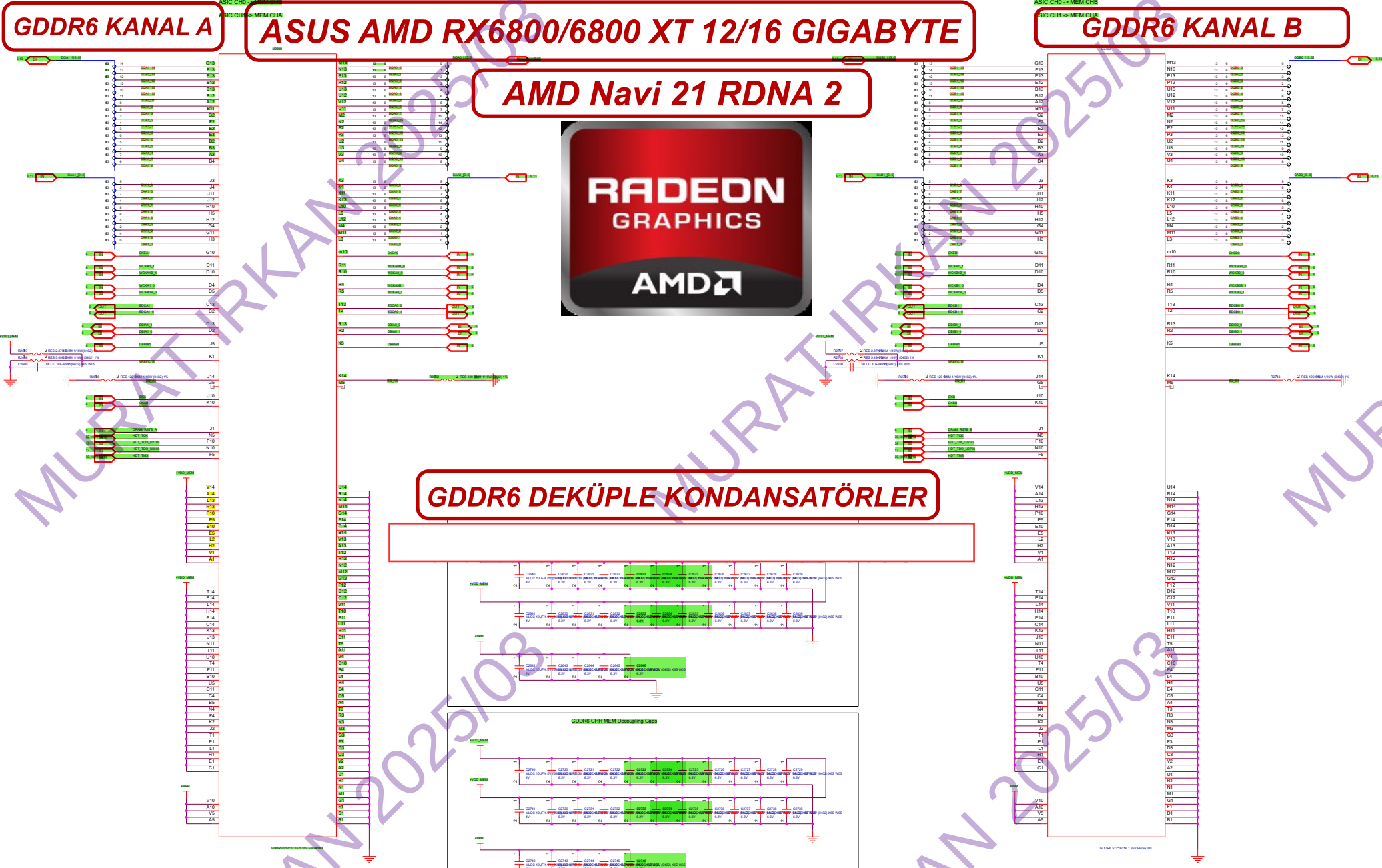
GDDR6 KANAL A

ASUS AMD RX6800/6800 XT 12/16 GIGABYTE

GDDR6 KANAL B

AMD Navi 21 RDNA 2



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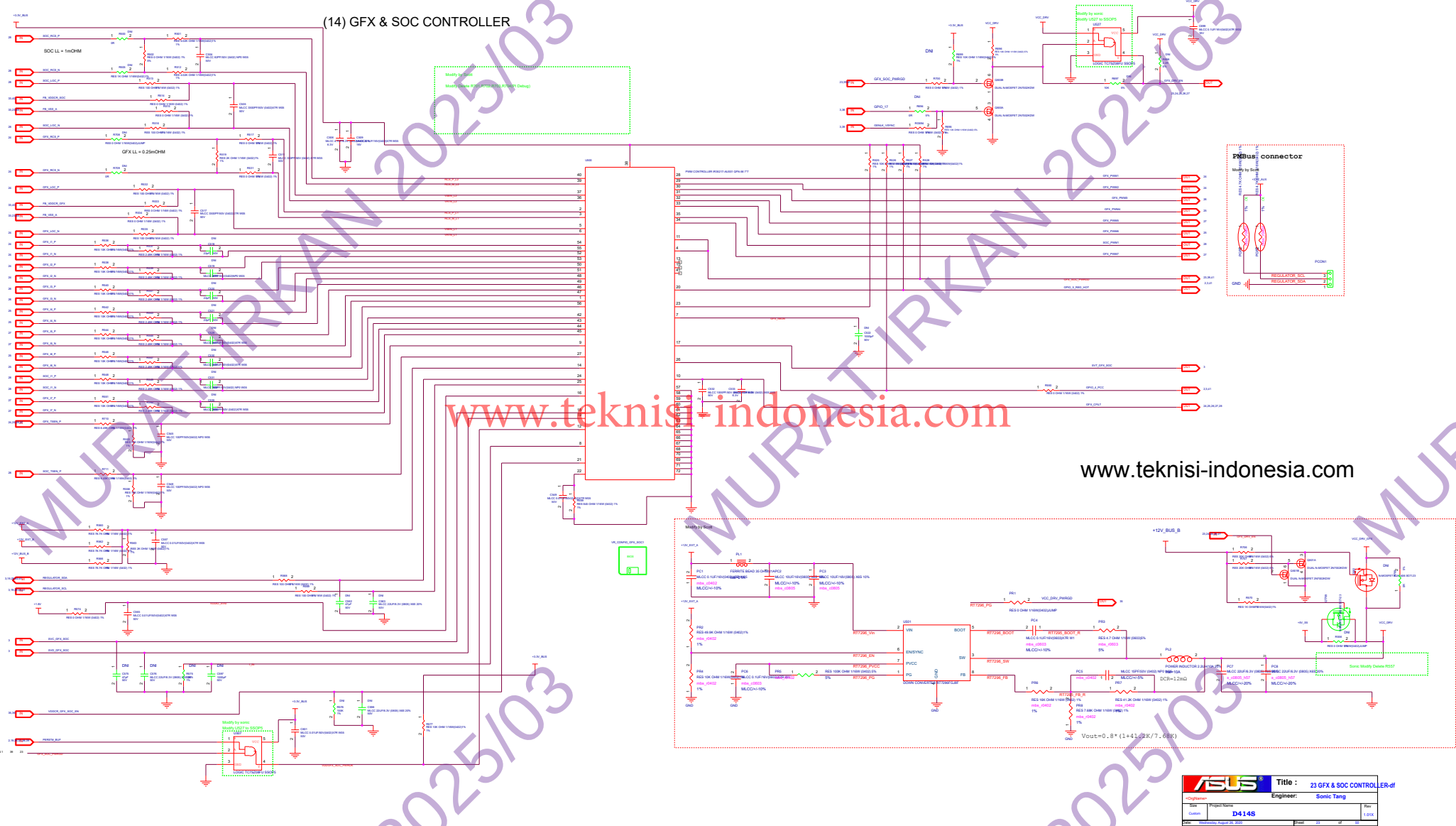
ASUS	Title :	13 GDDR6 MEM CH AB	
	Engineer:	Sonic Tang	
Size	Project Name		Rev
Custom	D414S		1.0X
Date: Wednesday, August 26, 2020	Sheet 13 of 50		

(14) GFX & SOC CONTROLLER



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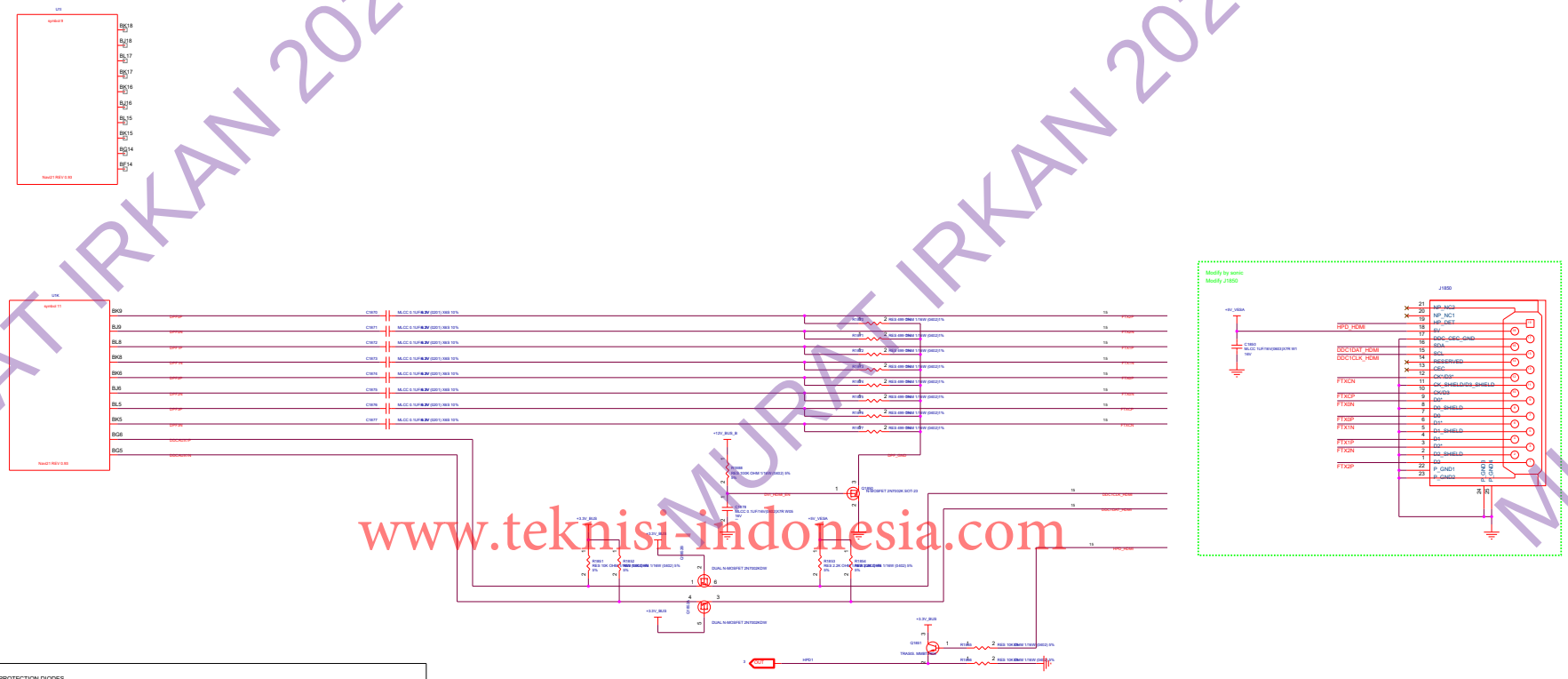
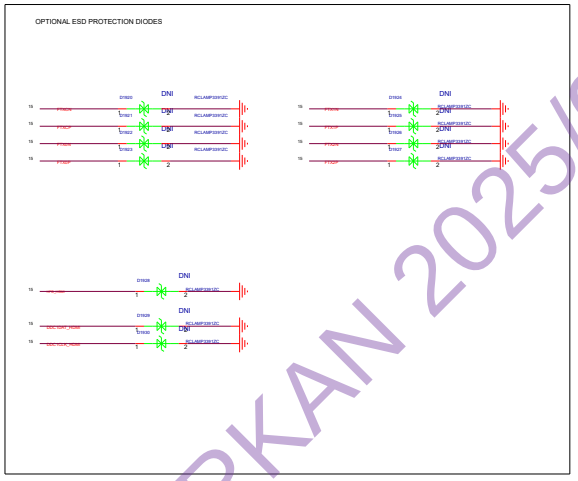
MURAT IRKAN 2025/03

ASUS	Title :	23 GFX & SOC CONTROLLER-df
<OrgName>	Engineer:	Sonic Tang
Size: Custom	Project Name: D414S	Rev: 1.0/1A
Date: Wednesday, August 28, 2024	Sheet 23 of 56	





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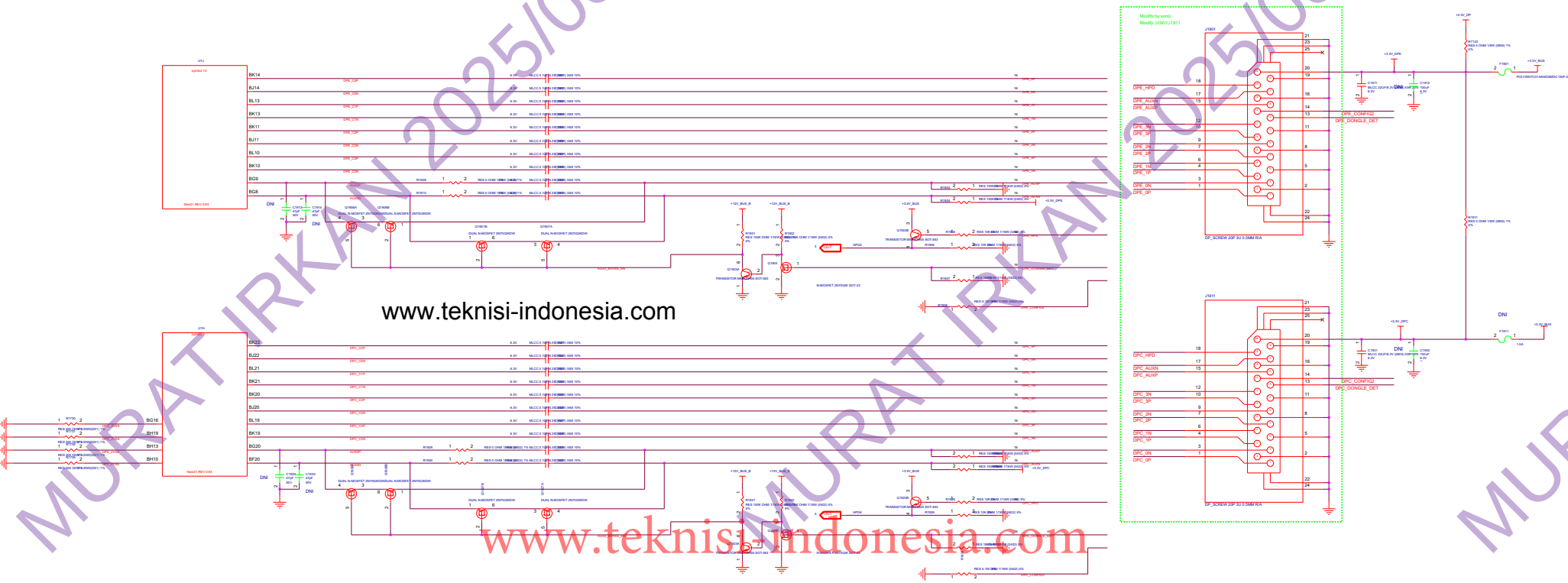
ASUS	Title :	15 NAVI21 TMDPF - HDMI
<OrgName>	Engineer:	Sonic Tang
Size: Custom	Project Name: D414S	Rev: 1.01X
Date: Wednesday, August 26, 2020	Sheet 15 of 58	



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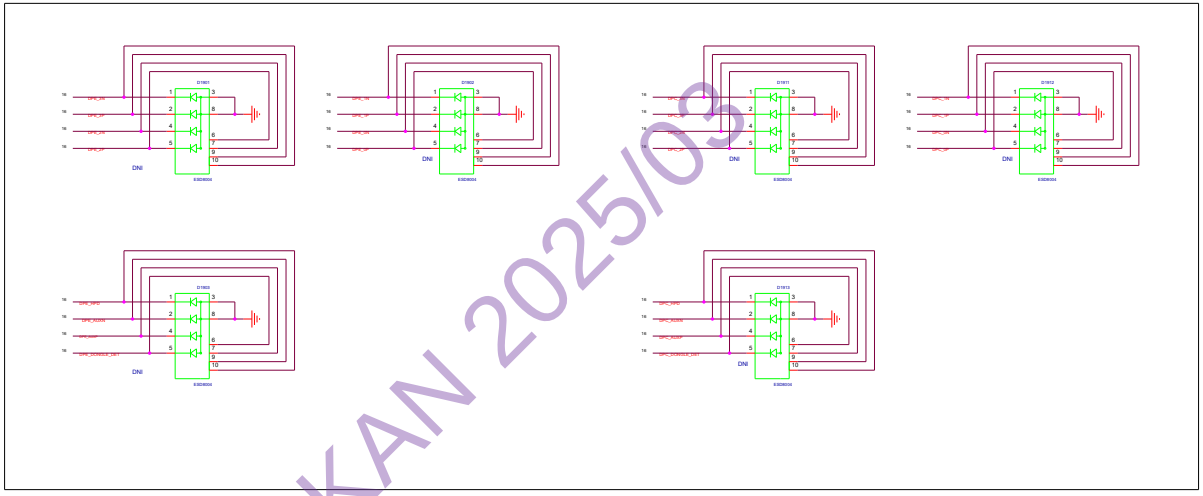

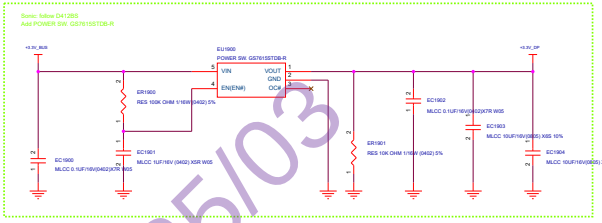

ASUS	Title :	16 NAVI21 TMDPC&E - DP	
<OrgName>	Engineer:	Sonic Tang	
Size: Custom	Project Name: D414S		Rev: 1.01X
Date: Wednesday, August 26, 2020	Sheet: 16 of 50		

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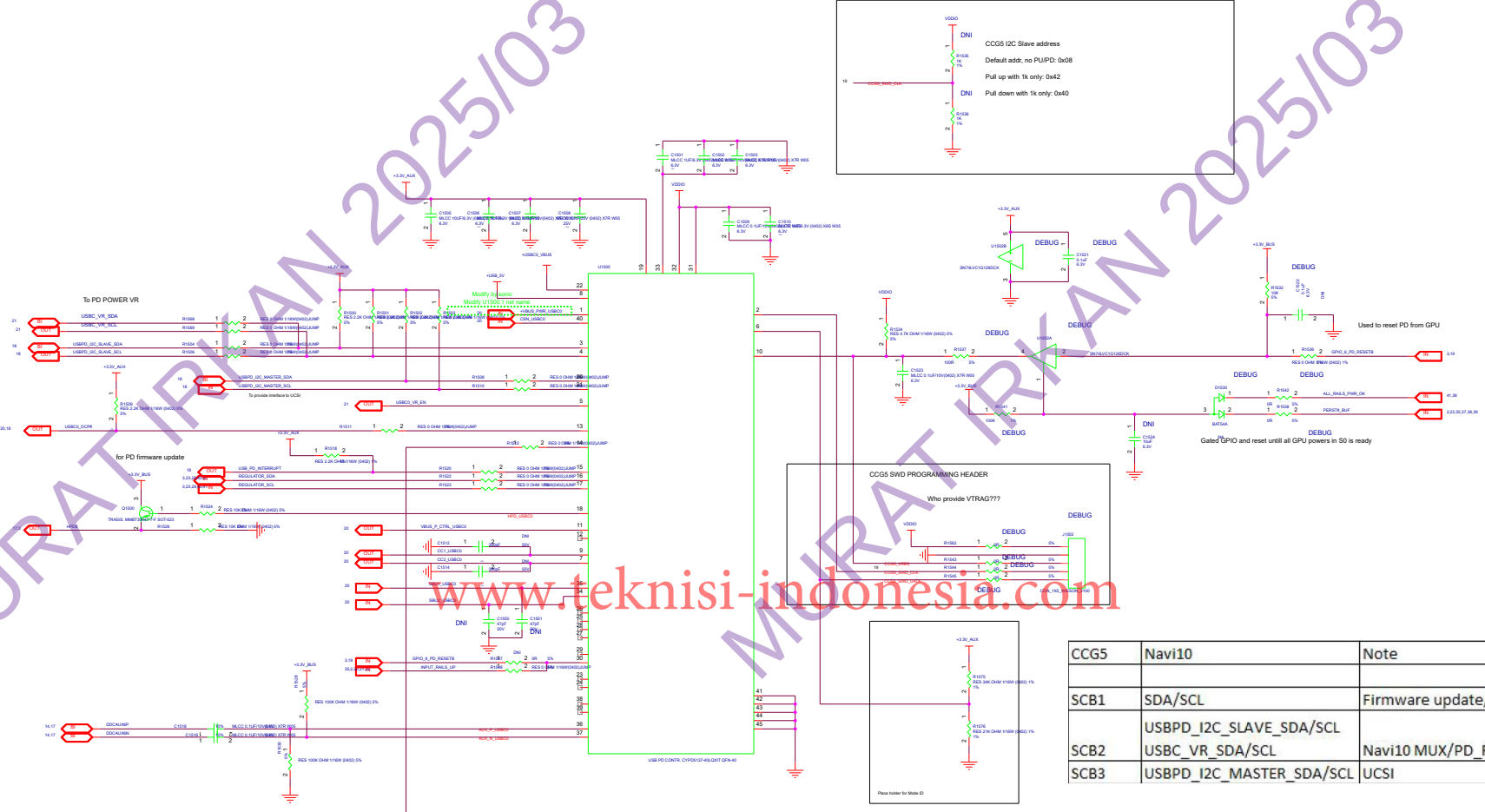

CCG5	Navi10	Note
SCB1	SDA/SCL	Firmware update/SMU
SCB2	USBPD_I2C_SLAVE_SDA/SCL USBC_VR_SDA/SCL	Navi10 MUX/PD_Regulator/re-driver
SCB3	USBPD_I2C_MASTER_SDA/SCL	UCSI

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ASUS	Title :	19 PD Controller
<OrgName>	Engineer:	Sonic Tang
Size: Custom	Project Name: D414S	Rev: 1.01X
Date: Wednesday, August 26, 2020	Sheet 19 of 50	

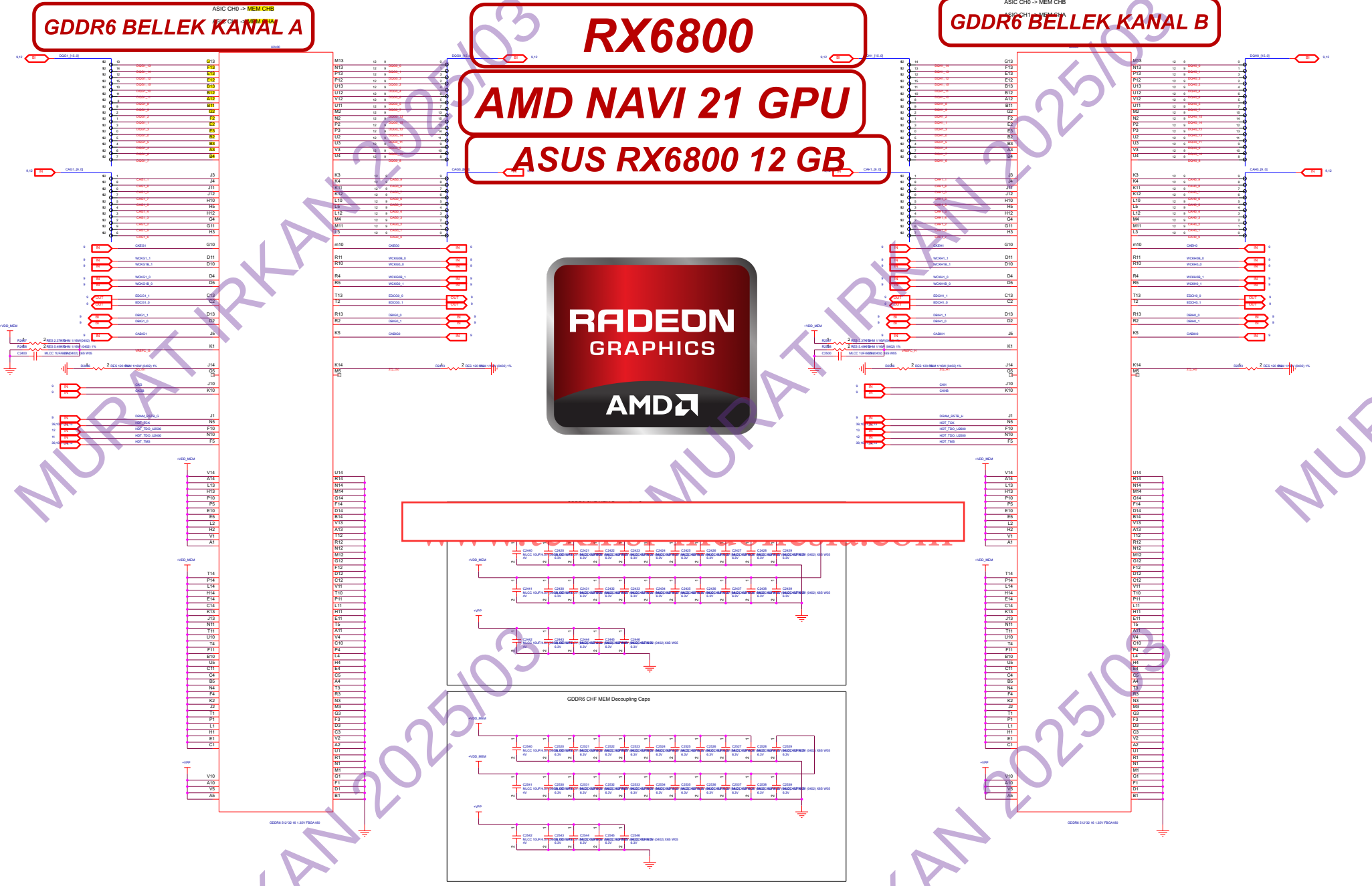
GDDR6 BELLEK KANAL A

RX6800

AMD NAVI 21 GPU

ASUS RX6800 12 GB

GDDR6 BELLEK KANAL B



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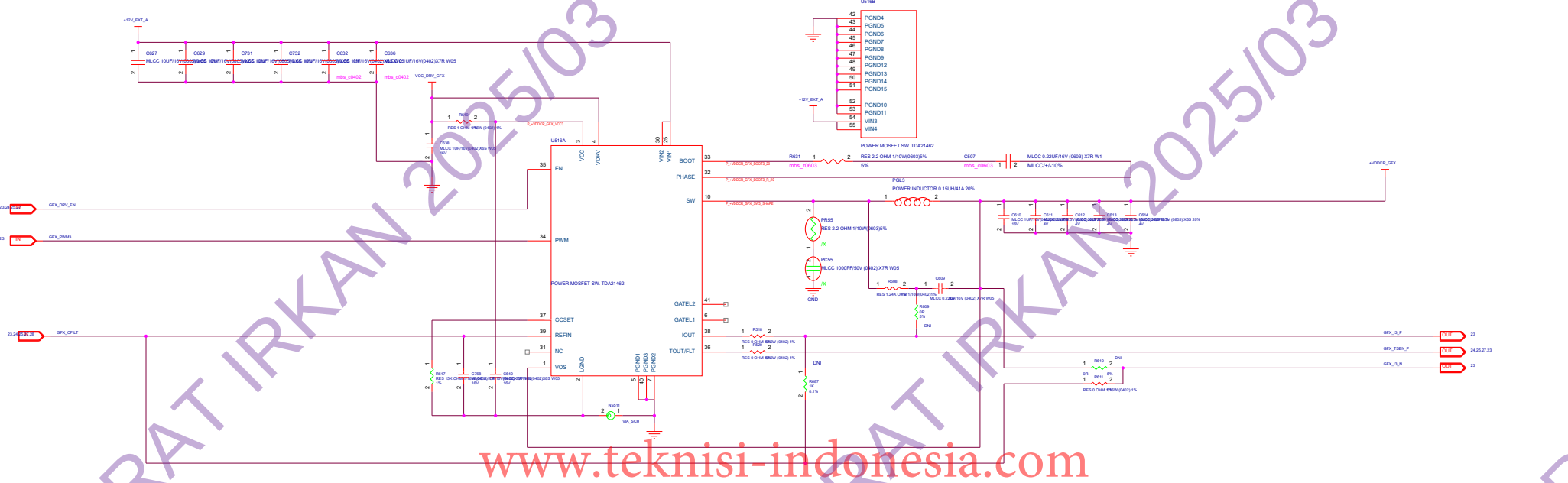
ASUS	Title :	12 GDDR6 MEM CH GH
<OrgName>	Engineer:	Sonic Tang
Size: Custom	Project Name: D414S	Rev: 1.01X
Date: Wednesday, August 26, 2020	Sheet 12 of 50	



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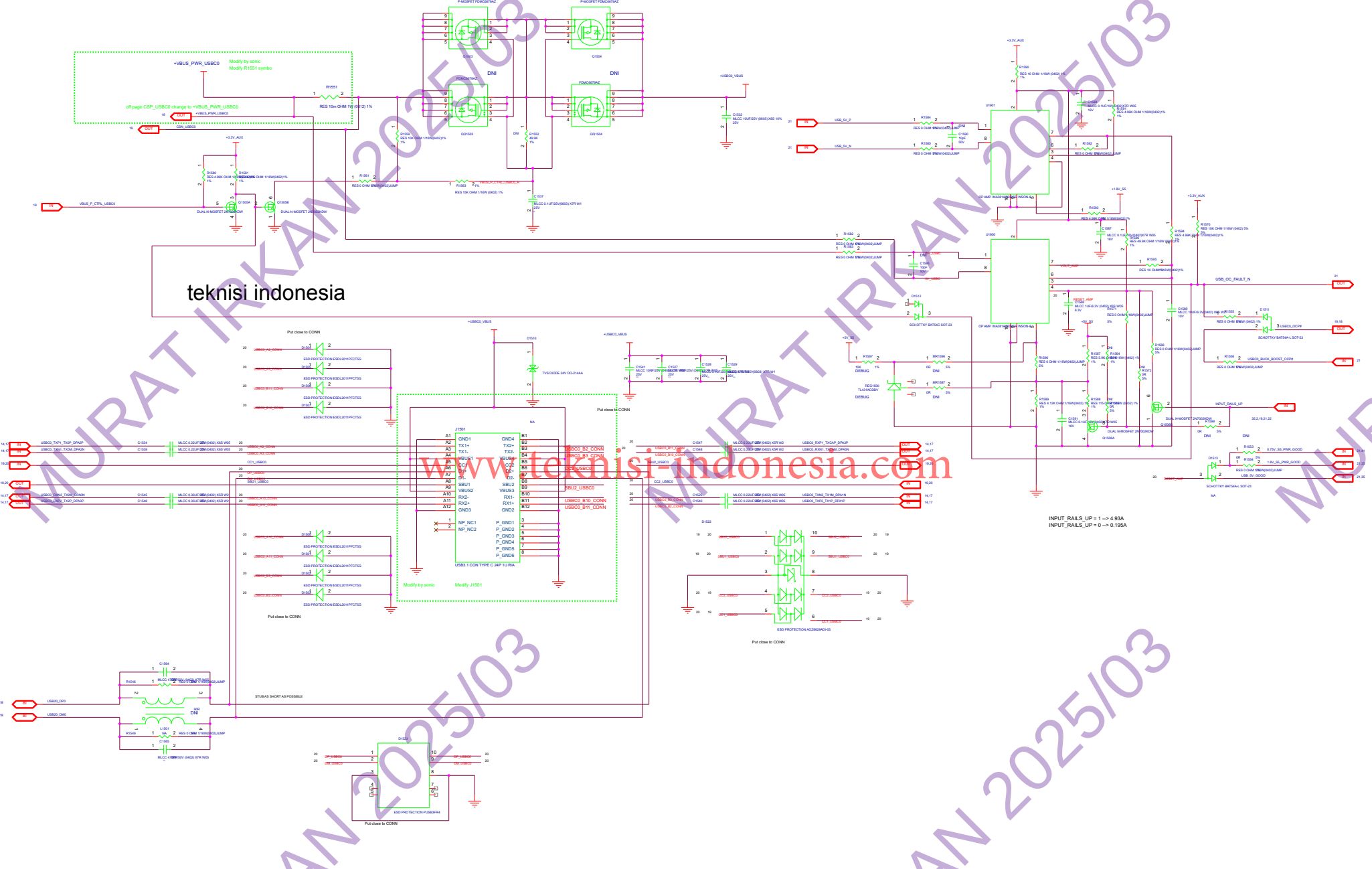
ASUS	Title :	26 GFX PHASES 3-df	
<OrgName>	Engineer:	Sonic Tang	
Size: Custom	Project Name: D414S		Rev: 1.01X
Date: Wednesday, August 26, 2020	Sheet 26 of 50		


+VBUS_PWR_USBC0
Modify by sonic
Modify R1551 symbo
off page CSP_USBC0 change to +VBUS_PWR_USBC0
R1551
RES 10m OHM 1W (6012) 1%
DNI
FDMC8676AZ
Q1503
Q1504
QG1503
QG1504
+USBC0_VBUS
C1532
MLCC 10UF/25V (0805) X6S 10%
25V
USB_5V_P
USB_5V_N
R1584
R1585
RES 0 OHM 5%W(0402)JUMP
U1501
OP AMP INA381A2QDRGT WSON-8
U1502
+3.3V_AUX
+1.8V_SS
VBUS_P_CTRL_USBC0
DUAL N-MOSFET 2N7002KDW
Q1505A
Q1505B
R1561
RES 0 OHM 5%W(0402)JUMP
R1562
RES 15K OHM 1/16W (0402) 1%
C1537
MLCC 0.1UF/25V(0603) X7R W1
R1582
RES 0 OHM 5%W(0402)JUMP
C1538
C1539
C1540
C1541
C1542
C1543
C1544
C1545
C1546
C1547
C1548
C1549
C1550
C1551
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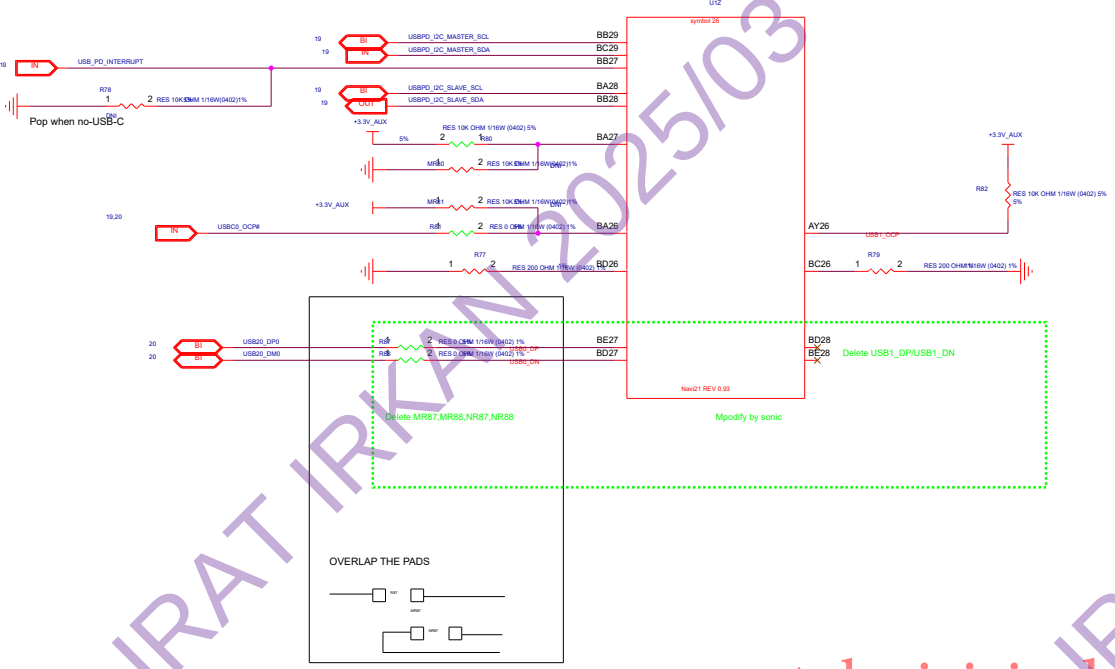
C1577



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ASUS	Title :	18 NAVI21 USB	
<OrgName>	Engineer:	Sonic Tang	
Size: Custom	Project Name: D414S		Rev: 1.01X
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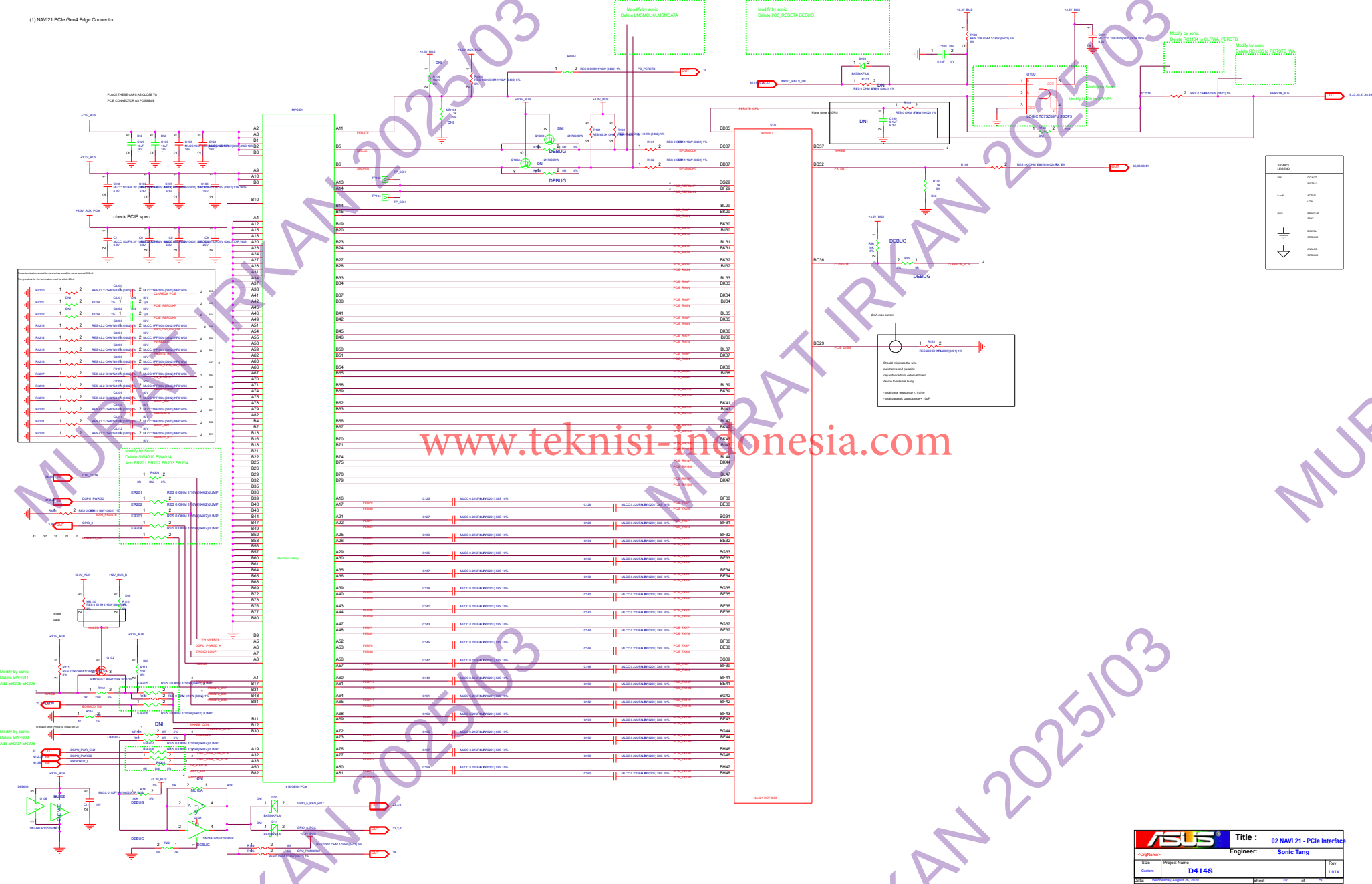
ASUS	Title : 01 TOC	
<OrgName>	Engineer: Sonic Tang	
Size: Custom	Project Name: D414S	Rev: 1.01X
Date: Wednesday, August 26, 2020	Sheet 01 of 50	

(1) NAVI21 PCIe Gen4 Edge Connector



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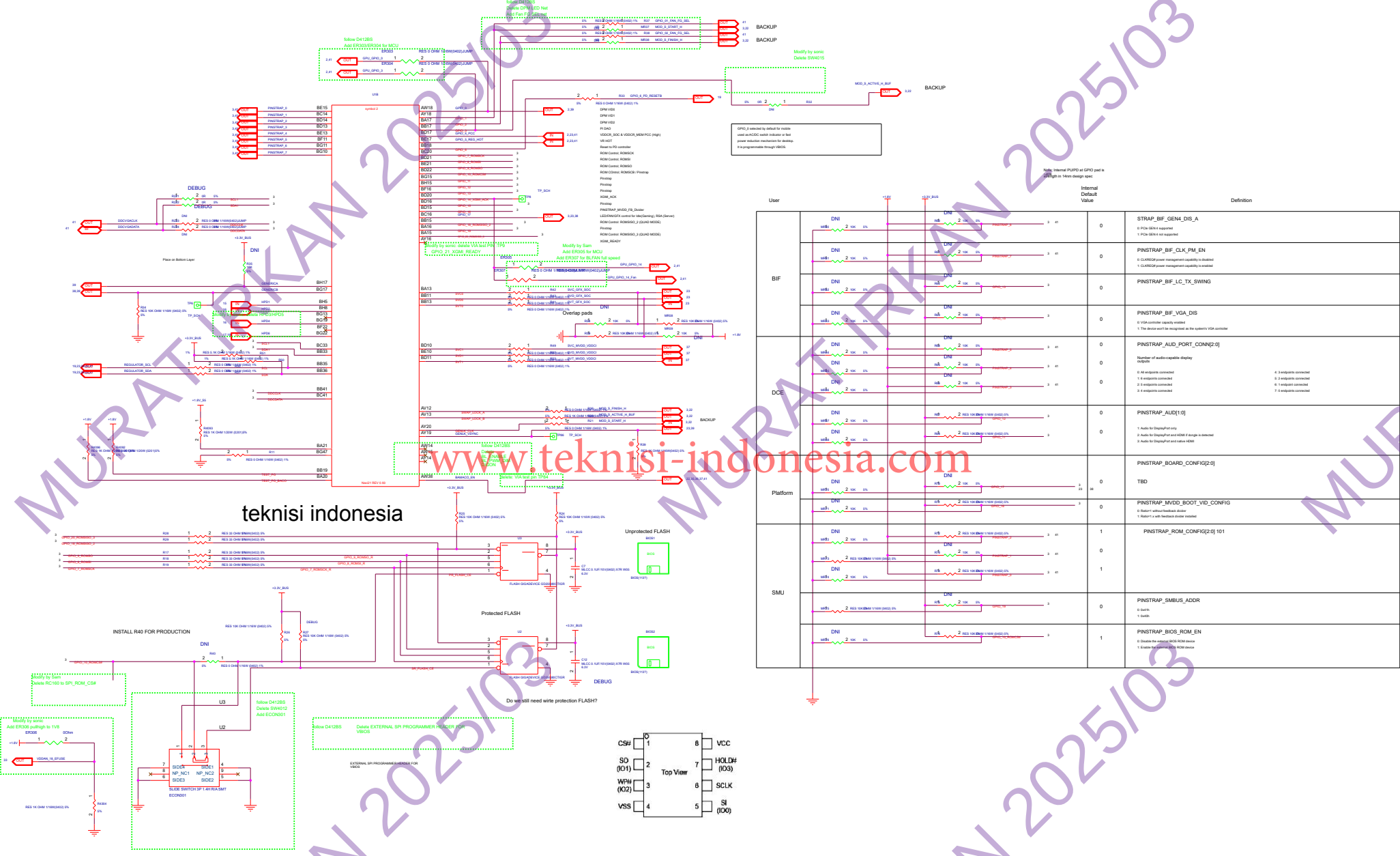

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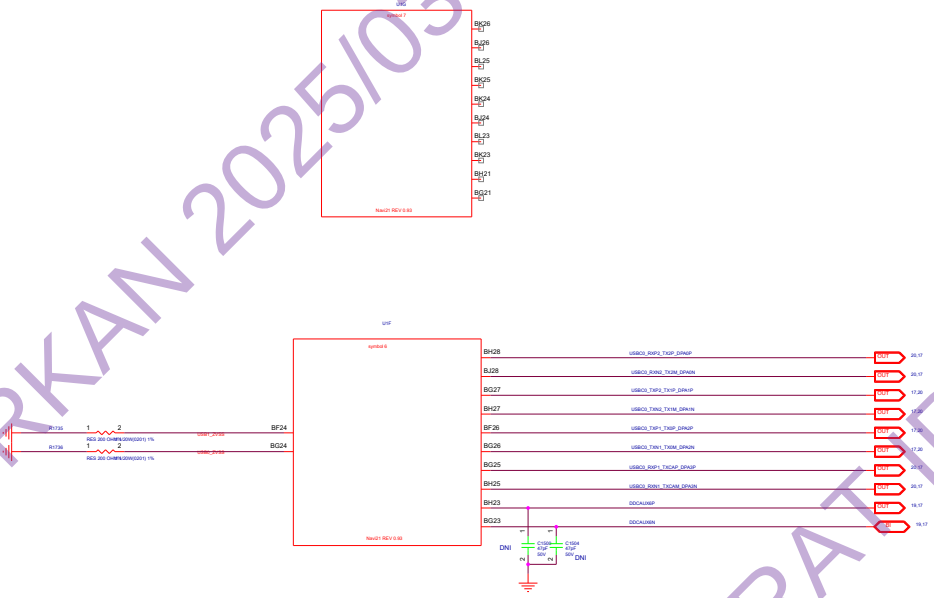

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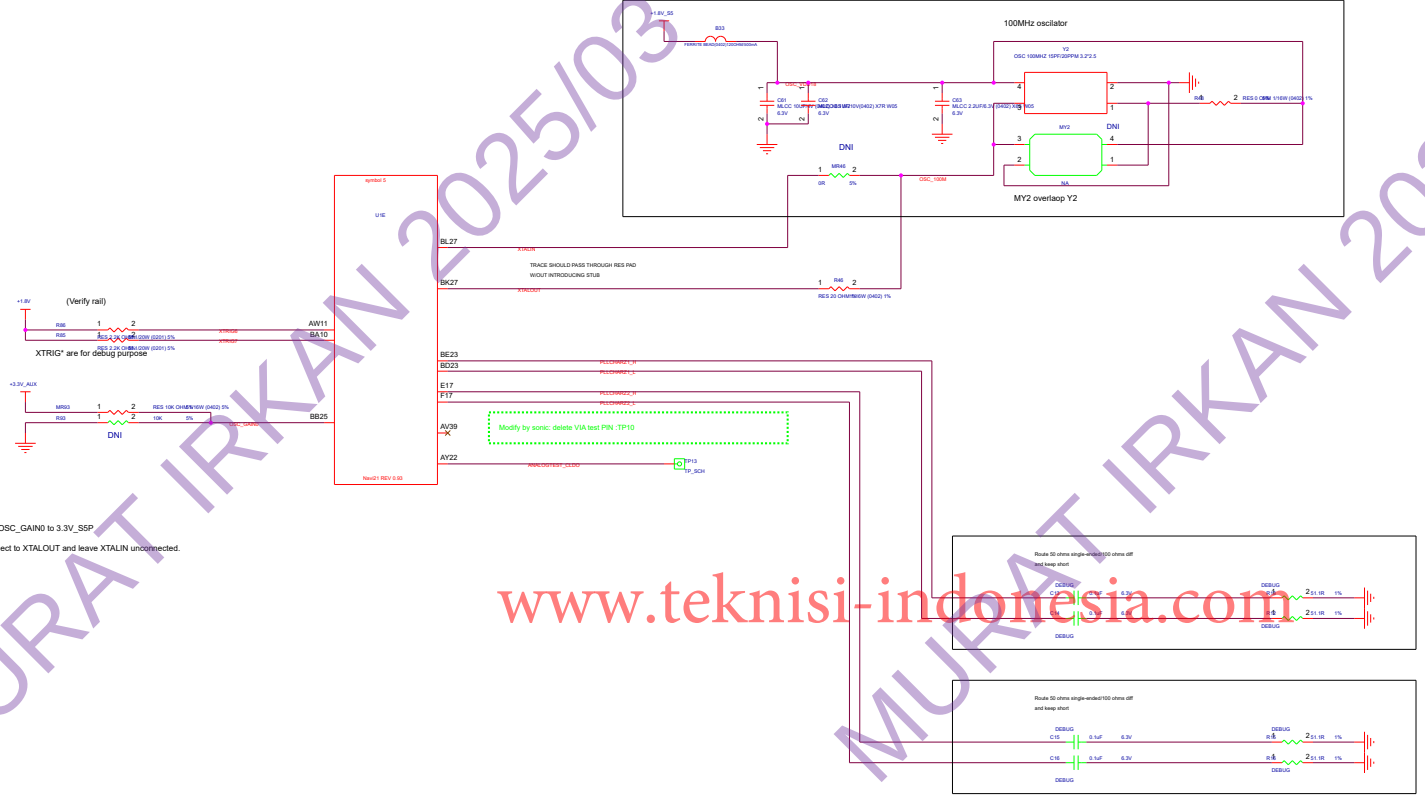
ASUS	Title :	14 NAVI21 TMDPA - USB-C	
<OrgName>	Engineer:	Sonic Tang	
Size: Custom	Project Name: D414S		Rev: 1.01X
Date: Wednesday, August 26, 2020	Sheet 14 of 50		



Default OSC_GAIN is 0x7. Pull-up OSC_GAIN0 to 3.3V_S5P.

When 0x7, external clock chip connect to XTALOUT and leave XTALIN unconnected.

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ASUS	Title :	04 NAVI 21 XTAL
<OrgName>	Engineer:	Sonic Tang
Size: Custom	Project Name: D414S	Rev: 1.01X
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Navi21 XGMI LINK 0 & 1

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ASUS	Title : 05 XGMI		
<Orgname>	Engineer: Sonic Tang		
Size: Custom	Project Name: D414S		Rev: 1.01X
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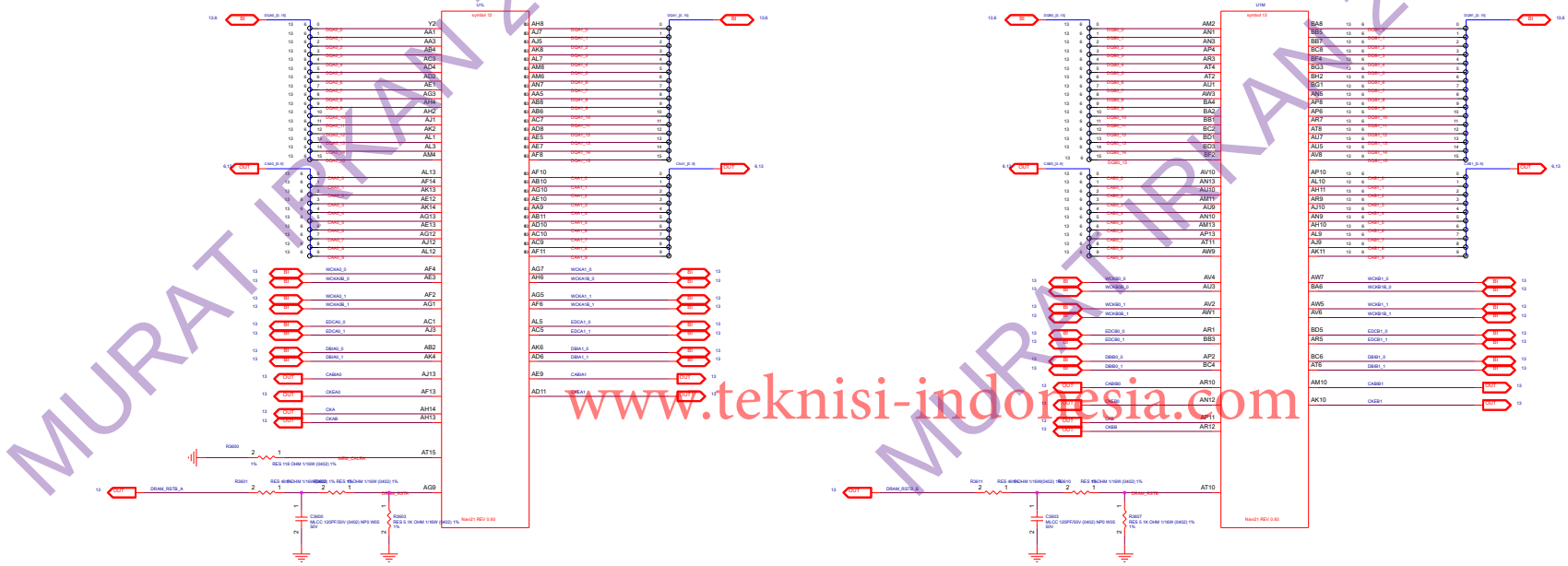
(1) NAVI 21 MEM INTERFACE CH A/B



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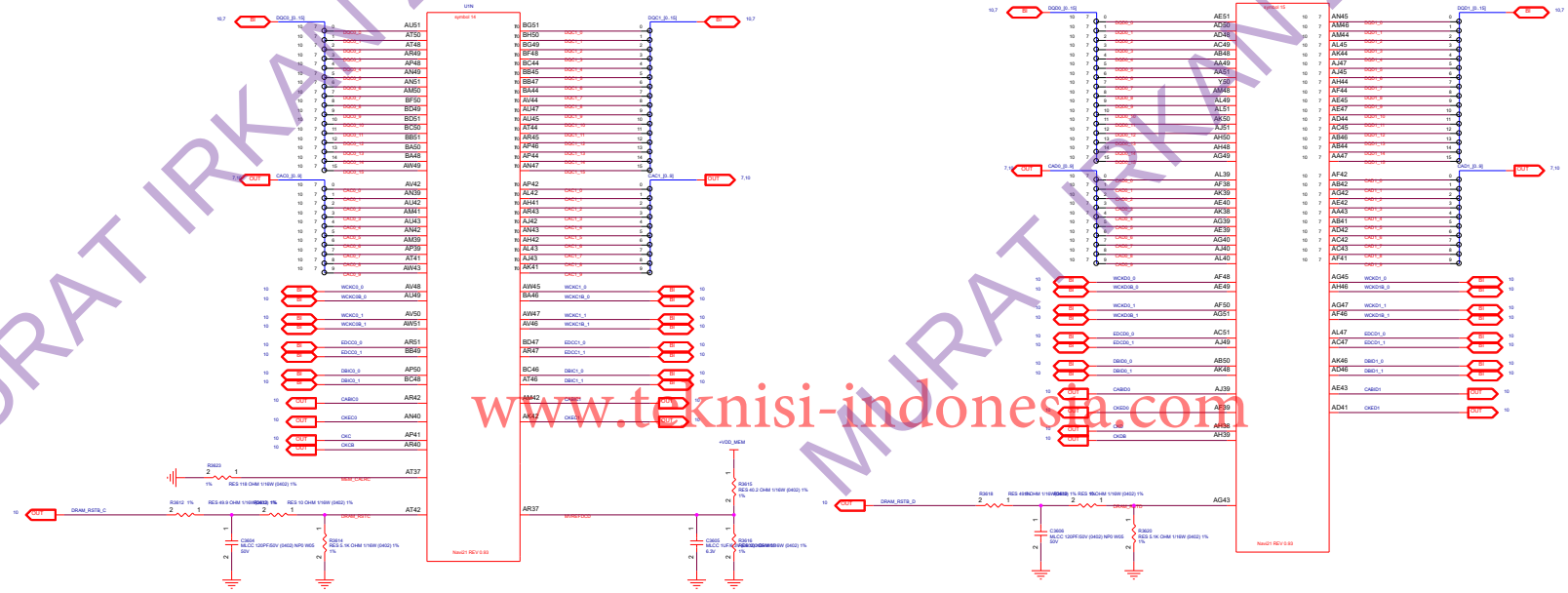
ASUS	Title :	06 NAVI 21 MEM CH AB
<OrgName>	Engineer:	Sonic Tang
Size: Custom	Project Name: D414S	Rev: 1.01X
Date: Wednesday, August 26, 2020	Sheet 06 of 50	



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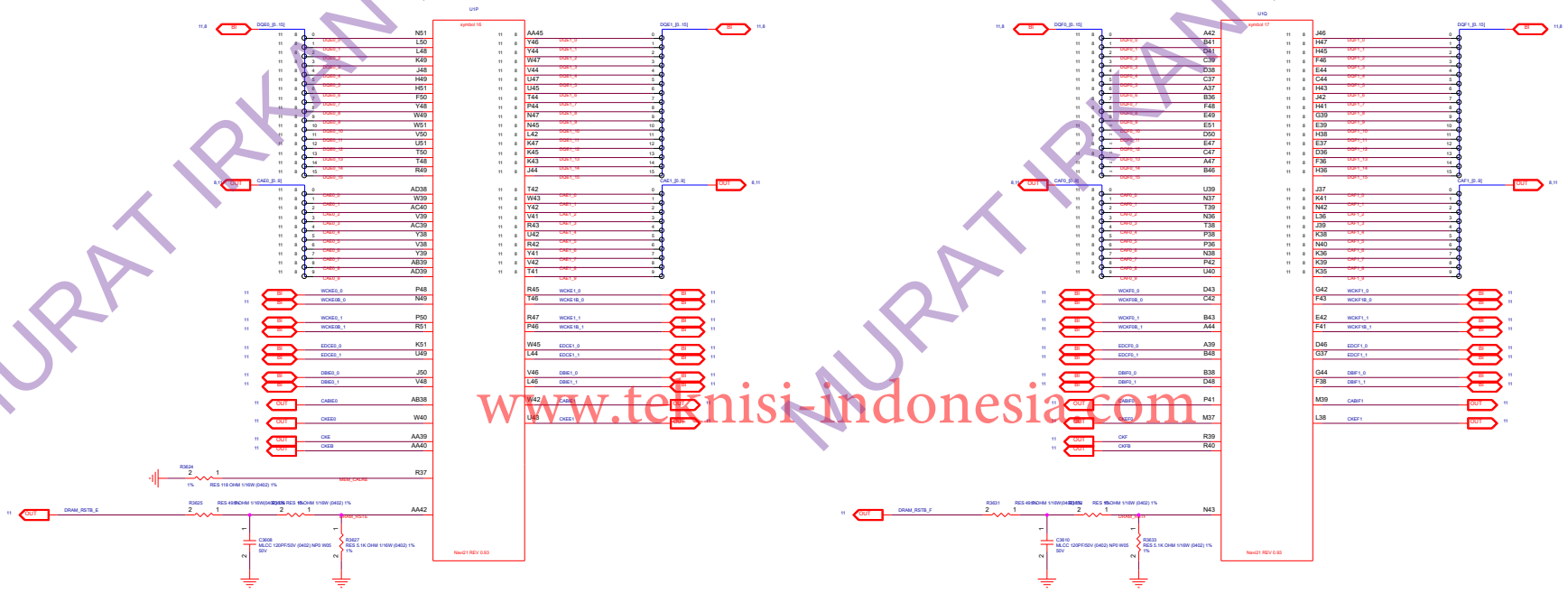
ASUS	Title :	07 NAVI 21 MEM CH CD	
<OrgName>	Engineer:	Sonic Tang	
Size: Custom	Project Name: D414S		Rev: 1.01X
Date: Wednesday, August 26, 2020	Sheet 07 of 50		

AMD NAVI 21 GDDR6 BELLEK BAĞLANTILAR E/F KANAL

RX6800



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ASUS	Title :	08 NAVI 21 MEM CH EF	
<OrgName>	Engineer:	Sonic Tang	
Size: Custom	Project Name: D414S		Rev: 1.01X
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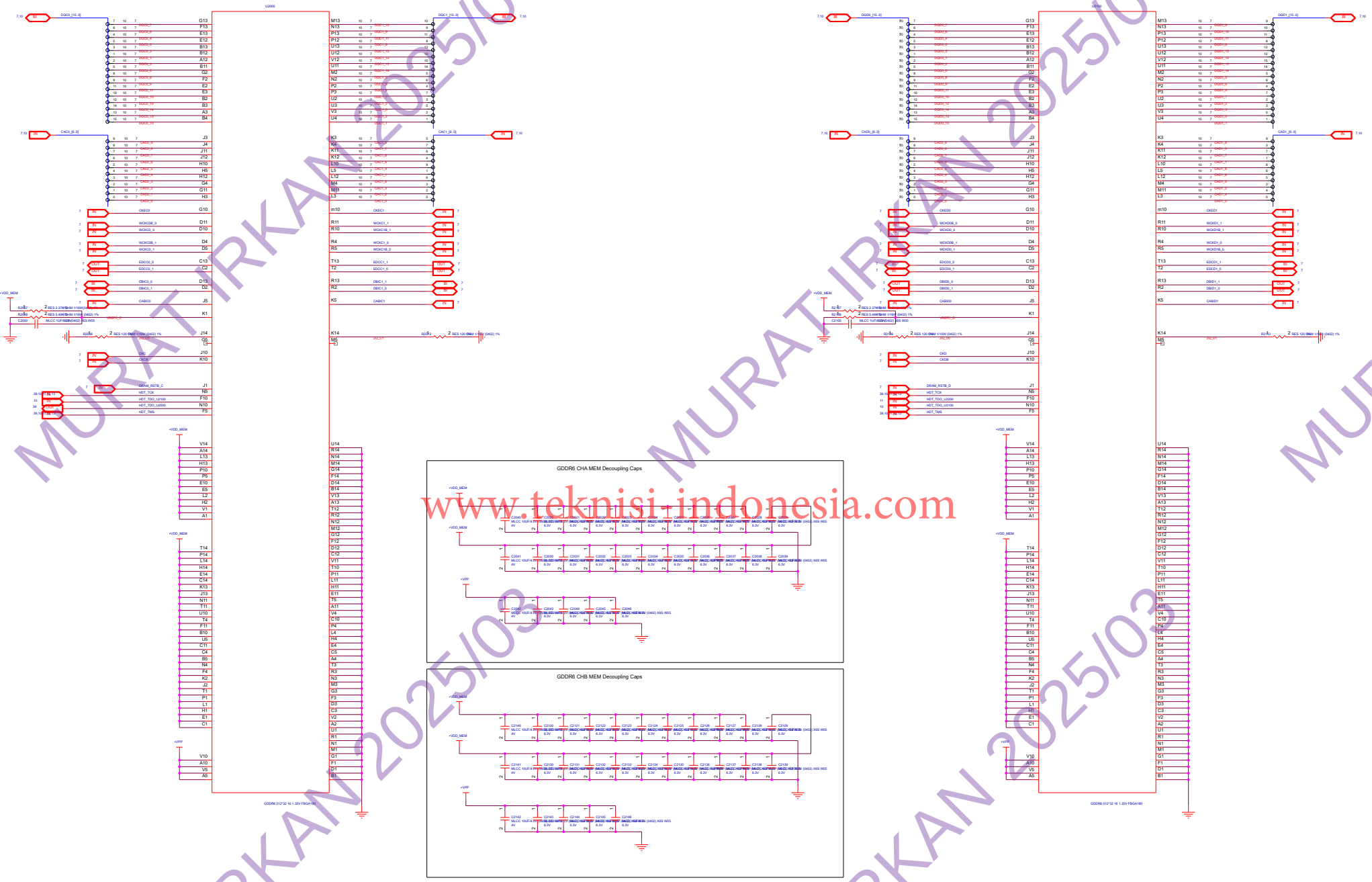
ASUS	Title :	09 NAVI 21 MEM CH GH	
<OrgName>	Engineer:	Sonic Tang	
Size: Custom	Project Name: D414S		Rev: 1.01X
Date: Wednesday, August 26, 2020	Sheet 09 of 50		

ASIC CH0 -> MEM CHA

ASIC CH1 -> MEM CHB



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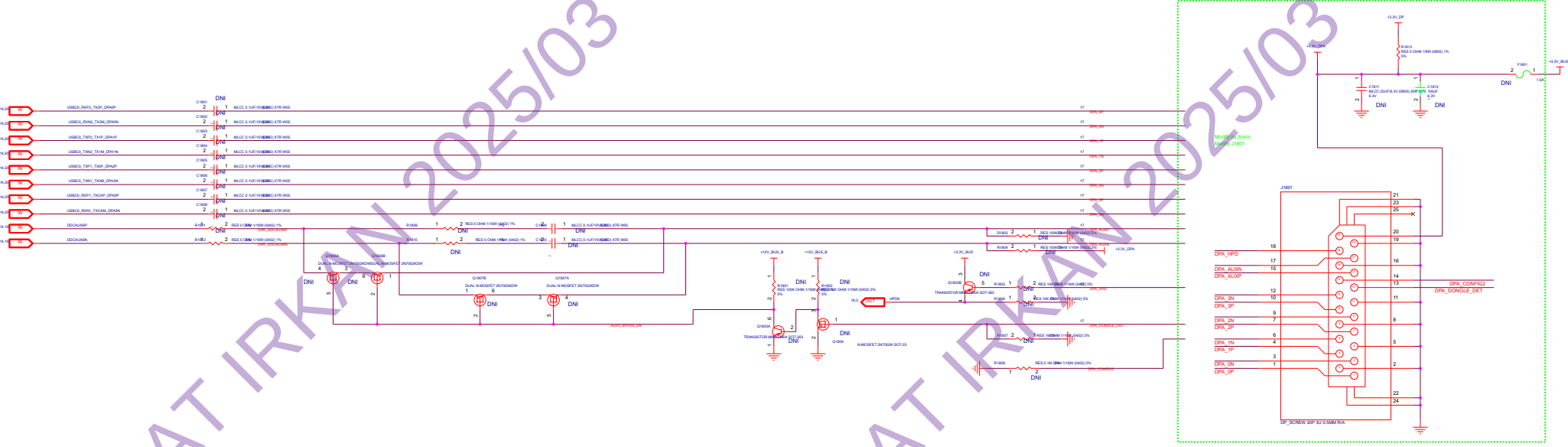
ASUS	Title :	10 GDDR6 MEM CH CD
<OrgName>	Engineer:	Sonic Tang
Size: Custom	Project Name: D414S	Rev: 1.01X
Date: Wednesday, August 26, 2020	Sheet 10 of 50	



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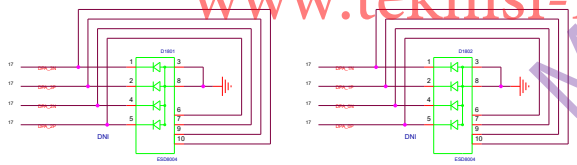
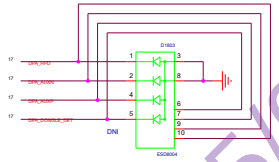


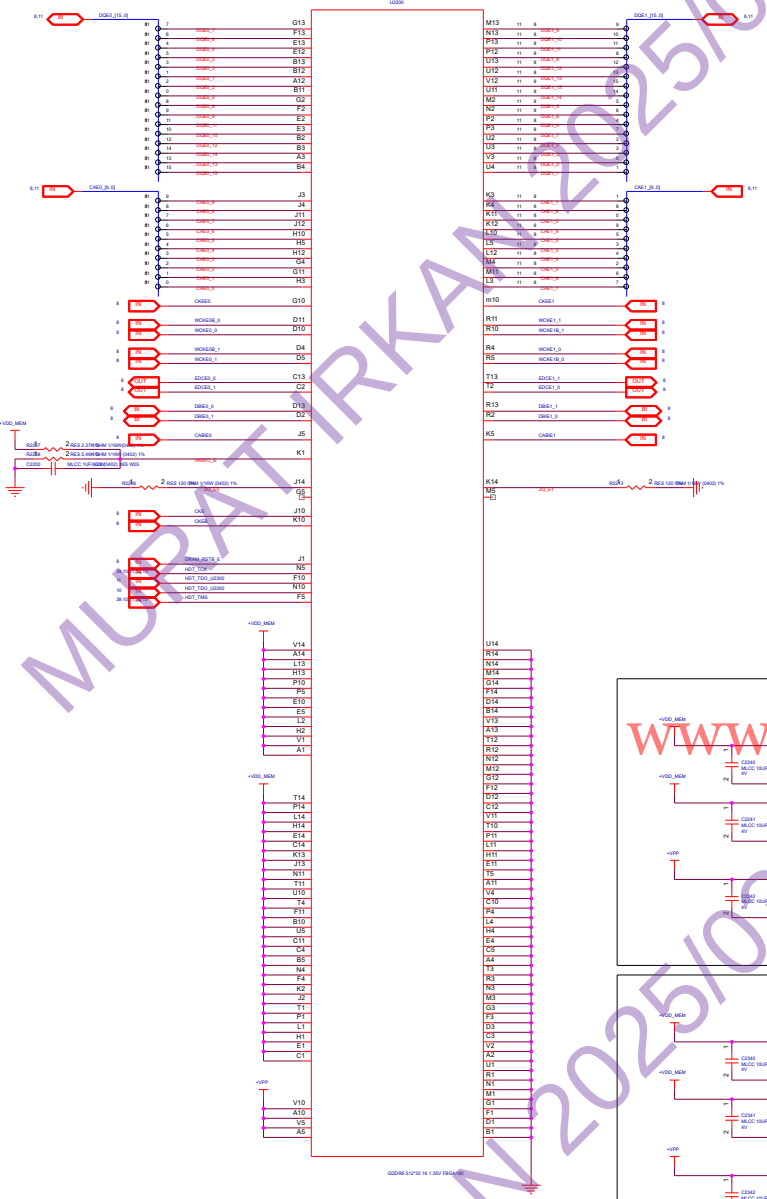


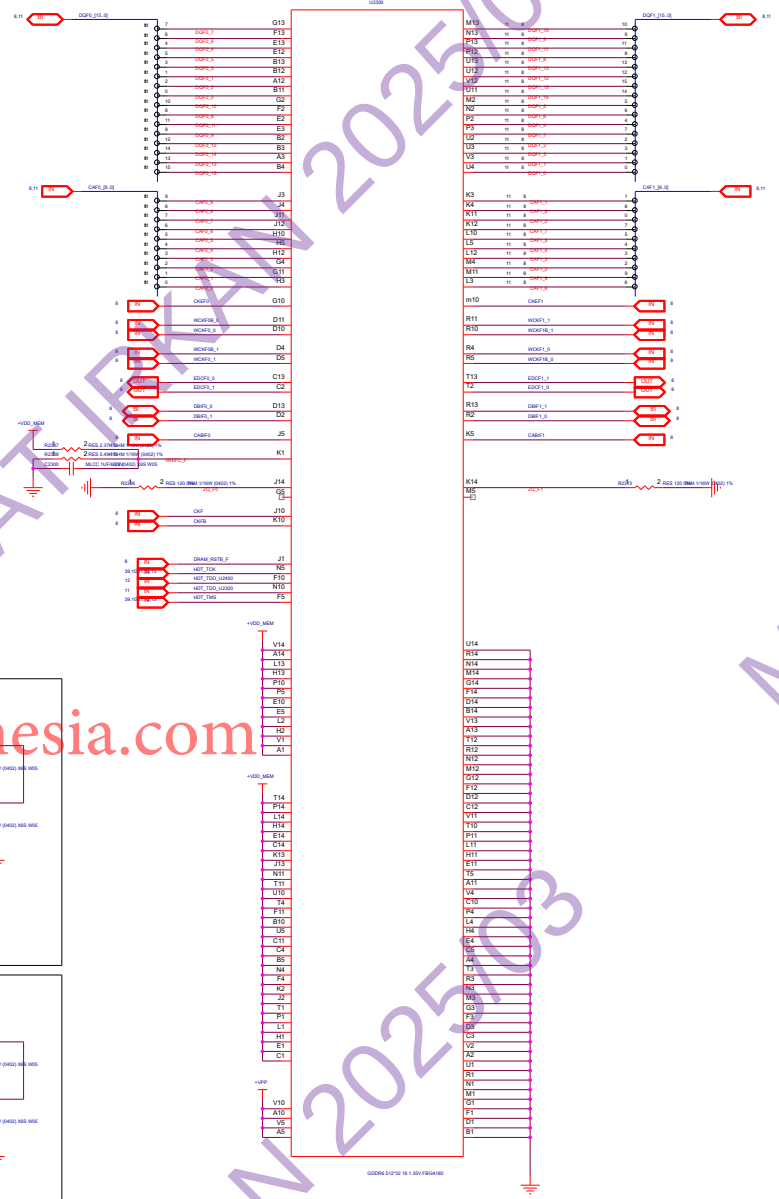
MURAT IRKAN 2025/03

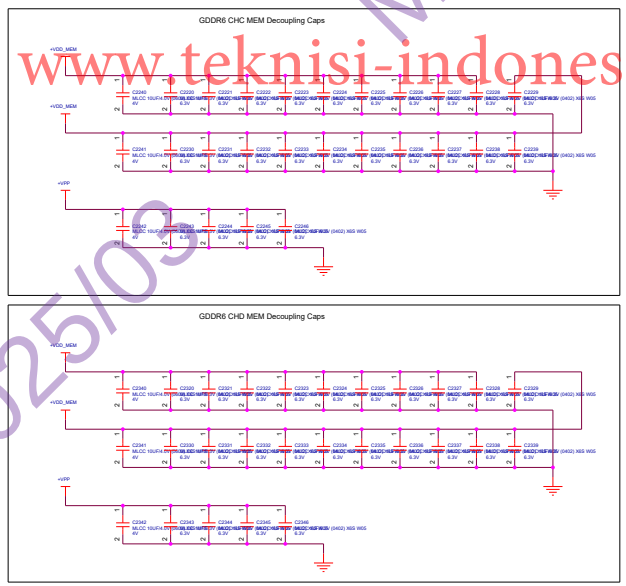
ASUS	Title :	17 NAVI21 TMDPA-DP
<OrgName>	Engineer:	Sonic Tang
Size: Custom	Project Name: D414S	Rev: 1.01X
Date: Wednesday, August 26, 2020	Sheet 17 of 50	

ASIC CH0 -> MEM CHA

ASIC CH1 -> MEM CHB







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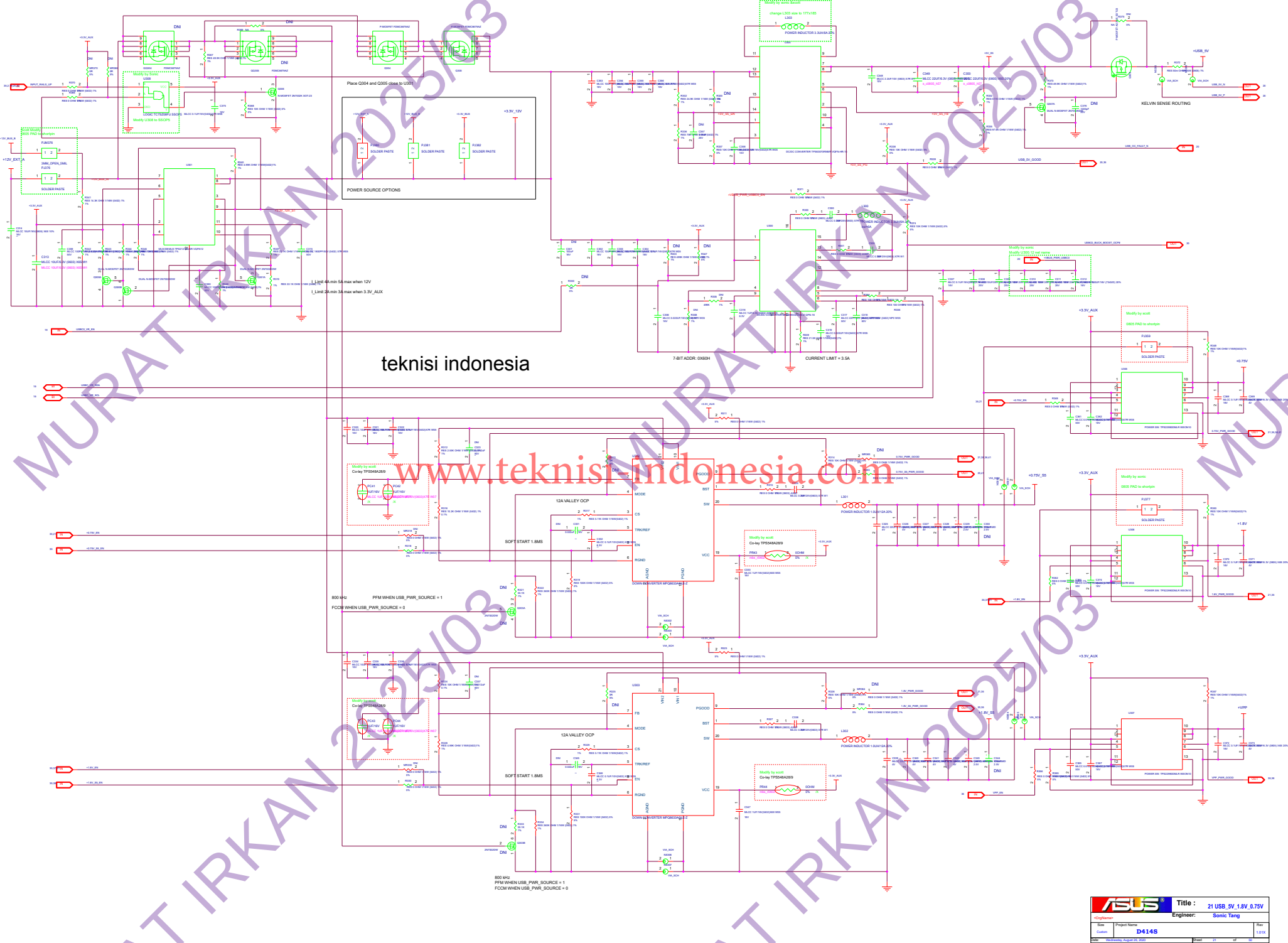
ASUS	Title :	11 GDDR6 MEM CH EF
<OrgName>	Engineer:	Sonic Tang
Size: Custom	Project Name: D414S	Rev: 1.01X
Date: Wednesday, August 26, 2020	Sheet 11 of 50	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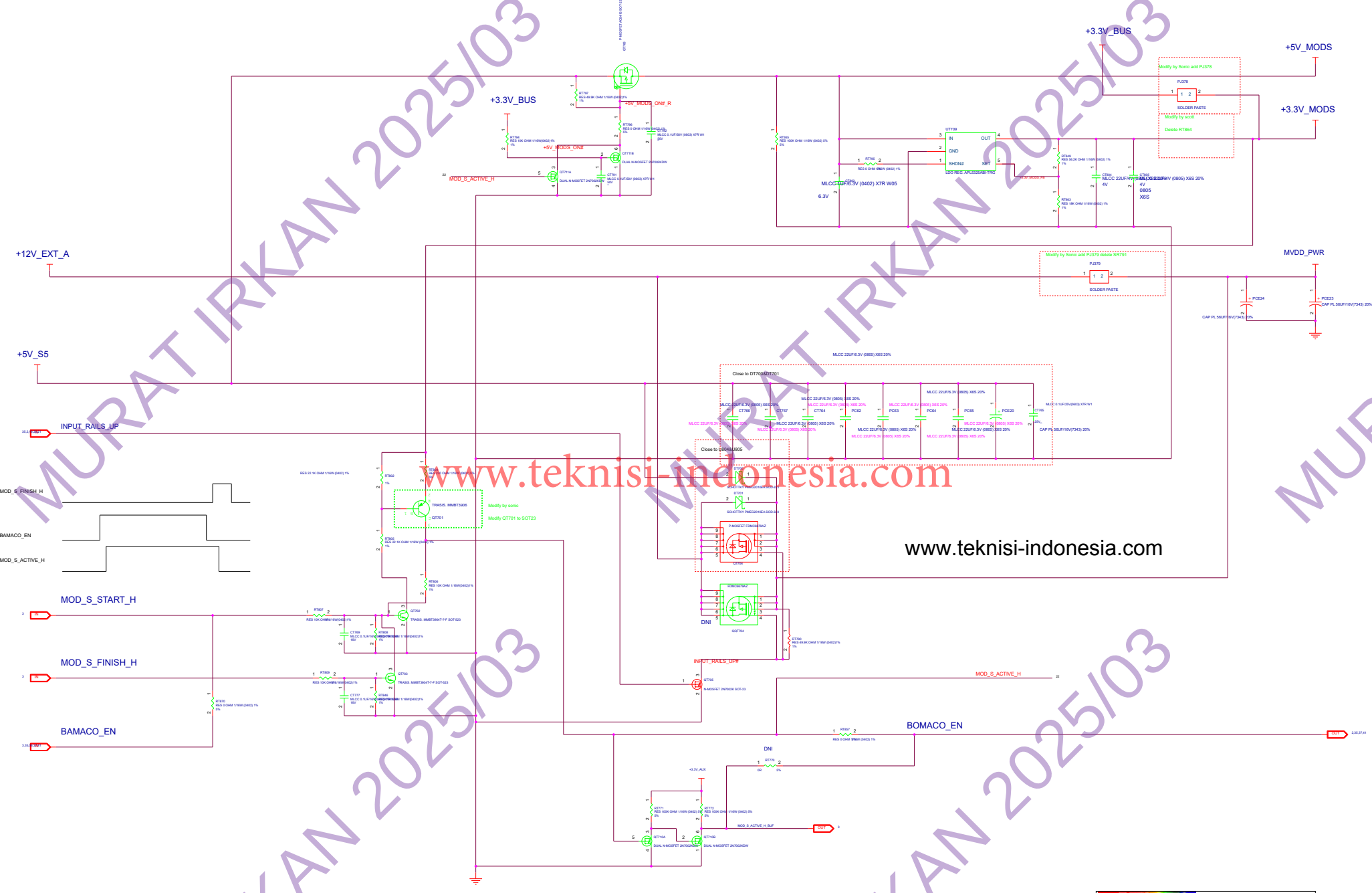
POWER SOURCE OPTIONS
Place Q304 and Q305 close to U301
KELVIN SENSE ROUTING
12A VALLEY OCP
SOFT START 1.8MS
800 kHz
PFM WHEN USB_PWR_SOURCE = 1
FCCM WHEN USB_PWR_SOURCE = 0
CURRENT LIMIT = 3.5A
7-BIT ADDR: 0X60H
Title : 21 USB_5V_1.8V_0.75V
Engineer: Sonic Tang
D414S



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ASUS	Title :	22 MODS CONTROL & POWER-df
<OrgName>	Engineer:	Sonic Tang
Size: Custom	Project Name: D414S	Rev: 1.01X
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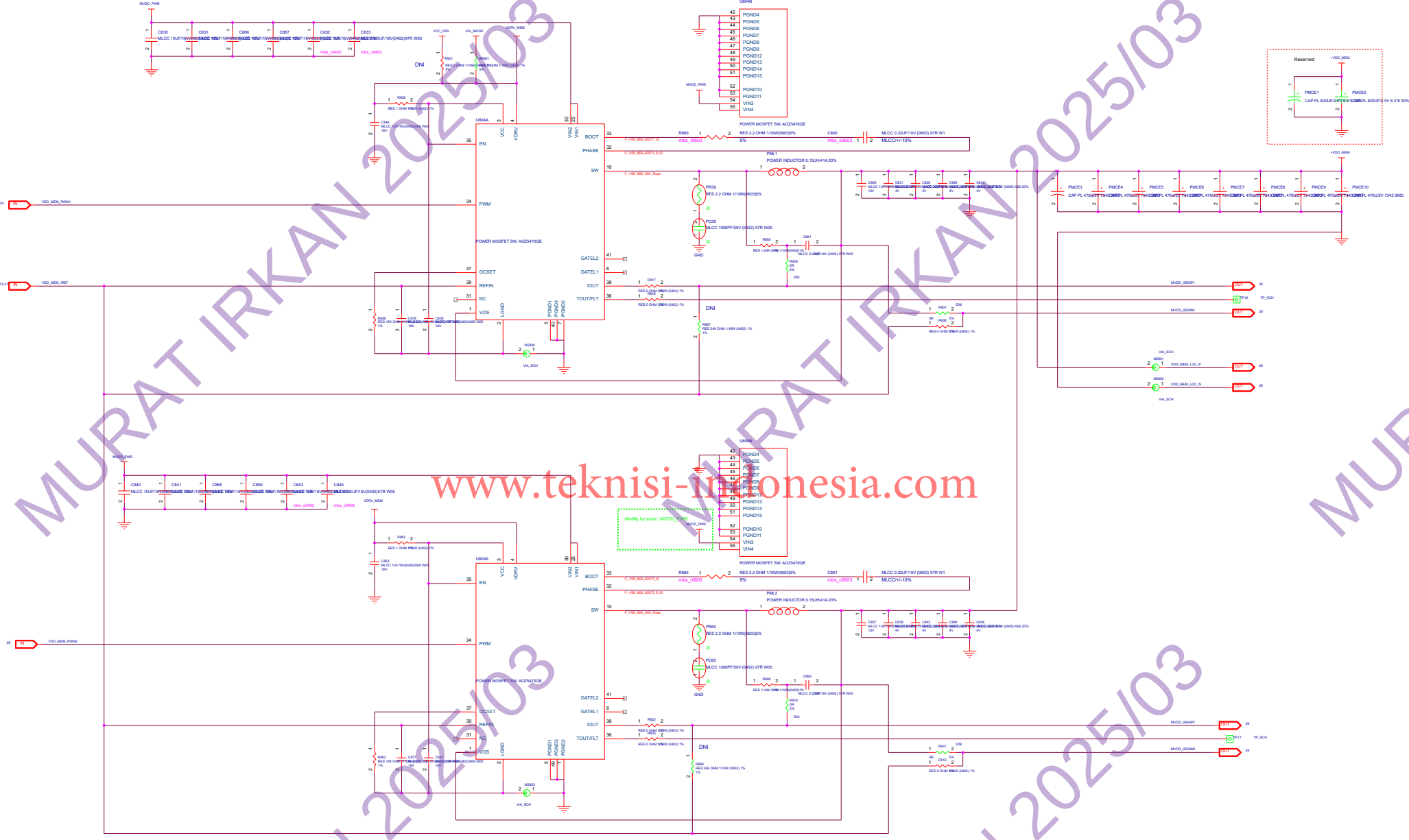

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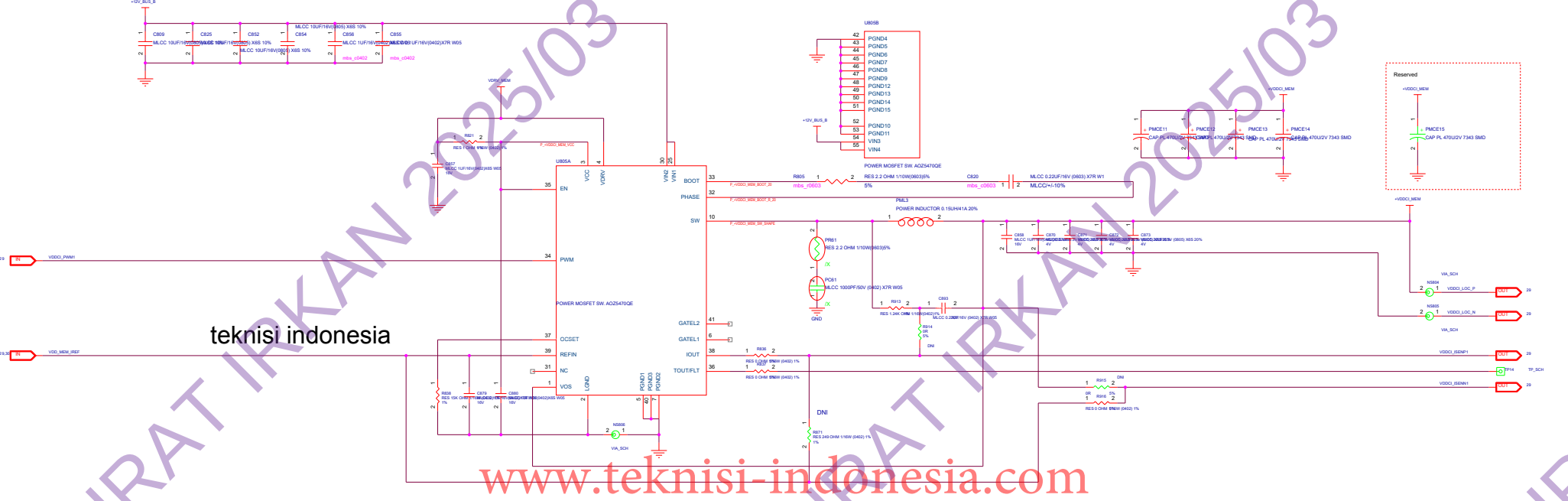
ASUS	Title :	30 VDD_MEM PHASES 1&2
<OrgName>	Engineer:	Sonic Tang
Size: Custom	Project Name: D414S	Rev: 1.01X
Date: Wednesday, August 26, 2020	Sheet 30 of 50	



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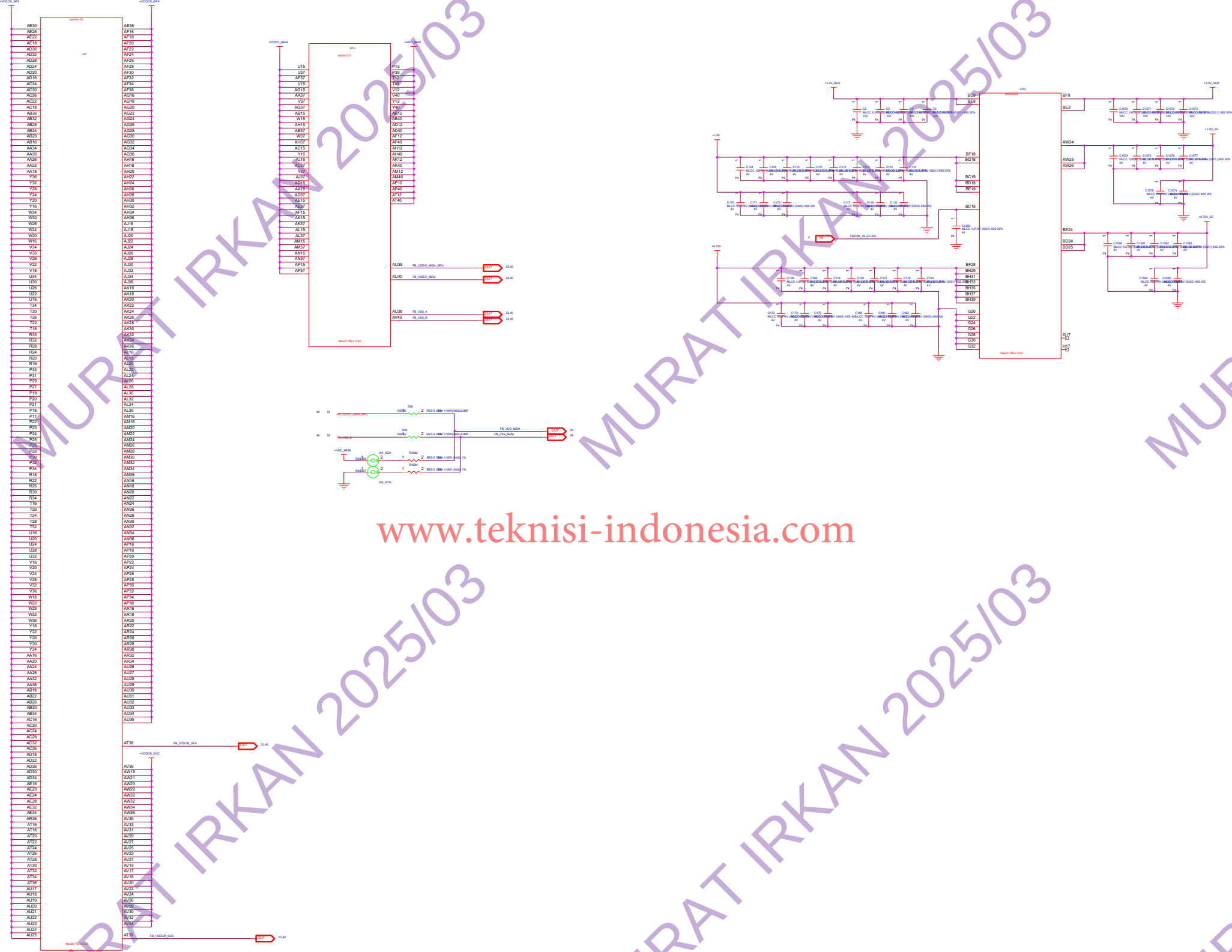
MURAT IRKAN 2025/03

ASUS	Title :	31 VDDCI_MEM PHASE 1
<OrgName>	Engineer:	Sonic Tang
Size: Custom	Project Name: D414S	Rev: 1.01X
Date: Wednesday, August 26, 2020	Sheet 31 of 50	



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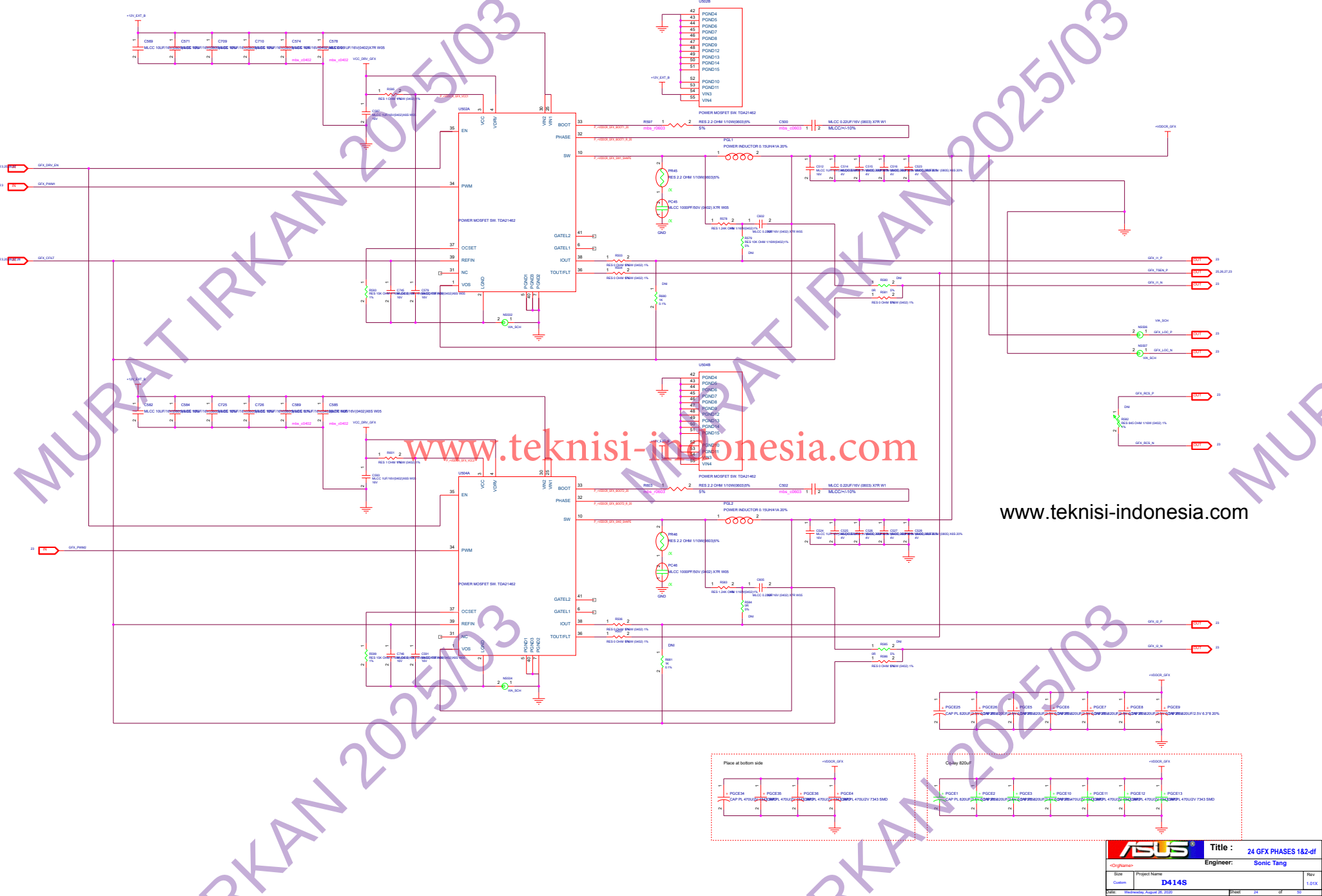
ASUS	Title :	33 NAVI 21 POWER
<OrgName>	Engineer:	Sonic Tang
Size: Custom	Project Name: D414S	Rev: 1.01X
Date: Wednesday, August 26, 2020	Sheet 33 of 50	



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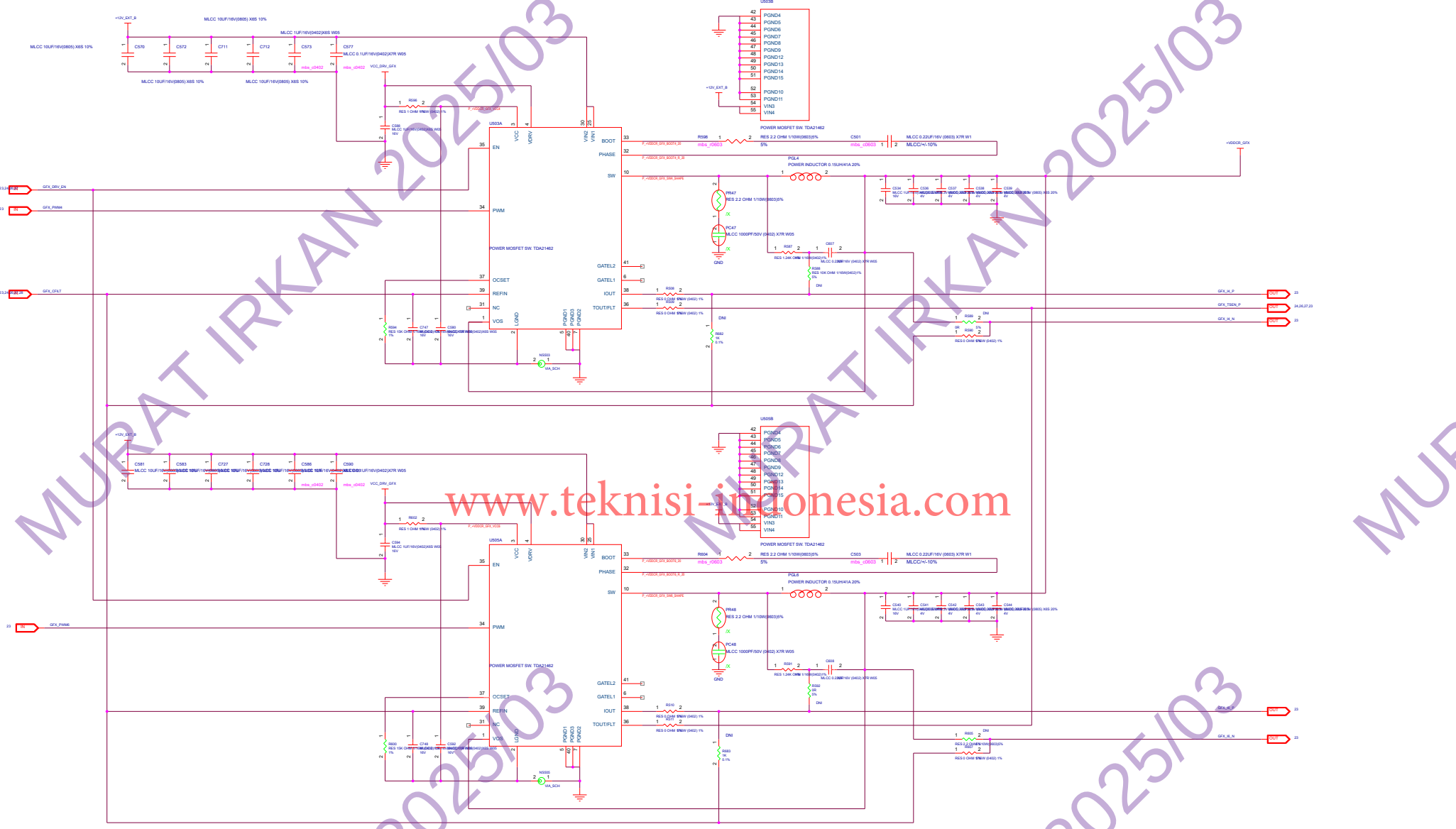
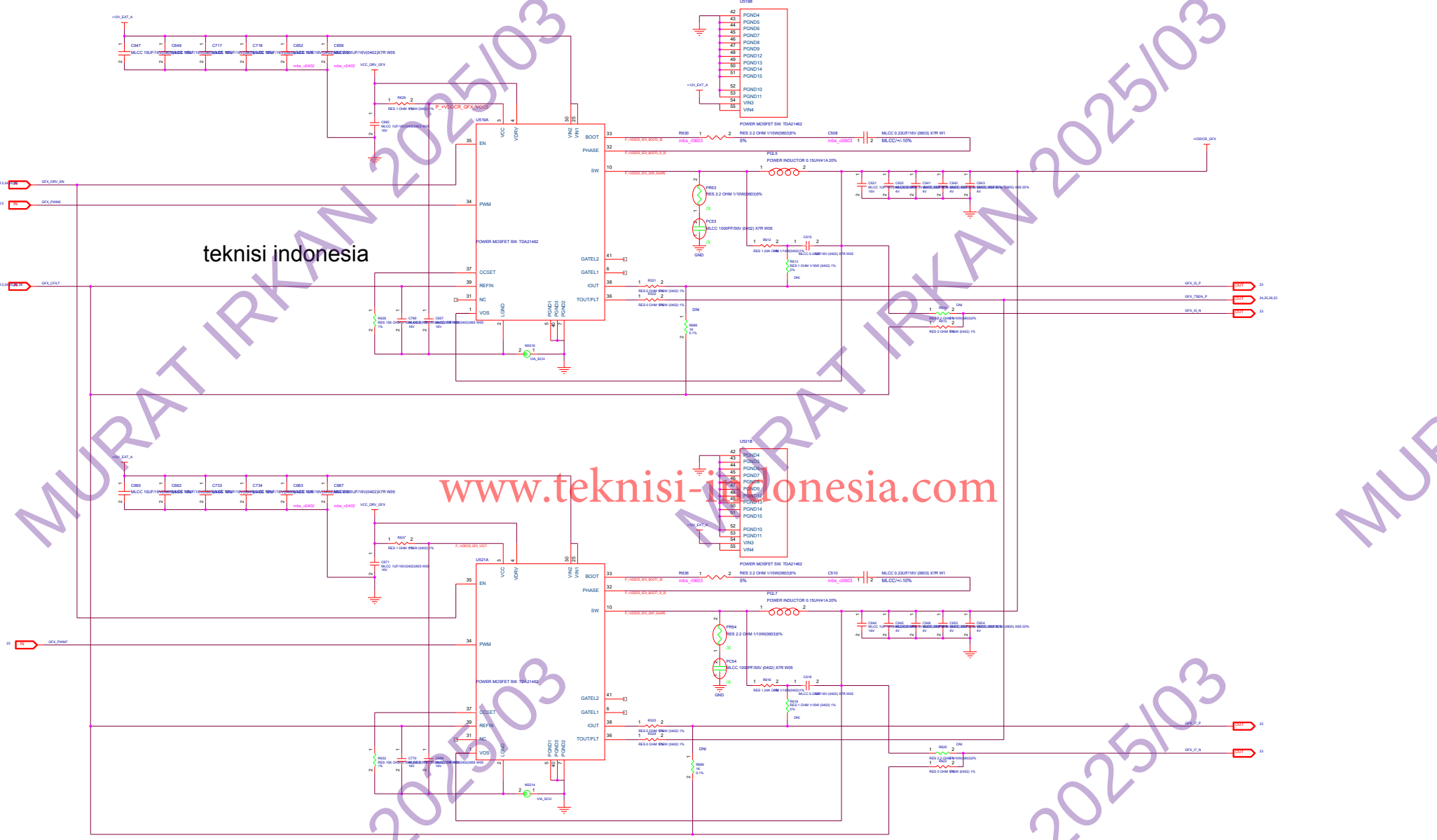


MURAT IRKAN 2025/03

ASUS	Title :	25 GFX PHASES 4&6-df
<OrgName>	Engineer:	Sonic Tang
Size: Custom	Project Name: D414S	Rev: 1.01X
Date: Wednesday, August 26, 2020	Sheet 25 of 50	



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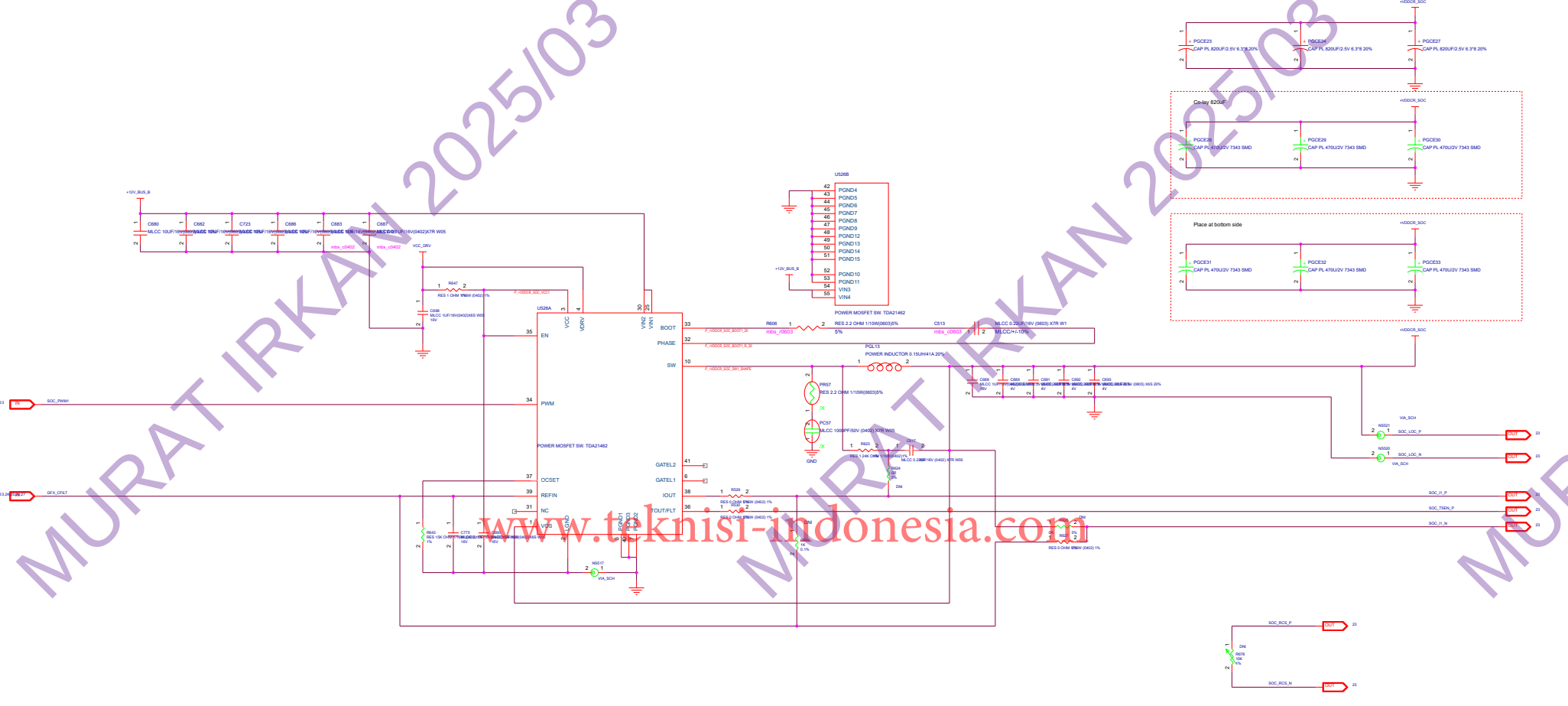
ASUS	Title :	27 GFX PHASES 5&7-df
<OrgName>	Engineer:	Sonic Tang
Size: Custom	Project Name: D414S	Rev: 1.01X
Date: Wednesday, August 26, 2020	Sheet 27 of 50	



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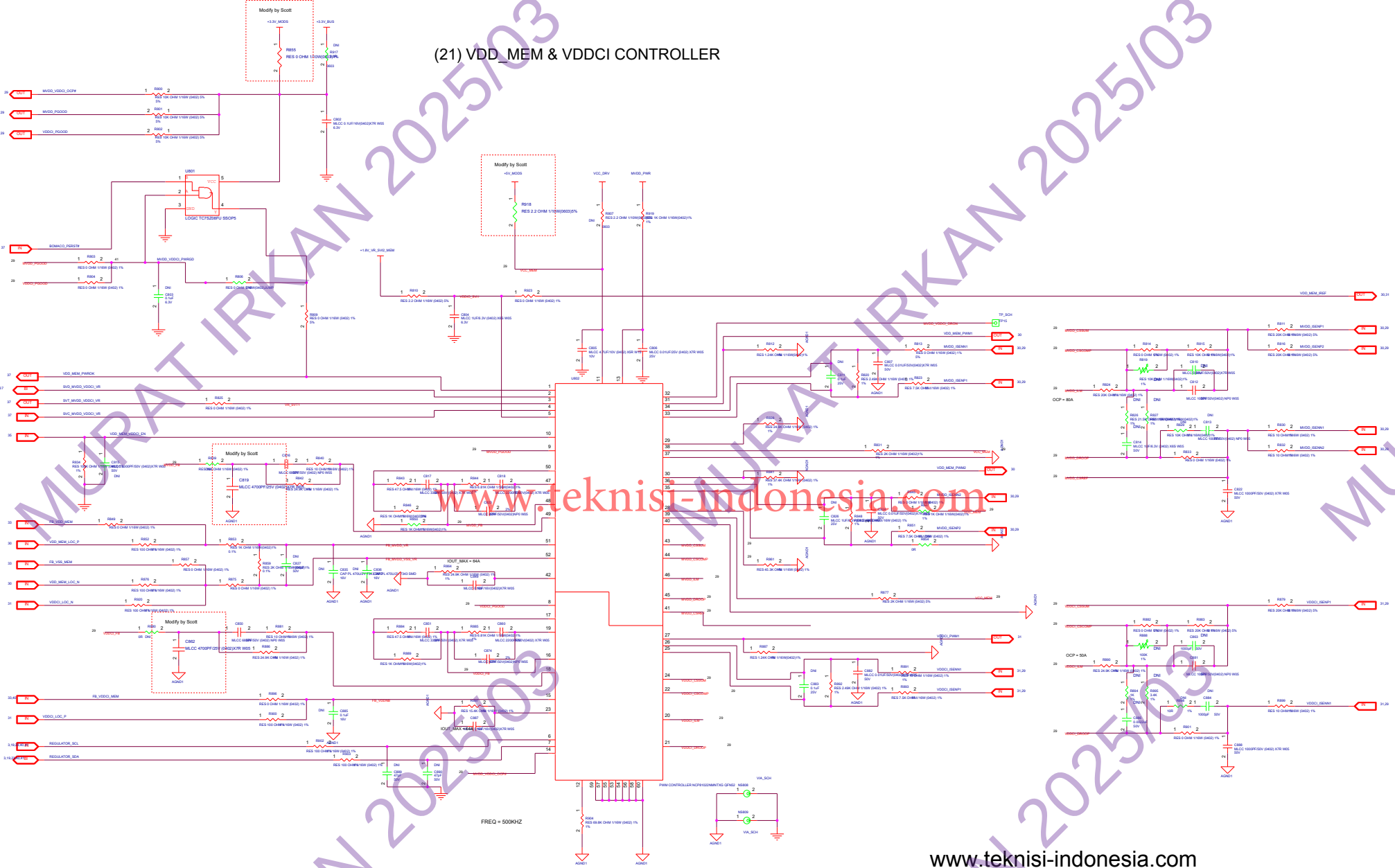
ASUS	Title :	28 SOC PHASE 1-df	
<OrgName>	Engineer:	Sonic Tang	
Size: Custom	Project Name: D414S		Rev: 1.01X
Date: Wednesday, August 26, 2020	Sheet 28 of 50		

(21) VDD_MEM & VDDCI CONTROLLER



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ASUS	Title :	29 VDD_MEM & VDDCI CONTROLLER
<OrgName>	Engineer:	Sonic Tang
Size: Custom	Project Name: D414S	Rev: 1.01X
Date: Wednesday, August 26, 2020	Sheet 29 of 50	

SWITCHES

Modify by Sonic
Delete BUTAGE CTF / MAXIMIZE
Delete BAKO CHAS

Yellow LED shows VRHOT

Modify by sonic
Delete VRHOT LED

FOR YELLOW TEST

Modify by sonic
Delete Panel Control Interface

PCC LED

Modify by sonic
Delete PCC LED

FOR I2C DEBUG

Modify by sonic
Delete EMC1412 for EXT_SCL,SDA

LED RED ON indicates Fault

Modify by sonic
Delete CTF LED
Delete BACO LED
Delete MAMACO LED
Delete BOMACO LED

Modify by sonic
Delete U200

EMC1412 for EXT TMON to Provide CAL AND OFFSET

Modify by sonic
Delete EMC1412 for EXT TMON to Provide CAL AND OFFSET

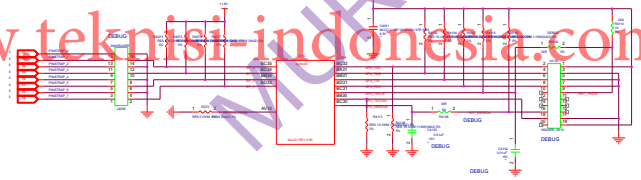
7-BIT I2C ADDRESS: 0x7C

THERMAL SENSOR FOR GDDR6

Modify by sonic
Delete THERMAL SENSOR FOR GDDR6

Table 4. Address Pin and Slave Addresses

DEVICE TWO-WIRE ADDRESS	A0 PIN CONNECTION
1001000	Ground
1001001	V+
1001010	SDA
1001011	SCL



0	A	02/10/2020	Initial schematic creation
1	-00B	Apr 7 2020	Pg.22: Change UT709 to SOT23 package part 2480074401G for multi-sourcing
2	-00B	Apr 7 2020	Pg.38&40: Correct net name GPIO_S_REG_HOT# to GPIO_S_REG_HOT
3	-00B	Apr 7 2020	Pg.35: Change Q1103 to dual MOSFET part 2020008501G
4	-00B	Apr 7 2020	Pg.29: Change R904 to 69.8K
5	-00B	Apr 9 2020	Pg.20: DNI R1552, Install R1559, Change R1563 to 49.9K
6	-00B	Apr 9 2020	Pg.20: Install a 150pF cap on C1589
7	-00B	Apr 9 2020	Pg.20: Change R1572 to 1uF and Change R1586 to 49.9K
8	-00B	Apr 9 2020	Pg.36: Add R1077 and R1078 (DNI) option
9	-00B	Apr 9 2020	Pg.39: Add R4154 (DEBUG)
10	-00B	Apr 9 2020	Pg.18: Add R78 (DNI)
11	-00B	Apr 14 2020	Pg.3: Change R20 to 1k
12	-00B	Apr 23 2020	Pg.23: Change R536, R538, R540, R542, R544, R546, R548, R551 to 10k, change R537, R539, R541, R543, R545, R547, R549, R552 to 2.49k
13	-00B	Apr 23 2020	Pg.23: Change C511 to 330pF and C504 to 82pF
14	-00B	Apr 23 2020	Pg.2: Change PCIe connctor to Gen4 PN: 614NOPN098
15	-00B	Apr 23 2020	Pg.23: Change GFX Load line R502, R517, R531 to 0ohm and R519 to 2k
16	-00B	Apr 24 2020	Pg.40: Install D4010
17	-00B	Apr 27 2020	Pg.28: Add C695
18	-00B	Apr 27 2020	Pg.35: Change C7114 from 405A010700G to 423K010700G
19	-00B	Apr 27 2020	Pg.3,23,37,38: Add circuits to use GENERICA, GENERICB,GENLK_VSYNC to control fan power, GFX power, amd LED
20	-00B	Apr 27 2020	Pg.20: Add R1556
21	-00B	Apr 28 2020	Pg.36,2,3,35: Add Clamp Workaround circuit for A0 bootloader hang bug
22	-00B	Apr 29 2020	Pg.23: DNI R705
23	-00B	Apr 29 2020	Pg.33: GND VSDAN_XGMI
24	-00B	Apr 29 2020	Pg.41: Change U4300 to 2530023100
25	-00B	Apr 30 2020	Pg.5: Add MR123 option to GND XGMI_REFCLKN
26	-00B	May 1 2020	Pg.41: add U4300 POWER 3.3V_AUX option
27	-00B	May 1 2020	Pg.10/11/12/13: Change memory chips to Samsung 16gbps PN: 23H416G7LM16
28	-00B	May 4 2020	Pg.35: Change R7120 to 39.2k
29	-00B	May 4 2020	Pg.35: DNI R7117
30	-00B	May 6 2020	Pg.28: Add R684, MR684, NR684 for SOC power option
31	-00B	May 6 2020	Pg.2: DNI R4210, R4211, C4210, C4211 for PCIe TX jitter
32	-00B	May 7 2020	Pg.3: Change I2C R50, R51 to 5.1K, following D412
33	-00B	May 7 2020	Pg.20: Add INA381 Reset pin delay options
34	-00B	May 7 2020	Pg.21: Add 12V_BUS power option for 3V_12V MUX input
35	-00B	May 7 2020	Pg.33: Add C170, C171, C172 on +1.8V and C173, C174, C175 on +0.75V
36	-00B	May 7 2020	Pg.32: DNI C1384
37	-00B	May 8 2020	Pg.19: Change R1537 to 100R
38	-00B	May 8 2020	Pg.2: Change PCIe Tx AC coupling caps to X6S type
39	-00B	May 8 2020	Pg.3: Change C61 to X6S type
40	-00B	May 12 2020	Pg.3: Change MOD_S_ACTIVE_H to MODS_S_ACTIVE_H_BUF
41	-00B	May 12 2020	Pg.35: Change TPS25220 to TPS25221
42	-00B	May 28 2020	Pg.20: Change C1589 to 4.7uF

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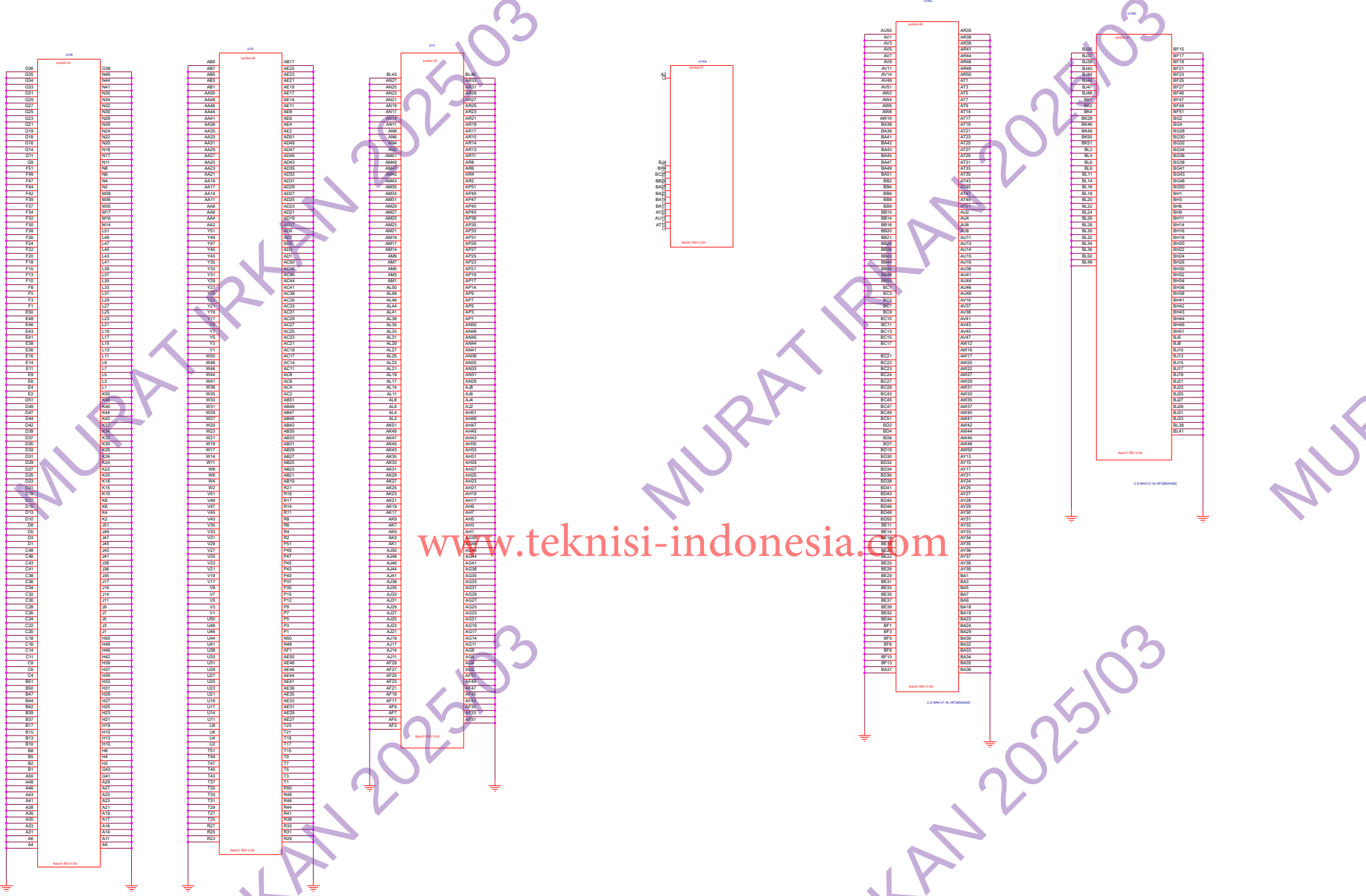
ASUS	Title :	42 History
<Doc Name>	Engineer:	Sonic Tang
Size: Custom	Project Name: D414S	Rev: 1.01X
Date: Wednesday, August 26, 2020	Sheet 42 of 50	



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ASUS	Title : 34 NAVI 21 POWER & GND
<OrgName>	Engineer: Sonic Tang
Size: Custom	Project Name: D414S
Rev: 0.51X	
Date: Wednesday, August 26, 2020	Sheet 34 of 50

Power

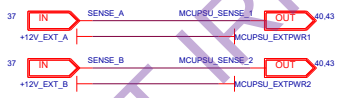
From 12V (for 外接式風扇使用, 任一組12V皆可)

From PCIE 3V3_AUX (for ITE)

From BUS 3V3 (for ITE logic判斷)

For 12V to 5V ARGB PWR

PSU DETECT INPUT



From EXT 0 (外部電源第一組)

From EXT1 (外部電源第二組)

From EXT1 (外部電源第三組)

I2C

GPU I2CB Master (for ITE / ENE)

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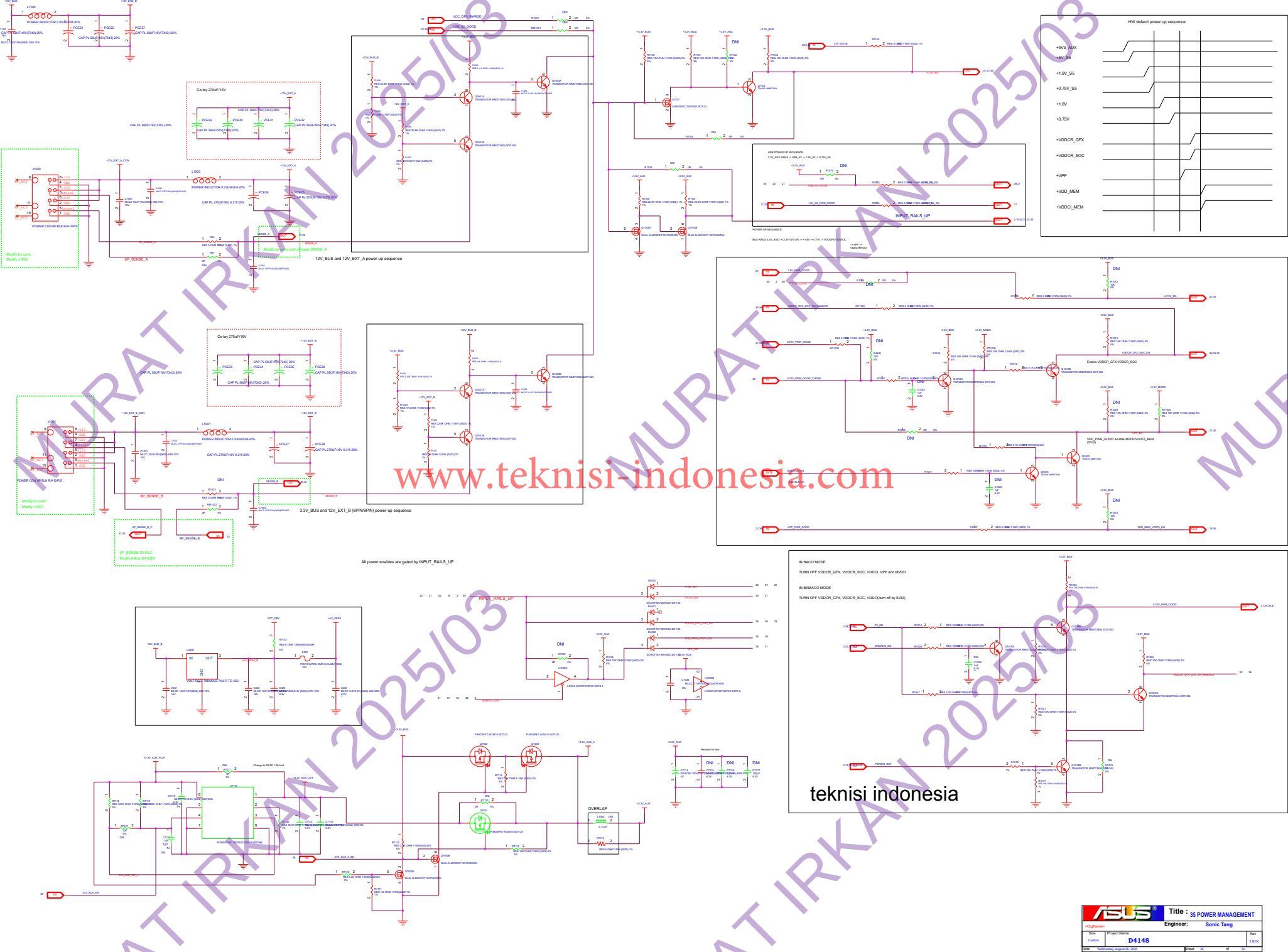
GPU_GPIO

MURAT IRKAN 2025/03

ASUS	Title :	STRIX000_POWER & OFF-PAGE	
<OrgName>	Engineer:	Sonic Tang	
Size: B	Project Name: D414S		Rev: 1.01X
Date: Wednesday, August 26, 2020	Sheet 45	of 50	



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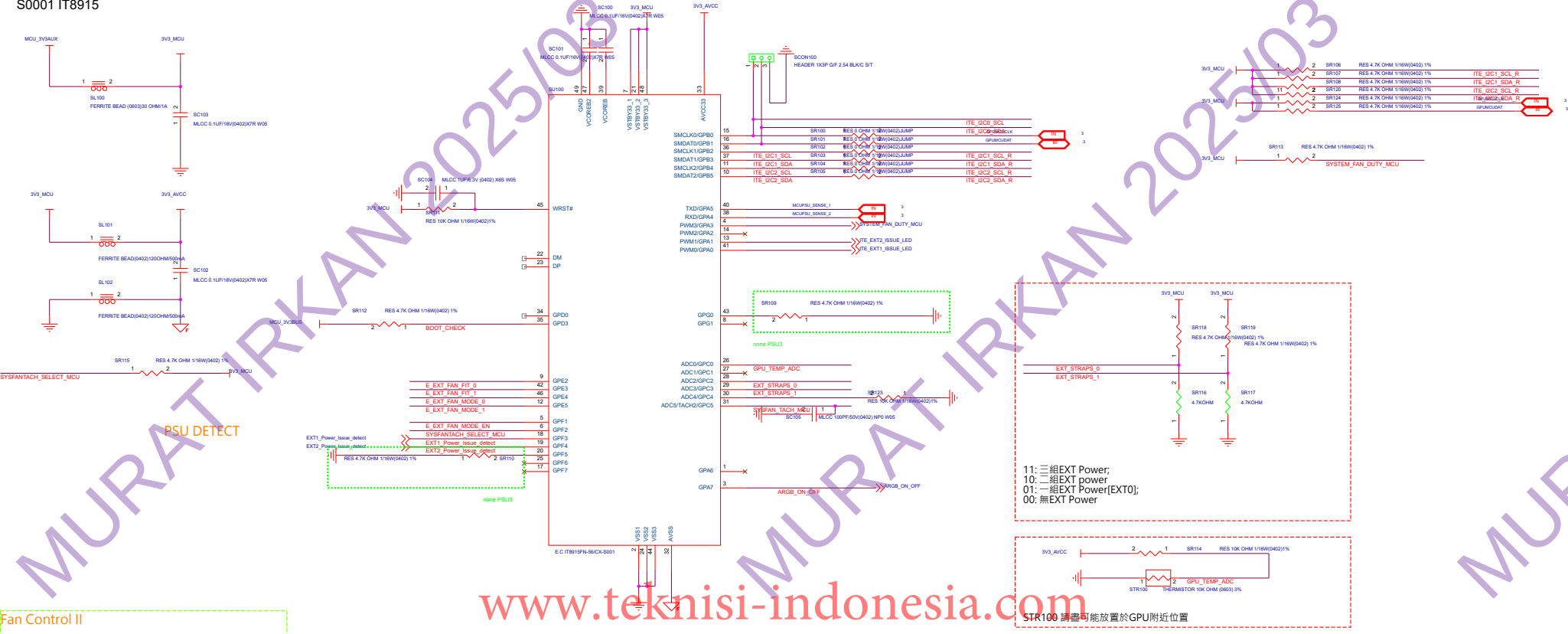

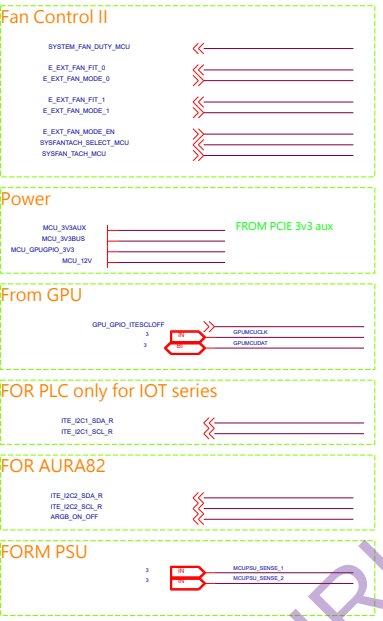

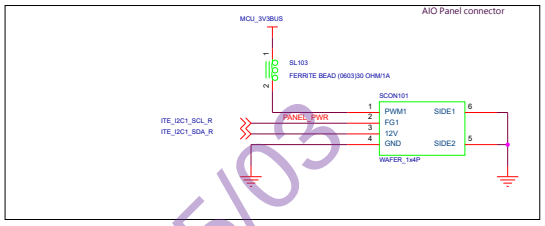

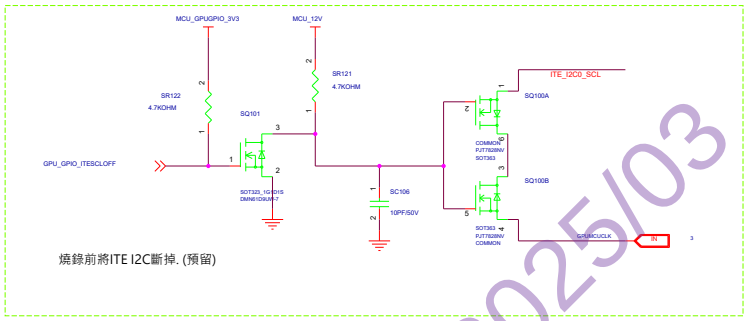

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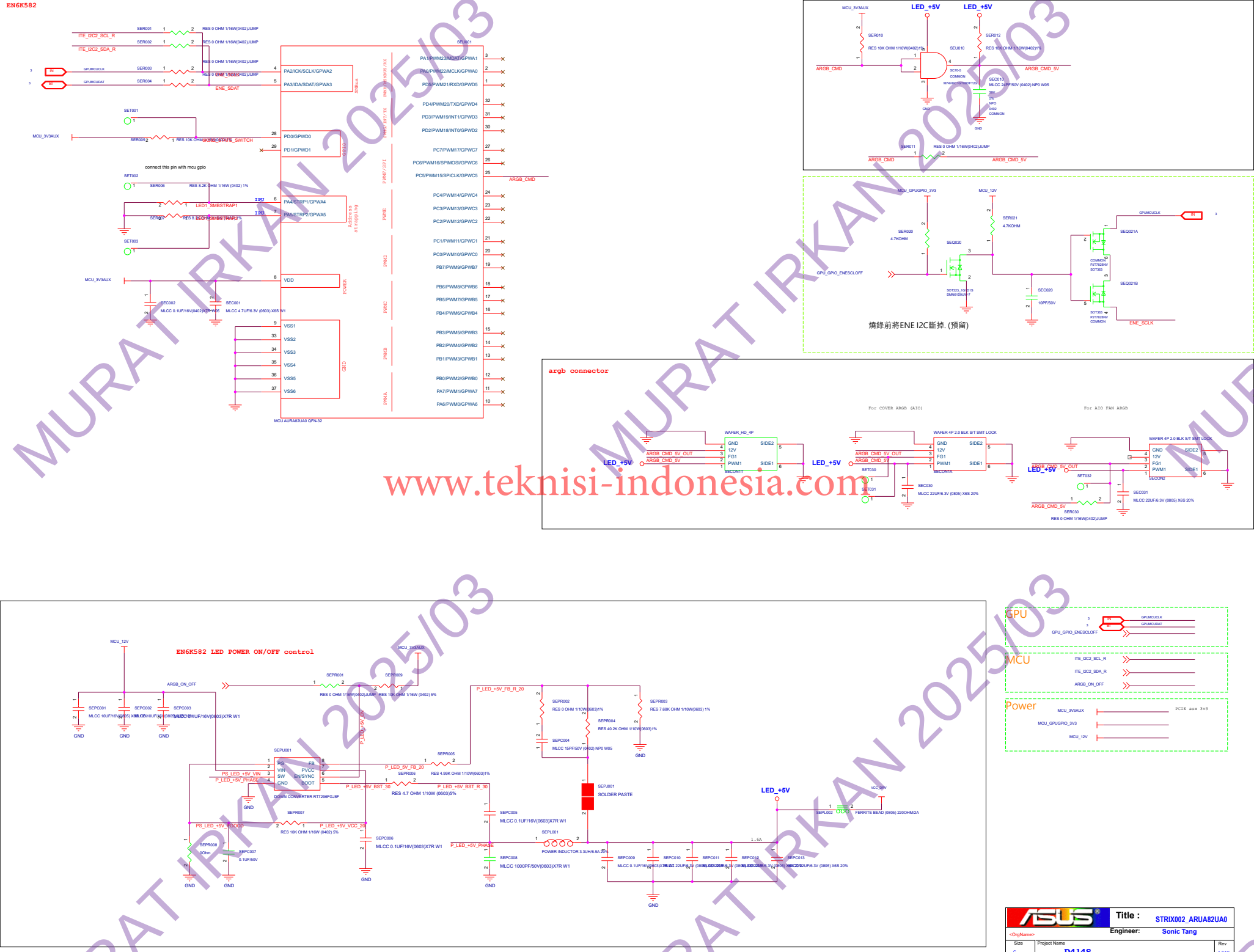
ASUS	Title :	STRIX001_ITE8915
<OrgName>	Engineer:	Sonic Tang
Size: C	Project Name: D414S	Rev: 1.01X
Date: Wednesday, August 26, 2020	Sheet 46 of 50	



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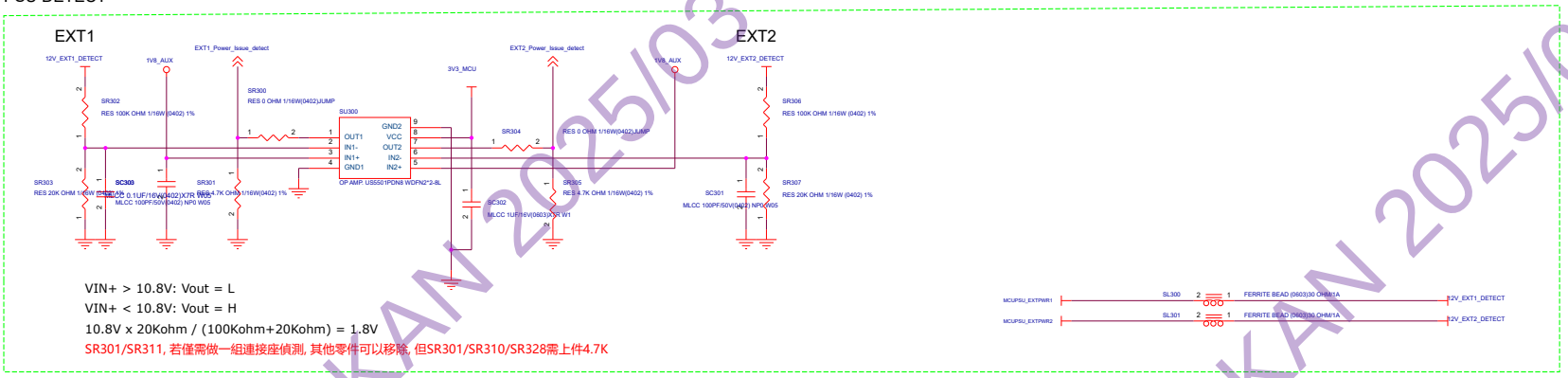
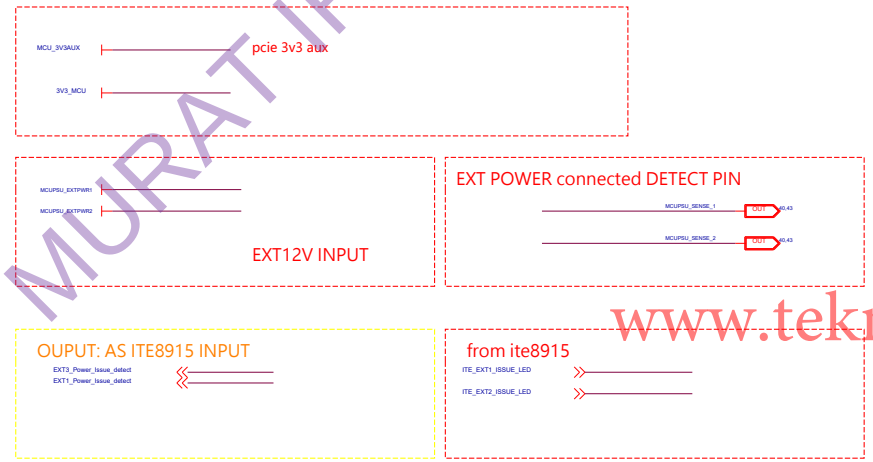
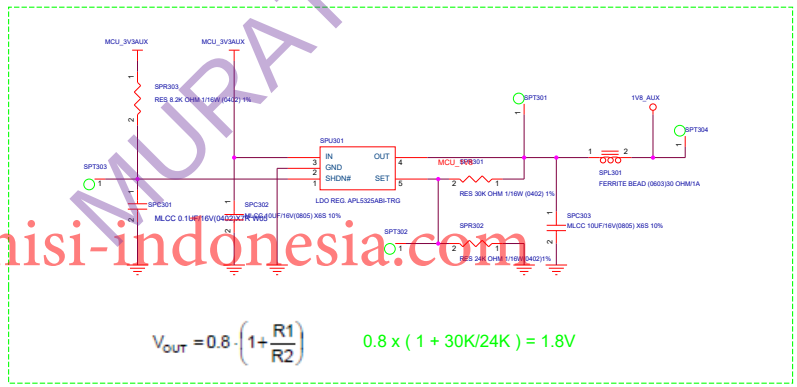
ASUS	Title :	STRIX002_ARUA82UA0	
<OrgName>	Engineer:	Sonic Tang	
Size: C	Project Name: D414S		Rev: 1.01X
Date: Wednesday, August 26, 2020	Sheet 47 of 50		

PSU DETECT





1v8_ref



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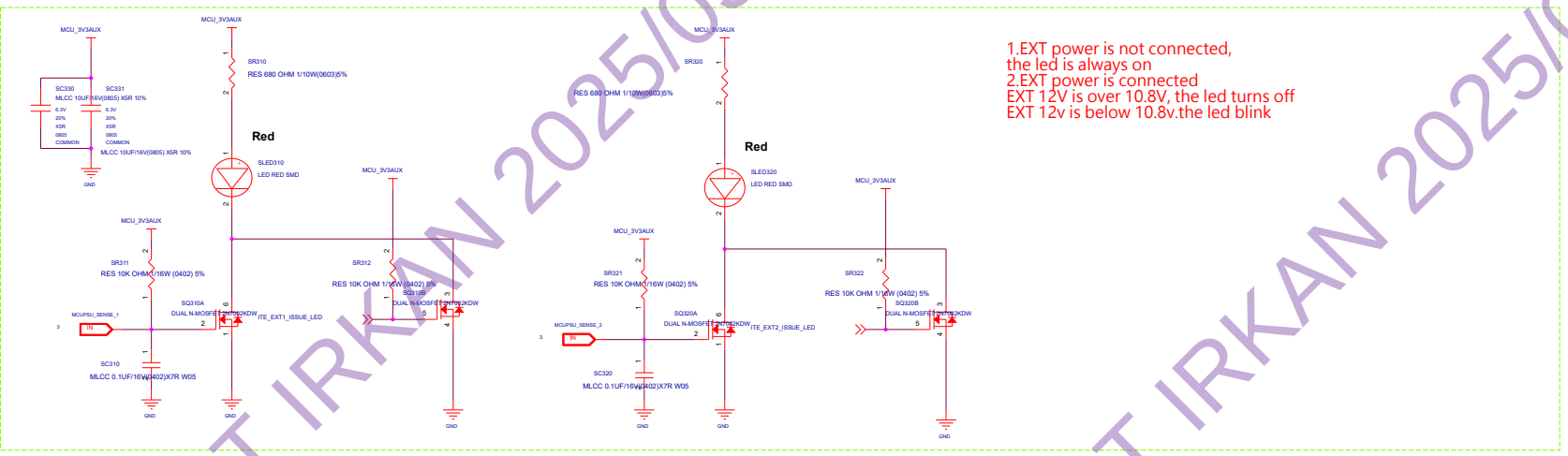
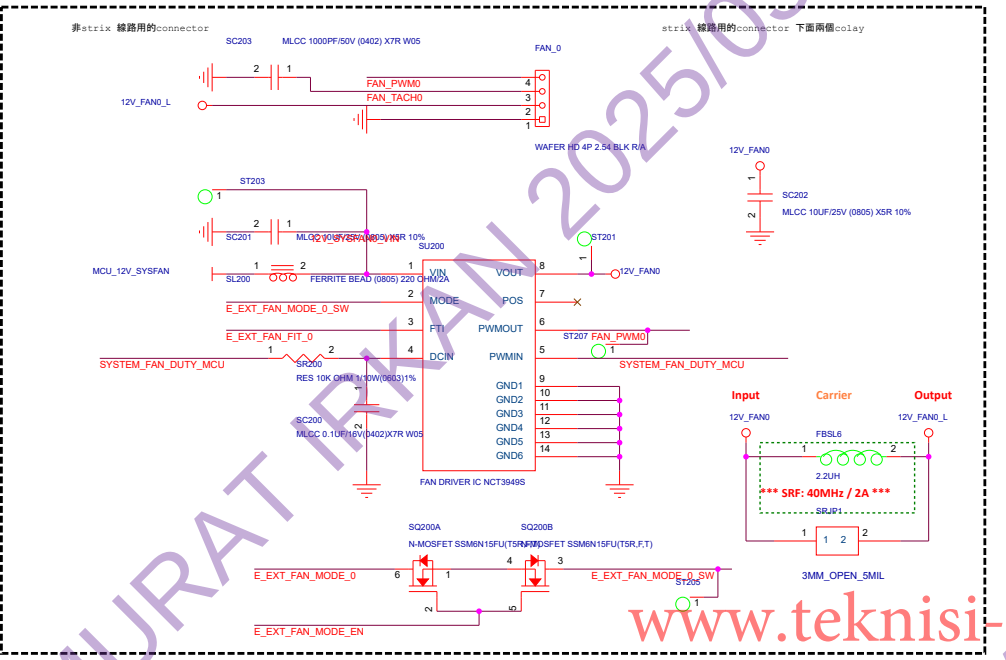


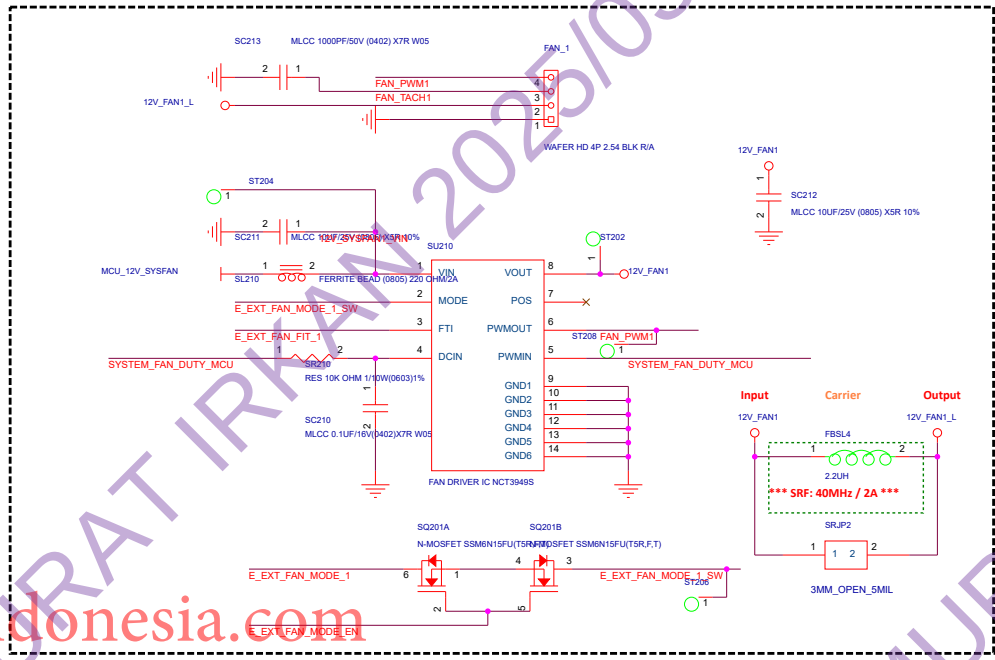
1.EXT power is not connected,
the led is always on
2.EXT power is connected
EXT 12V is over 10.8V, the led turns off
EXT 12v is below 10.8v.the led blink

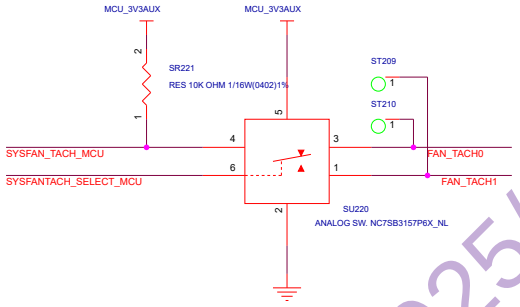
ASUS	Title :	STRIX003_PSU DETECT
<OrgName>	Engineer:	Sonic Tang
Size: C	Project Name: D414S	Rev: 1.01X
Date: Wednesday, August 26, 2020	Sheet 48 of 50	

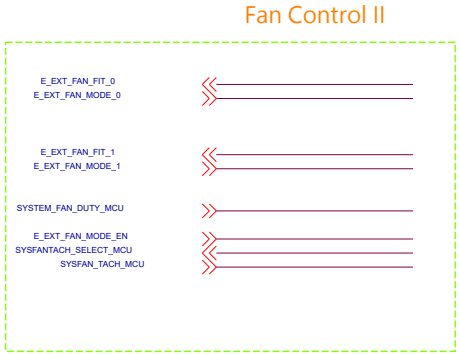
MURAT IRKAN 2025/03

S0002 SYSTEM FAN CONTROL









ASUS	Title :	STRIX004_SYSTEM FAN CONTROL
<OrgName>	Engineer:	Sonic Tang
Size: B	Project Name: D414S	Rev: 1.01X
Date: Wednesday, August 26, 2020	Sheet 49 of 50	

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ASUS VGA PCB Logo

LOGO1
CE
CE

LOGO8
UKRAINE
UKRAINE

LOGO2
VCCI
VCCI

LOGO9
PCB MADE IN CHINA
PCB_MADE_IN_CHINA

PCB MADE IN CHINA

LOGO3
EMI_D33005_H
EMI_D33005_H

D33005

LOGO10
MARK_L
S_MARK_L

LOGO4
FCC
FCC

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LOGO11
WEEE_LOGO
WEEE_LOGO

ASUS Re-design logo
Do not place this on reference board

LOGO13
ASUS CUSTOM PCB DESIGN
ASUS_CUSTOM_PCB

LOGO5
RCM
RCM

LOGO6
CAN ICES-3(B)/NMB-3(B)
CAN_ICES_3B_NMB_3B

CAN ICES-3 (B)/NMB-3(B)

LOGO12
SFIS
SFIS

SFIS

LOGO7
KC R-R-MSQ-XXXXXXXXXXXXXX
KC_R_R_LOGO

M1
PCB_ruler ASUS
PCB_RULER_ASUS

ASUS <OrgName>	Title : XX ASUS PCB Logo	
	Engineer: Sonic Tang	
Size A3	Project Name D414S	Rev 1.01X
Date: Wednesday, August 26, 2020	Sheet 50 of 50	

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Delete by Scott

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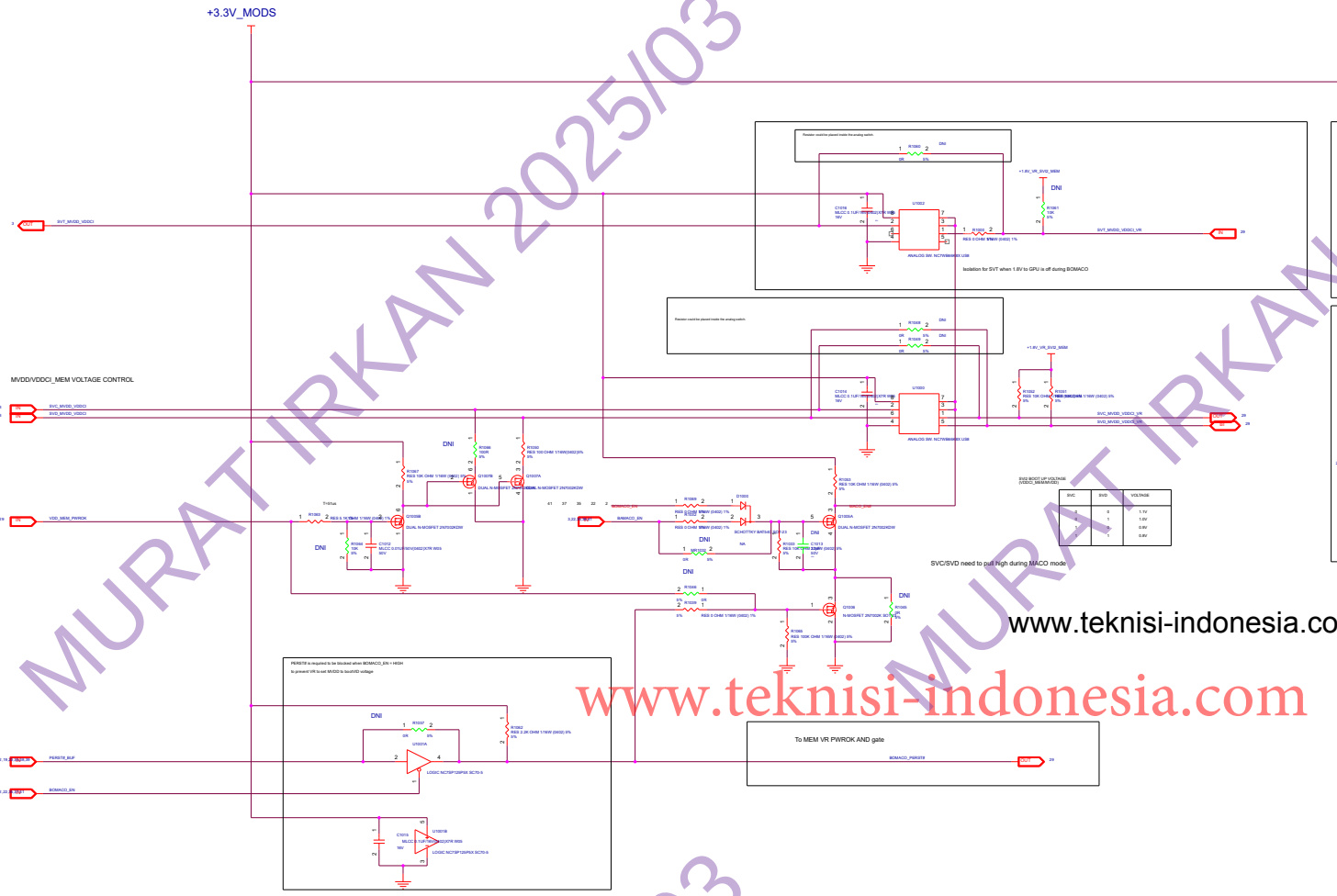
ASUS	Title : 36 CLAMP WORKAROUND	
<OrgName>	Engineer: Sonic Tang	
Size: Custom	Project Name: D414S	Rev: 1.01X
Date: Wednesday, August 26, 2020	Sheet 36 of 50	



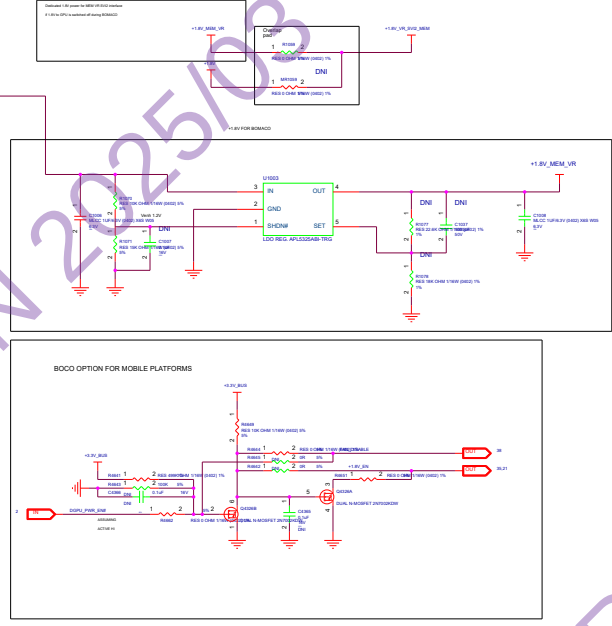


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Table 3 Power Rails Status at BAMACO Mode

Power Rail at ASIC	Used logic	ON/OFF Status
VDDCR_GFX	GFX IP, SDMA, GFXCLK CLKIP	OFF
VDDCR_SOC	SYS IPs	OFF
VDDCI_MEM	MEM PHY	OFF
VDDIO_MEM	MEM PHY	ON
MVDDC/MVDDQ/VPP	DRAM	ON
VDDCR_BACO	NBIO/THM/MP1/USB	ON
VDDIO_PCIE	PCIe PHY	ON
VDDAN_C	PHY	ON
VDDAN_18	PLL, PHY, etc	ON
VDDIO_18	1.8V GPIO, I2C, etc	ON
VDDIO_33	3.3V GPIO	ON
VDDAN_*_EFUSE	EFUSE	ON
VDDCR_S5*	USB	ON

Table 4 Key Signals at Different PM Modes

Signals	Default	BOCO	BOMACO
PX_EN	LOW	N/A	N/A
MACO_EN	N/A	N/A	N/A
PERSTb	HIGH	1->0->1	1->0->1
PWR_EN	HIGH	LOW	LOW
BOMACO_EN	LOW	LOW	HIGH

Table 5 Platform to Support BOMACO

BOMACO_EN	SVC PU/PD	SVD PU/PD
HIGH	PU	PU
LOW	bootVID	bootVID

Table 3 Power Rails Status at BOMACO Mode

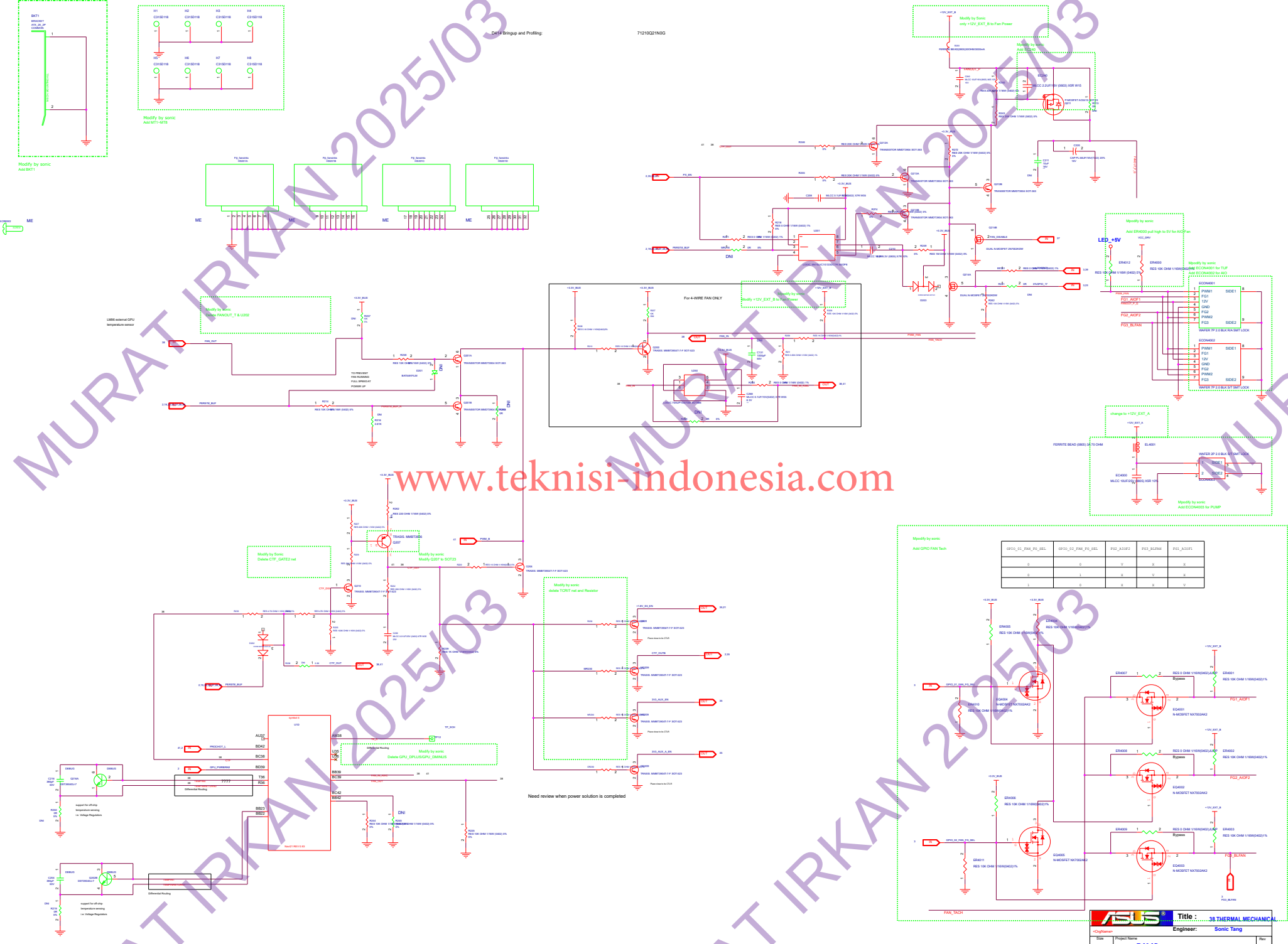
Power Rail at ASIC	Used logic	ON/OFF Status for BOMACO-A
VDDCR_GFX	GFX IP, SDMA, GFXCLK CLKIP	OFF
VDDCR_SOC	SYS IPs	OFF
VDDCI_MEM	MEM PHY	OFF
VDDIO_MEM	MEM PHY	ON
MVDDC/MVDDQ/VPP	DRAM	ON
VDDCR_BACO	NBIO/THM/MP1/USB	OFF
VDDIO_PCIE	PCIe PHY	OFF
VDDAN_C	PHY	OFF
VDDAN_18	PLL, PHY, etc	OFF
VDDIO_18	1.8V GPIO, I2C, etc	OFF
VDDIO_33	3.3V GPIO	OFF
VDDAN_*_EFUSE	EFUSE	OFF
VDDCR_S5*	USB	ON

ASUS	Title : 37 SVI2 & BxMACO	
<OrgName>	Engineer: Sonic Tang	
Size: Custom	Project Name: D414S	Rev: 1.01X
Date: Wednesday, August 26, 2020	Sheet 37 of 50	

MURAT IRKAN 2025/03

D414 Bringup and Profiling:

71210Q21N0G



GPIO_01_FAN_PG_SEL	GPIO_02_FAN_PG_SEL	PG2_AIOF2	PG3_BLFAN	PG1_AIOF1
0	0	V	X	X
0	1	X	V	X
1	0	X	X	V

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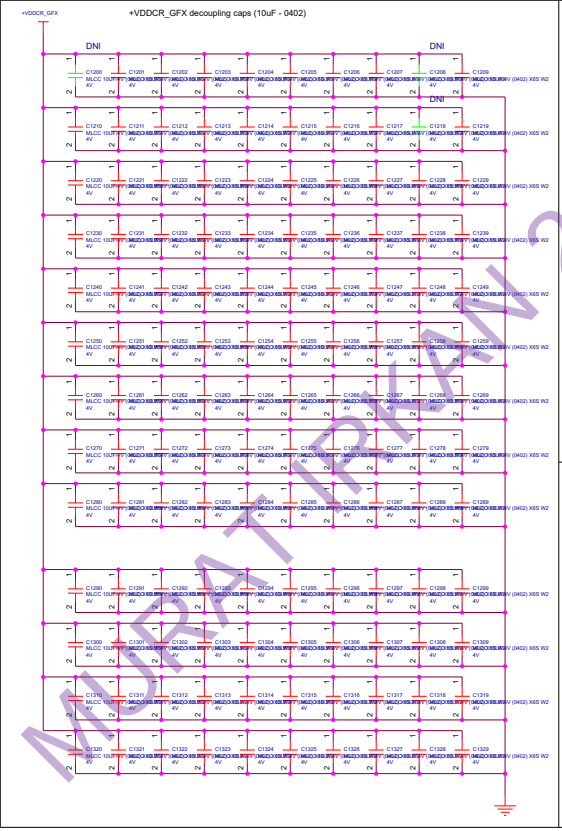
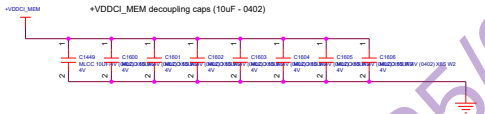
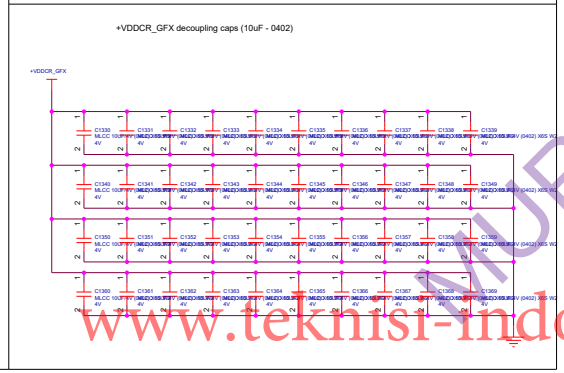




DNI these six caps to match SLT board and keep the design consistent across SKUs

C1218
C1208
C1200
C1438
C1413
C1384



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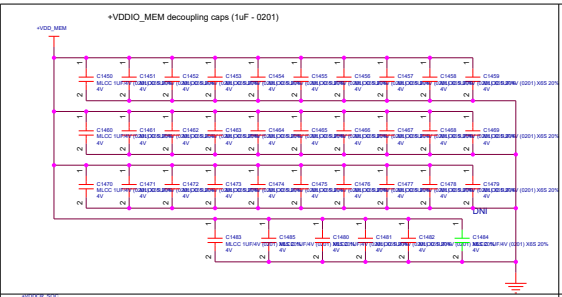

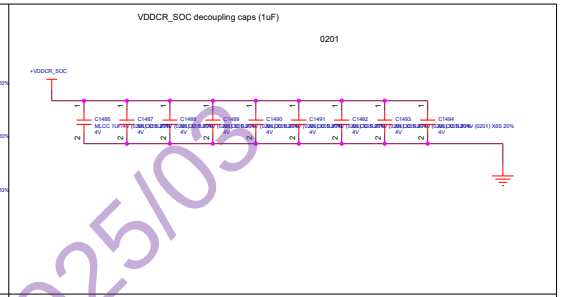

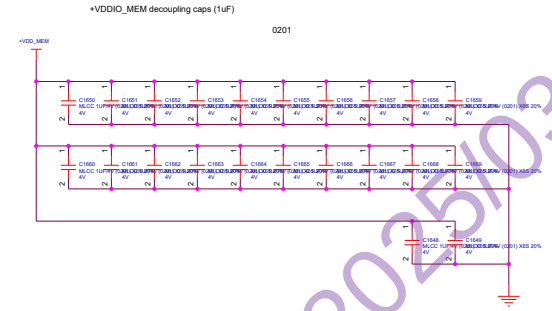

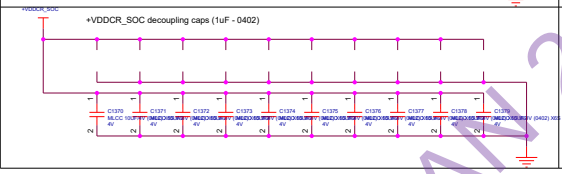

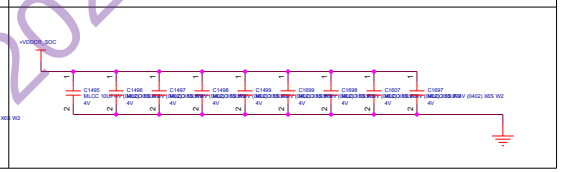

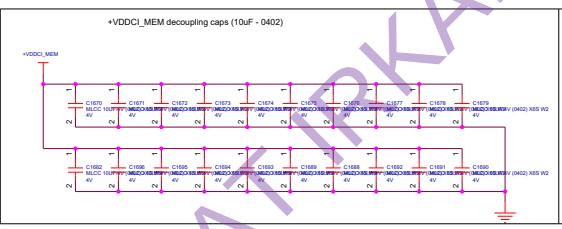

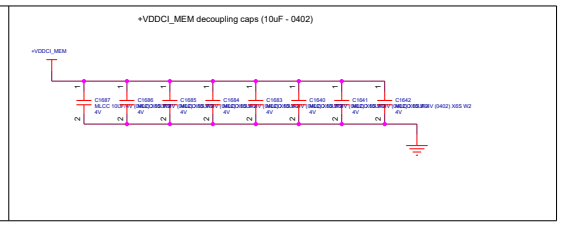

ASUS	Title :	32 NAVI 21 DECAPS	
<OrgName>	Engineer:	Sonic Tang	
Size: Custom	Project Name: D414S		Rev: 1.01X
Date: Wednesday, August 26, 2020	Sheet 32 of 50		

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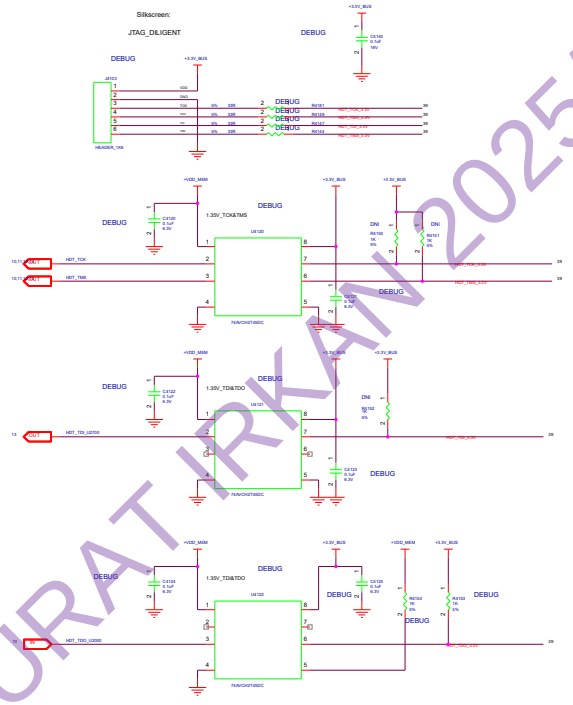
Silkscreen:

JTAG_DILIGENT



Modify by Sonic
Delete DPM LED

RGB LED header

Modify by sonic
Delete RGB LED header
Delete RADEON Lightbar header

RADEON Lightbar header

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ASUS	Title :	39 DPM_STATUS_LED & GDDR6_JTAG
<OrgName>	Engineer:	Sonic Tang
Size: Custom	Project Name: D414S	Rev: 1.01X
Date: Wednesday, August 26, 2020	Sheet 39 of 50	

Modify by sonic
Delete U3034/U3033/U3032/U3000

FOR PI DAUGHTER CARD
Modify by sonic
Delete PI DAUGHTER CARD

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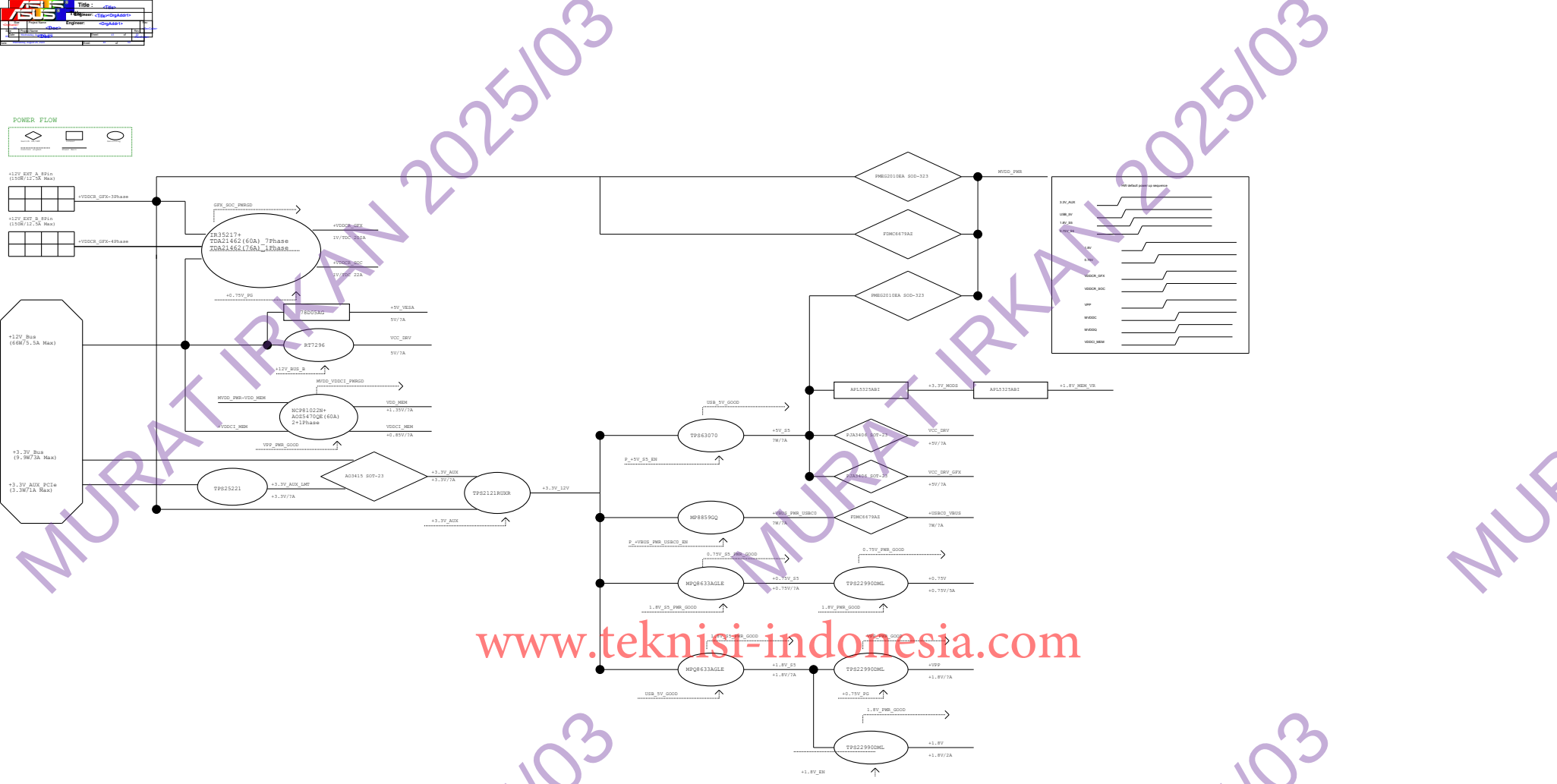
ASUS	Title : 40 PI DEBUG	
<OrgName>	Engineer: Sonic Tang	
Size: Custom	Project Name: D414S	Rev: 1.01X
Date: Wednesday, August 26, 2020	Sheet 40 of 50	



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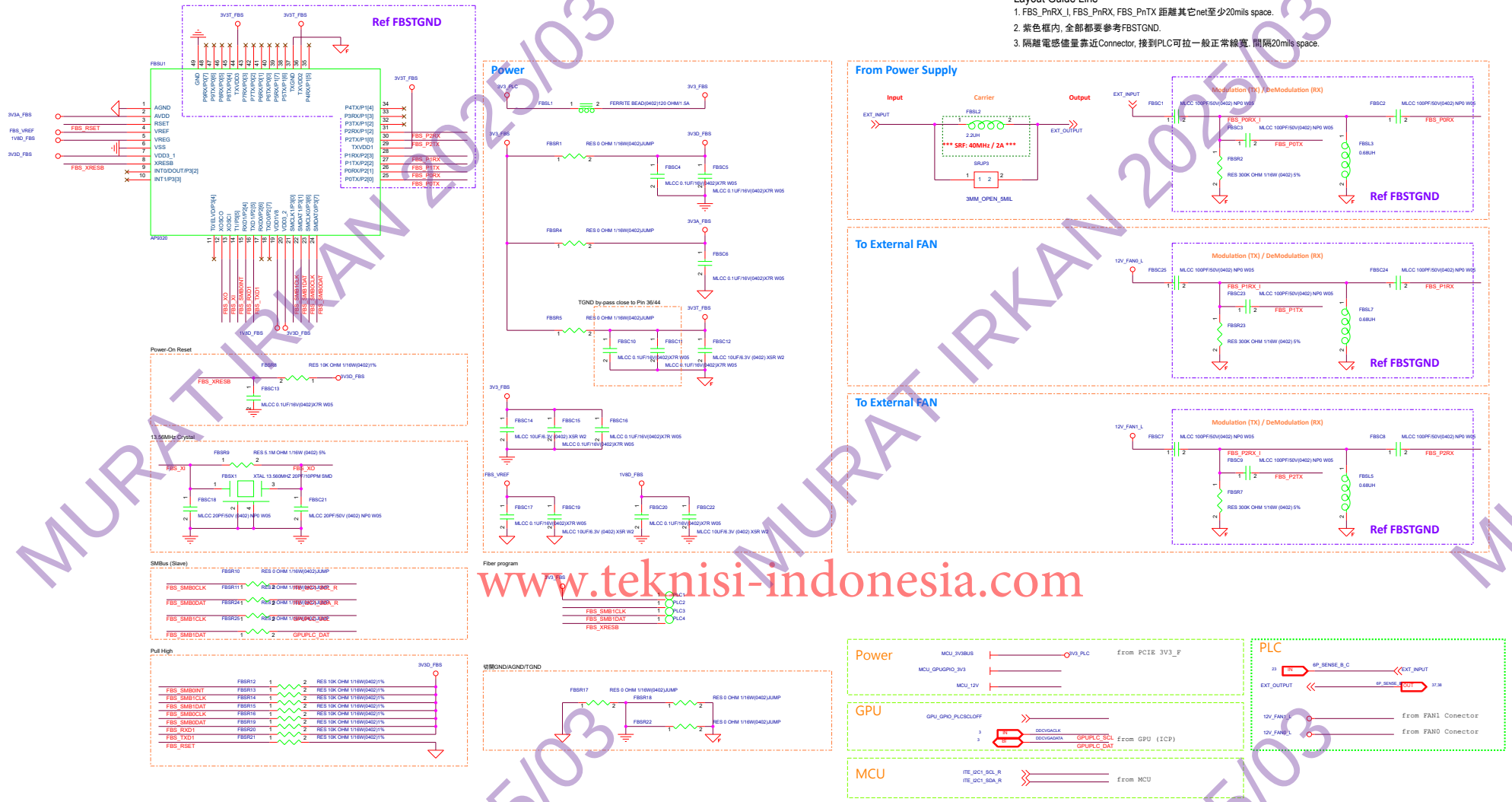
Layout Guide Line

1. FBS_PnRX_I, FBS_PnRX, FBS_PnTX 距離其它net至少20mils space.
2. 紫色框內, 全部都要參考FBSTGND.
3. 隔離電感儘量靠近Connector, 接到PLC可拉一般正常線寬. 間隔20mils space.



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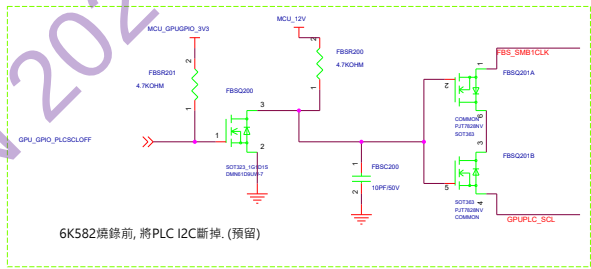

ASUS	Title :	PLC001_PLC COMM	
<OrgName>	Engineer:	Sonic Tang	
Size: C	Project Name: D414S		Rev: 1.01X
Date: Wednesday, August 26, 2020	Sheet 44 of 50		

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