

SERVICE MANUAL

P650HP6(-G) / P651HP6(-G)

notebook

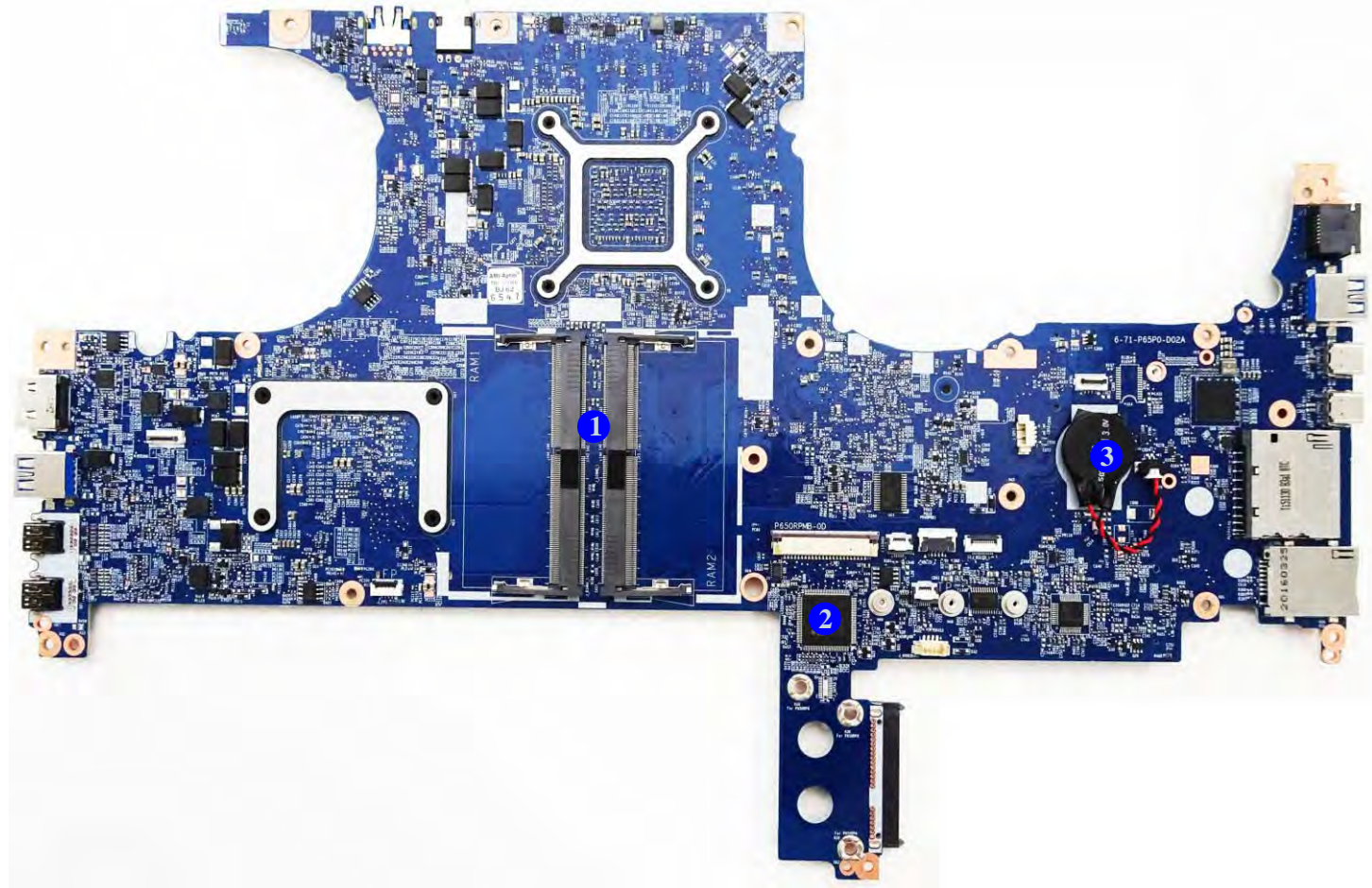


Introduction

Figure 7
**Mainboard Top
Key Parts**

1. Memory Slots
DDR4 SO-DIMM
2. KBC-ITE IT8587
3. CMOS Battery

Mainboard Overview - Top (Key Parts)



Mainboard Overview - Bottom (Key Parts)



Figure 8
**Mainboard Bottom
Key Parts**

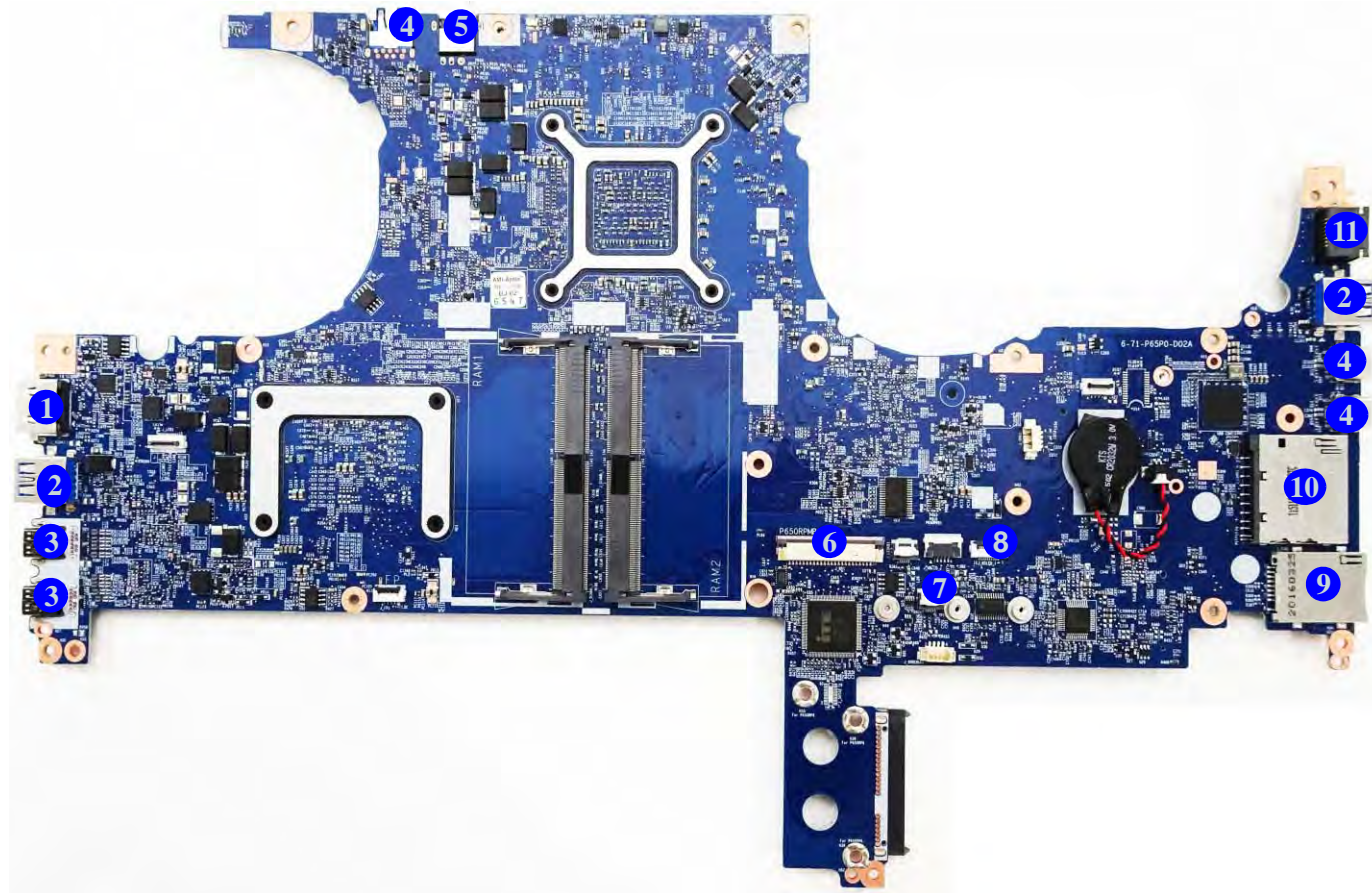
1. Mini-Card Connector (WLAN Module)
2. Mini-Card Connector (M.2 3G/SATA Module)
3. Mini-Card Connector (M.2 PCIE/SATA SSD Module)
4. GPU-GTX1060M
5. Memory Slots (DDR4 SO-DIMM)
6. CPU

Introduction

Figure 9
**Mainboard Top
Connectors**

1. HDMI Port
2. USB Port 3.0
Connector
3. Mini Display Port
4. USB Port 3.1
Connector
5. DC-In Jack
6. Keyboard Cable
Connector
7. TP Connector
8. Speaker
Connector
9. USIM Card
Reader (for 3G/
4G USIM Cards)
10. Multi-in-1 Card
Reader
11. RJ-45 LAN Jack

Mainboard Overview - Top (Connectors)



Mainboard Overview - Bottom (Connectors)

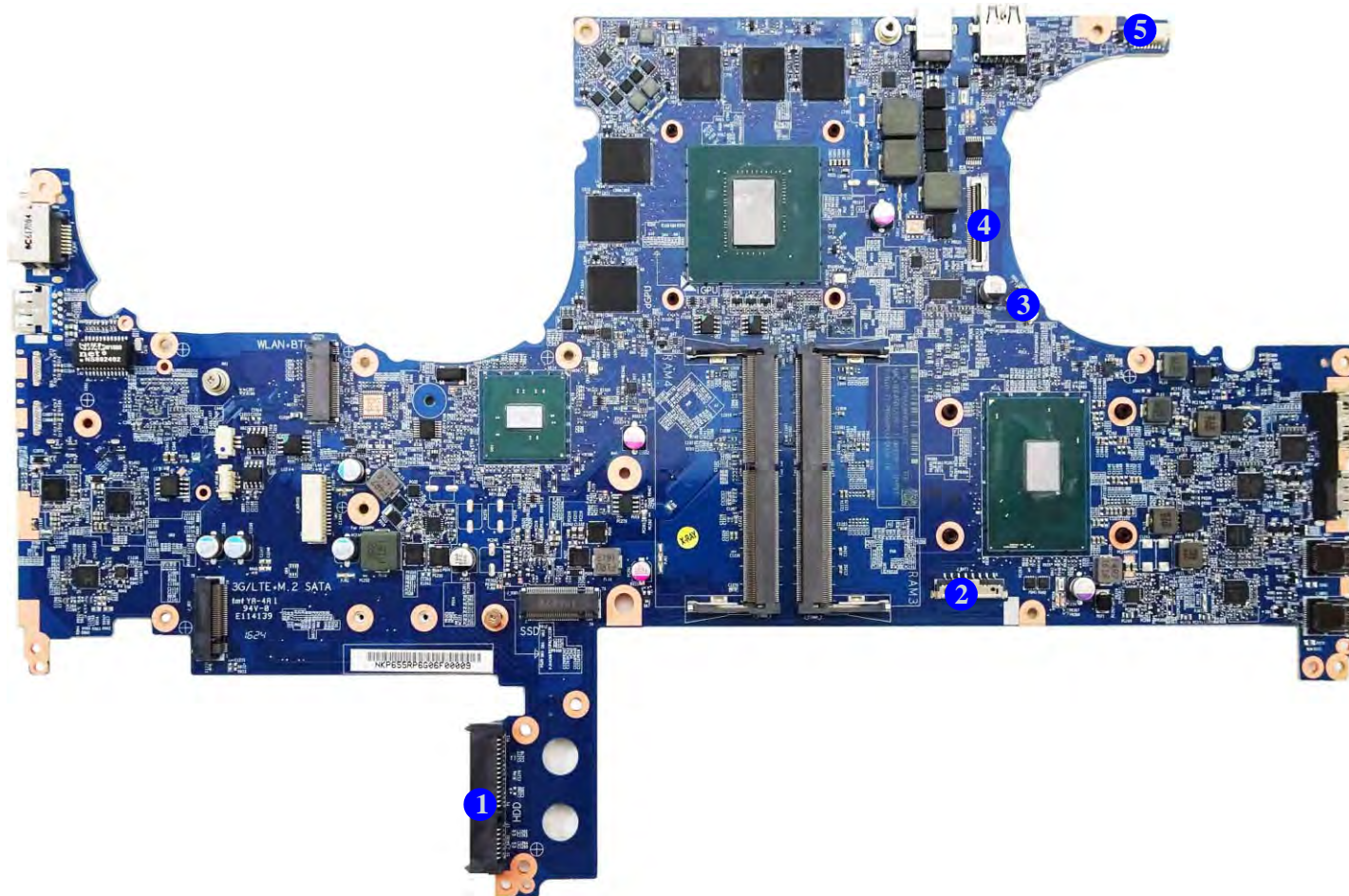


Figure 10
**Mainboard Bottom
Connectors**

1. HDD Connector
2. Battery Connector
3. Fan Connector
4. LCD Cable Connector
5. CCD Connector

Appendix B: Schematic Diagrams

This appendix has circuit diagrams of the *P650HP6(-G) / P651HP6(-G)* notebook's PCB's. The following table indicates where to find the appropriate schematic diagram.

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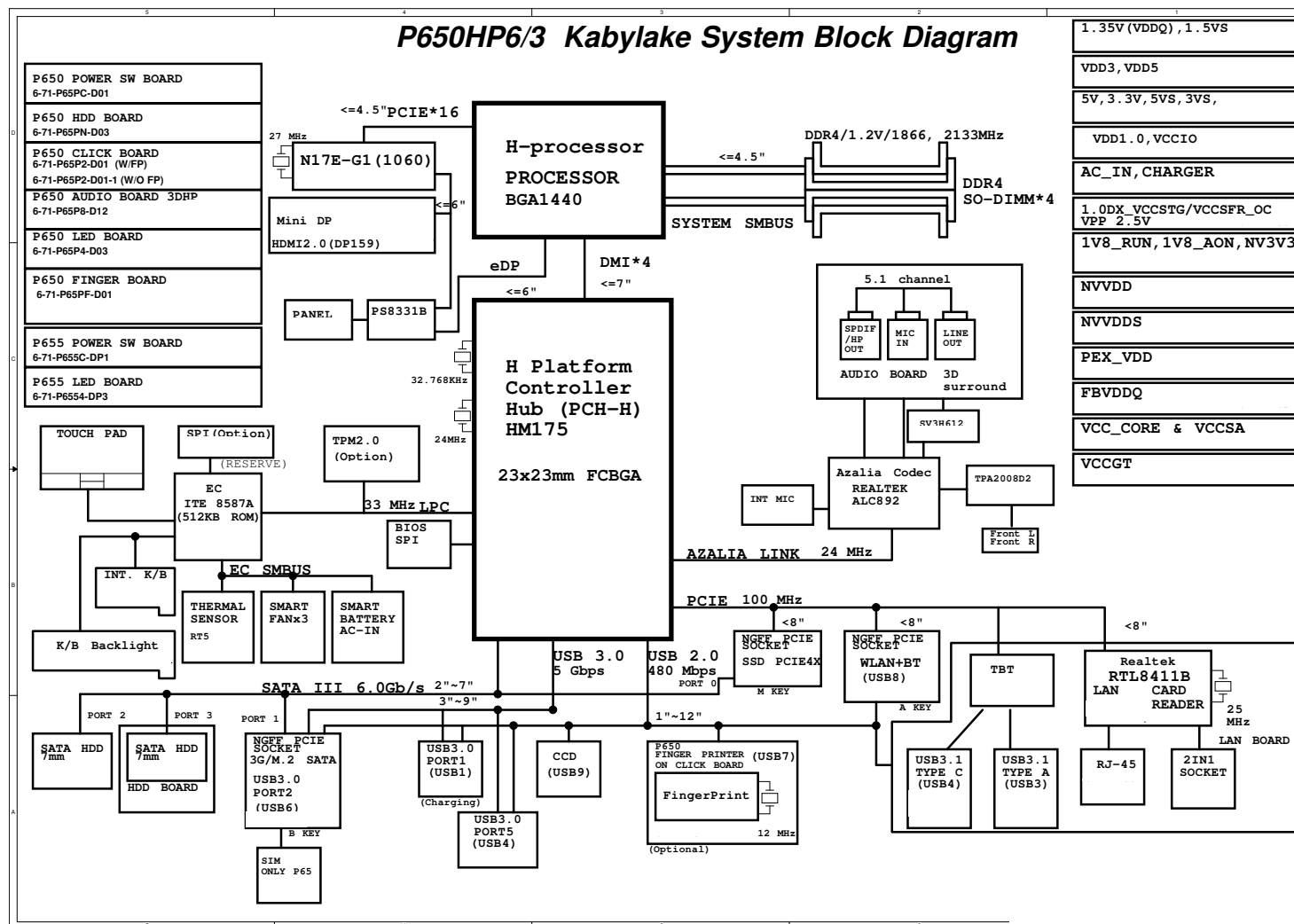
Table B - 1
**SCHEMATIC
DIAGRAMS**



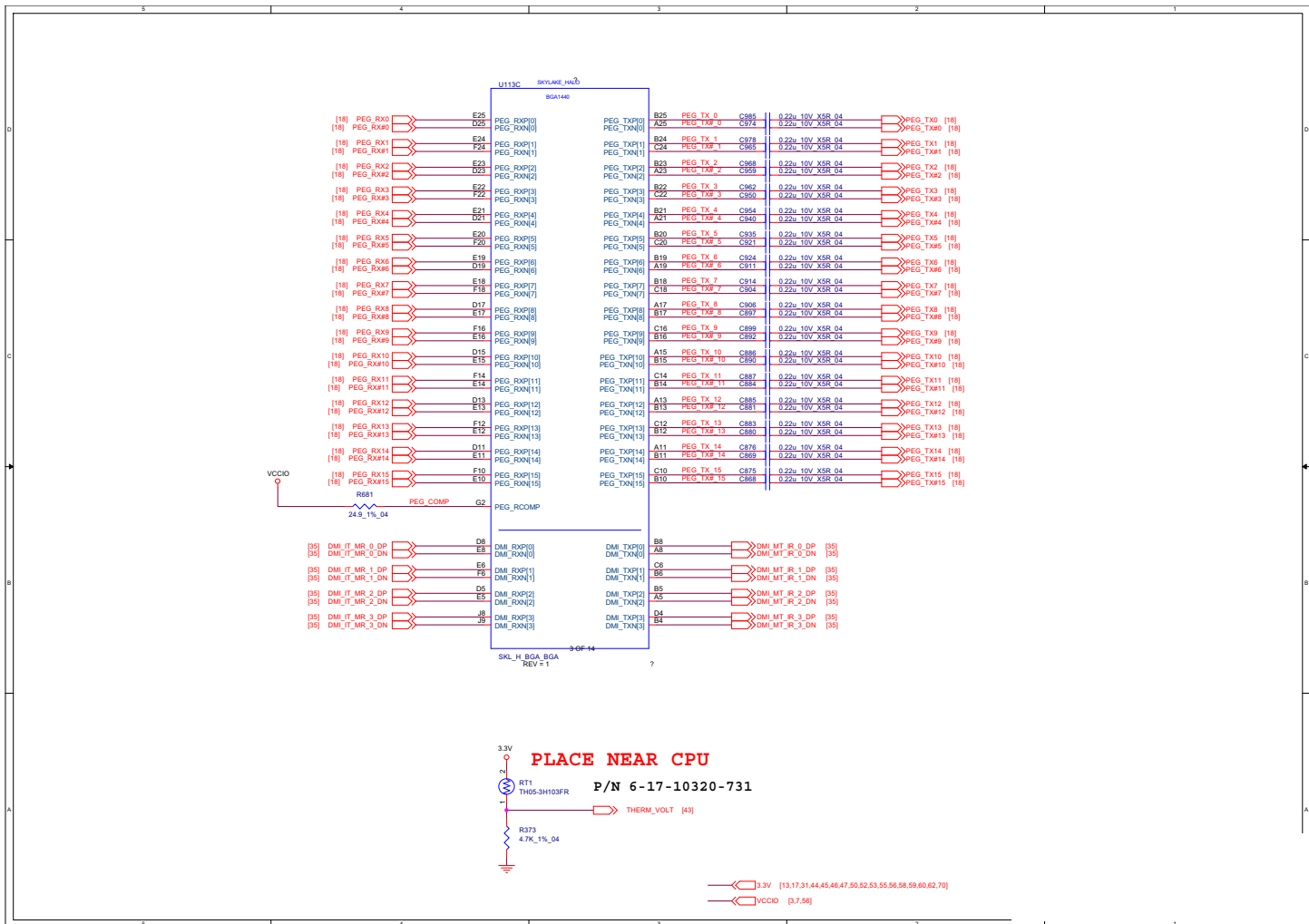
Version Note

The schematic diagrams in this chapter are based upon version 6-7P-P65P9-002. If your mainboard (or other boards) are a later version, please check with the Service Center for updated diagrams (if required).

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System Block
Diagram

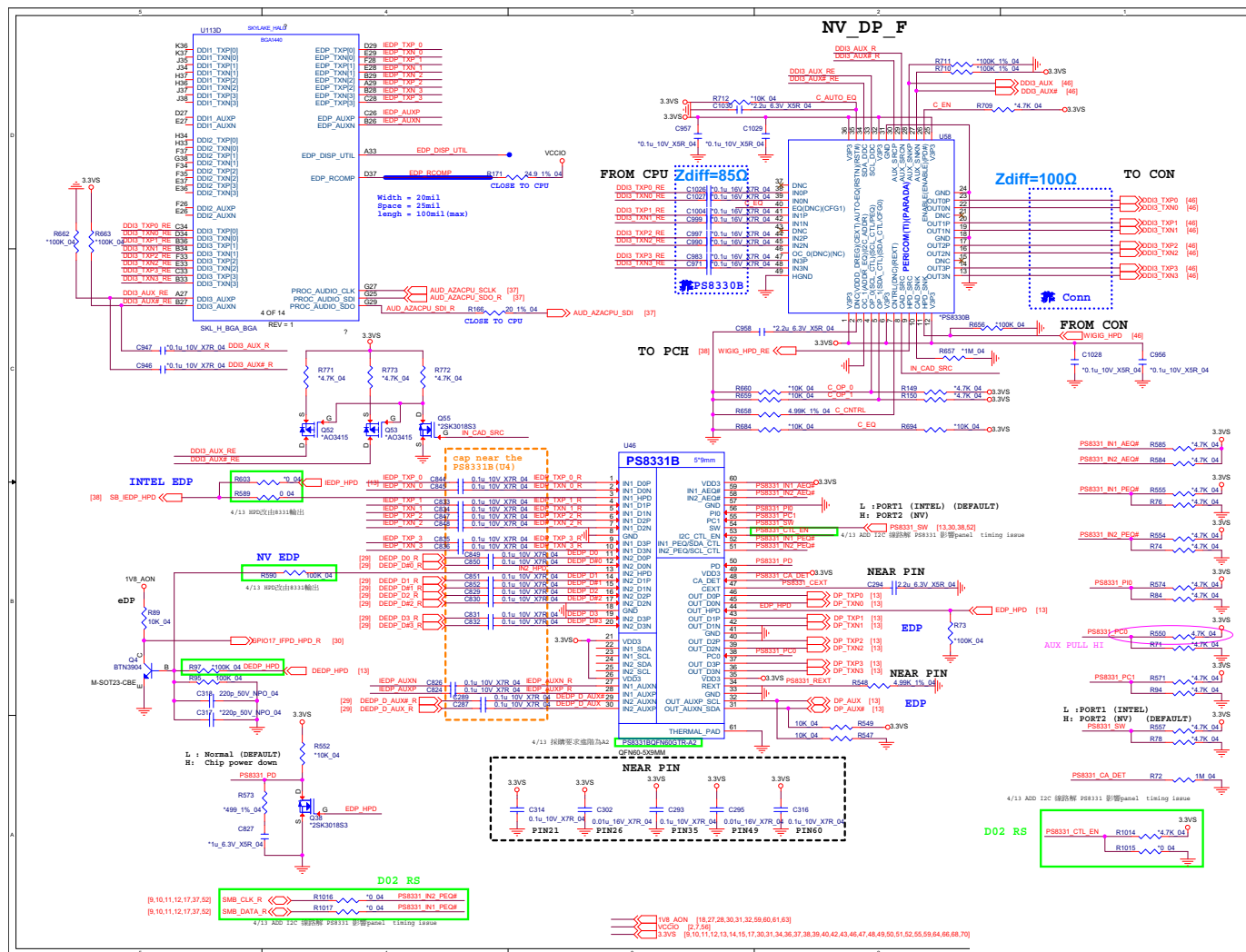


Processor 1/7

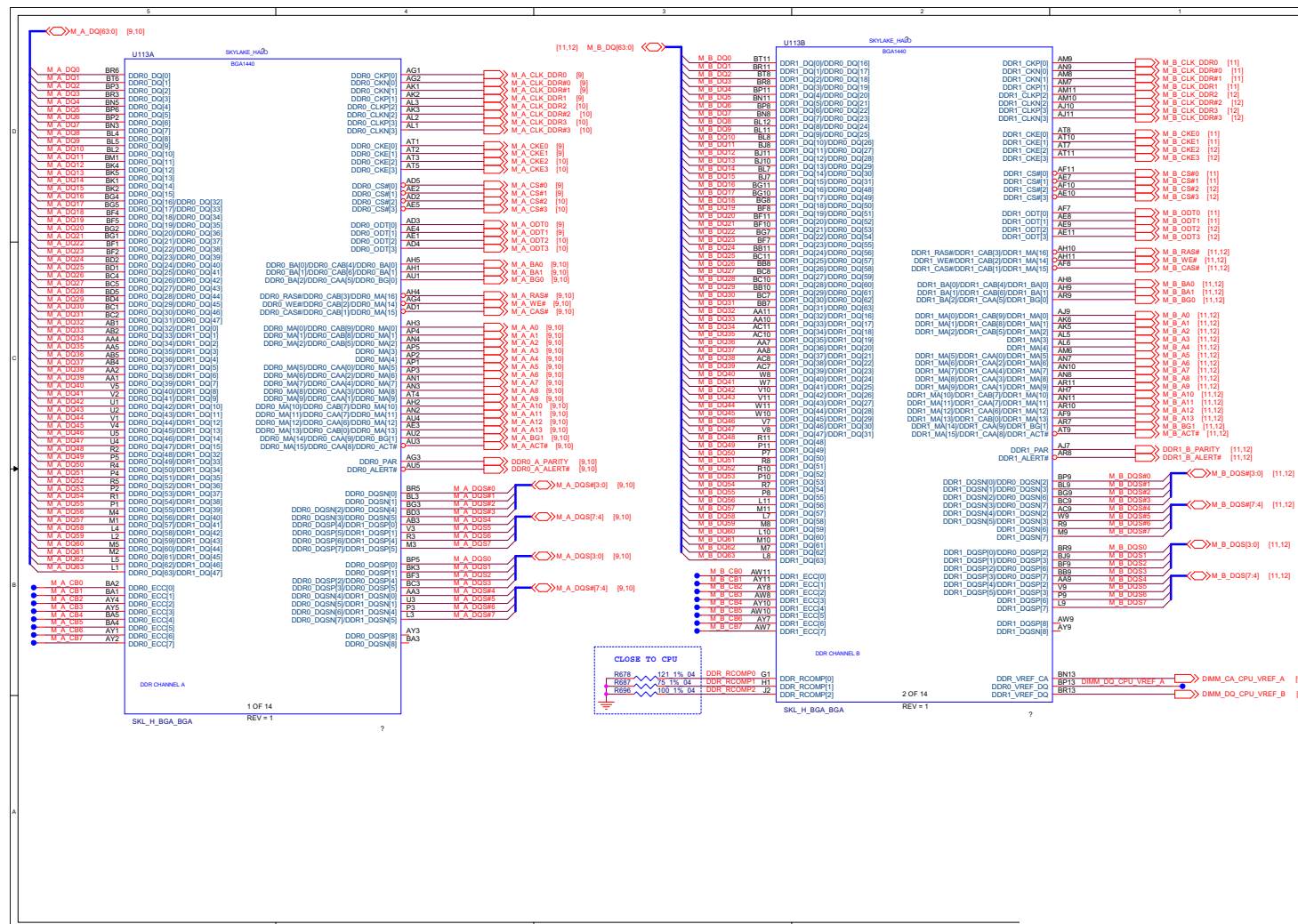


Processor 2/7

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Processor 2/7

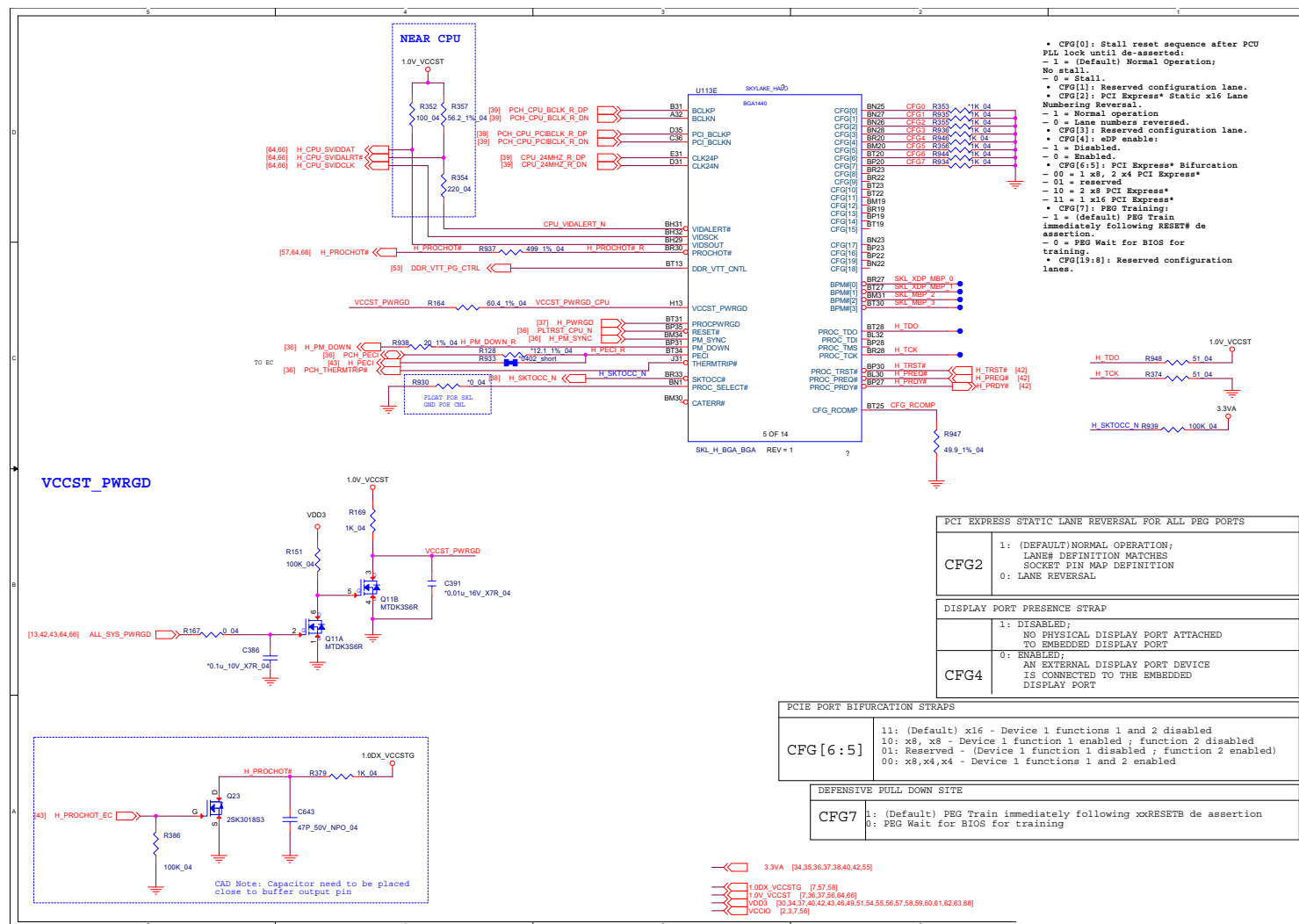


Processor 3/7 B - 5

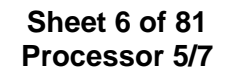


Processor 4/7

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Processor 4/7

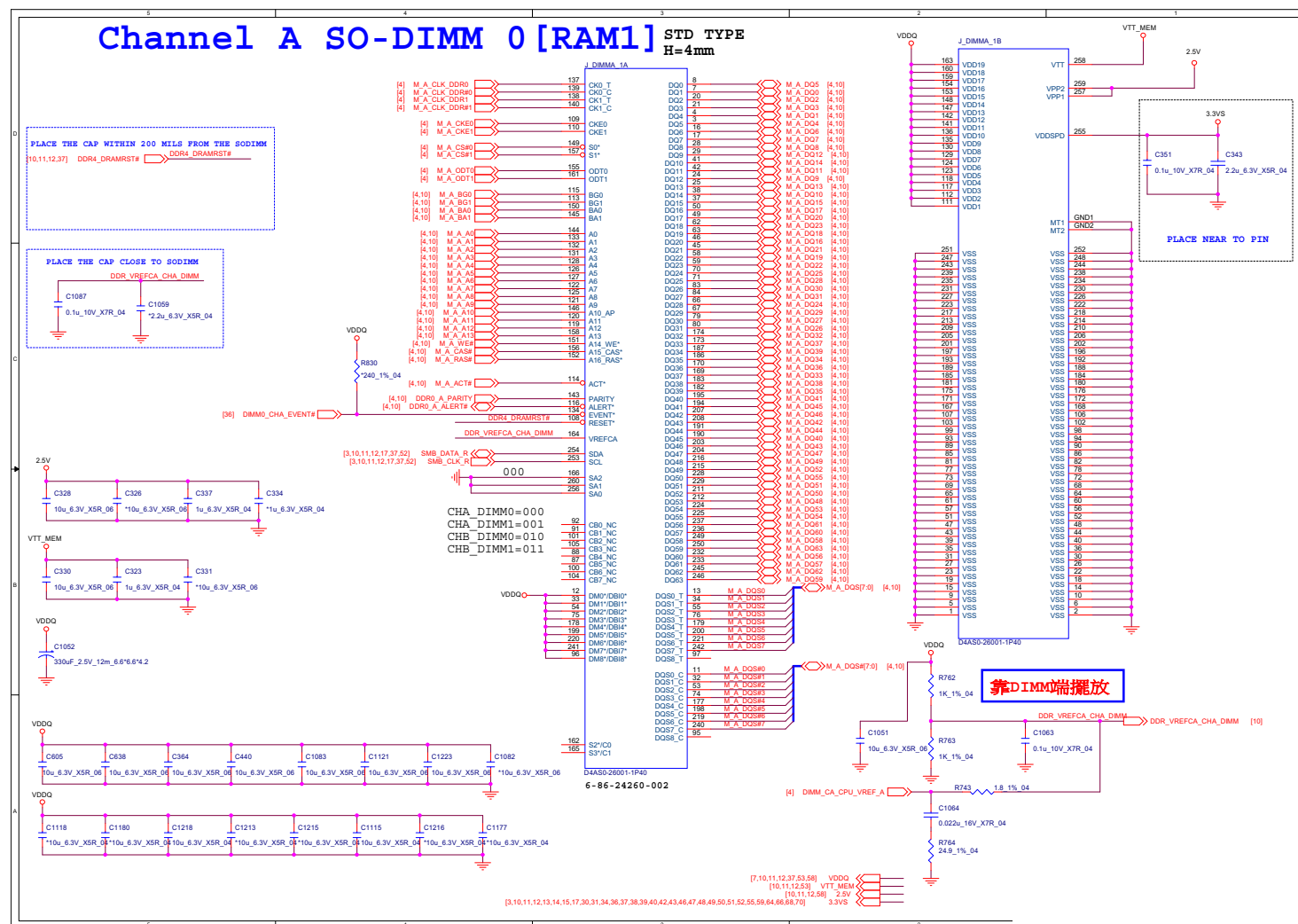


Processor 5/7 B - 7



B. Schematic Diagrams

B - 10 DDR CHA SO-DIMM_0

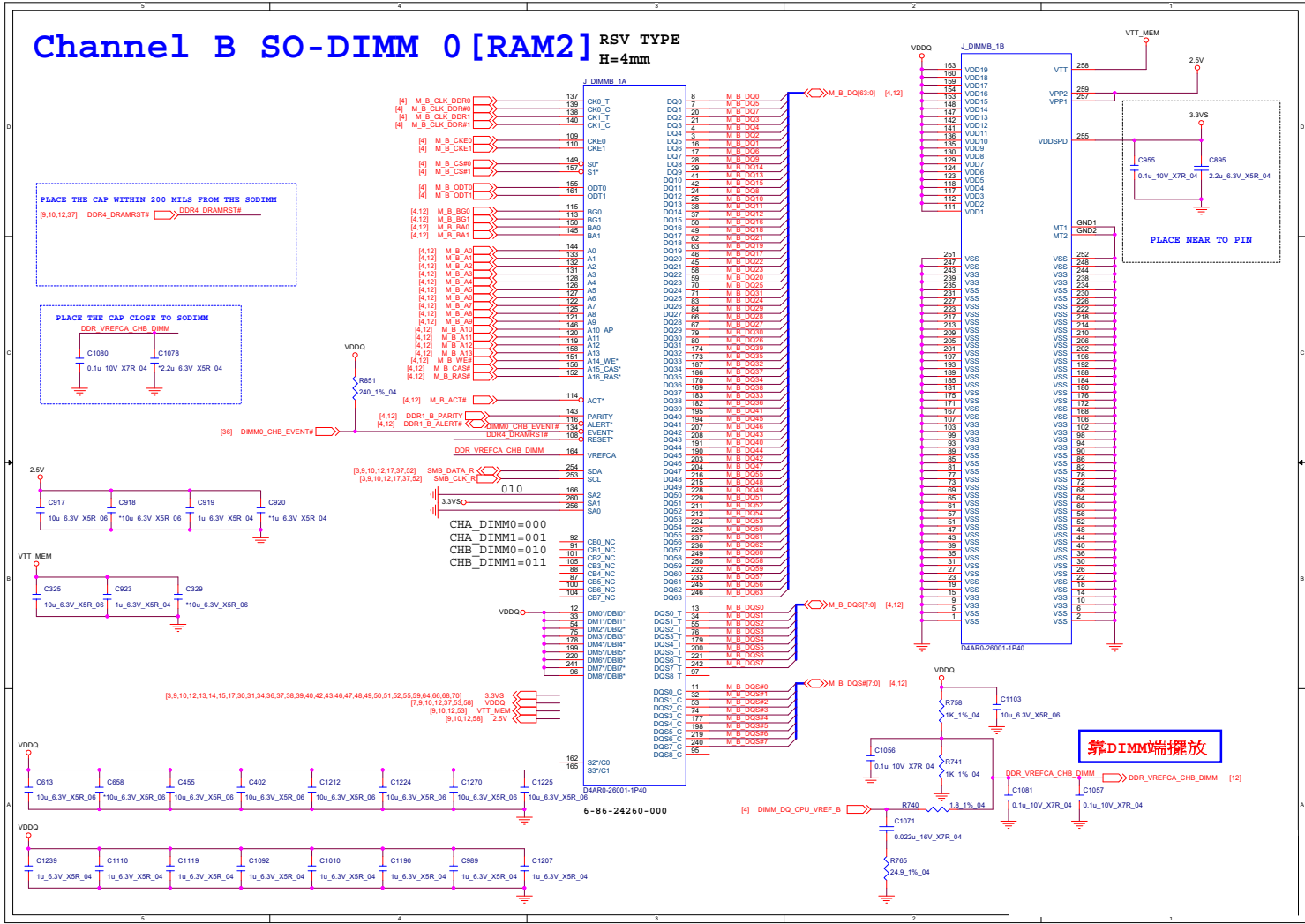


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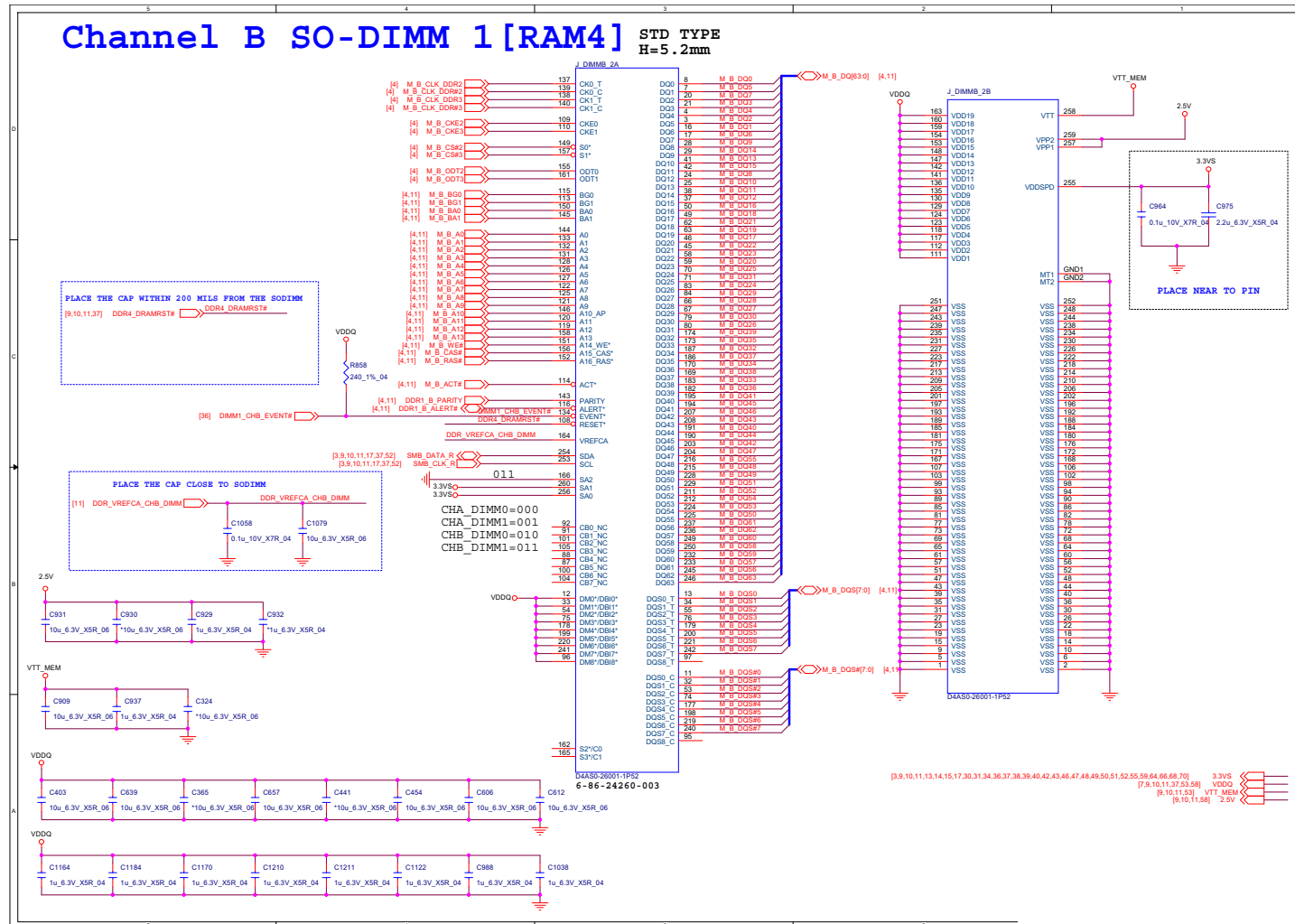
DDR CHB SO-DIMM_0

B. Schematic Diagrams

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DDR CHB SO-
DIMM 0

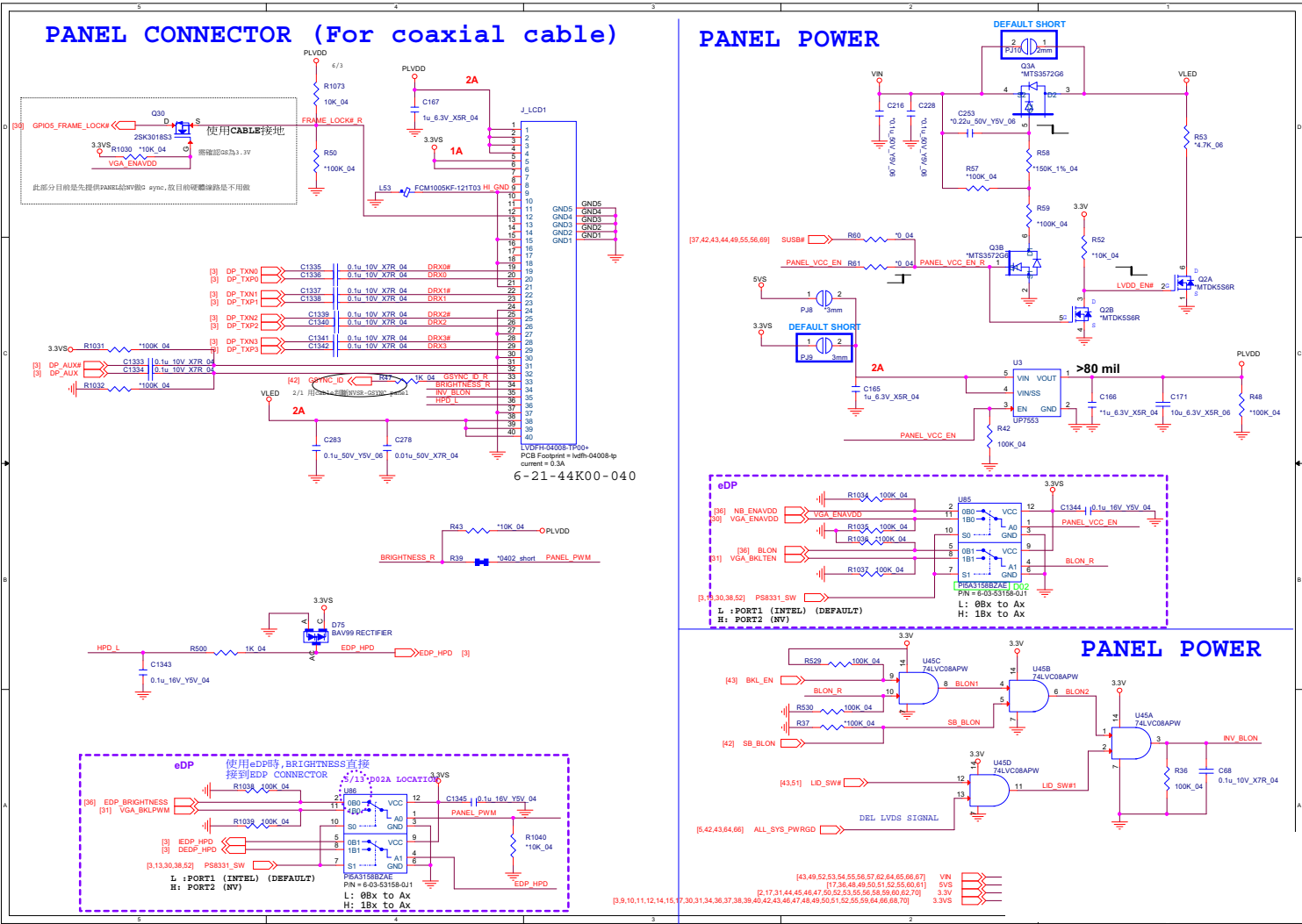


DDR CHB SO-DIMM_1

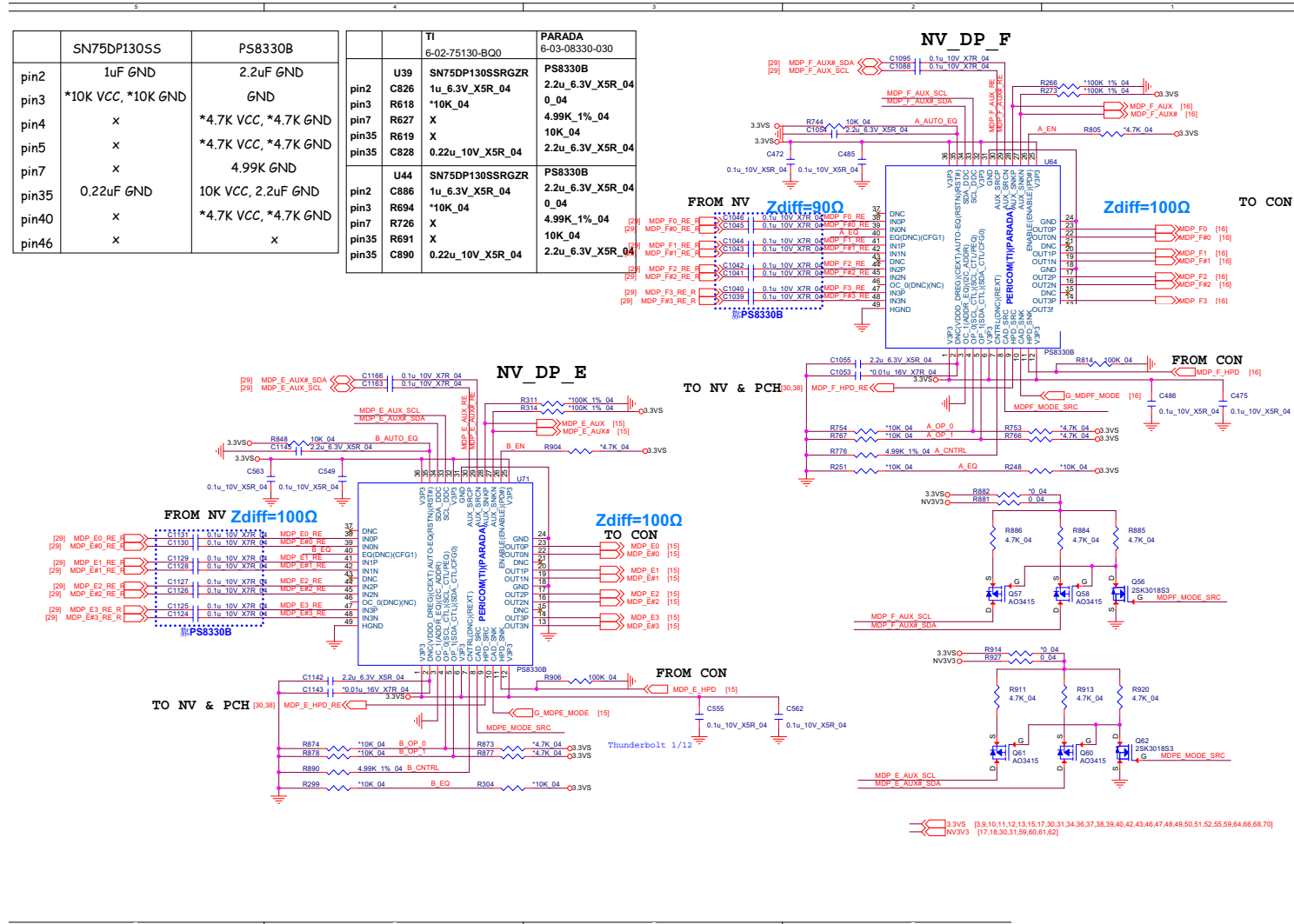


Panel, Inverter

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Panel, Inverter

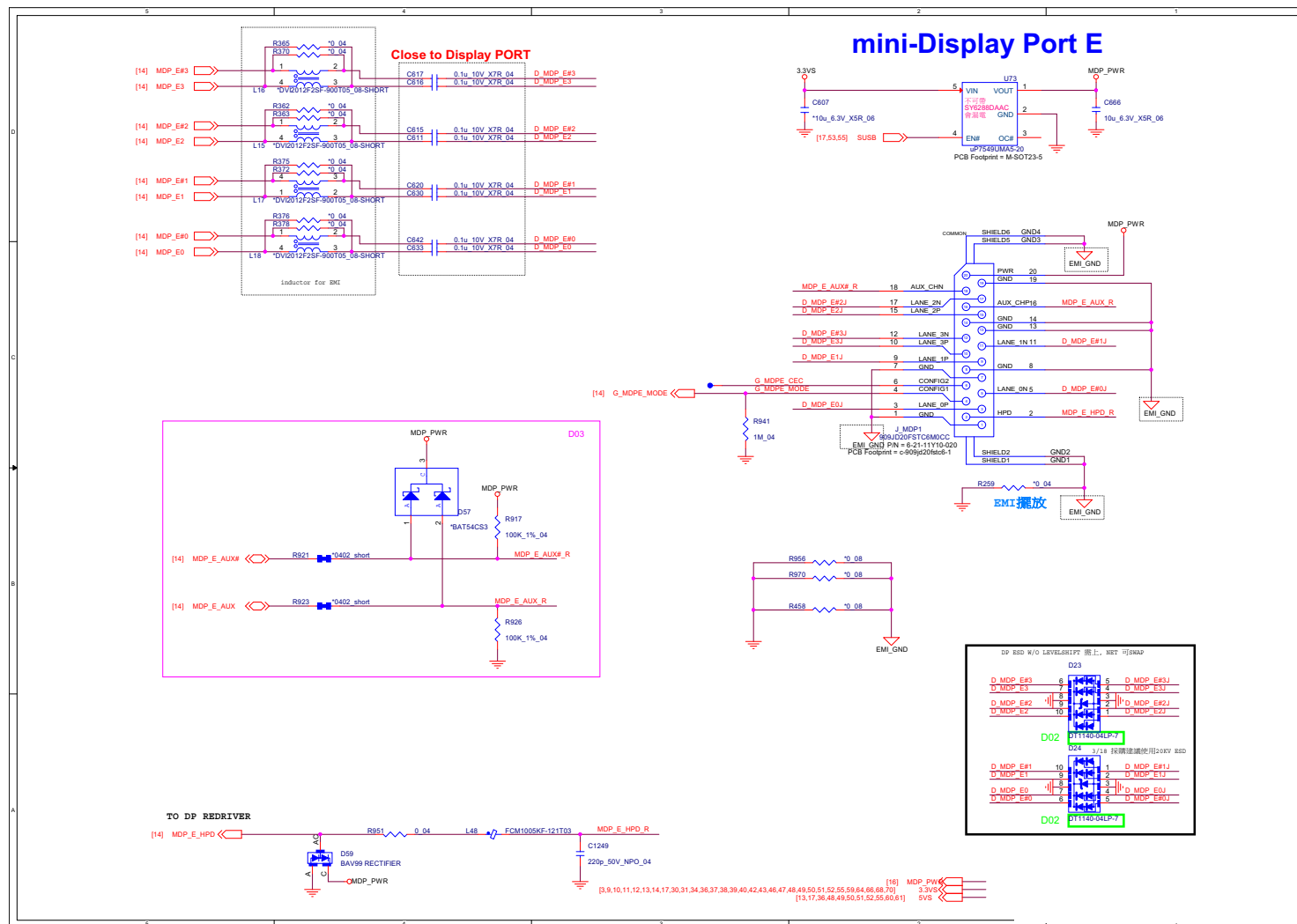


Redriver

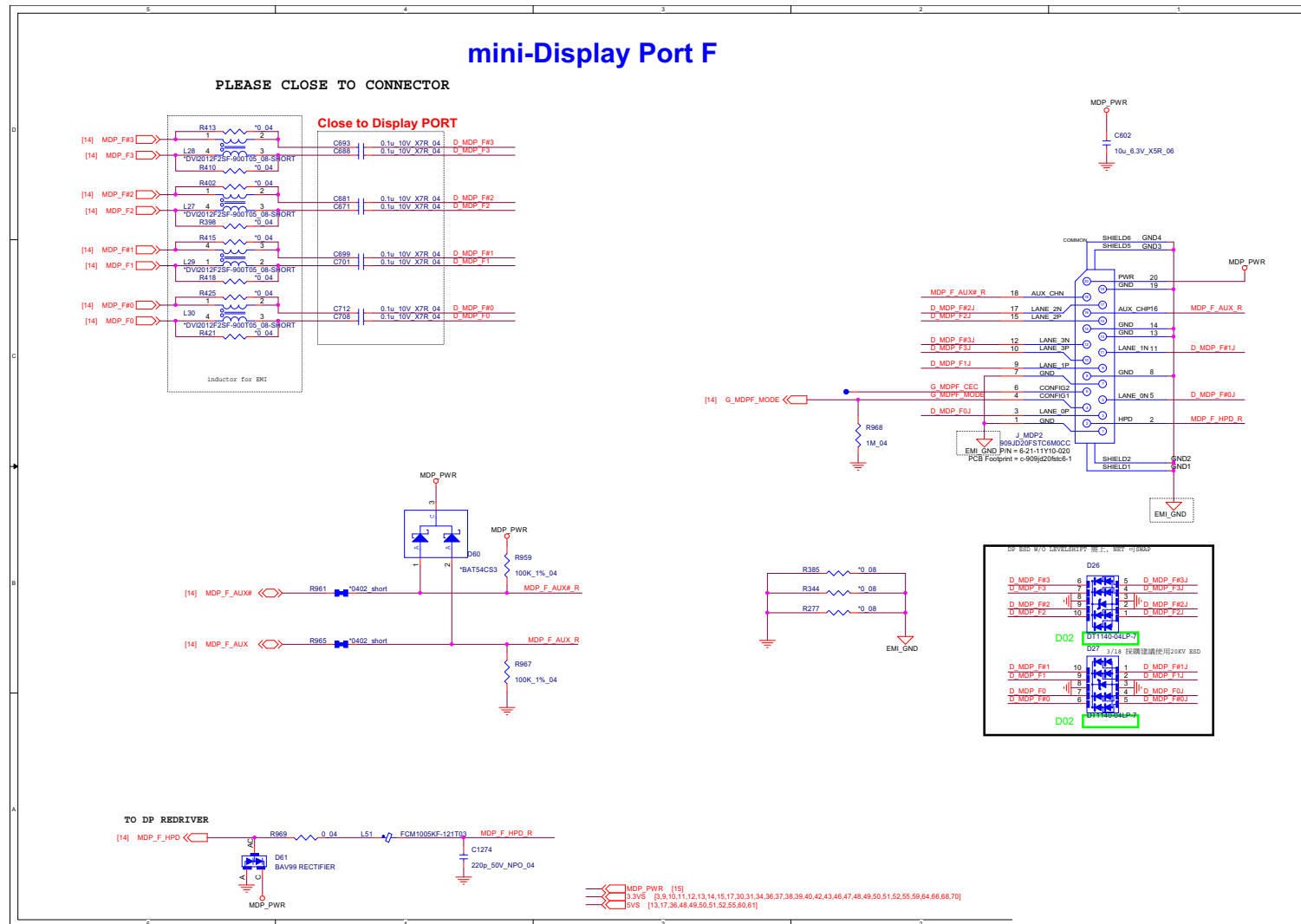
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Redriver

Mini DP Port E

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Mini DP Port E



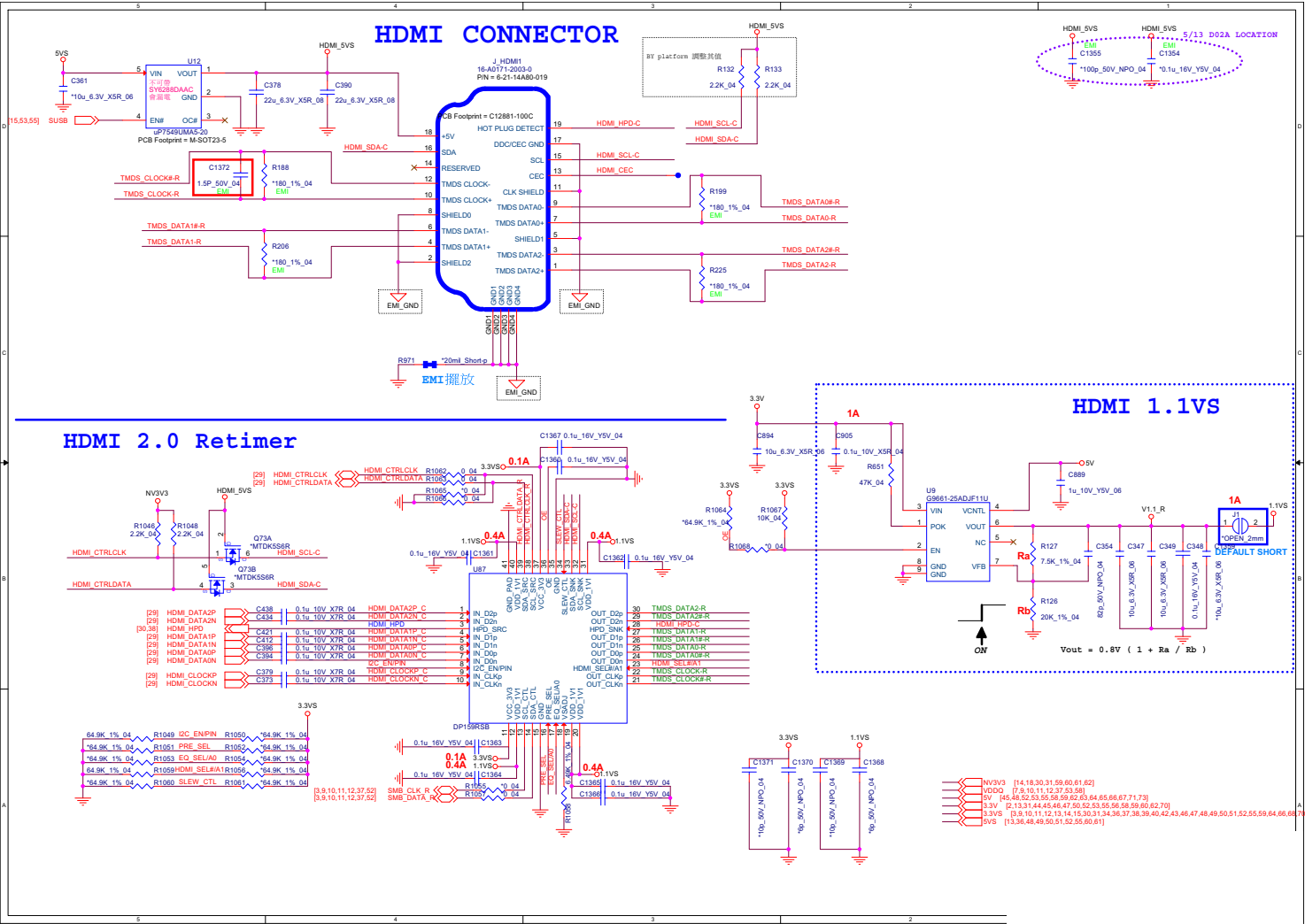
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Schematic Diagrams

HDMI Connector

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HDMI Connector

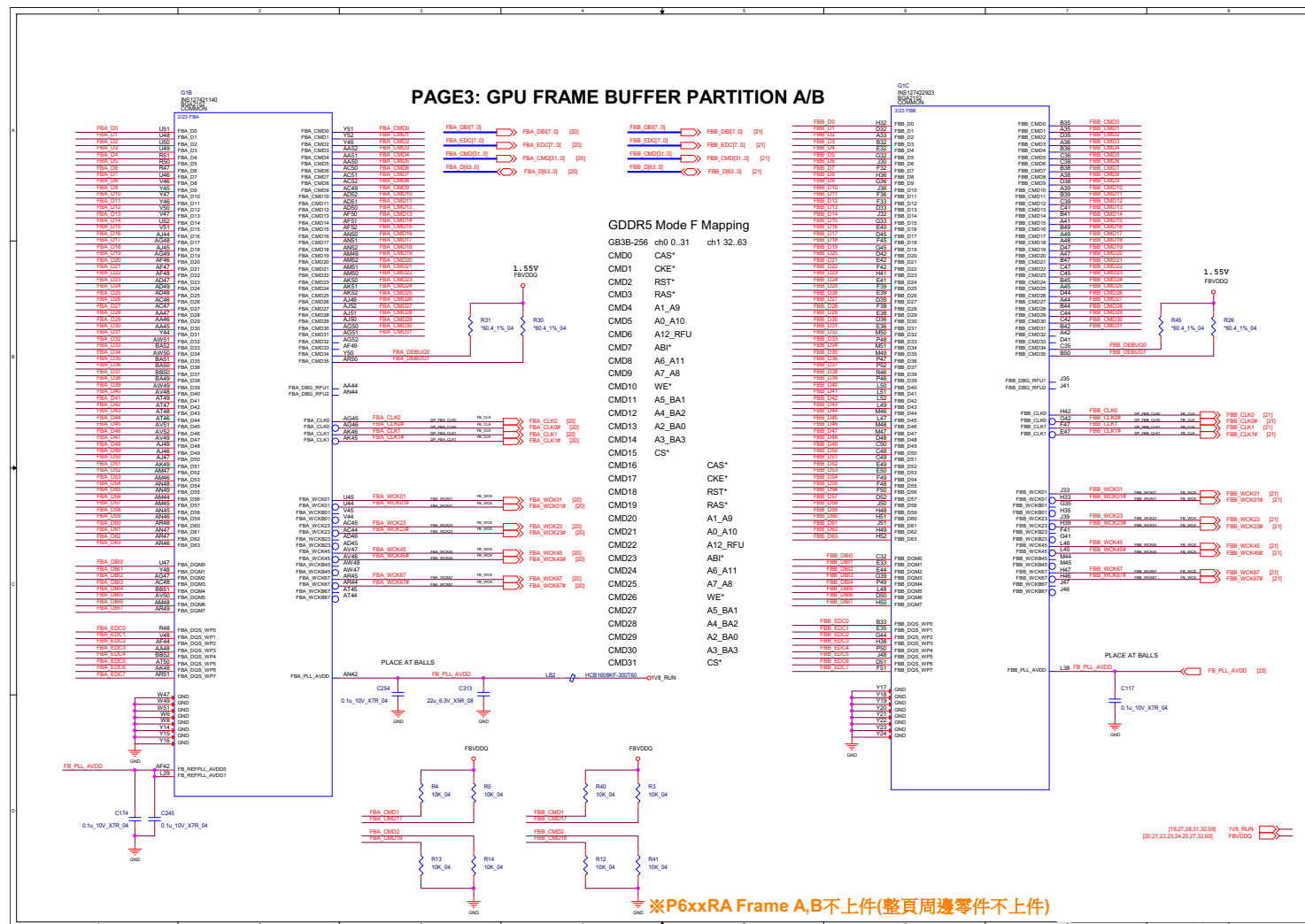


VGA PCI Express B - 19



B. Schematic Diagrams

B - 20 VGA Frame Buffer Partition



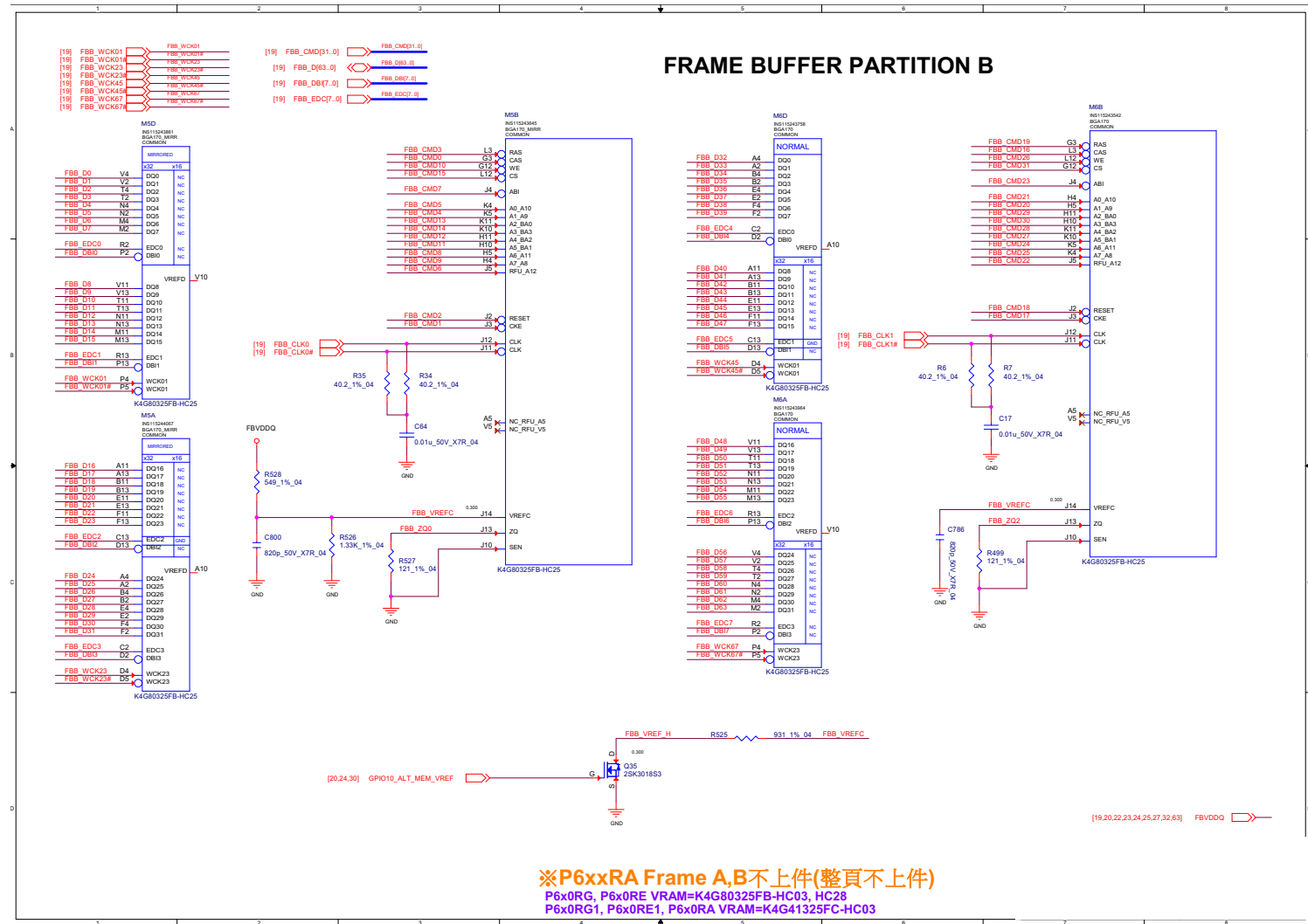
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Frame Buffer
Partition A



Schematic Diagrams

Frame Buffer Partition B

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Frame Buffer
Partition B



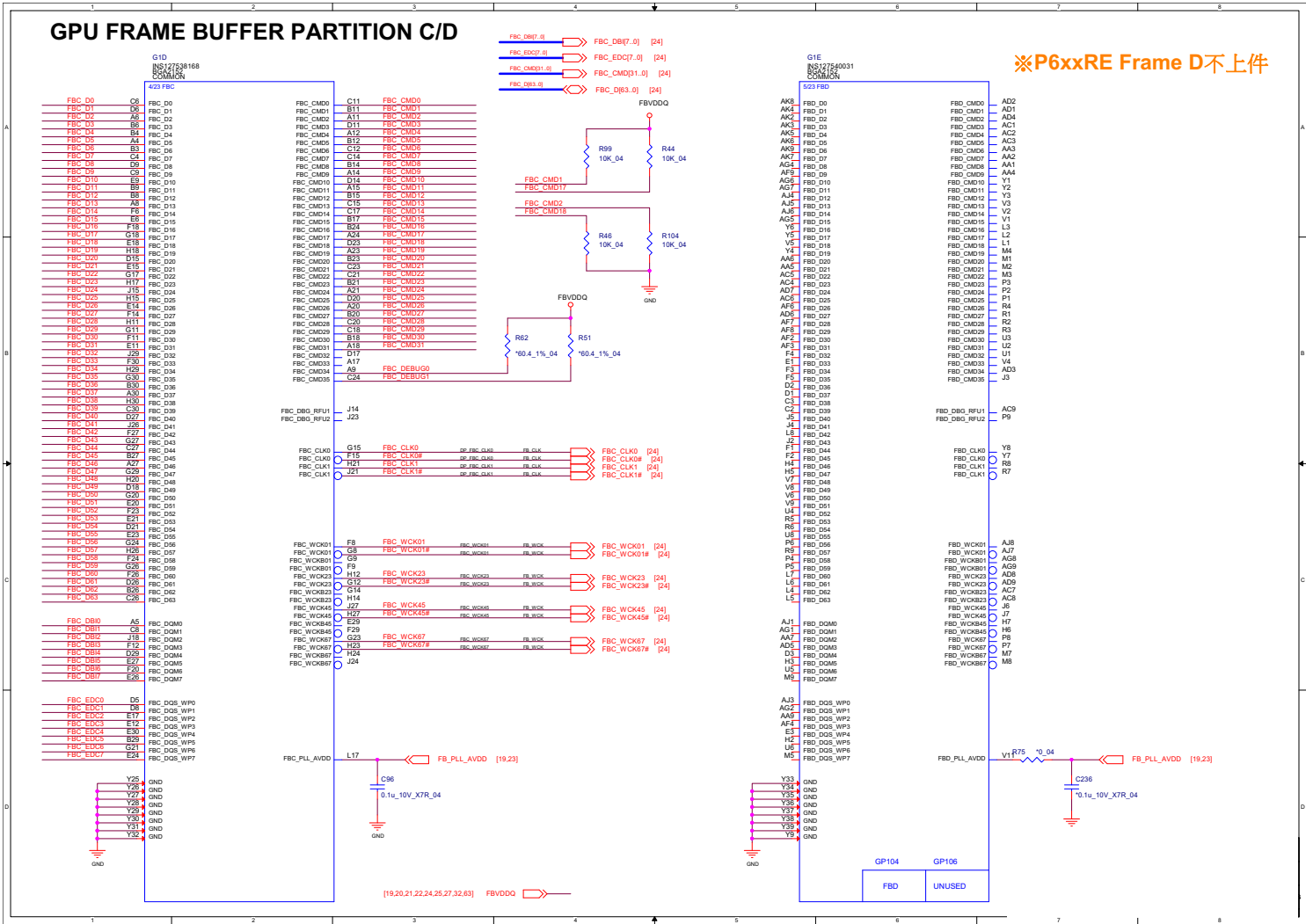
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Frame Buffer
Partition A_B



GPU Frame Buffer Partition

B. Schematic Diagrams

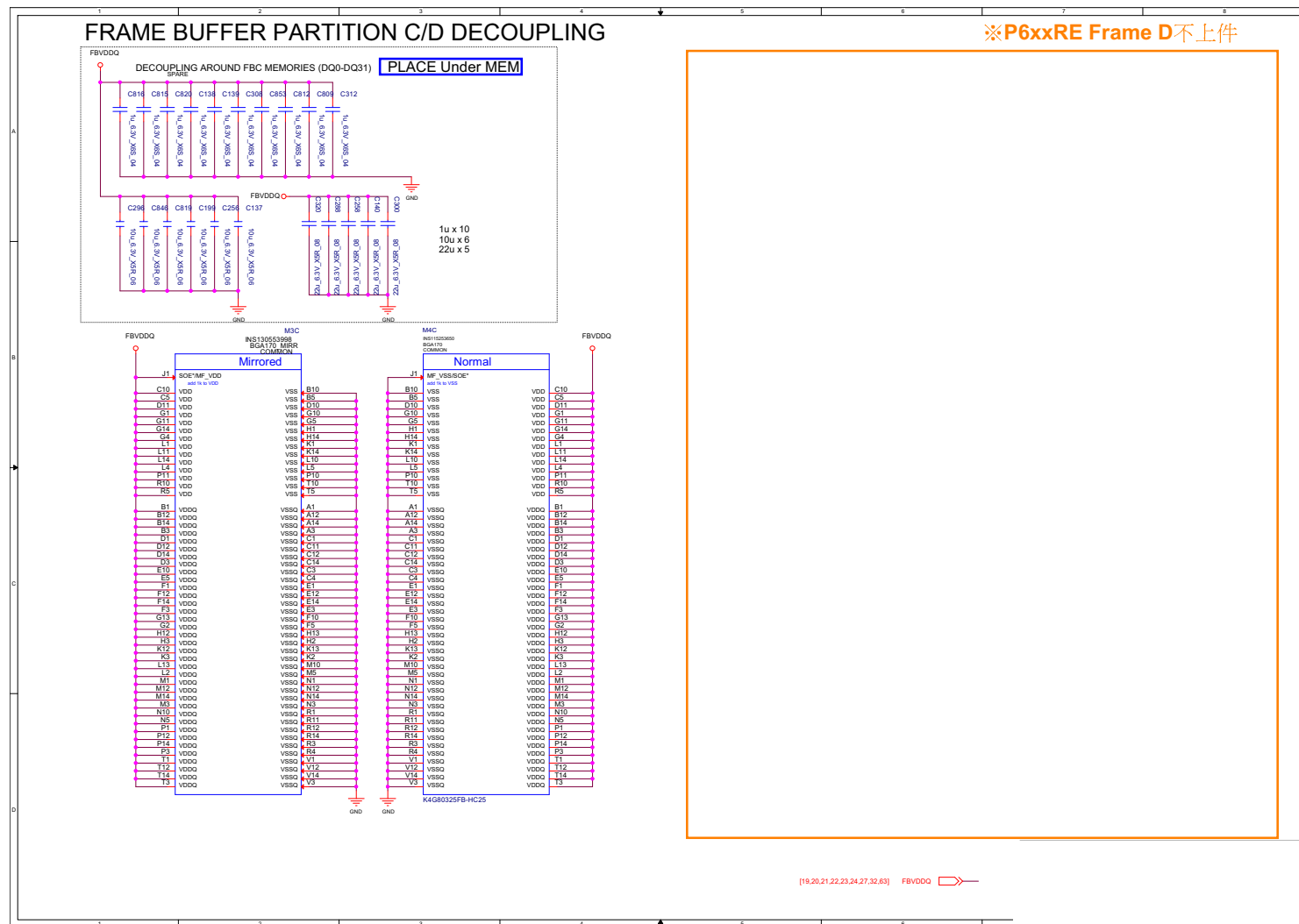
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GPU Frame Buffer
Partition



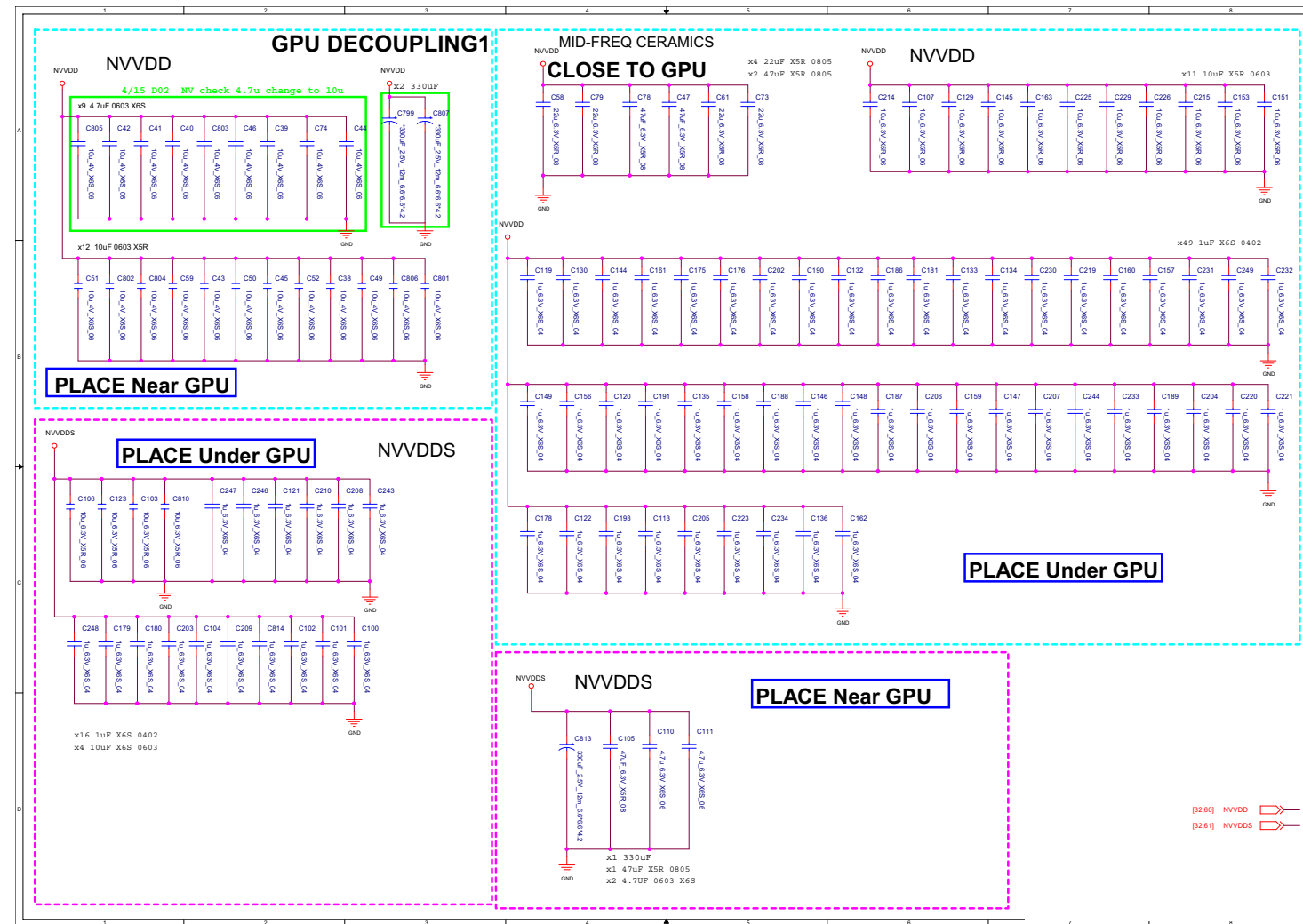
Frame Buffer Partition C_D

B. Schematic Diagrams

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Frame Buffer
Partition C_D



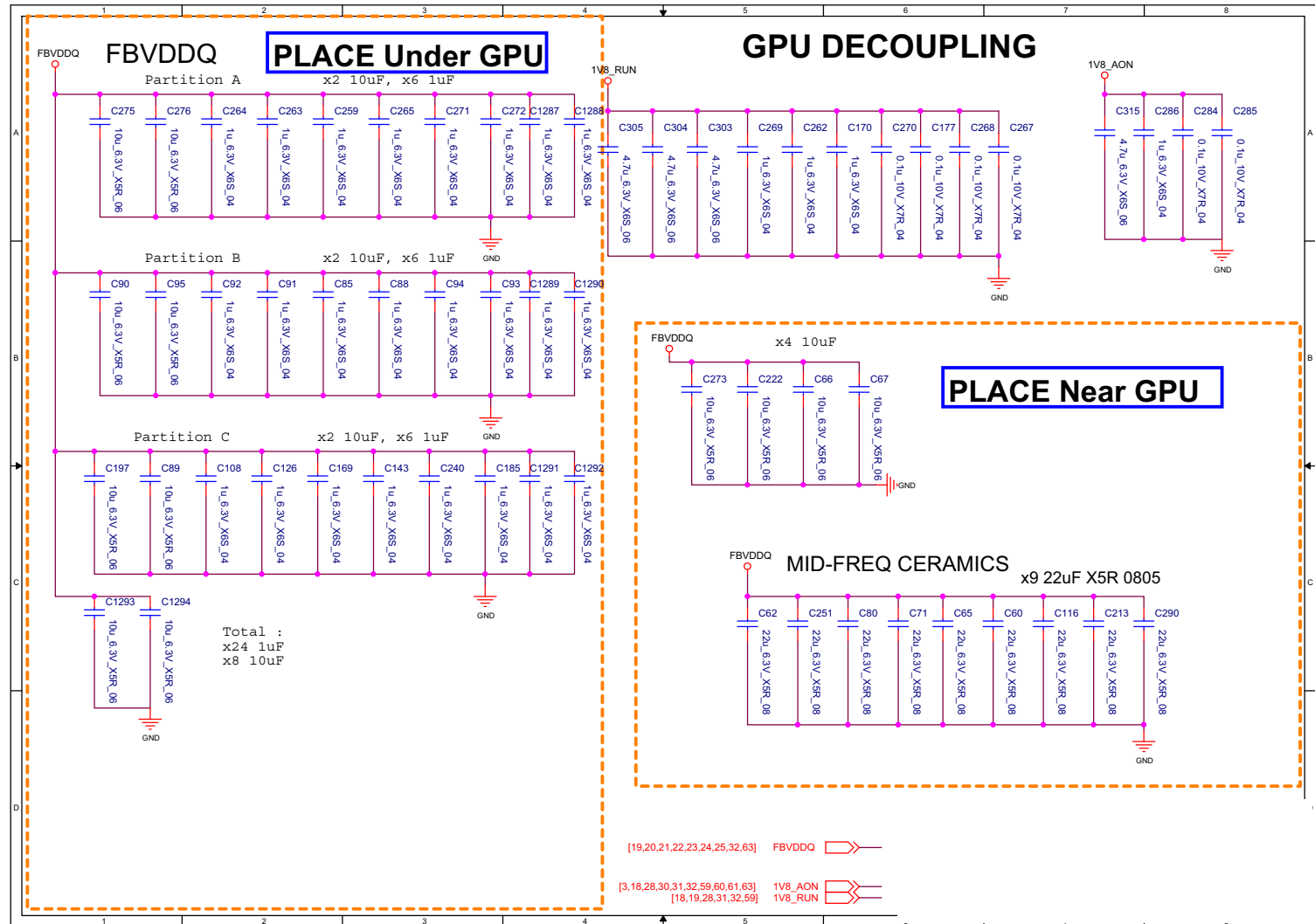
GPU Decoupling

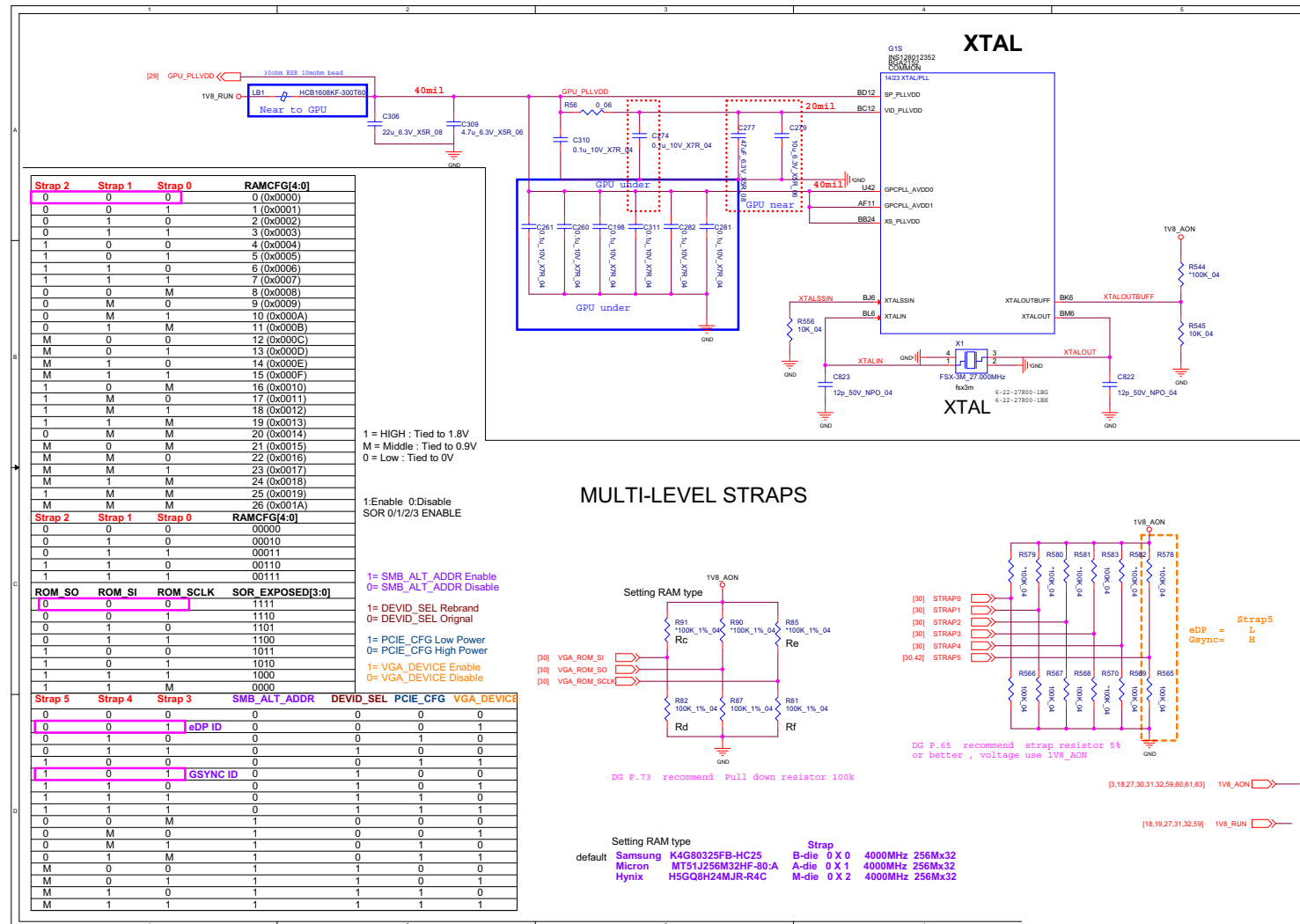


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GPU Decoupling

GPU Decoupling 2

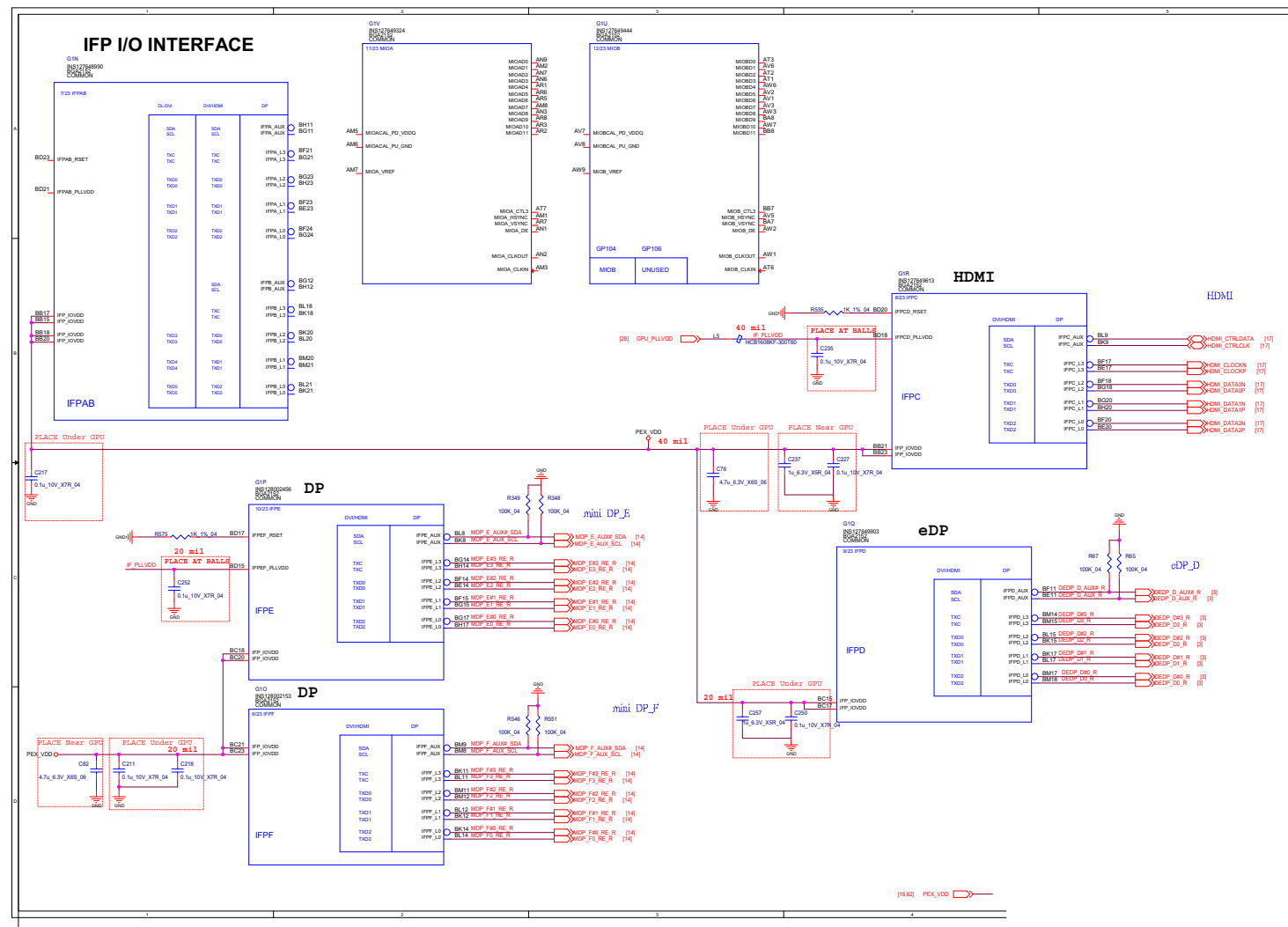
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GPU Decoupling 2



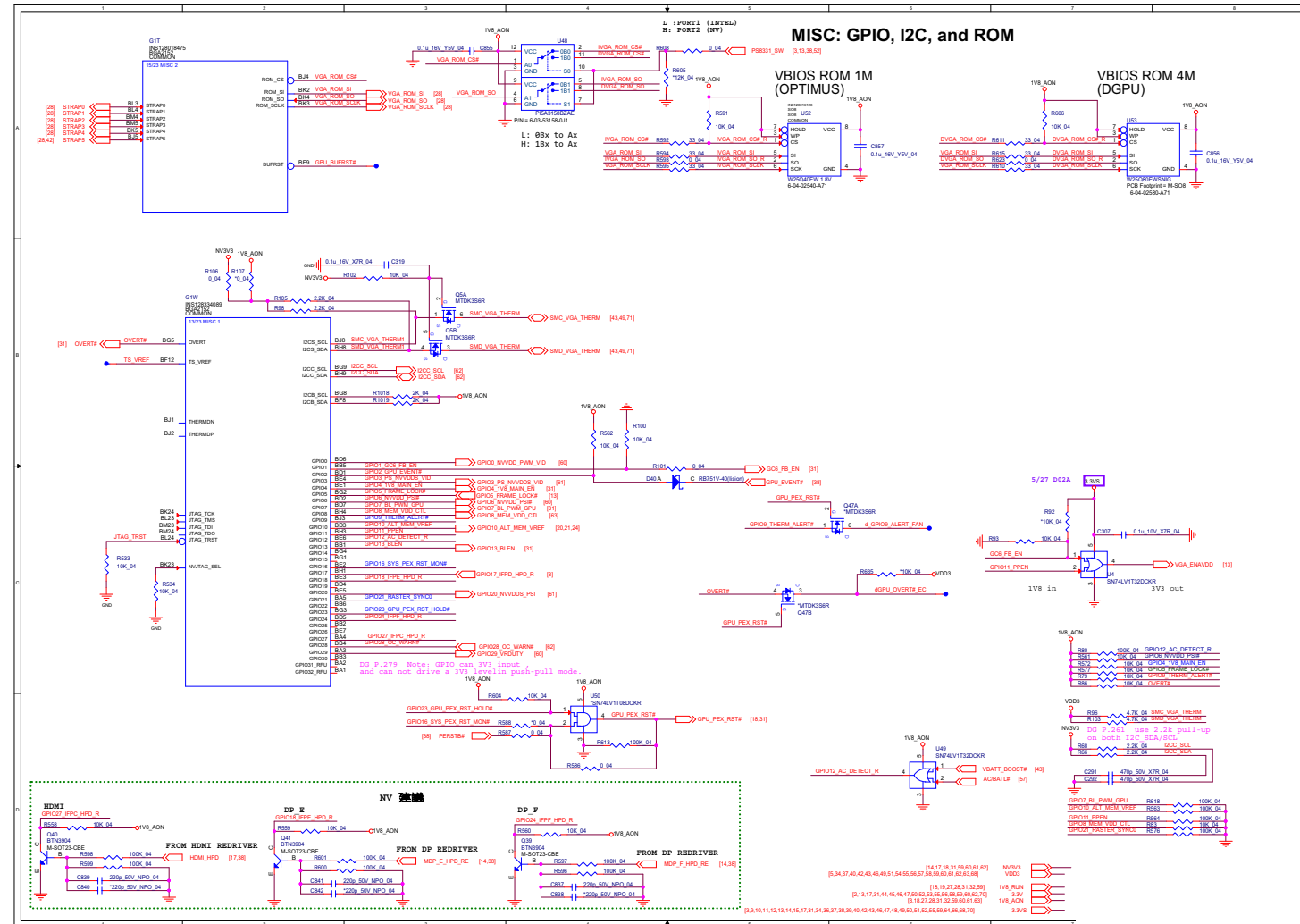
Straps and XTAL B - 29

IFP I/O Interface

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IFP I/O Interface



Misc - GPIO, I2C and ROM

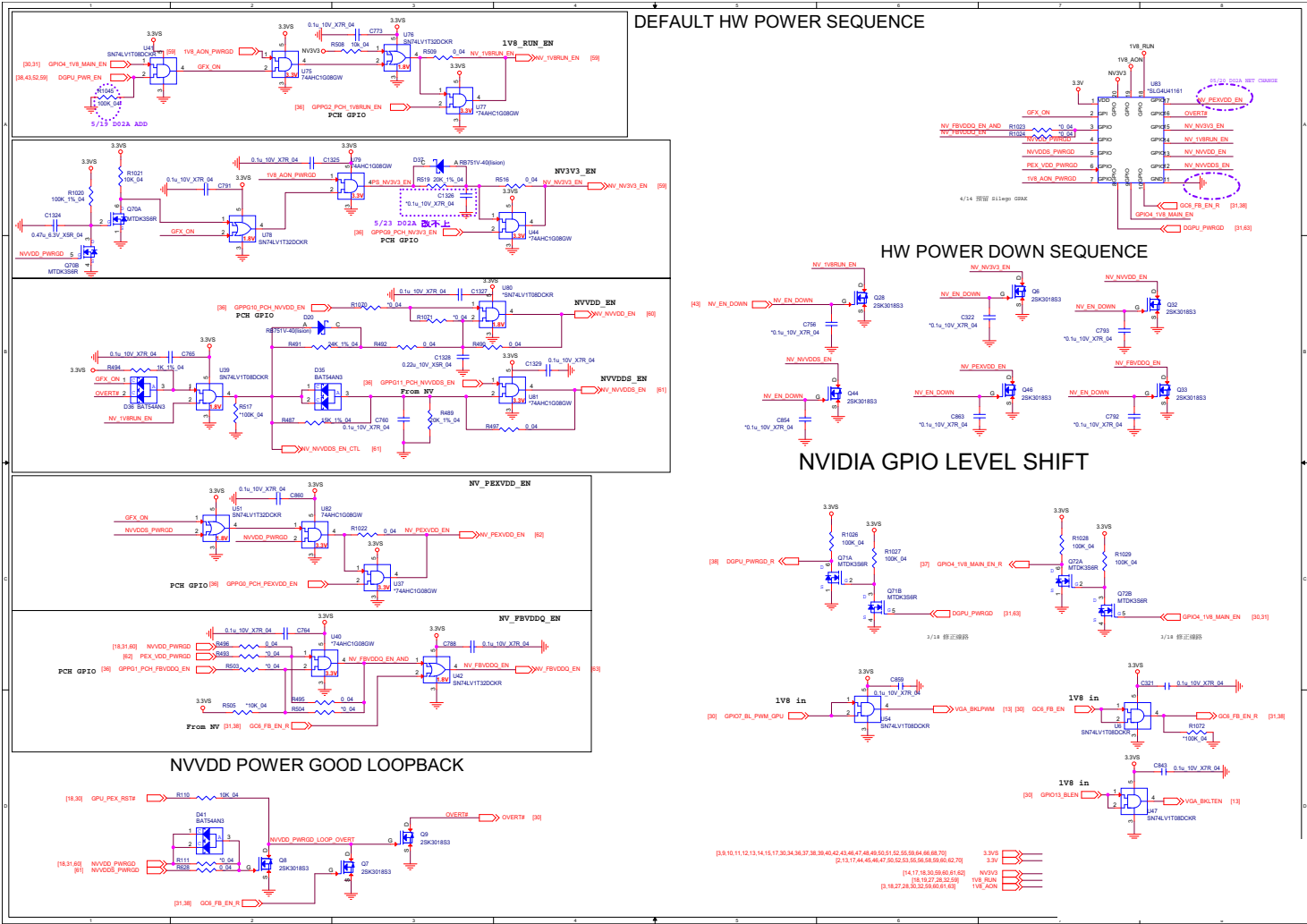


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Misc - GPIO, I2C
and ROM

Schematic Diagrams

NVIDIA Power Sequence

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NVIDIA Power Sequence



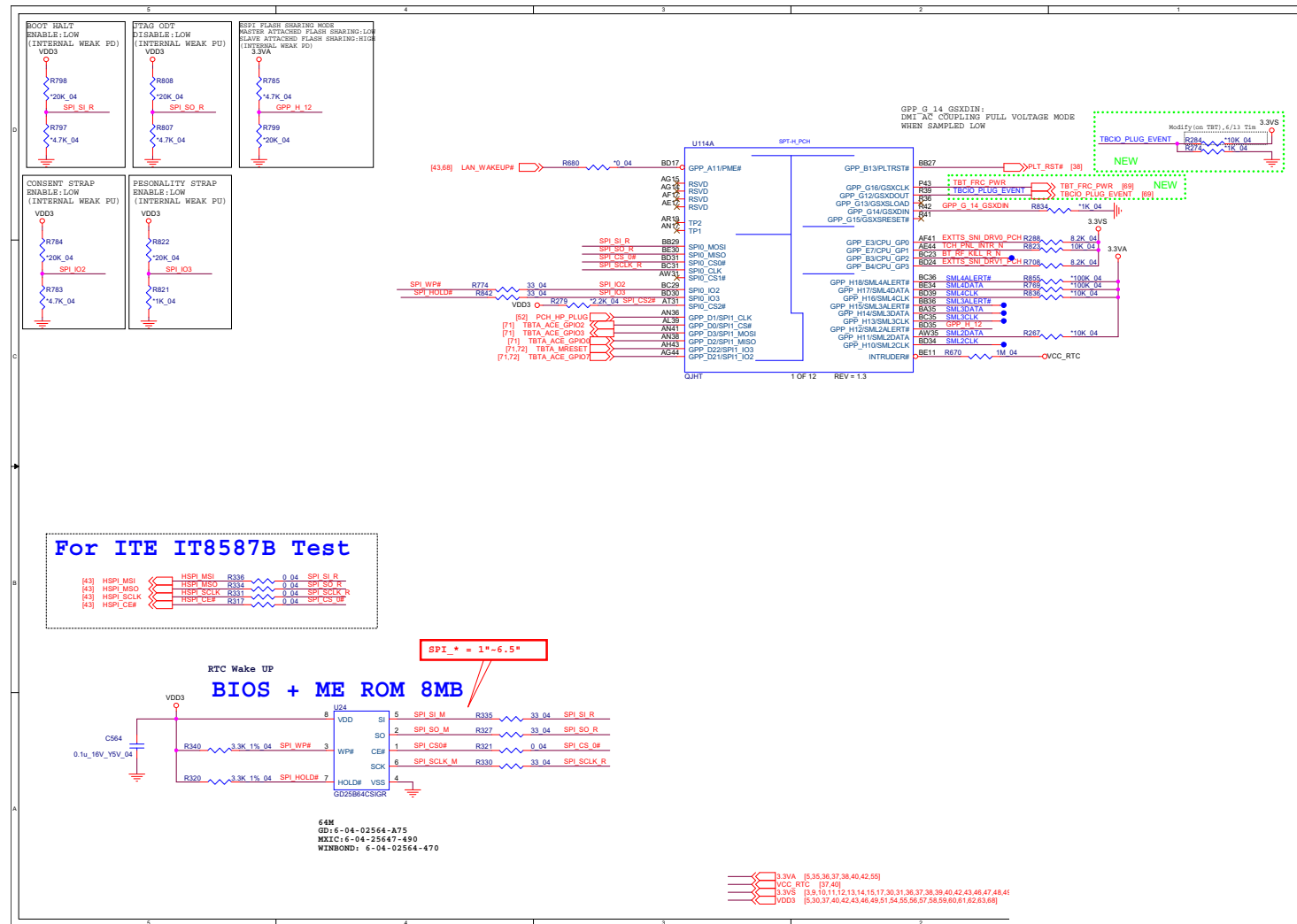


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GPU GND

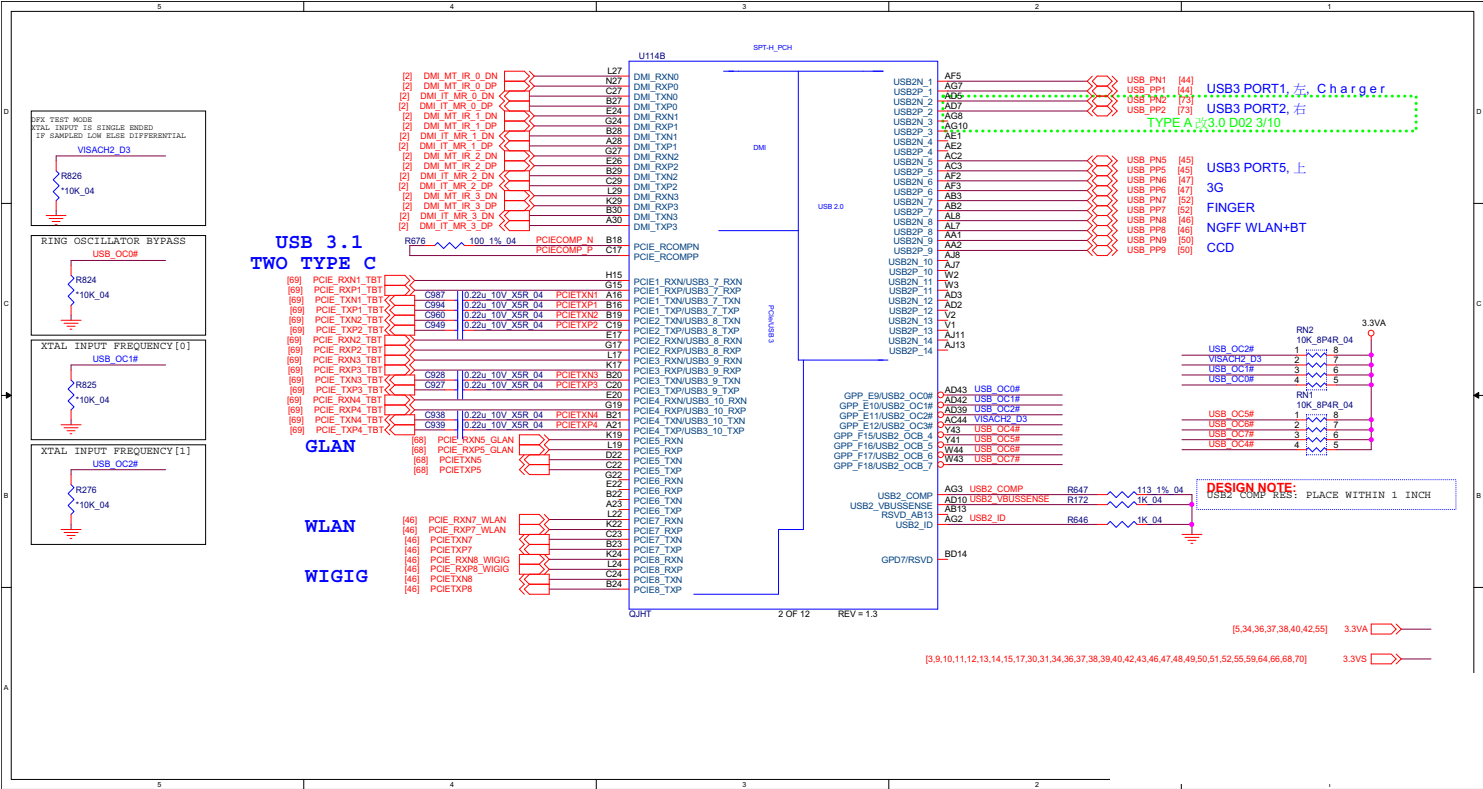


PCH 1/9



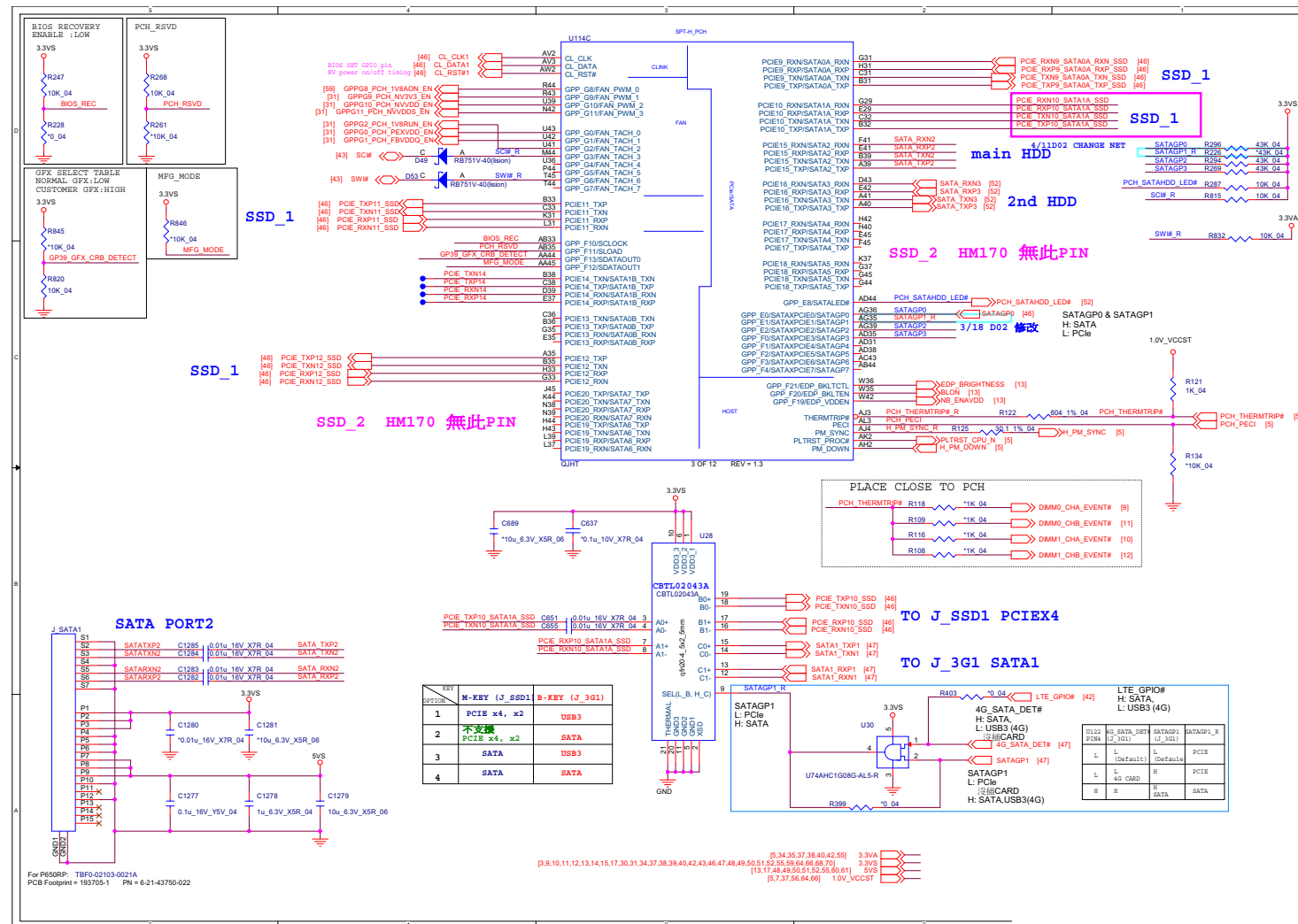
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PCH 1/9

PCH 2/9



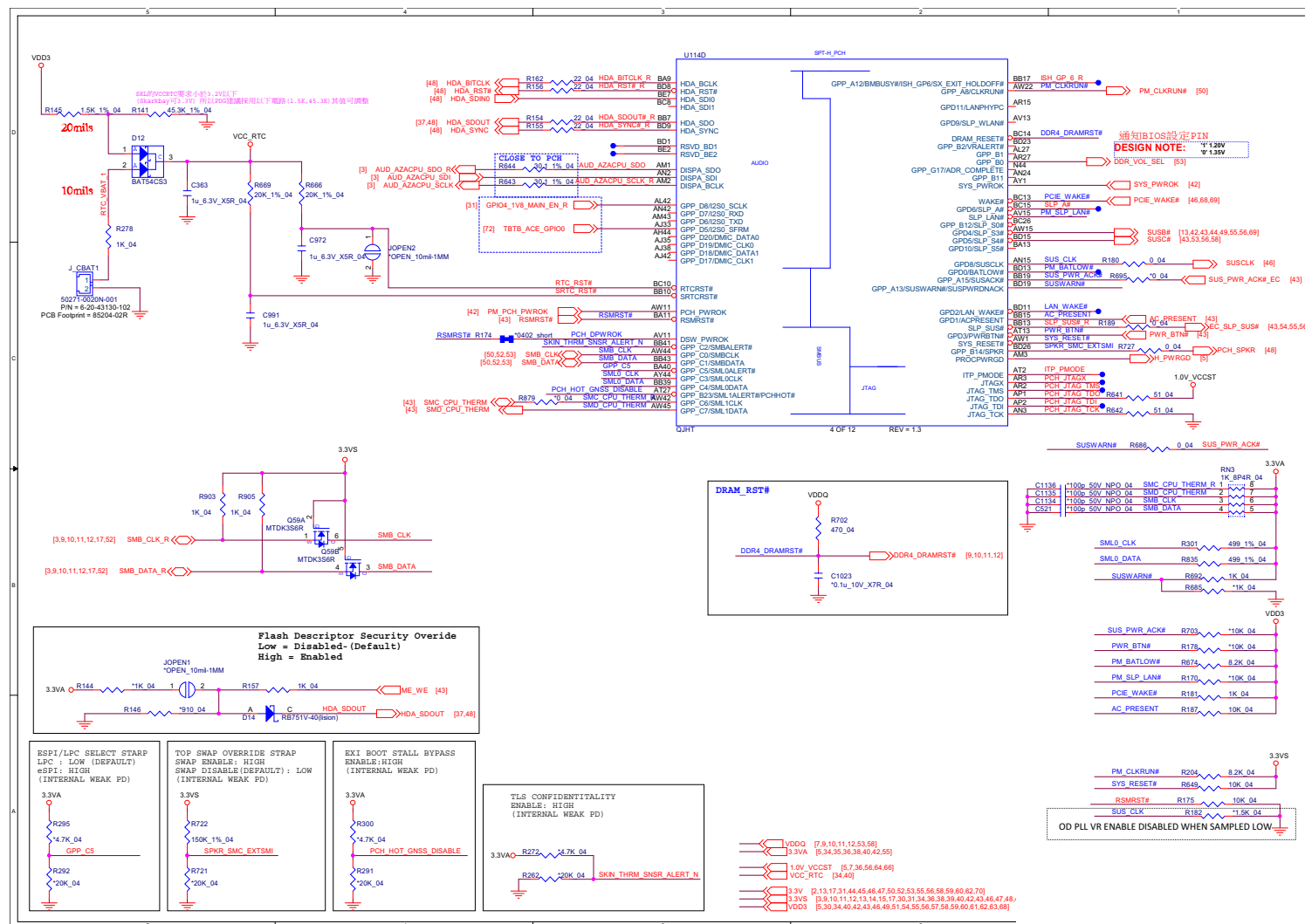
Schematic Diagrams

PCH 3/9



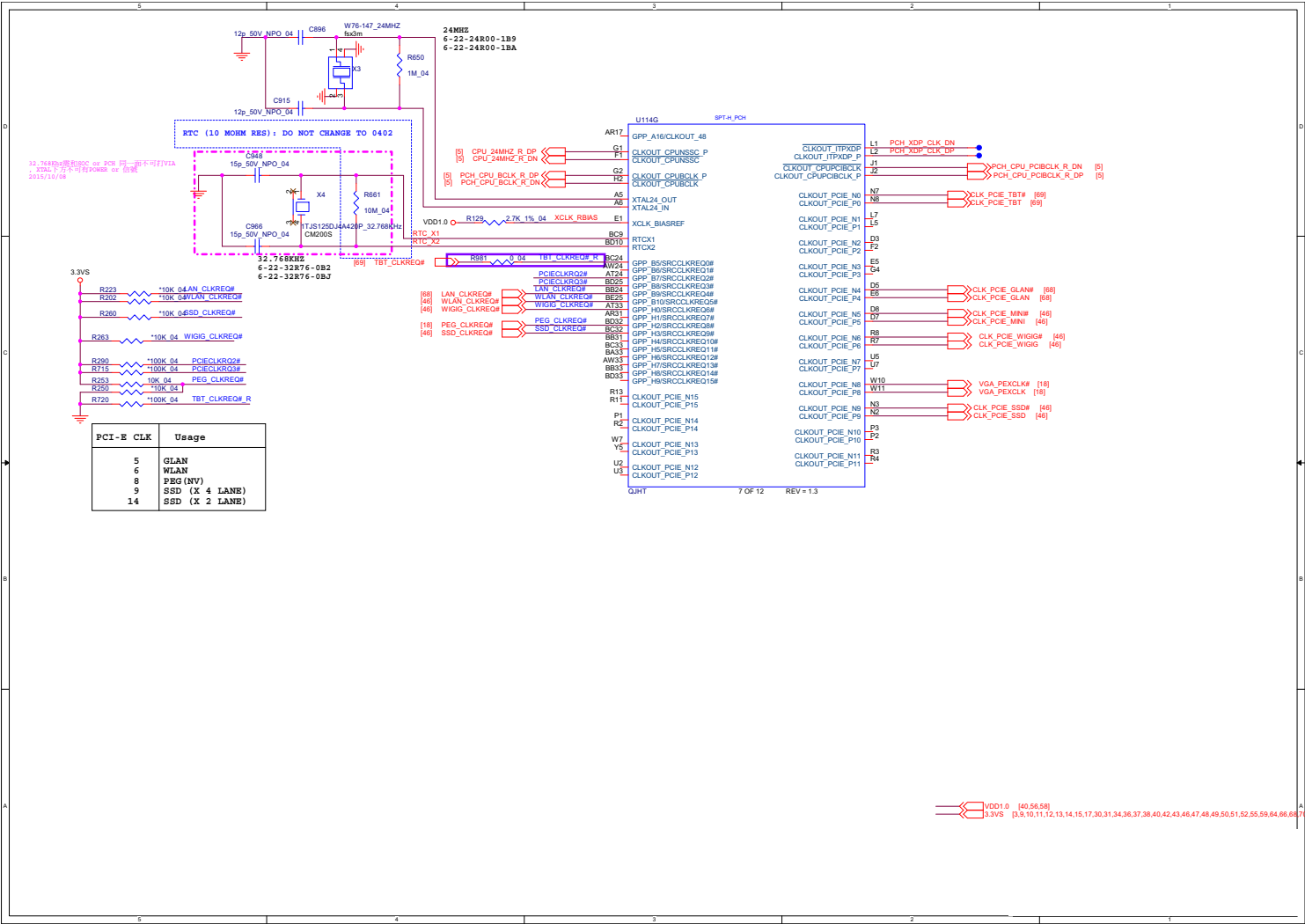
PCH 4/9

B. Schematic Diagrams



PCH 5/9 B - 39

PCH 6/9



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PCH 6/9

PCH 7/9 B - 41

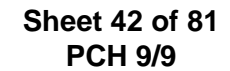


PCH 8/9

B. Schematic Diagrams

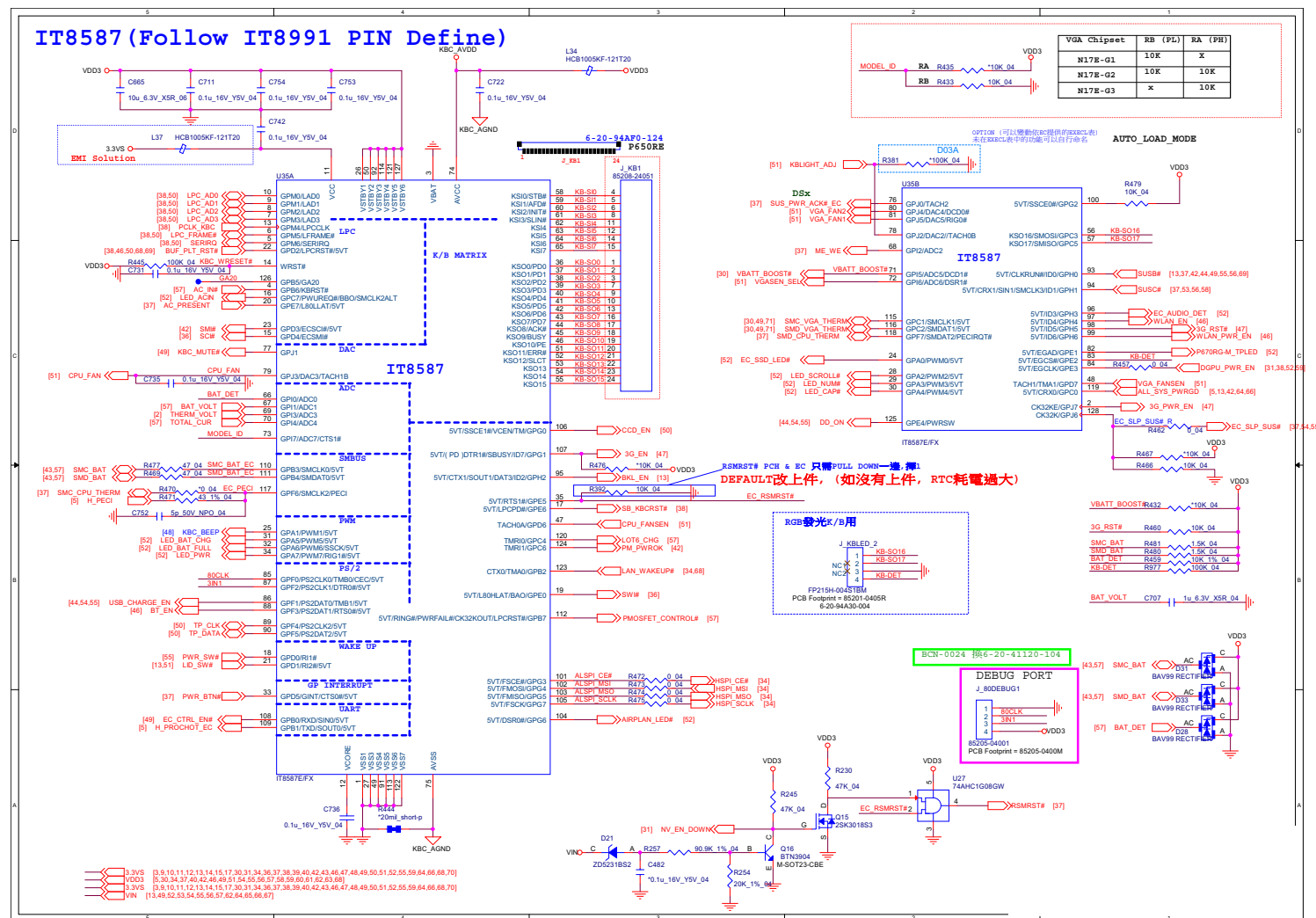
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PCH 9/9 B - 43

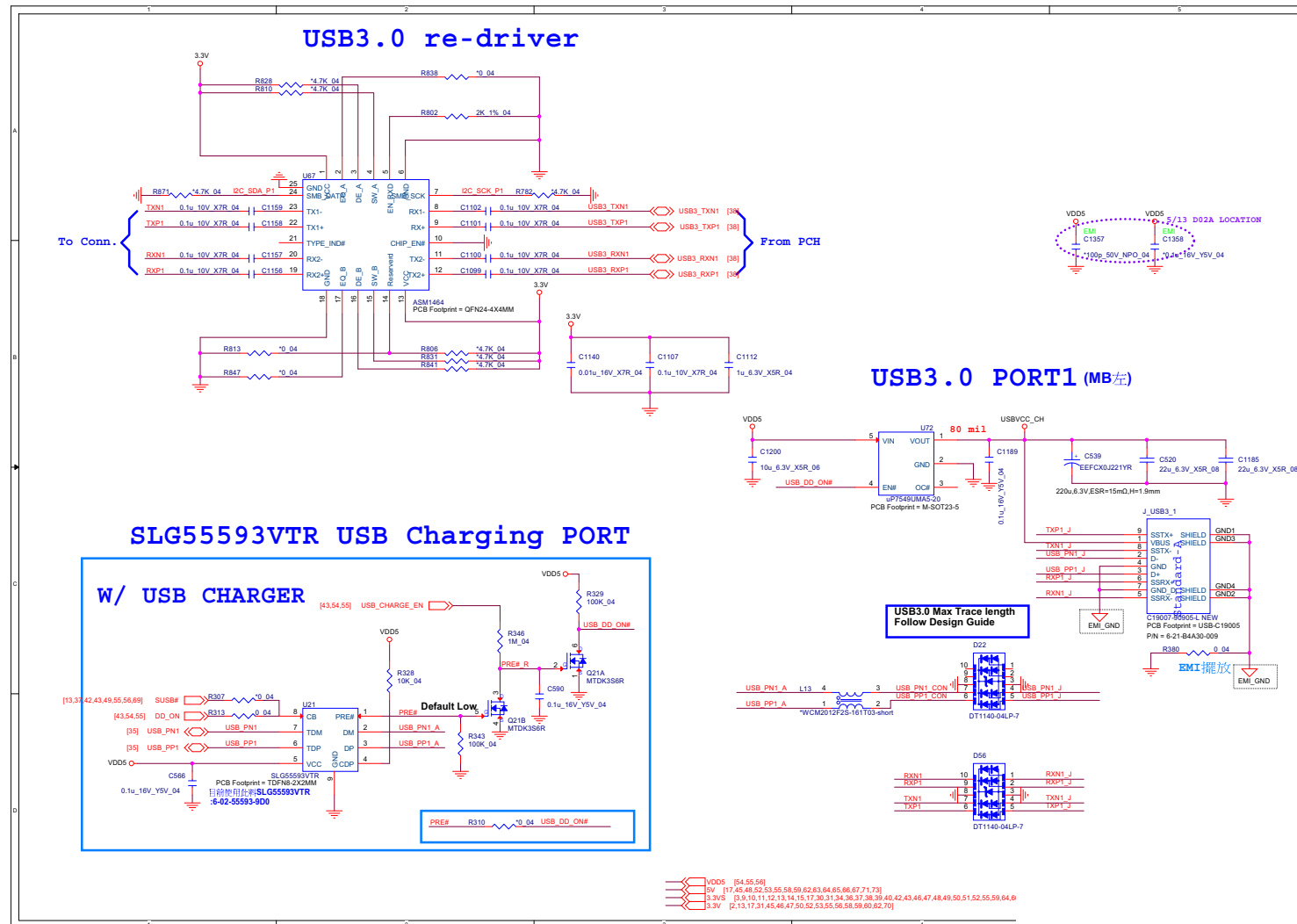


KBC IT8587

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KBC IT8587

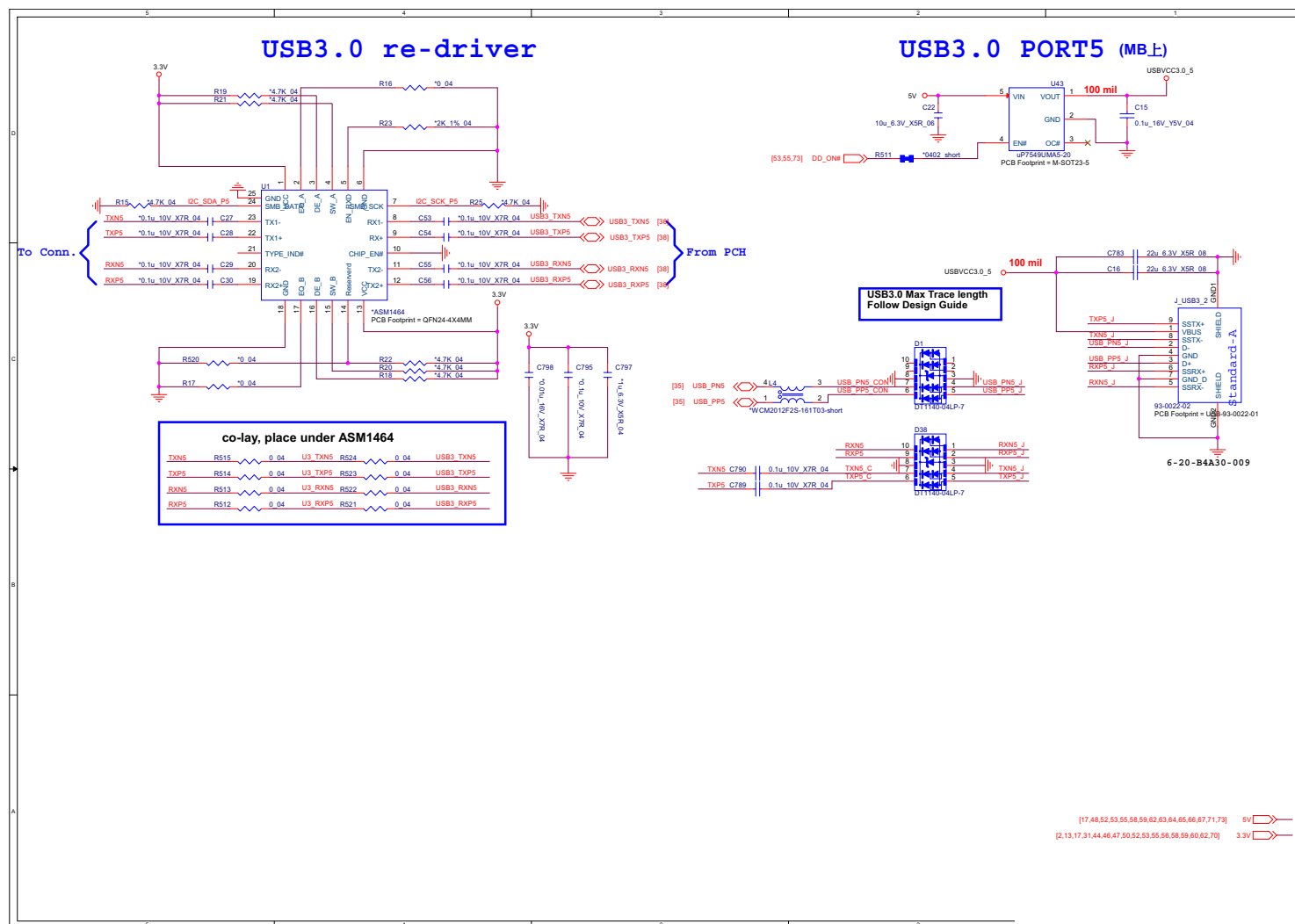


USB Charger B - 45

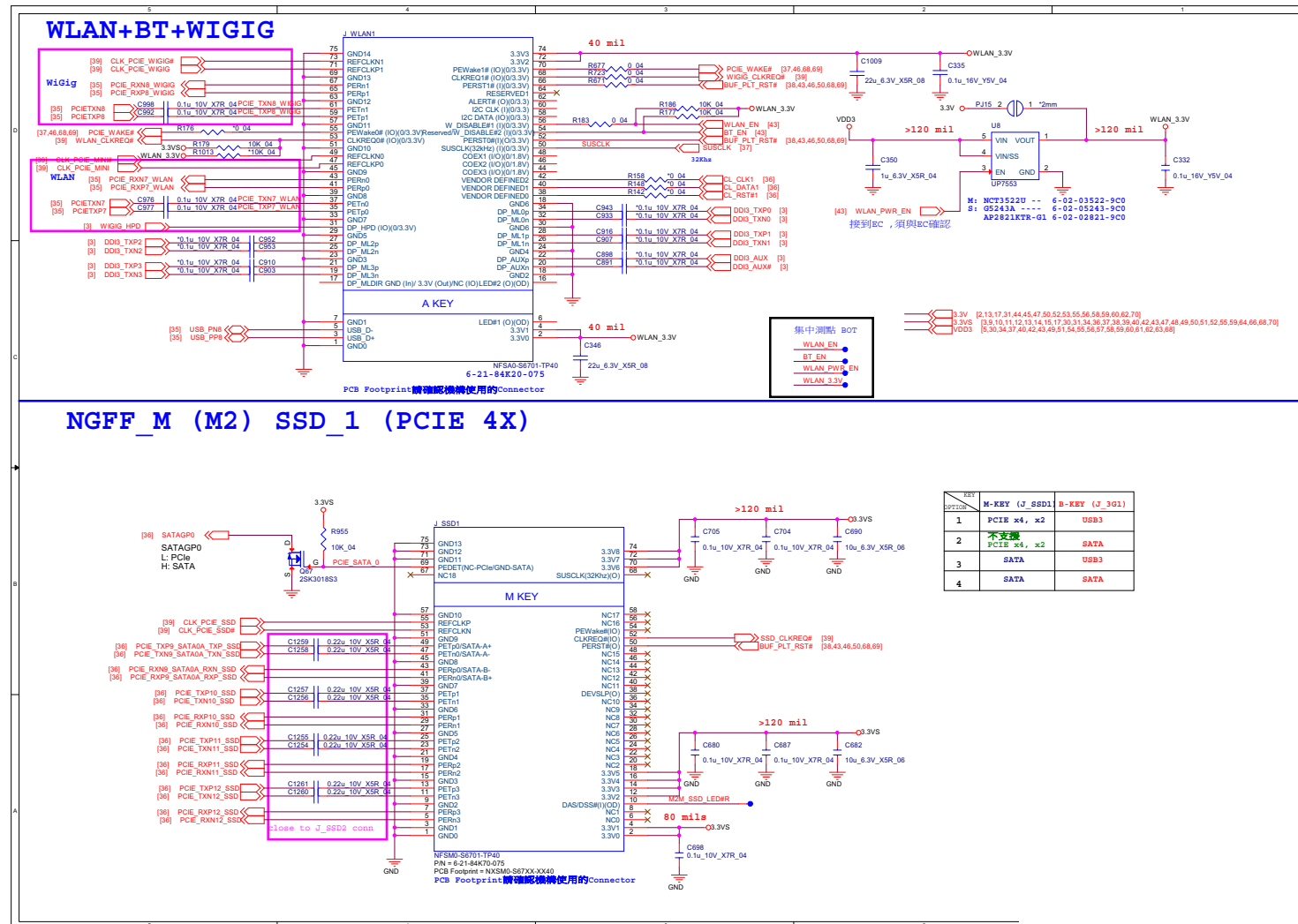


USB

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USB



M.2 WLAN+BT, PCIE4X SSD

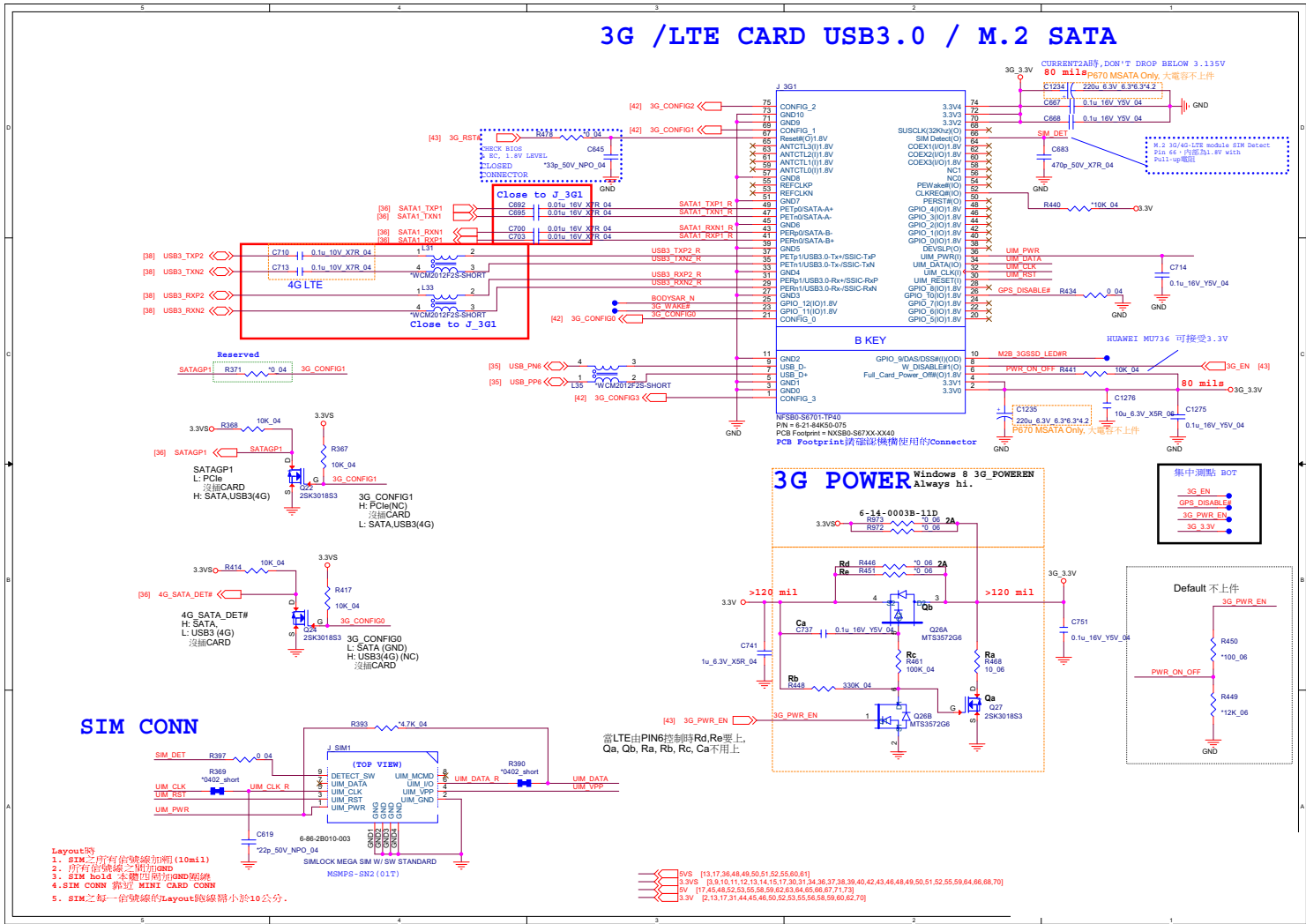


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M.2 WLAN+BT,
PCIE4X SSD

M.2 3G/LTE

B. Schematic Diagrams

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M.2 3G/LTE



B.Schematic Diagrams

Layout Note:
U43 pin 1 - pin 11 and pin 47 and pin 48 are Digital signals.
The others are Analog signals.

Layout Note:
(1)MIC1-L (U13.21) (2)MIC1-R (U13.22) (3)LINE-L (U13.23) (4)LINE-R (U13.24)
周圍必須包圍 AUDIO, 且儘量避免跨越 +5V2 & +V12V plane.

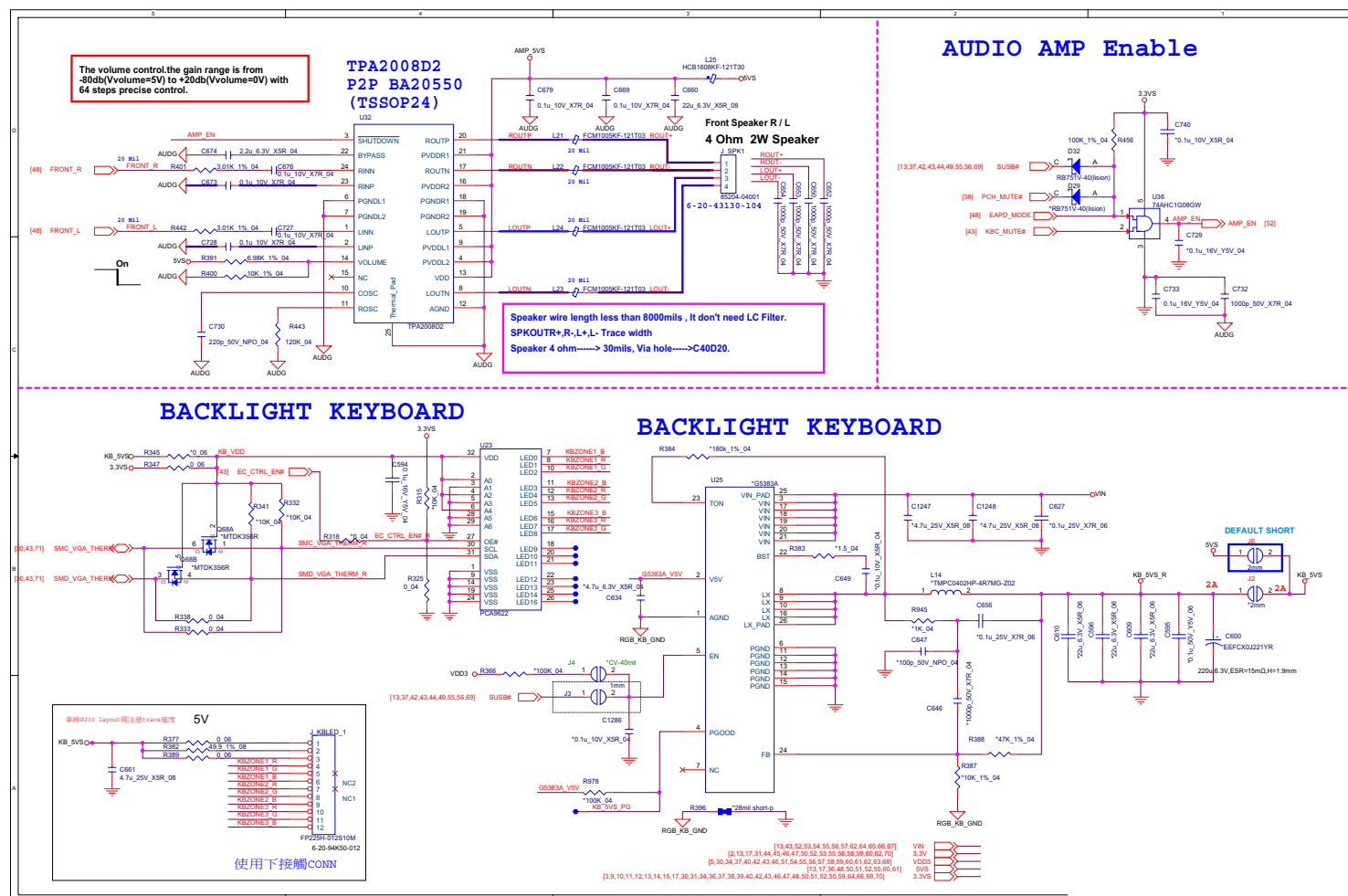
PCB Layout Details:
The diagram shows a complex PCB layout for the ALC889 audio chip. Key components and connections include:
- **Digital Section:** U43 (ALC889) pins 1-11, 47, 48 are digital. Connections include MIC_CLK, MIC_DATA, HDA_SDOUT, HDA_SIN, HDA_SYNC, HDA_RST, EAPD_MODE, SPDIF0, SPDIF1, VREF, and various control signals.
- **Analog Section:** U43 pins 12-46 are analog. Connections include HDA_SDOUT, HDA_SIN, HDA_SYNC, HDA_RST, EAPD_MODE, SPDIF0, SPDIF1, VREF, and various control signals.
- **Power and Grounding:** 3.3VS_AUD, 3.3VS_VDD, 3.3VS_VDD2, 3.3VS_VDD3, 3.3VS_VDD4, 3.3VS_VDD5, 3.3VS_VDD6, 3.3VS_VDD7, 3.3VS_VDD8, 3.3VS_VDD9, 3.3VS_VDD10, 3.3VS_VDD11, 3.3VS_VDD12, 3.3VS_VDD13, 3.3VS_VDD14, 3.3VS_VDD15, 3.3VS_VDD16, 3.3VS_VDD17, 3.3VS_VDD18, 3.3VS_VDD19, 3.3VS_VDD20, 3.3VS_VDD21, 3.3VS_VDD22, 3.3VS_VDD23, 3.3VS_VDD24, 3.3VS_VDD25, 3.3VS_VDD26, 3.3VS_VDD27, 3.3VS_VDD28, 3.3VS_VDD29, 3.3VS_VDD30, 3.3VS_VDD31, 3.3VS_VDD32, 3.3VS_VDD33, 3.3VS_VDD34, 3.3VS_VDD35, 3.3VS_VDD36, 3.3VS_VDD37, 3.3VS_VDD38, 3.3VS_VDD39, 3.3VS_VDD40, 3.3VS_VDD41, 3.3VS_VDD42, 3.3VS_VDD43, 3.3VS_VDD44, 3.3VS_VDD45, 3.3VS_VDD46, 3.3VS_VDD47, 3.3VS_VDD48, 3.3VS_VDD49, 3.3VS_VDD50, 3.3VS_VDD51, 3.3VS_VDD52, 3.3VS_VDD53, 3.3VS_VDD54, 3.3VS_VDD55, 3.3VS_VDD56, 3.3VS_VDD57, 3.3VS_VDD58, 3.3VS_VDD59, 3.3VS_VDD60, 3.3VS_VDD61, 3.3VS_VDD62, 3.3VS_VDD63, 3.3VS_VDD64, 3.3VS_VDD65, 3.3VS_VDD66, 3.3VS_VDD67, 3.3VS_VDD68, 3.3VS_VDD69, 3.3VS_VDD70, 3.3VS_VDD71, 3.3VS_VDD72, 3.3VS_VDD73, 3.3VS_VDD74, 3.3VS_VDD75, 3.3VS_VDD76, 3.3VS_VDD77, 3.3VS_VDD78, 3.3VS_VDD79, 3.3VS_VDD80, 3.3VS_VDD81, 3.3VS_VDD82, 3.3VS_VDD83, 3.3VS_VDD84, 3.3VS_VDD85, 3.3VS_VDD86, 3.3VS_VDD87, 3.3VS_VDD88, 3.3VS_VDD89, 3.3VS_VDD90, 3.3VS_VDD91, 3.3VS_VDD92, 3.3VS_VDD93, 3.3VS_VDD94, 3.3VS_VDD95, 3.3VS_VDD96, 3.3VS_VDD97, 3.3VS_VDD98, 3.3VS_VDD99, 3.3VS_VDD100.
- **Component Values:** Various resistors (R405, R406, R407, R408, R409, R410, R411, R412, R413, R414, R415, R416, R417, R418, R419, R420, R421, R422, R423, R424, R425, R426, R427, R428, R429, R430, R431, R432, R433, R434, R435, R436, R437, R438, R439, R440, R441, R442, R443, R444, R445, R446, R447, R448, R449, R450, R451, R452, R453, R454, R455, R456, R457, R458, R459, R460, R461, R462, R463, R464, R465, R466, R467, R468, R469, R470, R471, R472, R473, R474, R475, R476, R477, R478, R479, R480, R481, R482, R483, R484, R485, R486, R487, R488, R489, R490, R491, R492, R493, R494, R495, R496, R497, R498, R499, R500, R501, R502, R503, R504, R505, R506, R507, R508, R509, R510, R511, R512, R513, R514, R515, R516, R517, R518, R519, R520, R521, R522, R523, R524, R525, R526, R527, R528, R529, R530, R531, R532, R533, R534, R535, R536, R537, R538, R539, R540, R541, R542, R543, R544, R545, R546, R547, R548, R549, R550, R551, R552, R553, R554, R555, R556, R557, R558, R559, R560, R561, R562, R563, R564, R565, R566, R567, R568, R569, R570, R571, R572, R573, R574, R575, R576, R577, R578, R579, R580, R581, R582, R583, R584, R585, R586, R587, R588, R589, R590, R591, R592, R593, R594, R595, R596, R597, R598, R599, R600, R601, R602, R603, R604, R605, R606, R607, R608, R609, R610, R611, R612, R613, R614, R615, R616, R617, R618, R619, R620, R621, R622, R623, R624, R625, R626, R627, R628, R629, R630, R631, R632, R633, R634, R635, R636, R637, R638, R639, R640, R641, R642, R643, R644, R645, R646, R647, R648, R649, R650, R651, R652, R653, R654, R655, R656, R657, R658, R659, R660, R661, R662, R663, R664, R665, R666, R667, R668, R669, R670, R671, R672, R673, R674, R675, R676, R677, R678, R679, R680, R681, R682, R683, R684, R685, R686, R687, R688, R689, R690, R691, R692, R693, R694, R695, R696, R697, R698, R699, R700, R701, R702, R703, R704, R705, R706, R707, R708, R709, R710, R711, R712, R713, R714, R715, R716, R717, R718, R719, R720, R721, R722, R723, R724, R725, R726, R727, R728, R729, R730, R731, R732, R733, R734, R735, R736, R737, R738, R739, R740, R741, R742, R743, R744, R745, R746, R747, R748, R749, R750, R751, R752, R753, R754, R755, R756, R757, R758, R759, R760, R761, R762, R763, R764, R765, R766, R767, R768, R769, R770, R771, R772, R773, R774, R775, R776, R777, R778, R779, R780, R781, R782, R783, R784, R785, R786, R787, R788, R789, R790, R791, R792, R793, R794, R795, R796, R797, R798, R799, R800, R801, R802, R803, R804, R805, R806, R807, R808, R809, R810, R811, R812, R813, R814, R815, R816, R817, R818, R819, R820, R821, R822, R823, R824, R825, R826, R827, R828, R829, R830, R831, R832, R833, R834, R835, R836, R837, R838, R839, R840, R841, R842, R843, R844, R845, R846, R847, R848, R849, R850, R851, R852, R853, R854, R855, R856, R857, R858, R859, R860, R861, R862, R863, R864, R865, R866, R867, R868, R869, R870, R871, R872, R873, R874, R875, R876, R877, R878, R879, R880, R881, R882, R883, R884, R885, R886, R887, R888, R889, R890, R891, R892, R893, R894, R895, R896, R897, R898, R899, R900, R901, R902, R903, R904, R905, R906, R907, R908, R909, R910, R911, R912, R913, R914, R915, R916, R917, R918, R919, R920, R921, R922, R923, R924, R925, R926, R927, R928, R929, R930, R931, R932, R933, R934, R935, R936, R937, R938, R939, R940, R941, R942, R943, R944, R

B.Schematic Diagrams

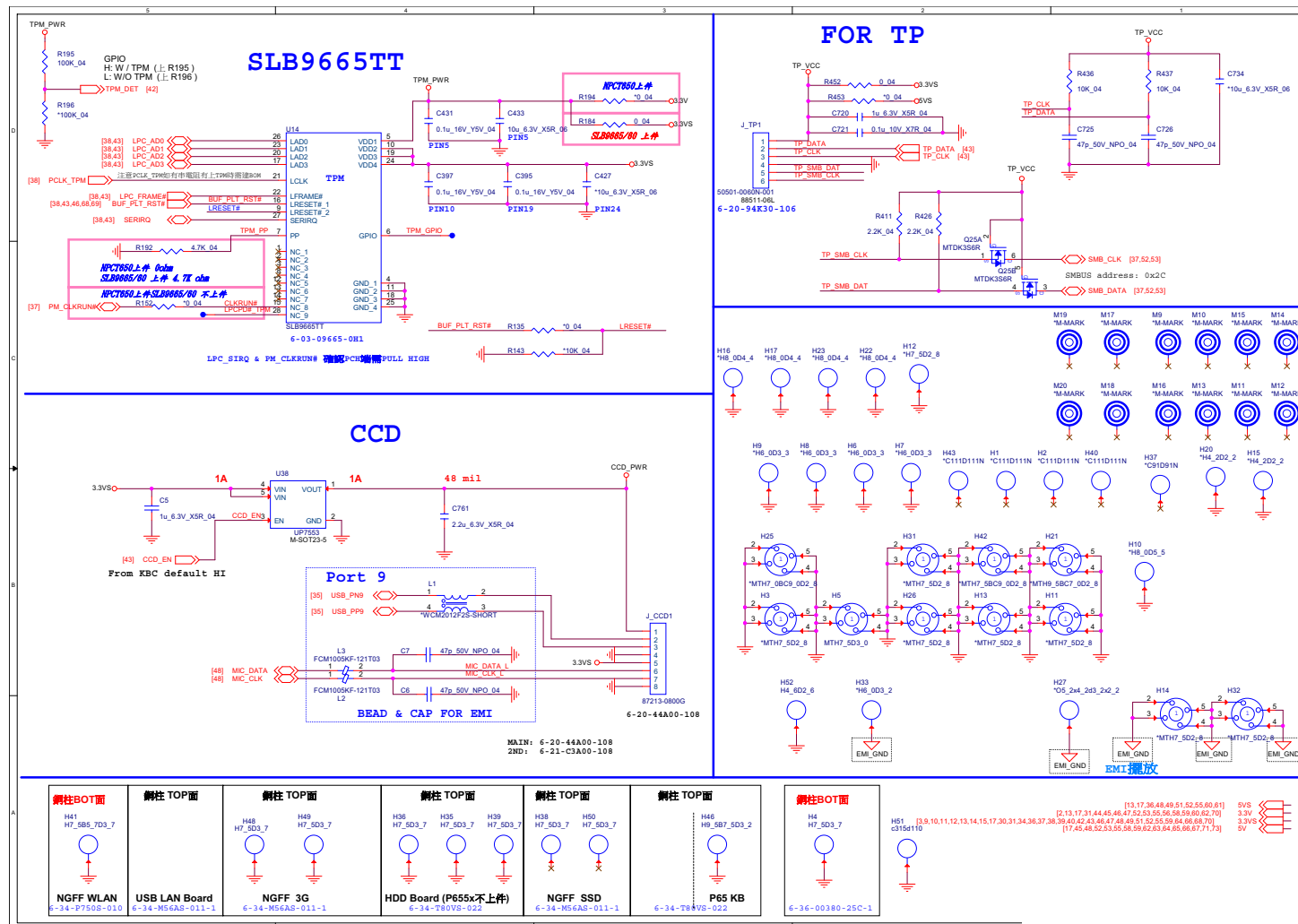
TPA2008D2

Sheet 49 of 81
TPA2008D2

B.Schematic Diagrams

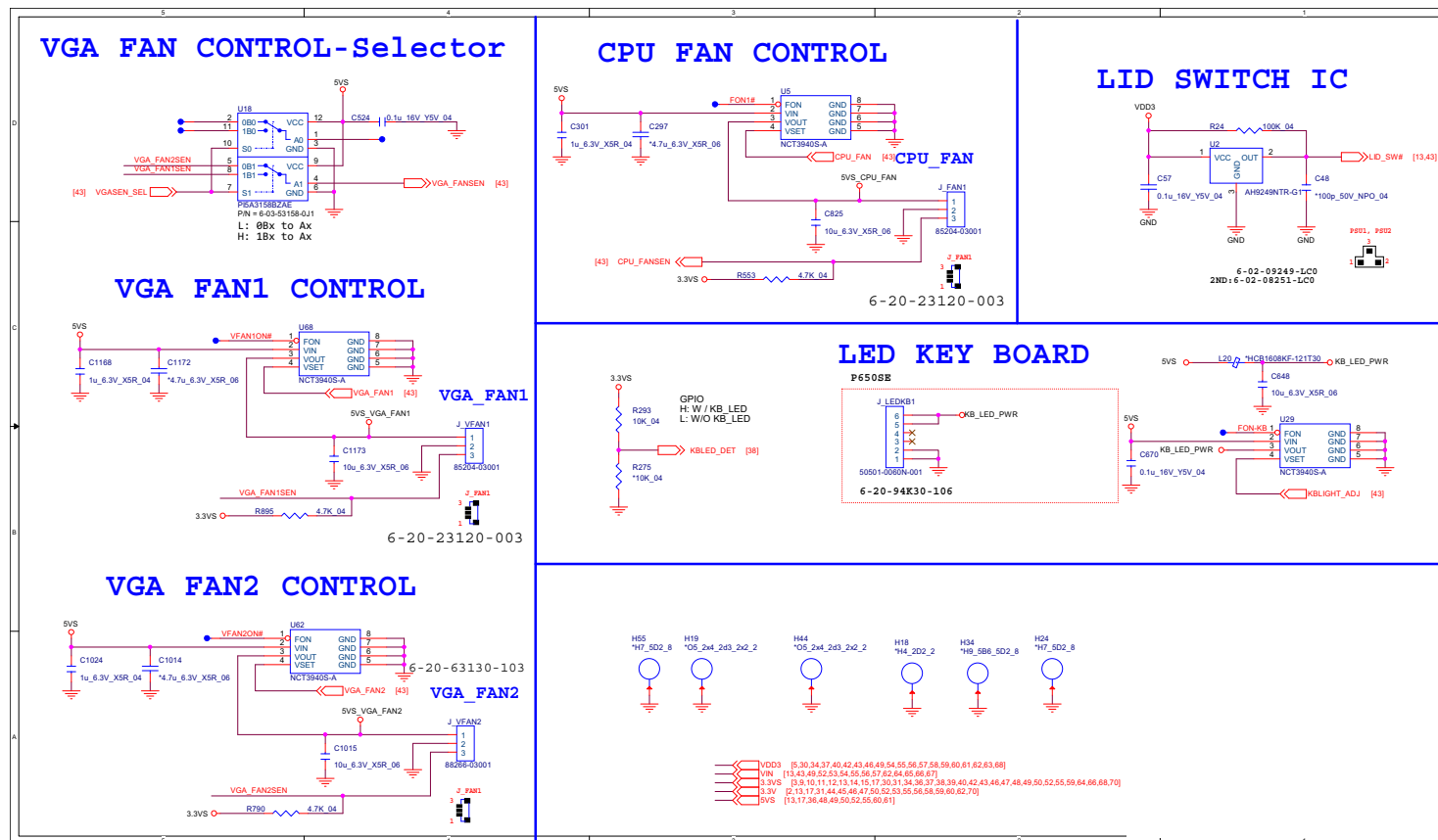


TPM, CCD, TP B - 51

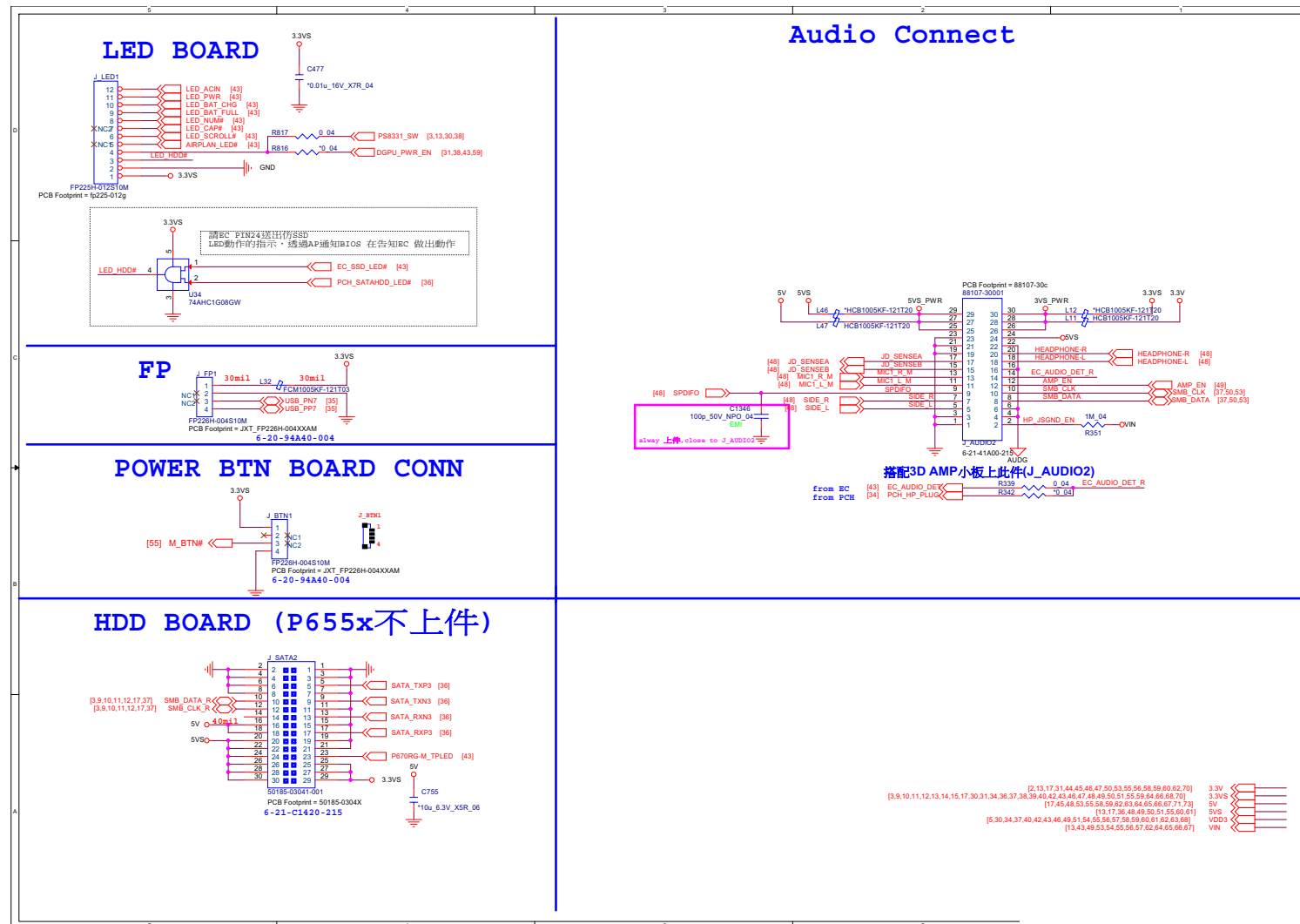


Fan, LID, KB LED

Sheet 51 of 81
Fan, LID, KB LED

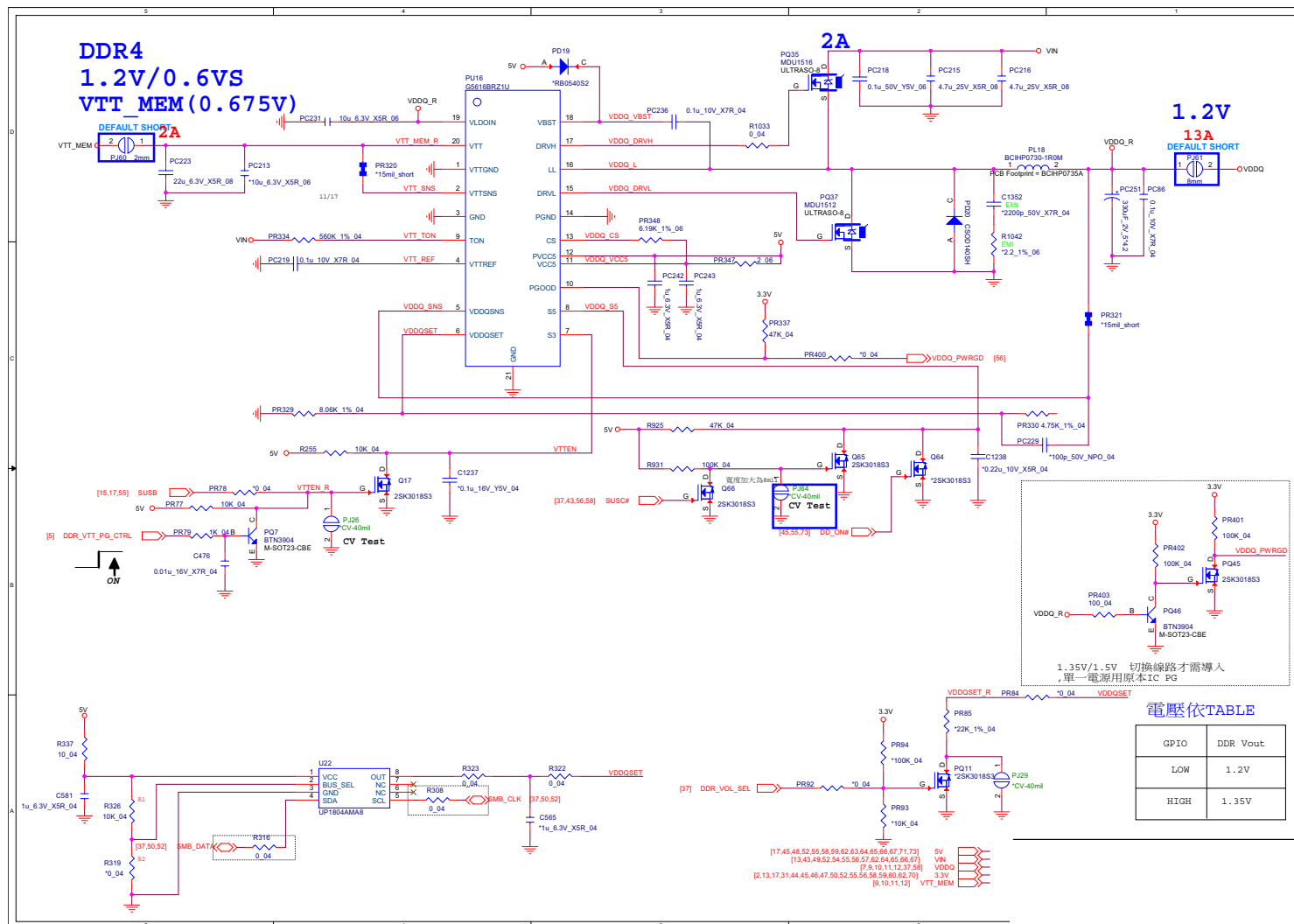


Connector B - 53

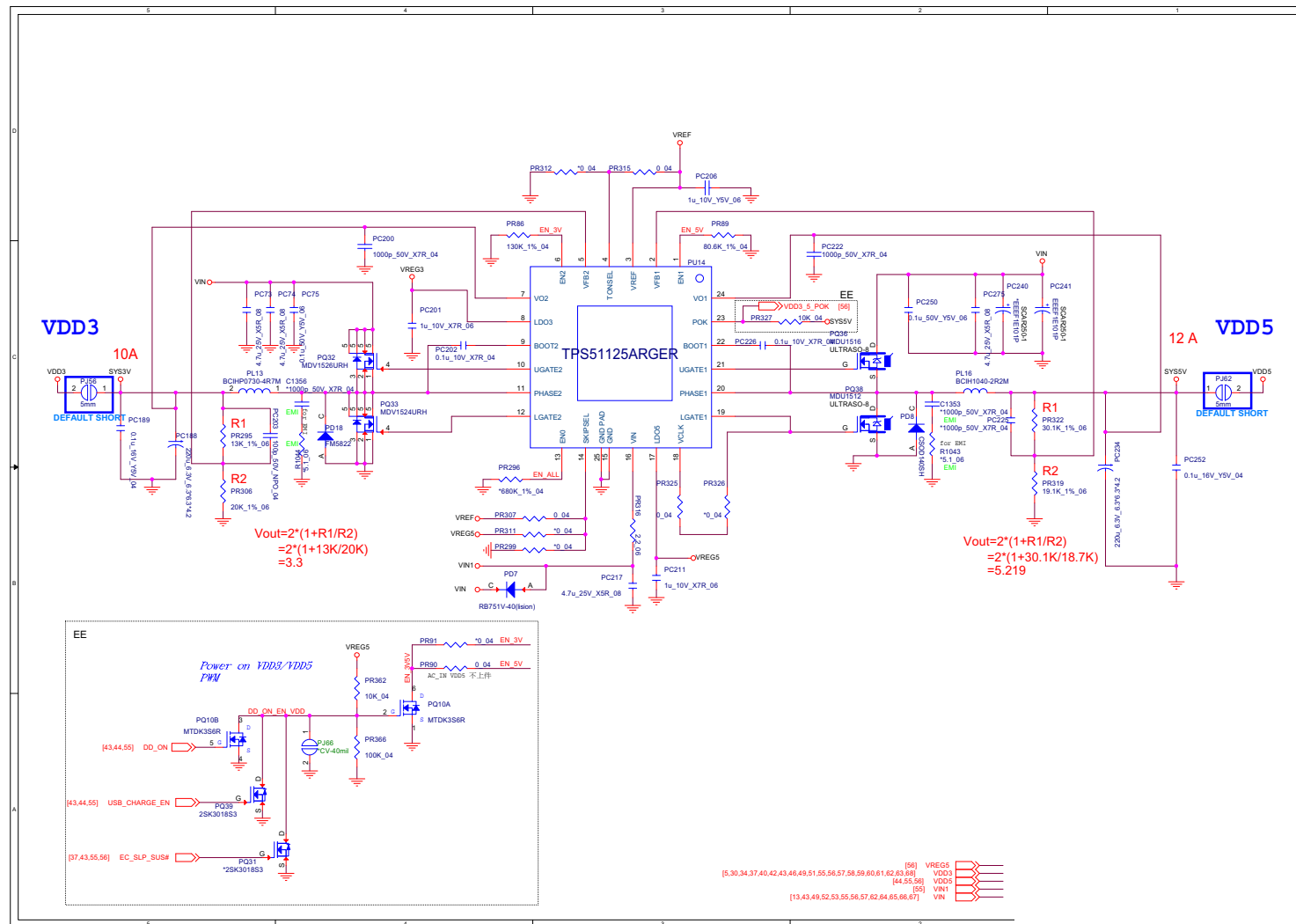


DDR 1.2V / 0.6VS

Sheet 53 of 81
DDR 1.2V / 0.6VS

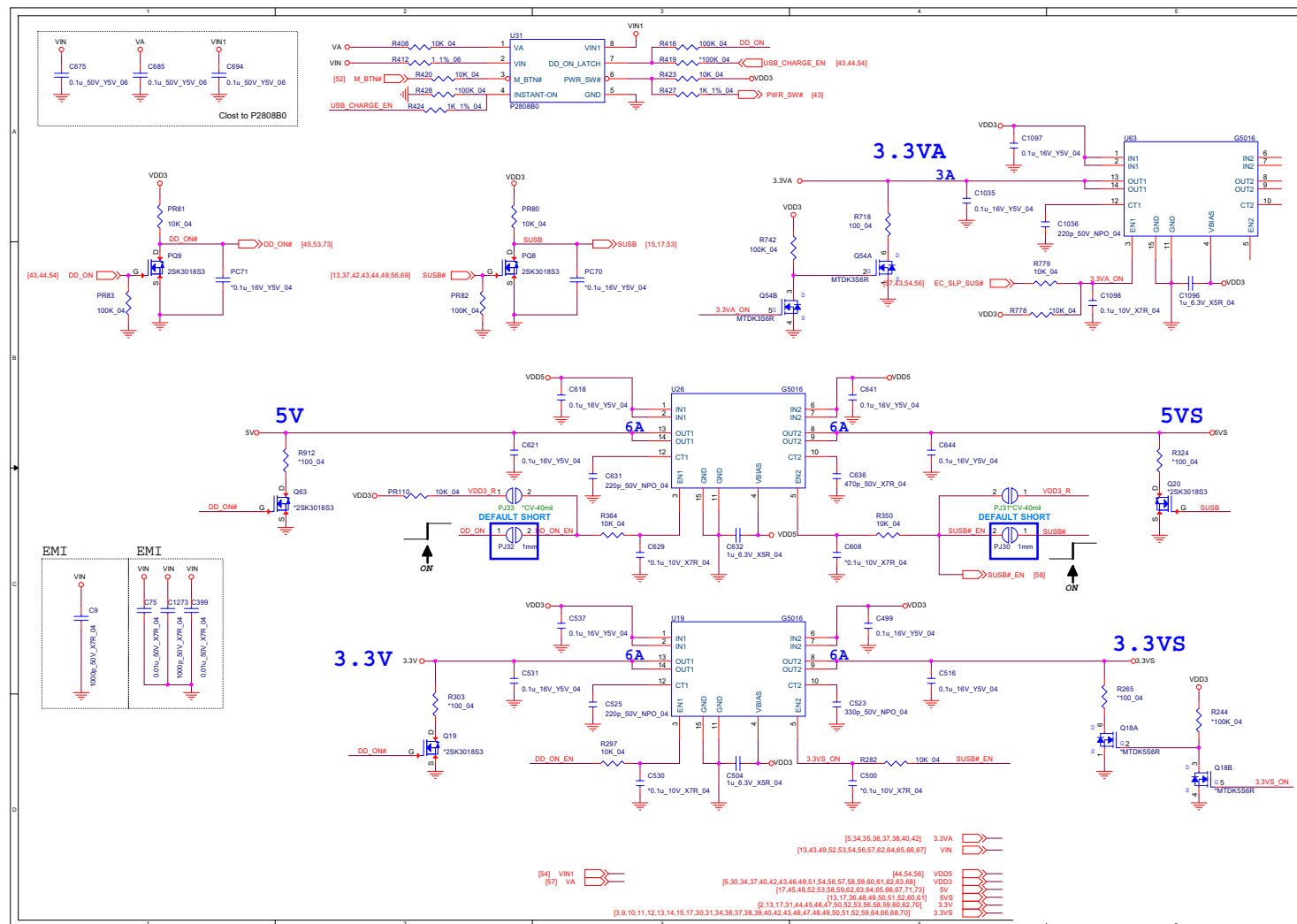


VDD3, VDD5

Sheet 54 of 81
VDD3, VDD5

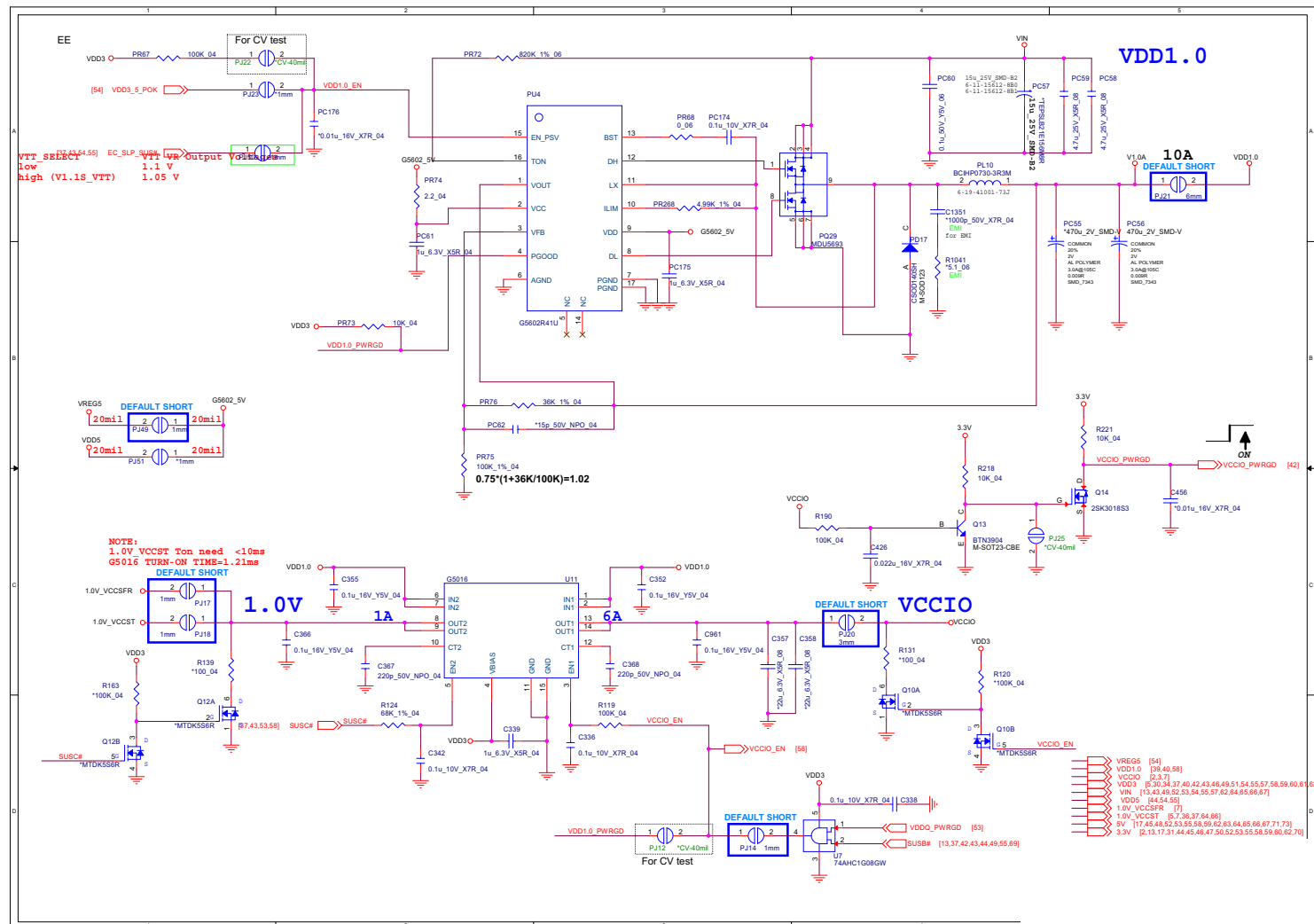
5V, 5VS, 3.3V, 3.3VS, 3.3VA

B. Schematic Diagrams



Power 1.0V, VCCIO

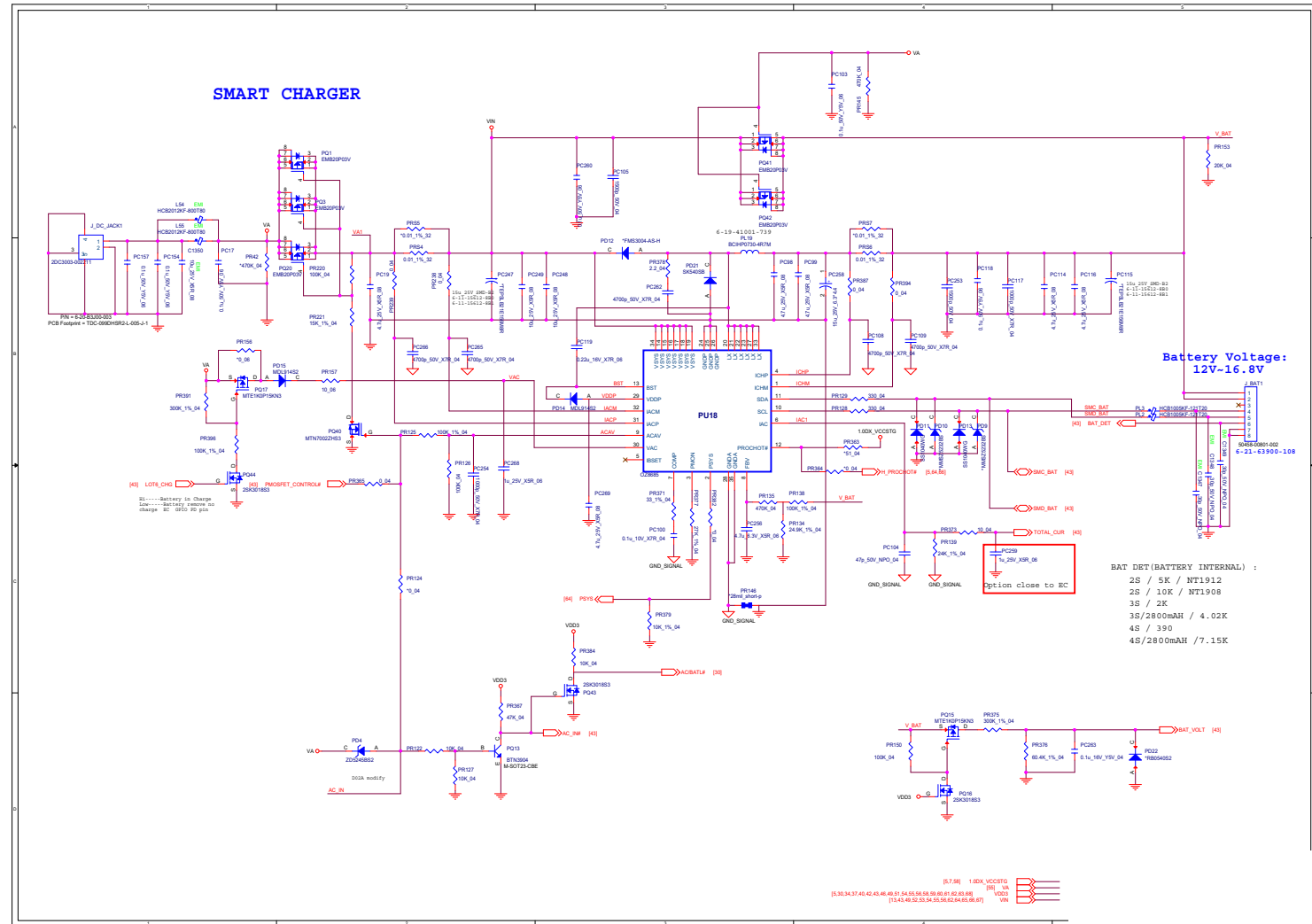
Sheet 56 of 81
Power 1.0V, VCCIO



AC_In, Charger

B. Schematic Diagrams

Sheet 57 of 81
AC_In, Charger

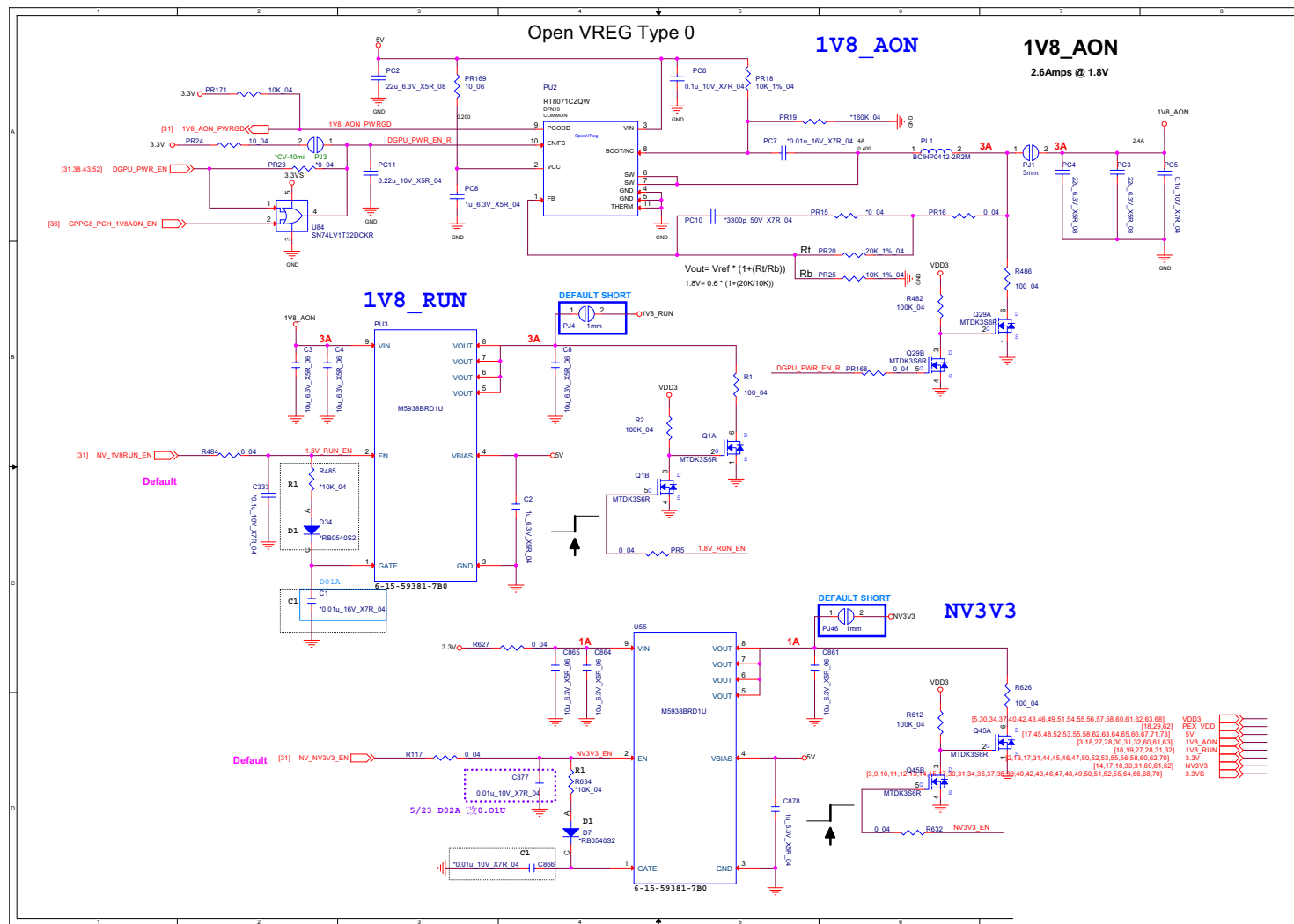


Sheet 58 of 81
1.0DX_VCCSTG/
VCCSFR OC/2.5V

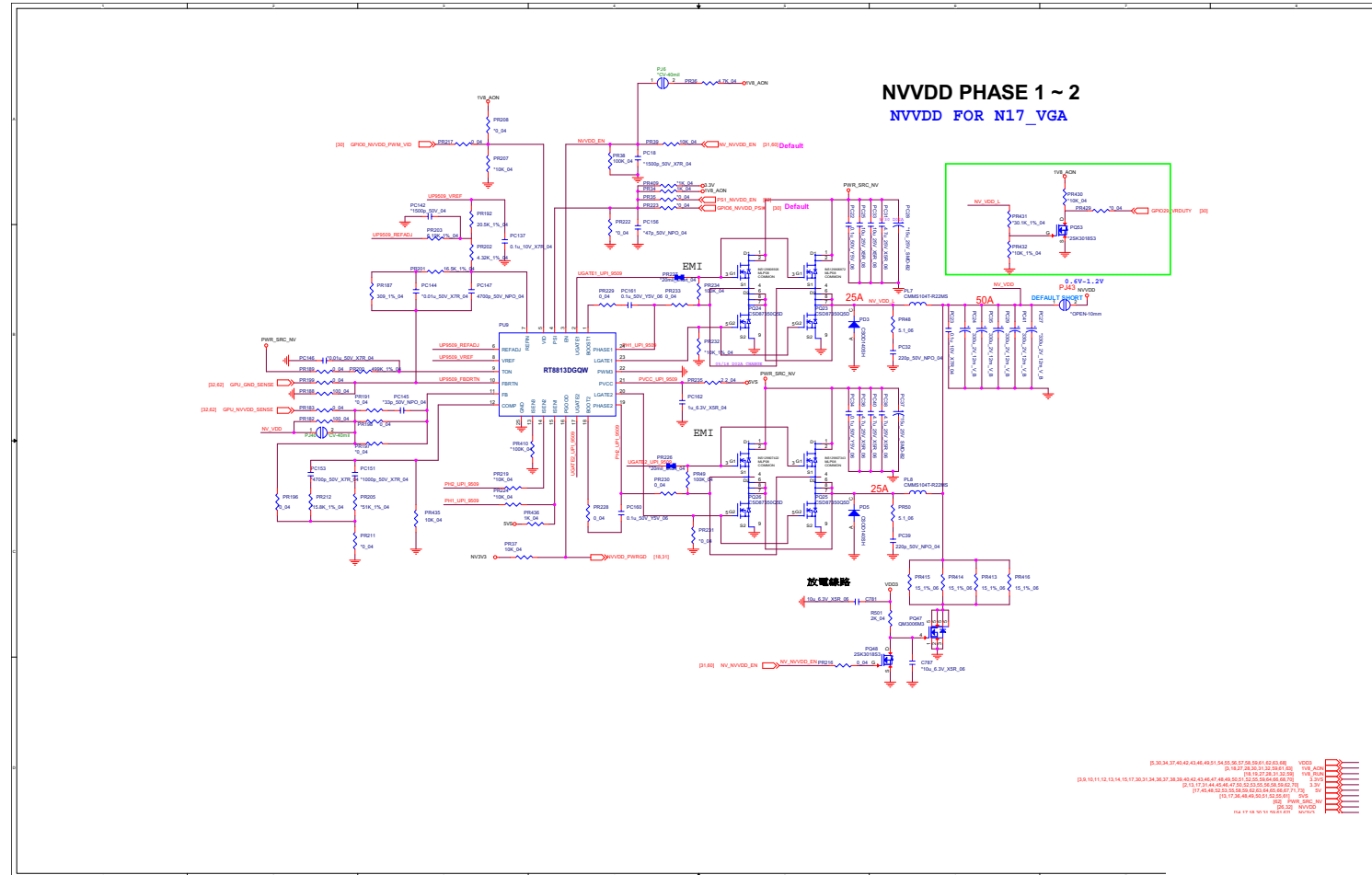


1V8_RUN/AON, NV3V3

Sheet 59 of 81
1V8_RUN/AON,
NV3V3



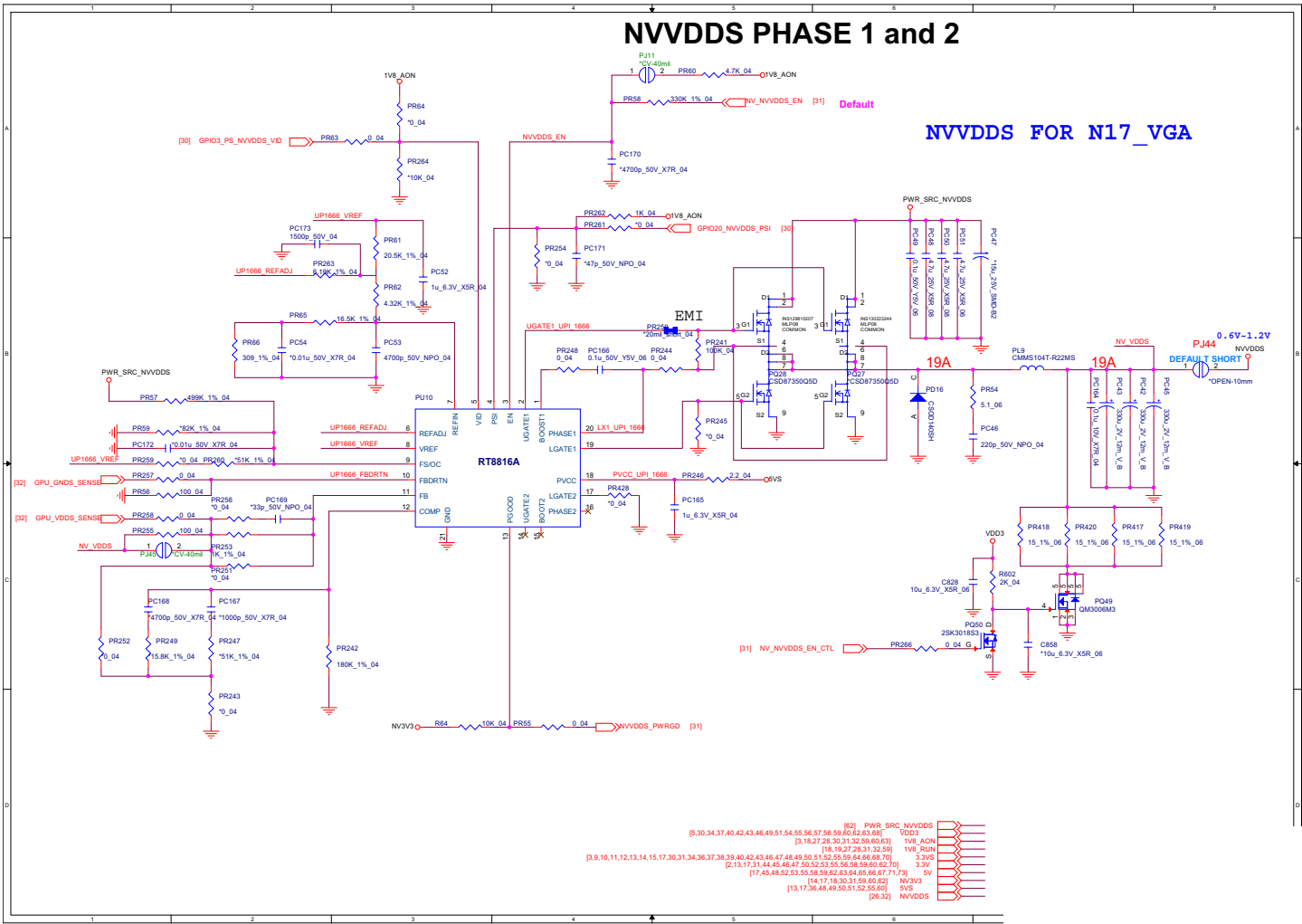
NVVDD Phase 1 & 2



Schematic Diagrams

NVVDDS

Sheet 61 of 81
NVVDDS



Open VREG Type 0 PEX_VDD
2.6Amps @ 1.0V

Cold boot/Optimus: 1V8_AON→1V8_RUN→NVVDD→NVVDDS→PEX_VDD→FBVDD/Q
GC6 2.1 Exit: 1V8_RUN→NVVDD_L→NVVDD_S→PEX_VDD or 1V8_RUN→NVVDD_L→NVVDD_S & PEX_VDD

GC6 2.1 Control Signals

- 1V8_MAIN_EN
- GC6_FB_EN
- GPU_EVENT#
- GPU_PEX_RST_HOLD#
- SYS_PEX_RST_MON#

GC6 2.1 - VR Complex

- GPU_PWR_EN (SYSTEM)
- 1V8_AON
- 1V8_MAIN_EN
- PEX&1.05V
- NVVDD
- FBVDD/Q

POWER RAIL State in GC6

POWER RAIL	State in GC6
1V8_AON	ON
1V8_MAIN	OFF
PEX&1.05V	OFF
NVVDD	OFF
NVVDDS	OFF
FBVDD/Q	ON

POWER ON SEQUENCE

POWER OFF SEQUENCE

FBVDD/Q

PEX_VDD

GPU

VR Complex

EC/PCH

GPU PWR EN (SYSTEM)

1V8_AON

1V8_MAIN_EN

1V8_MAIN

GPU_EVENT#

GPU_PEX_RST_HOLD#

SYS_PEX_RST_MON#

GPU_PEX_RST#

GPU_RST#

GPU_PWR_EN

GPU

GPU PWR EN (SYSTEM)

1V8_AON

1V8_MAIN_EN

1V8_MAIN

GPU_EVENT#

GPU_PEX_RST_HOLD#

SYS_PEX_RST_MON#

GPU_PEX_RST#

GPU_RST#

GPU_PWR_EN

GPU

GPU PWR EN (SYSTEM)

1V8_AON

1V8_MAIN_EN

1V8_MAIN

GPU_EVENT#

GPU_PEX_RST_HOLD#

SYS_PEX_RST_MON#

GPU_PEX_RST#

GPU_RST#

GPU_PWR_EN

GPU

GPU PWR EN (SYSTEM)

1V8_AON

1V8_MAIN_EN

1V8_MAIN

GPU_EVENT#

GPU_PEX_RST_HOLD#

SYS_PEX_RST_MON#

GPU_PEX_RST#

GPU_RST#

GPU_PWR_EN

GPU

GPU PWR EN (SYSTEM)

1V8_AON

1V8_MAIN_EN

1V8_MAIN

GPU_EVENT#

GPU_PEX_RST_HOLD#

SYS_PEX_RST_MON#

GPU_PEX_RST#

GPU_RST#

GPU_PWR_EN

GPU

GPU PWR EN (SYSTEM)

1V8_AON

1V8_MAIN_EN

1V8_MAIN

GPU_EVENT#

GPU_PEX_RST_HOLD#

SYS_PEX_RST_MON#

GPU_PEX_RST#

GPU_RST#

GPU_PWR_EN

GPU

GPU PWR EN (SYSTEM)

1V8_AON

1V8_MAIN_EN

1V8_MAIN

GPU_EVENT#

GPU_PEX_RST_HOLD#

SYS_PEX_RST_MON#

GPU_PEX_RST#

GPU_RST#

GPU_PWR_EN

GPU

GPU PWR EN (SYSTEM)

1V8_AON

1V8_MAIN_EN

1V8_MAIN

GPU_EVENT#

GPU_PEX_RST_HOLD#

SYS_PEX_RST_MON#

GPU_PEX_RST#

GPU_RST#

GPU_PWR_EN

GPU

GPU PWR EN (SYSTEM)

1V8_AON

1V8_MAIN_EN

1V8_MAIN

GPU_EVENT#

GPU_PEX_RST_HOLD#

SYS_PEX_RST_MON#

GPU_PEX_RST#

GPU_RST#

GPU_PWR_EN

GPU

GPU PWR EN (SYSTEM)

1V8_AON

1V8_MAIN_EN

1V8_MAIN

GPU_EVENT#

GPU_PEX_RST_HOLD#

SYS_PEX_RST_MON#

GPU_PEX_RST#

GPU_RST#

GPU_PWR_EN

GPU

GPU PWR EN (SYSTEM)

1V8_AON

1V8_MAIN_EN

1V8_MAIN

GPU_EVENT#

GPU_PEX_RST_HOLD#

SYS_PEX_RST_MON#

GPU_PEX_RST#

GPU_RST#

GPU_PWR_EN

GPU

GPU PWR EN (SYSTEM)

1V8_AON

1V8_MAIN_EN

1V8_MAIN

GPU_EVENT#

GPU_PEX_RST_HOLD#

SYS_PEX_RST_MON#

GPU_PEX_RST#

GPU_RST#

GPU_PWR_EN

GPU

GPU PWR EN (SYSTEM)

1V8_AON

1V8_MAIN_EN

1V8_MAIN

GPU_EVENT#

GPU_PEX_RST_HOLD#

SYS_PEX_RST_MON#

GPU_PEX_RST#

GPU_RST#

GPU_PWR_EN

GPU

GPU PWR EN (SYSTEM)

1V8_AON

1V8_MAIN_EN

1V8_MAIN

GPU_EVENT#

GPU_PEX_RST_HOLD#

SYS_PEX_RST_MON#

GPU_PEX_RST#

GPU_RST#

GPU_PWR_EN

GPU

GPU PWR EN (SYSTEM)

1V8_AON

1V8_MAIN_EN

1V8_MAIN

GPU_EVENT#

GPU_PEX_RST_HOLD#

SYS_PEX_RST_MON#

GPU_PEX_RST#

GPU_RST#

GPU_PWR_EN

GPU

GPU PWR EN (SYSTEM)

1V8_AON

1V8_MAIN_EN

1V8_MAIN

GPU_EVENT#

GPU_PEX_RST_HOLD#

SYS_PEX_RST_MON#

GPU_PEX_RST#

GPU_RST#

GPU_PWR_EN

GPU

GPU PWR EN (SYSTEM)

1V8_AON

1V8_MAIN_EN

1V8_MAIN

GPU_EVENT#

GPU_PEX_RST_HOLD#

SYS_PEX_RST_MON#

GPU_PEX_RST#

GPU_RST#

GPU_PWR_EN

GPU

GPU PWR EN (SYSTEM)

1V8_AON

1V8_MAIN_EN

1V8_MAIN

GPU_EVENT#

GPU_PEX_RST_HOLD#

SYS_PEX_RST_MON#

GPU_PEX_RST#

GPU_RST#

GPU_PWR_EN

GPU

GPU PWR EN (SYSTEM)

1V8_AON

1V8_MAIN_EN

1V8_MAIN

GPU_EVENT#

GPU_PEX_RST_HOLD#

SYS_PEX_RST_MON#

GPU_PEX_RST#

GPU_RST#

GPU_PWR_EN

GPU

GPU PWR EN (SYSTEM)

1V8_AON

1V8_MAIN_EN

1V8_MAIN

GPU_EVENT#

GPU_PEX_RST_HOLD#

SYS_PEX_RST_MON#

GPU_PEX_RST#

GPU_RST#

GPU_PWR_EN

GPU

GPU PWR EN (SYSTEM)

1V8_AON

1V8_MAIN_EN

1V8_MAIN

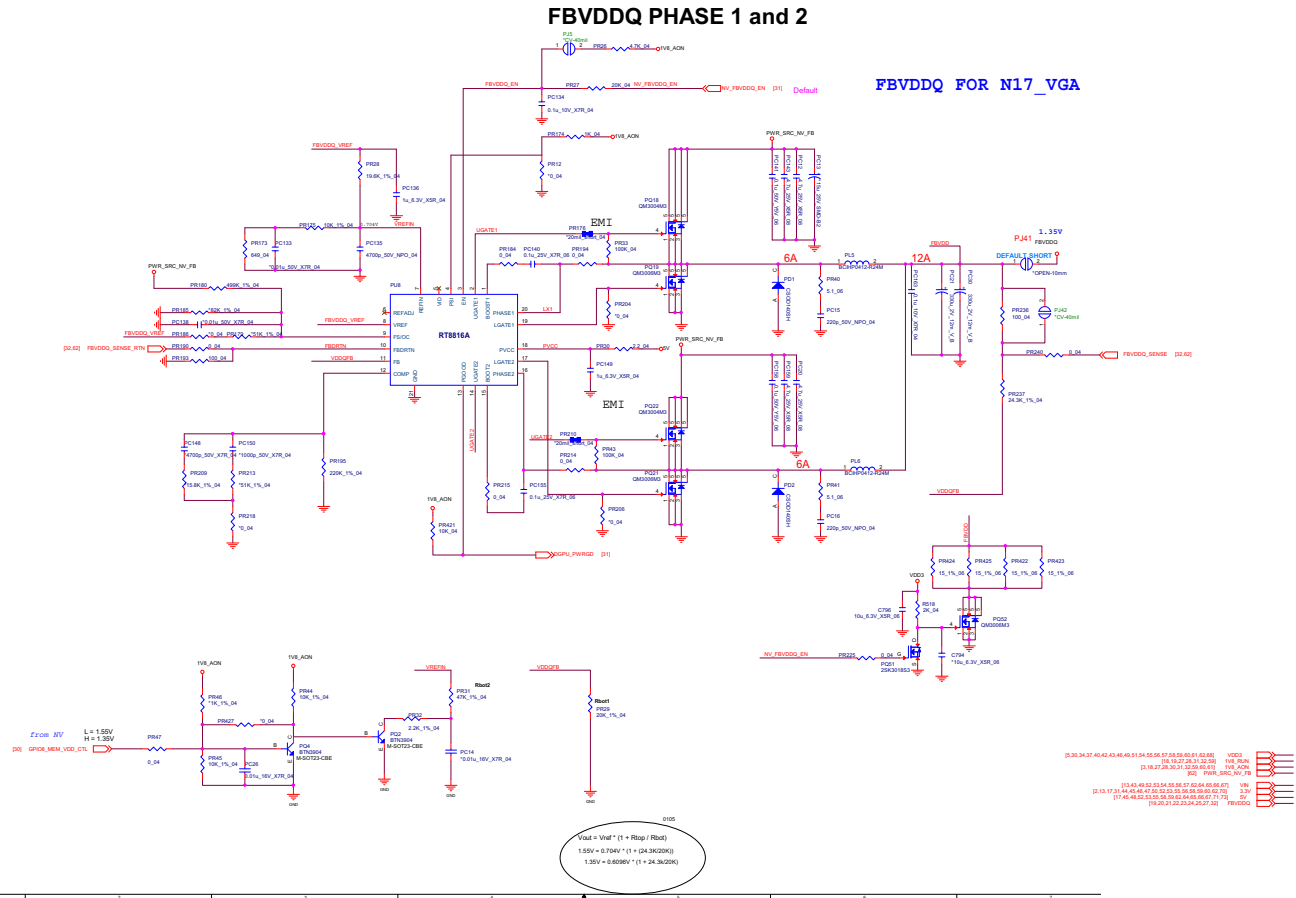
GPU_EVENT#

Schematic Diagrams

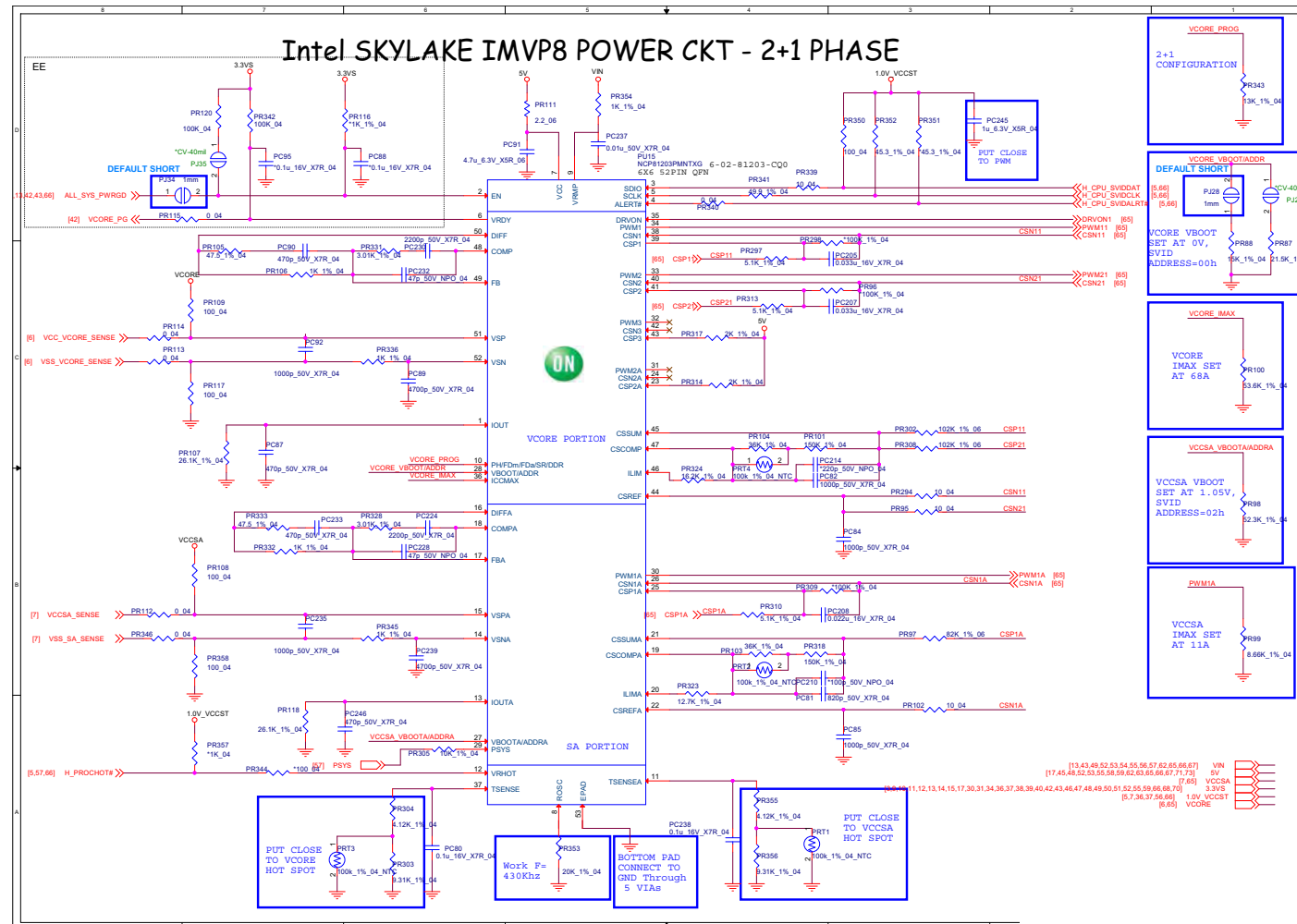
FBVDDQ

Sheet 63 of 81
FBVDDQ

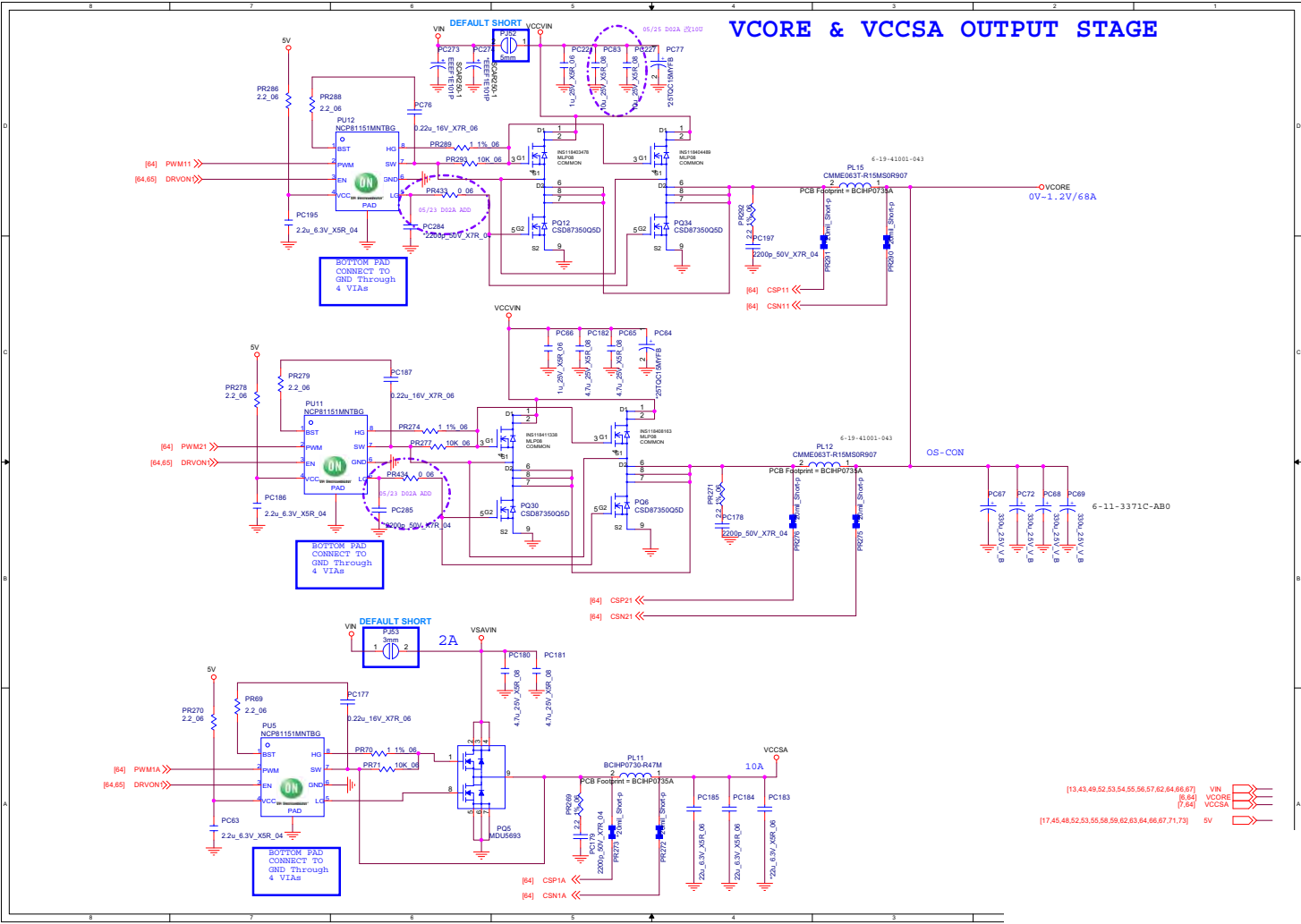
PAGE22: FBVDDQ, and MXM Mounting Holes

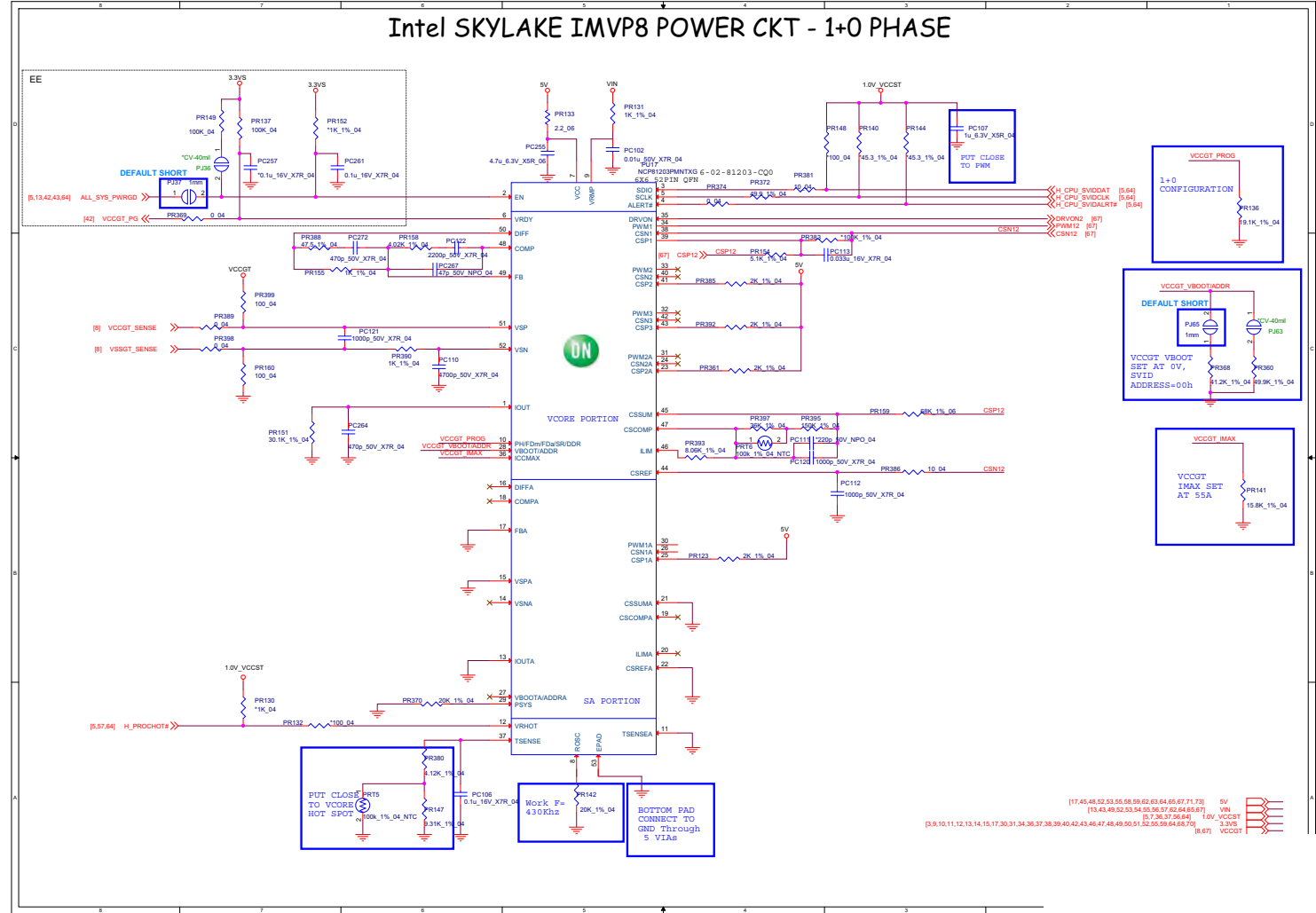


B.Schematic Diagrams



VCore Output Stage





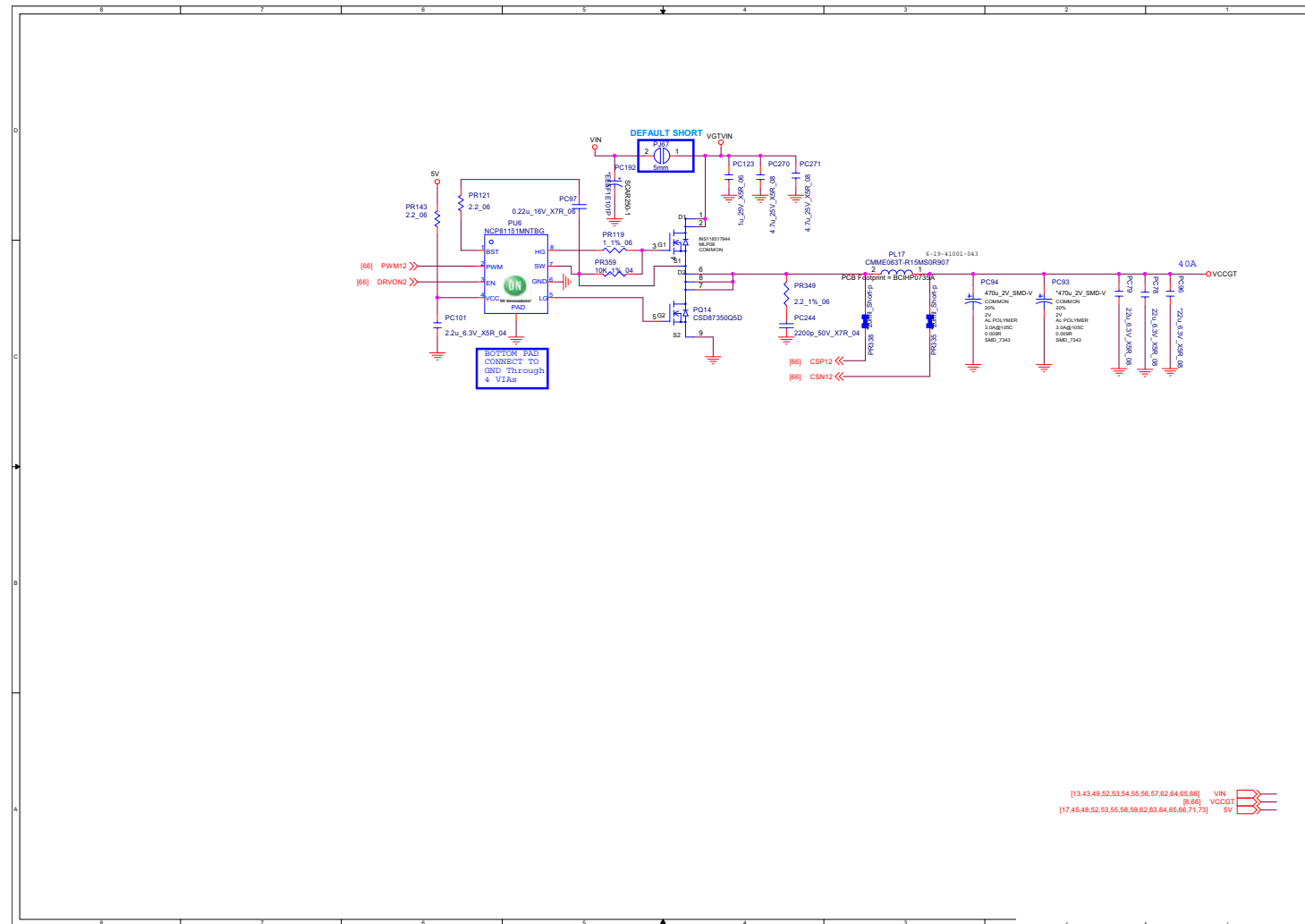
Sheet 66 of 81
VCCGT

B.Schematic Diagrams

VCCGT Output Stage

B. Schematic Diagrams

Sheet 67 of 81
VCCGT Output
Stage

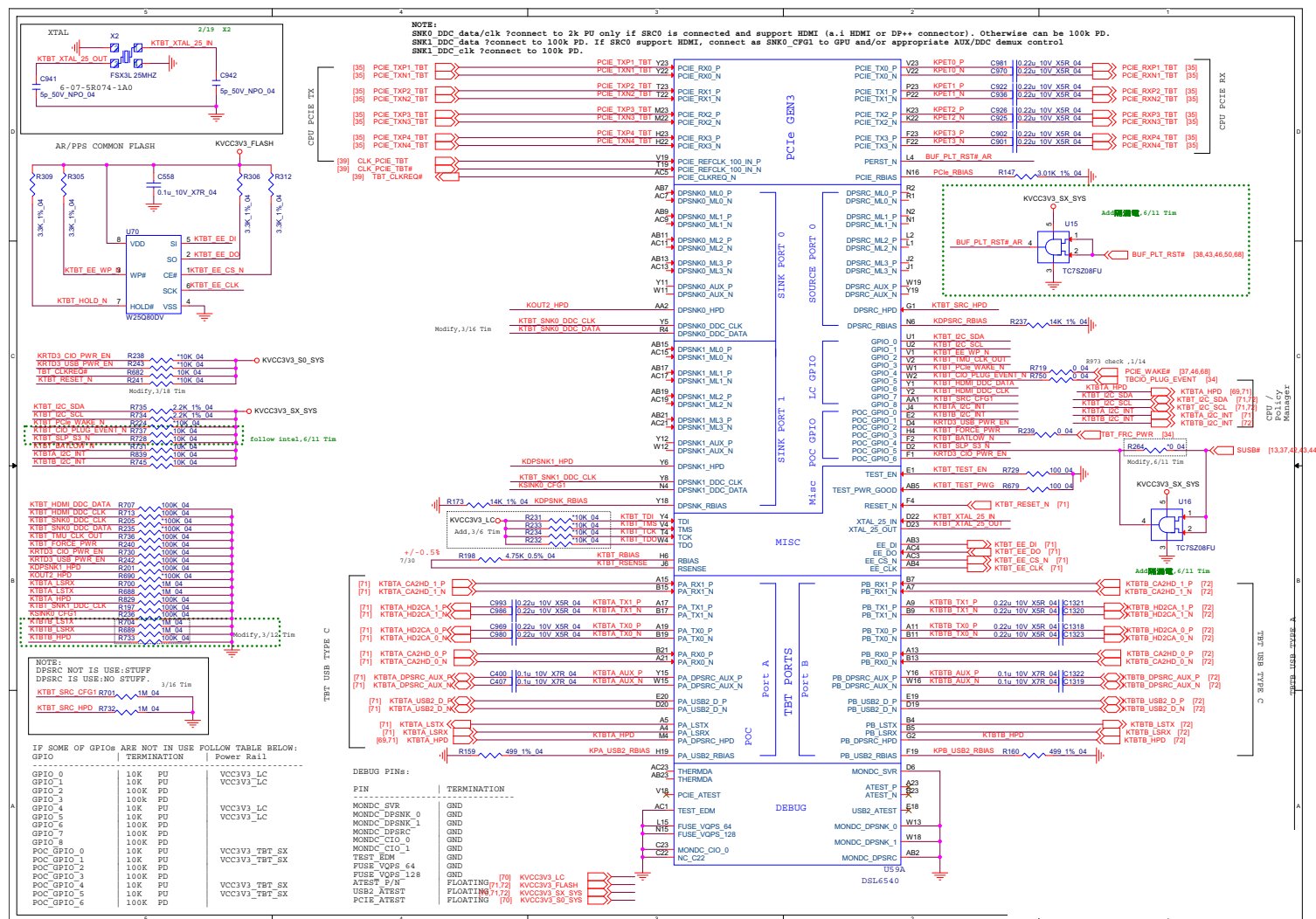


Sheet 68 of 81
LAN RTL8411, Card
Reader



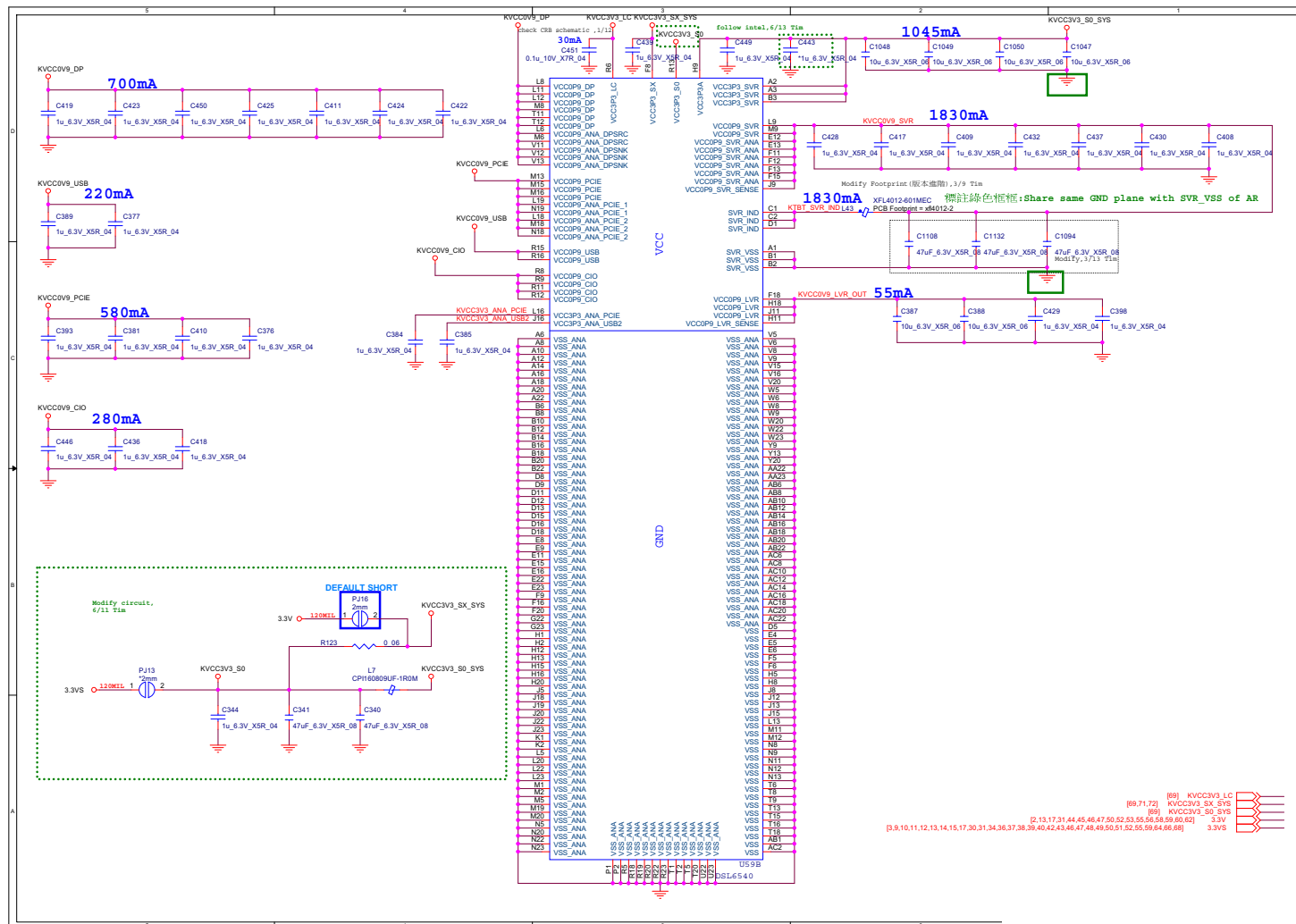
AR_TBT

B. Schematic Diagrams



Schematic Diagrams

AR_Power

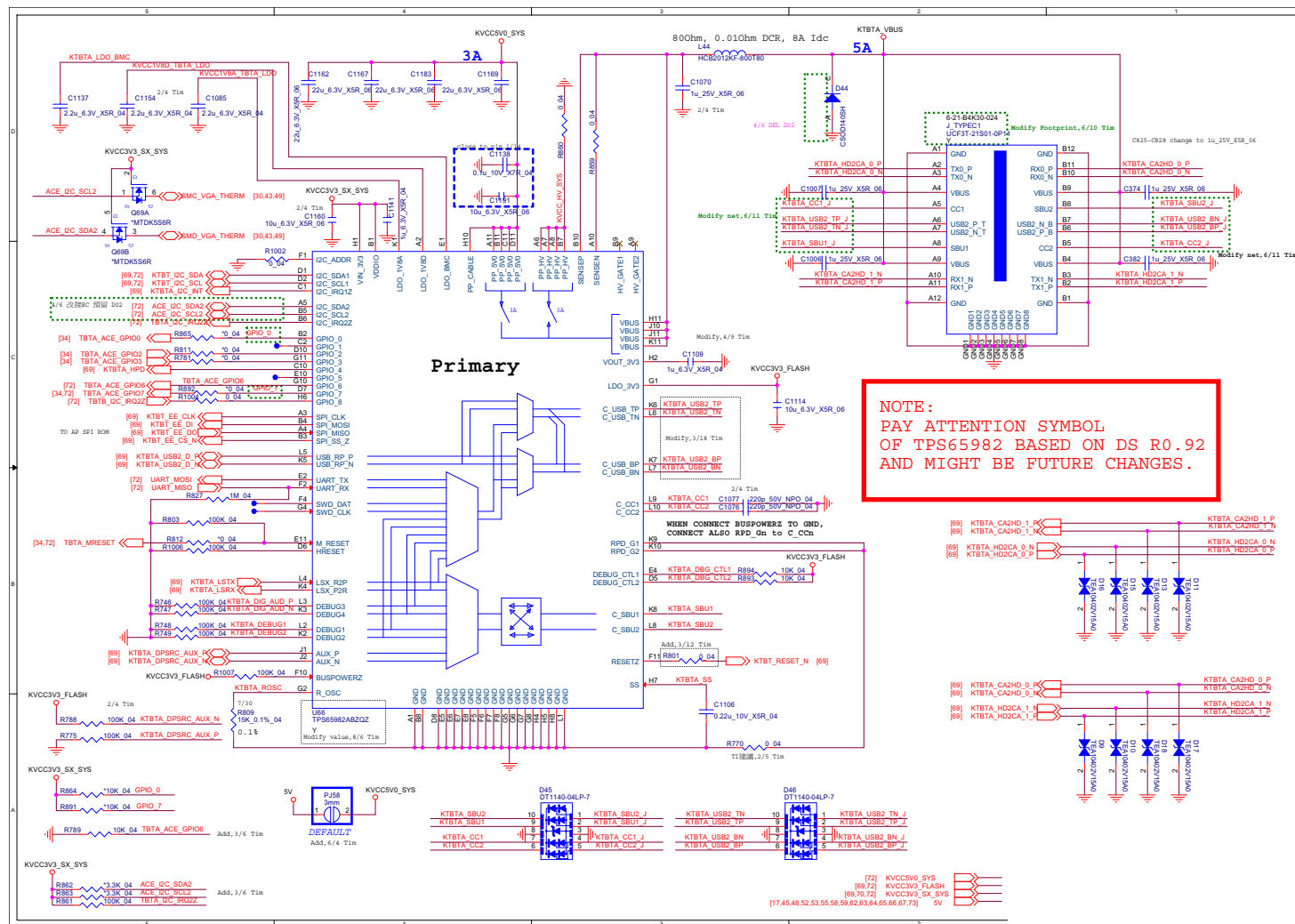


Sheet 70 of 81
AR_Power

B.Schematic Diagrams

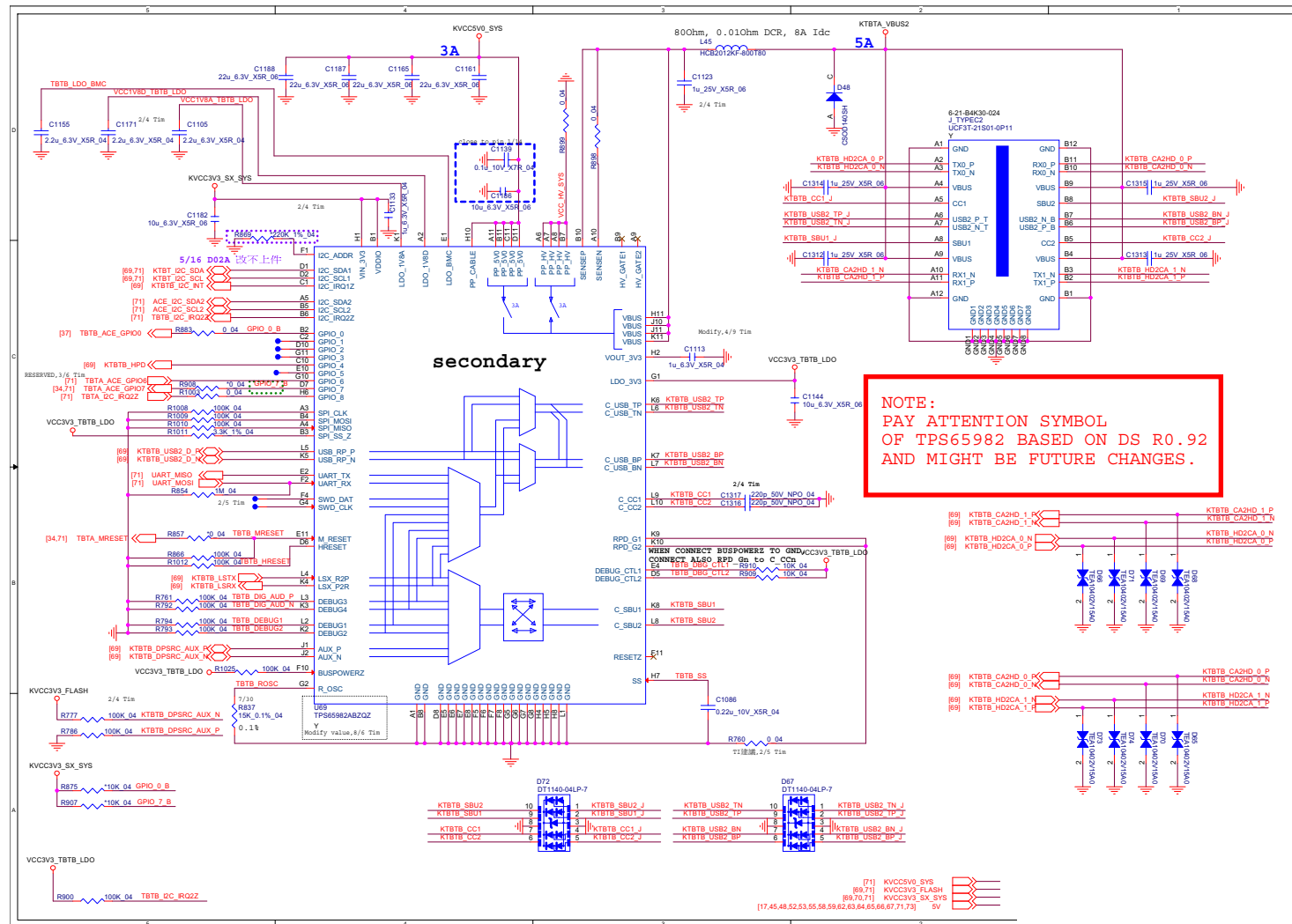
TPS65982, Type C

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TPS65982, Type C

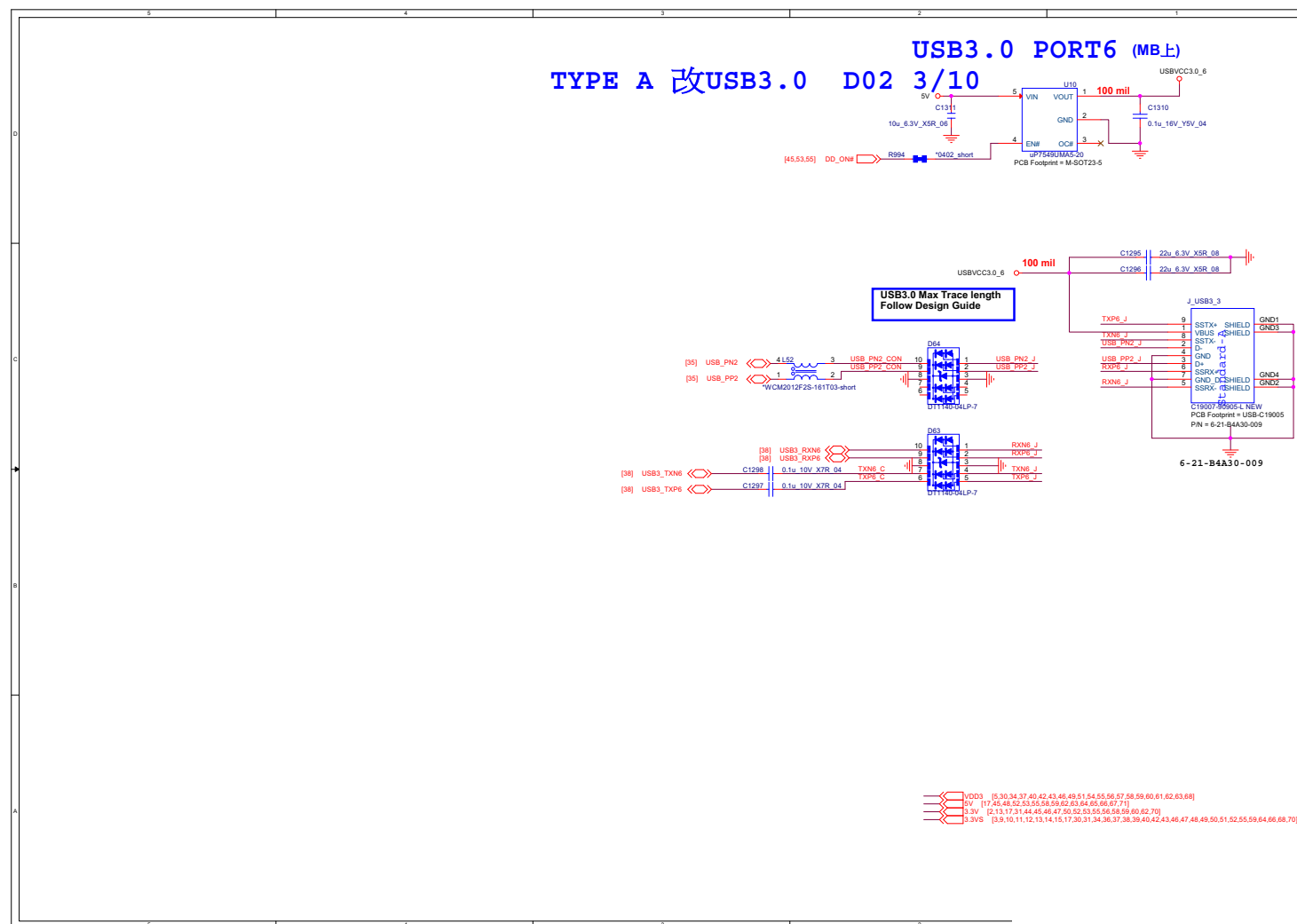


NOTE:
PAY ATTENTION SYMBOL
OF TPS65982 BASED ON DS R0.92
AND MIGHT BE FUTURE CHANGES.

S65982, Type A B - 73



Sheet 73 of 81
USB, Type A



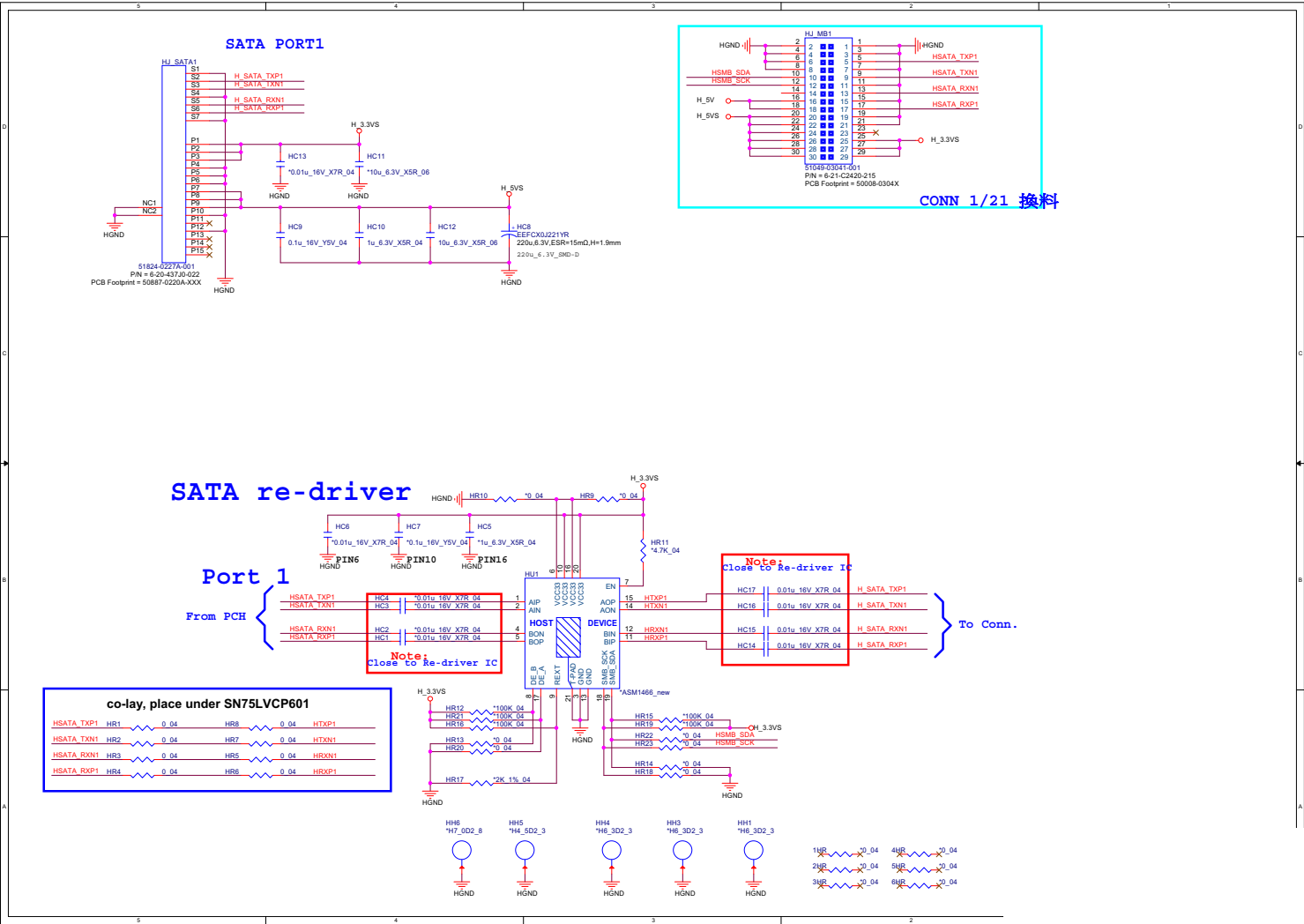
[illegible]

Audio Board_3D AMP B - 75

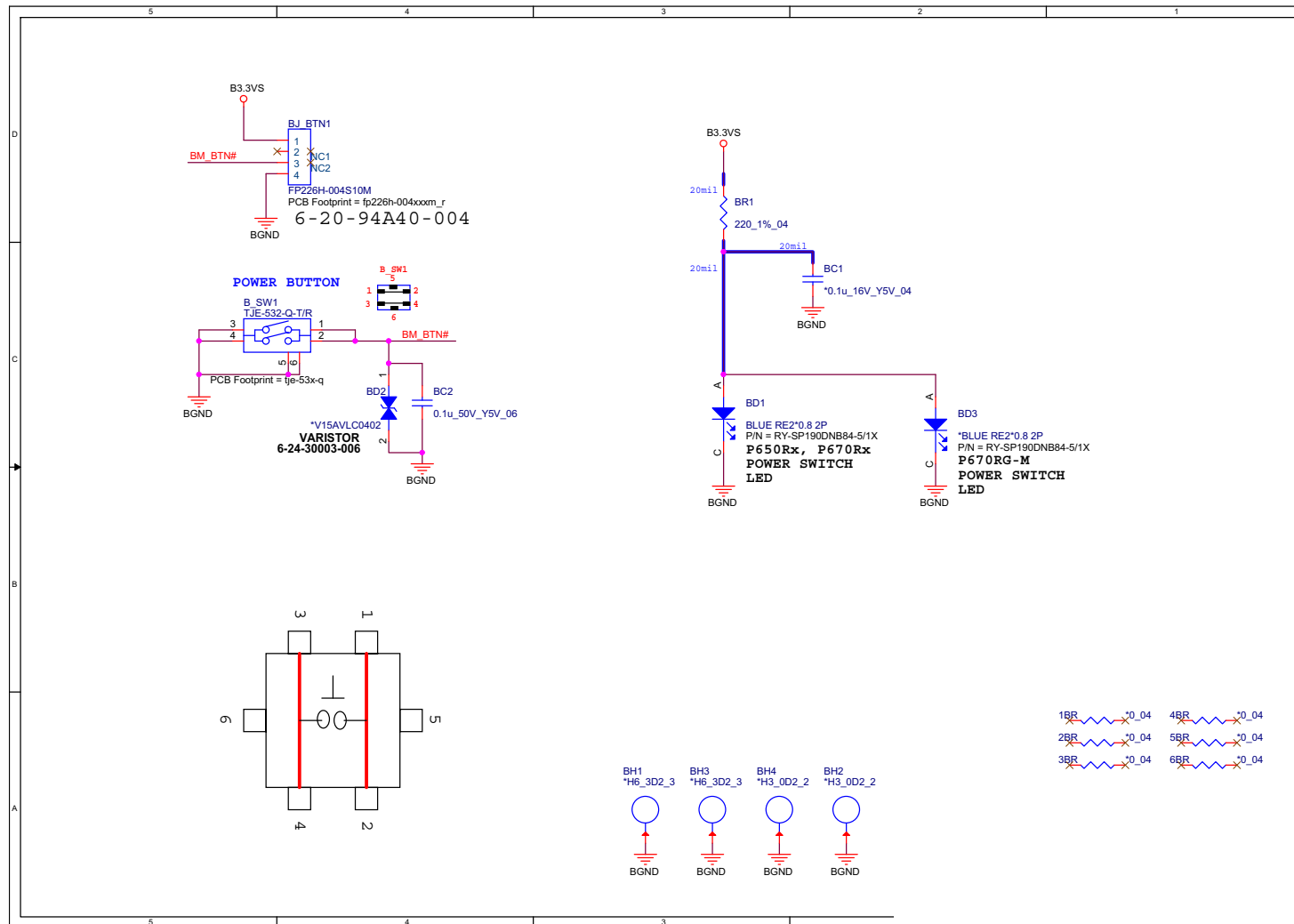
Schematic Diagrams

HDD Board

Sheet 75 of 81
HDD Board



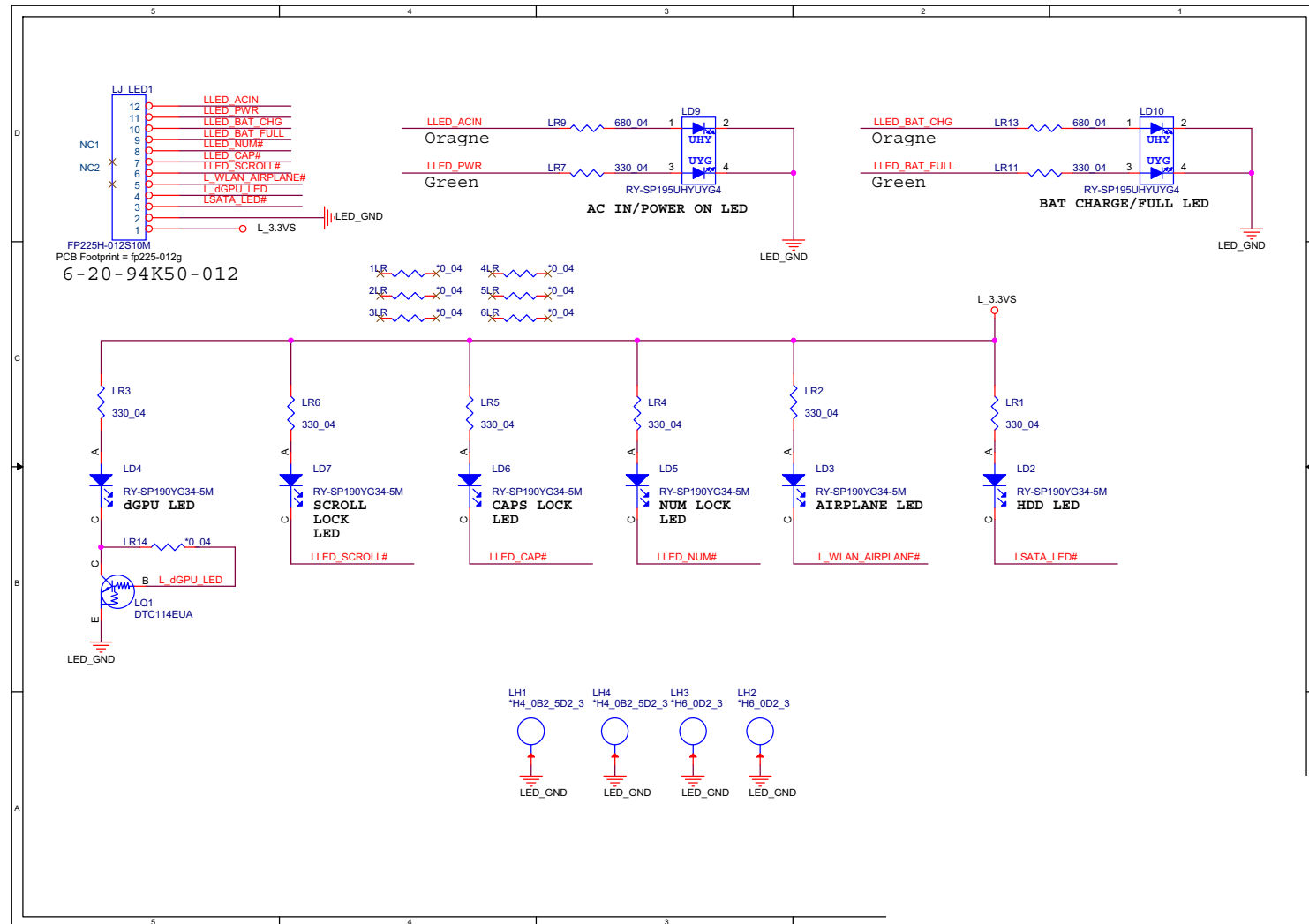
Power Board

Sheet 76 of 81
Power Board

Schematic Diagrams

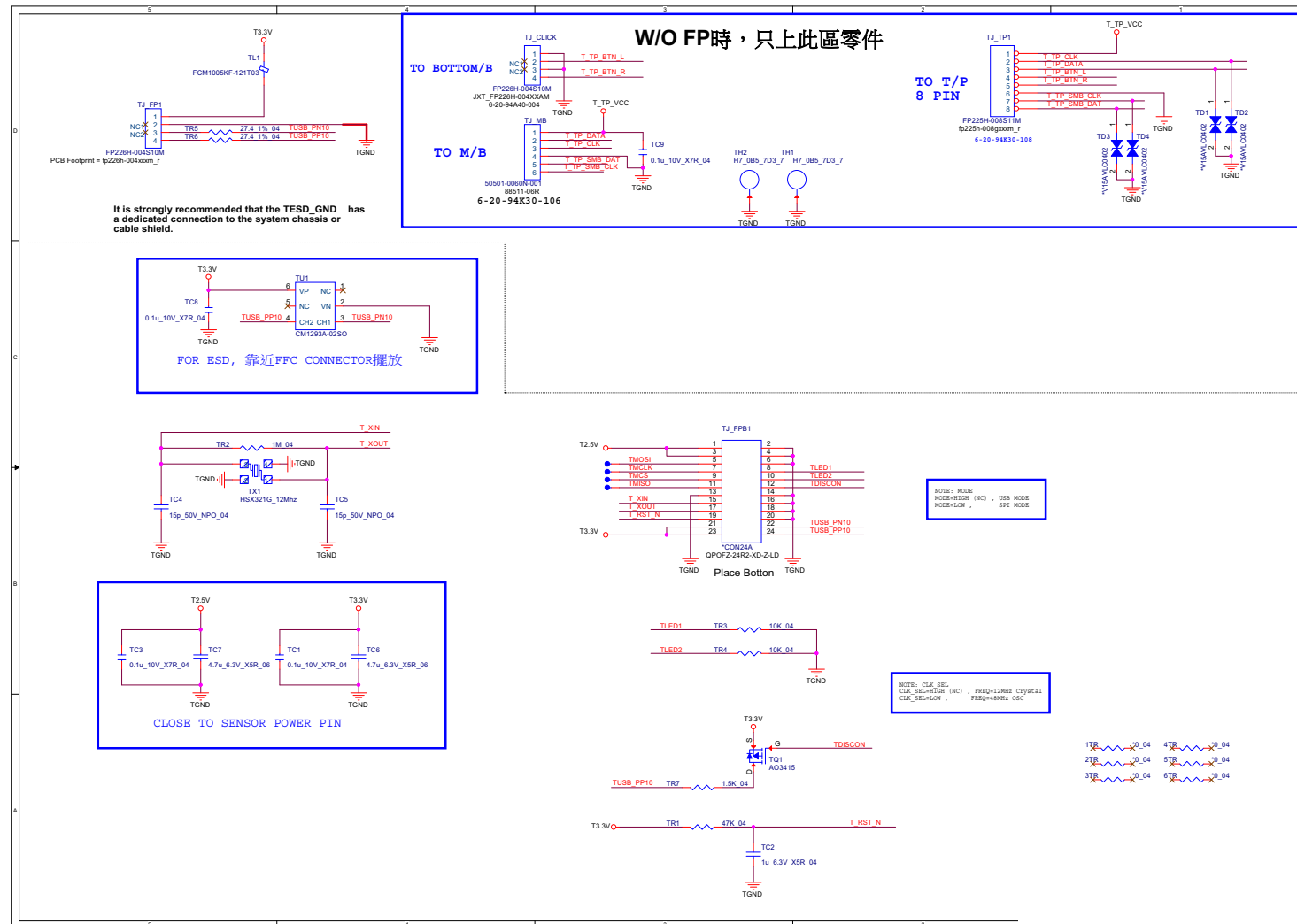
LED Board

Sheet 77 of 81
LED Board



Schematic Diagrams

Click Board



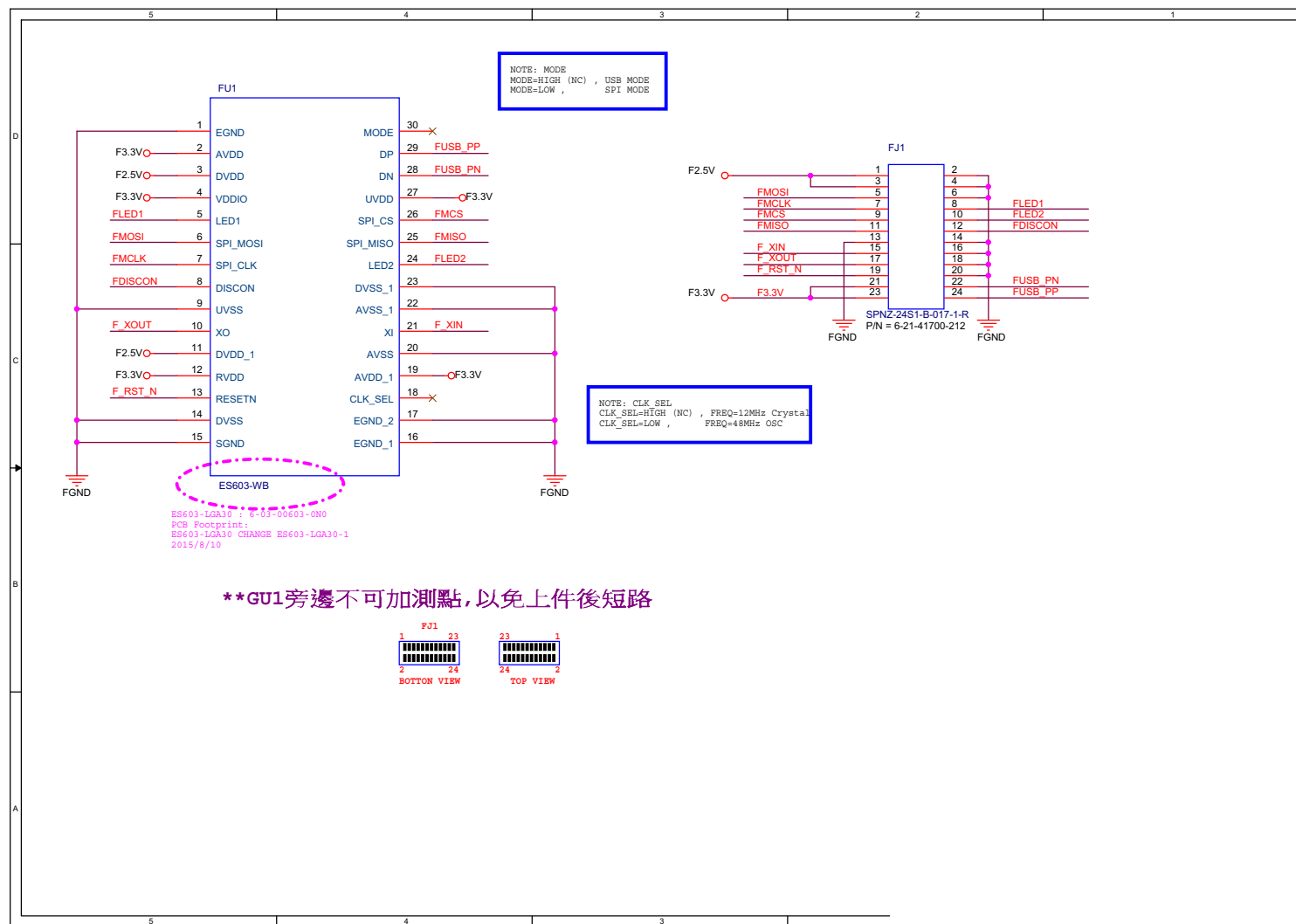
Sheet 78 of 81
Click Board

B.Schematic Diagrams

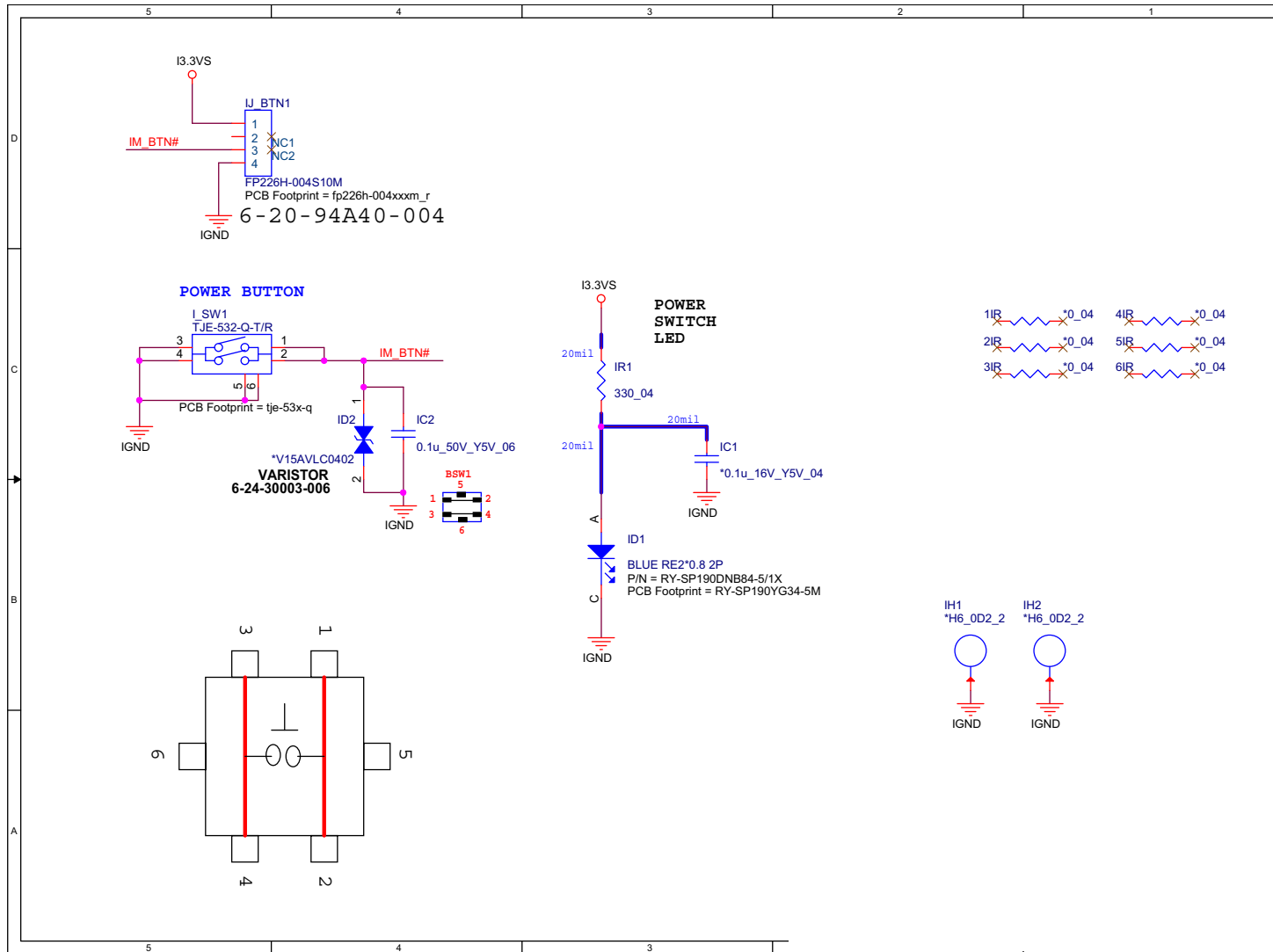
Schematic Diagrams

Finger Sensor Board

Sheet 79 of 81
Finger Sensor
Board



Power Board



Sheet 80 of 81
Power Board

Schematic Diagrams

LED Board

Sheet 81 of 81
LED Board

