Toledo SB
FAB E
REV 1.04

PAGE	CONTENTS
1	TABLE OF CONTENTS
2	SB: SMC
3	SB: USB
4	SB: PCIEX, SATA, VIDEO
5	SB: SMM UART, SPI, JTAG, GPIO
6	SB: POWER
7	SB: POWER VSS
8	SB: DECOUPLING
9	SB: CLOCKS, STRAPPING, POR
10	VREG: V_12P0_SB INPUT & FILTER
11	VREG: STANDBY GATES
12	VREG: V_3P3STBY_SB
13	VREG: V_1P1STBY, V_1P8STBY
14	VREG: V_SB1P1, V_SB1P8
15	VREG: V_5P0
16	MEMORY: EMMC (LEGACY)
17	MEMORY: SPI FLASH
18	AUDIO: BASIC
19	AUDIO: PREMIUM (SE/LE)
20	ETHERNET NIC
21	CONN: RJ45, NEXUS BOARD
22	CONN: USB (FRONT, REAR)
23	CONN: ODD SATA & PWR
24	CONN: FAN, ACCY & NTWK RADIOS
25	CONN: B2B SB/SOC
26	DEBUG: FACET, I2C, V_BAT
27	DEBUG: FTDI BRIDGE
28	DEBUG: FTDI BUFFERS, FTDI PWR
29	DEBUG: BUTTONS, HDT
30	DEBUG: TEST POINTS, LEDS, USB2 SWITCH
31	LABELS AND MOUNTING
32	BOM DEFINITIONS

RULES: (APPLIED WHEN POSSIBLE)
1. MSB TO LSB IS TOP TO BOTTOM
2. WHEN POSSIBLE: INPUTS ON LEFT, OUTPUTS ON RIGHT
3. ORDER OF PAGES=CHIP INTERFACES, TERMINATION, POWER, DECOUPLING
4. AVOID USING OFF PAGE CONNECTORS FOR ON PAGE CONNECTIONS
5. LANED SIGNALS ARE GROUPED ON SYMBOLS
6. TRANSIMITTER NAME USED AS PREFIX WITH RX AND TX CONNECTIONS
7. PREFIX V_ IS USED FOR VOLTAGE RAIL SIGNAL NAMES
8. SUFFIX _DP AND _DN ARE USED FOR DIFFERIENTAL PAIRS
9. UNNAMED NETS ARE NAMED WITH /2 TEXT SIZE
10. SUFFIX _N FOR ACTIVE LOW OR N JUNCTION
12. SUFFIX _P FOR P JUNCTION
13. SUFFIX _EN FOR ENABLE
14. 'CLK' FOR CLOCKS, 'RST' FOR RESETS
15. PWRGD FOR POWER GOOD
16. REV AND FAB ARE SET USING CUSTOM VARIABLES
TOOLS>OPTIONS>VARIABLES

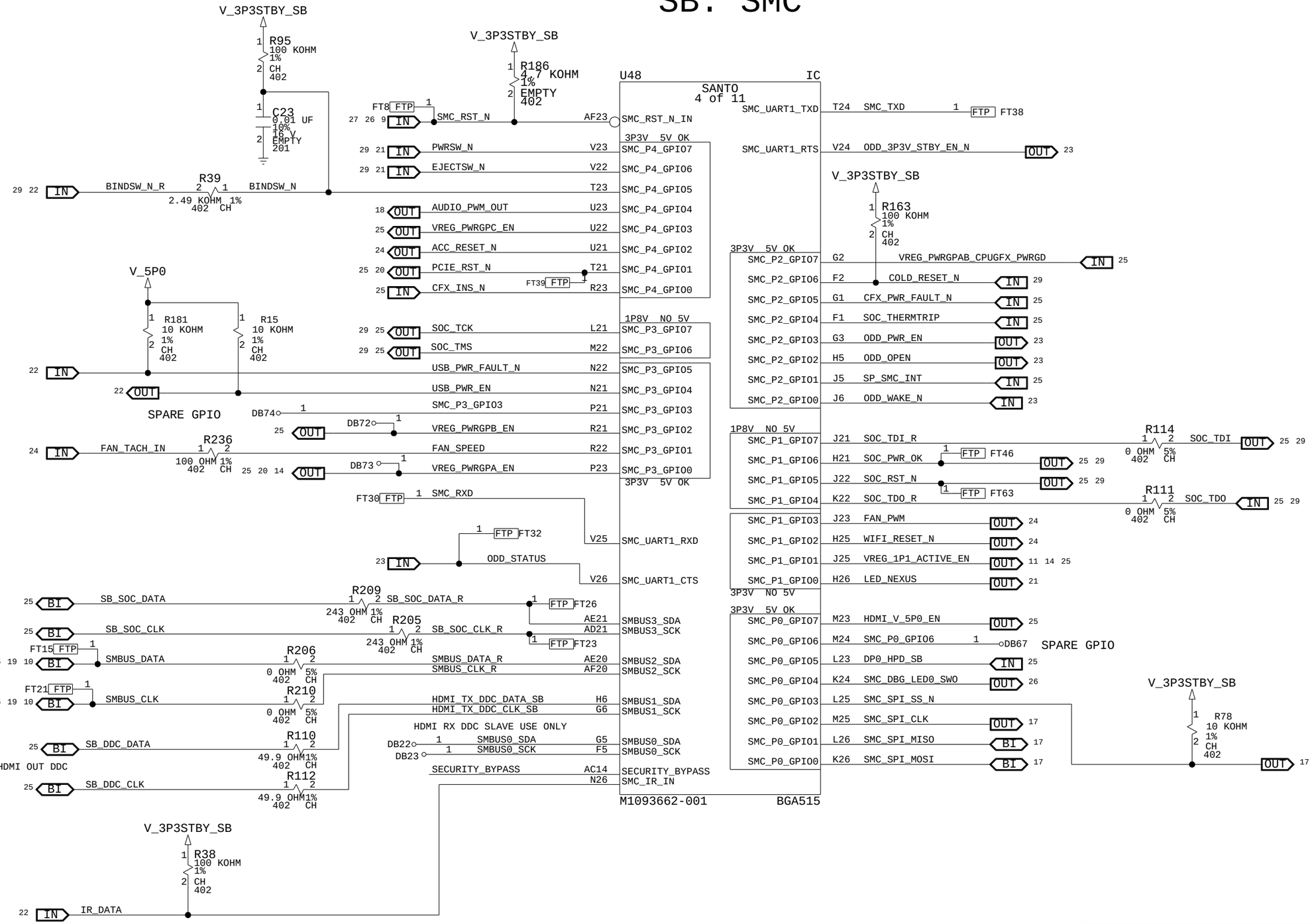
CRITICAL NOTE: THE "RF" BOM STUFFING OPTION SHOULD BE USED BY DEFAULT

ANY NON-RF BOM CONFIGURATION WILL REQUIRE INDUCTOR L5 TO BE PHYSICALLY SHORTED

DRAWING
Mon Aug 12 06:28:42 2019

MICROSOFT CONFIDENTIAL	PROJECT NAME	PAGE	CSA PAGE	FAB	VER
	Toledo SB	1/32	1/32	E	1.04

SB: SMC



MICROSOFT CONFIDENTIAL	PROJECT NAME	PAGE	CSA PAGE	FAB	VER
	Toledo SB	2/32	2/32	E	1.04

SB: USB

U48
SANTO
6 of 11
IC

WIFI

USBD_D0_DP AF8 — USB2_WIFI_DP — BI 24
USBD_D0_DN AE8 — USB2_WIFI_DN — BI 24

REAR 1

USBC_D0_DP AC4 — USB2_AUX_DP — BI 22
USBC_D0_DN AC3 — USB2_AUX_DN — BI 22

REAR 1
22 IN USB3_AUX_RP Y1 USBC_D1_RXP
22 IN USB3_AUX_RN Y2 USBC_D1_RXN

USBC_D1_TXP W3 USB3_AUX_TP_C — C270 (1, 2) 0.1 UF 10% X5R 16 V 201 — USB3_AUX_TP OUT 22
USBC_D1_TXN W4 USB3_AUX_TN_C — C269 (1, 2) 0.1 UF 10% X5R 16 V 201 — USB3_AUX_TN OUT 22

REAR 0

REAR 0
22 IN USB3_BP_P1_RP V1 USBB_D2_RXP
22 IN USB3_BP_P1_RN V2 USBB_D2_RXN

USBB_D2_TXP U3 USB3_BP_P1_TP_C — C268 (1, 2) 0.1 UF 10% X5R 16 V 201 — USB3_BP_P1_TP OUT 22
USBB_D2_TXN U4 USB3_BP_P1_TN_C — C267 (1, 2) 0.1 UF 10% X5R 16 V 201 — USB3_BP_P1_TN OUT 22

USBB_D0_DP AE4 — USB2_BP_P1_DP — BI 30
USBB_D0_DN AE3 — USB2_BP_P1_DN — BI 30

NOT USED

USBB_D1_DP AD2 — USB2_BP_P0_DP 1 — DB70
USBB_D1_DN AD1 — USB2_BP_P0_DN 1 — DB69

NOT USED
DB13 1 USB3_BP_P0_RP T1 USBB_D3_RXP
DB16 1 USB3_BP_P0_RN T2 USBB_D3_RXN

USBB_D3_TXP R3 — USB3_BP_P0_TP 1 — DB17
USBB_D3_TXN R4 — USB3_BP_P0_TN 1 — DB14

FRONT

FRONT
22 IN USB3_FP_P0_RP AA8 USBA_D2_RXP
22 IN USB3_FP_P0_RN AA7 USBA_D2_RXN

USBA_D2_TXP AB10 USB3_FP_P0_TP_C — C18 (1, 2) 0.1 UF 10% X5R 16 V 201 — USB3_FP_P0_TP OUT 22
USBA_D2_TXN AB9 USB3_FP_P0_TN_C — C22 (1, 2) 0.1 UF 10% 201 X5R 16 V — USB3_FP_P0_TN OUT 22

USBA_D0_DP AC7 — USB2_FP_P0_DP — BI 22
USBA_D0_DN AC8 — USB2_FP_P0_DN — BI 22

FRONT PANEL ACC

USBA_D1_DP AF6 — USB2_ACC_DP — BI 24
USBA_D1_DN AF5 — USB2_ACC_DN — BI 24

NOT USED

NOT USED
DB8 1 USB3_ACC_RP AB1 USBA_D3_RXP
DB7 1 USB3_ACC_RN AB2 USBA_D3_RXN

USBA_D3_TXP AA3 — USB3_ACC_TP 1 — DB9
USBA_D3_TXN AA4 — USB3_ACC_TN 1 — DB10

USBA_D2_AMOUT AA5 USBA_D2_AMOUNT
USBA_D1_AMOUT AE6 USBA_D1_AMOUNT
USBA_D0_AMOUT AC11 USBA_D0_AMOUNT

USBB_D2_AMOUT R5 USBB_D2_AMOUNT
USBB_D1_AMOUT AD5 USBB_D1_AMOUNT
USBB_D0_AMOUT AF4 USBB_D0_AMOUNT

USBC_D1_AMOUT W5 USBC_D1_AMOUNT
USBC_D0_AMOUT AC5 USBC_D0_AMOUNT

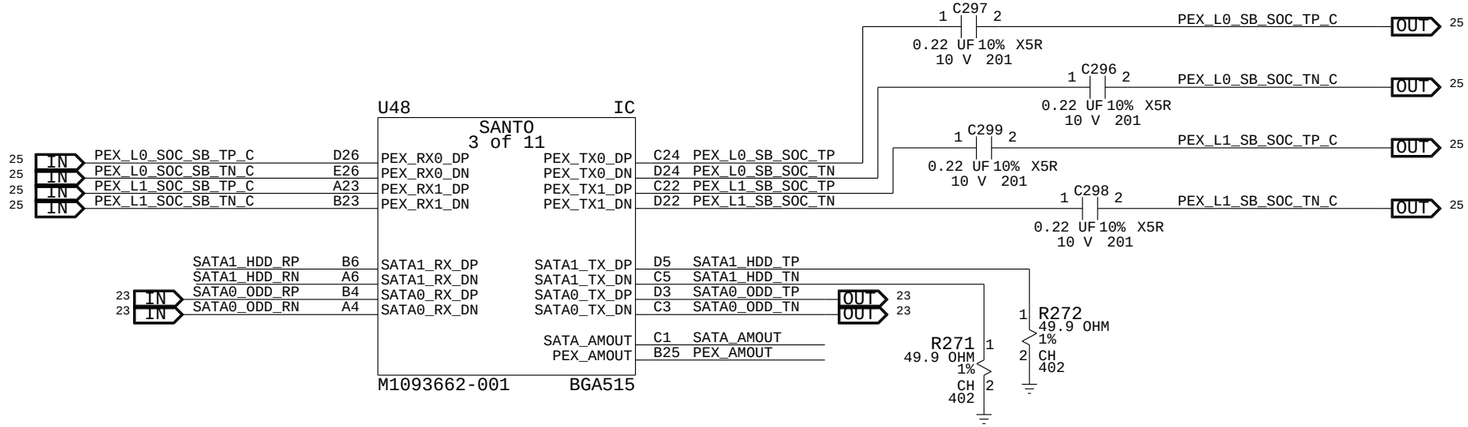
USBD_D0_AMOUT AE9 USBD_D0_AMOUNT

USBA_D1_TXRTUNE
1 R88 174 OHM 1% 2 CH 402
AB11 USBA_D1_TXRTUNE

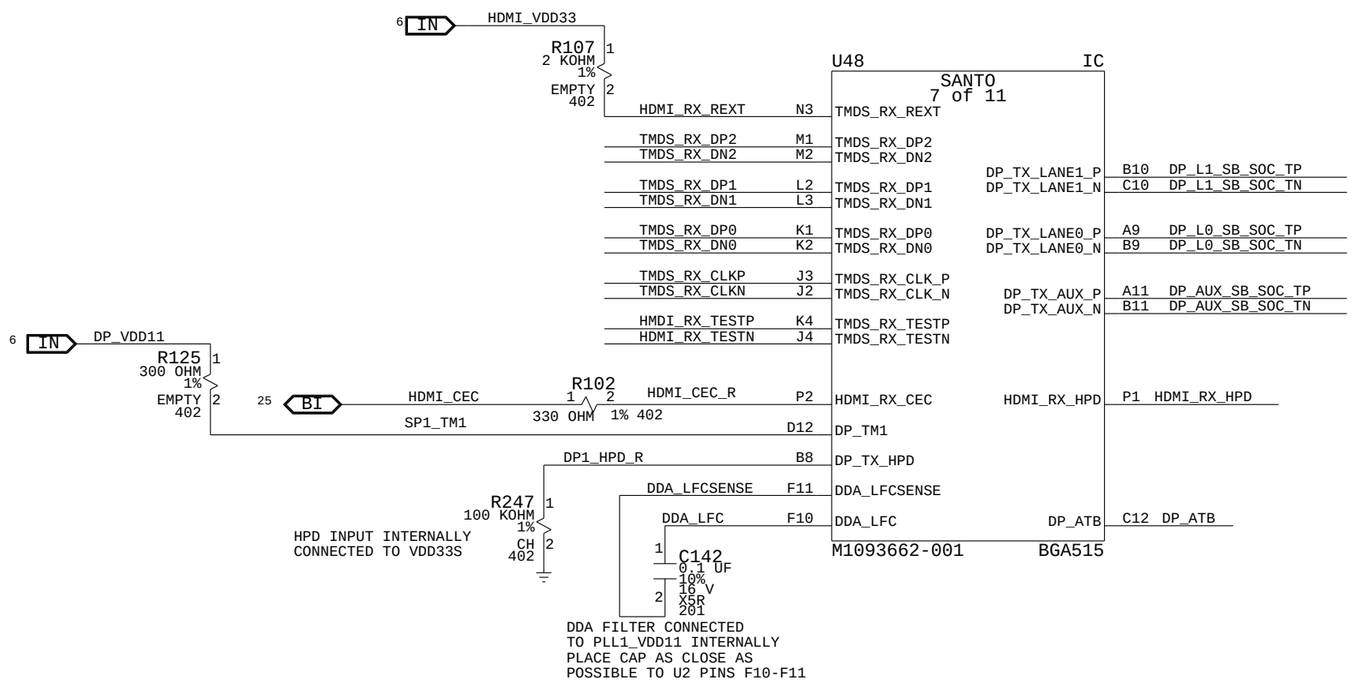
M1093662-001 BGA515

MICROSOFT CONFIDENTIAL	PROJECT NAME	PAGE	CSA PAGE	FAB	VER
	Toledo SB	3/32	3/32	E	1.04

SB: PCIEX, SATA, VIDEO

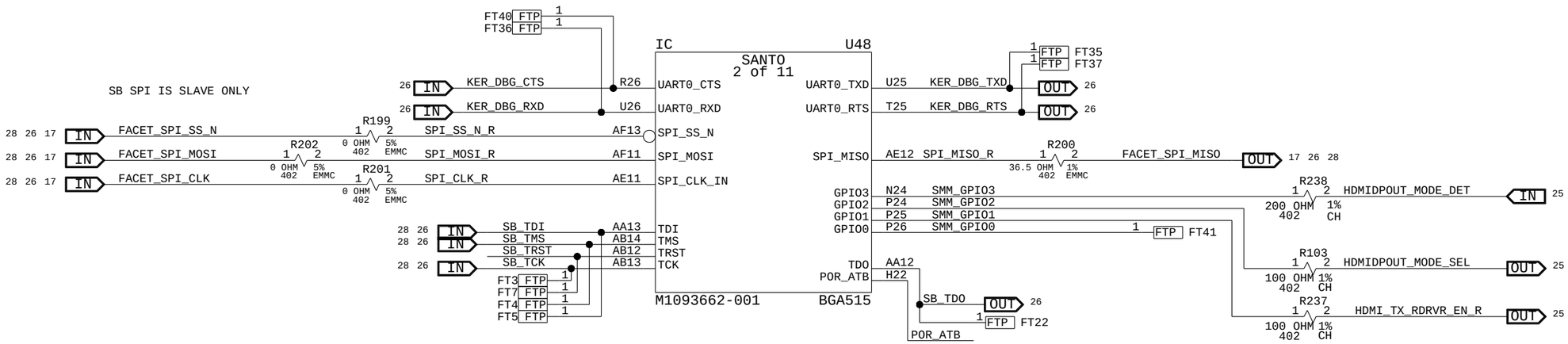


HDMI/DP NOT USED
VIB SHOULD BE HELD IN RESET



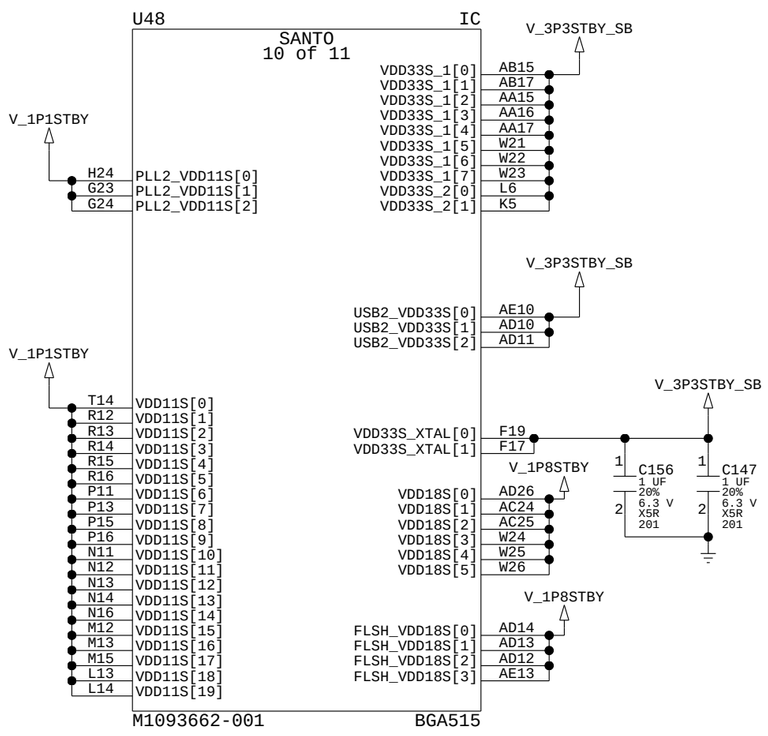
MICROSOFT CONFIDENTIAL	PROJECT NAME	PAGE	CSA PAGE	FAB	VER
	Toledo SB	4/32	4/32	E	1.04

SB: SMM UART, SPI, JTAG, GPIO

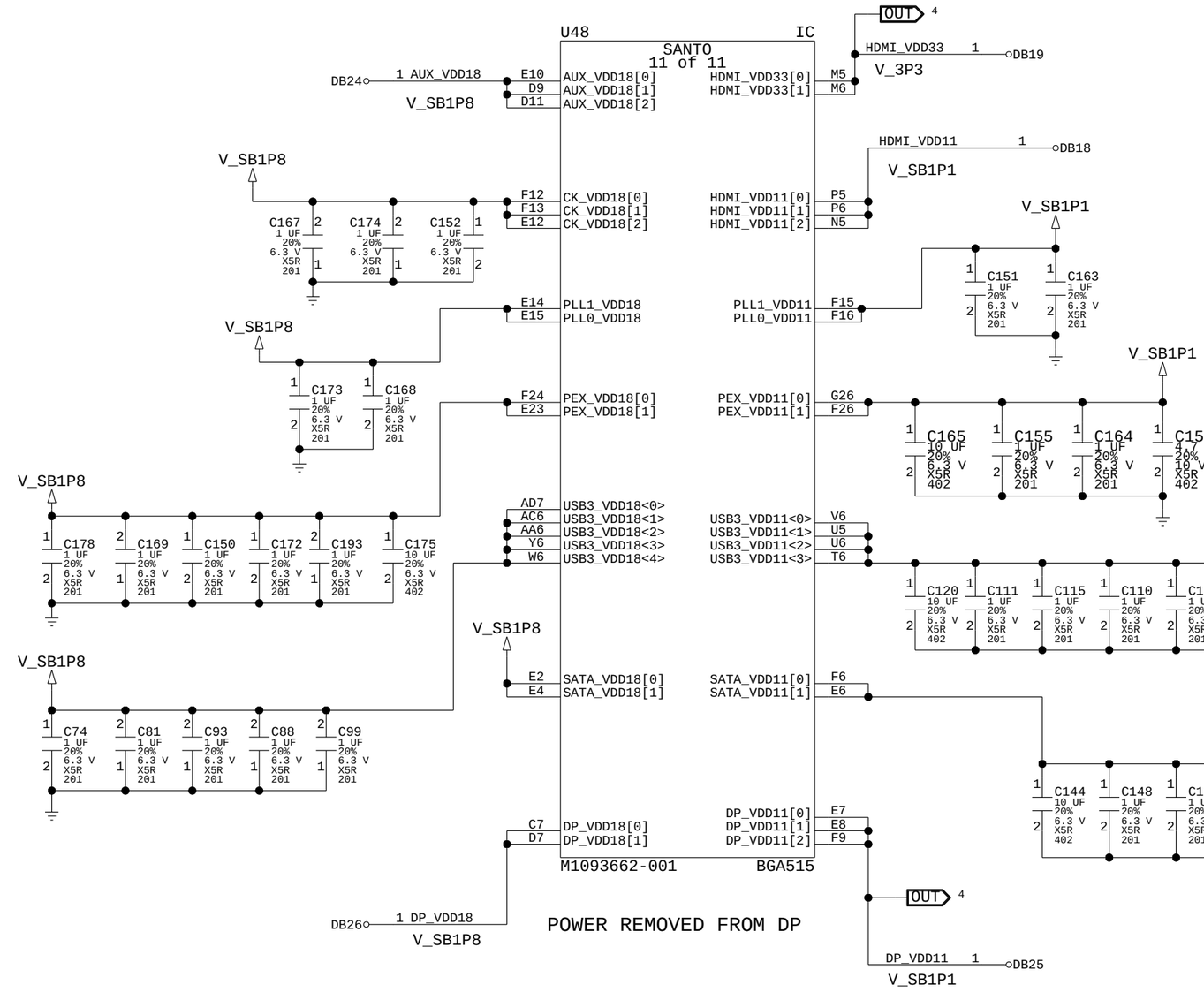


MICROSOFT CONFIDENTIAL	PROJECT NAME	PAGE	CSA PAGE	FAB	VER
	Toledo SB	5/32	5/32	E	1.04

SB: POWER

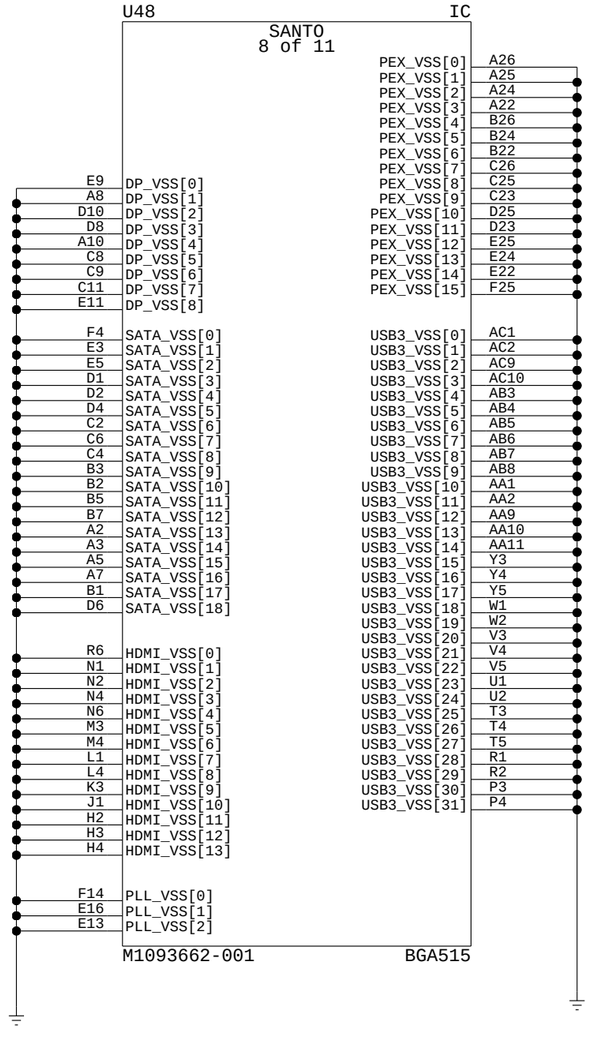


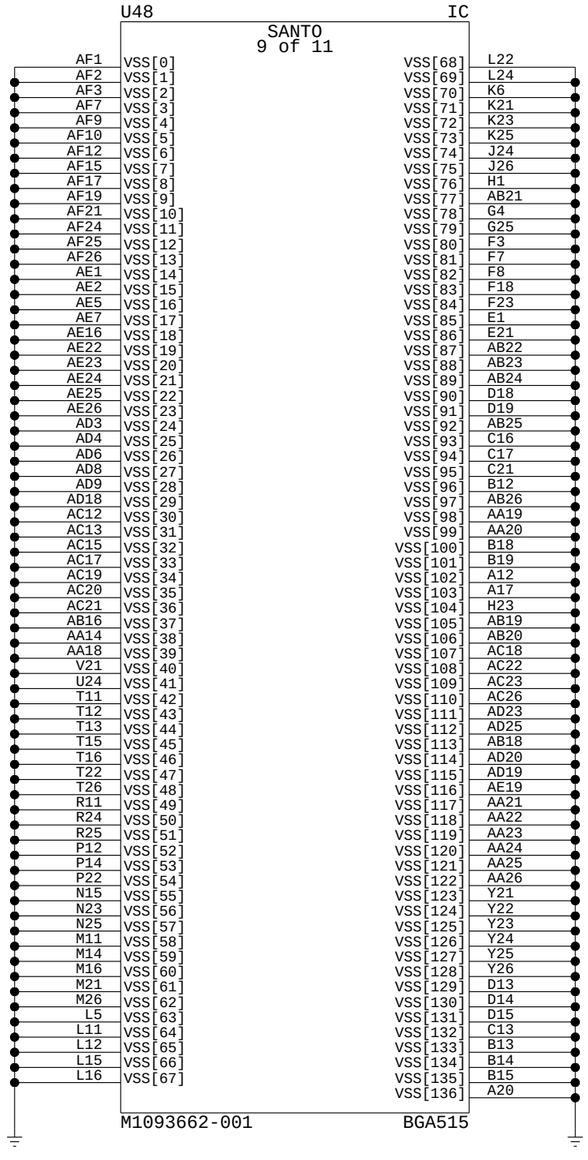
POWER REMOVED FROM AUX AND HDMI



MICROSOFT CONFIDENTIAL	PROJECT NAME	PAGE	CSA PAGE	FAB	VER
	Toledo SB	6/32	6/32	E	1.04

SB: POWER VSS



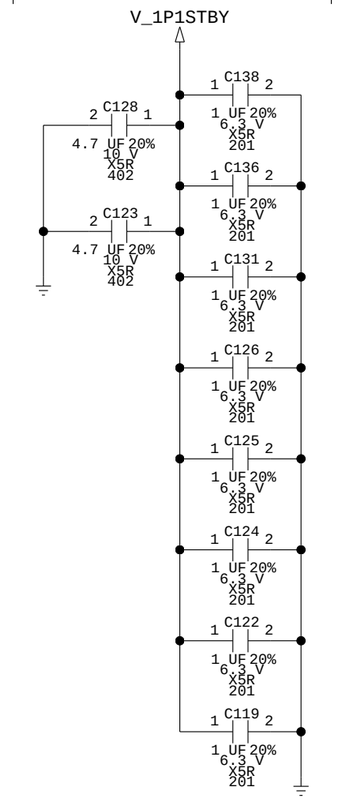


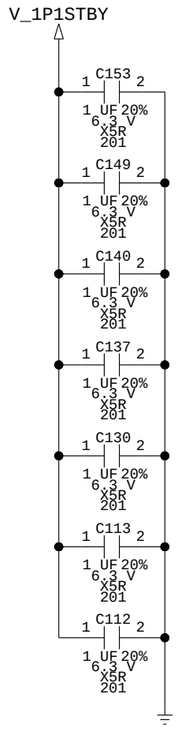
MICROSOFT CONFIDENTIAL	PROJECT NAME	PAGE	CSA PAGE	FAB	VER
	Toledo SB	7/32	7/32	E	1.04

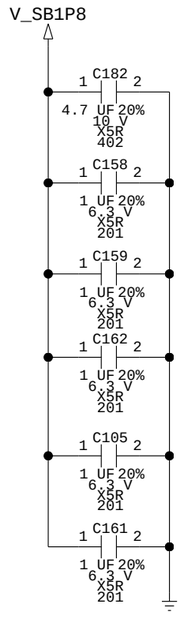
NOTE: ALL V_SB1P1 DECOUPLING
IS SHOWN ON POWER PAGE 6

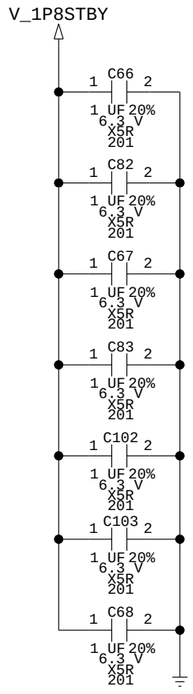
SB: DECOUPLING

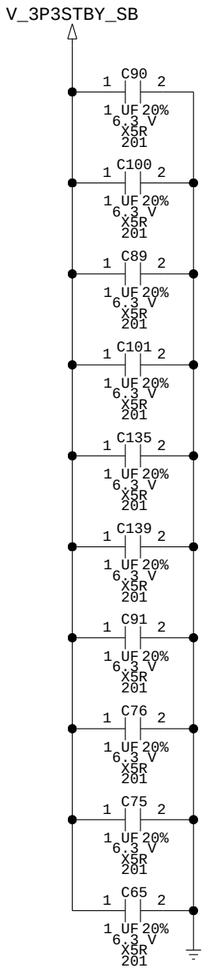
THIS GROUP OF CAPS MUST BE
REMOVED TO SUPPORT SOCKET USE





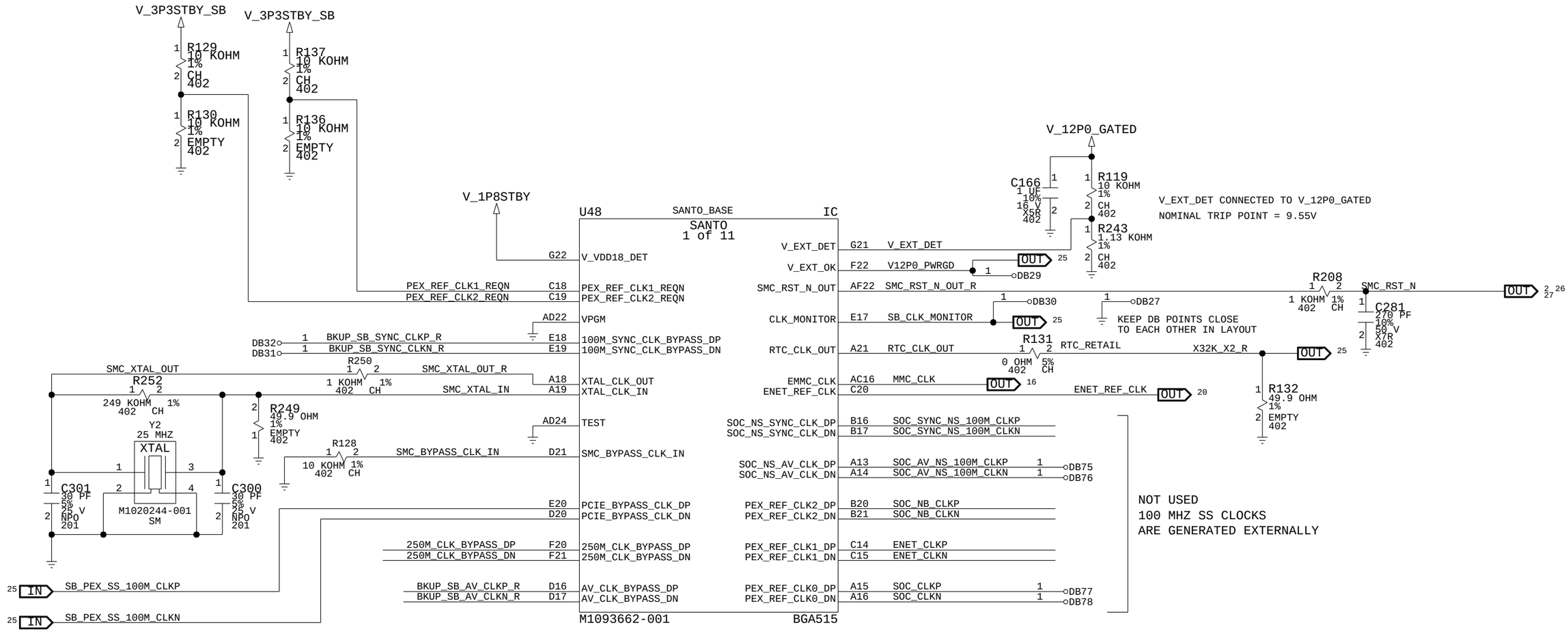






MICROSOFT CONFIDENTIAL	PROJECT NAME	PAGE	CSA PAGE	FAB	VER
	Toledo SB	8/32	8/32	E	1.04

SB: CLOCKS, STRAPPING, POR



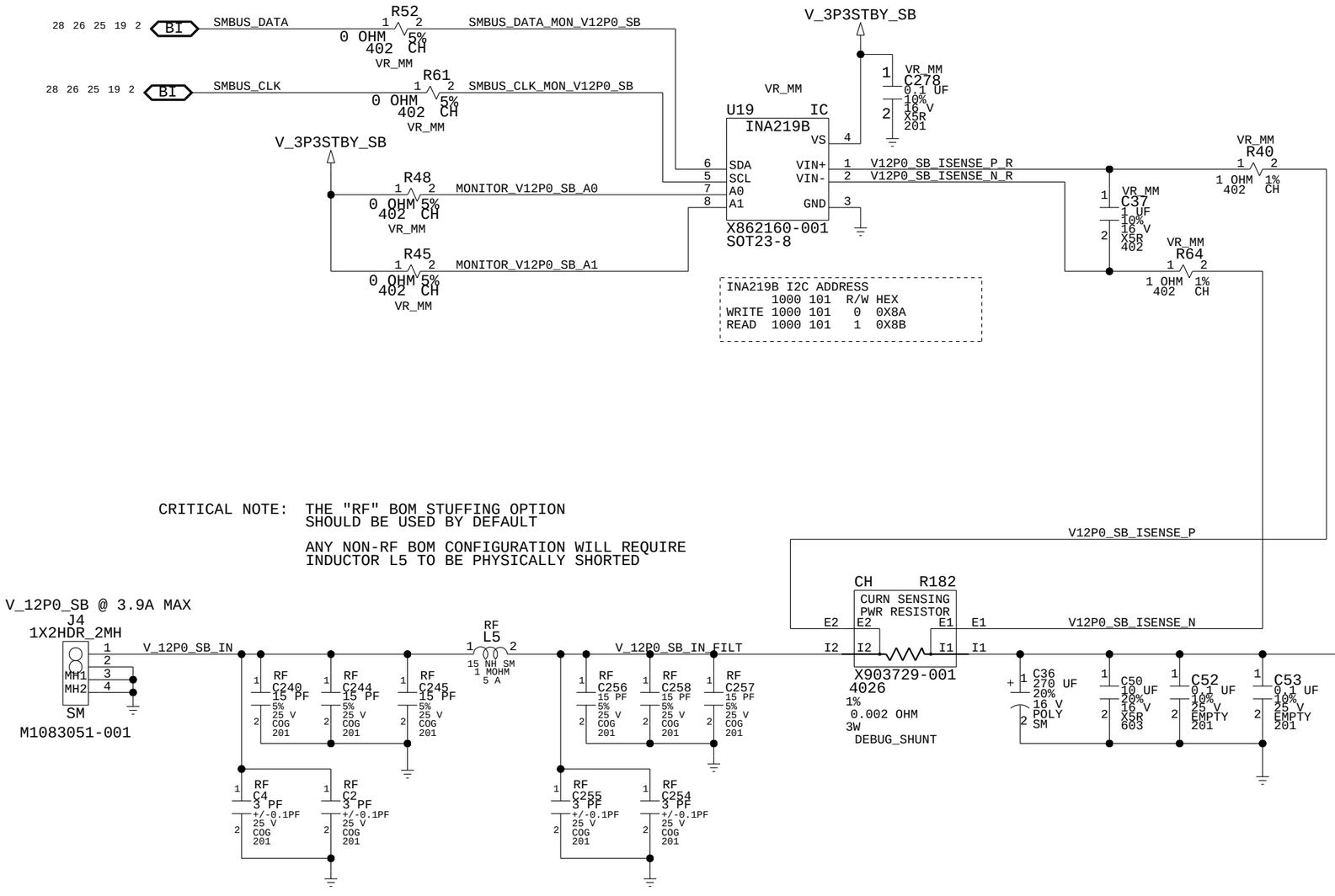
UNUSED 100 MHZ OUTPUTS
MUST BE TURNED OFF BY SMC

NOTE: USE ALTERNATE FOOTPRINT SKT_BGA515_27X27X2P4_1MM_CO
IN LAYOUT TO SUPPORT USE OF SOUTHBRIDGE SOCKET.

MXXXXXXX-001	MATL	REF_DES	DESCR.	BOM PROPERTY
M1093668-001	IC	U48	SANTO,IC,SM,BGA-515,SB,PRODUCTION	SANTO_RETAIL
M1093662-001	IC	U48	SANTO,IC,SM,BGA-515,SB,DEV MODE,STD	SANTO_DEV
M1093668-001	EMPTY	U48	SANTO,NO STUFF	SANTO_EMPTY

MICROSOFT CONFIDENTIAL	PROJECT NAME	PAGE	CSA PAGE	FAB	VER
	Toledo SB	9/32	9/32	E	1.04

VREG: V_12P0_SB INPUT & FILTER



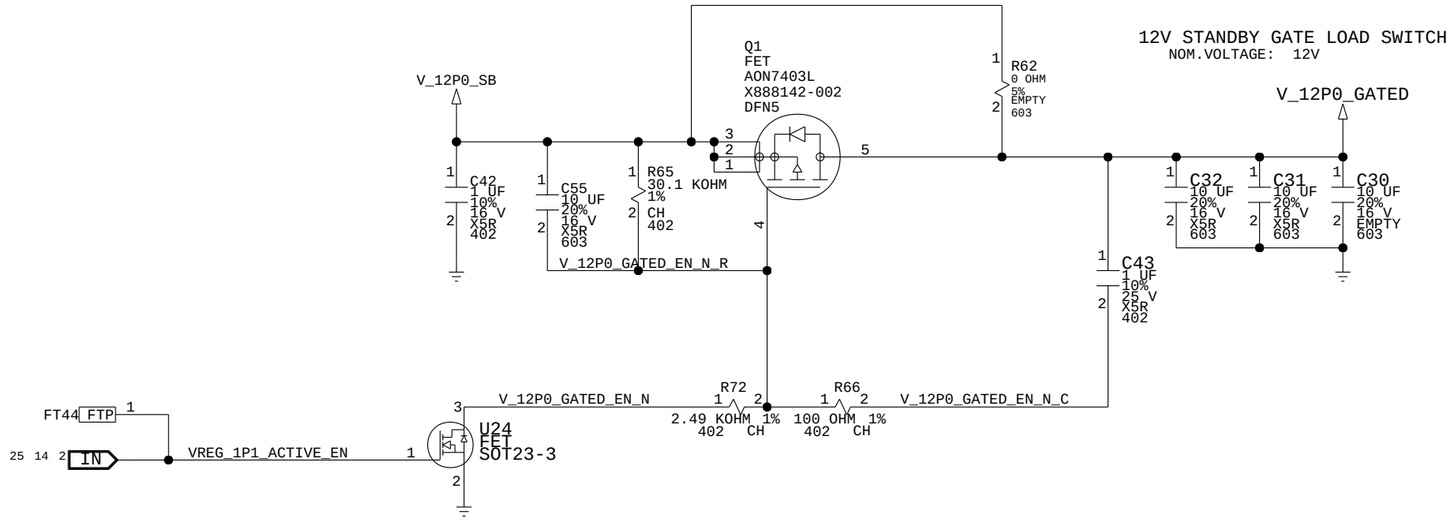
CRITICAL NOTE: THE "RF" BOM STUFFING OPTION SHOULD BE USED BY DEFAULT

ANY NON-RF BOM CONFIGURATION WILL REQUIRE INDUCTOR L5 TO BE PHYSICALLY SHORTED

V_5P0 AND V_3P3STBY INPUT FILTER

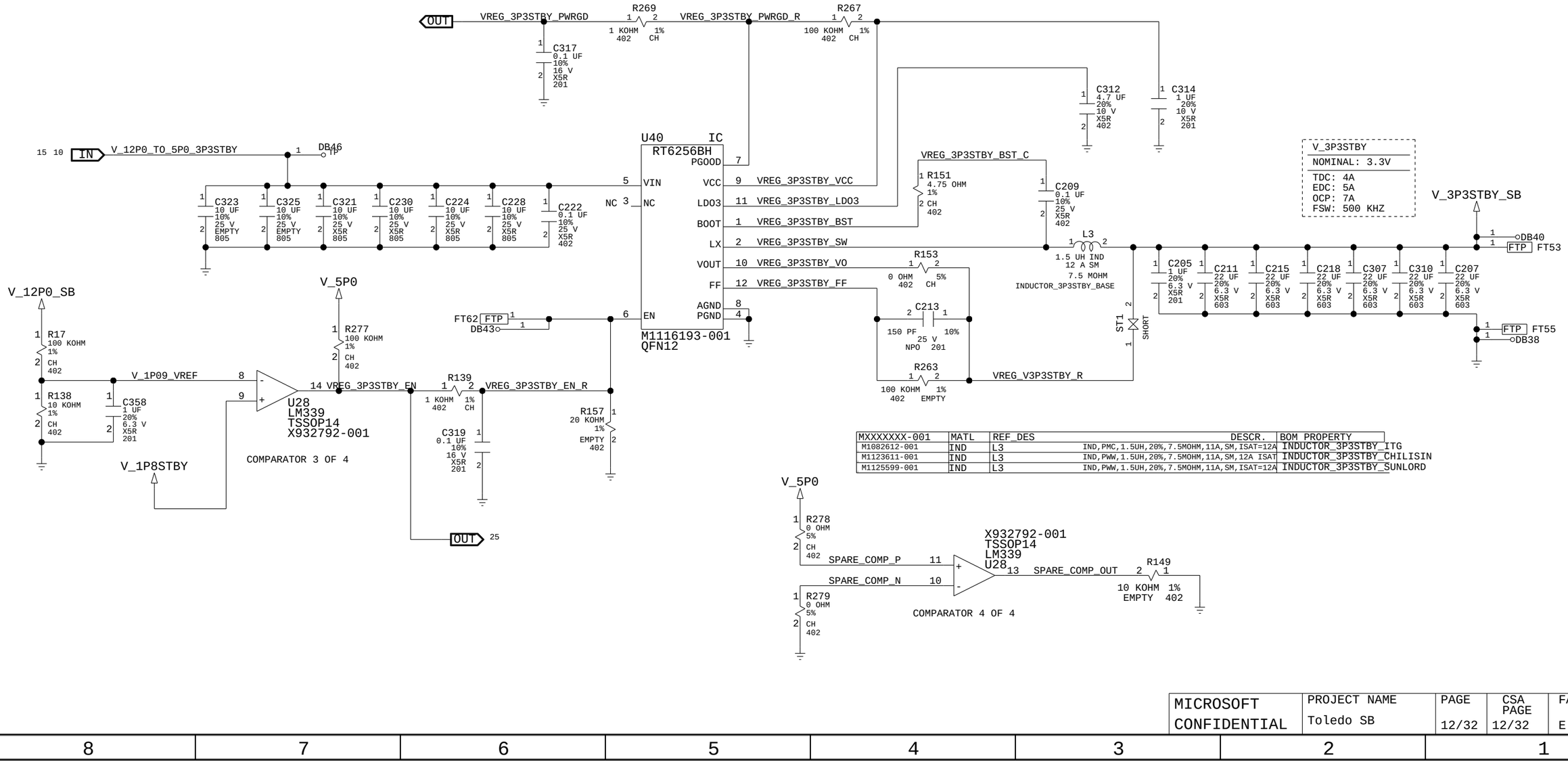
MICROSOFT CONFIDENTIAL	PROJECT NAME	PAGE	CSA PAGE	FAB	VER
	Toledo SB	10/32	10/32	E	1.04

VREG: STANDBY GATES



MICROSOFT CONFIDENTIAL	PROJECT NAME	PAGE	CSA PAGE	FAB	VER
	Toledo SB	11/32	11/32	E	1.04

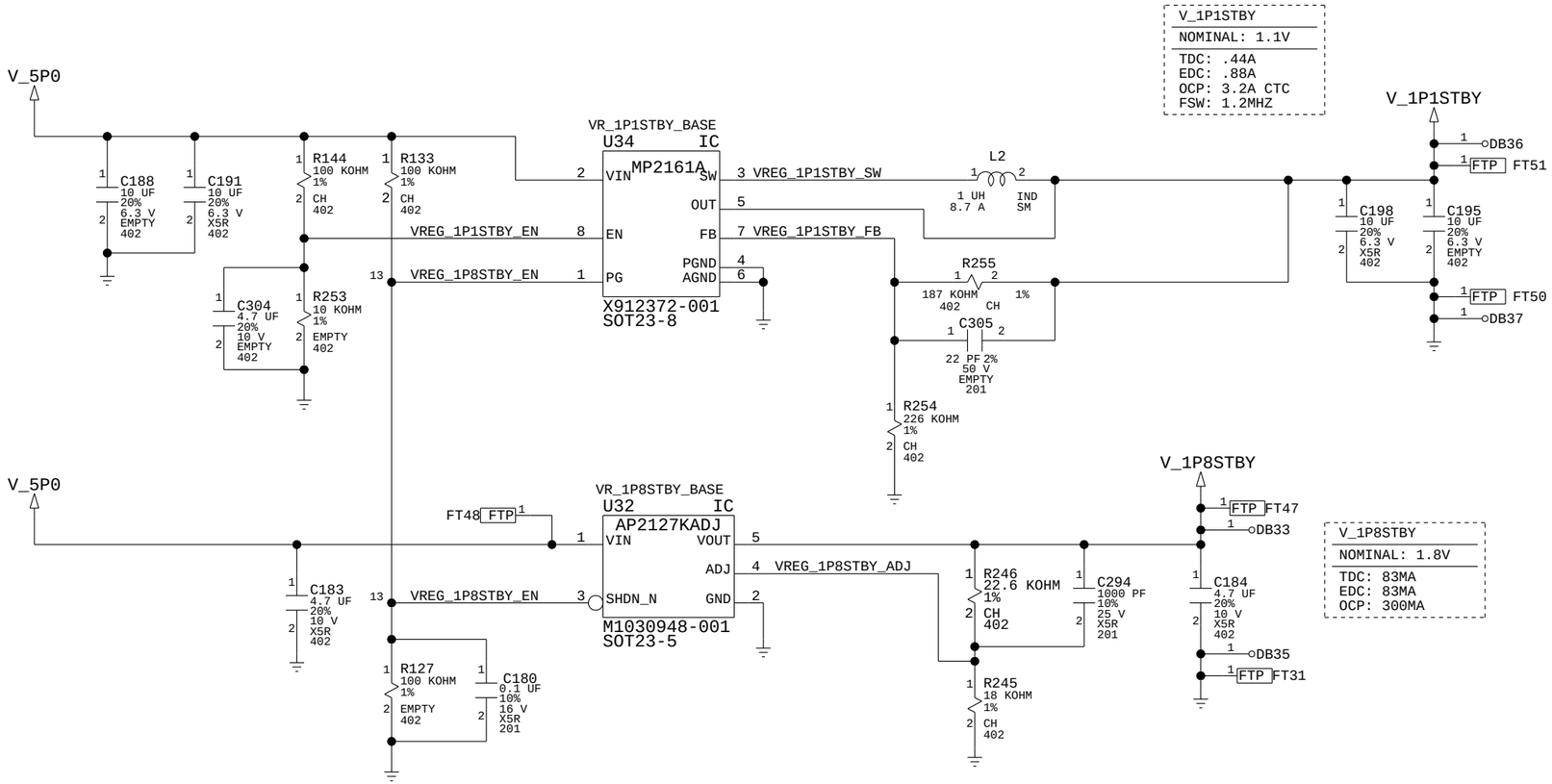
VREG: V_3P3STBY_SB



MXXXXXXX-001	MATL	REF_DES	DESCR.	BOM PROPERTY
M1082612-001	IND	L3	IND,PMC,1.5UH,20%,7.5MOHM,11A,SM,ISAT=12A	INDUCTOR_3P3STBY_ITG
M1123611-001	IND	L3	IND,PWW,1.5UH,20%,7.5MOHM,11A,SM,12A ISAT	INDUCTOR_3P3STBY_CHILISIN
M1125599-001	IND	L3	IND,PWW,1.5UH,20%,7.5MOHM,11A,SM,ISAT=12A	INDUCTOR_3P3STBY_SUNLORD

MICROSOFT CONFIDENTIAL	PROJECT NAME	PAGE	CSA PAGE	FAB	VER
	Toledo SB	12/32	12/32	E	1.04

VREG: V_1P1STBY, V_1P8STBY

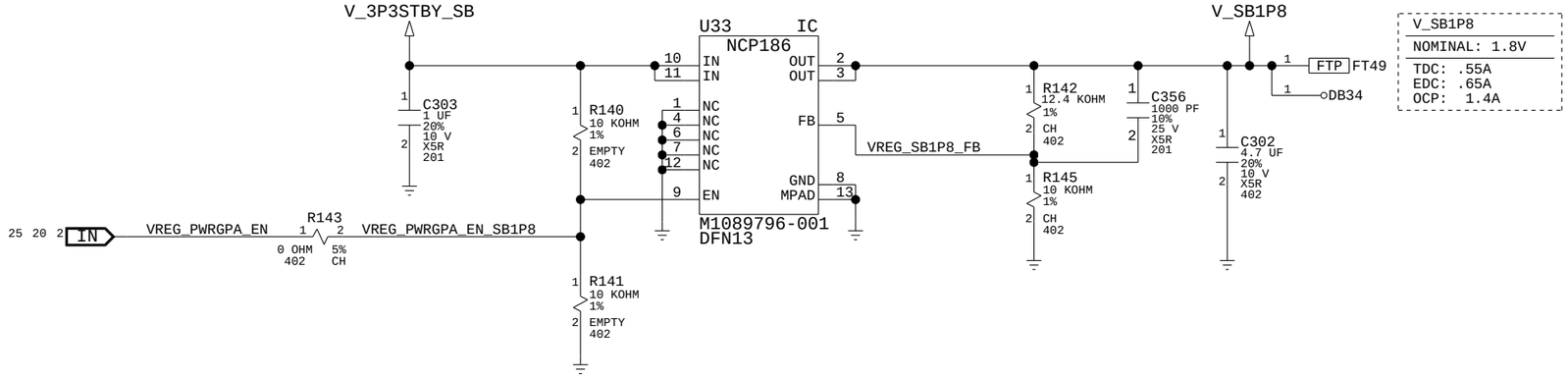


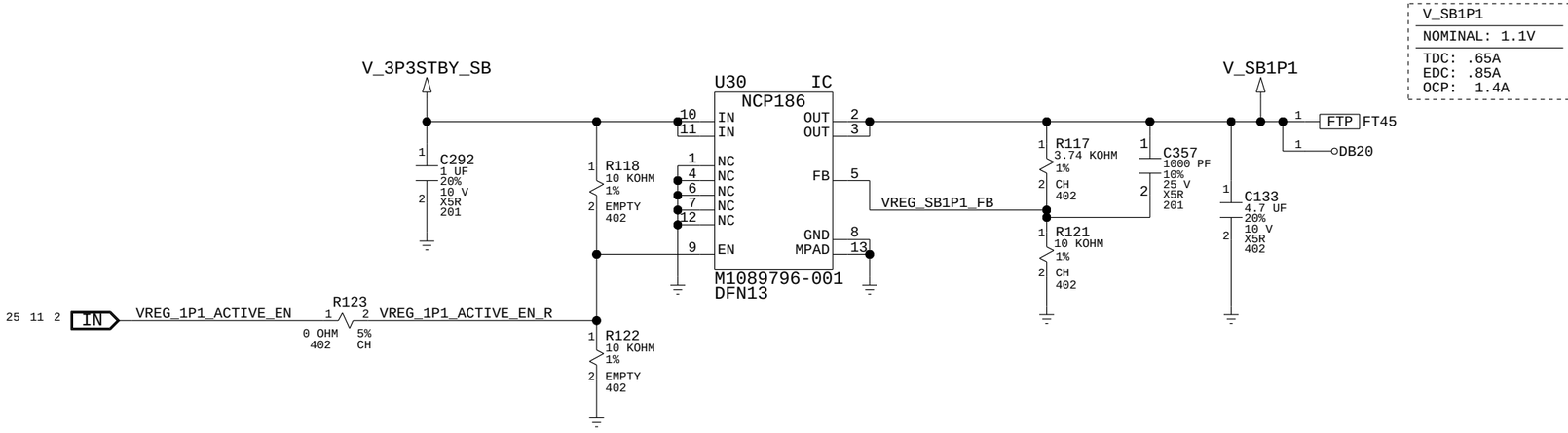
MXXXXXXX-001	MATL	REF_DES	DESCR.	BOM PROPERTY
X912372-001	IC	U34	IC-PWR,VREG,SM,TSOT23-8,STEP DOWN,6V,2A,MP2161A	VR_1P1STBY_MPS
M1018565-001	IC	U34	IC-PWR,VREG,SM,TSOT23-8,STEP DOWN,6V,2A,RICHTEK,RT5785C QUAL	VR_1P1STBY_RICHTEK

MXXXXXXX-001	MATL	REF_DES	DESCR.	BOM PROPERTY
M1030948-001	IC	U32	IC-PWR,LDO,300MA,ADJ V,SM,SOT-23-5,0.8 T	VR_1P8STBY_DIODES
M1125074-001	IC	U32	IC-PWR,LDO,SM,TSOT23-5,LDO,ADJ,300MA,RT9078	VR_1P8STBY_RICHTEK

MICROSOFT CONFIDENTIAL	PROJECT NAME	PAGE	CSA PAGE	FAB	VER
	Toledo SB	13/32	13/32	E	1.04

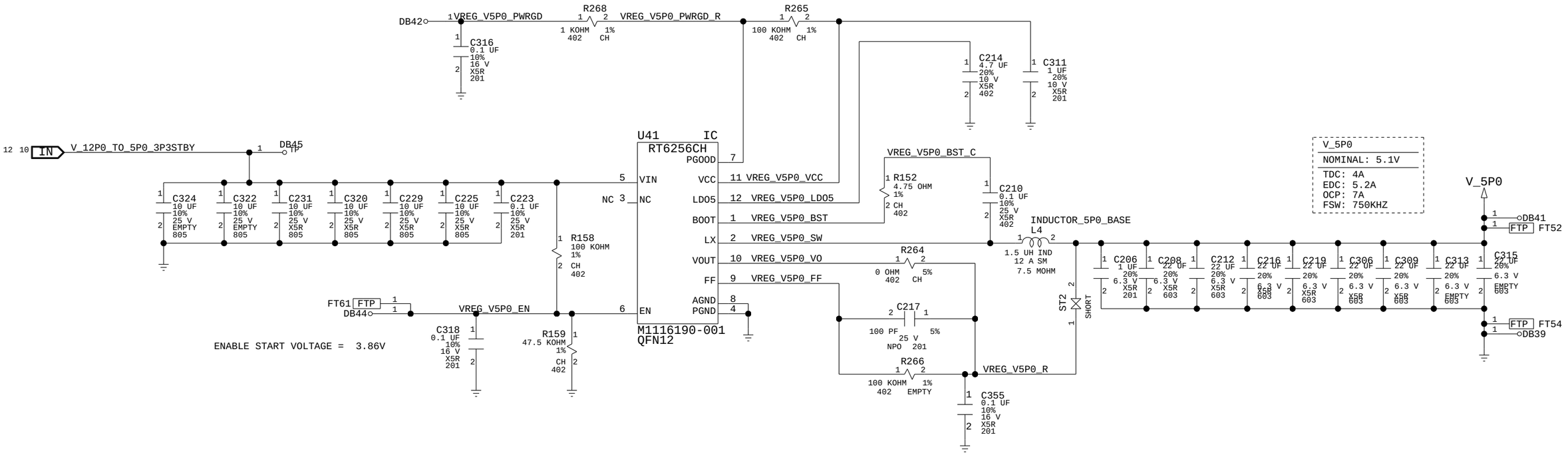
VREG: V_SB1P1, V_SB1P8





MICROSOFT CONFIDENTIAL	PROJECT NAME	PAGE	CSA PAGE	FAB	VER
	Toledo SB	14/32	14/32	E	1.04

VREG: V_5P0

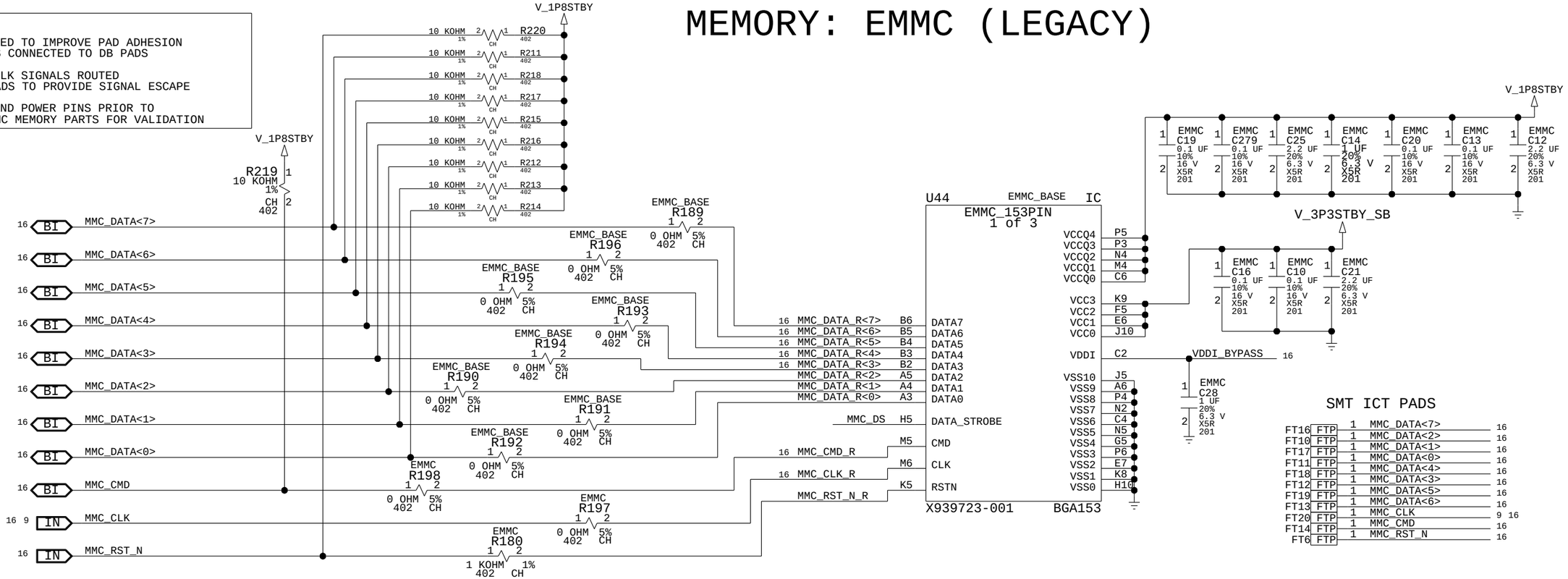


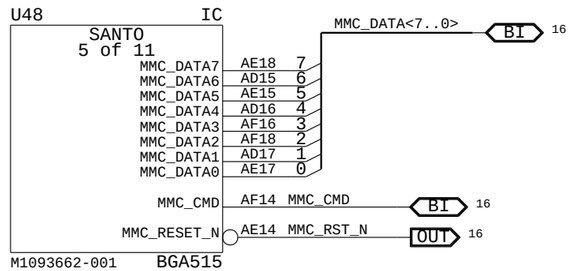
MXXXXXXX-001	MATL	REF_DES	DESCR.	BOM PROPERTY
M1082612-001	IND	L4	IND,PMC,1.5UH,20%,7.5MOHM,11A,SM,ISAT=12A	INDUCTOR_5P0_ITG
M1123611-001	IND	L4	IND,PWW,1.5UH,20%,7.5MOHM,11A,SM,12A ISAT	INDUCTOR_5P0_CHILISIN
M1125599-001	IND	L4	IND,PWW,1.5UH,20%,7.5MOHM,11A,SM,ISAT=12A	INDUCTOR_5P0_SUNLORD

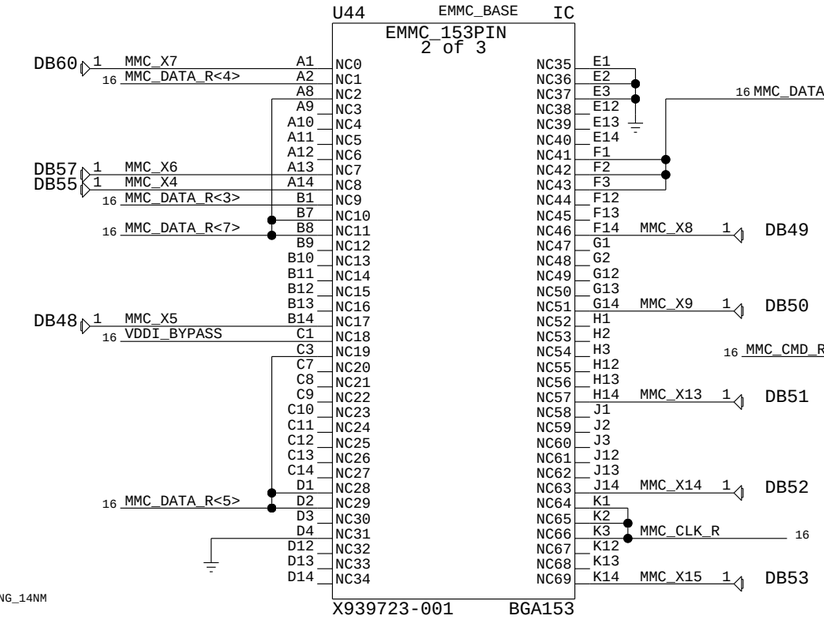
MICROSOFT CONFIDENTIAL	PROJECT NAME	PAGE	CSA PAGE	FAB	VER
	Toledo SB	15/32	15/32	E	1.04

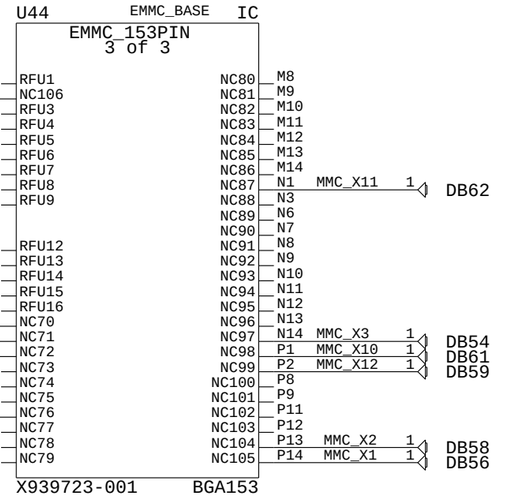
MEMORY: EMMC (LEGACY)

NOTES:
1. MMC_X NETS ARE NEEDED TO IMPROVE PAD ADHESION USING 13 MIL TRACES CONNECTED TO DB PADS
2. EMMC DATA,CMD AND CLK SIGNALS ROUTED THROUGH MULTIPLE PADS TO PROVIDE SIGNAL ESCAPE
3. VERIFY ALL SIGNAL AND POWER PINS PRIOR TO CONSIDERING NEW EMMC MEMORY PARTS FOR VALIDATION







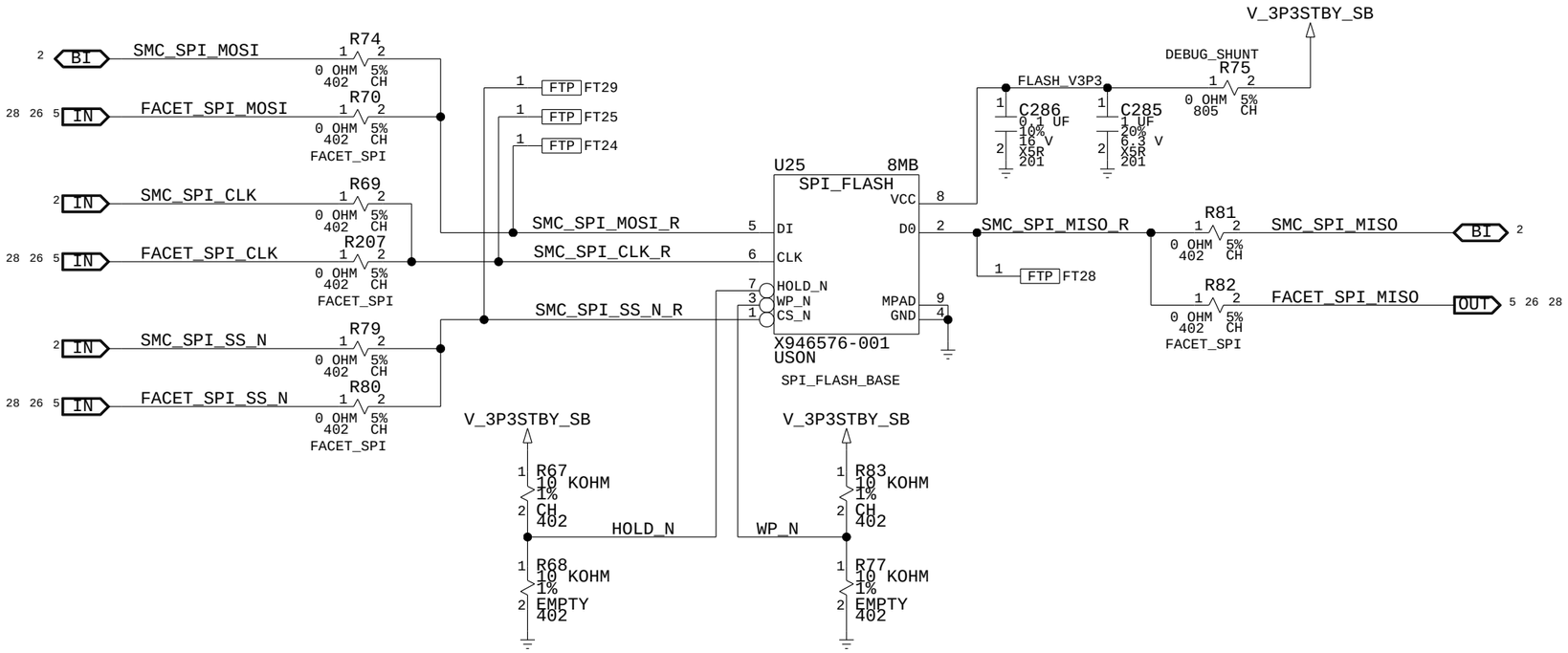


MXXXXXXX-001	MATL	REF_DES	DESCR.	BOM PROPERTY
X934261-001	IC	U44	MEM,8GB,EMMC,FLASH,15NM,BGA153,TOSHIBA	EMMC_TOSHIBA_15NM
X945540-002	IC	U44	MEM,8GB,EMMC,FLASH,14NM,BGA153,SAMSUNG	EMMC_SAMSUNG_14NM
X939723-001	IC	U44	MEM,8GB,EMMC,FLASH,16NM,BGA153,HYNIX	EMMC_HYNIX_16NM
X800617-001	RES	R189,R190,R191,R192,R193,R194,R195,R196	49.9 OHM 1%,1/16W,0402	EMMC_TOSHIBA_15NM,EMMC_SAMSUNG_14NM
X809936-001	RES	R189,R190,R191,R192,R193,R194,R195,R196	100 OHM 1%,1/16W,0402	EMMC_HYNIX_16NM

MICROSOFT CONFIDENTIAL	PROJECT NAME	PAGE	CSA PAGE	FAB	VER
	Toledo SB	16/32	16/32	E	1.04

MEMORY: SPI FLASH

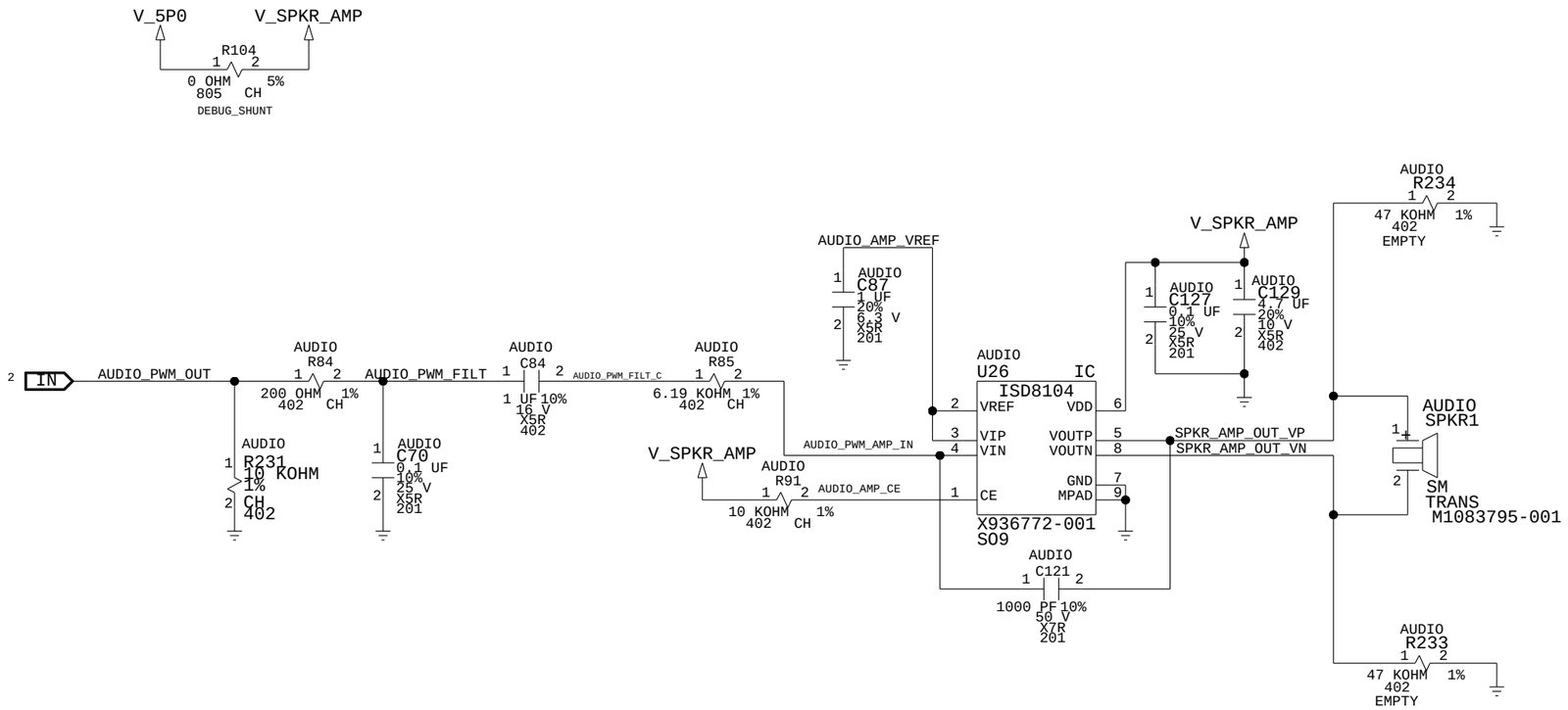
NOTE:SPI FLASH IS CONNECTED TO
BOTH SMC AND FACET MASTERS



MXXXXXXX-001	MATL	REF_DES	DESCR.	BOM_PROPERTY
X946576-001	IC	U25	WINBOND,SPI_FLASH,8GBIT,USON	SPI_FLASH_WINBOND
M1090771-001	IC	U25	MACRONIX,SPI_FLASH,8GBIT,USON	SPI_FLASH_MACRONIX

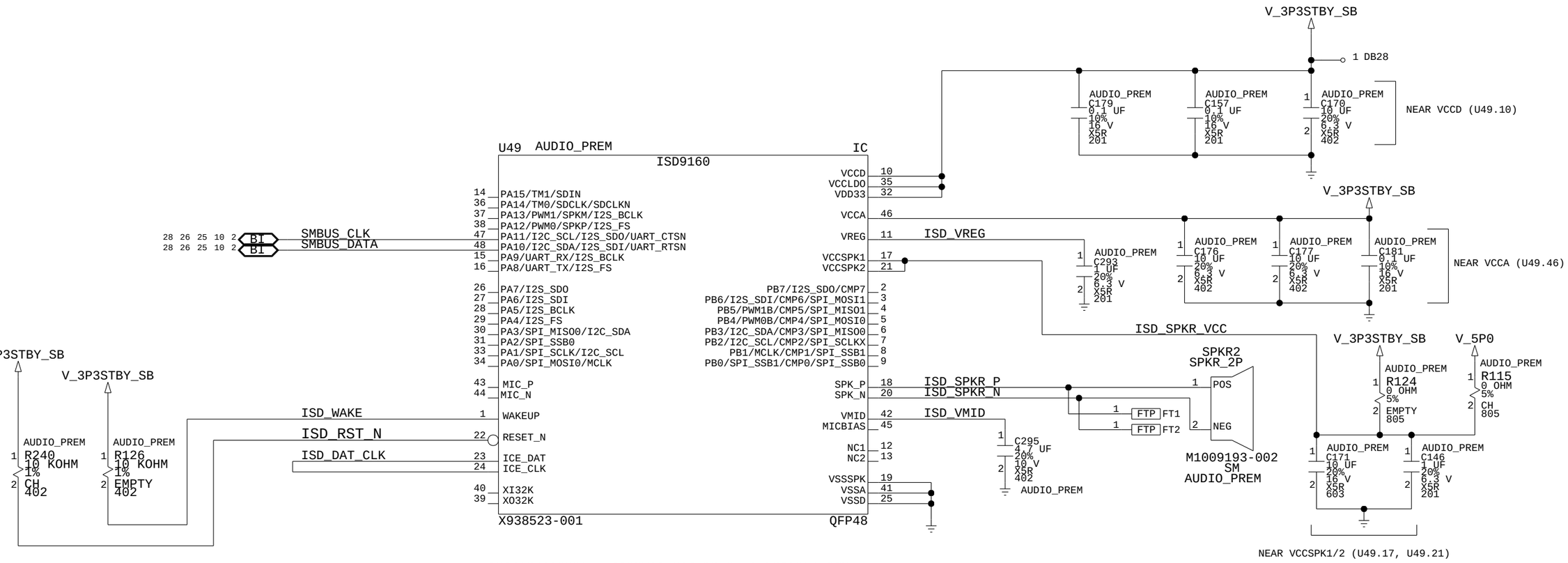
MICROSOFT CONFIDENTIAL	PROJECT NAME	PAGE	CSA PAGE	FAB	VER
	Toledo SB	17/32	17/32	E	1.04

AUDIO: BASIC



MICROSOFT CONFIDENTIAL	PROJECT NAME	PAGE	CSA PAGE	FAB	VER
	Toledo SB	18/32	18/32	E	1.04

AUDIO: PREMIUM (SE/LE)

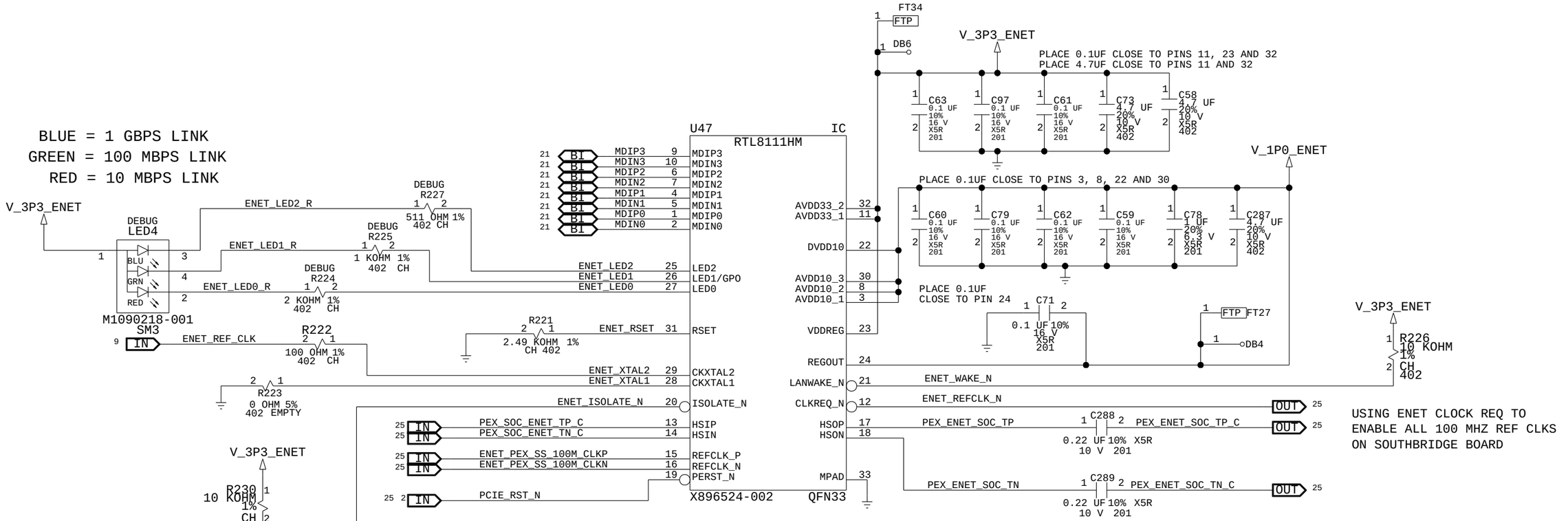


ISD9160FIMS05 - REMOVED CAP TOUCH FUNCTIONALITY

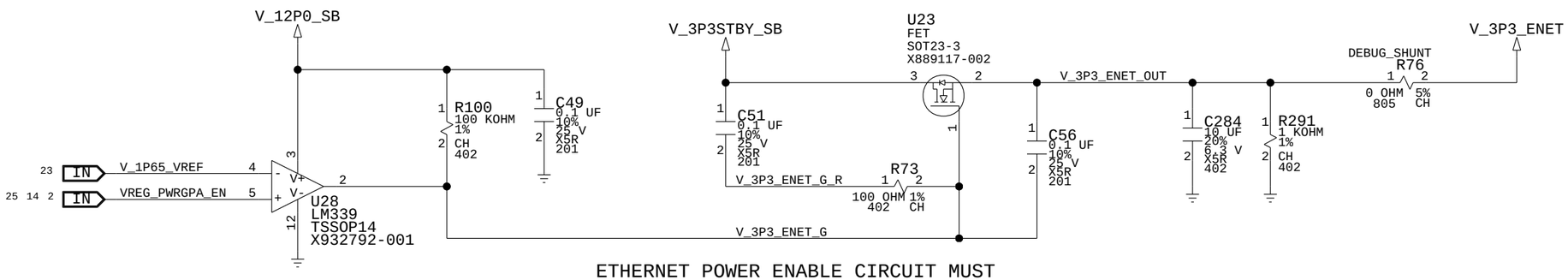
MICROSOFT CONFIDENTIAL	PROJECT NAME	PAGE	CSA PAGE	FAB	VER
	Toledo SB	19/32	19/32	E	1.04

ETHERNET NIC

BLUE = 1 GBPS LINK
GREEN = 100 MBPS LINK
RED = 10 MBPS LINK



NOM. VOLTAGE: 3.3V
MAX POWER: 590MW



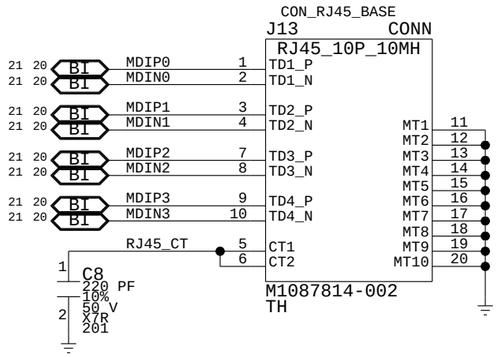
COMPARATOR 1 OF 4:
V_3P3_ENET GATE DRIVE

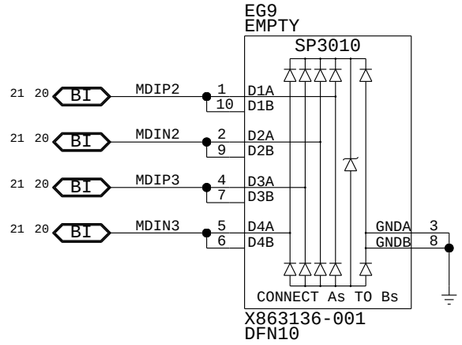
ETHERNET POWER ENABLE CIRCUIT MUST
MEET THE FOLLOWING TIMING REQUIREMENTS
RISE TIME: > 0.5 MS AND < 100 MS
POWER OFF/ON CYCLE TIME: > 50 MS

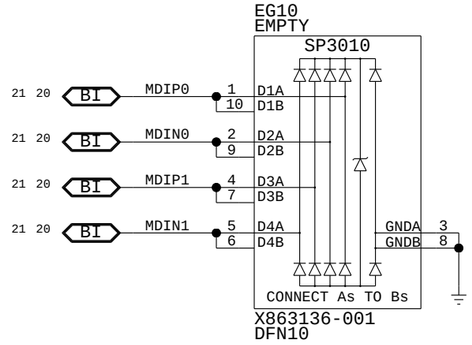
MICROSOFT CONFIDENTIAL	PROJECT NAME	PAGE	CSA PAGE	FAB	VER
	Toledo SB	20/32	20/32	E	1.04

CONN: RJ45, NEXUS BOARD

ETHERNET RJ45







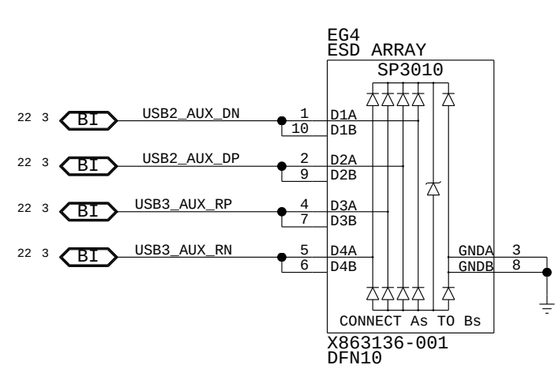
MXXXXXXX-001	MATL	REF_DES	DESCR.	BOM PROPERTY
M1087814-002	CONN	J13	FOXCONN RJ45 CONNECTOR	CON_RJ45_FOXC
MXXXXXXX-001	CONN	J13	AMPHENOL QUAL RJ45 CONNECTOR	CON_RJ45_AMP

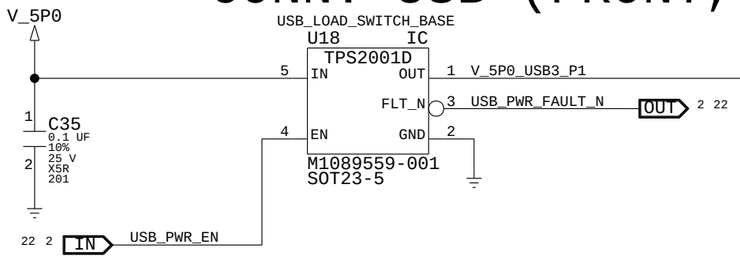
NEXUS BOARD

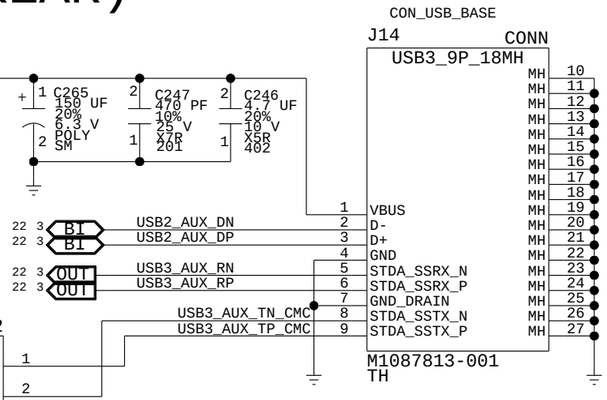
EMC FLAG INDICATES COMPONENT
IS A PLACEHOLDER FOR COMPLIANCE
TESTING AND IS NOT A BOM
STUFFING OPTION

MICROSOFT CONFIDENTIAL	PROJECT NAME	PAGE	CSA PAGE	FAB	VER
	Toledo SB	21/32	21/32	E	1.04

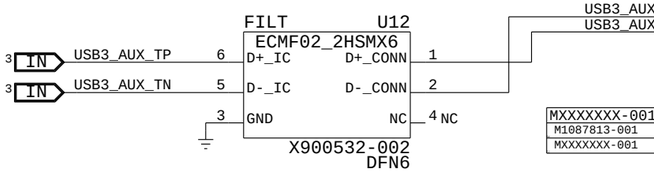
CONN: USB (FRONT, REAR)



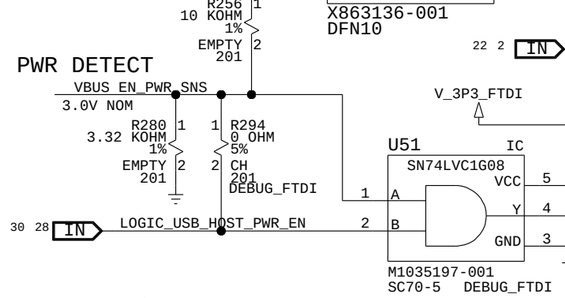


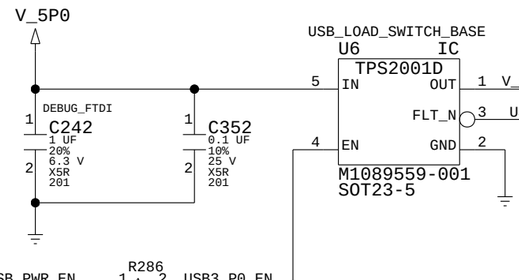


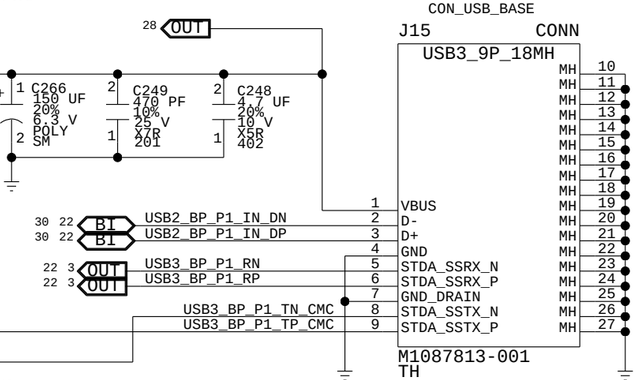
REAR 1
(FORMERLY KINECT)
TX/RX FROM
HOST PERSPECTIVE



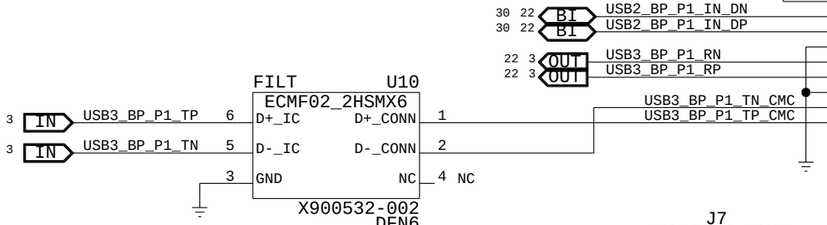
MXXXXXXX-001	MATL	REF_DES	DESCR.	BOM PROPERTY
M1087813-001	CONN	J14,J15	FOXCONN USB CONNECTOR	CON_USB_FOXC
MXXXXXX-001	CONN	J14,J15	AMPHENOL QUAL USB CONNECTOR	CON_USB_AMP

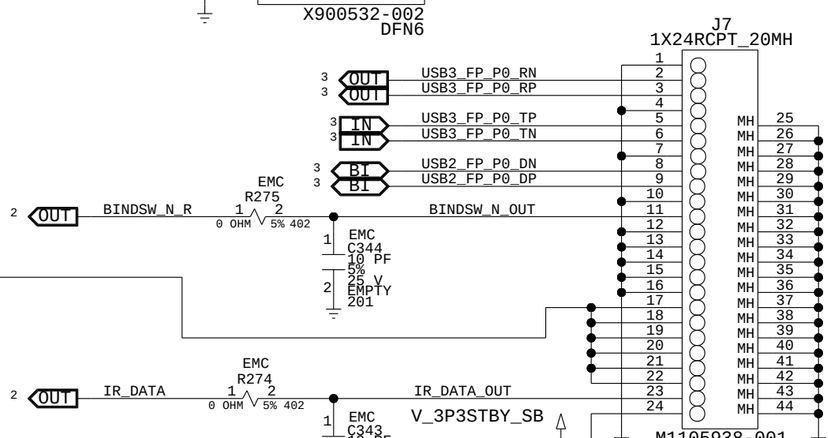






REAR 0
(CLOSEST TO ENET PORT)
TX/RX FROM
HOST PERSPECTIVE





FRONT USB

SIGNALS MIRRORD BY DESIGN

DUE TO FFC ROUTING REQUIREMENTS

NOTE: TO ACTIVATE INTERCEPT 12V SENSE
1. STUFF: R256,R280
2. REMOVE: R294
3. SEE PAGE 27 FOR ADDITIONAL STUFFING REQUIREMENTS

FRONT USB PORT PROTECTION

EMC FLAG INDICATES COMPONENT IS A PLACEHOLDER FOR COMPLIANCE TESTING AND IS NOT A BOM STUFFING OPTION

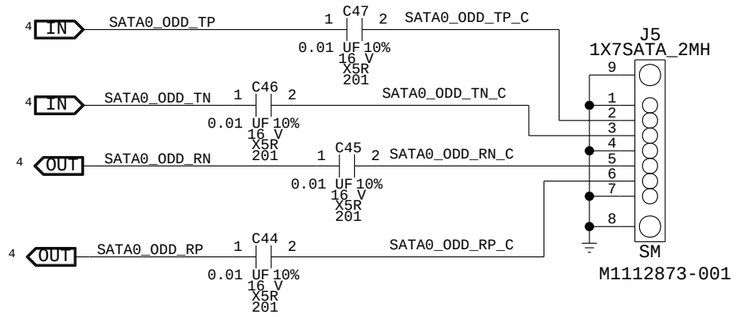
MXXXXXXX-001	MATL	REF_DES	DESCR.	BOM PROPERTY
M1089694-001	IC	U6	IC,SM,SOT25,LOAD SWITCH,50 MOHM,2.5 A, SI	USB_LOAD_SWITCH_FTDI
M1089559-001	IC	U18	IC,SM,SOT23-5,CURRENT LIMITED, POWER DISTRIBUTION SWITCH	USB_LOAD_SWITCH_FTDI
M1089559-001	IC	U6, U18	IC,SM,SOT23-5,CURRENT LIMITED, POWER DISTRIBUTION SWITCH	USB_LOAD_SWITCH_TI
M1104212-001	IC	U6, U18	IC-PWR,DC/DC CONV,SM,TSOT-23-5,HIGH SIDE POWER SWITCH, W/FLAG,RT9742	USB_LOAD_SWITCH_RICHTEK

USB_LOAD_SWITCH_FTDI STUFFS USB P0 LOAD SWITCH WITH REVERSE CURRENT PROTECTION

MICROSOFT CONFIDENTIAL	PROJECT NAME	PAGE	CSA PAGE	FAB	VER
	Toledo SB	22/32	22/32	E	1.04

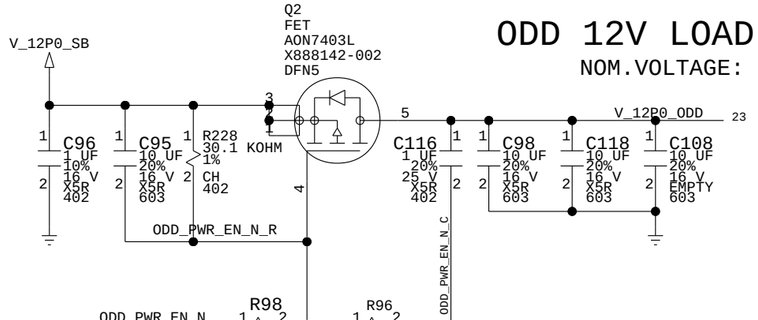
CONN: ODD SATA & PWR

ODD SATA



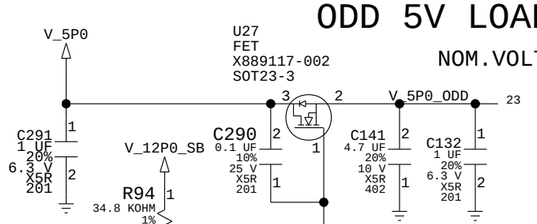
ODD 12V LOAD SWITCH

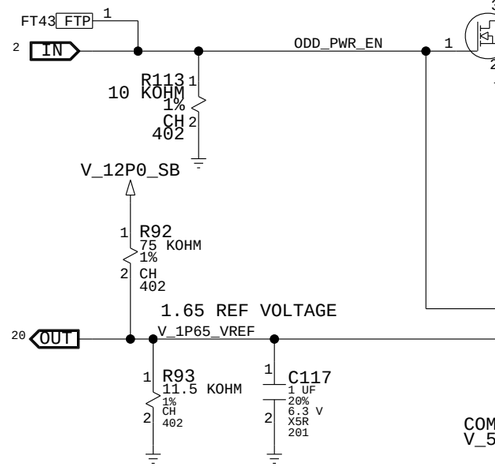
NOM.VOLTAGE: 12V



ODD 5V LOAD SWITCH

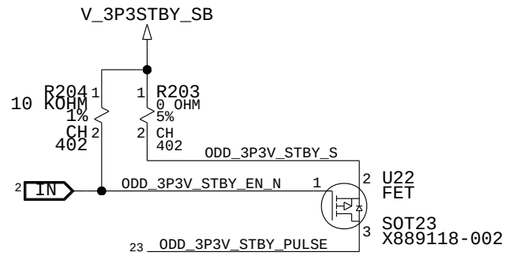
NOM.VOLTAGE: 5.0V





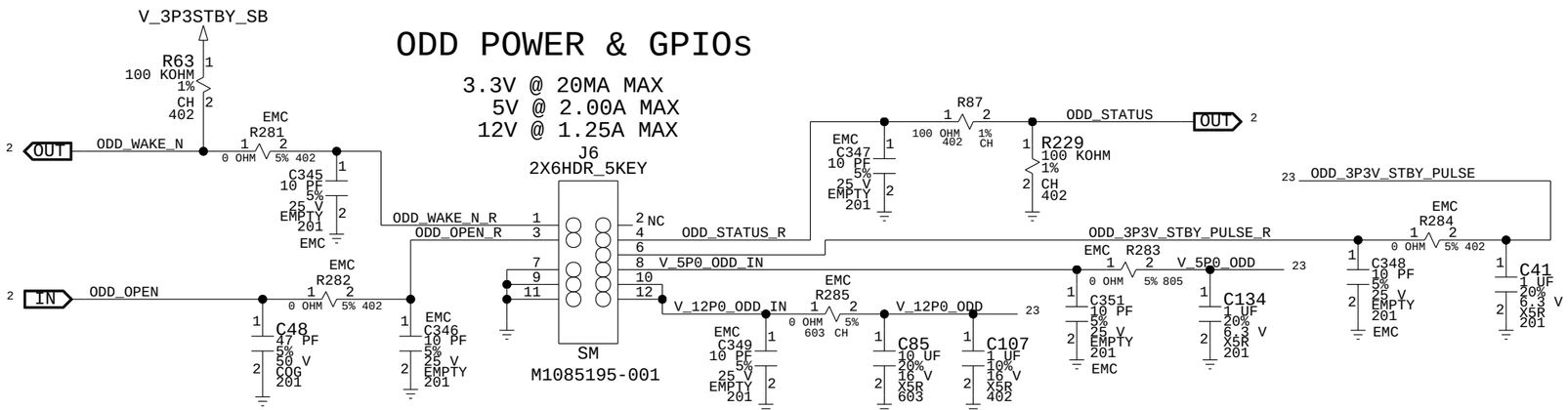
COMPARATOR 2 OF 4:
V_5P0_ODD GATE DRIVE

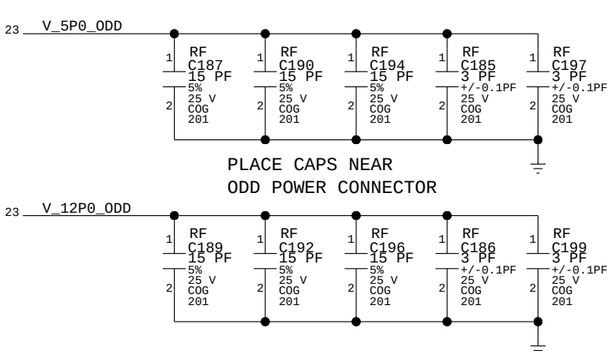
EMC FLAG INDICATES COMPONENT
IS A PLACEHOLDER FOR COMPLIANCE
TESTING AND IS NOT A BOM
STUFFING OPTION



ODD POWER & GPIOs

3.3V @ 20MA MAX
5V @ 2.00A MAX
12V @ 1.25A MAX

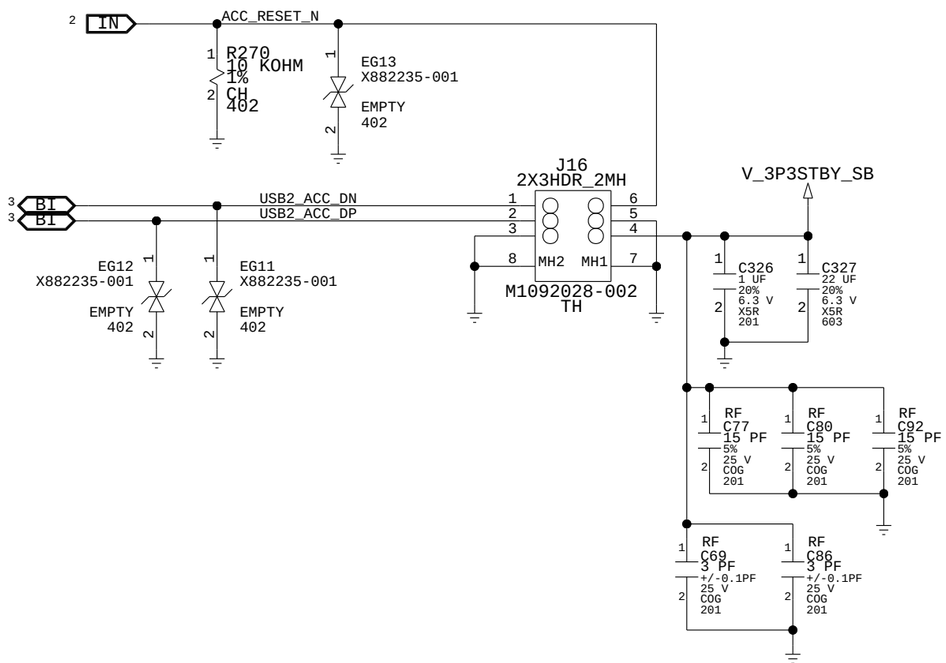




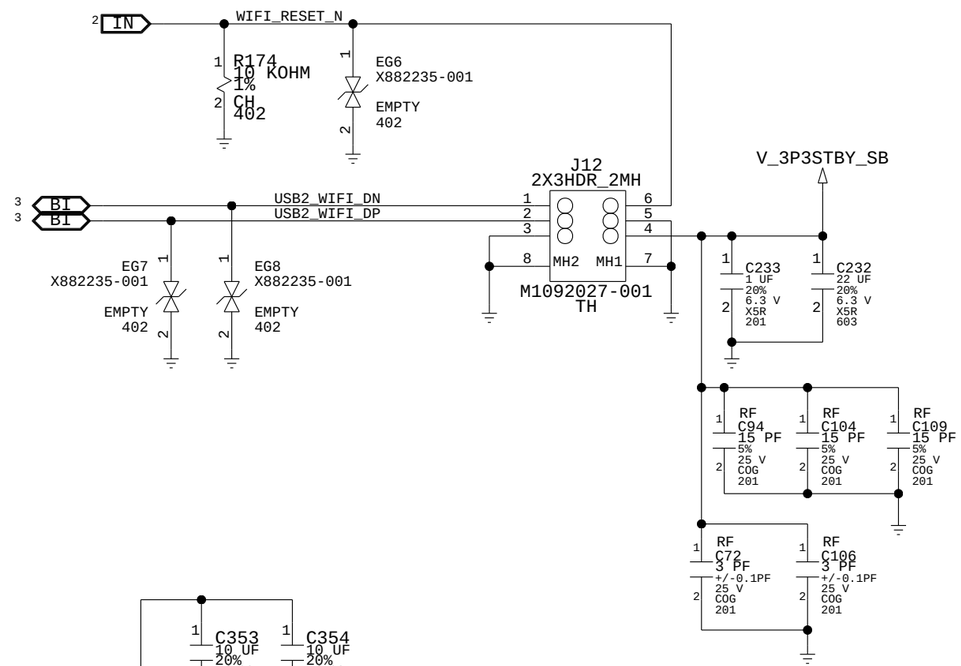
MICROSOFT CONFIDENTIAL	PROJECT NAME	PAGE	CSA PAGE	FAB	VER
	Toledo SB	23/32	23/32	E	1.04

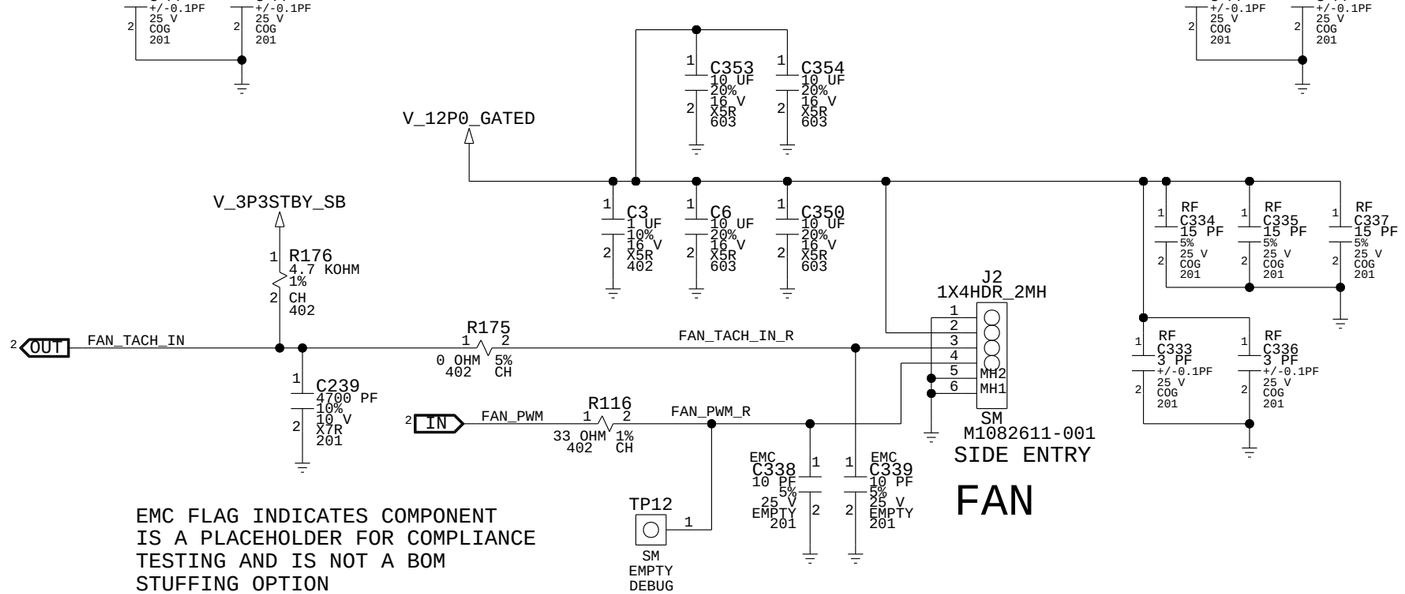
CONN: FAN, ACCY & NTWK RADIOS

ACCY RADIO



NETWORK RADIO





EMC FLAG INDICATES COMPONENT
IS A PLACEHOLDER FOR COMPLIANCE
TESTING AND IS NOT A BOM
STUFFING OPTION

MICROSOFT CONFIDENTIAL	PROJECT NAME	PAGE	CSA PAGE	FAB	VER
	Toledo SB	24/32	24/32	E	1.04

CONN: B2B SB/SOC

NOTE: EMPTY RESISTORS ARE
POPULATED ON SOC BOARD

PCIE SOC RX

PEX_ENET_SOC_TP_C — IN — 20 25
PEX_ENET_SOC_TN_C — IN — 20 25
PEX_L1_SB_SOC_TP_C — IN — 4 25
PEX_L1_SB_SOC_TN_C — IN — 4 25
PEX_L0_SB_SOC_TP_C — IN — 4 25
PEX_L0_SB_SOC_TN_C — IN — 4 25

PCIE SOC TX

PEX_SOC_ENET_TP_C — OUT — 20 25
PEX_SOC_ENET_TN_C — OUT — 20 25
PEX_L1_SOC_SB_TP_C — OUT — 4 25
PEX_L1_SOC_SB_TN_C — OUT — 4 25
PEX_L0_SOC_SB_TP_C — OUT — 4 25
PEX_L0_SOC_SB_TN_C — OUT — 4 25

100 MHZ REF CLOCKS FROM SOC

SB_PEX_SS_100M_CLKP — OUT — 9 25
SB_PEX_SS_100M_CLKN — OUT — 9 25
ENET_PEX_SS_100M_CLKP — OUT — 20 25
ENET_PEX_SS_100M_CLKN — OUT — 20 25

SB SIGNALS FROM SOC

V_3P3STBY_SB
R244 10 KOHM 1% EMPTY 402
R292 10 KOHM 1% EMPTY 402
R293 100 KOHM 1% EMPTY 402
CFX_INS_N — OUT — 2 25
CFX_PWR_FAULT_N — OUT — 2 25
VREG_PWRGPAB_CPUGFX_PWRGD — OUT — 2 25

V_SB1P8
R164 10 KOHM 1% EMPTY 402
R165 10 KOHM 1% CH 402
R173 10 KOHM 1% CH 402
R168 4.7 KOHM 1% EMPTY 402
SP_SMC_INT — OUT — 2
SOC_THERMTRIP — OUT — 2
U42 XSTR
SP_SMC_INT_N — 25
SOC_THERMTRIP_N — 25
FT64 FTP

3.3V LEVEL SHIFTER

J11
2 OF 3 — 1 OF 3
SM SM
M1094507-001

25 14 11 2	VREG_1P1_ACTIVE_EN	41	40	TRST_L	25 29
		42	39	CFX_PWR_FAULT_N	2 25
25 4	HDMI_CEC	43	38	CFX_INS_N	2 25
		44	37	DBREQ_L	25 29
25 2	SB_DDC_DATA	45	36	SPARE_36 1	DB1
25 2	SB_DDC_CLK	46	35	ENET_REFCLK_N	20 25
		47	34		
25	25MHZ_SB_CLK	48	33	SOC_TDO	2 25 29
		49	32	SOC_TDI	2 25 29
28 26 25 19 10 2	SMBUS_CLK	50	31		
28 26 25 19 10 2	SMBUS_DATA	51	30	PEX_ENET_SOC_TN_C	20 25
		52	29	PEX_ENET_SOC_TP_C	20 25
25 2	VREG_PWRGPAB_CPUGFX_PWRGD	53	28		
25	SP_SMC_INT_N	54	27	SOC_TMS	2 25 29
25	SOC_THERMTRIP_N	55	26	SOC_TCK	2 25 29
		56	25		
25 2	SB_SOC_CLK	57	24	ENET_PEX_SS_100M_CLKN	20 25
25 2	SB_SOC_DATA	58	23	ENET_PEX_SS_100M_CLKP	20 25
		59	22		
29 25 2	SOC_RST_N	60	21	SOC_PWR_OK	2 25 29
		61	20		
25 9	X32K_X2_R	62	19	PEX_L0_SOC_SB_TN_C	4 25
		63	18	PEX_L0_SOC_SB_TP_C	4 25
25 9	V12P0_PWRGD	64	17		
25 12	VREG_3P3STBY_EN	65	16	PEX_L0_SB_SOC_TN_C	4 25
		66	15	PEX_L0_SB_SOC_TP_C	4 25
25 2	HDMI_V_5P0_EN	67	14		
25 2	DP0_HPD_SB	68	13	PEX_L1_SOC_SB_TN_C	4 25
		69	12	PEX_L1_SOC_SB_TP_C	4 25
		70	11		
		71	10	PEX_L1_SB_SOC_TN_C	4 25
25 5	HDMIDPOUT_MODE_DET	72	9	PEX_L1_SB_SOC_TP_C	4 25
25 5	HDMI_TX_RDRVR_EN_R	73	8		
25 5	HDMIDPOUT_MODE_SEL	74	7	SB_PEX_SS_100M_CLKP	9 25
		75	6	SB_PEX_SS_100M_CLKN	9 25
25 20 14 2	VREG_PWRGPA_EN	76	5		
25 2	VREG_PWRGPB_EN	77	4	PEX_SOC_ENET_TP_C	20 25
25 2	VREG_PWRGPC_EN	78	3	PEX_SOC_ENET_TN_C	20 25
		79	2		
25 20 2	PCIE_RST_N	80	1		

V_BAT
V_5P0

V_5P0 @ 55MA MAX
V_BAT @ 1MA MAX

HDT SUPPORT

DBREQ_L — IN — 25 29
TRST_L — IN — 25 29
SOC_TCK — OUT — 2 25 29
SOC_TMS — OUT — 2 25 29
SOC_TDI — OUT — 2 25 29
SOC_TDO — IN — 2 25 29

SEE P30 FOR SIGNAL DETAILS

25MHZ CLOCK TO SOC

9 IN SB_CLK_MONITOR — R135 0 OHM 5% 402 EMPTY — 25MHZ_SB_CLK — 25
R134 49.9 OHM 1% 2 EMPTY 402
RESISTORS ON SB BOARD ONLY

V_3P3_ENET
V_SB1P8
R86 10 KOHM 1% EMPTY 402
R169 4.7 KOHM 1% CH 402
ENET_REFCLK_N — IN — 20 25
SOC_RST_N — IN — 2 25 29

SB SIGNALS TO SOC

X32K_X2_R — IN — 9 25
VREG_3P3STBY_EN — IN — 12 25
SOC_PWR_OK — IN — 2 25 29
VREG_PWRGPA_EN — IN — 2 14 20 25
VREG_PWRGPB_EN — IN — 2 25
VREG_PWRGPC_EN — IN — 2 25
VREG_1P1_ACTIVE_EN — IN — 2 11 14 25
PCIE_RST_N — IN — 2 20 25

R273 100 KOHM 1% EMPTY 402
R120 4.7 KOHM 1% CH 402
R106 100 KOHM 1% CH 402
R242 10 KOHM 1% CH 402
R89 10 KOHM 1% CH 402
R97 10 KOHM 1% EMPTY 402
R90 10 KOHM 1% EMPTY 402
R12 10 KOHM 1% EMPTY 402
V12P0_PWRGD — IN — 9 25

V_3P3STBY_SB
R188 1.27 KOHM 1% CH 402
R187 1.27 KOHM 1% CH 402

SMBUS GLOBAL

SMBUS_CLK — BI — 2 10 19 25 26 28
SMBUS_DATA — BI — 2 10 19 25 26 28

V_SB1P8
R166 2 KOHM 1% EMPTY 402
R167 2 KOHM 1% EMPTY 402

SMBUS SB/SOC

SB_SOC_CLK — BI — 2 25
SB_SOC_DATA — BI — 2 25

HDMI SUPPORT

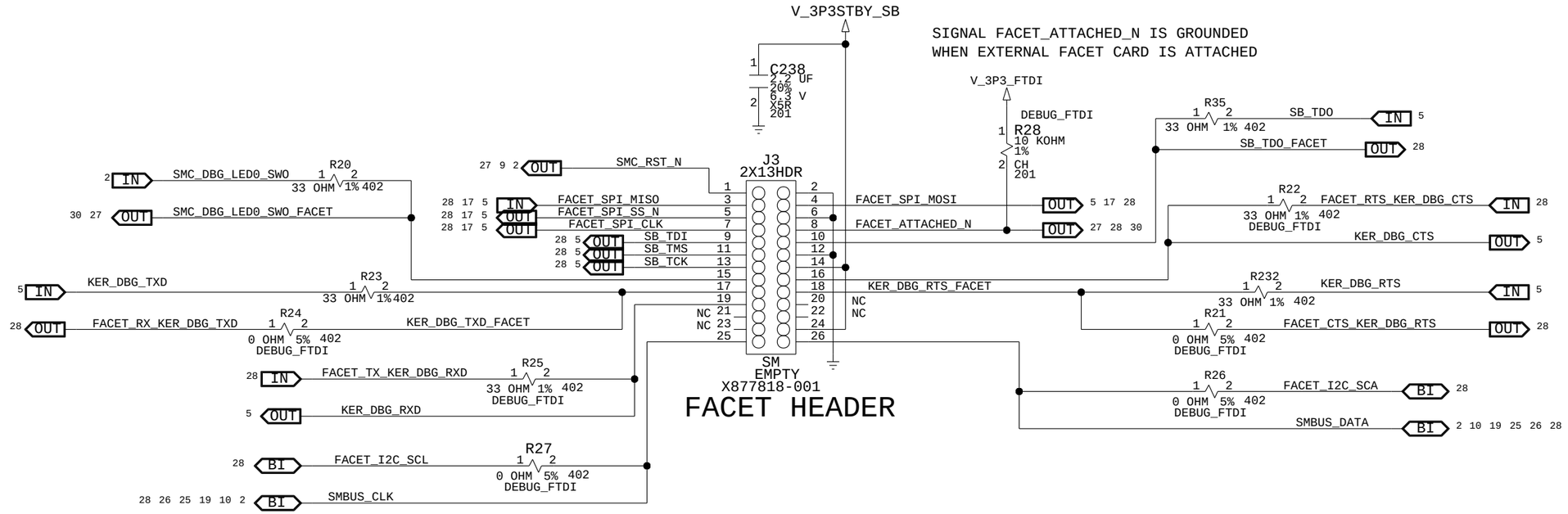
V_3P3STBY_SB
DP0_HPD_SB — OUT — 2 25
HDMIDPOUT_MODE_SEL — IN — 5 25
HDMI_V_5P0_EN — IN — 2 25
HDMI_TX_RDRVR_EN_R — IN — 5 25

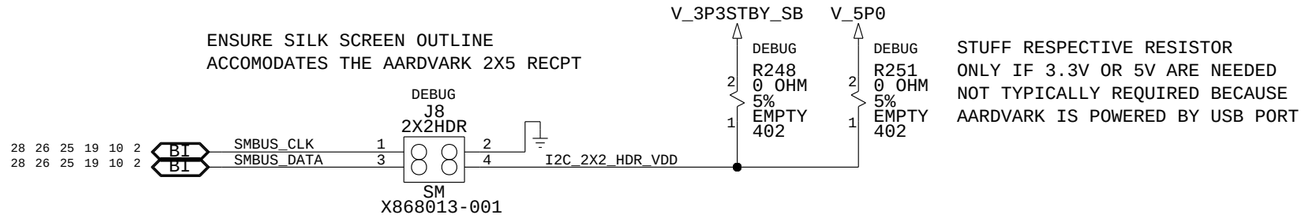
R109 100 KOHM 1% CH 402
R235 10 KOHM 1% EMPTY 402
R108 10 KOHM 1% EMPTY 402
R105 10 KOHM 1% EMPTY 402
D4 BAS40LT SOT23-3
D3 BAS40LT SOT23-3
HDMI_CEC_3P3
HDPO_MD_PUR
R101 27 KOHM 1% CH 402
R99 1 KOHM 1% CH 402
HDMI_CEC — BI — 25 4
HDMIDPOUT_MODE_DET — OUT — 25 5

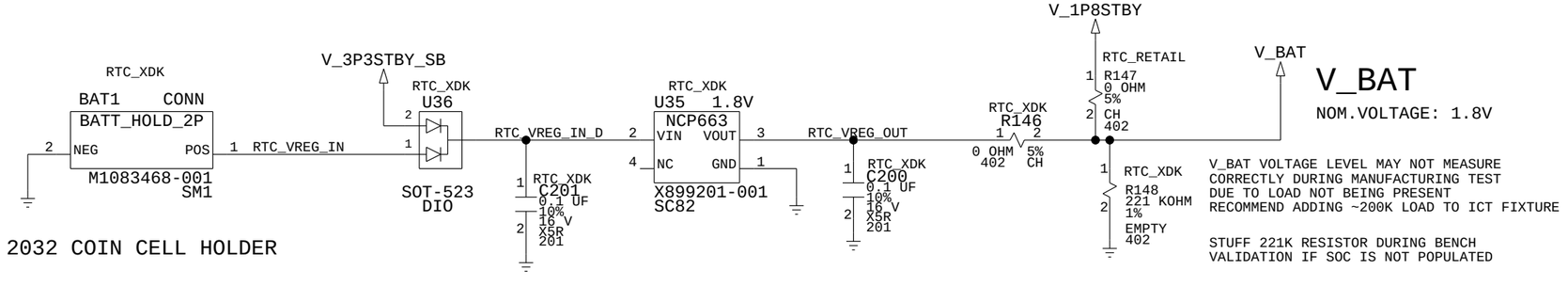
V_3P3STBY_SB
R241 2 KOHM 1% EMPTY 402
R239 2 KOHM 1% EMPTY 402
SB_DDC_CLK — BI — 25 2
SB_DDC_DATA — BI — 25 2

MICROSOFT CONFIDENTIAL	PROJECT NAME	PAGE	CSA PAGE	FAB	VER
	Toledo SB	25/32	25/32	E	1.04

DEBUG: FACET, I2C, V_BAT



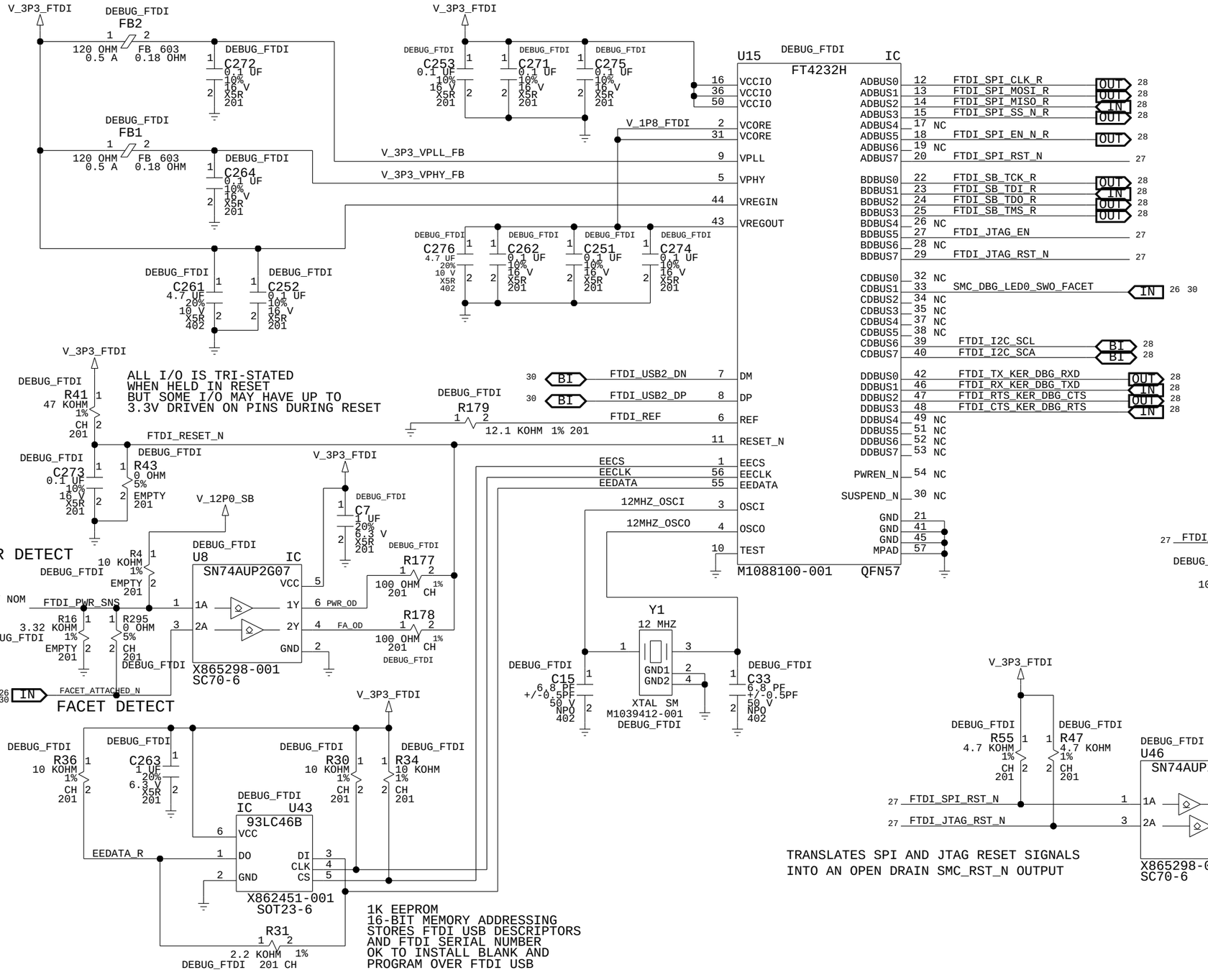




MICROSOFT CONFIDENTIAL	PROJECT NAME	PAGE	CSA PAGE	FAB	VER
	Toledo SB	26/32	26/32	E	1.04

DEBUG: FTDI BRIDGE

NOTE: TO ACTIVATE INTERCEPT 12V SENSE
1. STUFF: R4,R16
2. REMOVE: R295
3. SEE PAGE 22 FOR ADDITIONAL STUFFING REQUIREMENTS



MICROSOFT CONFIDENTIAL	PROJECT NAME	PAGE	CSA PAGE	FAB	VER
	Toledo SB	27/32	27/32	E	1.04

DEBUG: FTDI BUFFERS, FTDI PWR

SPI BUS SWITCH

JTAG BUS SWITCH

GPIO EXPANDER

PCA9570 I2C ADDRESS
0100 100 R/W HEX
WRITE 0100 100 0 0X48
READ 0100 100 1 0X49

U7 LOGIC
0X0 = HOST MODE
0X3 = DEVICE MODE (DEFAULT)

MISC. BUS SWITCHES

FACET DETECT

FTDI VREG
3.3V @ 600MA MAX

ALWAYS ENABLED

MICROSOFT CONFIDENTIAL	PROJECT NAME	PAGE	CSA PAGE	FAB	VER
	Toledo SB	28/32	28/32	E	1.04

DEBUG: BUTTONS, HDT

DEBUG
SW5 SW
TACT SW
BINDSW_N_R
OUT 2 22
M1083063-001
SM
BIND

DEBUG
SW1 SW
TACT SW
EJECTSW_N_SW
DEBUG R42
2.49 KOHM 1%
402 CH
EJECTSW_N
OUT 2 21
DEBUG C29
0.01 UF
10%
16 V
EMPTY
201
M1083063-001
SM
ODD EJECT

DEBUG
SW4 SW
TACT SW
29 PWRSW_N_SW
DEBUG R170
2.49 KOHM 1%
402 CH
PWRSW_N
OUT 2 21
DEBUG C227
0.01 UF
10%
16 V
EMPTY
201
M1083063-001
SM
POWER

DEBUG
SW3 SW
TACT SW
COLD_RESET_N
OUT 2 29
DEBUG C226
0.22 UF
10%
10 V
X5R
201
M1083063-001
SM
COLD RESET

29 BI WARM_RESET_N
29 2 BI COLD_RESET_N
29 BI PWRSW_N_SW
J10
2X3HDR
SM
DEBUG_HDT
X876507-001

V_SB1P8
DEBUG_HDT R257 1 KOHM 1% EMPTY 402
DEBUG_HDT R260 1 KOHM 1% EMPTY 402
DEBUG_HDT R261 1 KOHM 1% EMPTY 402
DEBUG_HDT R262 1 KOHM 1% EMPTY 402

V_SB1P8
DEBUG_HDT R154 1 KOHM 1% EMPTY 402
DEBUG_HDT R161 0 OHM 5% 402 CH
25 OUT TRST_L
DEBUG_HDT C221 1 UF 20% 6.3 V X5R 201
DEBUG_HDT C220 0.1 UF 10% 16 V X5R 201
DEBUG_HDT C308 0.1 UF 10% 16 V X5R 201
DEBUG_HDT J9
2x10HDR_HDT
SM
X864221-001
1 SOC_TCK
3 SOC_TMS
5 SOC_TDI
7 SOC_TDO
9 PWROK_BUF
11 RESET_L_BUF
13 DBRDY
15 DBREQ_L
17 PLLTEST0
19 PLLTEST1
HDT_TRST
HDT_PIN11
HDT_PIN13
HDT_PIN15
2 SOC_TCK OUT 2 25
4 SOC_TMS OUT 2 25
6 SOC_TDI OUT 2 25
8 SOC_TDO OUT 2 25
10 PWROK_BUF IN 2 25
OUT 25
DEBUG_HDT R162 10 KOHM 1% CH 402
DEBUG_HDT R155 10 KOHM 1% CH 402
DEBUG_HDT R156 10 KOHM 1% CH 402
DEBUG_HDT R288 1 KOHM 1% CH 402
DEBUG_HDT R289 1 KOHM 1% CH 402
DEBUG_HDT R290 10 KOHM 1% CH 402

V_SB1P8
DEBUG_HDT
SW2 SW
TACT SW
29 WARM_RESET_N
V_SB1P8
DEBUG_HDT R150 47 KOHM 1% CH 402
DEBUG_HDT C203 0.22 UF 10% 10 V X5R 201
DEBUG_HDT U37 IC
SN74AUP1G17
VCC 5
A 2
NC 1
GND 3
Y 4
WARM_RESET_N_DEBOUNCE
V_SB1P8
DEBUG_HDT C204 0.22 UF 10% 10 V X5R 201
M1083063-001
SM
WARM RESET
X862374-001
SC70-5

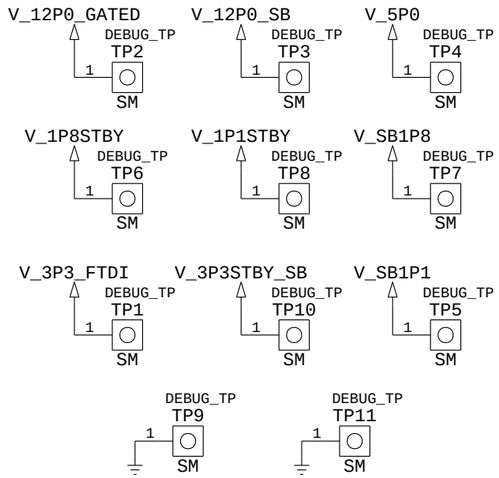
V_SB1P8
DEBUG_HDT U38 IC
74LVC1G07
VCC 5
A 2
NC 1
GND 3
Y 4
OUT 2 25
SOC_RST_N
25 2 IN SOC_PWR_OK 3
X801758-001
SC70
BUFFER MAKES SOC_RST_N OUTPUT
OPEN DRAIN TO PREVENT
SIGNAL CONTENTION

V_SB1P8
DEBUG_HDT U39 IC
SN74AUP2G07
VCC 5
1A 1
2A 2
GND 2
1Y 6
2Y 4
DEBUG_HDT C202 0.22 UF 10% 10 V X5R 201
DEBUG_HDT R259 1 KOHM 1% CH 402
DEBUG_HDT R258 1 KOHM 1% CH 402
X865298-001
SC70-6

MICROSOFT CONFIDENTIAL	PROJECT NAME	PAGE	CSA PAGE	FAB	VER
	Toledo SB	29/32	29/32	E	1.04

DEBUG: TEST POINTS, LEDS, USB2 SWITCH

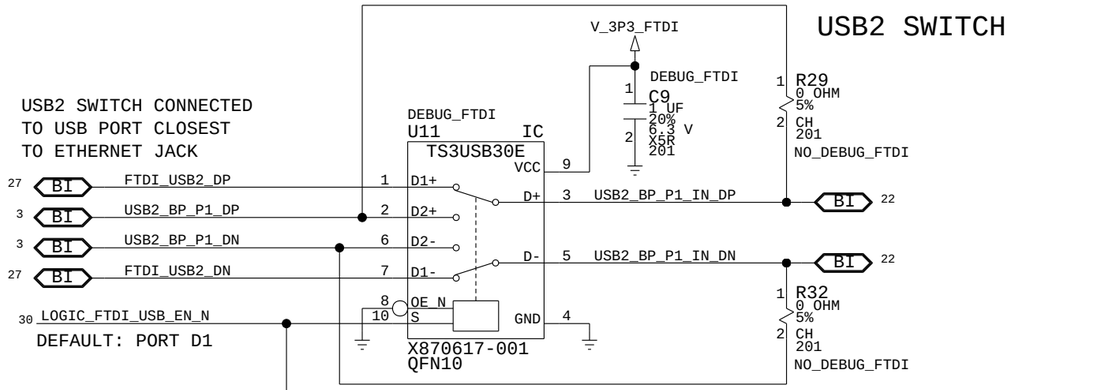
NOTE: THESE TEST POINTS ARE NOT
TO BE USED FOR VOLTAGE REGULATOR
QUALIFICATION TEST POINTS



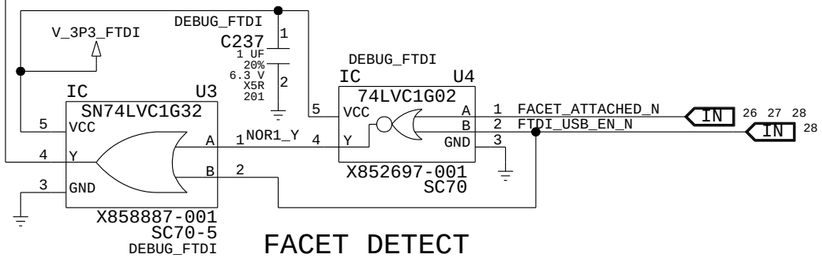
USB2 SWITCH

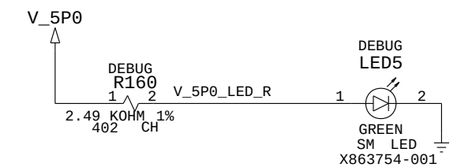
USB2 SWITCH CONNECTED
TO USB PORT CLOSEST
TO ETHERNET JACK

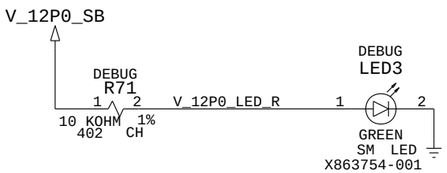
DEFAULT: PORT D1

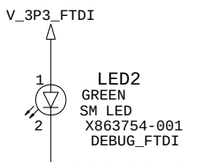


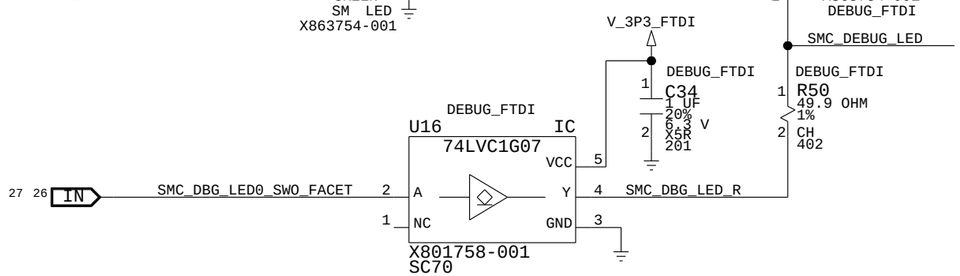
FACET DETECT



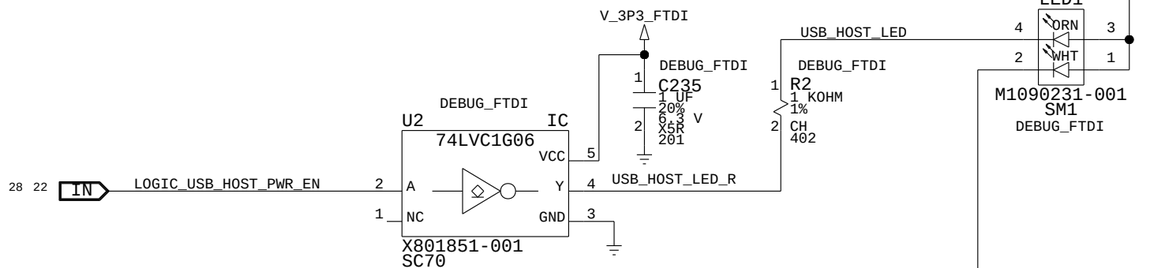




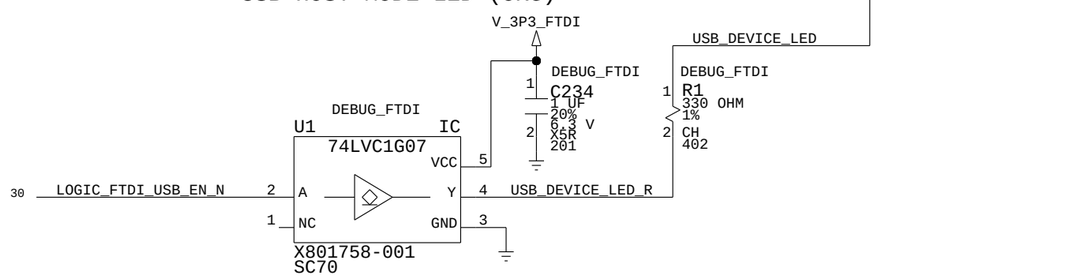




SMC DEBUG LED (GRN)



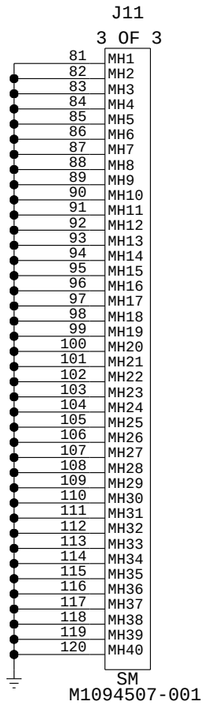
USB HOST MODE LED (ORG)



USB DEVICE MODE LED (WHT)

MICROSOFT CONFIDENTIAL	PROJECT NAME	PAGE	CSA PAGE	FAB	VER
	Toledo SB	30/32	30/32	E	1.04

LABELS AND MOUNTING



INTELLIGENT SERIAL NUMBER TARGET

MXXXXXXX-001	MATL	REF_DES	DESCR.	BOM PROPERTY	
MXXXXXXX-00X	FR4	PCB1	PCB,TOLEDO,6LAYERS,GI,FR4,SB,FAB E	PCB_GI	
M1127054-001	FR4	PCB1	PCB,TOLEDO,6LAYERS,OSP,FR4,SB,DEBUG,RF,FAB E	PCB_OSP_DEBUG	USES DEBUG NETLIST
M1126891-002	FR4	PCB1	PCB,TOLEDO,6LAYERS,OSP,FR4,SB,RF,FABE,RETAIL	PCB_OSP_RETAIL_RF	USES RETAIL NETLIST
M1128162-002	FR4	PCB1	PCB,TOLEDO,6LAYERS,OSP,FR4,SB,NON-RF,FABE,RETAIL	PCB_OSP_RETAIL_NO_RF	USES RETAIL NETLIST W/RF INDUCTOR SHORTED

NOTE: MUST ADD ELECTRICAL SHORT ACROSS L5 IN BOARD FILE
TO PHYSICALLY CREATE PCB_OSP_RETAIL_NO_RF CONFIG

MICROSOFT CONFIDENTIAL	PROJECT NAME	PAGE	CSA PAGE	FAB	VER
	Toledo SB	31/32	31/32	E	1.04

BOM DEFINITIONS

BOM	DEFINITION
AUDIO	INCLUDES COMPONENTS FOR THE STANDARD AUDIO SOLUTION
AUDIO_PREM	INCLUDES COMPONENTS FOR THE PREMIUM SE/LE SPEAKER SOLUTION
COMMON	ALL COMPONENTS WITH NO BOM PROPERTY
DEBUG	COMPONENTS REQUIRED FOR BRING UP & DEBUG
NO_DEBUG_FTDI	DO NOT USE WITH DEBUG_FTDI OPTION. BYPASSES DEBUG_FTDI FOOTPRINTS AND CONNECTS USB R0 ENABLE TO SMC
DEBUG_FTDI	DO NOT USE WITH NO_DEBUG_FTDI OPTION. ADDS COMPONENTS TO SUPPORT DEBUGGING OVER USB. USE WITH USB_LOAD_SWITCH_DEBUG
DEBUG_HDT	HDT-RELATED DEBUG COMPONENTS
DEBUG_SHUNT	COMPONENTS WHICH ARE ON DEBUG BOARDS, BUT ARE REMOVED/SHORTED ON RETAIL
EMMC	POPULATE TO SUPPORT EMMC INTERFACE
EMMC_BASE	DUMMY PLACE HOLDER FOR EMMC DEVICE & RESISTORS. NEVER USE THIS IN THE RECIPE FILE. SELECT ONE OF THESE INSTEAD: EMMC_HYNIX_16NM, EMMC TOSHIBA_15NM, EMMC SAMSUNG_14NM
EMMC_HYNIX_16NM	HYNIX EMMC DEVICE
EMMC_SAMSUNG_14NM	SAMSUNG EMMC DEVICE
EMMC_TOSHIBA_15NM	TOSHIBA EMMC DEVICE
CON_USB_BASE	DUMMY PLACE HOLDER FOR USB CONNECTORS. NEVER USE IN RECIPE FILE
CON_USB_FOXC	FOXCONN USB CONNECTORS
CON_USB_AMP	AMPHENOL USB CONNECTORS
CON_RJ45_BASE	DUMMY PLACE HOLDER FOR RJ45 CONNECTOR. NEVER USE IN RECIPE FILE
CON_RJ45_FOXC	FOXCONN RJ45 CONNECTOR
CON_RJ45_AMP	FOXCONN RJ45 CONNECTOR
PCB_GI	FAB TYPE: GOLD
PCB_OSP	FAB TYPE: ORGANIC SOLDERABILITY PRESERVATIVE GREEN SOLDERMASK
PCB_RF	FAB TYPE: GOLD. PCB ROUTED TO POPULATE RF FILTER INDUCTOR
RTC_RETAIL	RTC CIRCUIT IMPLEMENTATION FOR RETAIL BOARDS
RTC_XDK	RTC CIRCUIT IMPLEMENTATION FOR XDK BOARDS
RF	STUFFS HIGH FREQUENCY RF FILTERS
SANTO_BASE	DUMMY PLACE HOLDER FOR SANTO SB. NEVER USE THIS IN THE RECIPE FILE. USE ONE OF THESE INSTEAD: SANTO_DEV OR SANTO_RETAIL
SANTO_DEV	DEBUG VERSION OF SANTO SB
SANTO_RETAIL	RETAIL VERSION OF SANTO SB
SPI_FLASH_WINBOND	WINBOND SPI FLASH
SPI_FLASH_MACRONIX	MACRONIX SPI FLASH
USB_LOAD_SWITCH_BASE	BASE PROPERTY FOR REAR USB LOAD SWITCHES. NEVER USE IN RECIPE FILE
USB_LOAD_SWITCH_FTDI	STUFFS RETAIL LOAD SWITCH FOR USB REAR0 AND TI LOAD SWITCH FOR REAR1. USE WITH DEBUG_FTDI
USB_LOAD_SWITCH_RICHTEK	STUFFS RICHTEK LOAD SWITCH FOR USB REAR0 AND REAR1. USE WITH NO_DEBUG_FTDI
USB_LOAD_SWITCH_TI	STUFFS TI LOAD SWITCH FOR USB REAR0 AND REAR1. USE WITH NO_DEBUG_FTDI
VR_1P1STBY_BASE	BASE PROPERTY FOR 1P1STBY REGULATOR SOURCE. NEVER USE IN RECIPE FILE
VR_1P1STBY_MPS	STUFFS MPS 1P1STBY REGULATOR
VR_1P1STBY_RICHTEK	STUFFS RICHTEK 1P1STBY REGULATOR
VR_FIXED	SET ALL VRS TO FIXED VOLTAGES (NON-MARGINED). EXCLUDES V_MEMIO. MUST BE USED IN CONJUNCTION WITH NOT VR_MM
VR_MM	ALLOWS MOST VRS TO BE MARGINED FOR M&M BOARDS. EXCLUDES V_MEMIO. MUST BE USED IN CONJUNCTION WITH NOT VR_FIXED