Revision History

X00
1. Schematics taken from P85-A03-X03

X04

1. Versions X01-X03 were false starts trying to sync up with the Layout
2. Corrections to the GPU symbol as per Layout.

X05
1. Corrected the AGP connector symbol
2. Added the components for TYPEDET#, CGDET# and MBDET#

X06

Changed the FBVDD and FBVDDQ supplies to use the SC2610A

X07

1. Correcting the NVVDD power supply
2. Added the AGP-Power-Good circuity
3. Removed the Power Sequence circuitry
4. Added de-caps to VDDQ (AGP) and 3.3V

X08

1.Design changes to FBVDD and FBVDDQ

X09

1. Added D654

X10
1. Changed footprint on U820 to SC70-5
2. Removed the Fan circuitry for the right side
3. Added the AGP_MBDET: Components Q613, Q901

X11

1. Added C1423

X12
1) Changed Q901 to a PNP
2) Moved R1012 to net name FCC_HOTPLUG
3) Connected D611-pin2 to 3.3VL
4) Added component R1130 to U820 pin 1
5) Added FET to U820 pin 4
6) Removed components R1114, R1088, R1090
7) Added component C2265
8) Changed C2304 to 470uF
9) Connected D655 pin 3 to 12V rail

X13

1) Added R94
2) Changed footprint on C103 and C104 to 0402
3) Removed C1355 - C1362
4) Added the power sequence circuit (AGP Power Good)
5) Changed the "COMP_FB" net

X14

1) Corrected U100 foot print with
   IC_NV28_GPU_BGA816_P10_SKT
   Pin AE25 was VDDQ is now VDD333
   Pin AH27 was FBVDDQ is now VDD333
   Pins added to VDD33 are AG8, AG27

X15
1) Changed the MBDET# circuit to a COMMON assembly
2) R106 was 0R, is now 1K
3) Corrected U100 (GPU) symbol as follows:
   VDD: AD21, H6, H8
   GND: H7, AG6, AG7

X16
1) Added AGPCALPU and AGPCALPD cuircuits
2) Added GPU VDD and GND pins

X17
1) Changed caps C104 to 3.3V decoupling on the GPU
2) Changed C917 (2200pF) to 3.3V decoupling on the GPU
3) Added C930 (2200pF) and C931 (220pF) to NVVDD decoupling

X18
Added pullup R90 (10K)to MBDET

X19
1) Added disclaimer to all pages of the schematics
2) Changed the footprints for R80-R83 to SMD0402
3) Removed R90

X20
1) Corrected component properties. No netlist or component changes.
2) Changed footprints for R102 and R103 to SMD0402 to facilitate routing.

X21

1) Corrected Assemblies for R972-R975
2) Added compensation circuit to the NVVDD core supply: C1250,C1251,R1076,R1078
   These compensation components are stuffed only when
   the following components are installed:
   U814=SC2602, C1304=510uF OSCON - low ESR ~15mO.

X22

1) Corrected Assemblies for R972-R975
2) Added compensation circuit to the FBVDDsupply: C1254,C1255,R1067,R10678
   These compensation components are not stuffed, but
   serve asplace holders should we need the compensation circuits.

X23

1) Corrected values for all feed-back resistors.
   R1102,R1103,R2075,R2078,R1075,R1078
2) C2301 NO_STUFF

X24

1) removed the following caps: C14-C17
2) Changed values for C12 and C19 and R1011
3) Added R2143

X25

1) Added C2241, R1100, R1101 to the FBVDDQ supply

X26

1) Added an alternate regulator circuit (U815, R2212, C1374) for FBDVVQ.
2) Added C112 (0.22uF) to AGPVREFCG
3) Changed values of R80 and R82 to 56.2 Ohm (1%)
4) Changed R81 and R83 to NO_STUFF

X27
1) Changed D654 to BAT54
2) Changed Comment: PC_DevID = 0X280h
3) R80 is 49.9 Ohm
4) Changed assembly to COMMON for
C110 and C113. Net: AGPVREFCG

X28
1) Corrected the following components:
   R80 56.2 Ohm - AGPCALPU
   R82 49.9 Ohm - AGPCALPD
   R98 6.49K Ohm - AGPVREFGC
   Q613 changed to an IRLML2502
   Changed footprint Q901 to SOT23

X29
1) Corrected AGPCALPD/PU rails
2) R82 is 56.2 Ohm - AGPCALPD
3) R80 is 49.9 Ohm - AGPCALPU
4) R98 6.49K Ohm - AGPVREFGC
5) R105, R110 .. 2.32K Ohm - AGPVREFGC
6) Q613 is IRLML2502
7) Changed Q901 foot print to match Allegro foot print ic_sot23_123.
8) Added comments to the power circuits.

X30
1) Added AGPVREFCG-GPU circuit

X31
1) Changed V/H Sync filter components
   L713,L714,C1120,C1121,L316,L319,C320,C325
2) Changed the DAC_RSET resistor values (R1107,R927)
3) Changed L731 (NVVDD) to improve efficiency

X32
1) Removed R1197, R1198
2) Replaced C1274, C1275 with 330pF
3) Replaced C1183 with 470pF

P151-A02-X32

Sub Assemblies	Description
COMMON	Components are stuffed for all SKUs
NO_STUFF	Components are not stuffed
PRI_DVI_I	Components stuffed for Primary VGA
PRI_PROT	Components stuffed for Primary Protection
SEC_DVI_I	Components stuffed for Secondary DVI
SEC_PROT	Components stuffed for Secondary Protection
AGP3VFBDQ	Components stuffed for AGP 3.3V to FBVDD
FBVDD-FBDQ	Components stuffed for FBVDDQ 2.5V to FBVDD
PLL-SEQ	Components stuffed for PLL Sequence
PWR-SEQ	Components stuffed for Power Sequence
PWR-SEQ-BP	Components stuffed for Power Sequence By-PASS
NVVDD-2602	Components stuffed for NVVDD Power
FB_2610_SWT	Components stuffed for FBVDD Power
SC1541	Components stuffed for 3.3VL Fixed
SC1565	Components stuffed for SC1565 - 3.3VL Adj.
FB64LO	Components stuffed for FBA_DATA and FBD_DATA
FB64UP	Components stuffed for FBC_DATA and FBD_DATA
SER-PROM	Components stuffed for Serial PROM
PAR-PROM	Components stuffed for Parallel PROM
FAN_HS-LFT	Components stuffed for Fan / Blower left of the GPU
FAN_SNK	Fan Sink Component
HEAT_SNK	Heat Sink Component
VIVO	Components stuffed for Video IN/OUT
VIDO-7104	SAA7104 Video Out
CX-ENC-TVOUT	Components stuffed for CX25871 - TV-OUT
SOCKET	Components stuffed for Socket
64MB-4MX16	Components stuffed for Mem-CFG: 64MB (4Mx16) memory
BRACKET	IO Bracket / VGA-DIN-DVI-I
BRACKET-VGA	IO Bracket / VGA- -DVI-I
FB_2610_LDO	Components stuffed for FBVDDQ Power
FBVDD_ADJ	Components to adjust FBVVD out voltage.
FBVDQ_ADJ	Components to adjust FBVVDQ out voltage.

Table of Contents

Legend:

TPNC = Test Point - Not Connected

602-10151-0000-A02
140-10151-0000-A02

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1.b AGP Interface to NV28

Caps placed at the bottom side of the board and next to the VDDQ balls of the GPU

Place components close to the AGP connector

Use trace to short pads

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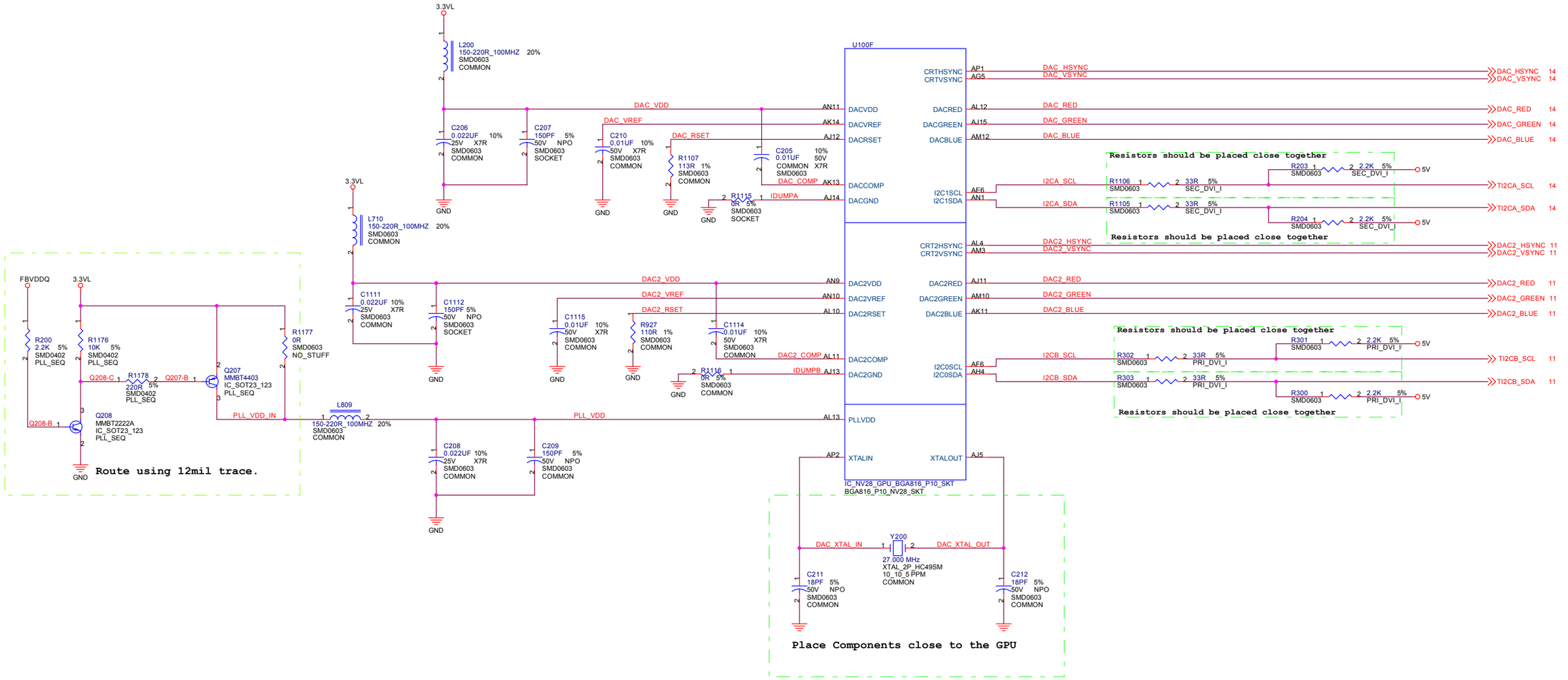

1.c NV28 .. PLL / DAC / I2C

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NVIDIA	NV28..PL / DAC / I2C			
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2.a NV28 FB Interface and NV Decoupling

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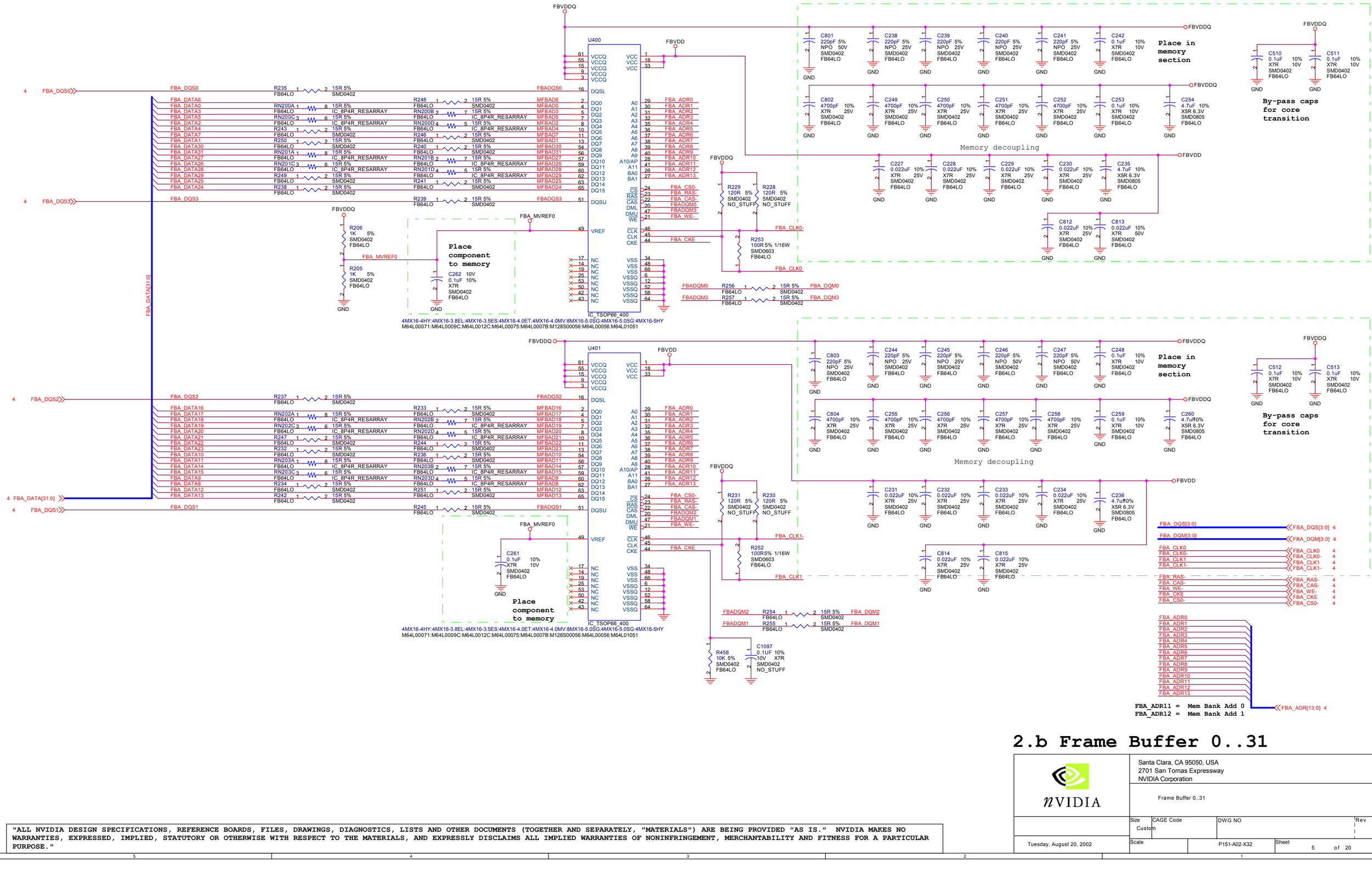

2.b Frame Buffer 0..31

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Frame Buffer 0..31

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Custom			

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2.c Frame Buffer 32..63

FBB_DATA[31:0]

FBB_DQS1 — FBB_DQS3 — FBB_DQS2 — FBB_DQS0

FBB_MVREF0

U402 / U403 — IC_TSOP66_400

4MX16-4HY:4MX16-3.8EL:4MX16-3.5ES:4MX16-4.0ET:4MX16-4.0MV:8MX16-5.0SG:4MX16-5.0SG:4MX16-5HY
M64L00071:M64L0009C:M64L0012C:M64L00075:M64L0007B:M128S00056:M64L00056:M64L01051

Place component to memory

Memory decoupling

Place in memory section

By-pass caps for core transition

FBB_ADR11 = Mem Bank Add 0
FBB_ADR12 = Mem Bank Add 1

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Frame Buffer 32..63

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2.d Frame Buffer 64..95

U404 — IC_TSOP66_400

4MX16-4HY:4MX16-3.8EL:4MX16-3.5ES:4MX16-4.0ET:4MX16-4.0MV:8MX16-5.0SG:4MX16-5.0SG:4MX16-5HY
M64U00071:M64U0009C:M64U0012C:M64U00075:M64U0007B:M128S00056:M64U00056:M64U01051

U405 — IC_TSOP66_400

4MX16-4HY:4MX16-3.8EL:4MX16-3.5ES:4MX16-4.0ET:4MX16-4.0MV:8MX16-5.0SG:4MX16-5.0SG:4MX16-5HY
M64U00071:M64U0009C:M64U0012C:M64U00075:M64U0007B:M128S00056:M64U00056:M64U01051

Memory decoupling

Place component to memory

Place component in memory section

By-pass caps for core transition

FBC_ADR11 = Mem Bank Add 0
FBC_ADR12 = Mem Bank Add 1

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Frame Buffer 64..95

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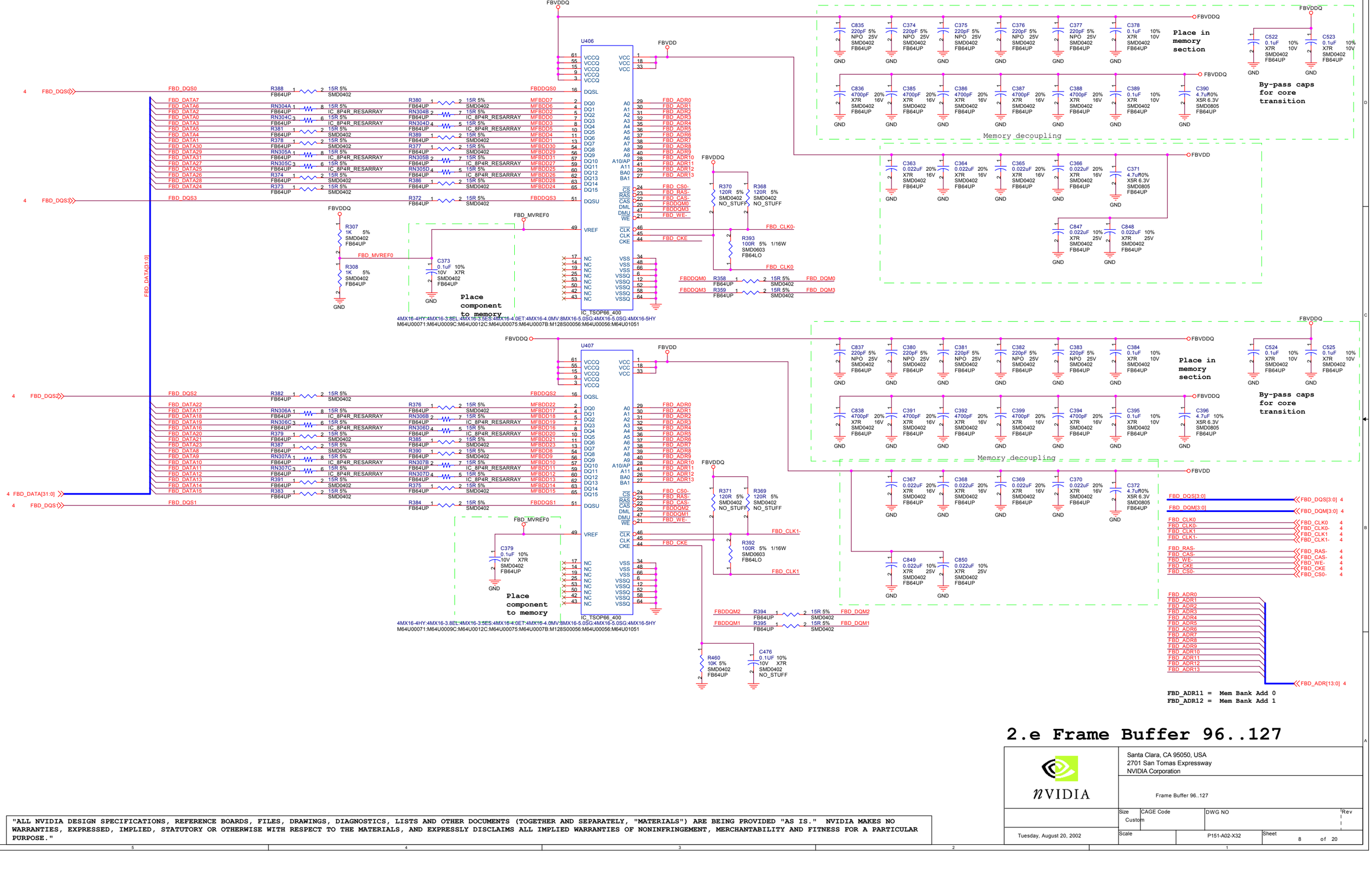

2.e Frame Buffer 96..127

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Frame Buffer 96..127

Tuesday, August 20, 2002

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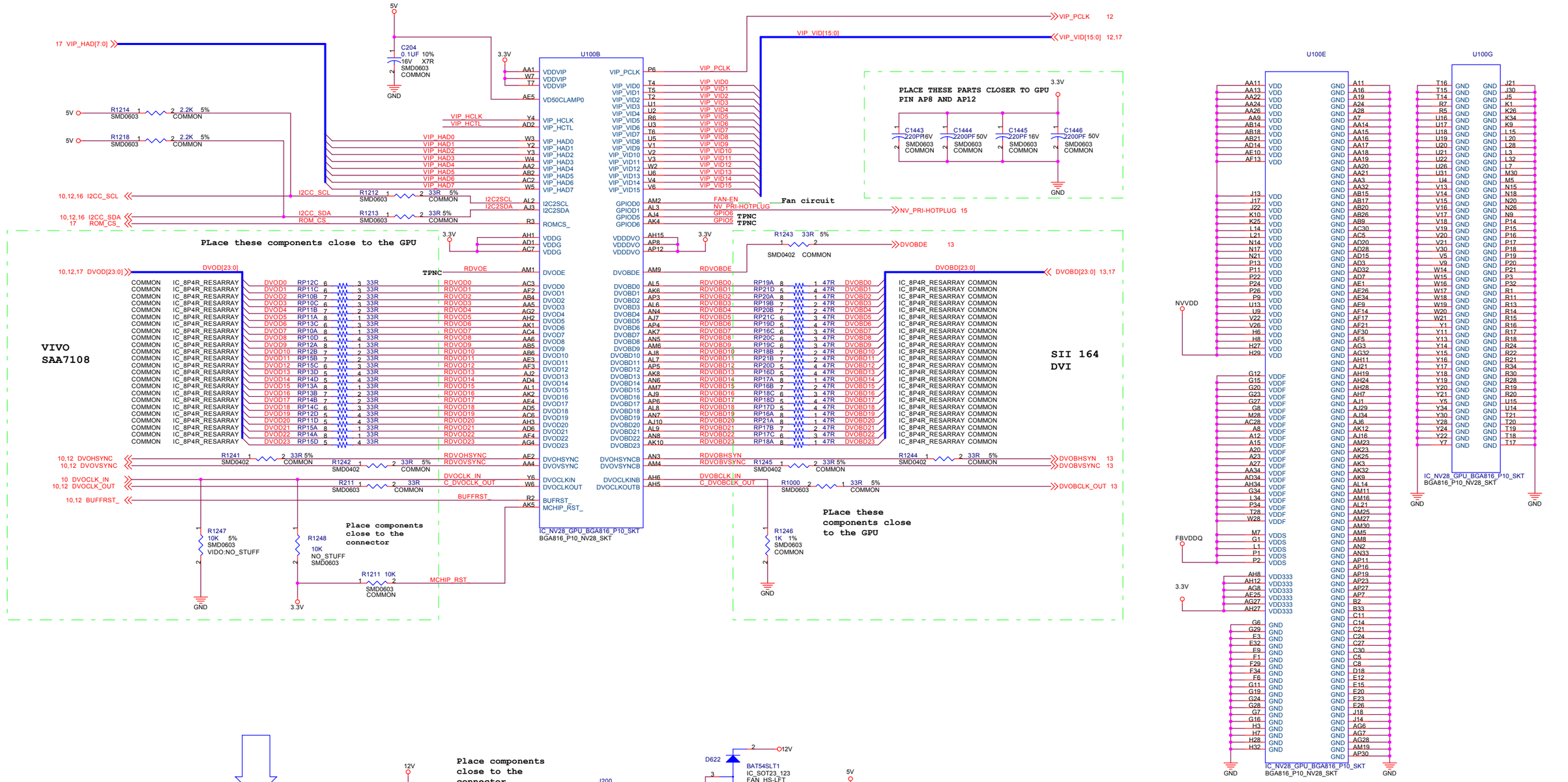

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3.a DVO Bus .. A/B

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DVO A/B

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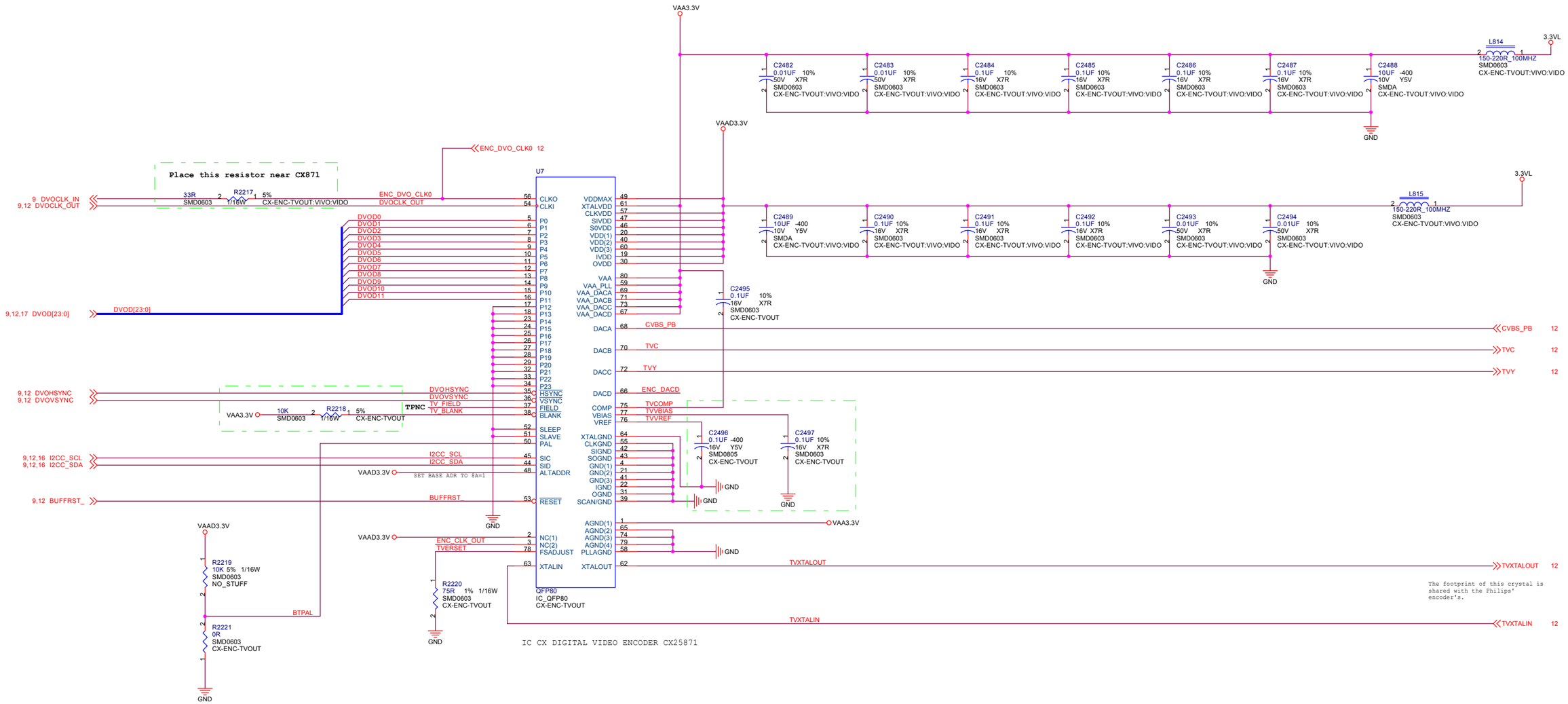

IC CX DIGITAL VIDEO ENCODER CX25871

3.b Conexant 25871-Encoder - TV Out

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DVOA Ext. TMDSA Sec

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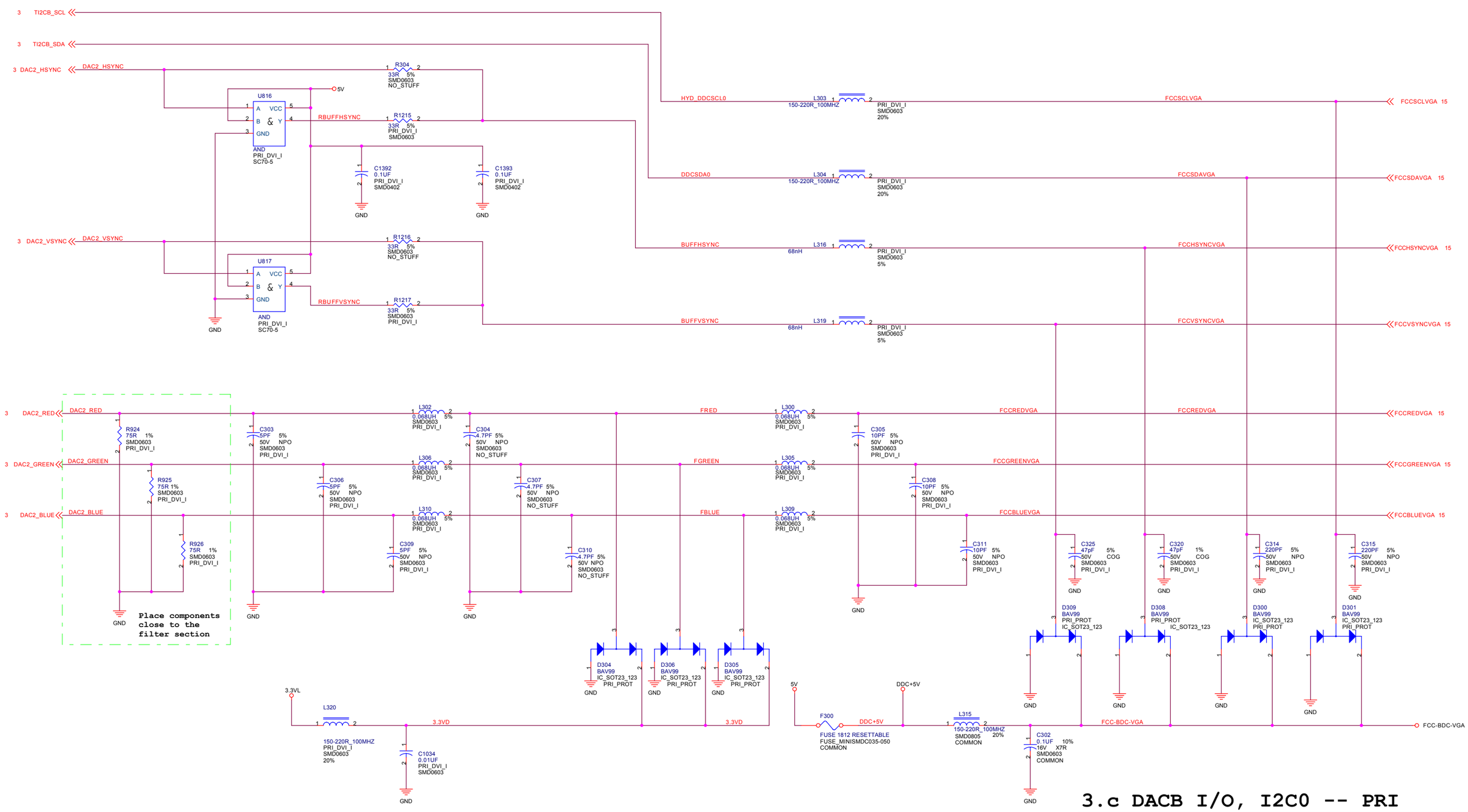

3.c DACB I/O, I2C0 -- PRI

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DACB I/O I2C0 - Sec

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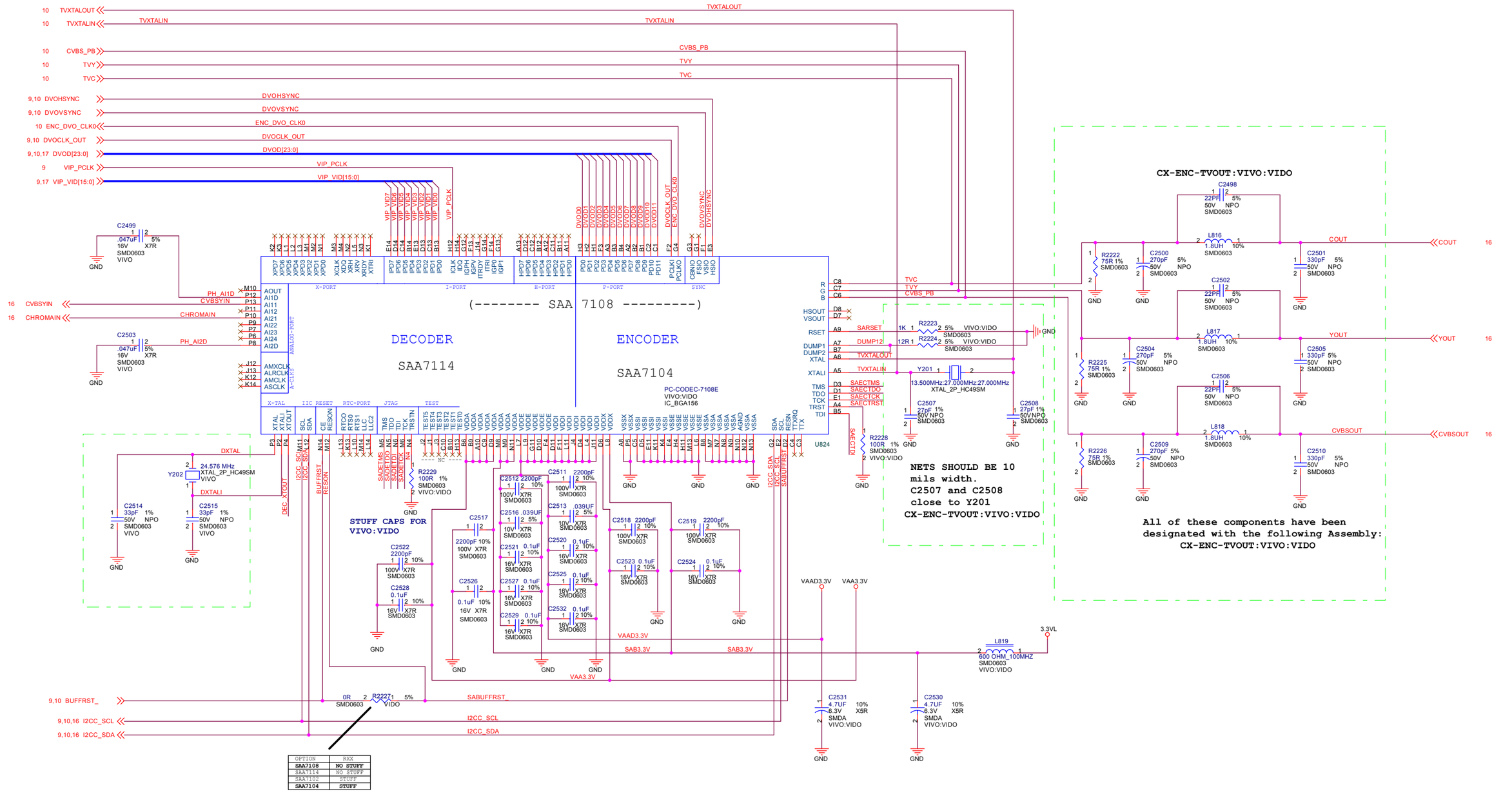

3.d SAA7108 - Video-Codec

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Hyfra Support

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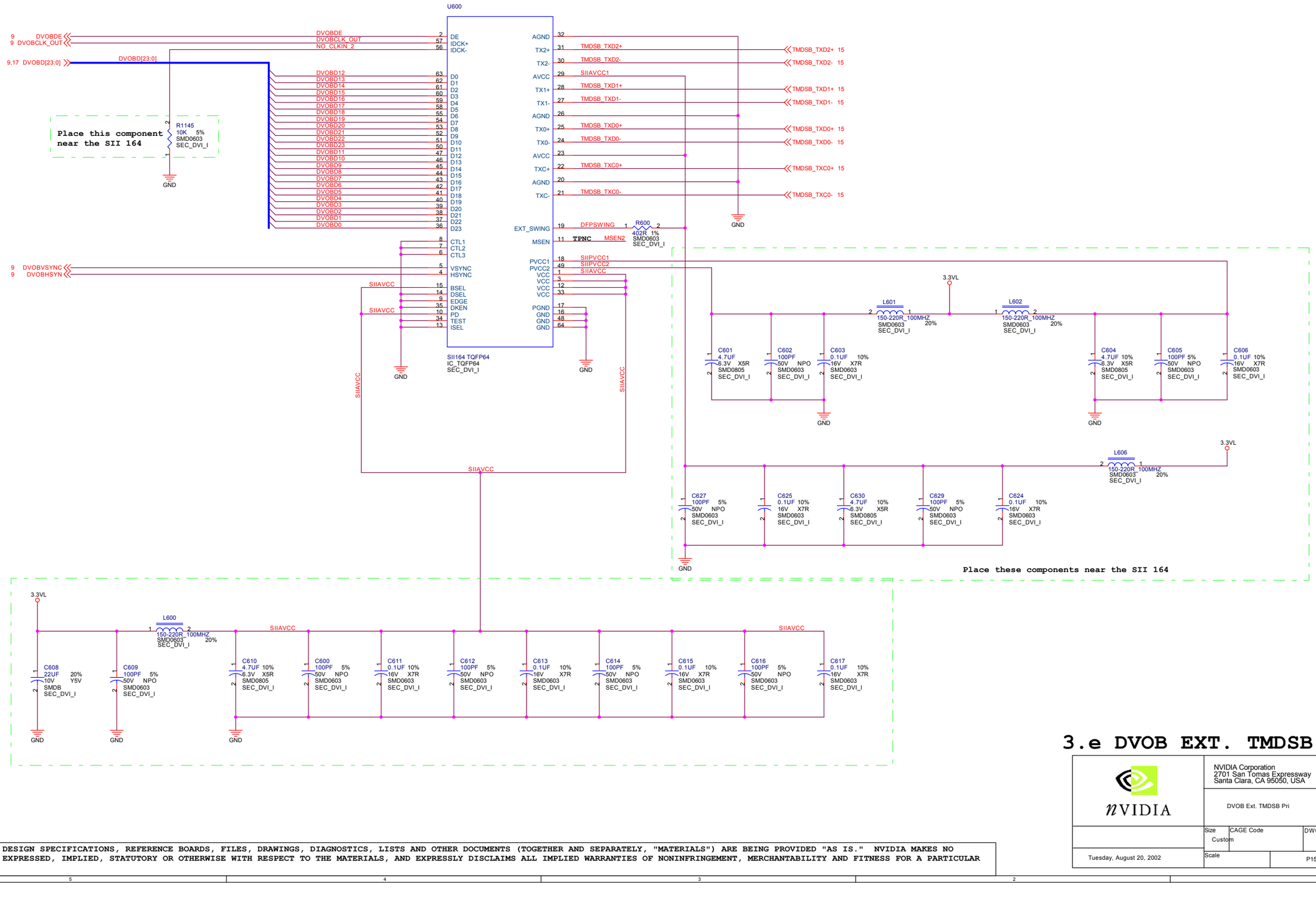

3.e DVOB EXT. TMDSB SEC

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DVOB Ext. TMDSB Pri

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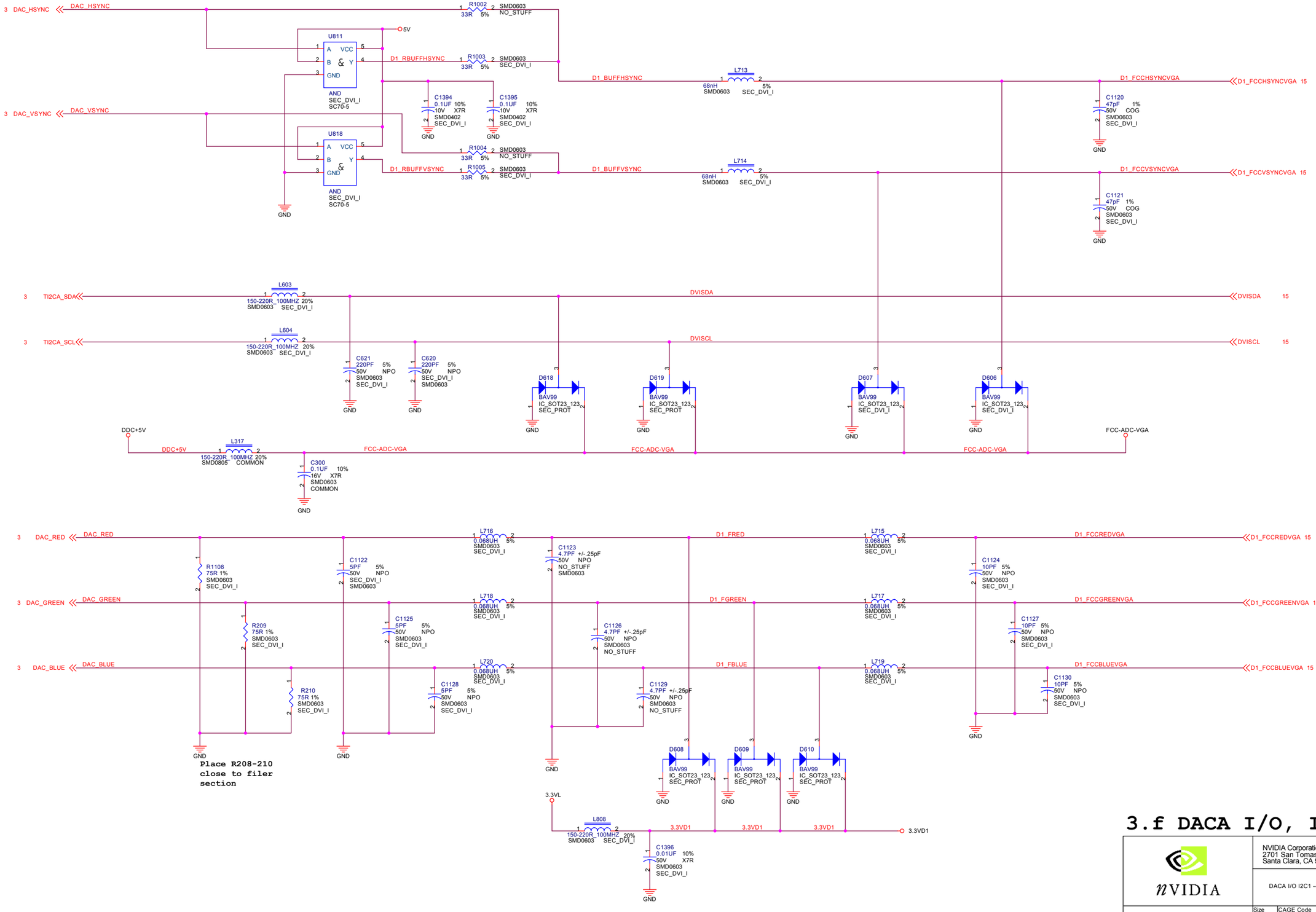

3.f DACA I/O, I2C1-- SEC

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DACA I/O I2C1 -- Pri

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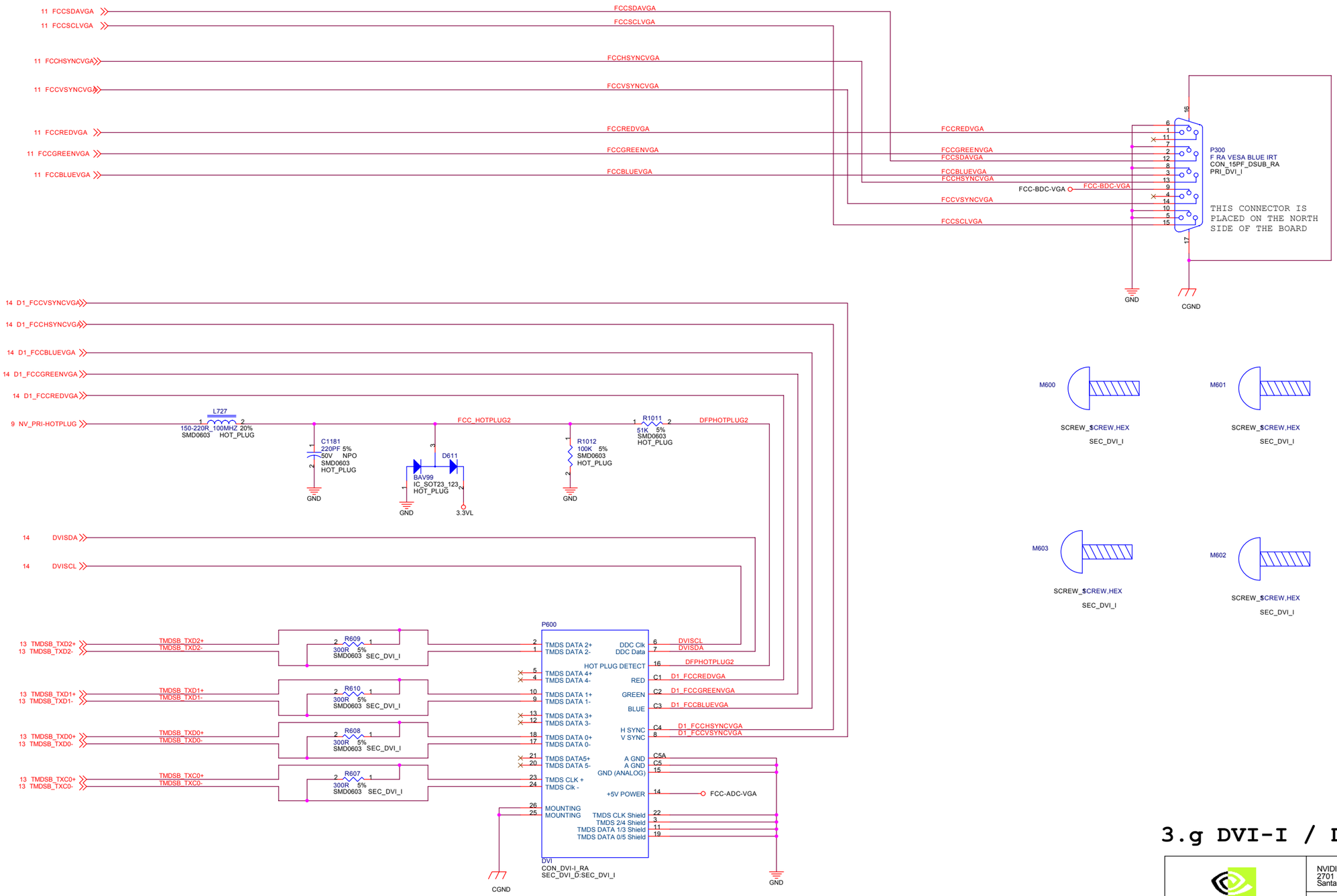

3.g DVI-I / DB15 Connectors

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DVOA / TMDSA DVI Connector

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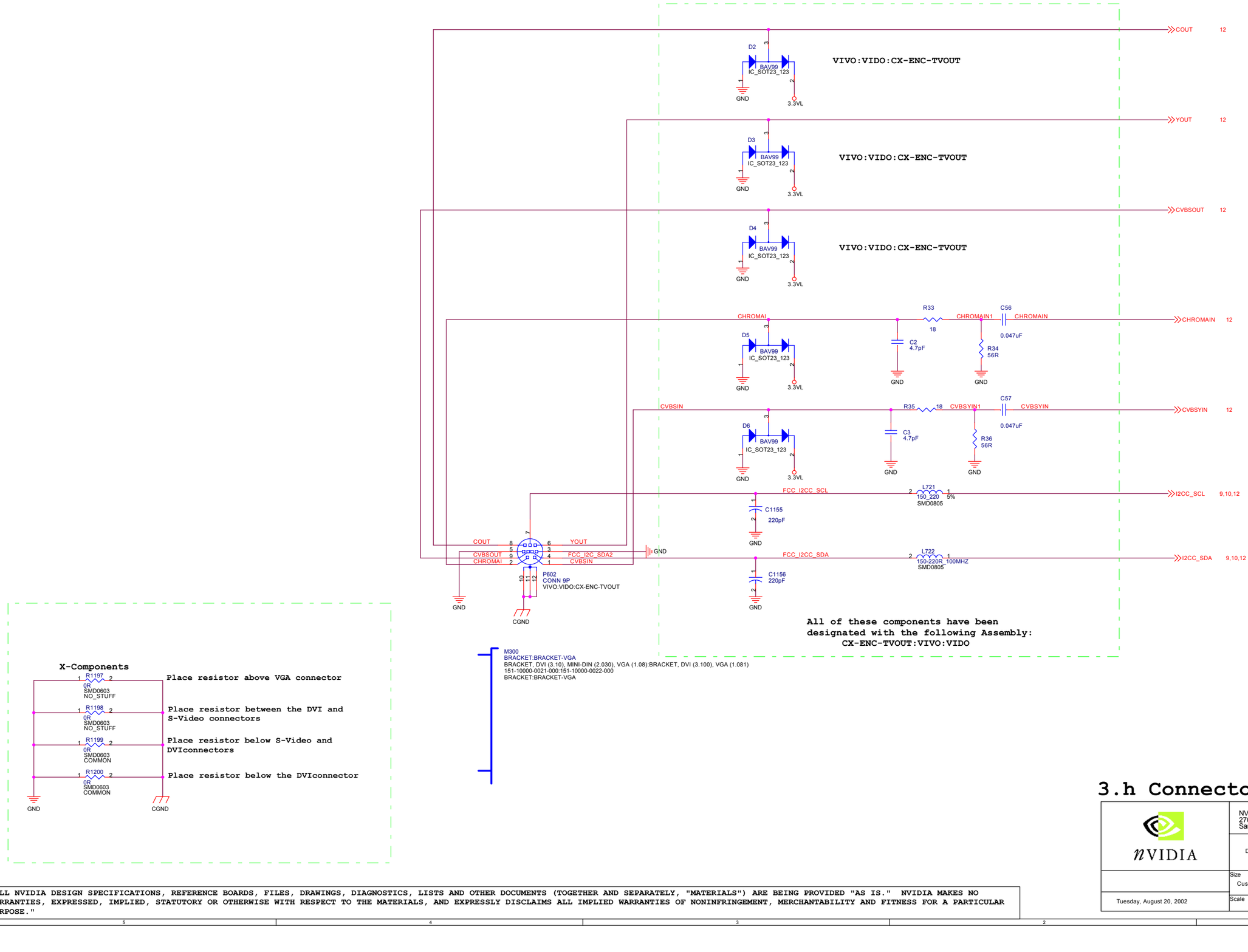

3.h Connector - S-Video-Vidcap.

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DVOB / DACA ADC Connector

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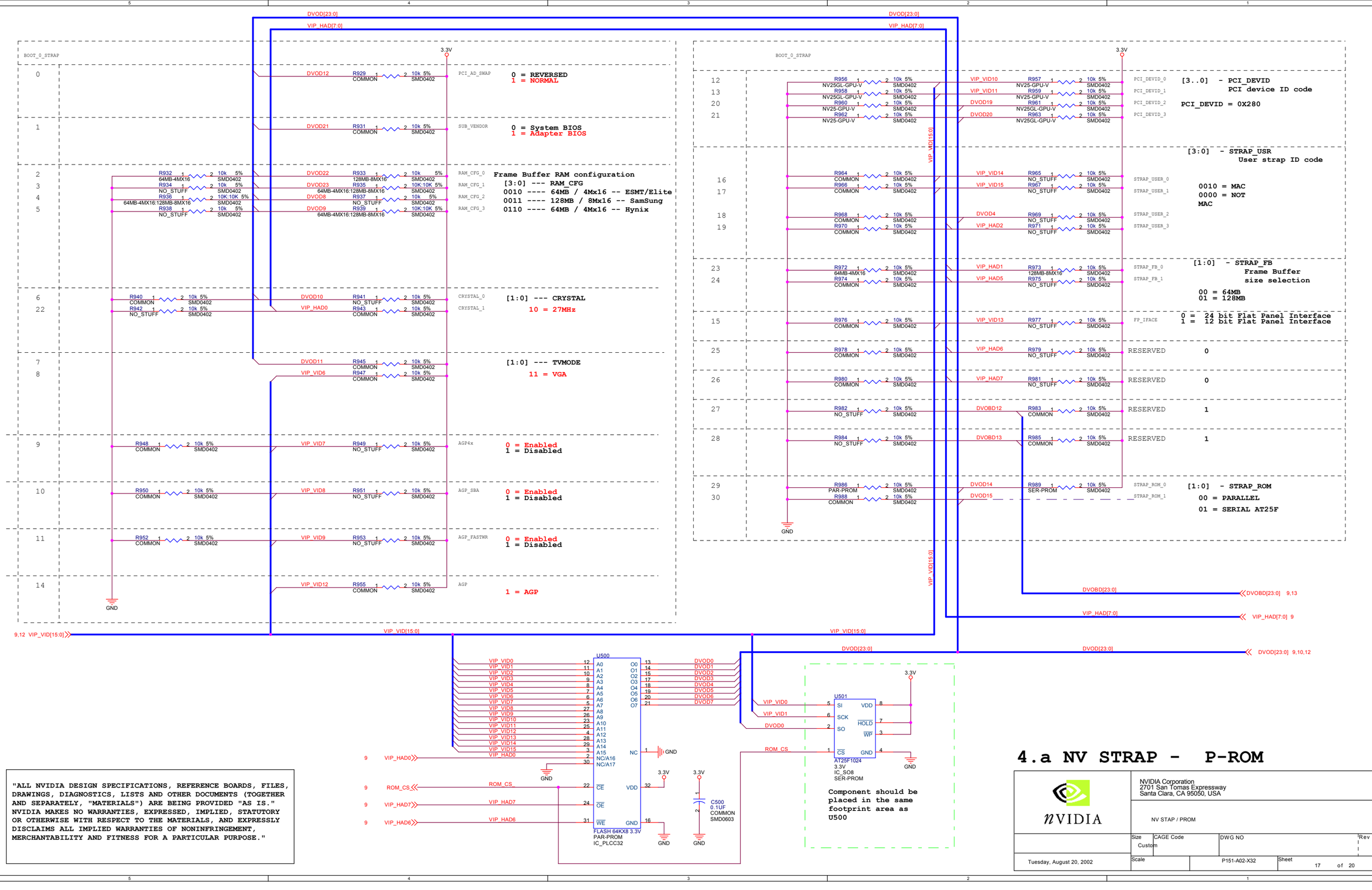

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4.a NV STRAP - P-ROM

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NV STAP / PROM

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19,20 GPUPWR_GD

R1141 SMD0603 0R NO_STUFF

EN33VL

Power Sequencing Circuit

12V 12V

D621 BAT54C/SOT IC_SOT23_123 PWR-SEQ

5V 3.3V

D620 BAT54C/SOT IC_SOT23_123 PWR-SEQ

RAILPRES

PWRGD_AGP 19

R1023 10K 5% SMD0402 PWR-SEQ

R1130 10K 5% SMD0402 PWR-SEQ

R1024 10K 5% SMD0402 PWR-SEQ

PSFET_D3G4

(8V-NOM) + 1.5V = 9.5V TRIP

12V

R1125 2.7K 5% SMD0402 PWR-SEQ

PSFET3G

C1420 0.039UF 10% 16V X7R SMD0603 PWR-SEQ

R1134 6.2K 5% SMD0402 PWR-SEQ

PSFET_D2S3

R1135 0R 5% SMD0603 PWR-SEQ-BP

BYPASS

PWR-SEQ

U820 IC_SUPERSOT-6 FDC6301N

D4 4 S3 5 NUM D3 6 3 G4 2 S4 1 G3

C1423 680PF SMD0603 PWR-SEQ 16V 10% X7R

GND

BYPASS

R1136 0R 5% SMD0603 PWR-SEQ-BP

PSFET_D1S2

(2V-NOM) + 1.5V = 3.5V TRIP

5V

R1126 2.7K 5% SMD0402 PWR-SEQ

PSFET2G

C1421 0.039UF 10% 16V X7R SMD0603 PWR-SEQ

R1137 2K 5% SMD0603 PWR-SEQ

U821 IC_SUPERSOT-6 FDC6301N

D2 4 3 G2 S1 5 NUM D1 6 2 S2 1 G1

R1138 0R 5% SMD0603 PWR-SEQ-BP

BYPASS

PWR-SEQ

NO ADJ = 1.5V TRIP

3.3V

R1128 2.7K 5% SMD0402 PWR-SEQ

PSFET1G

C1424 0.039UF 10% 16V X7R SMD0603 PWR-SEQ

R1139 100R 5% SMD0603 NO_STUFF

GND

5V

U823 SC1541-3.3V IC_SO8 SC1541

IN OUT NC OUT GND OUT

3.3VL

EN33VL

Large copper shape attached to the 3.3VL to act as heat sink to have RthJA within 65C/W.

5V

C1407 4.7uF 10% 10V X7R SMD1206 COMMON

R1173 0R SMD0603 COMMON

U819 IC REG ADJ LINEAR SC1565 SC1565 IC_SO8

GND EN GND Vin GND Vo GND ADJ

LN-FBADJ

Regulated 3.3V

3.3VL

C1408 4.7UF 10% 6.3V X5R SMD0805 COMMON

C1409 0.1UF 10% 16V X7R SMD0603 COMMON

C1410 0.039UF 10% 16V X7R SMD0603 COMMON

C1411 220PF 10% 16V X7R SMD0603 COMMON

C1405 330UF 20% 6.3V ALE 150mA 0.76Ohm CAP_ALE_SMD_6_3 COMMON

C1406 330UF 20% 6.3V ALE 150mA 0.76Ohm NO_STUFF

Can be placed on same location. Alternative stuffing

Rtop R1121 200R 1% SMD0603 SC1565

Rbot R1122 110R 1% SMD0603 SC1565

Vout=1.2*(1 + (Rout/Rgnd))

Large copper shape attached to the Reg. GND to act as heat sink to have RthJA within 65C/W.

Alternate for SC1541 if adjustable 3.3 supply is required

Semtech SC1565 SO8
3.3V@500mA
Drop Out 225mV Typ.

3.3VL = 1.2 x (1 + Rtop/Rbot)

200/110 , Vout = 3.38V

5.a Power Sequence / 3.3VL Pwr.

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Pwr Sequence / 3.3VL Supply

Size	CAGE Code	DWG NO	Rev
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18 PWRGD_AGP

Imax * Rds(on) = 200uA * R(lim)
Imax set for 14.2A

5V

ILIM

R1142 2.2R 5% NVVDD_2602 SMD0603

R1072 1K 1% NVVDD_2602 SMD0603

C1233 1000pF 5% 25V X7R SMD0603 NVVDD_2602

3.3VFLT

U814
IC REG SWITCH SC2602
IC_SO14_150MIL
NVVDD_2602

SC_VCC-NV	1 VCC	GND 14	GND
GPUPWR_GD	2 PWGD	SS/SHDN~ 13	C1234 0.1UF 10% 16V X7R SMD0603 NVVDD_2602
OVP-NV	3 OVP	VREF 12	SC_VREF-NV
OCSET1-NV	4 OCSET	SENSE 11	
MID_FET12-NV	5 PHASE	BSTH 10	SC_BST-NV
	6 DRVH	BSTL 9	
CGH-NV	7 GND	DRVL 8	CGL-NV

GND — 1K R1073 5% SMD0603 NO_STUFF — OVP-NV

SC_VREF-NV — R1210 15K 5% SMD0603 NVVDD_2602 — SC_VREFRC-NV — C1448 0.1uF 10% 16V X7R SMD0603 NVVDD_2602 — GND

C1252 10pF 10% 25V X7R SMD0603 NVVDD_2602 — GND

C1243 0.1UF 10% 16V X7R SMD0603 NO_STUFF — GND

C1242 2.2uF 20% 10V X7R SMD0805 NVVDD_2602 — GND

R1129 0R SMD0603 NO_STUFF — GND

D617 BAT54ALT1 IC_SOT23_123 NVVDD_2602 — GND

Place this diode close to the SC1102

CGH-NV — GND

D615 MMBD4148CA IC_SOT23_123 NVVDD_2602 — 12V

C1240 1.0uF 20% 16V X7R SMD0805 NVVDD_2602 — GND

CGL-NV

3.3VFLT

C1183 470pF 20% 10V SMD0805 NVVDD_2602

C1273 0.039UF 10% 16V SMD0603 NVVDD_2602

C1274 330pF 5% 10V SMD0603 NVVDD_2602

C1275 330pF 5% 10V SMD0603 NVVDD_2602 — GND

CGH-NV — R1080 2.2R 5% SMD0603 NVVDD_2602 — GH1-NV — Q905 IRF7809A NVVDD_2602 IC_SO8 30V 14.6A 8.5mO

SC_FB-NV

MID_FET12-NV

L731 IND_MULTIPADS 1.5uH NVVDD_2602 3mOhm 18.3A

R1104 2.2R 5% NVVDD_2602 SMD0805

D616 10MQ040N 2.1A 40V RECT_SMDA NVVDD_2602

INDRC2-NV

C1306 2200PF 10% 50V X7R NVVDD_2602 SMD0603

CGL-NV — R1082 2.2R 5% SMD0603 NVVDD_2602 — GL1-NV — Q210 IRF7809A 30V 14.6A 8.5mO IC_SO8 NVVDD_2602

GND

GPUPWR_GD 18,20

3.3V

L801 1UH IND_CDR73 NVVDD_2602

3.3VFLT

C1371 1000UF 20% 6.3V 0.45A 170mO ALE CAPS_SMD_8_0-10_0_SANYO NVVDD_2602

C1276 470UF 20% 6.3V 0.56A 110mO ALE CAPS_TH_3_5_8-5_0_10 NO_STUFF

GND GND

Can be placed on same location. Alternative stuffing

3.3VFLT

C1267 330uF 20% 6.3V 2.09A 25mO ALE-EX CAPS_SMD_8_0-10_0_SANYO NVVDD_2602

C1268 510UF 50/-10% 4V 4.08A 14mO OSCON CAPS_TH_3_5_8-5_0_10 NO_STUFF

GND GND

Can be placed on same location. Alternative stuffing

C1366 SMD_SANYO_CAP NO_STUFF — GND

3.3VFLT

C1263 330uF 20% 6.3V 2.09A 25mO ALE-EX CAPS_SMD_8_0-10_0_SANYO NVVDD_2602

C1264 510UF 50/-10% 4V 4.08A 14mO OSCON CAPS_TH_3_5_8-5_0_10 NO_STUFF

GND GND

Can be placed on same location. Alternative stuffing

NVVDD

Min: 1.641V, Typ: 1.665, Max: 1.690

C1402 220PF 10% 16V X7R SMD0603 NVVDD_2602

C1401 0.039UF 10% 16V X7R SMD0603 NVVDD_2602

C1403 0.1UF 10% 16V X7R SMD0603 NVVDD_2602

C1305 4.7UF 10% 6.3V X5R SMD0805 NVVDD_2602

C1301 330uF 20% 6.3V 0.67A 90mO ALE CAPS_SMD_8_0-10_0_SANYO NVVDD_2602

C1302 510UF 50/-10% 4V 4.08A 14mO OSCON CAPS_TH_3_5_8-5_0_10 NO_STUFF

GND GND

Can be placed on same location. Alternative stuffing

C1379 SMD_SANYO_CAP NO_STUFF — GND

C1303 330uF 20% 6.3V 0.67A 90mO ALE CAPS_SMD_8_0-10_0_SANYO NVVDD_2602

C1304 510UF 50/-10% 4V 4.08A 14mO OSCON CAPS_TH_3_5_8-5_0_10 NO_STUFF

GND GND

Can be placed on same location. Alternative stuffing

Components C1250,C1251, R1076 and R1071 are installed only if the output caps have a low ESR. Example: C1304 = 510uF (OSCON low ESR 15mO)

Rtop — R1075 10K 1% SMD0603 NVVDD_2602

C1250 33nF 5% 25V X7R SMD0603 NVVDD_2602 — R1076 100R 5% SMD0603 NVVDD_2602

TP25 HOLE_48C28P TEST POINT NO_STUFF

SC_FB-NV

Rbot — R1078 31.6K 1% SMD0603 NVVDD_2602

C1251 1uF 10% 10V X7R SMD0603 NVVDD_2602 — R1071 100R 5% SMD0603 NVVDD_2602

TP26 HOLE_48C28P TEST POINT NO_STUFF

TP27 HOLE_48C28P TEST POINT NO_STUFF

GND

NVVDD (Vout) = 1.265 x (1 + Rtop/Rbot)
10K/31.6K , Vout = 1.66V

5.b NVVDD Power Supply

NVIDIA Corporation
2701 San Tomas Expressway
Santa Clara, CA 95050, USA

NVVDD Power Supply

Size	CAGE Code	DWG NO	Rev
Custom			
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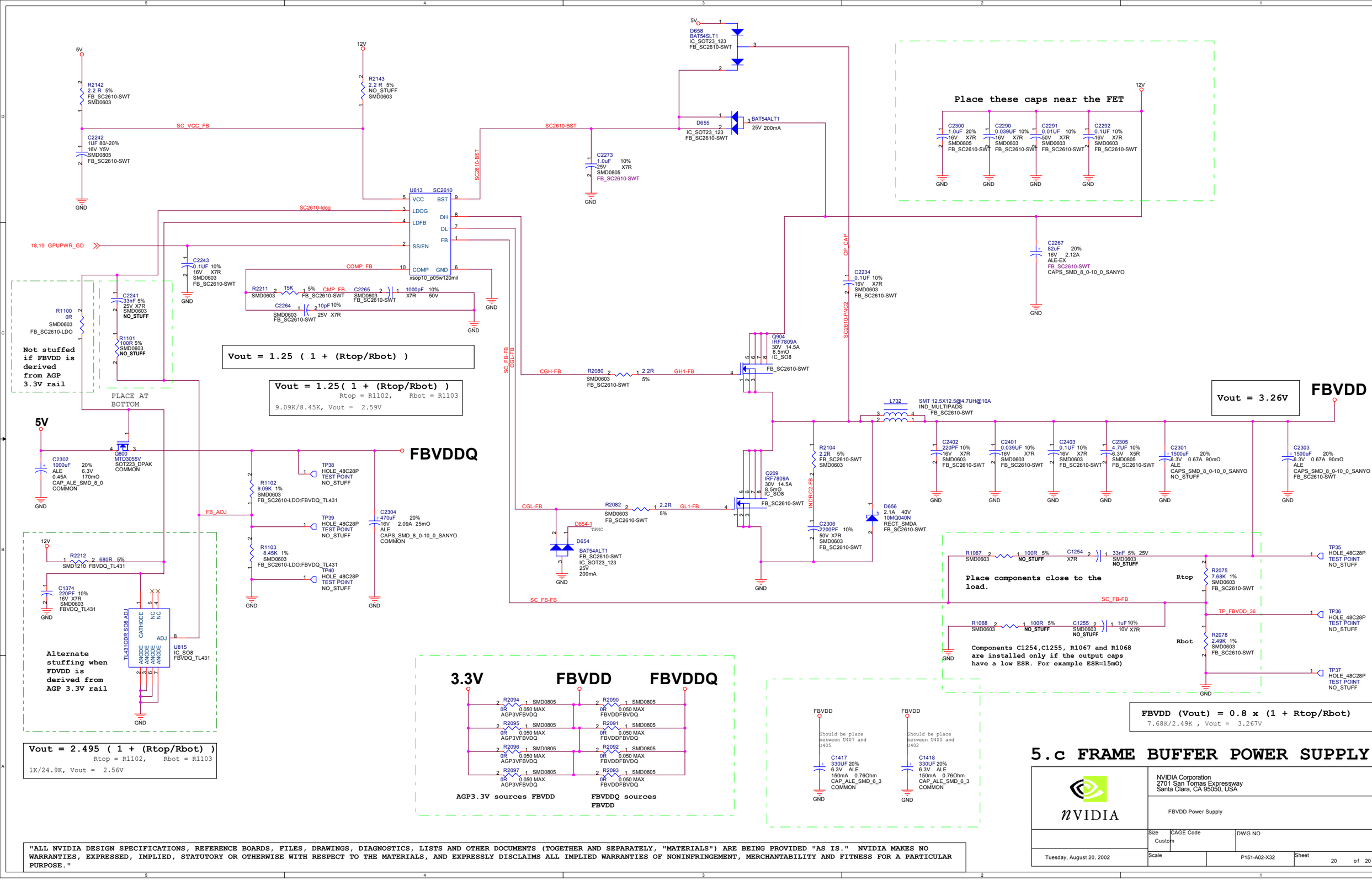

5.c FRAME BUFFER POWER SUPPLY

NVIDIA Corporation
2701 San Tomas Expressway
Santa Clara, CA 95050, USA

FBVDD Power Supply

Size	CAGE Code	DWG NO	Rev
Custom			
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