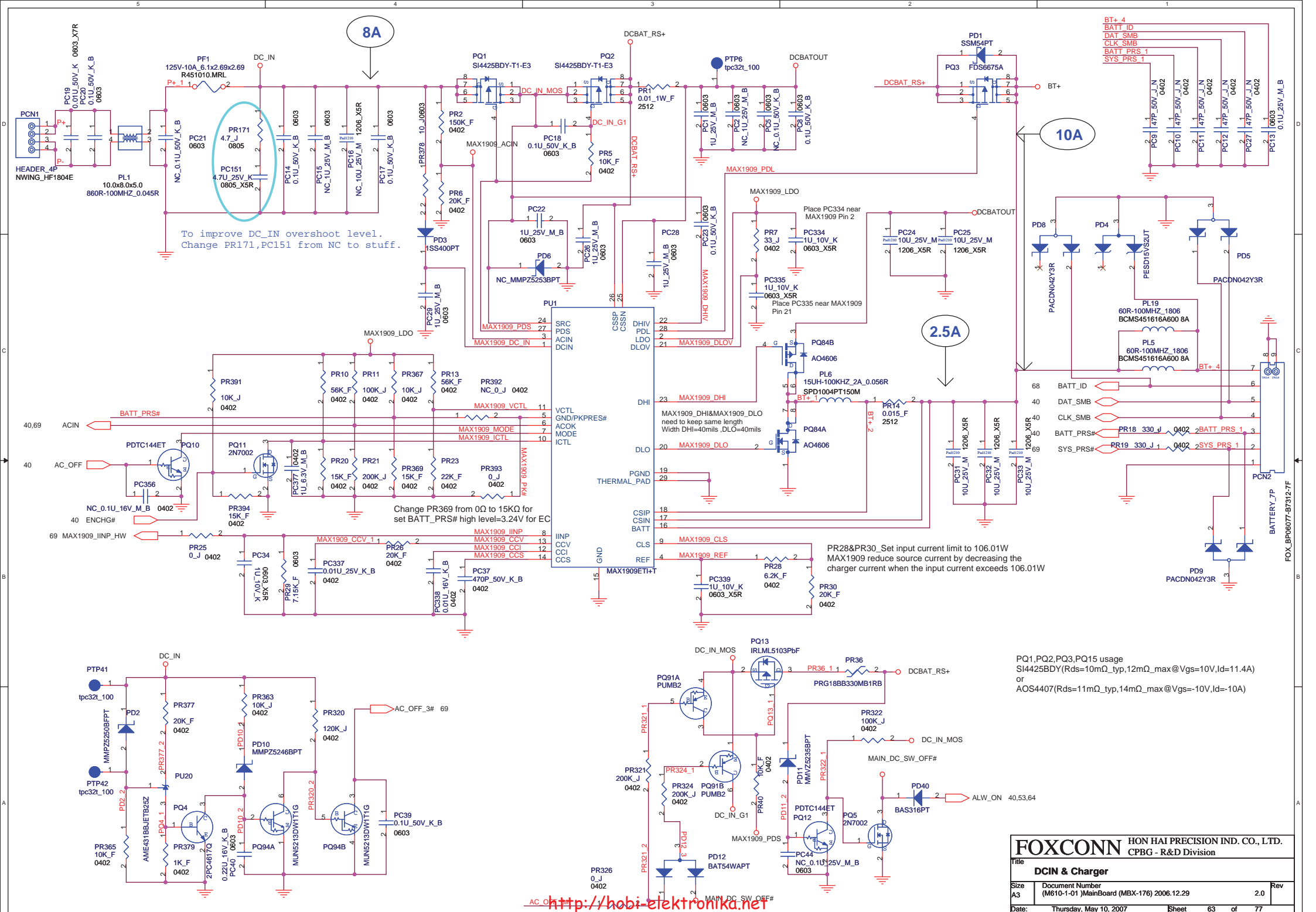


# Audio Board connector



<b>FOXCONN</b>		HON HAI PRECISION IND. CO., LTD.	
Title		CPBG - R&D Division	
<b>Audio Board conn</b>			
Size A3	Document Number (M610-1-01 )MainBoard (MBX-176) 2007.1.4	2.0	Rev
Date:	Thursday, May 10, 2007	Sheet 61	of 77





To improve DC\_IN overshoot level.  
Change PR171, PC151 from NC to stuff.

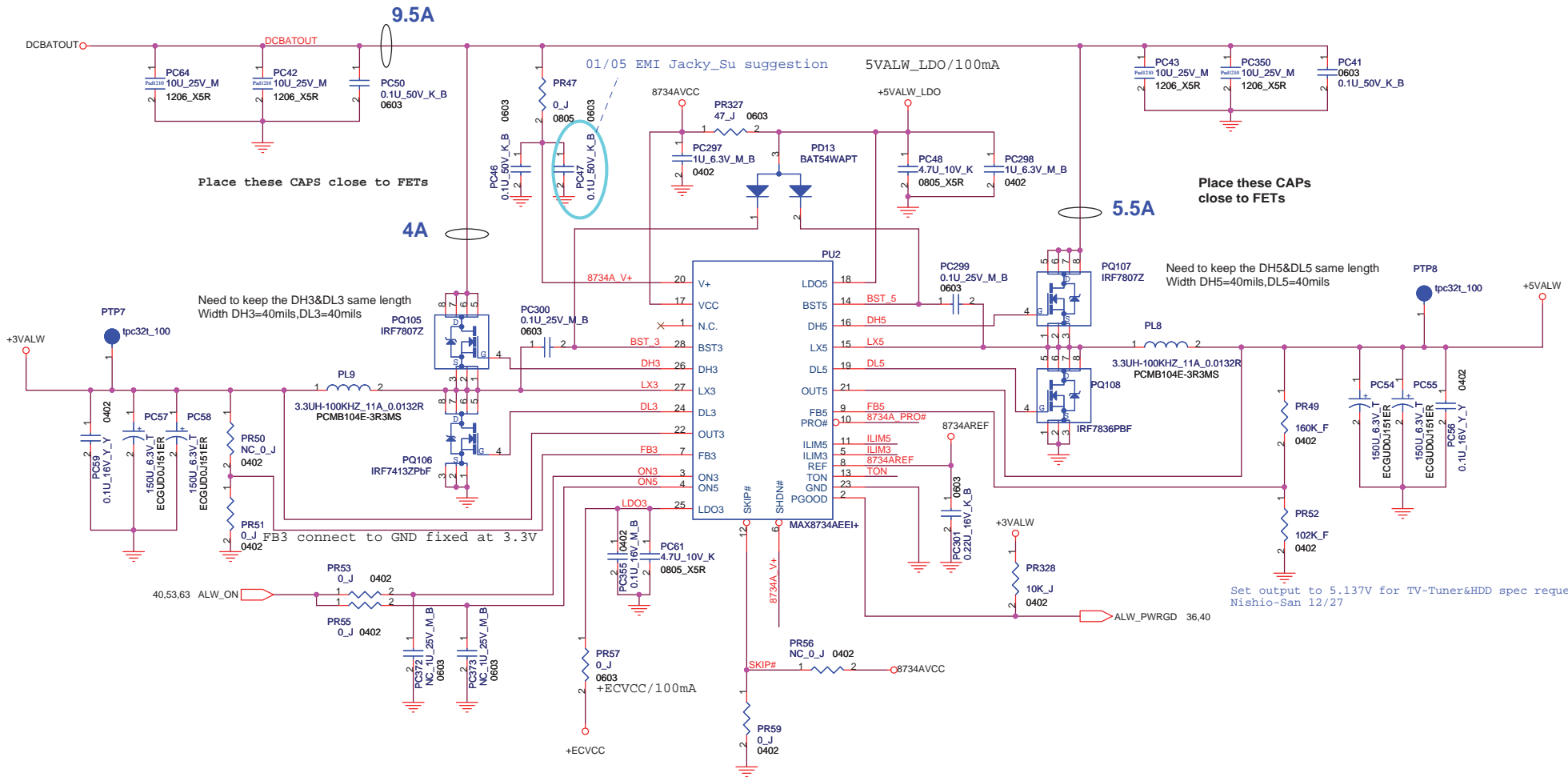
Change PR369 from 0Ω to 15KΩ for  
set BATT\_PR# high level=3.24V for EC

PR28&PR30. Set input current limit to 106.01W  
MAX1909 reduce source current by decreasing the  
charger current when the input current exceeds 106.01W

PQ1,PQ2,PQ3,PQ15 usage  
SI4425BDY(Rds=10mΩ<sub>typ</sub>,12mΩ<sub>max</sub>@Vgs=10V,I<sub>d</sub>=11.4A)  
or  
AOS4407(Rds=11mΩ<sub>typ</sub>,14mΩ<sub>max</sub>@Vgs=-10V,I<sub>d</sub>=-10A)

<http://hobi-elektronika.net>

<b>FOXCONN</b> HON HAI PRECISION IND. CO., LTD.	
CPBG - R&D Division	
Title <b>DCIN &amp; Charger</b>	
Size A3	Document Number (M610-1-01) MainBoard (MBX-176) 2006.12.29
Date: Thursday, May 10, 2007	Rev 2.0
Sheet 63	of 77



+3VALW Notice:  
Output capacitor  
ECGUD0J151ER(18 mohm,H=2.8mm)  
6TPE150M(25 mohm,H=1.8mm)

MOSFET  
Top\_IRF7807Z(Total Qg=11nc\_max)  
Bottom\_IRF7413Z(Rds=10.5mΩ\_typ&13mΩ\_max.@Vgs=4.5V,Id=10A)  
or  
Top\_SI4892DY(Total Qg=10.5nc\_max)  
Bottom\_SI4392DY(Rds=11mΩ\_typ&13.75mΩ\_max.@Vgs=4.5V,Id=10A)

+5VALW Notice:  
Output capacitor  
ECGUD0J151ER(18 mohm,H=2.8mm)  
6TPE150M(25 mohm,H=1.8mm)

MOSFET  
Top\_IRF7807Z(Total Qg=11.5nc\_max)  
Bottom\_IRF7836PBF(Rds=5.7mΩ\_typ,7.1mΩ\_max@Vgs=4.5V,Id=13A)  
or  
Top\_SI4892DY(Total Qg=10nc\_max)  
Bottom\_SI4856ADY(Rds=6.3mΩ\_typ,7.6mΩ\_max@Vgs=4.5V,Id=14A)

Adjust +5VALW current limit  
Change PR64 from 51K to 62K

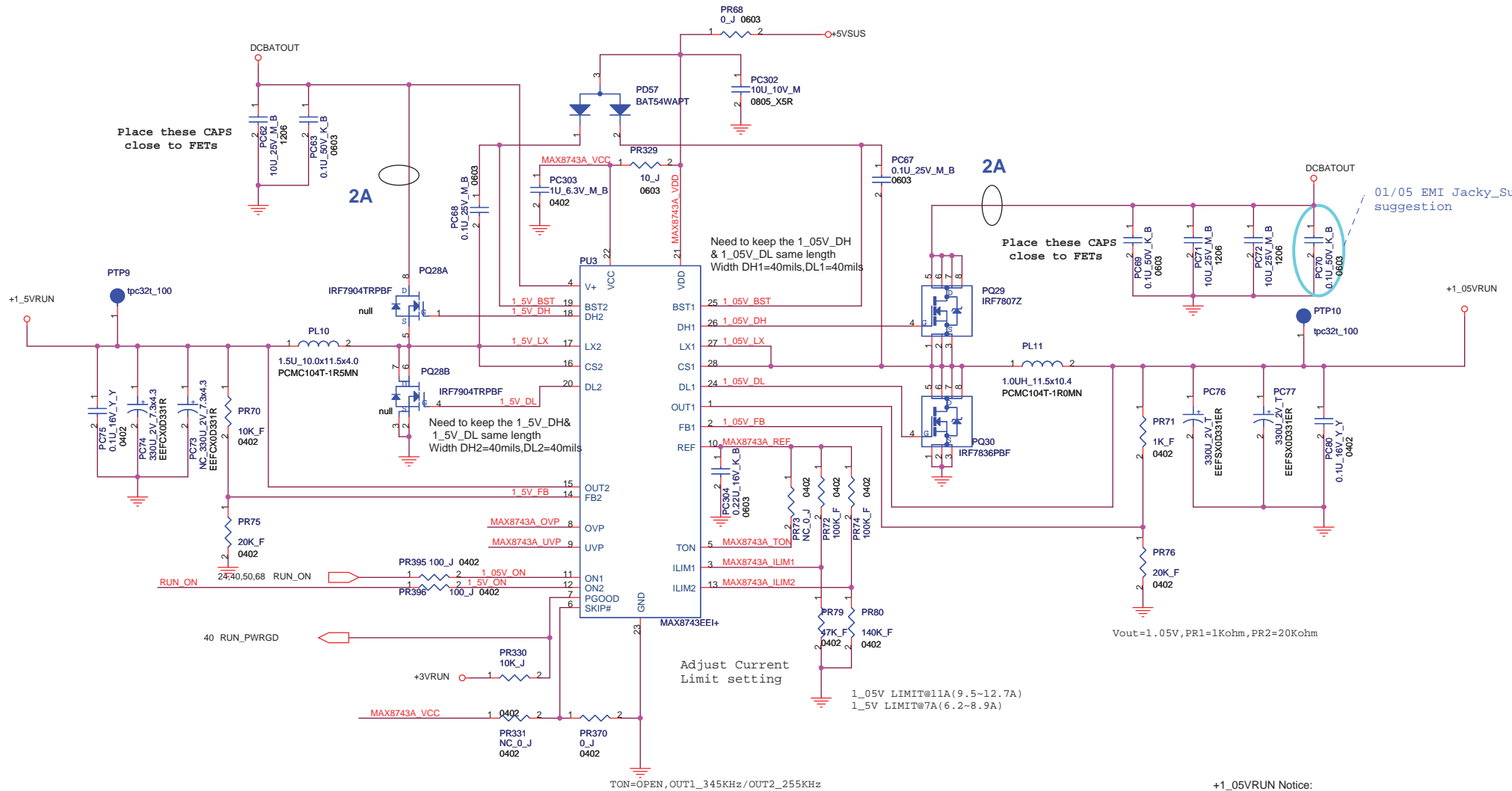
5V LIMIT@12A(10.9~15.4A)  
3V LIMIT@11A(9.2~12.3A)

TON connect to GND = 5V/400KHZ,3.3V/500KHZ

<http://hobi-elektronika.net>

<b>FOXCONN</b>		HON HAI PRECISION IND. CO., LTD.	
		CPBG - R&D Division	
File	<b>System Power 3.3V&amp;5V</b>		
Size	Document Number		Rev
A3	(M610-1-01 )MainBoard (MBX-176) 2006.12.29		2.0
Date:	Thursday, May 10, 2007	Sheet	64 of 77





Place these CAPS close to FETs

Place these CAPS close to FETs

01/05 EMI Jacky\_Su suggestion

Need to keep the 1\_05V\_DH & 1\_05V\_DL same length Width DH1=40mils, DL1=40mils

Need to keep the 1\_5V\_DH & 1\_5V\_DL same length Width DH2=40mils, DL2=40mils

Adjust Current Limit setting

1\_05V LIMIT@11A(9.5~12.7A)  
1\_5V LIMIT@7A(6.2~8.9A)

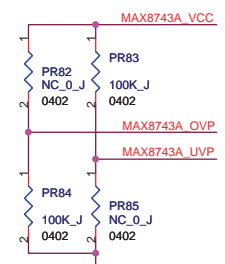
Vout=1.05V, PR1=1Kohm, PR2=20Kohm

+1\_5VVRUN Notice:  
Output capacitor usage  
EEFCX0D331R(ESR=15 mohm,H=1.9mm,Arms=2.7A)  
2R5TPE330MF(ESR=15 mohm,H=1.8mm,Arms=3.1A)

MOSFET(Top+Bottom)  
IRF7902PBF(Low side Rds=14.3mΩ\_typ,20.5mΩ\_max@Vgs=4.5V,Id=7.2A)  
Si4816DY(Low side Rds=15mΩ\_typ,18.5mΩ\_max@Vgs=4.5V,Id=8.6A)

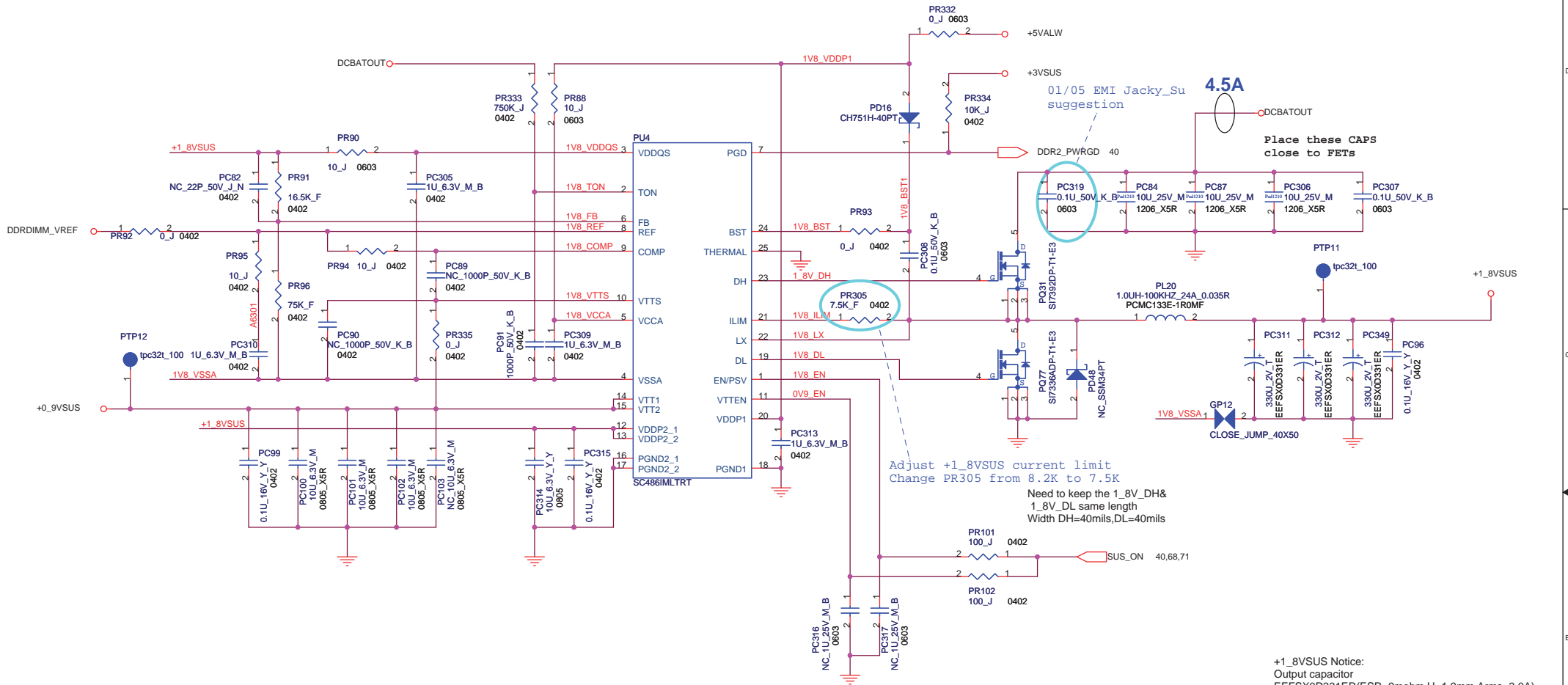
+1\_05VVRUN Notice:  
Output capacitor usage  
EEFSX0D331ER(ESR=9mohm,H=1.9mm,Arms=3.0A)  
2R5TPE330M9(ESR=9mohm,H=1.8mm,Arms=3.9A)

MOSFET  
Top\_IRF7807Z(Total Qg=11.5nc\_max)  
Bottom\_IRF7836PBF(Rds=5.7mΩ\_typ,7.1mΩ\_max@Vgs=4.5V,Id=13A)  
or  
Top\_Si4892DY(Total Qg=10nc\_max)  
Bottom\_Si4856ADY(Rds=6.3mΩ\_typ,7.6mΩ\_max@Vgs=4.5V,Id=14A)



<http://hobi-elektronika.net>

<b>FOXCONN</b> HON HAI PRECISION IND. CO., LTD.	
CPBG - R&D Division	
Title	
<b>1.5V/1.05V</b>	
Size	Document Number
A3	(M610-1-01)MainBoard (MBX-176) 2006.12.29
Date:	Thursday, May 10, 2007
Sheet	65 of 77



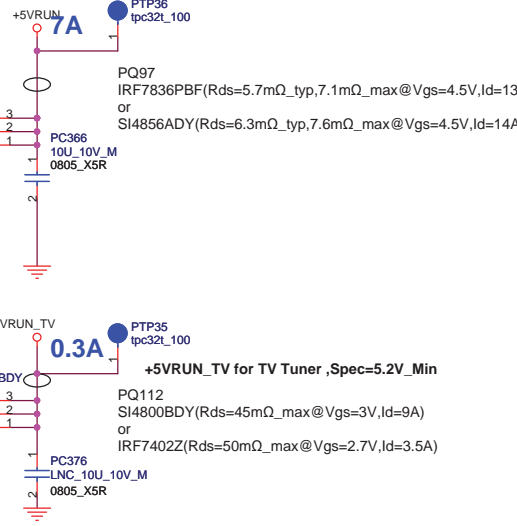
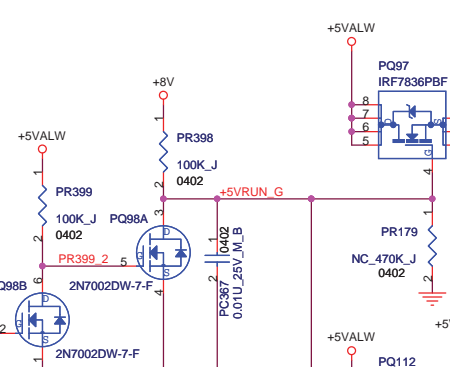
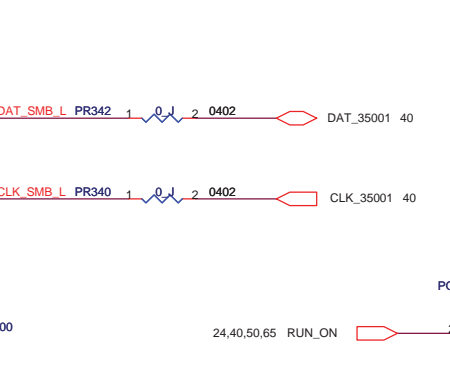
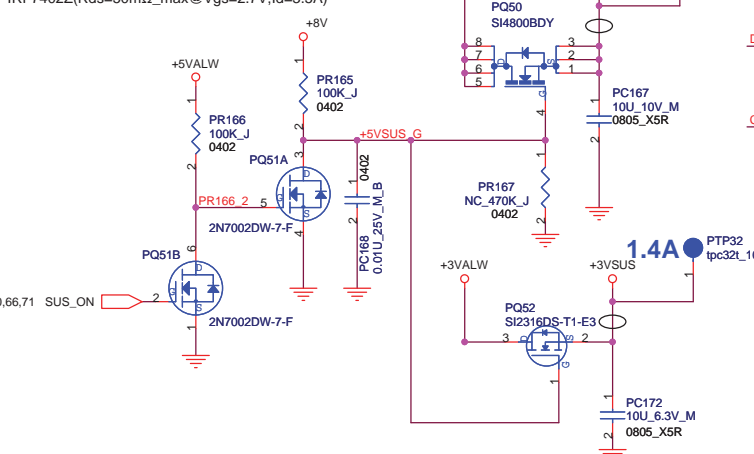
+1.8VSUS Notice:  
 Output capacitor  
 EEF5X0D331ER (ESR=9mohm, H=1.9mm, Arms=3.0A)  
 2R5TPE330M9 (ESR=9mohm, H=1.8mm, Arms=3.9A)

MOSFET  
 Top\_Si7392DP (Total Qg=15nc\_max)  
 Bottom\_Si7336ADP (Rds=3.1mΩ\_typ, 4.0mQ\_max@19A)  
 or  
 Top\_NTMFS4707N (Total Qg=15nc\_max)  
 Bottom\_NTMFS4119N (Rds=3.1mΩ\_typ, 4.8mQ\_max@25A)

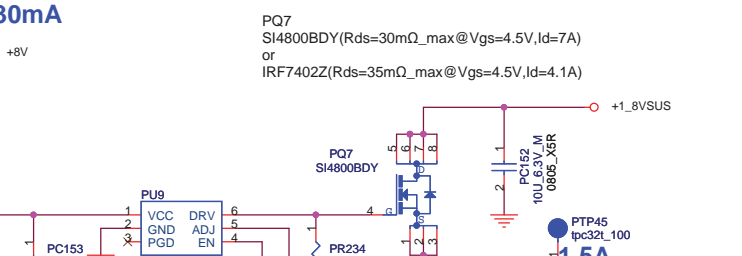
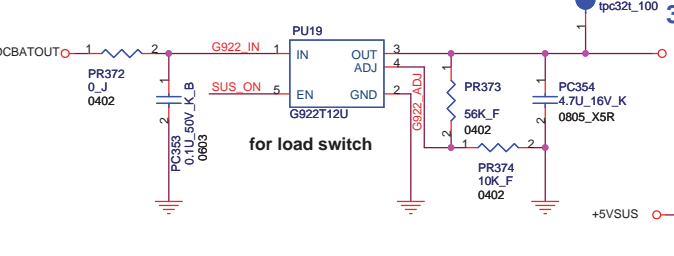
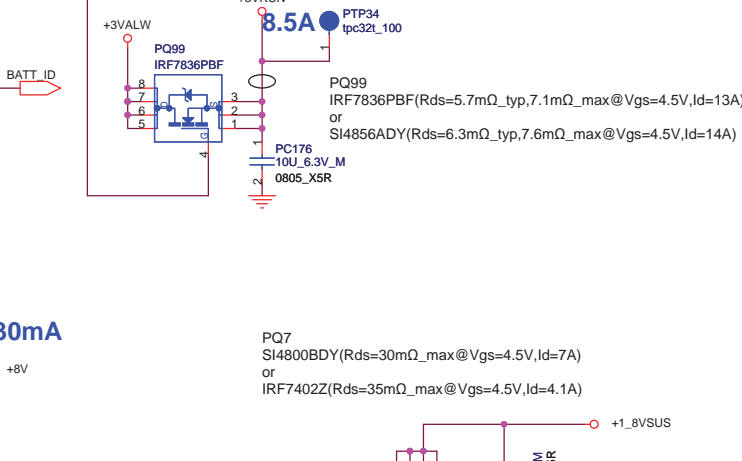
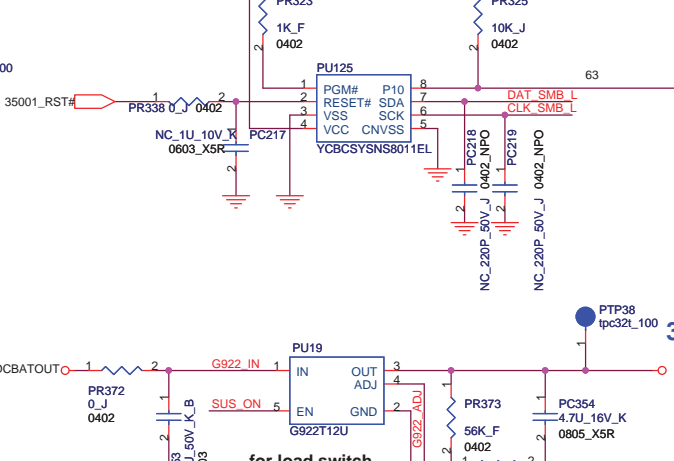
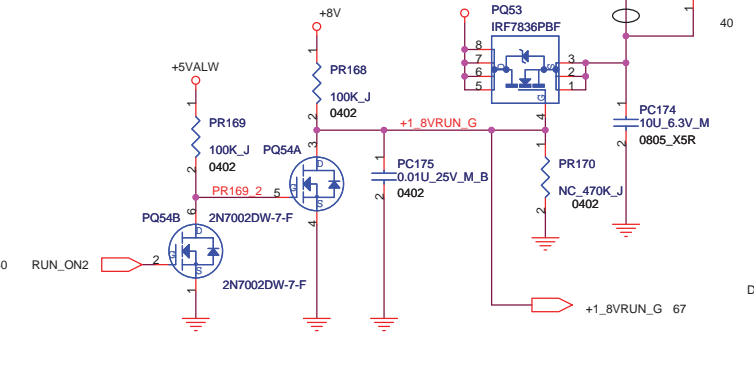
1.8V LIMIT@22A(20.2-25A)



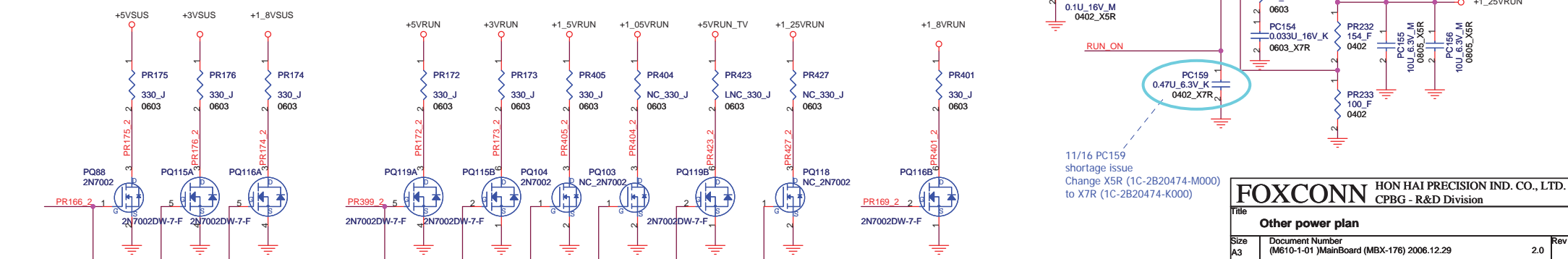
PQ50  
SI4800BDY(Rds=45mΩ\_max@Vgs=3V,Id=9A)  
or  
IRF7402Z(Rds=50mΩ\_max@Vgs=2.7V,Id=3.5A)



PQ53  
IRF7836PBF(Rds=5.7mΩ\_typ,7.1mΩ\_max@Vgs=4.5V,Id=13A)  
or  
SI4856ADY(Rds=6.3mΩ\_typ,7.6mΩ\_max@Vgs=4.5V,Id=14A)

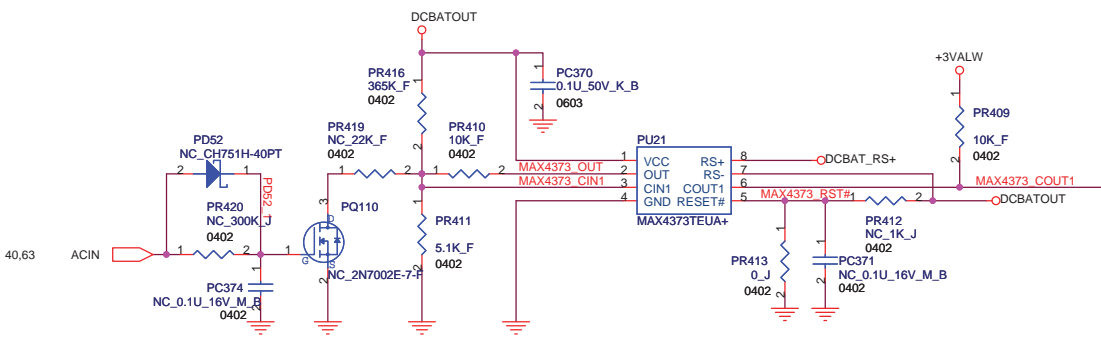
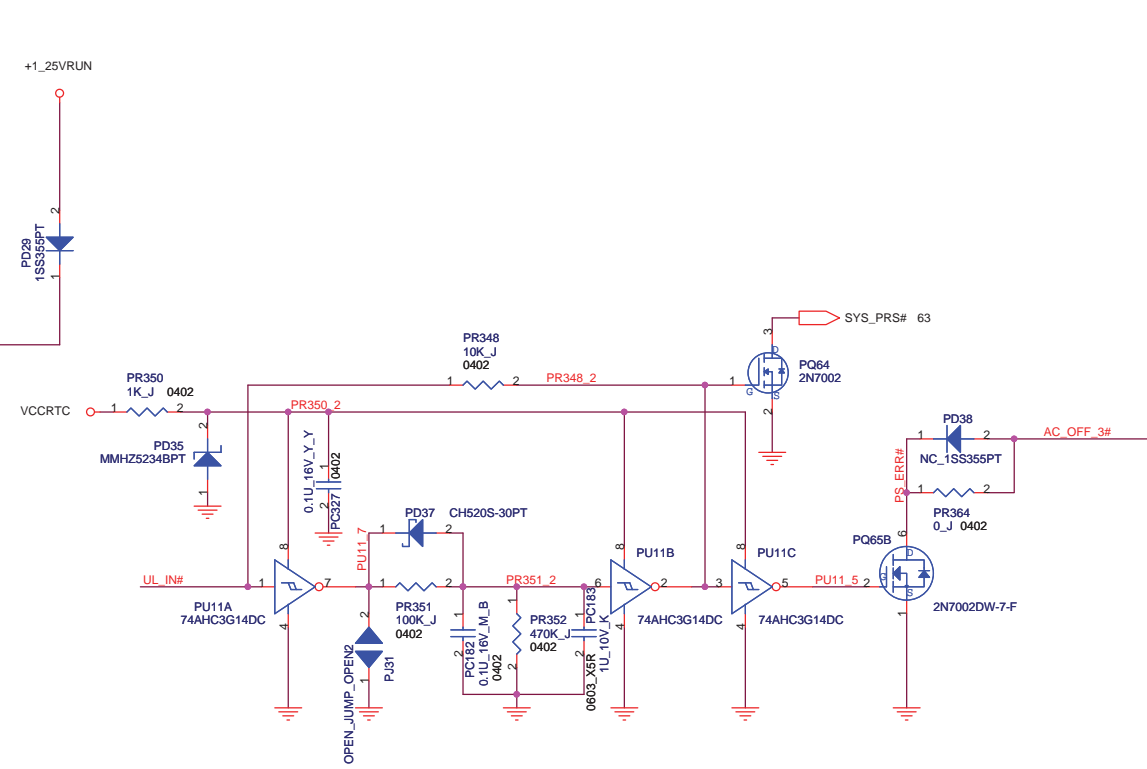
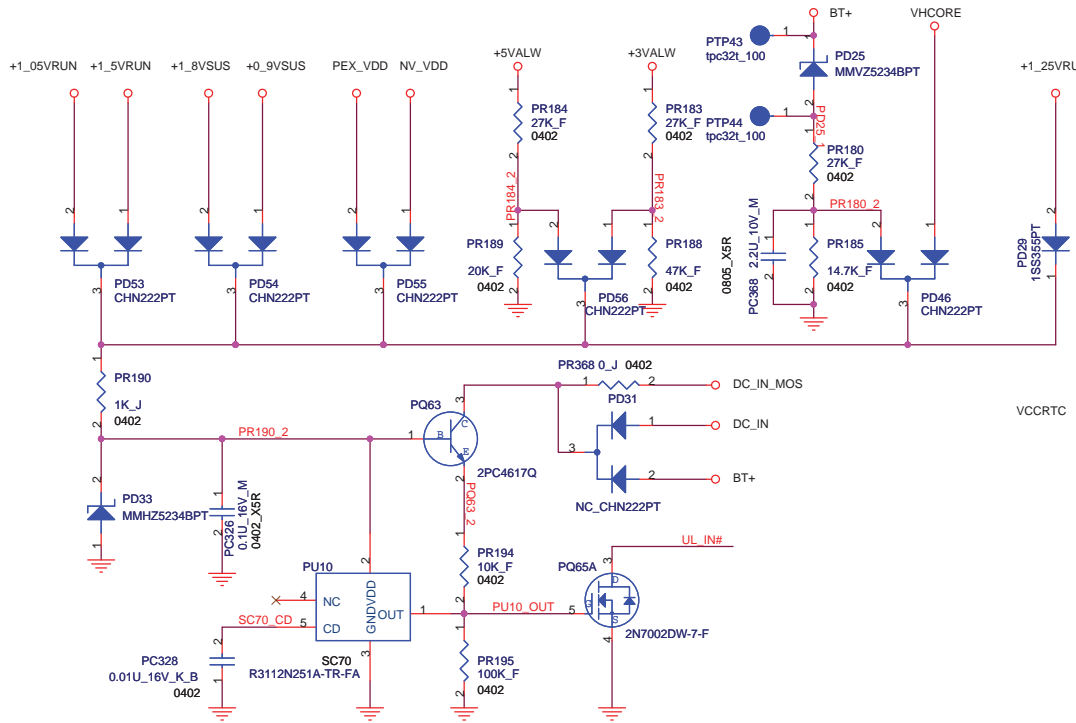


**Discharge circuit for power-off**

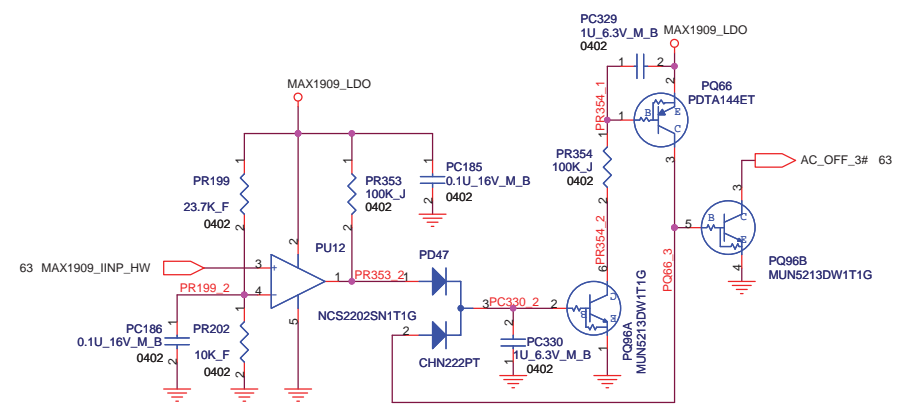


11/16 PC159  
shortage issue  
Change X5R (1C-2B20474-M000)  
to X7R (1C-2B20474-K000)

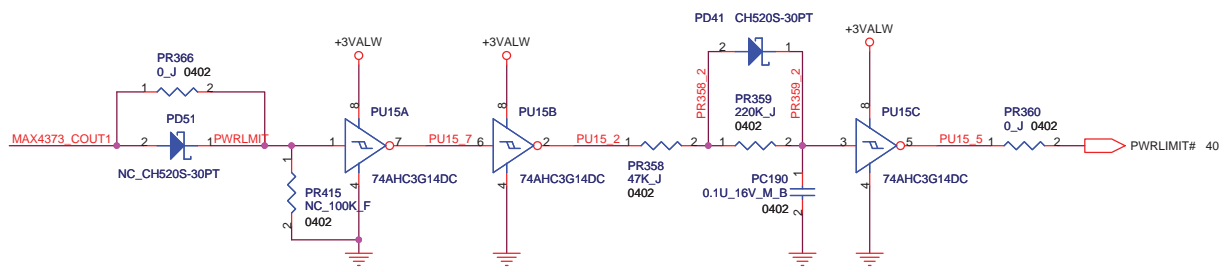
<b>FOXCONN</b>		HON HAI PRECISION IND. CO., LTD.	
		CPBG - R&D Division	
File	<b>Other power plan</b>		
Size	Document Number		Rev
A3	(M610-1-01)MainBoard	(MBX-176) 2006.12.29	2.0
Date:	Thursday, May 10, 2007	Sheet	68 of 77



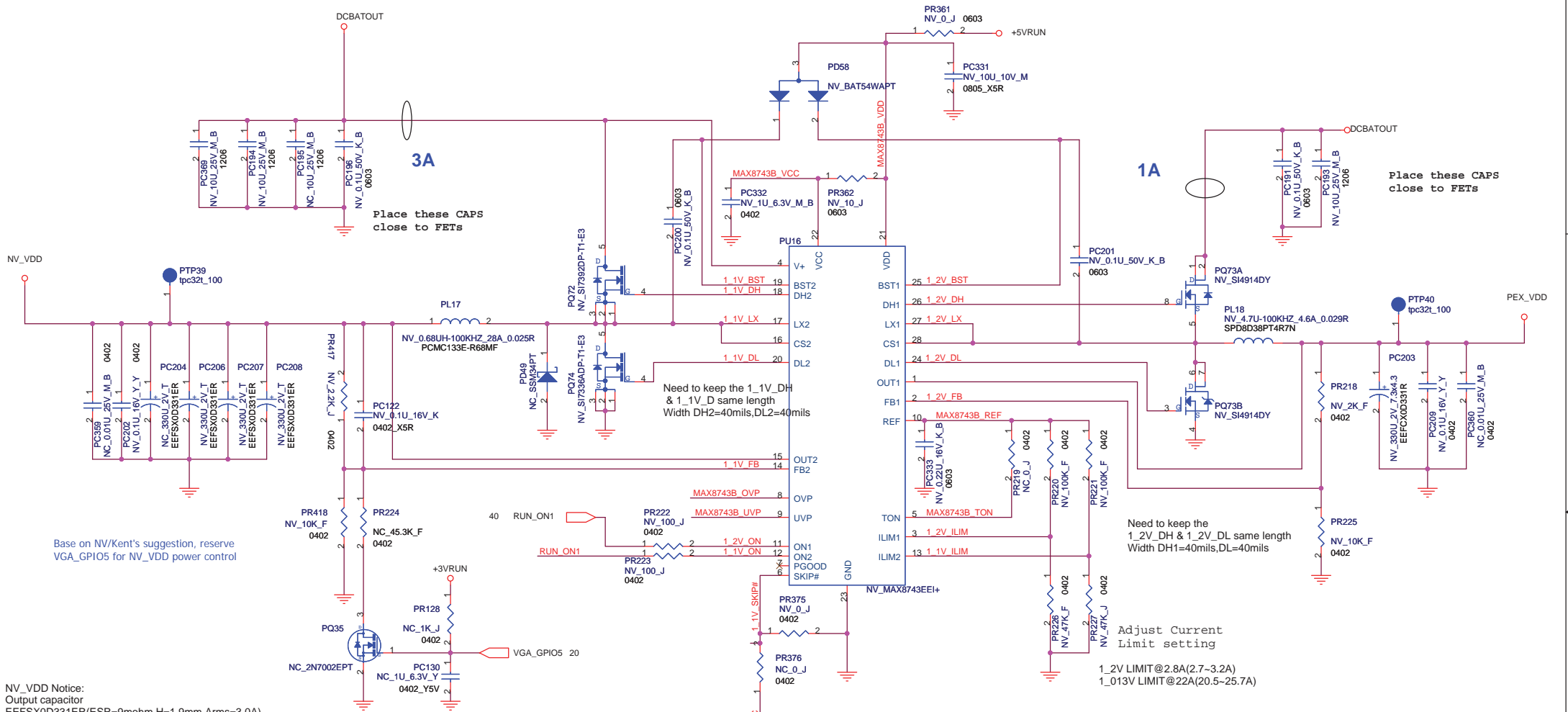
**Control 9V@7.73A=69.59W & 18.5V@6.43A=118.96W POWER LIMIT**



**Control ACIN OCP protect 145W**



<b>FOXCONN</b> HON HAI PRECISION IND. CO., LTD. CPBG - R&D Division		
File: <b>OVP protection</b>		
Size: A3	Document Number: (M610-1-01) MainBoard (MBX-176) 2006.12.29	Rev: 2.0
Date: Thursday, May 10, 2007	Sheet: 69	of 77



NV\_VDD Notice:  
 Output capacitor  
 EEFSX0D331ER(ESR=9mohm,H=1.9mm,Arms=3.0A)  
 2R5TPE330M9(ESR=9mohm,H=1.8mm,Arms=3.9A)

MOSFET  
 Top\_S17392DP(Total Qg=15nc\_max)  
 Bottom\_S17336ADP(Rds=3.1mΩ\_typ,4 mΩ\_max@Vgs=4.5V,Id=19A)  
 or  
 Top\_NTMFS4707N(Total Qg=15nc\_max)  
 Bottom\_NTMFS4119N(Rds=3.1mΩ\_typ,4.8 mΩ\_max@Vgs=4.5V,Id=25A)

GPIO TABLE			
GPIO	I/O	Inter pull low	
GPIO5	O	Yes	GPU Voltage H: NVDD=1.22V GPU Voltage L: NVDD=1.15V

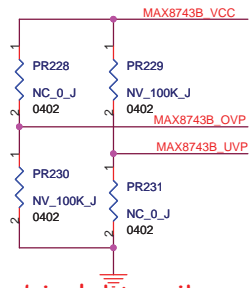
Base on NV/Kent's suggestion, reserve  
 VGA\_GPIO5 for NV\_VDD power control

Need to keep the  
 1.2V\_DH & 1.2V\_DL same length  
 Width DH1=40mils,DL=40mils

Adjust Current  
 Limit setting  
 1.2V LIMIT@2.8A(2.7-3.2A)  
 1.013V LIMIT@22A(20.5-25.7A)

PEX\_VDD Notice:  
 Output capacitor  
 EEFCX0D331R(ESR=15mohm,H=1.9mm,Arms=2.7A)  
 2R5TPE330MF(ESR=15mohm,H=1.8mm,Arms=3.1A)

Top+Bottom side (Dual N MOSFET)  
 SI4914DY(Rds=22mΩ\_typ,27mΩ\_max@Vgs=4.5V,Id=6.4A)

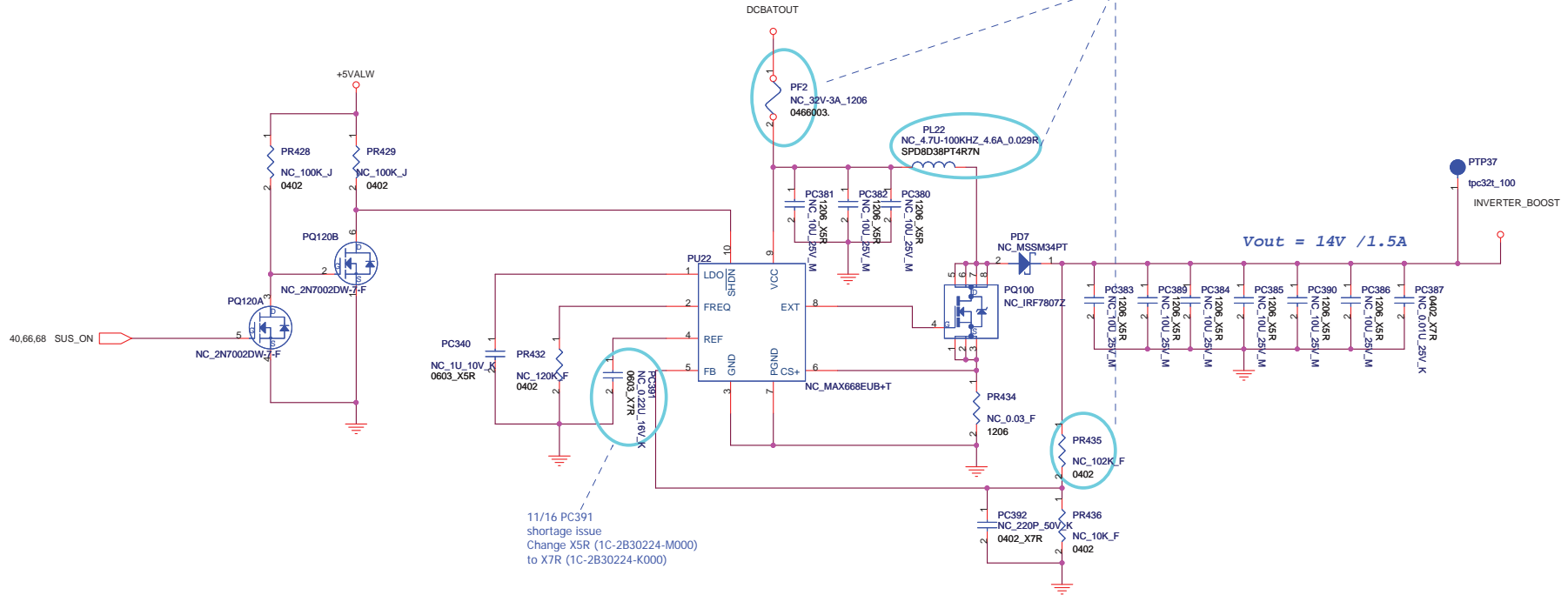


**FOXCONN** HON HAI PRECISION IND. CO., LTD.  
 CPBG - R&D Division

File: **+1\_2VRUN&+1\_025VRUN**

Size A3	Document Number (M610-1-01) MainBoard (MBX-176) 2006.12.29	Rev 2.0
Date: Thursday, May 10, 2007	Sheet 70	of 77

Boost circuit design change.  
 Add PF2 (32V-3A\_1206) fuse for boost circuit,  
 Change PL22 from 8UH-100KHZ\_2.5A\_0.07R to 4.7U-100KHZ\_4.6A\_0.029R.  
 Change PR435 from 95.3K to 102K

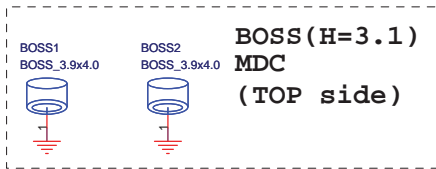
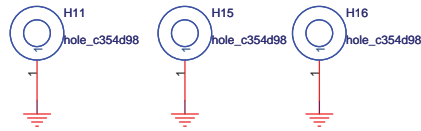


11/16 PC391  
 shortage issue  
 Change X5R (1C-2B30224-M000)  
 to X7R (1C-2B30224-K000)

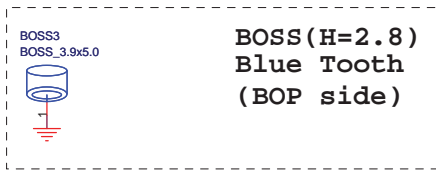
<b>FOXCONN</b> HON HAI PRECISION IND. CO., LTD. CPBG - R&D Division			
Title <b>STEP_UP</b>			
Size	Document Number	Rev	
Custom	(M610-1-01) MainBoard (MBX-176) 2006.12.29	2.0	
Date:	Thursday, May 10, 2007	Sheet	71 of 77

# HOLE

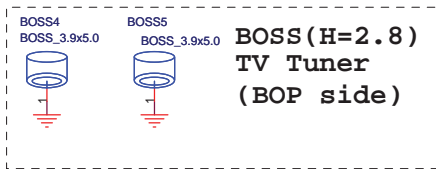
## Type 1



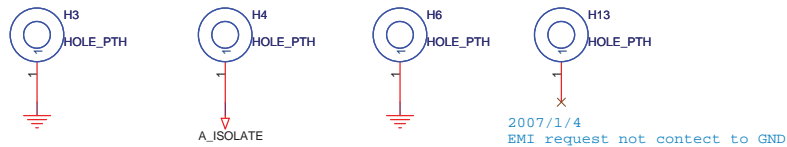
## Type 2



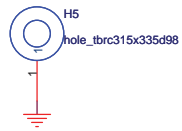
## Type 3



## Type 4



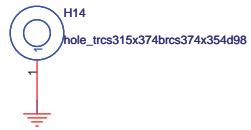
## Type 5



### Type NPTH Guide (spherical) HOLD



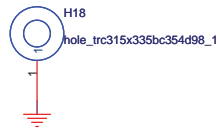
## Type 6



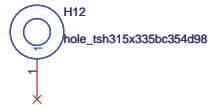
### Type NPTH Guide (oval-shaped) HOLD



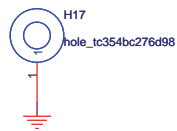
## Type 7



## Type 8



## Type 9



## Type CPU





16.(Page1)HDMI-DT Device ID setting mismatch between VDDIO and I2M Stage  
Change R212 value from 1K to 10KOHM.  
Change R212 value from 1K to 10KOHM.

2.(Page2)HD212A update USB VDDM termination value  
Change R202 from 50ohm to 40ohm  
Change R272 from 45ohm to 35ohm

3.(Page3)Remove 2\_007F\_00208 (FPGA noise)  
Add a (C1947) 1uF cap for 2\_007F\_00208,layout pull down close 074 pin

4.(Page3)HD212A FAK suggestion:  
Change GPIO thermal alert signal input from GPIO28 to GPIO28.  
Delete TP222 and pull-up GPIO28 (R2332 2.2K to +VDDIN)

5.(Page3)HD212A FAK suggestion:  
Remove HV\_2022 bus connected to NC for HDMI's internal thermal sensor.  
Remove R2126 (10K) / R2224 (1K)

6.(Page3)Use down evaluation  
Change R2126 R2126 from NC to 10KOHM.  
Change R1240,R1416,2126 from 0V9V90M to NC

7.(Page5)Change speaker amp gain to 14dB when Play +SD wave file the speaker power is 1.2W.  
Change R2214 to 4.7K

8.(Page5)When Play +SD wave file the speaker power is 1.2W,TP20-HV104.  
Change damping resistor R2219,R2221 to 4.7K

9.(Page5)change out off frequency from 10K to 250 Hz  
C1850,C1851 from 1uF to 0.01uF

10.(Page49)To solve HD2120 enable pin (not name USB\_DP\_20(floating during 079 (DP\_W from 100\_DP\_WN disable,  
Add pull low 47K(R2311) at end USB\_DP\_20). Change R2319 from 10K to 1K.

11.(Page35)3612080 deassert error. GPIO14 is not true GPIO pin, HD20 can't control it's action  
Change R2120F from 20K to 10KOHM to GPIO14  
TCM pin A077(GPIO204) add TP2051  
TCM pin A074(GPIO204) add TP2045, size to 3-MSD conn.

12.(Page1)MOS not agree use HD2 chip for second source  
Change Regress Card Power Switch (SW1) from HD2 R2211TP to T1 TP22211TP

13.(Page)The same CDS5 CLK\_IN is high enable,  
add low enable, correct 4'input warning  
on schematic:Change T208 pin 21  
T208 pin 24 use name from CLK\_IN  
to CLK\_IN

14.(Page6)  
Base on HD2 side suggest to modify camera power source circuit.  
Add R111(TP2219)(10K 0.1W) between net +VDDSD and CAM\_VD,  
Add (C1948)(10K)

15.(Page1)Base on HD2 side suggest to add HW thermal protection circuit (HW thermal shut down temperature  
adjustment) , layout please check.  
Back up SW1 (0P6,TP207F)  
Back up R2126 (10K),R2124 (10K),R2336 (10K),R2330 (10K),R2331 (10K),C1948 (10K)

16.(Page64)Adjust +5VALN current limit  
Change PR64 from 51K to 62K

17.(Page66)Adjust +1\_8VUSV current limit  
Change PR305 from 8.2K to 7.5K

18.(Page68)PC159  
Storage issue  
Change XSR (IC-2B20474-M000)  
to XTR (IC-2B20474-K000)

19.(Page70)Base on NvMedia suggestion, Change NV\_VDD from 1.0V to 1.2V  
Change PR417, PR418 from NC to mount and Change PR217, PR224 from mount to NC

20.(Page71)PC391  
Storage issue  
Change XSR (IC-2B30224-M000)  
to XTR (IC-2B30224-K000)

21.(Page71)  
Reset circuit design change,  
Add 99V (120K,100F) fuse for boot circuit.  
Change R212 from 10K to 100K, R2126, R2127, R2128, R2129, R2130, R2131, R2132, R2133, R2134, R2135, R2136, R2137, R2138, R2139, R2140, R2141, R2142, R2143, R2144, R2145, R2146, R2147, R2148, R2149, R2150, R2151, R2152, R2153, R2154, R2155, R2156, R2157, R2158, R2159, R2160, R2161, R2162, R2163, R2164, R2165, R2166, R2167, R2168, R2169, R2170, R2171, R2172, R2173, R2174, R2175, R2176, R2177, R2178, R2179, R2180, R2181, R2182, R2183, R2184, R2185, R2186, R2187, R2188, R2189, R2190, R2191, R2192, R2193, R2194, R2195, R2196, R2197, R2198, R2199, R2200, R2201, R2202, R2203, R2204, R2205, R2206, R2207, R2208, R2209, R2210, R2211, R2212, R2213, R2214, R2215, R2216, R2217, R2218, R2219, R2220, R2221, R2222, R2223, R2224, R2225, R2226, R2227, R2228, R2229, R2230, R2231, R2232, R2233, R2234, R2235, R2236, R2237, R2238, R2239, R2240, R2241, R2242, R2243, R2244, R2245, R2246, R2247, R2248, R2249, R2250, R2251, R2252, R2253, R2254, R2255, R2256, R2257, R2258, R2259, R2260, R2261, R2262, R2263, R2264, R2265, R2266, R2267, R2268, R2269, R2270, R2271, R2272, R2273, R2274, R2275, R2276, R2277, R2278, R2279, R2280, R2281, R2282, R2283, R2284, R2285, R2286, R2287, R2288, R2289, R2290, R2291, R2292, R2293, R2294, R2295, R2296, R2297, R2298, R2299, R2300, R2301, R2302, R2303, R2304, R2305, R2306, R2307, R2308, R2309, R2310, R2311, R2312, R2313, R2314, R2315, R2316, R2317, R2318, R2319, R2320, R2321, R2322, R2323, R2324, R2325, R2326, R2327, R2328, R2329, R2330, R2331, R2332, R2333, R2334, R2335, R2336, R2337, R2338, R2339, R2340, R2341, R2342, R2343, R2344, R2345, R2346, R2347, R2348, R2349, R2350, R2351, R2352, R2353, R2354, R2355, R2356, R2357, R2358, R2359, R2360, R2361, R2362, R2363, R2364, R2365, R2366, R2367, R2368, R2369, R2370, R2371, R2372, R2373, R2374, R2375, R2376, R2377, R2378, R2379, R2380, R2381, R2382, R2383, R2384, R2385, R2386, R2387, R2388, R2389, R2390, R2391, R2392, R2393, R2394, R2395, R2396, R2397, R2398, R2399, R2400, R2401, R2402, R2403, R2404, R2405, R2406, R2407, R2408, R2409, R2410, R2411, R2412, R2413, R2414, R2415, R2416, R2417, R2418, R2419, R2420, R2421, R2422, R2423, R2424, R2425, R2426, R2427, R2428, R2429, R2430, R2431, R2432, R2433, R2434, R2435, R2436, R2437, R2438, R2439, R2440, R2441, R2442, R2443, R2444, R2445, R2446, R2447, R2448, R2449, R2450, R2451, R2452, R2453, R2454, R2455, R2456, R2457, R2458, R2459, R2460, R2461, R2462, R2463, R2464, R2465, R2466, R2467, R2468, R2469, R2470, R2471, R2472, R2473, R2474, R2475, R2476, R2477, R2478, R2479, R2480, R2481, R2482, R2483, R2484, R2485, R2486, R2487, R2488, R2489, R2490, R2491, R2492, R2493, R2494, R2495, R2496, R2497, R2498, R2499, R2500, R2501, R2502, R2503, R2504, R2505, R2506, R2507, R2508, R2509, R2510, R2511, R2512, R2513, R2514, R2515, R2516, R2517, R2518, R2519, R2520, R2521, R2522, R2523, R2524, R2525, R2526, R2527, R2528, R2529, R2530, R2531, R2532, R2533, R2534, R2535, R2536, R2537, R2538, R2539, R2540, R2541, R2542, R2543, R2544, R2545, R2546, R2547, R2548, R2549, R2550, R2551, R2552, R2553, R2554, R2555, R2556, R2557, R2558, R2559, R2560, R2561, R2562, R2563, R2564, R2565, R2566, R2567, R2568, R2569, R2570, R2571, R2572, R2573, R2574, R2575, R2576, R2577, R2578, R2579, R2580, R2581, R2582, R2583, R2584, R2585, R2586, R2587, R2588, R2589, R2590, R2591, R2592, R2593, R2594, R2595, R2596, R2597, R2598, R2599, R2600, R2601, R2602, R2603, R2604, R2605, R2606, R2607, R2608, R2609, R2610, R2611, R2612, R2613, R2614, R2615, R2616, R2617, R2618, R2619, R2620, R2621, R2622, R2623, R2624, R2625, R2626, R2627, R2628, R2629, R2630, R2631, R2632, R2633, R2634, R2635, R2636, R2637, R2638, R2639, R2640, R2641, R2642, R2643, R2644, R2645, R2646, R2647, R2648, R2649, R2650, R2651, R2652, R2653, R2654, R2655, R2656, R2657, R2658, R2659, R2660, R2661, R2662, R2663, R2664, R2665, R2666, R2667, R2668, R2669, R2670, R2671, R2672, R2673, R2674, R2675, R2676, R2677, R2678, R2679, R2680, R2681, R2682, R2683, R2684, R2685, R2686, R2687, R2688, R2689, R2690, R2691, R2692, R2693, R2694, R2695, R2696, R2697, R2698, R2699, R2700, R2701, R2702, R2703, R2704, R2705, R2706, R2707, R2708, R2709, R2710, R2711, R2712, R2713, R2714, R2715, R2716, R2717, R2718, R2719, R2720, R2721, R2722, R2723, R2724, R2725, R2726, R2727, R2728, R2729, R2730, R2731, R2732, R2733, R2734, R2735, R2736, R2737, R2738, R2739, R2740, R2741, R2742, R2743, R2744, R2745, R2746, R2747, R2748, R2749, R2750, R2751, R2752, R2753, R2754, R2755, R2756, R2757, R2758, R2759, R2760, R2761, R2762, R2763, R2764, R2765, R2766, R2767, R2768, R2769, R2770, R2771, R2772, R2773, R2774, R2775, R2776, R2777, R2778, R2779, R2780, R2781, R2782, R2783, R2784, R2785, R2786, R2787, R2788, R2789, R2790, R2791, R2792, R2793, R2794, R2795, R2796, R2797, R2798, R2799, R2800, R2801, R2802, R2803, R2804, R2805, R2806, R2807, R2808, R2809, R2810, R2811, R2812, R2813, R2814, R2815, R2816, R2817, R2818, R2819, R2820, R2821, R2822, R2823, R2824, R2825, R2826, R2827, R2828, R2829, R2830, R2831, R2832, R2833, R2834, R2835, R2836, R2837, R2838, R2839, R2840, R2841, R2842, R2843, R2844, R2845, R2846, R2847, R2848, R2849, R2850, R2851, R2852, R2853, R2854, R2855, R2856, R2857, R2858, R2859, R2860, R2861, R2862, R2863, R2864, R2865, R2866, R2867, R2868, R2869, R2870, R2871, R2872, R2873, R2874, R2875, R2876, R2877, R2878, R2879, R2880, R2881, R2882, R2883, R2884, R2885, R2886, R2887, R2888, R2889, R2890, R2891, R2892, R2893, R2894, R2895, R2896, R2897, R2898, R2899, R2900, R2901, R2902, R2903, R2904, R2905, R2906, R2907, R2908, R2909, R2910, R2911, R2912, R2913, R2914, R2915, R2916, R2917, R2918, R2919, R2920, R2921, R2922, R2923, R2924, R2925, R2926, R2927, R2928, R2929, R2930, R2931, R2932, R2933, R2934, R2935, R2936, R2937, R2938, R2939, R2940, R2941, R2942, R2943, R2944, R2945, R2946, R2947, R2948, R2949, R2950, R2951, R2952, R2953, R2954, R2955, R2956, R2957, R2958, R2959, R2960, R2961, R2962, R2963, R2964, R2965, R2966, R2967, R2968, R2969, R2970, R2971, R2972, R2973, R2974, R2975, R2976, R2977, R2978, R2979, R2980, R2981, R2982, R2983, R2984, R2985, R2986, R2987, R2988, R2989, R2990, R2991, R2992, R2993, R2994, R2995, R2996, R2997, R2998, R2999, R3000, R3001, R3002, R3003, R3004, R3005, R3006, R3007, R3008, R3009, R3010, R3011, R3012, R3013, R3014, R3015, R3016, R3017, R3018, R3019, R3020, R3021, R3022, R3023, R3024, R3025, R3026, R3027, R3028, R3029, R3030, R3031, R3032, R3033, R3034, R3035, R3036, R3037, R3038, R3039, R3040, R3041, R3042, R3043, R3044, R3045, R3046, R3047, R3048, R3049, R3050, R3051, R3052, R3053, R3054, R3055, R3056, R3057, R3058, R3059, R3060, R3061, R3062, R3063, R3064, R3065, R3066, R3067, R3068, R3069, R3070, R3071, R3072, R3073, R3074, R3075, R3076, R3077, R3078, R3079, R3080, R3081, R3082, R3083, R3084, R3085, R3086, R3087, R3088, R3089, R3090, R3091, R3092, R3093, R3094, R3095, R3096, R3097, R3098, R3099, R3100, R3101, R3102, R3103, R3104, R3105, R3106, R3107, R3108, R3109, R3110, R3111, R3112, R3113, R3114, R3115, R3116, R3117, R3118, R3119, R3120, R3121, R3122, R3123, R3124, R3125, R3126, R3127, R3128, R3129, R3130, R3131, R3132, R3133, R3134, R3135, R3136, R3137, R3138, R3139, R3140, R3141, R3142, R3143, R3144, R3145, R3146, R3147, R3148, R3149, R3150, R3151, R3152, R3153, R3154, R3155, R3156, R3157, R3158, R3159, R3160, R3161, R3162, R3163, R3164, R3165, R3166, R3167, R3168, R3169, R3170, R3171, R3172, R3173, R3174, R3175, R3176, R3177, R3178, R3179, R3180, R3181, R3182, R3183, R3184, R3185, R3186, R3187, R3188, R3189, R3190, R3191, R3192, R3193, R3194, R3195, R3196, R3197, R3198, R3199, R3200, R3201, R3202, R3203, R3204, R3205, R3206, R3207, R3208, R3209, R3210, R3211, R3212, R3213, R3214, R3215, R3216, R3217, R3218, R3219, R3220, R3221, R3222, R3223, R3224, R3225, R3226, R3227, R3228, R3229, R3230, R3231, R3232, R3233, R3234, R3235, R3236, R3237, R3238, R3239, R3240, R3241, R3242, R3243, R3244, R3245, R3246, R3247, R3248, R3249, R3250, R3251, R3252, R3253, R3254, R3255, R3256, R3257, R3258, R3259, R3260, R3261, R3262, R3263, R3264, R3265, R3266, R3267, R3268, R3269, R3270, R3271, R3272, R3273, R3274, R3275, R3276, R3277, R3278, R3279, R3280, R3281, R3282, R3283, R3284, R3285, R3286, R3287, R3288, R3289, R3290, R3291, R3292, R3293, R3294, R3295, R3296, R3297, R3298, R3299, R3300, R3301, R3302, R3303, R3304, R3305, R3306, R3307, R3308, R3309, R3310, R3311, R3312, R3313, R3314, R3315, R3316, R3317, R3318, R3319, R3320, R3321, R3322, R3323, R3324, R3325, R3326, R3327, R3328, R3329, R3330, R3331, R3332, R3333, R3334, R3335, R3336, R3337, R3338, R3339, R3340, R3341, R3342, R3343, R3344, R3345, R3346, R3347, R3348, R3349, R3350, R3351, R3352, R3353, R3354, R3355, R3356, R3357, R3358, R3359, R3360, R3361, R3362, R3363, R3364, R3365, R3366, R3367, R3368, R3369, R3370, R3371, R3372, R3373, R3374, R3375, R3376, R3377, R3378, R3379, R3380, R3381, R3382, R3383, R3384, R3385, R3386, R3387, R3388, R3389, R3390, R3391, R3392, R3393, R3394, R3395, R3396, R3397, R3398, R3399, R3400, R3401, R3402, R3403, R3404, R3405, R3406, R3407, R3408, R3409, R3410, R3411, R3412, R3413, R3414, R3415, R3416, R3417, R3418, R3419, R3420, R3421, R3422, R3423, R3424, R3425, R3426, R3427, R3428, R3429, R3430, R3431, R3432, R3433, R3434, R3435, R3436, R3437, R3438, R3439, R3440, R3441, R3442, R3443, R3444, R3445, R3446, R3447, R3448, R3449, R3450, R3451, R3452, R3453, R3454, R3455, R3456, R3457, R3458, R3459, R3460, R3461, R3462, R3463, R3464, R3465, R3466, R3467, R3468, R3469, R3470, R3471, R3472, R3473, R3474, R3475, R3476, R3477, R3478, R3479, R3480, R3481, R3482, R3483, R3484, R3485, R3486, R3487, R3488, R3489, R3490, R3491, R3492, R3493, R3494, R3495, R3496, R3497, R3498, R3499, R3500, R3501, R3502, R3503, R3504, R3505, R3506, R3507, R3508, R3509, R3510, R3511, R3512, R3513, R3514, R3515, R3516, R3517, R3518, R3519, R3520, R3521, R3522, R3523, R3524, R3525, R3526, R3527, R3528, R3529, R3530, R3531, R3532, R3533, R3534, R3535, R3536, R3537, R3538, R3539, R3540, R3541, R3542, R3543, R3544, R3545, R3546, R3547, R3548, R3549, R3550, R3551, R3552, R3553, R3554, R3555, R3556, R3557, R3558, R3559, R3560, R3561, R3562, R3563, R3564, R3565, R3566, R3567, R3568, R3569, R3570, R3571, R3572, R3573, R3574, R3575, R3576, R3577, R3578, R3579, R3580, R3581, R3582, R3583, R3584, R3585, R3586, R3587, R3588, R3589, R3590, R3591, R3592, R3593, R3594, R3595, R3596, R3597, R3598, R3599, R3600, R3601, R3602, R3603, R3604, R3605, R3606, R3607, R3608, R3609, R3610, R3611, R3612, R3613, R3614, R3615, R3616, R3617, R3618, R3619, R3620, R3621, R3622, R3623, R3624, R3625, R3626, R3627, R3628, R3629, R3630, R3631, R3632, R3633, R3634, R3635, R3636, R3637, R3638, R3639, R3640, R3641, R3642, R3643, R3644, R3645, R3646, R3647, R3648, R3649, R3650, R3651, R3652, R3653, R3654, R3655, R3656, R3657, R3658, R3659, R3660, R3661, R3662, R3663, R3664, R3665, R3666, R3667, R3668, R3669, R3670, R3671, R3672, R3673, R3674, R3675, R3676, R3677, R3678, R3679, R3680, R3681, R3682, R3683, R3684, R3685, R3686, R3687, R3688, R3689, R3690, R3691, R3692, R3693, R3694, R3695, R3696, R3697, R3698, R3699, R3700, R3701, R3702, R3703, R3704, R3705, R3706, R3707, R3708, R3709, R3710, R3711, R3712, R3713, R3714, R3715, R3716, R3717, R3718, R3719, R3720, R3721, R3722, R3723, R3724, R3725, R3726, R3727, R3728, R3729, R3730, R3731, R3732, R3733, R3734, R3735, R3736, R3737, R3738, R3739, R3740, R3741, R3742, R3743, R3744, R3745, R3746, R3747, R3748, R3749, R3750, R3751, R3752, R3753, R3754, R3755, R3756, R3757, R3758, R3759, R3760, R3761, R3762, R3763, R3764, R3765, R3766, R3767, R3768, R3769, R3770, R3771, R3772, R3773, R3774, R3775, R3776, R3777, R3778, R3779, R3780, R3781, R3782, R3783, R3784, R3785, R3786, R3787, R3788, R3789, R3790, R3791, R3792, R3793, R3794, R3795, R3796, R3797, R3798, R3799, R3800, R3801, R3802, R3803, R3804, R3805, R3806, R3807, R3808, R3809, R3810, R3811, R3812, R3813, R3814, R3815, R3816, R3817, R3818, R3819, R3820, R3821, R3822, R3823, R3824, R3825, R3826, R3827, R3828, R3829, R3830, R3831, R3832, R3833, R3834, R3835, R3836, R3837, R3838, R3839, R3840, R3841, R3842, R3843, R3844, R3845, R3846, R3847, R3848, R3849, R3850, R3851, R3852, R3853, R3854, R3855, R3856, R3857, R3858, R3859, R3860, R3861, R3862, R3863, R3864, R3865, R3866, R3867, R3868, R3869, R3870, R3871, R3872, R3873, R3874, R3875, R3876, R3877, R3878, R3879, R3880, R3881, R3882, R3883, R3884, R3885, R3886, R3887, R3888, R3889, R3890, R3891, R3892, R3893, R3894, R3895, R3896, R3897, R3898, R3899, R3900, R3901, R3902, R3903, R3904, R3905, R3906, R3907, R3908, R3909, R3910, R3911, R3912, R3913, R3914, R3915, R3916, R3917, R3918, R3919, R3920, R3921, R3922, R3923, R3924, R3925, R3926, R3927, R3928, R3929, R3930, R3931, R3932, R3933, R3934, R3935, R3936, R3937, R3938, R3939, R3940, R3941, R3942, R3943, R3944, R3945, R3946, R3947, R3948, R3949, R3950, R3951, R3952, R3953, R3954, R3955, R395