N23-Hana Schematic---MB

based on MT8173C

V1.3

2017-1-15

Bitland Information Technology Co.,Ltd.			
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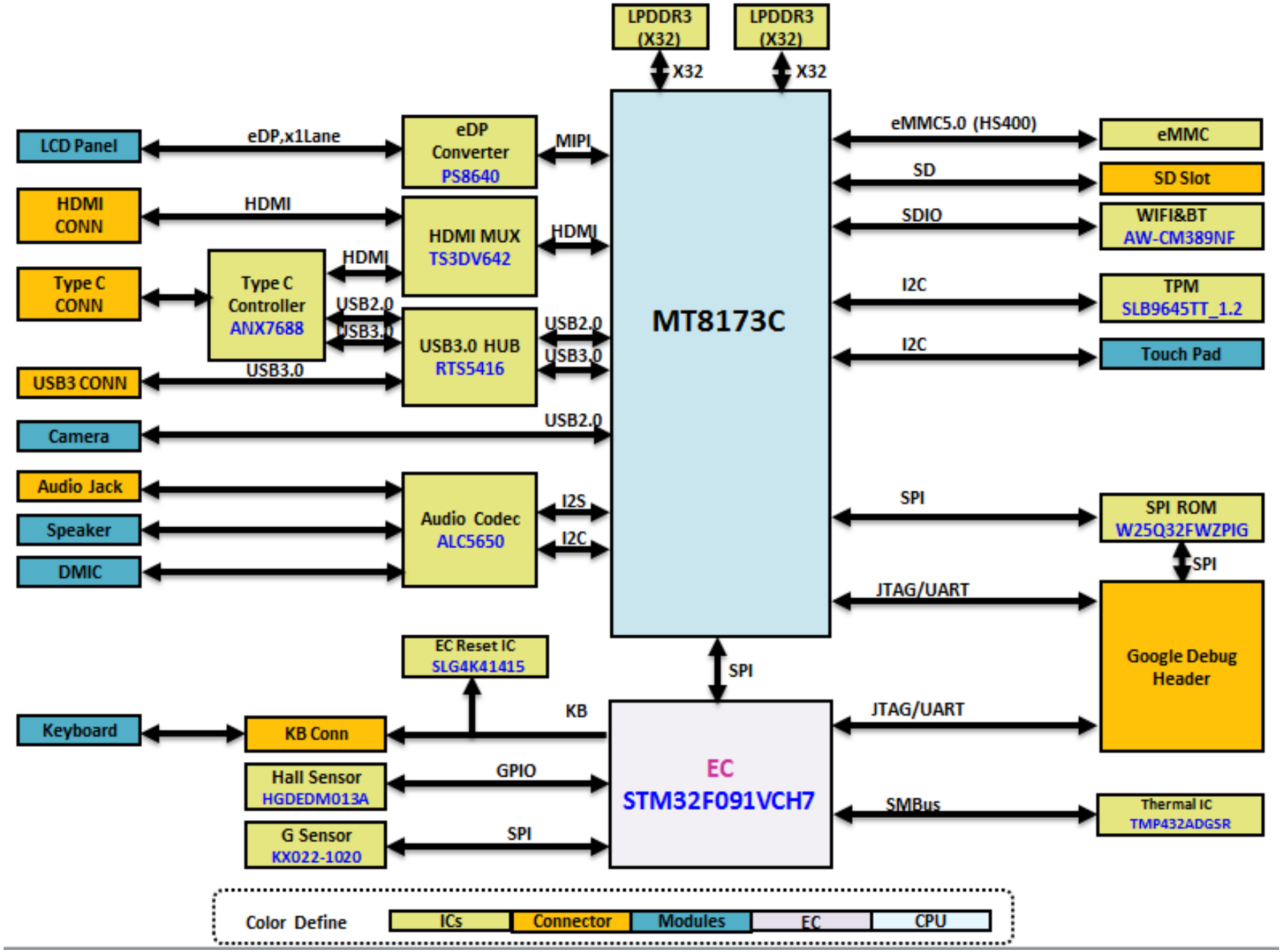

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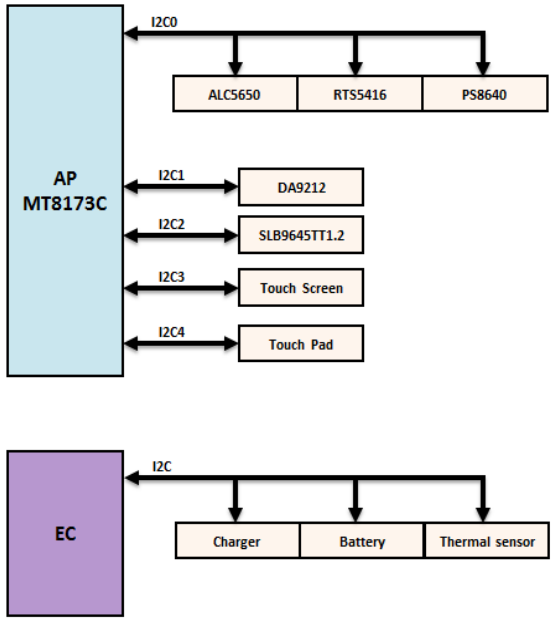
I2C Block



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Page Name	I/O Block Diagram	
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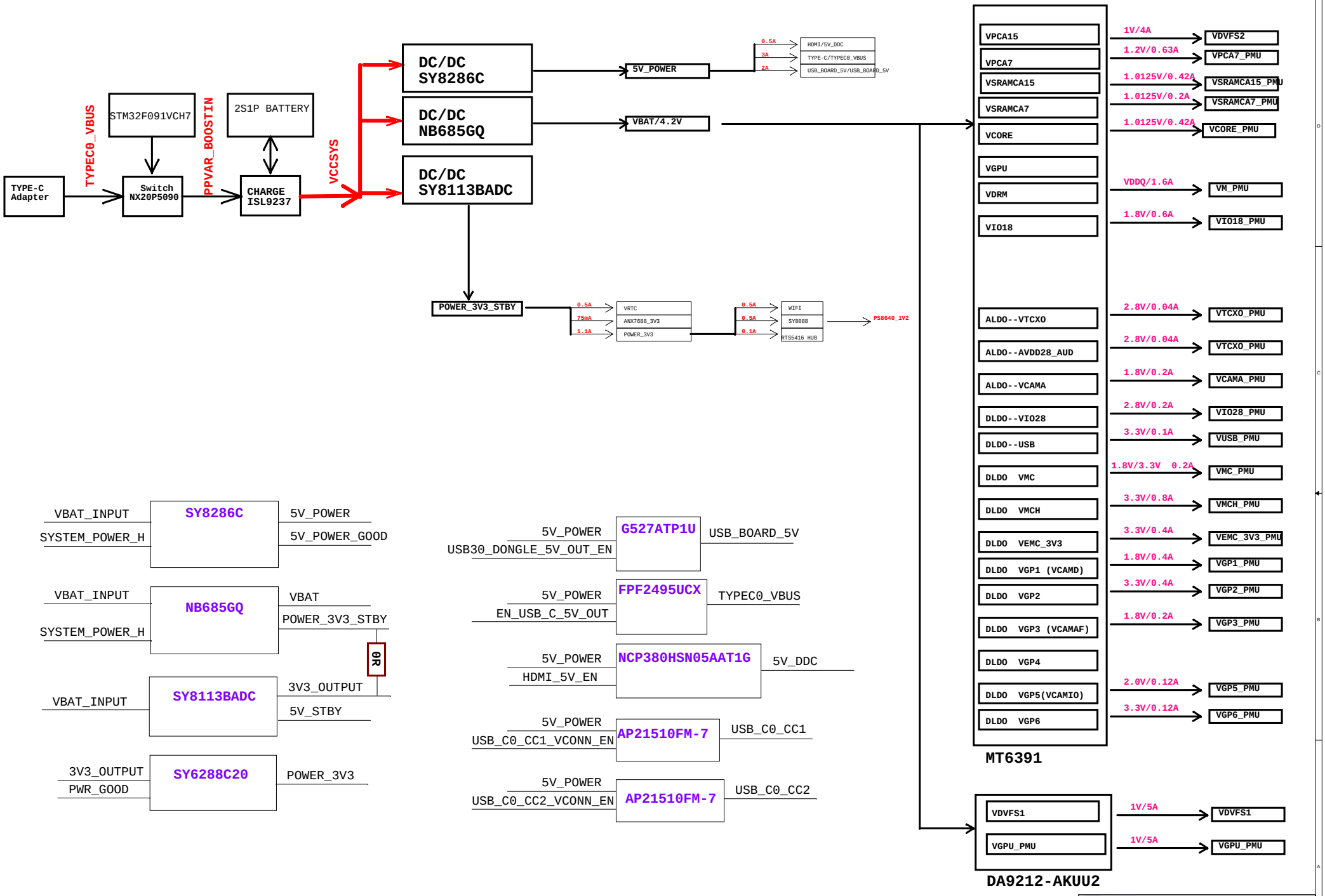

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Page Name	Power Tree	
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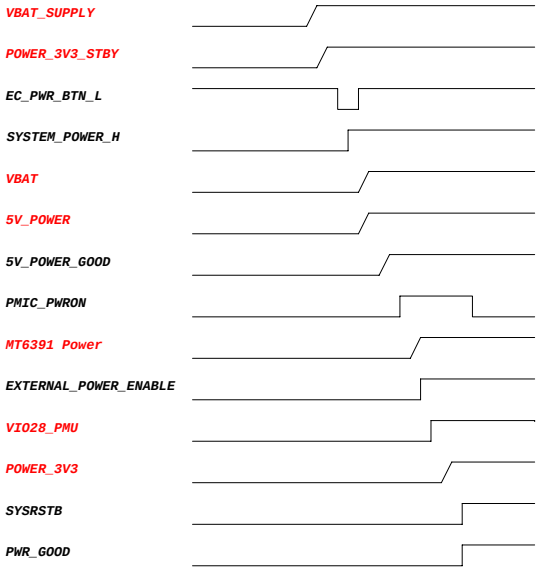

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Page Name	Power on sequence	
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178 Ball, 0.65mm pitch

VDD1=1.8V
VDD2=1.20V
VDDCA=1.2V
VDDQ= 1.20V

UM1A
MT8173

UM1B
MT8173

U1A
K4E6E304EB-EGCF
bga178_0d65x0d8_12x11d5

U1B
K4E6E304EB-EGCF
bga178_0d65x0d8_12x11d5

U2A
K4E6E304EB-EGCF
bga178_0d65x0d8_12x11d5

U2B
K4E6E304EB-EGCF
bga178_0d65x0d8_12x11d5

Near Ball M19

Place between Main chip & DRAM

DRAM VREF

Company	Bitland Information Technology Co.,Ltd.
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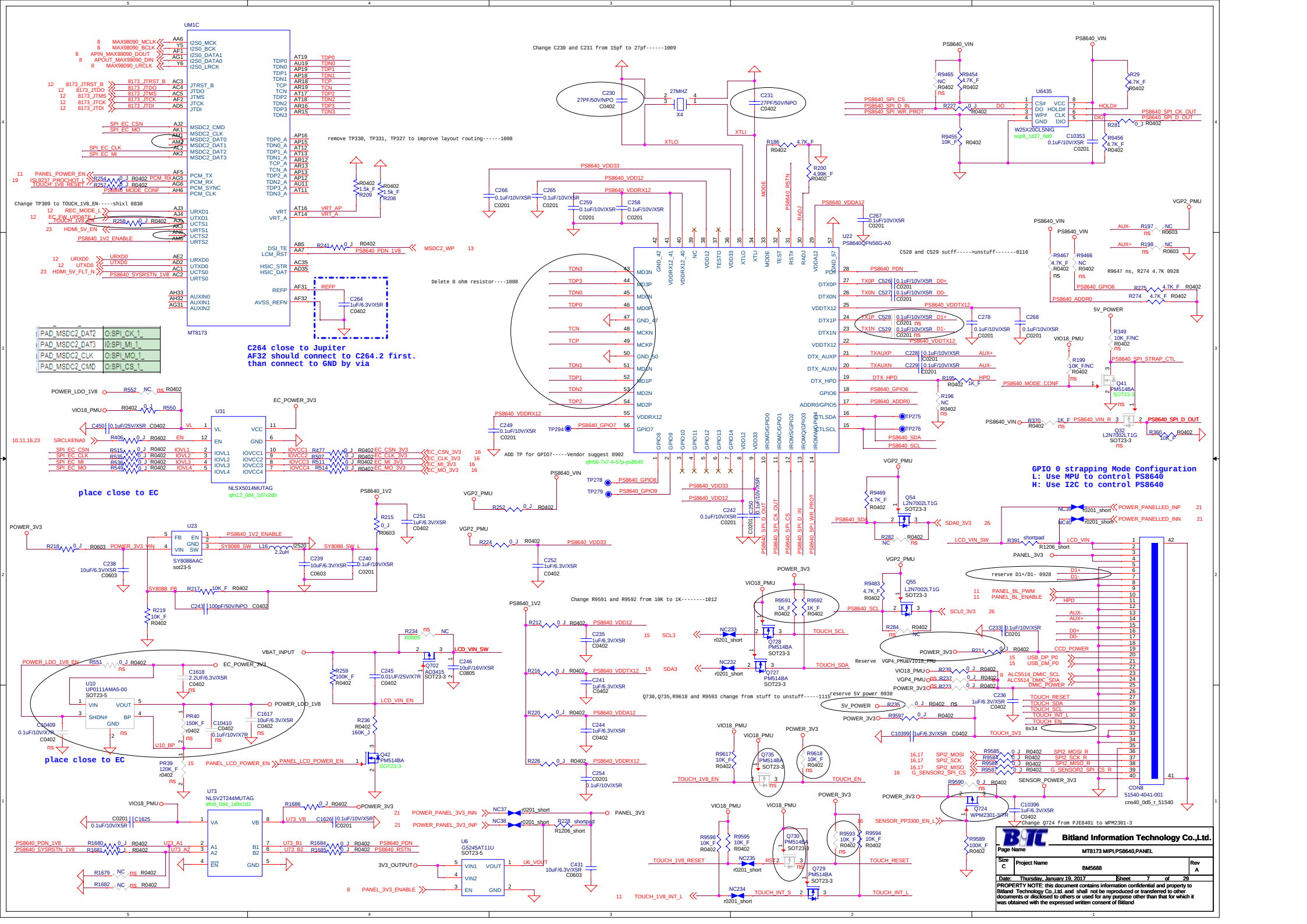
UM1C
MT8173
Change C230 and C231 from 15pf to 27pf------1009
remove TP330, TP331, TP327 to improve layout routing------1008
Change TP309 to TOUCH_1V8_EN-----shixl 0830
Delete 0 ohm resistor----1008
C264 close to Jupiter
AF32 should connect to C264.2 first.
than connect to GND by via
PAD_MSDC2_DAT2 O:SPI_CK_1_
PAD_MSDC2_DAT3 I0:SPI_MI_1_
PAD_MSDC2_CLK O:SPI_MO_1_
PAD_MSDC2_CMD O:SPI_CS_1_
place close to EC
NLSX5014MUTAG
qfn12_0d4_1d7x2d0
SY8088AAC
sot23-5
ADD TP for GPIO7-----Vendor suggest 0902
qfn56-7x7-4-57p-ps8640
C528 and C529 sutff----->unstuff-------0116
R9647 ns, R274 4.7K 0928
GPIO 0 strapping Mode Configuration
L: Use MPU to control PS8640
H: Use I2C to control PS8640
reserve D1+/D1- 0928
Change R9591 and R9592 from 10K to 1K--------1012
Q730,Q735,R9618 and R9593 change from stuff to unstuff-----1115
reserve 5V power 0930
Change Q724 from PJE8401 to WPM2301-3
W25X20CLSNIG
sop8_1d27_6d0
NLSV2T244MUTAG
dfn8_0d4_1d8x1d2
G5245AT11U
SOT23-5
U22
PS8640QFN56G-A0
U6435
U10
UP0111AMA5-00
SOT23-5
U31
U23
U73
U6
CON8
51540-4041-001
cns40_0d5_r_51540
Bitland Information Technology Co.,Ltd.
Page Name MT8173 MIPI,PS8640,PANEL
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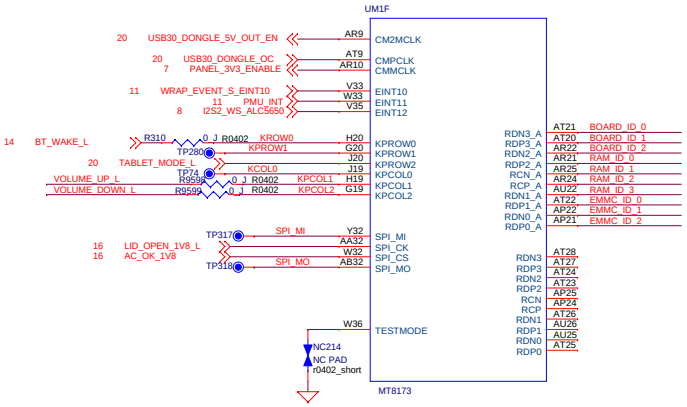
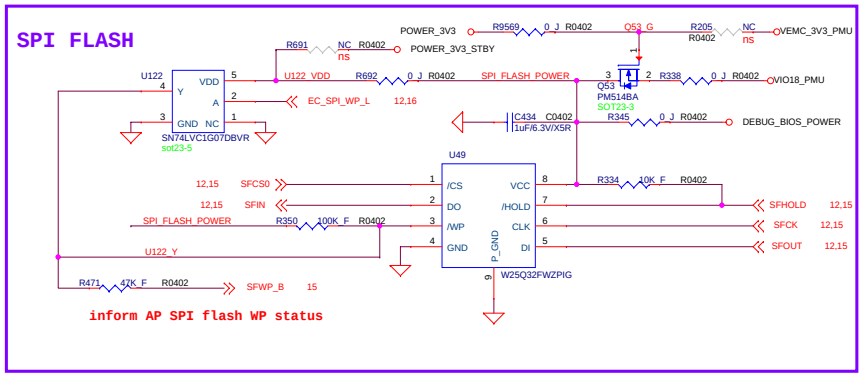
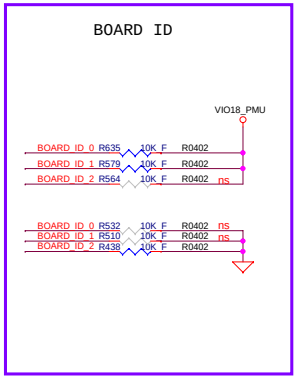
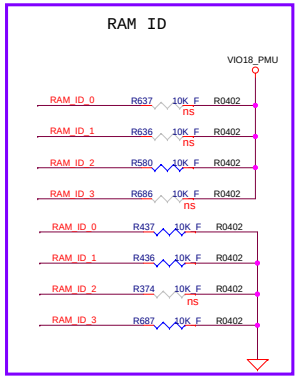


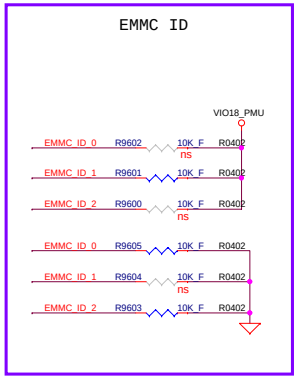


BOARD_ID_0	BOARD_ID_1	BOARD_ID_2	PCB version
0	0	0	1st build
1	0	0	Rev. 1
0	1	0	Rev. 2
1	1	0	Rev. 3 6 Layer
0	0	1	Rev. 4 6 Layer
1	0	1	Rev. 5 6 Layer
1	1	1	Rev. 7 6 Layer

RAM_ID_0	RAM_ID_1	RAM_ID_2	RAM_ID_3	DRAM Configuration
0	0	0	0	Total Size 2GB -- Hynix H9CNNNN8GTMLAR * 2
1	0	0	0	
0	1	0	0	Total Size 4GB -- Samsung K4E6E304EE-EGCF * 2
1	1	0	0	Total Size 4GB -- Hynix H9CCNNNBLTBLAR * 2
0	0	1	0	Total Size 4GB -- Samsung K4E6E304EB-EGCF * 2
1	0	1	0	Total Size 2GB -- Samsung K4E8E324EB-EGCF * 2
0	1	1	0	Total Size 4GB -- Micron MT52L512M32D2PF-107WT:B * 2
1	1	1	0	Total Size 4GB -- Hynix H9CCNNNBJTALAR-NUD * 2
0	0	0	1	Total Size 2GB -- Micron MT52L256M32D1PF-107 * 2

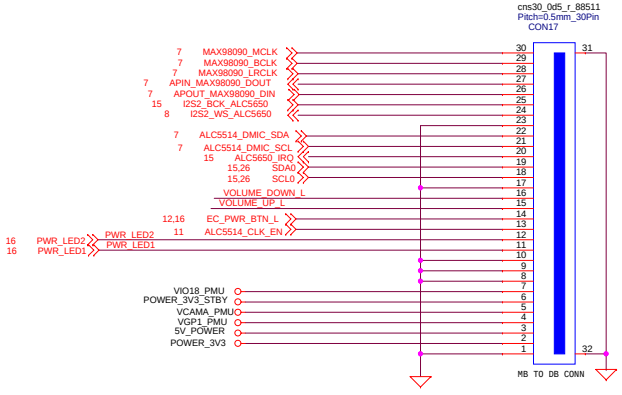






Change board ID to 000 for proto----0824
Change board ID to 001 for EVT----0930
Change board ID to 010 for DVT----1123
Change board ID[2:0] to 011 for PVT----0105

EMMC_ID_0	EMMC_ID_1	EMMC_ID_2	eMMC PN
0	0	0	Hynix H26M52208FPR
1	0	0	Samsung KLMBG2JENB-B041
0	1	0	Samsung KLMAG1JENB-B041
1	1	0	Hynix H26M64208EMR
0	0	1	Hynix H26M78208CMR
1	0	1	SanDisk SDINADF4-16G-H
0	1	1	Sandisk SDINADF4-32G-L-1001
1	1	1	



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Page Name	MT8173 MIPI GPIO,SPI FLASH	
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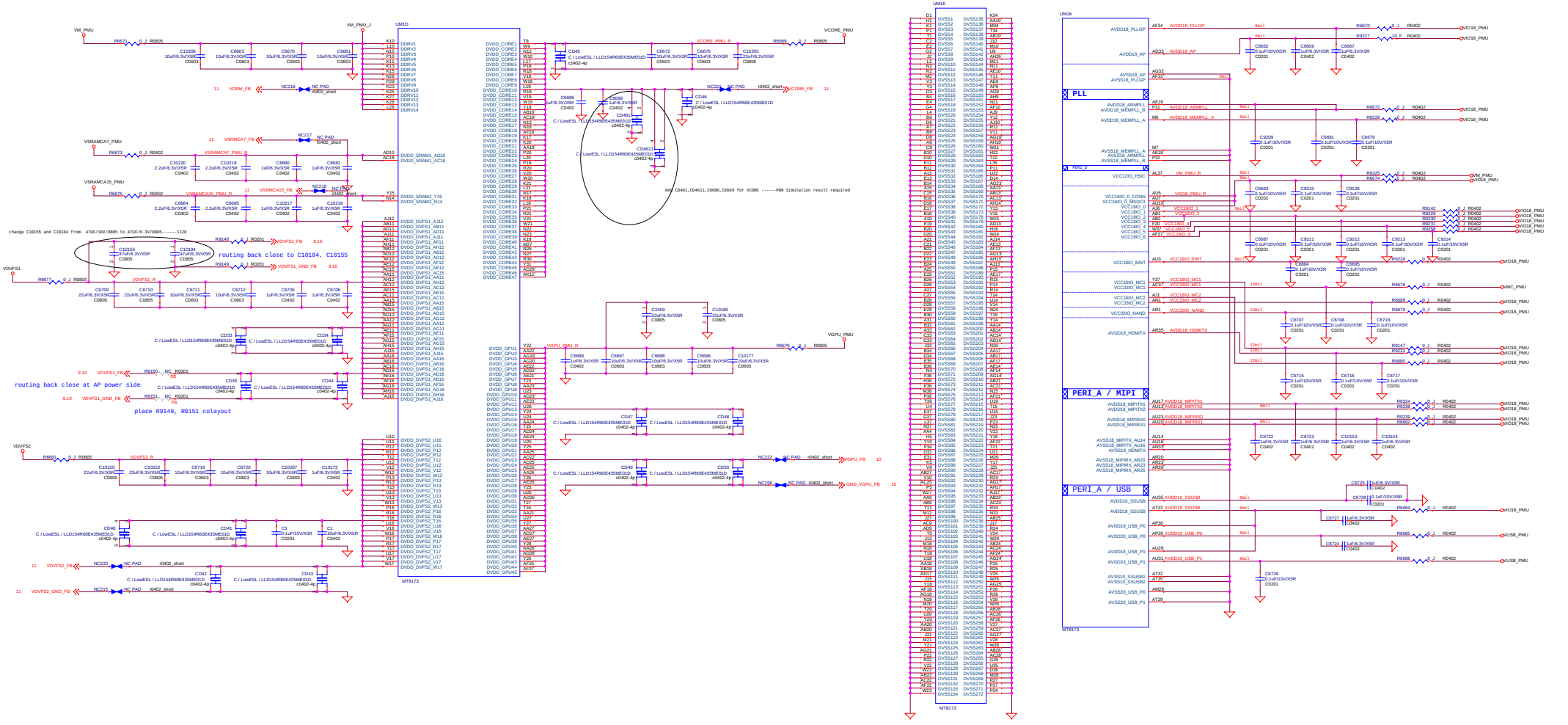
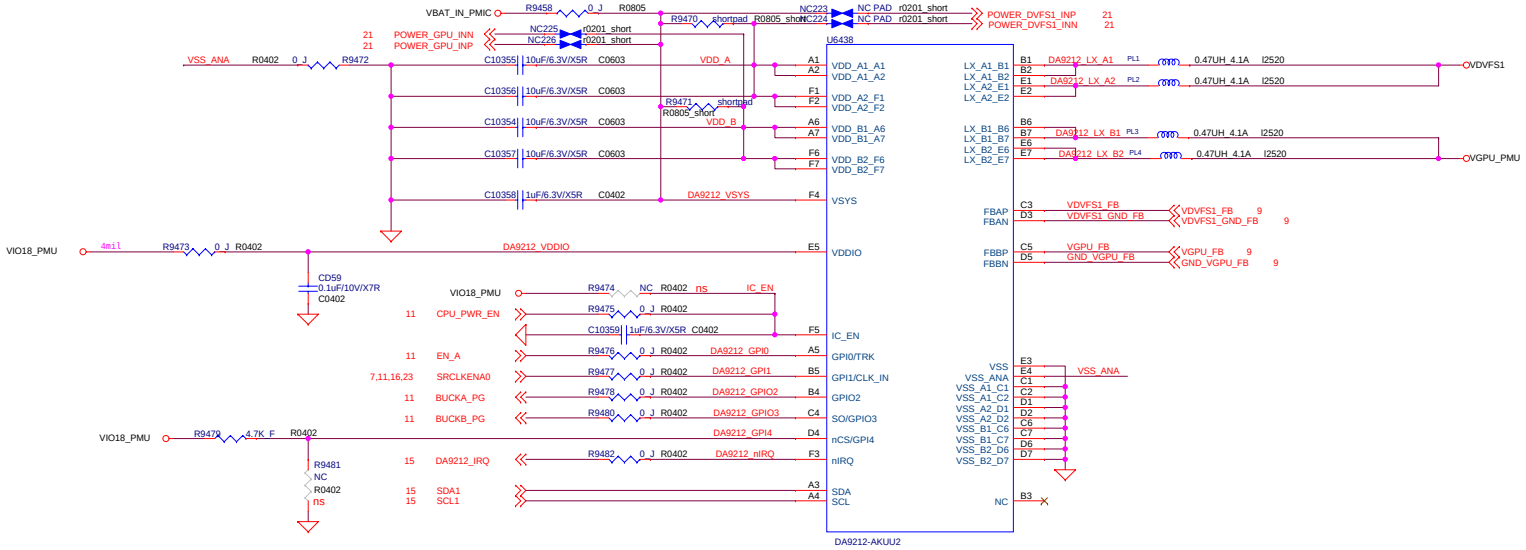

VM_PMU
VM_PMU_J
UM1D
MT8173
VSRAMCA7_PMU
VSRAMCA15_PMU
change C10155 and C10184 from 470F/10V/0805 to 470F/6.3V/0805------1128
routing back close to C10184, C10155
routing back close at AP power side
place R9149, R9151 colayout
VDVFS1
VDVFS2
UM1E
UM1K
PLL
PERI_A / MIPI
PERI_A / USB
VCORE_PMU
VGPU_PMU
Bitland Information Technology Co.,Ltd.
MT8173 POWER&GND
BM5688
Wednesday, January 18, 2017



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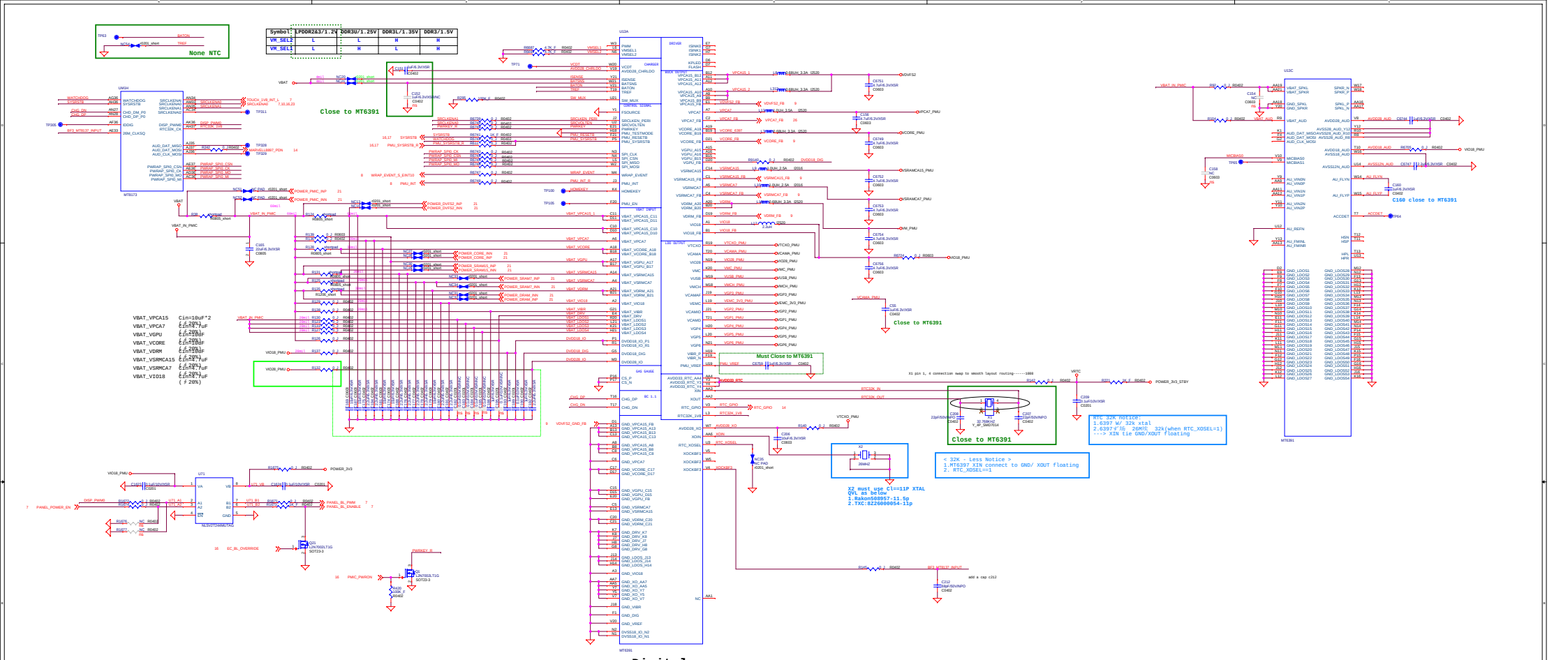

Symbol	LPDDR2&3/1.2V	DDR3U/1.25V	DDR3L/1.35V	DDR3/1.5V
VR_SEL2	L	L	H	H
VR_SEL1	L	H	L	H

VBAT_VPCA15 Cin=10uF*2 (± 20%)
VBAT_VPCA7 Cin=4.7uF (± 20%)
VBAT_VGPU Cin=10uF (± 20%)
VBAT_VCORE Cin=10uF (± 20%)
VBAT_VDRM Cin=4.7uF (± 20%)
VBAT_VSRMCA15 Cin=4.7uF (± 20%)
VBAT_VSRMCA7 Cin=4.7uF (± 20%)
VBAT_VIO18 Cin=4.7uF (± 20%)

	Symbol	Application	Vout (V)	Iout (mA)
Buck	VPCA15	CPU	0.7~1.4	4000
	VPCA7	CPU	0.7~1.4	630
	VSRAMCA15	Memory	0.7~1.4	400
	VSRAMCA7	Memory	0.7~1.4	200
	VCORE	MDSYS/Infra	0.7~1.4	1500
	VGPU	GPU	0.7~1.4	2000
	VDRM	DDR3	1.2/1.25/1.35/1.5	1300
	VIO18	IO App.	1.8	600
Analog LDO	VA28	Audio Block	2.8	40
	VTCXO	MDSYS	2.8	40
	VCAMA	VCAMA	1.5/1.8/2.5/2.8	200
Digital LDO	VIO28		2.8	200
	VUSB		3.3	100
	VMC	T-Card	1.8/3.3	200
	VMCH	T-Card	3.0/3.3	800
	VEMC_3V3	eMMC	3.0/3.3	400
	VGP1	VCAMD	1.2/1.3/1.5/1.8/2.5/2.8/3.0/3.3	300
	VGP2	VCAM_IO	1.2/1.3/1.5/1.8/2.5/2.8/3.0/3.3	200
	VGP3	VCAM_AF	1.2/1.3/1.5/1.8/2.5/2.8/3.0/3.3	200
	VGP4	CMMB	1.2/1.3/1.5/1.8/2.5/2.8/3.0/3.3	200
	VGP5	CMMB	1.2/1.3/1.5/1.8/2.6/2.5/2.8/3.0	120
	VGP6	CTP/LCM IO	1.2/1.3/1.5/1.8/2.5/2.8/3.0/3.3	300
RTC	VRTC	RTC Block	2.8	

TP216, TP285, TP283, TP282, TP296 test point could delete to let other nets routing easier.

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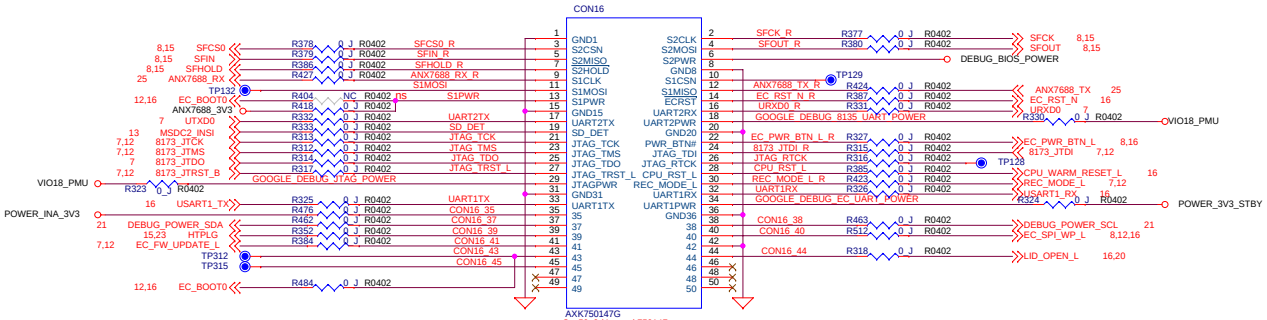
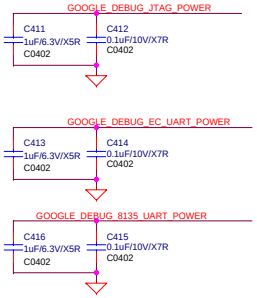
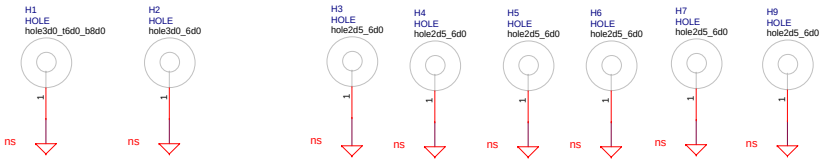
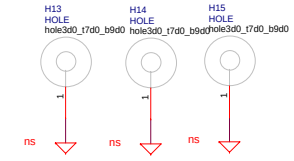
S: GOOGLE DEBUG BOARD D: Device, platform

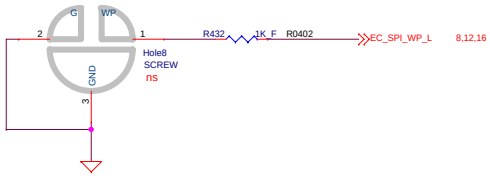
Group	Pin	Direction*	Description	x86 boards	ARM boards
GND	1	S <--> D	Shared ground plane	GND	GND
SPI2	2	S --> D	SPI2 clock (referenced to SPI2_VREF)	SPI_SCK BIOS EEPROM	SPI_SCK BIOS EEPROM
SPI2	3	S --> D	SPI2 chip select (referenced to SPI2_VREF)	SPI_CS# BIOS EEPROM	SPI_CS_L BIOS EEPROM
SPI2	4	S --> D	SPI2 data input(referenced to SPI2_VREF)	SPI_DI BIOS EEPROM	SPI_DI BIOS EEPROM
SPI2	5	S <-- D	SPI2 data output (referenced to SPI2_VREF)	SPI_DO BIOS EEPROM	SPI_DO BIOS EEPROM
SPI2	6	S <--> D	SPI2 Voltage Reference (1.8V ~ 3.3V)	SPI BIOS EEPROM voltage rail	SPI BIOS EEPROM voltage rail
SPI2	7	S -->D OD	SPI2 Hold signal. Used to float outputs on DUT EEPROM during emulation	SPI2_HOLD# (referenced to SPI2_VREF)	SPI2_HOLD_L (referenced to SPI2_VREF)
GND	8	S <--> D	Shared Ground plane	GND	GND
SPI1	9	S --> D	SPI1 clock (referenced to SPI1_VREF)	SPI_SCK EC EEPROM	SPI_SCK EC EEPROM
SPI1	10	S --> D	SPI1 chip select (referenced to SPI1_VREF)	SPI_CS# EC EEPROM	SPI_CS_L EC EEPROM
SPI1	11	S --> D	SPI1 data input(referenced to SPI1_VREF)	SPI_DI EC EEPROM	SPI_DI EC EEPROM
SPI1	12	S <-- D	SPI1 data output (referenced to SPI1_VREF)	SPI_DO EC EEPROM	SPI_DO EC EEPROM
SPI1	13	S <--> D	SPI1 Voltage Reference (1.8V ~ 3.3V)	SPI EC EEPROM voltage rail	SPI EC EEPROM voltage rail
GPIO	14	S --> D OD	EC Reset	EC_RESET#/COLD_RESET#	EC_RESET_L/COLD_RESET_L
GND	15	S <--> D	Shared Ground plane	GND	GND
UART2	16	S --> D	UART2 Rx Data (referenced to UART2_VREF)	PCH UART_RXD (or system uart from EC / SuperI/O)	ARM uP UART_RXD
UART2	17	S <-- D	UART2 Tx Data (referenced to UART2_VREF)	PCH UART_TXD (or system uart from EC / SuperI/O)	ARM uP UART_TXD
UART2	18	S <--> D	UART2 Voltage Reference (1.8V ~ 3.3V)	PCH UART voltage rail	ARM uP UART voltage rail
GPIO	19	S --> D OD	SD Card Detect - pulled low to simulate removal of an SD card	SD_DETECT	SD_DETECT
GND	20	S <--> D	Shared Ground plane	GND	GND
JTAG	21	S --> D	Jtag clock (referenced to JTAG_VREF)	EC JTAG_TCK	ARM uP JTAG_TCK
GPIO	22	S --> D OD	Power button access (low = pressed)	PWR_BTN#	PWR_BTN_L
JTAG	23	S --> D	Jtag mode select (referenced to JTAG_VREF)	EC JTAG_TMS	ARM uP JTAG_TMS
JTAG	24	S --> D	Jtag Data Input (referenced to JTAG_VREF)	EC JTAG_TDI	ARM uP JTAG_TDI
JTAG	25	S <-- D	Jtag Data output (referenced to JTAG_VREF)	EC JTAG_TDO	ARM uP JTAG_TDO
JTAG	26	S <-- D	Jtag Return Clock (referenced to JTAG_VREF)	EC JTAG_RTCK	ARM uP JTAG_RTCK
JTAG	27	S --> D	Jtag Reset (referenced to JTAG_VREF)	EC JTAG_TRST#	ARM uP JTAG_TRST_L
JTAG	28	S --> D OD	CPU/Peripheral reset	To be used as a system wide reset while JTAG'ing	To be used as a system wide reset while JTAG'ing
JTAG	29	S <--> D	Jtag Voltage reference (1.8V ~ 3.3V)	EC JTAG voltage rail	ARM uP JTAG voltage rail
GPIO	30	S --> D OD	Recovery Mode	REC_MODE_L	REC_MODE_L
GND	31	S <--> D	Shared Ground plane	GND	GND
UART1	32	S --> D	UART1 Rx Data (referenced to UART1_VREF)	EC UART_RXD	EC UART_RXD
UART1	33	S <-- D	UART1 Tx Data (referenced to UART1_VREF)	EC UART_TXD	EC UART_TXD
UART1	34	S <--> D	UART1 Voltage Reference (1.8V ~ 3.3V)	EC UART voltage rail	EC UART voltage rail
I2C	35	S --> D	Power supplied by debug board for power measurement devices on DUT	Connect to INA's on DUT	Connect to INA's on DUT
GND	36	S <--> D	Shared Ground plane	GND	GND
I2C	37	S <--> D OD	I2C data line to communicate with Power measurement devices	Connect to INA's on DUT	Connect to INA's on DUT
I2C	38	S --> D OD	I2C clock line to communicate with Power measurement devices	Connect to INA's on DUT	Connect to INA's on DUT
GPO	39	S --> D OD	Hot Plug Detect - pulled low to simulate external display disconnect	HPD	HPD
GPIO	40	S --> D	Enable WP on BIOS SPI bus (referenced to SPI2_VREF)	FW_WP (do not hard tie to VCC or GND). Referenced to SPI2_VREF	FW_WP (do not hard tie to VCC or GND). Referenced to SPI2_VREF
GPIO	41	S --> D OD	Thermal trip simulation/Firmware Update(ARM)	PROC_HOT_L/FW_UPDATE_L	PROC_HOT_L/FW_UPDATE_L
GND	42	S <--> D	Shared Ground plane	GND	GND
				**See note below	**See note below
GPIO	43**	S --> D OD	Developer Mode	DEV_MODE	DEV_MODE
GPIO	44**	S --> D OD	Lid Open	LID_OPEN	LID_OPEN
GPIO	45**	S --> D OD	PCH disable/CPU NMI (ARM)	PCH_DISABLE_L/CPU_NMI	PCH_DISABLE_L/CPU_NMI
GPIO	46**	S --> D OD	Keyboard matrix, column 1	KBD_COL1	KBD_COL1
GPIO	47**	S --> D OD	Keyboard matrix, column 2	KBD_COL2	KBD_COL2
GPIO	48**	S <--> D OD	Keyboard matrix, row 1	KBD_ROW1	KBD_ROW1
GPIO	49**	S <--> D OD	Keyboard matrix, row 2	KBD_ROW2	KBD_ROW2
GPIO	50**	S <--> D OD	Keyboard matrix, row 3	KBD_ROW3	KBD_ROW3

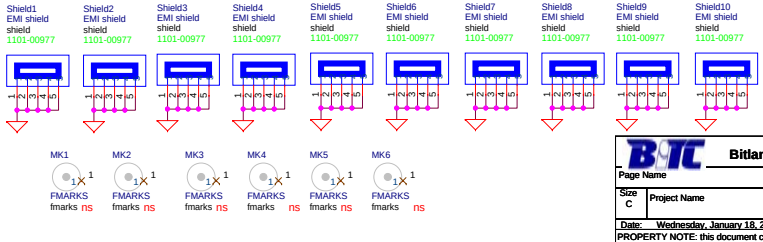












Bitland Information Technology Co.,Ltd.

Page Name	Google_DEBUG CONN,SCREW	
Size C	Project Name BM5688	Rev A
Date: Wednesday, January 18, 2017	Sheet 12 of 29	

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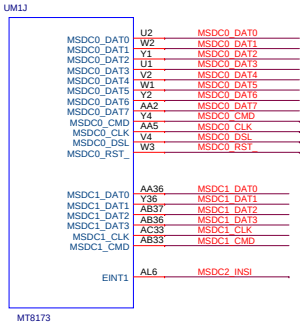
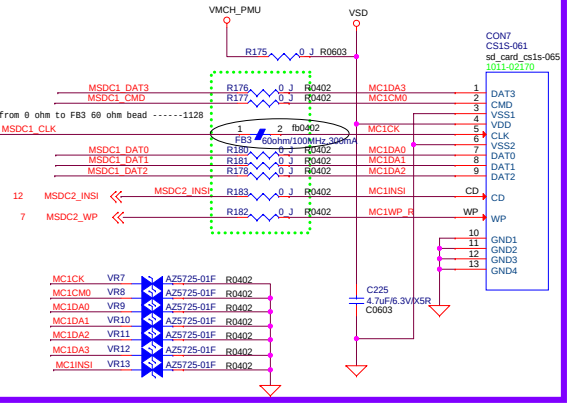


SD CARD 1

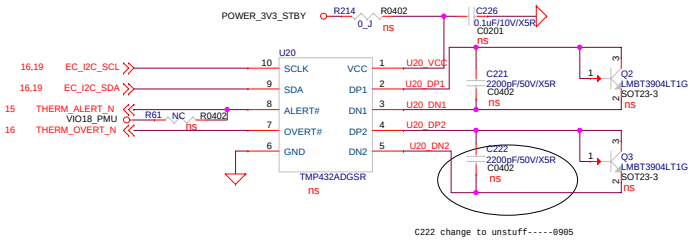
MSDC1

Shielding connect to ground

MSDC1_CLK need GND shielding

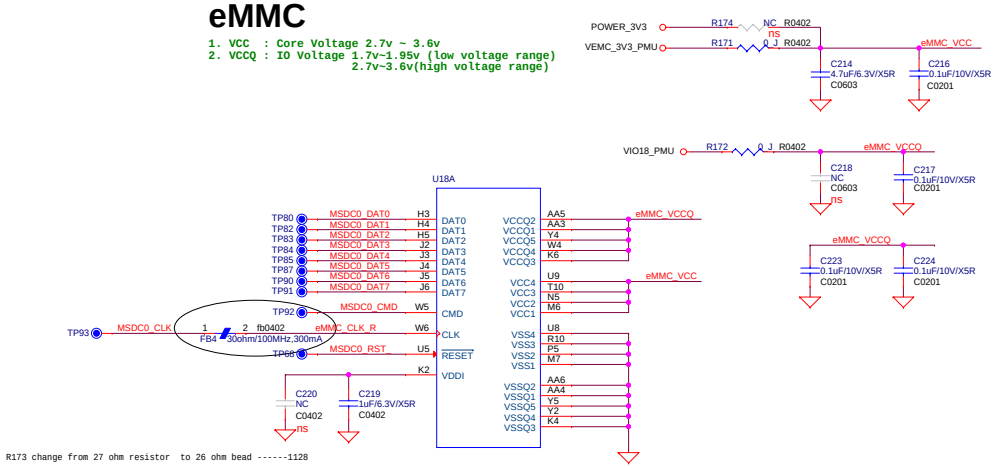


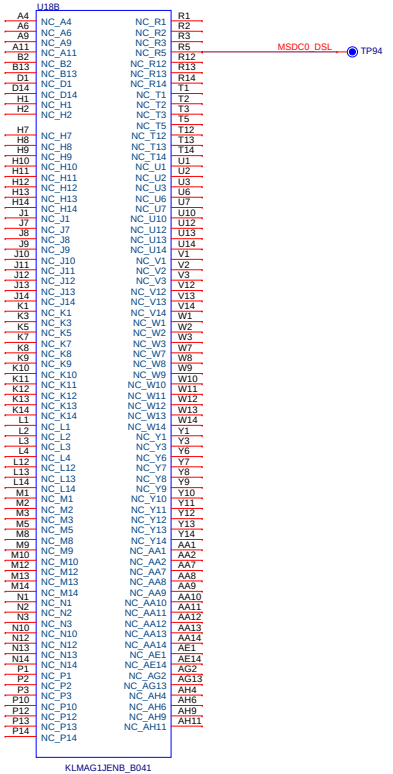
THERMAL SENSOR



eMMC

1. VCC : Core Voltage 2.7v ~ 3.6v
2. VCCQ : IO Voltage 1.7v~1.95v (low voltage range)
   2.7v~3.6v(high voltage range)





Bitland Information Technology Co.,Ltd.	
Page Name	EMMC/SD Card/Thermal Sensor
Size C / Project Name	BM5688 / Rev A
Date: Thursday, January 19, 2017	Sheet 13 of 29

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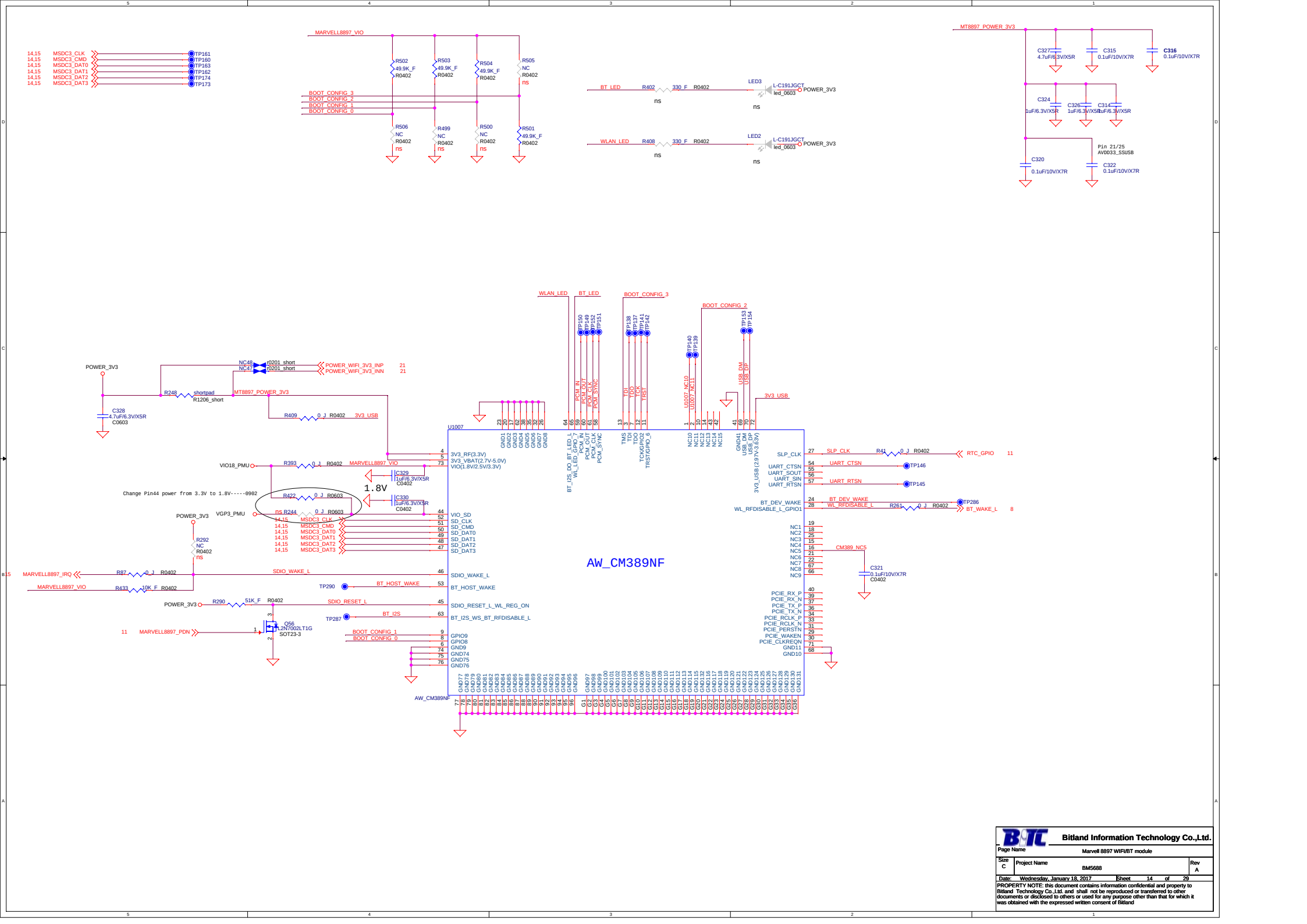

Bitland Information Technology Co.,Ltd.			
Page Name	Marvell 8897 WIFI/BT module		
Size C	Project Name BM5688		Rev A
Date: Wednesday, January 18, 2017	Sheet 14 of 29		

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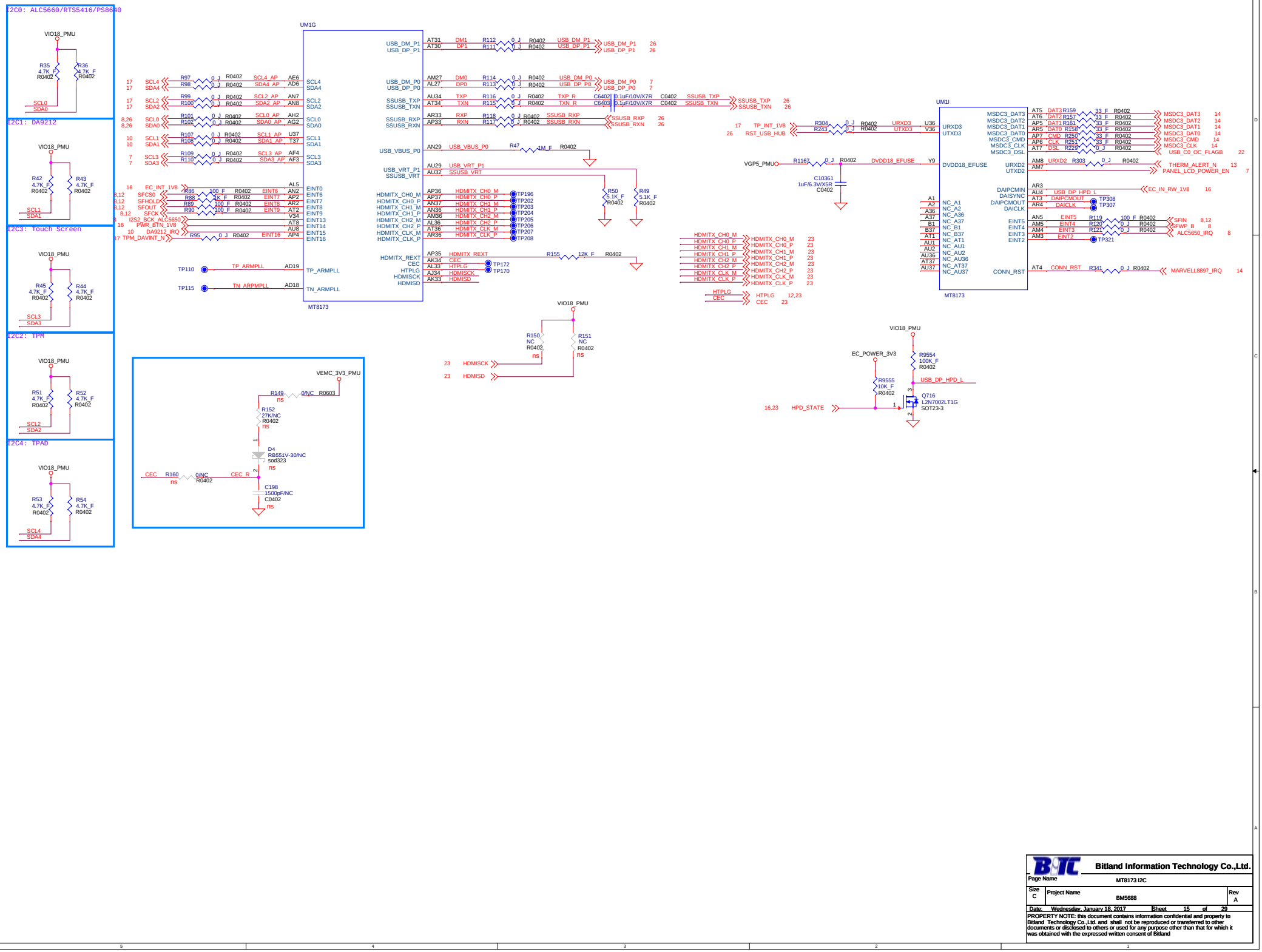
I2C0: ALC5660/RTS5416/PS8640
I2C1: DA9212
I2C3: Touch Screen
I2C2: TPM
I2C4: TPAD
VIO18_PMU
SCL0
SDA0
SCL1
SDA1
SCL3
SDA3
SCL2
SDA2
SCL4
SDA4
UM1G
MT8173
USB_DM_P1
USB_DP_P1
USB_DM_P0
USB_DP_P0
SSUSB_TXP
SSUSB_TXN
SSUSB_RXP
SSUSB_RXN
USB_VBUS_P0
USB_VRT_P1
SSUSB_VRT
HDMITX_CH0_M
HDMITX_CH0_P
HDMITX_CH1_M
HDMITX_CH1_P
HDMITX_CH2_M
HDMITX_CH2_P
HDMITX_CLK_M
HDMITX_CLK_P
HDMITX_REXT
CEC
HTPLG
HDMISCK
HDMISD
TP_ARMPLL
TN_ARMPLL
UM1I
MSDC3_DAT3
MSDC3_DAT2
MSDC3_DAT1
MSDC3_DAT0
MSDC3_CMD
MSDC3_CLK
MSDC3_DSL
USB_C0_OC_FLAGB
THERM_ALERT_N
PANEL_LCD_POWER_EN
EC_IN_RW_1V8
SFIN
SFWP_B
ALC5650_IRQ
MARVELL8897_IRQ
CONN_RST
VGP5_PMU
DVDD18_EFUSE
TP_INT_1V8
RST_USB_HUB
VEMC_3V3_PMU
EC_POWER_3V3
HPD_STATE
USB_DP_HPD_L
Q716
L2N7002LT1G
SOT23-3
D4
RB551V-30/NC
sod323
Bitland Information Technology Co.,Ltd.
MT8173 I2C
BM5688
Wednesday, January 18, 2017
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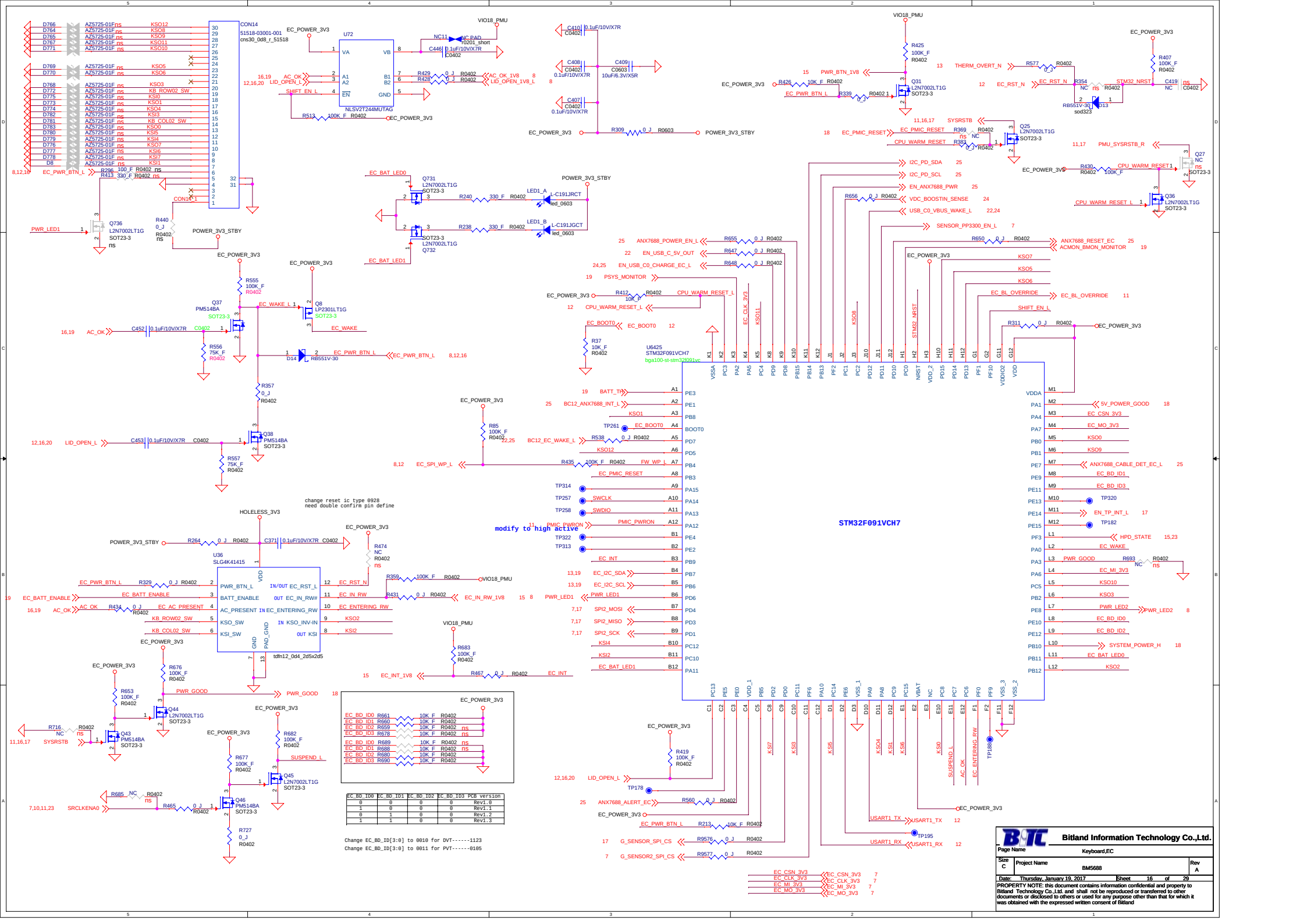
STM32F091VCH7
modify to high active
change reset ic type 0928
need double confirm pin define
Change EC_BD_ID[3:0] to 0010 for DVT-----1123
Change EC_BD_ID[3:0] to 0011 for PVT-----0105
Bitland Information Technology Co.,Ltd.
Page Name Keyboard,EC
Size C
Project Name BM5688
Rev A
Date: Thursday, January 19, 2017 Sheet 16 of 29
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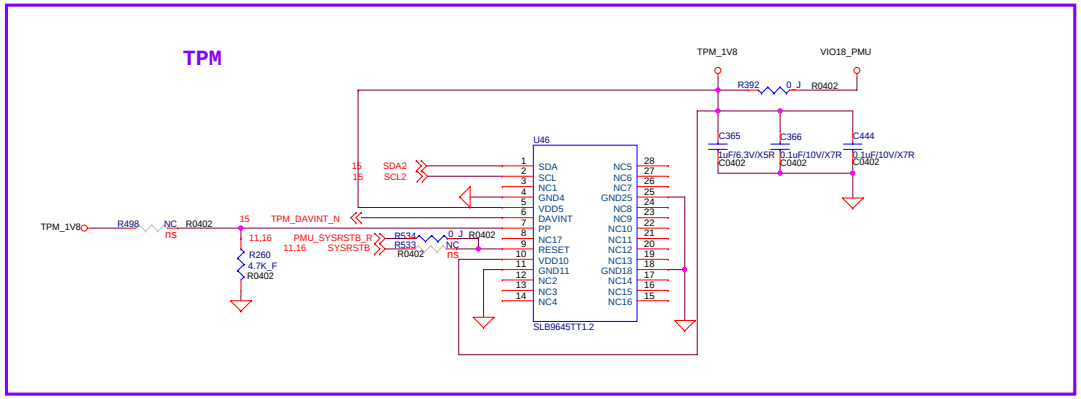

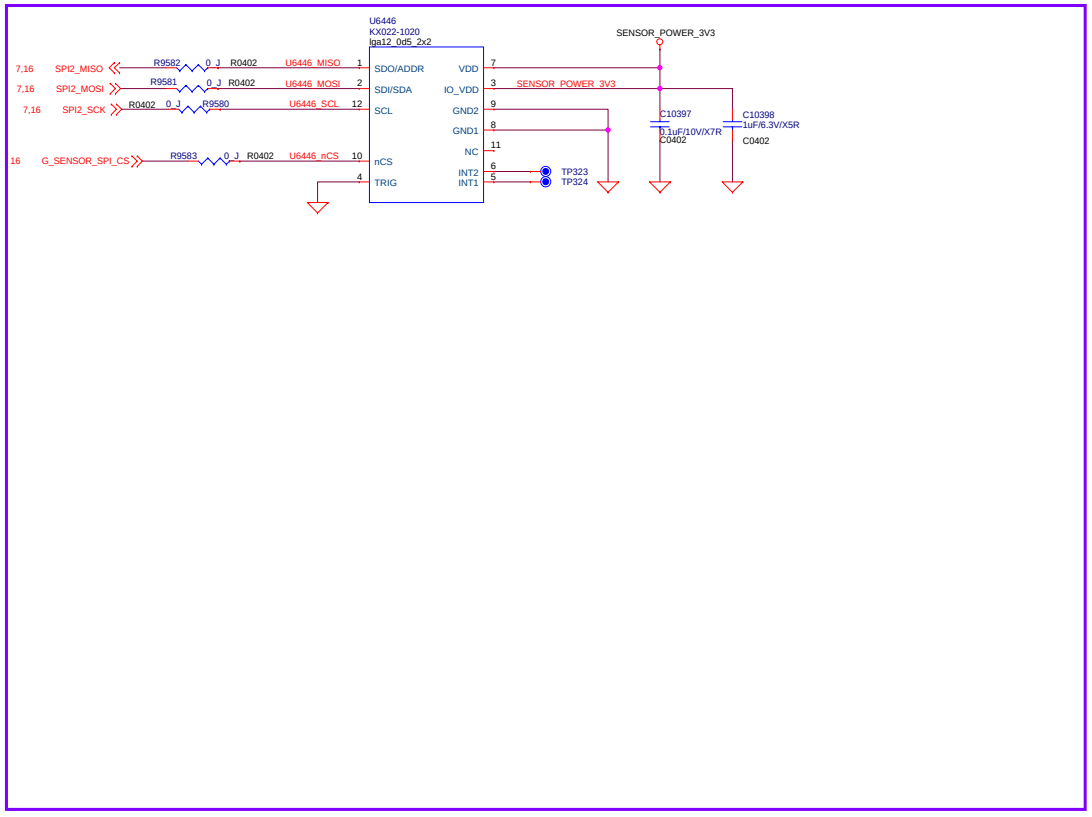

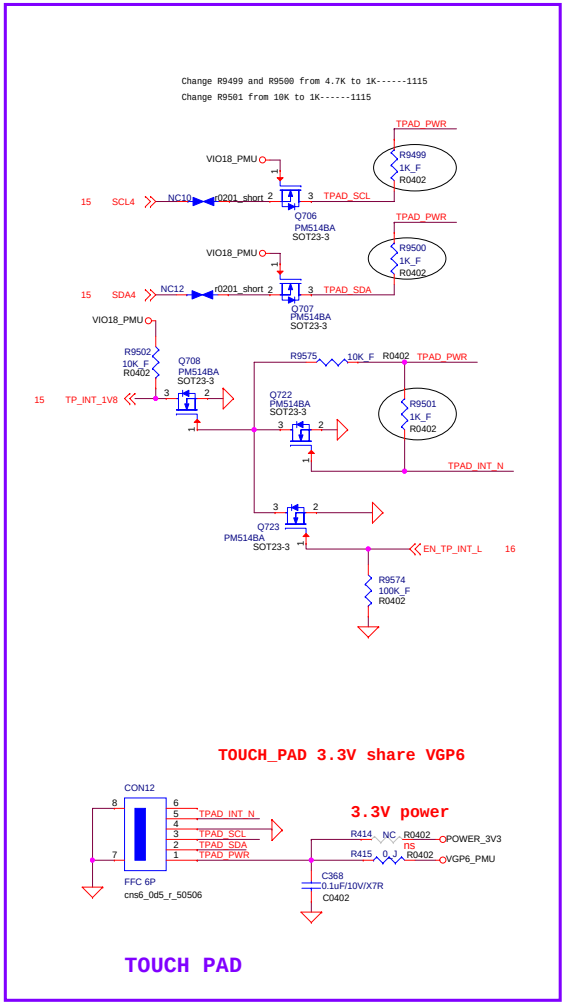

Bitland Information Technology Co.,Ltd.		
Page Name	TPM,Touch Pad	
Size C	Project Name BM5688	Rev A
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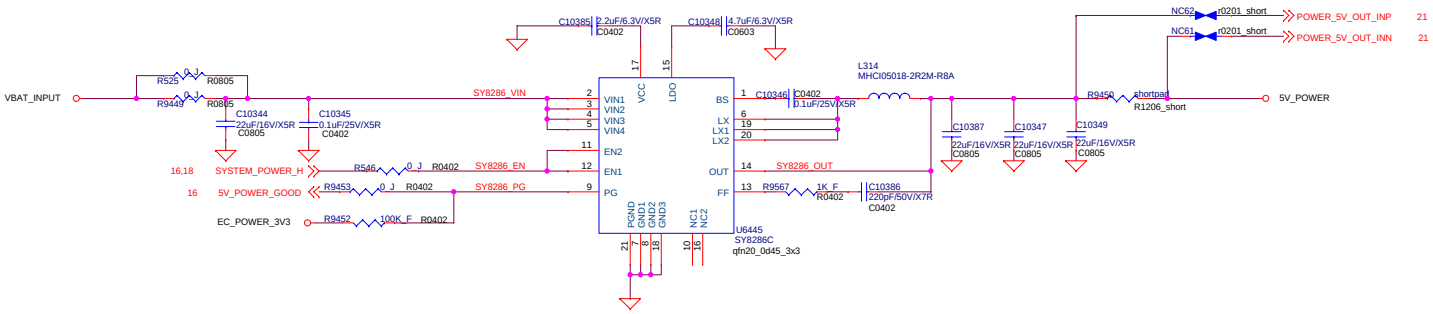
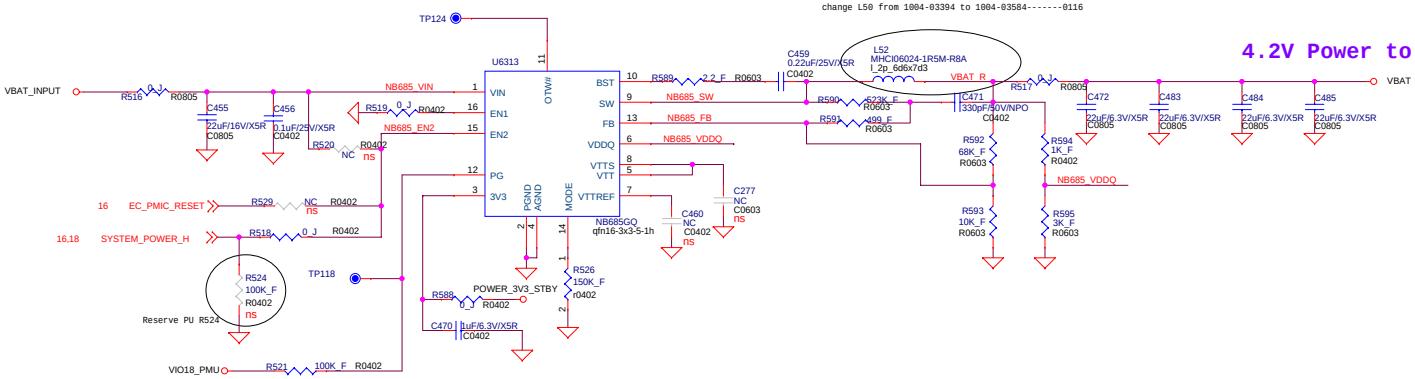


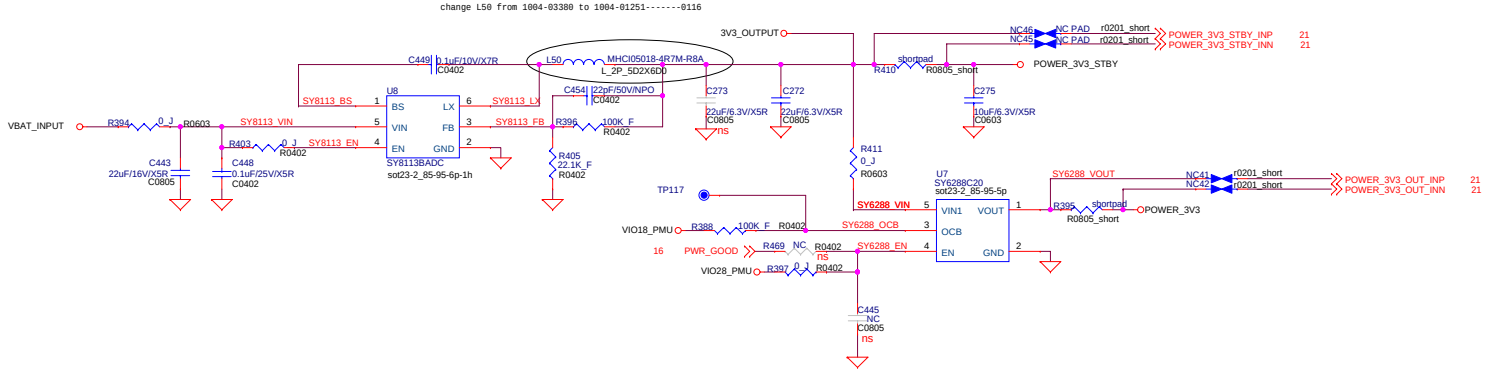
change L50 from 1004-03394 to 1004-03584------0116

4.2V Power to MT6391/DA9212



MP stage can remove G5245AT11U, SMT R441 0 ohm

change L50 from 1004-03380 to 1004-01251------0116



Bitland Information Technology Co.,Ltd.

Page Name	5V,4.2V,3.3V Power	
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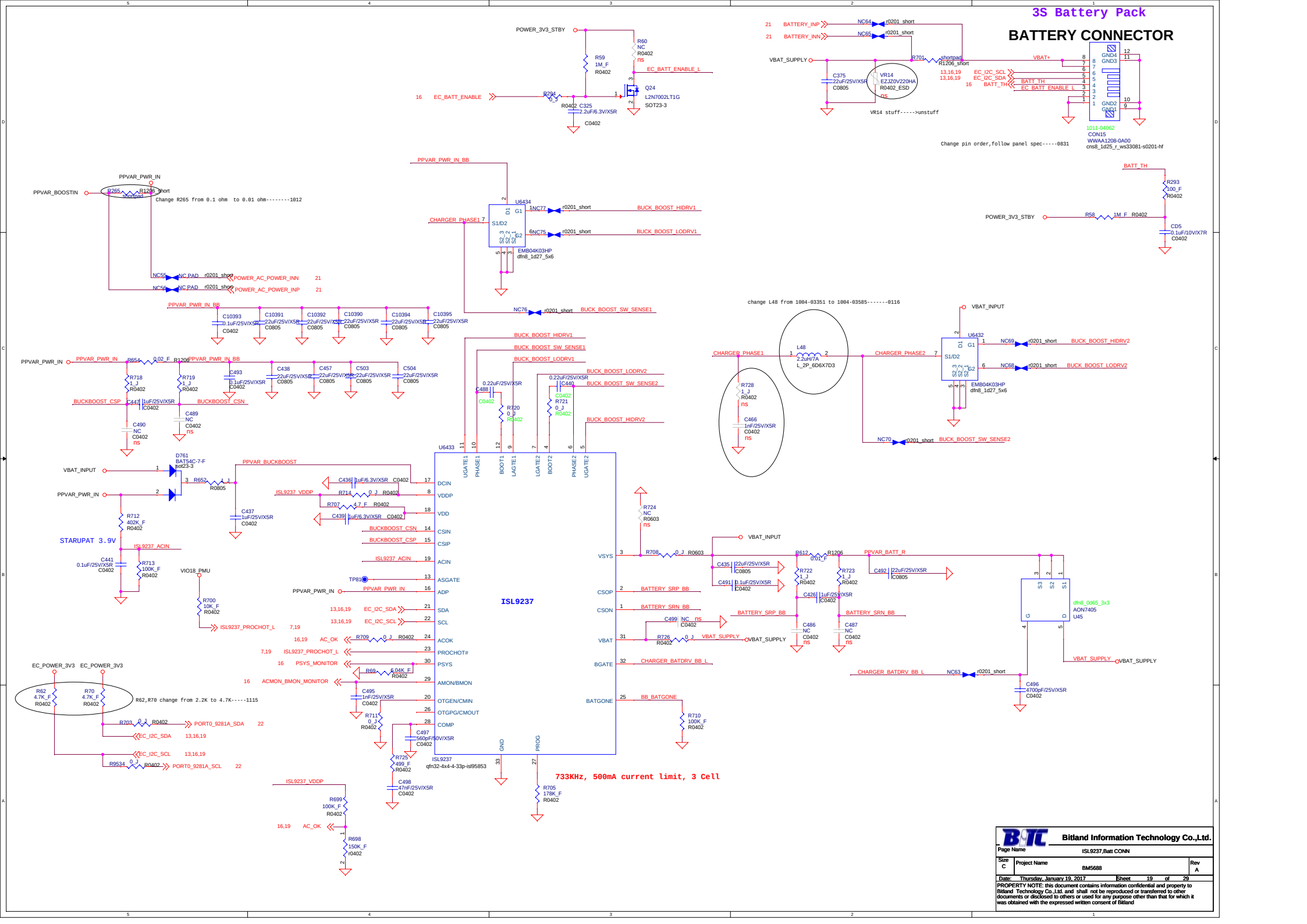
3S Battery Pack

BATTERY CONNECTOR



Bitland Information Technology Co.,Ltd.			
Page Name	ISL9237,Batt CONN		
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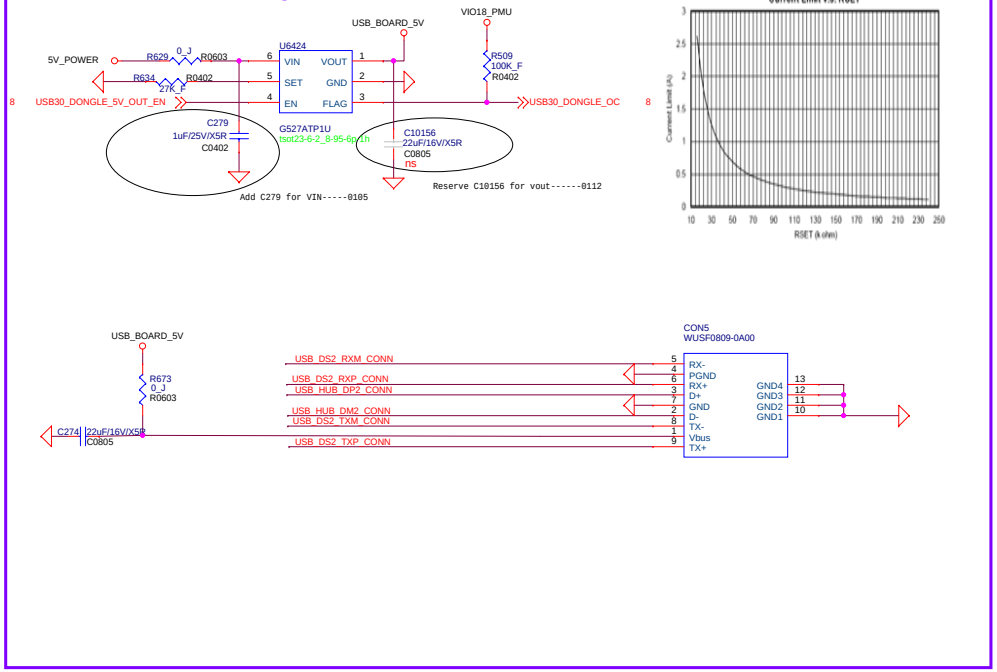
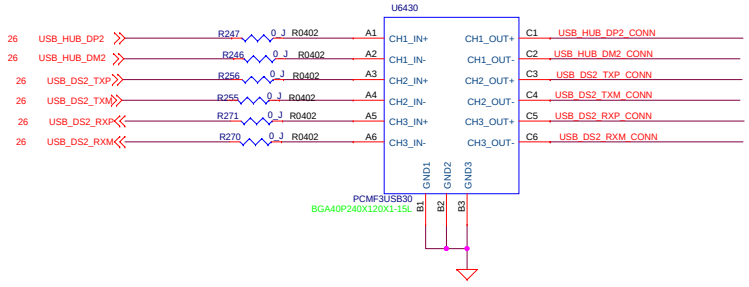
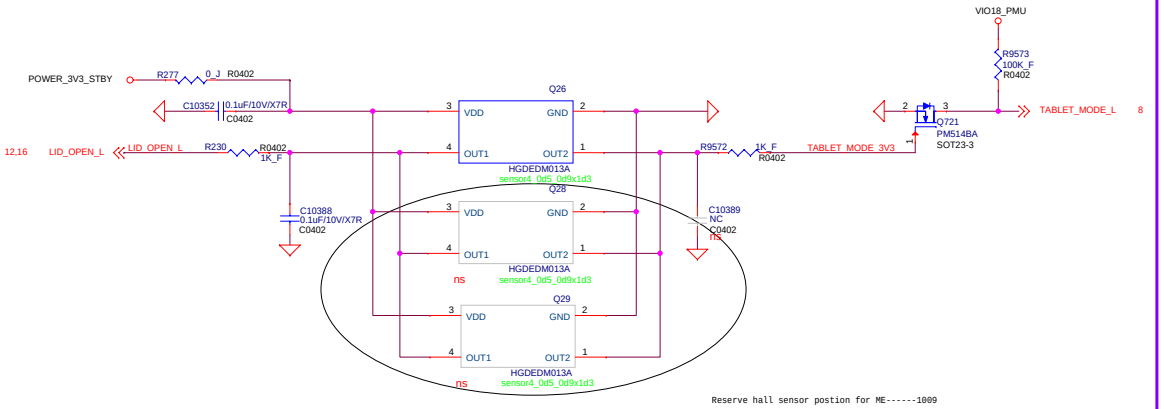
USB 3.0 Dongle Port





Remove reserved hall sensor AH180-----1009

LID Switch



Bitland Information Technology Co.,Ltd.		
Page Name	USB3.0 Port,LID Switch	
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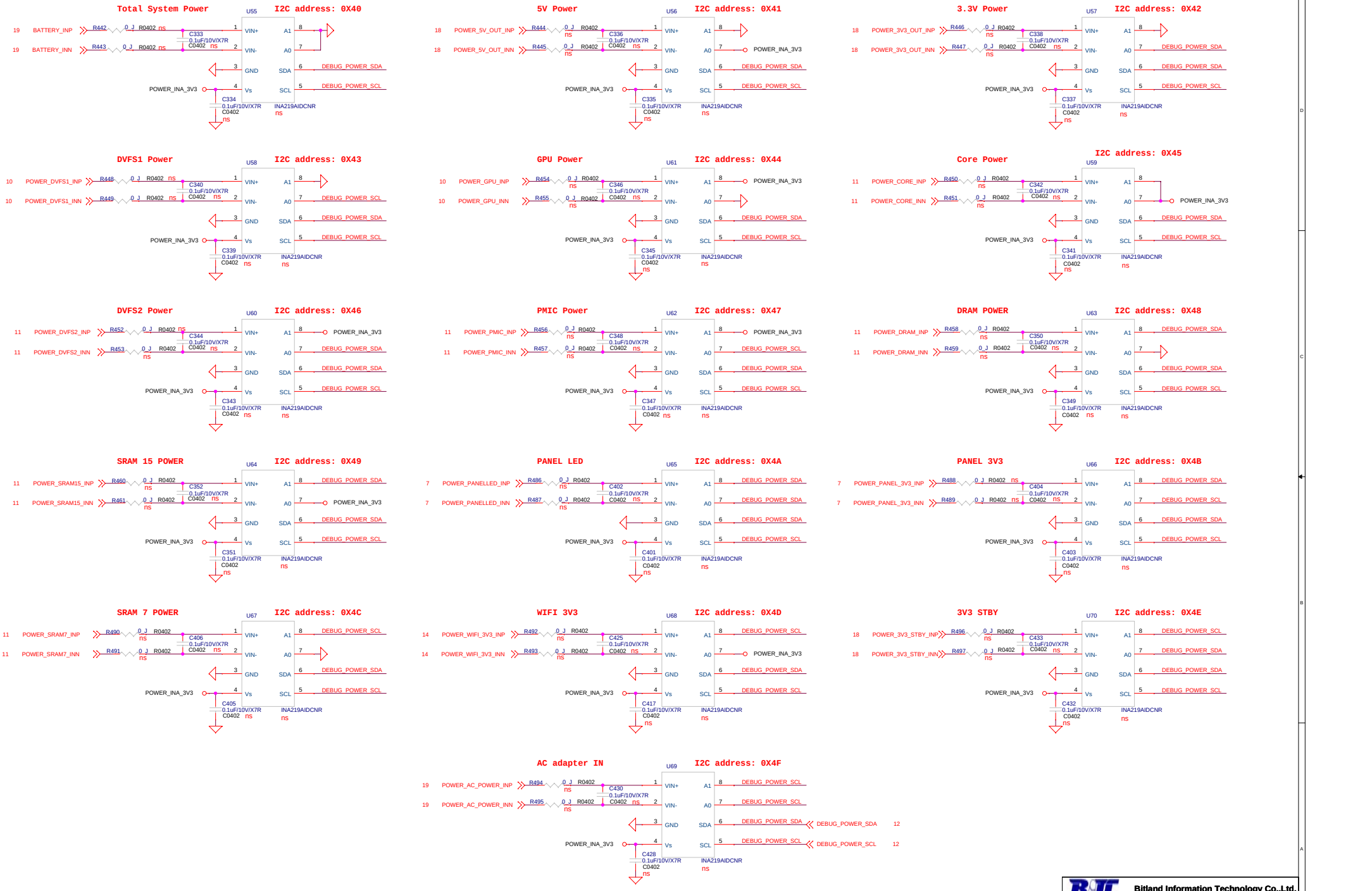

Unstuff these power telemetry parts for PVT------0115

Bitland Information Technology Co.,Ltd.		
Page Name: Power Telemetry		
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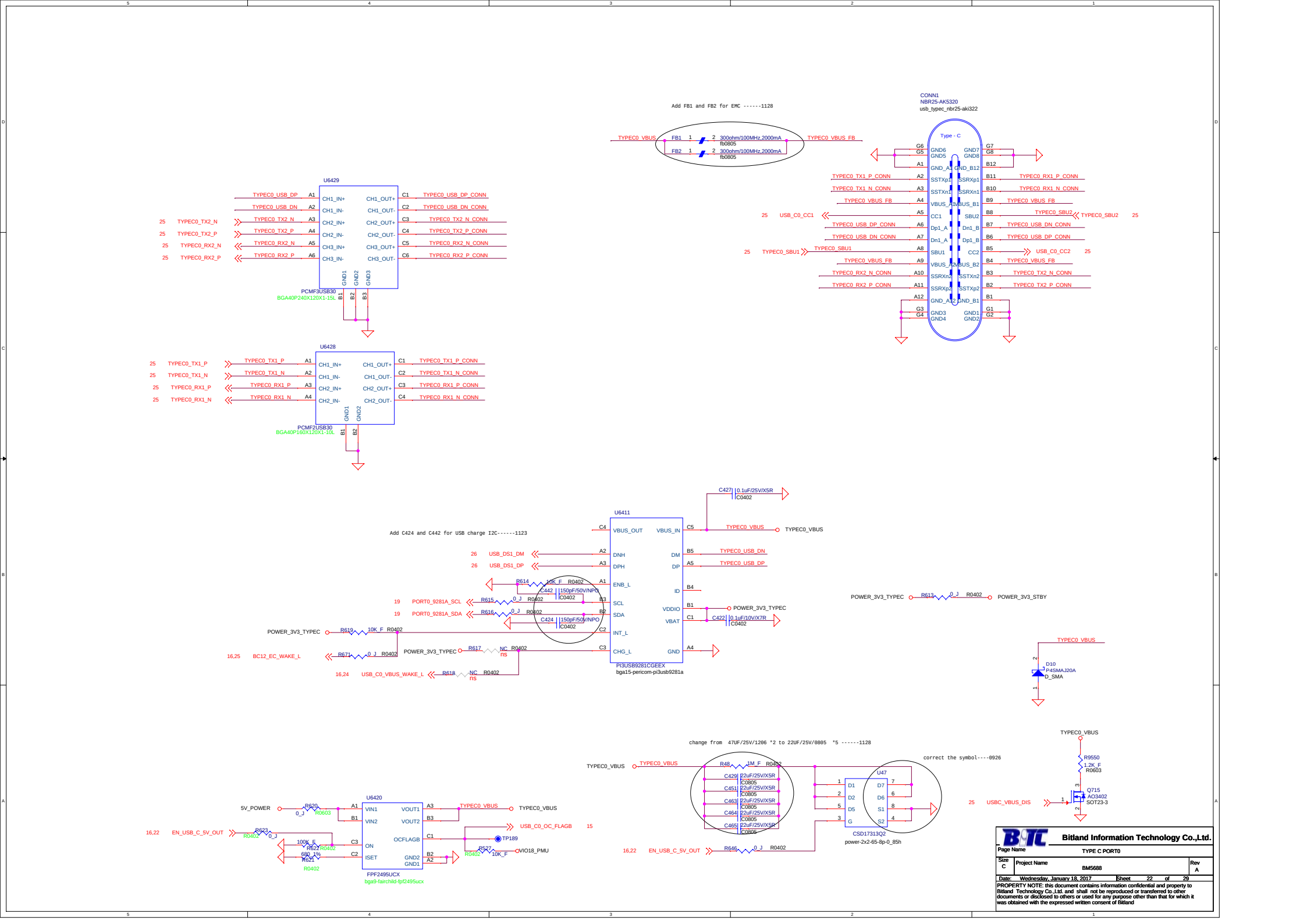
U6429
PCMF3USB30
BGA40P240X120X1-15L
U6428
PCMF2USB30
BGA40P160X120X1-10L
Add FB1 and FB2 for EMC ------1128
CONN1
NBR25-AK5320
usb_typec_nbr25-aki322
U6411
PI3USB9281CGEEX
bga15-pericom-pi3usb9281a
Add C424 and C442 for USB charge I2C------1123
U6420
FPF2495UCX
bga9-fairchild-fpf2495ucx
change from 47UF/25V/1206 *2 to 22UF/25V/0805 *5 ------1128
correct the symbol----0926
CSD17313Q2
power-2x2-65-8p-0_85h
Bitland Information Technology Co.,Ltd.
TYPE C PORT0
BM5688
Wednesday, January 18, 2017
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Differential Signal !
No Through Hole !
100 ohm - Impedance

HDMI Type A

Need add EMI component

D6
ESDA6V8UD
DFN10_0D5_2D5X1D0

D12
ESDA6V8UD
DFN10_0D5_2D5X1D0

J1

W-00-6023-1900
hdmi_w-00-6023-1900

LD2
SOT23_6
AZC199-04S

U6441
TS3DV642A0RUAR

U115
NCP380HSN05AAT1G
SOT23-5
0.5A CURRENT LIMIT

Q705
L2N7002LT1G
SOT23-3

Priority HDMI conn. port first

Delete 0 ohm resistor----1008

Bitland Information Technology Co.,Ltd.	
Page Name	HDMI MUX
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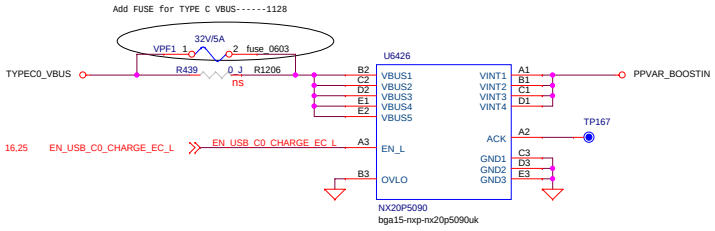

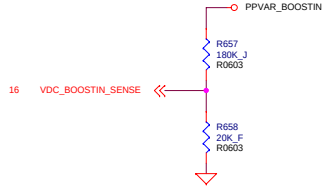

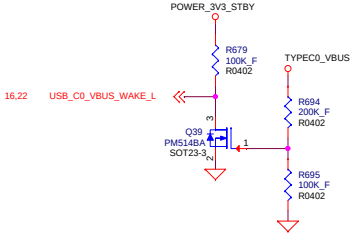

Bitland Information Technology Co.,Ltd.		
Page Name	NX20P5090 Load Swtich	
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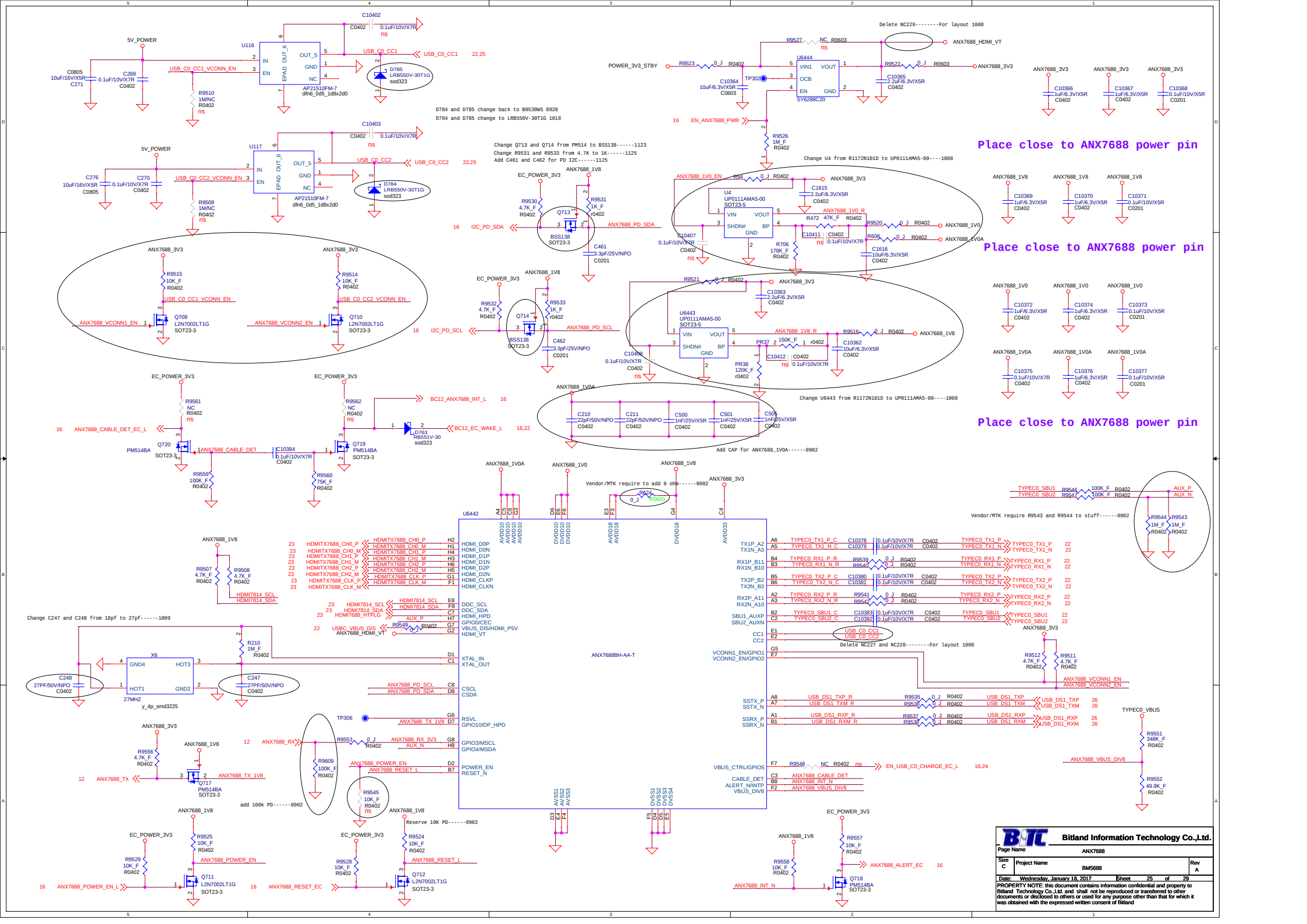

Bitland Information Technology Co.,Ltd.	
Page Name	ANX7688
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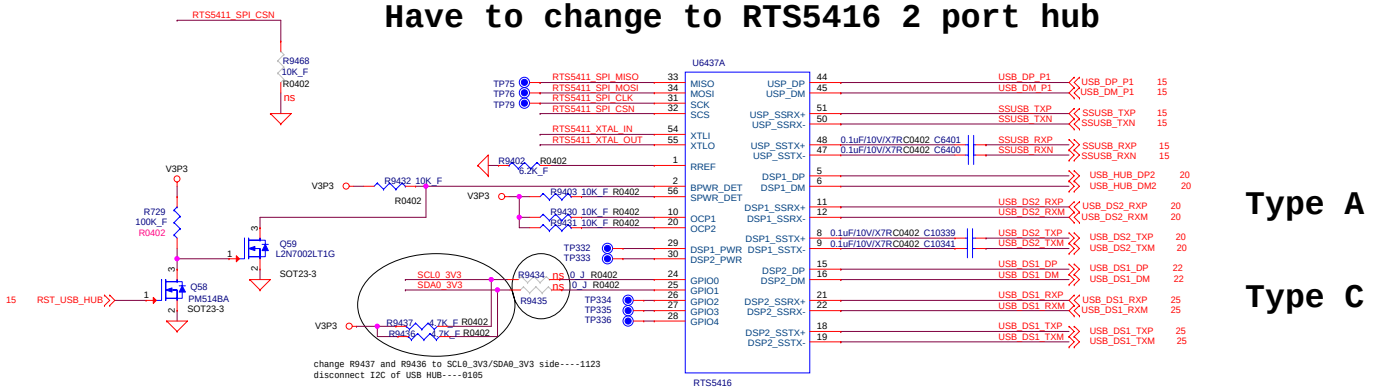
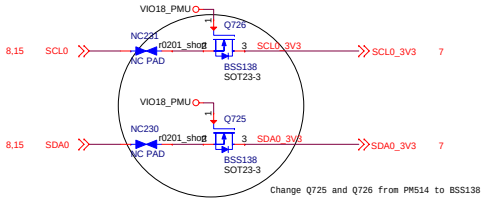
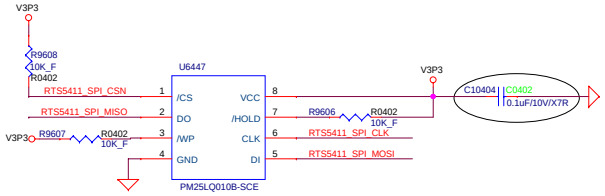
Have to change to RTS5416 2 port hub

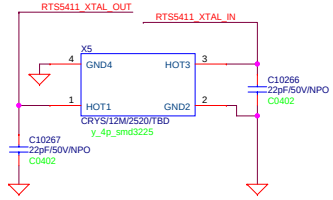


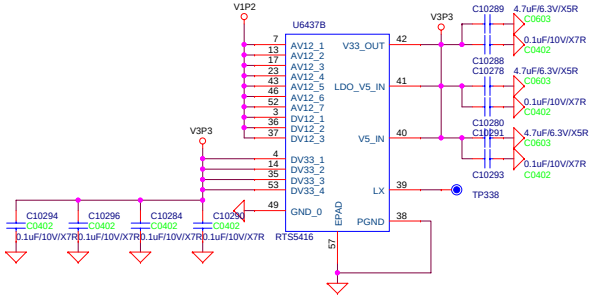
Type A port

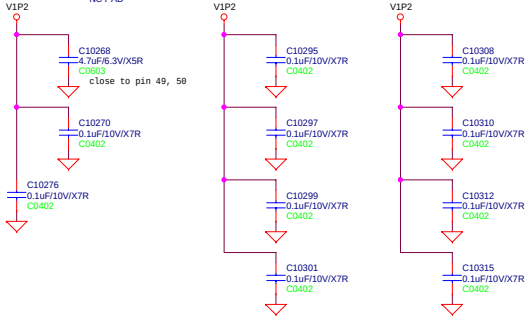
Type C port











Bitland Information Technology Co.,Ltd.		
Page Name	RTS5416 USB3.0 HUB	
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N23-Hana Schematic---DB

based on MT8173C

V1.3

2017-1-15

Bitland Information Technology Co.,Ltd.		
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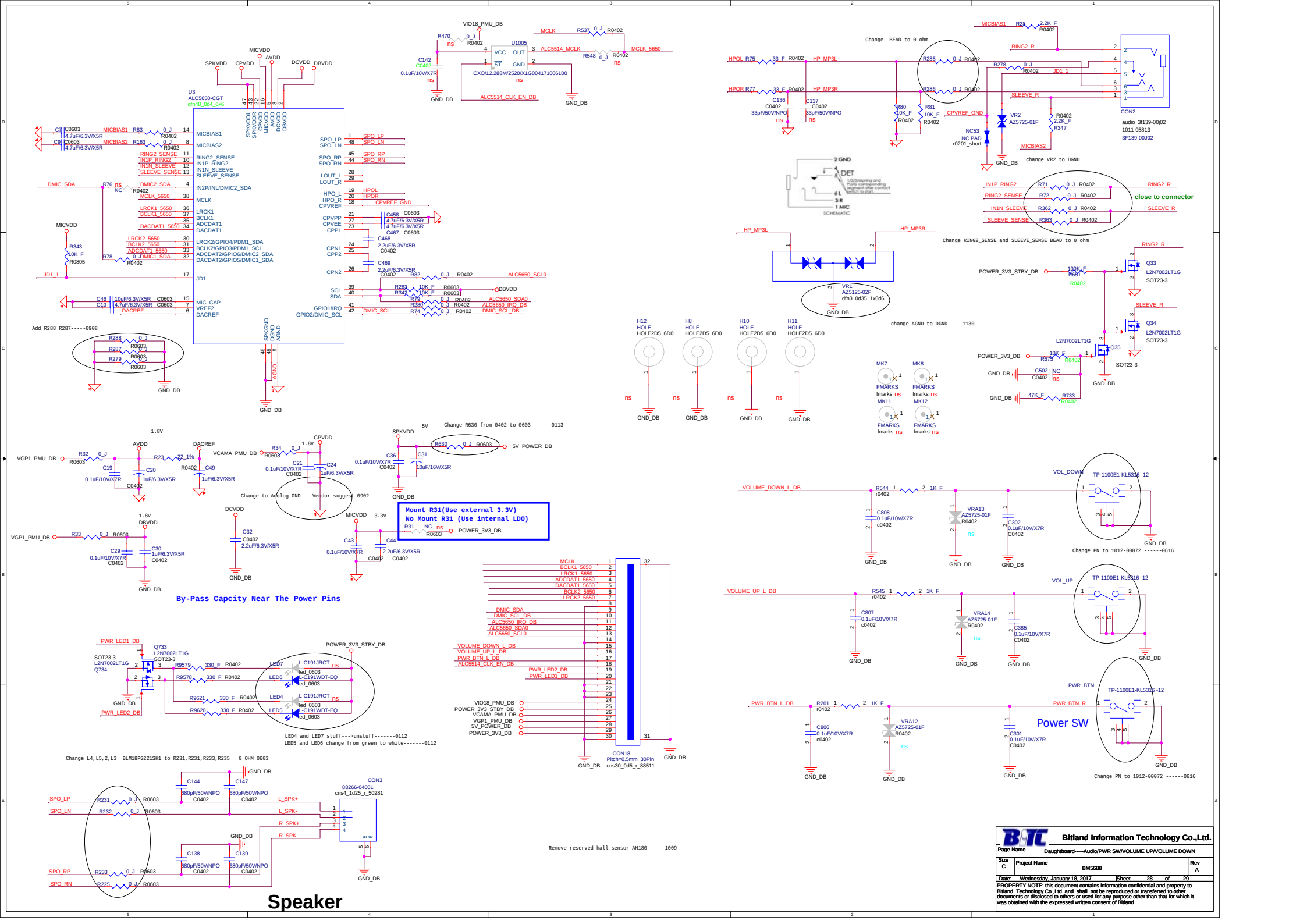
U3
ALC5650-CGT
qfn48_0d4_6x6
MICVDD
AVDD
SPKVDD
CPVDD
DCVDD
DBVDD
MICBIAS1
MICBIAS2
RING2_SENSE
IN1P_RING2
IN1N_SLEEVE
SLEEVE_SENSE
IN2P/INL/DMIC2_SDA
MCLK
LRCK1
BCLK1
ADCDAT1
DACDAT1
LRCK2/GPIO4/PDM1_SDA
BCLK2/GPIO3/PDM1_SCL
ADCDAT2/GPIO6/DMIC2_SDA
DACDAT2/GPIO5/DMIC1_SDA
JD1
MIC_CAP
VREF2
DACREF
SPO_LP
SPO_LN
SPO_RP
SPO_RN
LOUT_L
LOUT_R
HPO_L
HPO_R
CPVREF
CPVPP
CPVEE
CPP1
CPN1
CPP2
CPN2
SCL
SDA
GPIO1/IRQ
GPIO2/DMIC_SCL
SPKGND
DGND
AGND
VIO18_PMU_DB
U1005
ALC5514_MCLK
MCLK_5650
CXO/12.288M/2520/X1G004171006100
ALC5514_CLK_EN_DB
Add R288 R287-----0908
Change R630 from 0402 to 0603-------0113
Change to Analog GND----Vendor suggest 0902
Mount R31(Use external 3.3V)
No Mount R31 (Use internal LDO)
By-Pass Capcity Near The Power Pins
Change L4,L5,2,L3 BLM18PG221SH1 to R231,R231,R233,R235 0 OHM 0603
Speaker
CON3
88266-04001
cns4_1d25_r_50281
CON18
Pitch=0.5mm_30Pin
cns30_0d5_r_88511
Remove reserved hall sensor AH180------1009
Change BEAD to 0 ohm
CON2
audio_3f139-00j02
1011-05813
3F139-00J02
change VR2 to DGND
close to connector
Change RING2_SENSE and SLEEVE_SENSE BEAD to 0 ohm
change AGND to DGND-----1130
Power SW
Change PN to 1012-00072 ------0616
Bitland Information Technology Co.,Ltd.
Page Name Daughtboard----Audio/PWR SW/VOLUME UP/VOLUME DOWN
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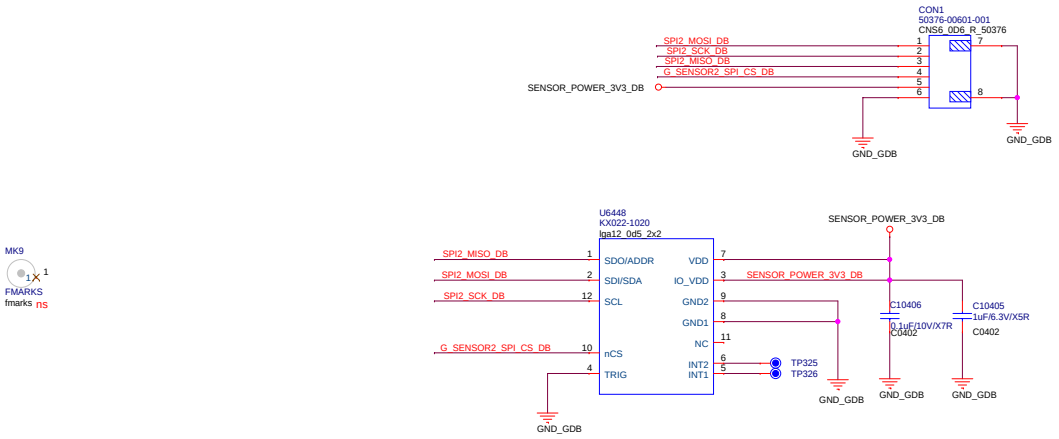

MK9

FMARKS

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