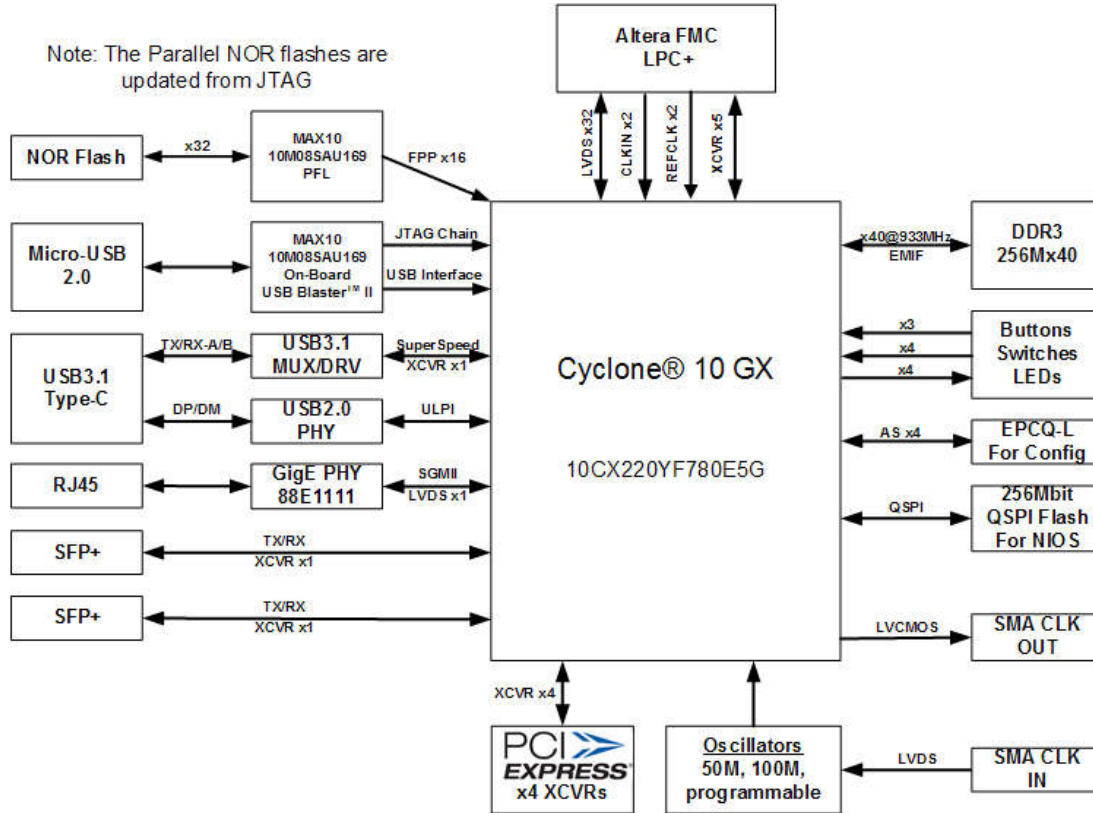


NOTES:

1. Project Drawing Numbers:
- Raw PCB 100-0321329-A1
 - Gerber Files 110-0321329-A1
 - PCB Design Files 120-0321329-A1
 - Assembly Drawing 130-0321329-A1
 - Fab Drawing 140-0321329-A1
 - Schematic Drawing 150-0321329-A1
 - PCB Film 160-0321329-A1
 - Bill of Materials 170-0321329-A1
 - Schematic Design Files 180-0321329-A1
 - Functional Specification 210-0321329-A1
 - PCB Layout Guidelines 220-0321329-A1
 - Assembly Rework 320-0321329-A1

Note: The Parallel NOR flashes are updated from JTAG



REV	DATE	PAGE	DESCRIPTION
0.1			initial schematic

PAGE	DESCRIPTION	PAGE	DESCRIPTION
1	01 - Title, Note, Block Diagram	24	24 - INTERFACE - USB3.1
2	02 - Clock Diagram	25	25 - INTERFACE - USB2.0
3	03 - Power Tree Diagram	26	26 - INTERFACE - GIGE - 1
4	04 - I2C JTAG Chain Diagram	27	27 - INTERFACE - GIGE - 2
5	05 - C10GX BANK CSS - Config	28	28 - SYS MAX10 - CTRL
6	06 - C10GX BANK1C/1D - XCVR	29	29 - SYS MAX10 - UBII
7	07 - C10GX BANK2K - EMIF	30	30 - CFG MAX10 - FPP
8	08 - C10GX BANK2J - EMIF	31	31 - CFG MAX10 - PFL
9	09 - C10GX BANK3A - FMC LVDS	32	32 - CFG PFL FLASH
10	10 - C10GX BANK3B - FMC LVDS	33	33 - LED & PB & SW
11	11 - C10GX BANK2A - FPP/GPIO	34	34 - POWER - INPUT
12	12 - C10GX BANK2L - GPIO	35	35 - POWER - 12V to 0.9V
13	13 - C10GX POWER	36	36 - POWER - 12V to 3.3V
14	14 - C10GX PWR Filter	37	37 - POWER - 12V to 5V
15	15 - C10GX GND	38	38 - POWER - 3.3V to 0.95V
16	16 - CLOCK - SI570/SI5332	39	39 - POWER - 3.3V to 1.5V
17	17 - CLOCK - SI5340	40	40 - POWER - 3.3V to 1.8V
18	18 - EMIF-DDR3-1	41	41 - POWER - 3.3V to VADJ
19	19 - EMIF-DDR3-2	42	42 - POWER - CURRENT SENSE
20	20 - INTERFACE - PCIe	43	43 - POWER - Fast Discharge
21	21 - INTERFACE - SFP+		
22	22 - INTERFACE - FMC - 1		
23	23 - INTERFACE - FMC - 2		

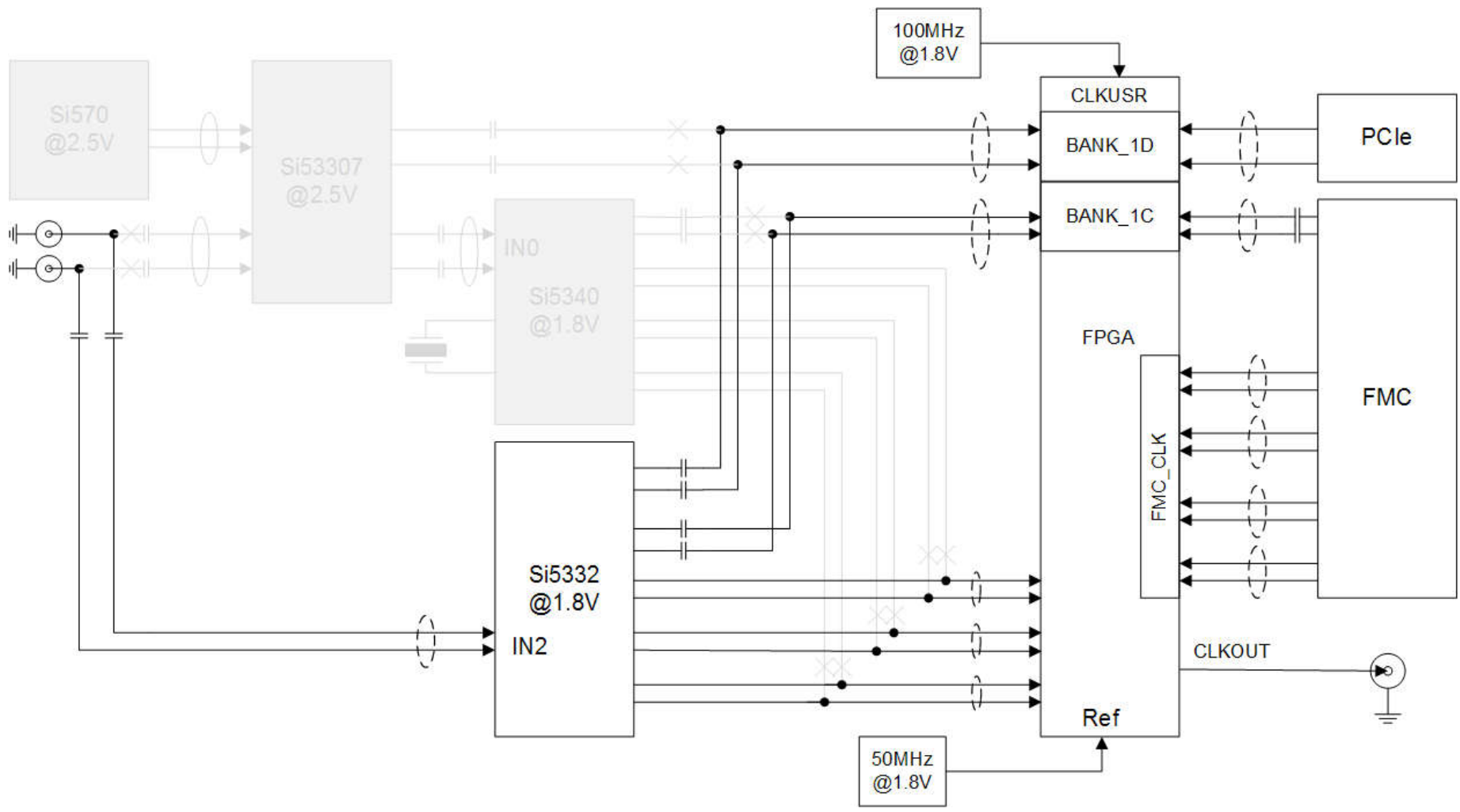


Intel Corporation, 301, Bibo Rd #888, Shanghai, China, 201203
 Copyright (c) 2017, Intel Corporation. All Rights Reserved.

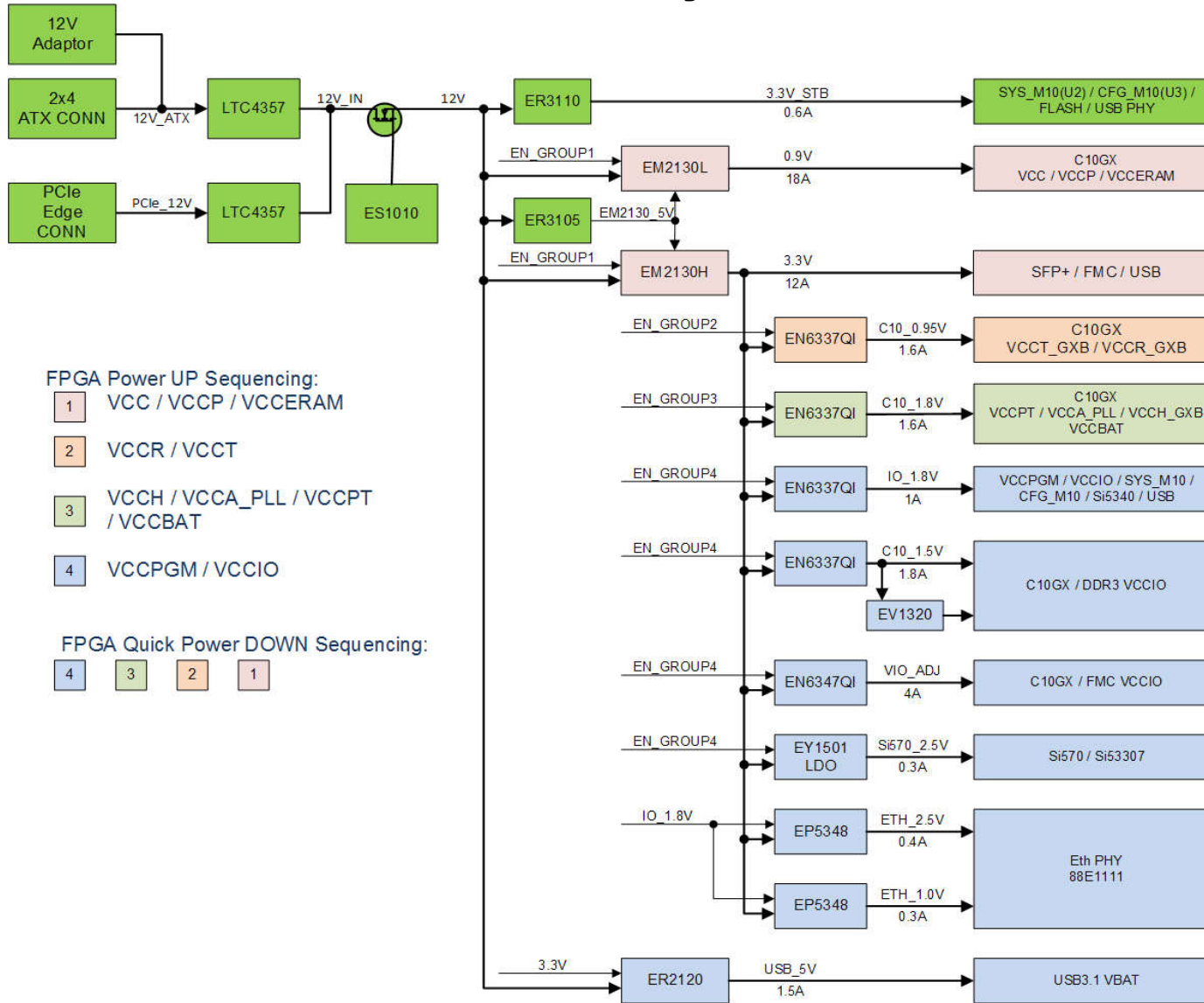
Title **Cyclone 10 GX Development Kit Board**

Size B	Document Number 6XX-44528R	Rev A1
Date:	Sunday, October 29, 2017	Sheet 1 of 43

Clock Diagram



Power Tree Diagram



FPGA Power UP Sequencing:

- 1 VCC / VCCP / VCCERAM
- 2 VCCR / VCCT
- 3 VCCH / VCCA_PLL / VCCPT / VCCBAT
- 4 VCCPGM / VCCIO

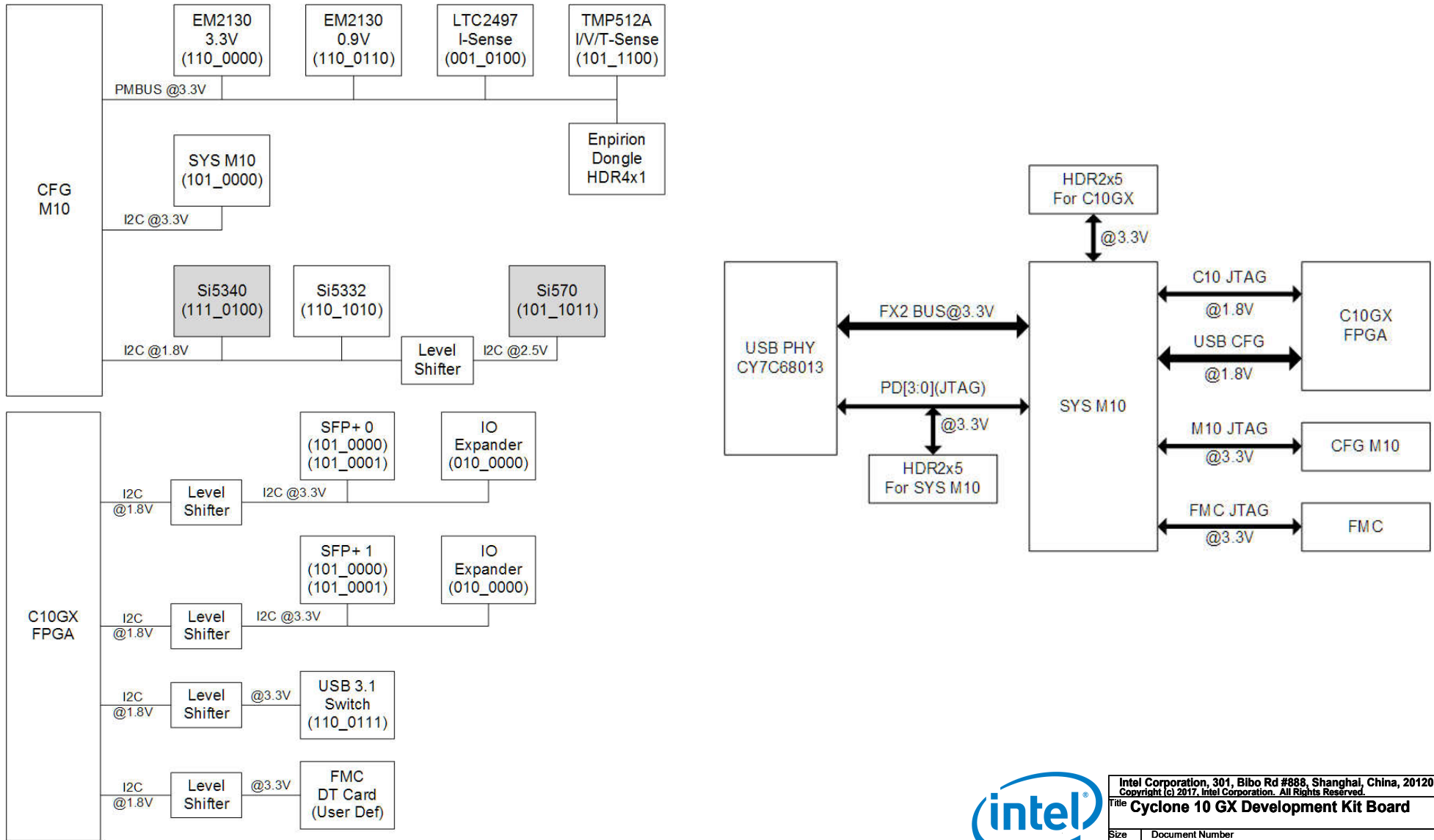
FPGA Quick Power DOWN Sequencing:

- 4
- 3
- 2
- 1

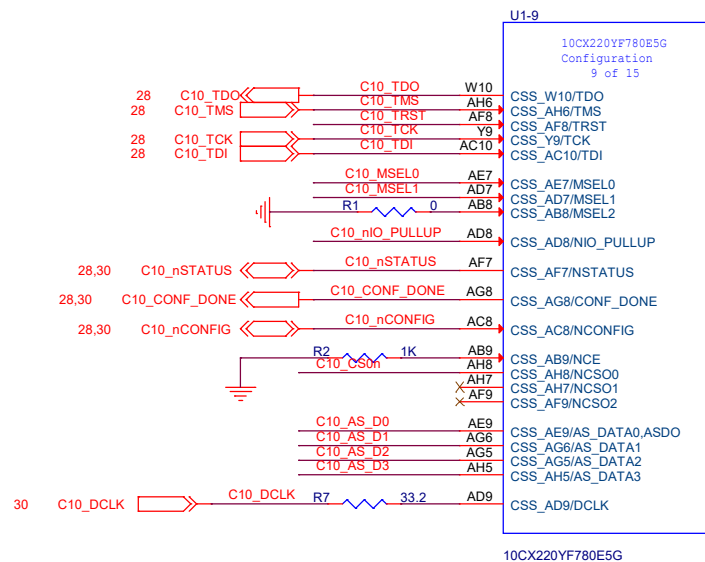
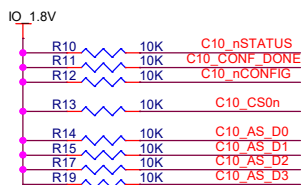
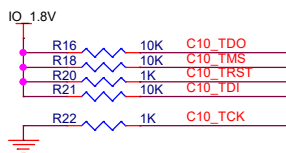
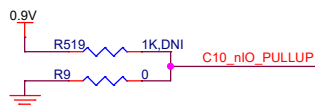
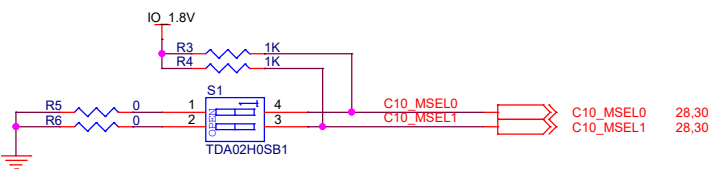
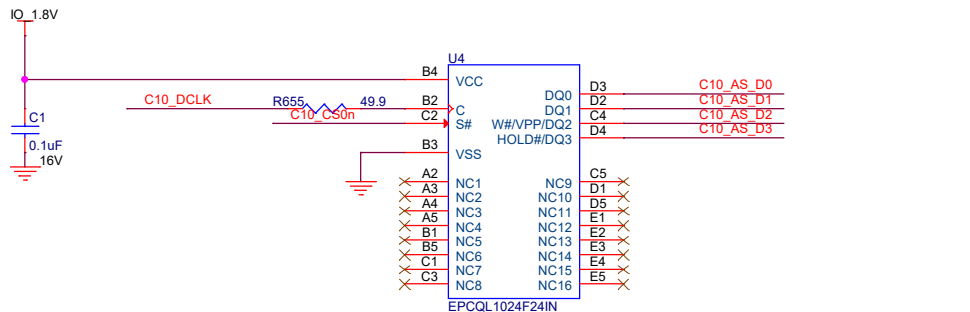


Intel Corporation, 301, Bibo Rd #888, Shanghai, China, 201203 Copyright (c) 2017, Intel Corporation. All Rights Reserved.		
Title Cyclone 10 GX Development Kit Board		
Size B	Document Number 6XX-44528R	Rev A1
Date:	Sunday, October 29, 2017	Sheet 3 of 43

I2C / JTAG Chain Diagram



C10GX BANK CSS - Config



Configuration Scheme	V _{CCPGM} (V)	Power-On Reset (POR) Delay	Valid MSEL[2..0]
JTAG-based configuration	—	—	Use any valid MSEL pin settings below
AS (x1 and x4)	1.8	Fast	010
		Standard	011
PS and FPP (x8, x16, and x32)	1.2/1.5/1.8	Fast	000
		Standard	001

Note:
MSEL2 is fixed '0', MSEL1 and MSEL0 are '0' when corresponding switch is ON



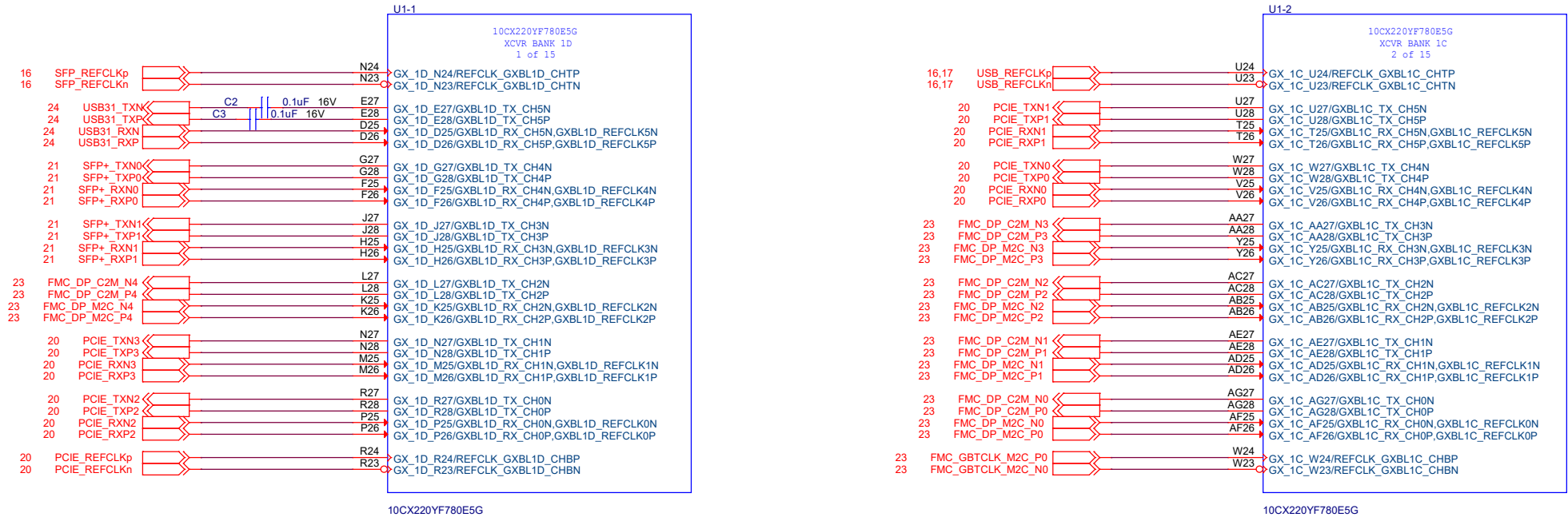
Intel Corporation, 301, Bibo Rd #888, Shanghai, China, 201203
Copyright (c) 2017, Intel Corporation. All Rights Reserved.

Title Cyclone 10 GX Development Kit Board

Size B	Document Number 6XX-44528R	Rev A1
--------	-------------------------------	-----------

Date: Sunday, October 29, 2017 Sheet 5 of 43

C10GX BANK1C/1D - XCVR



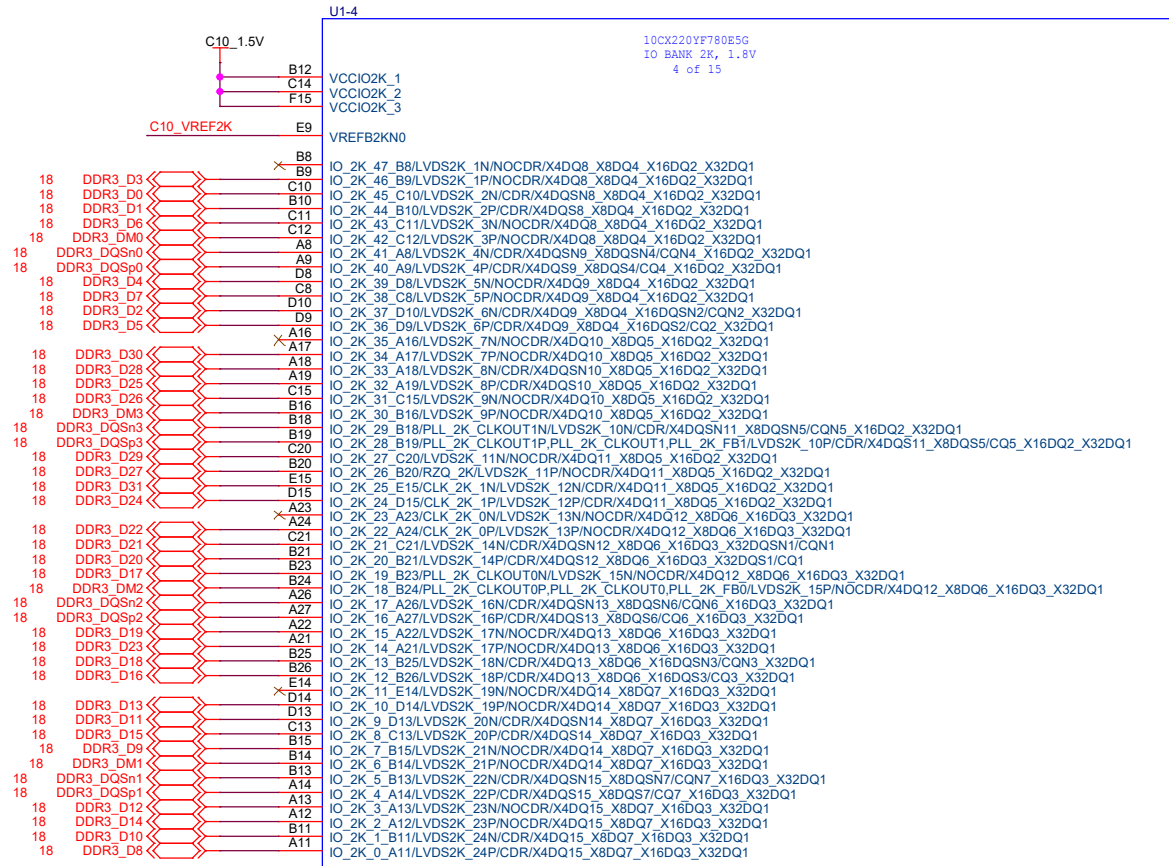
Intel Corporation, 301, Bibo Rd #888, Shanghai, China, 201203
Copyright (c) 2017, Intel Corporation. All Rights Reserved.

Title Cyclone 10 GX Development Kit Board

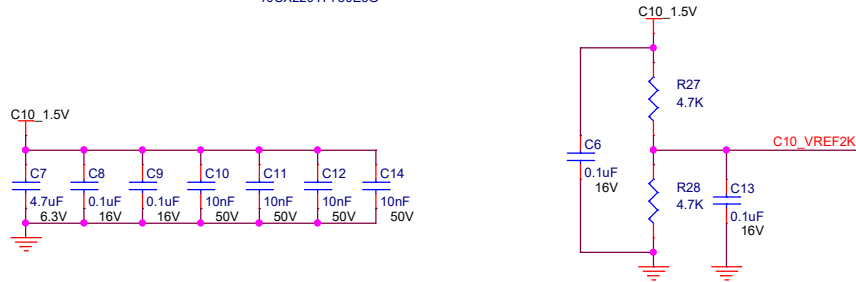
Size	Document Number	Rev
B	6XX-44528R	A1

Date: Sunday, October 29, 2017 Sheet 6 of 43

C10GX BANK2K - EMIF



10CX220YF780E5G

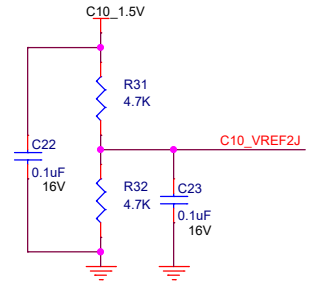
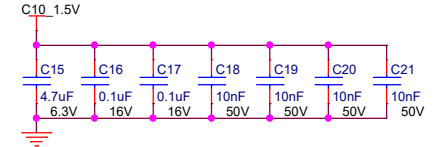
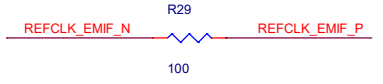
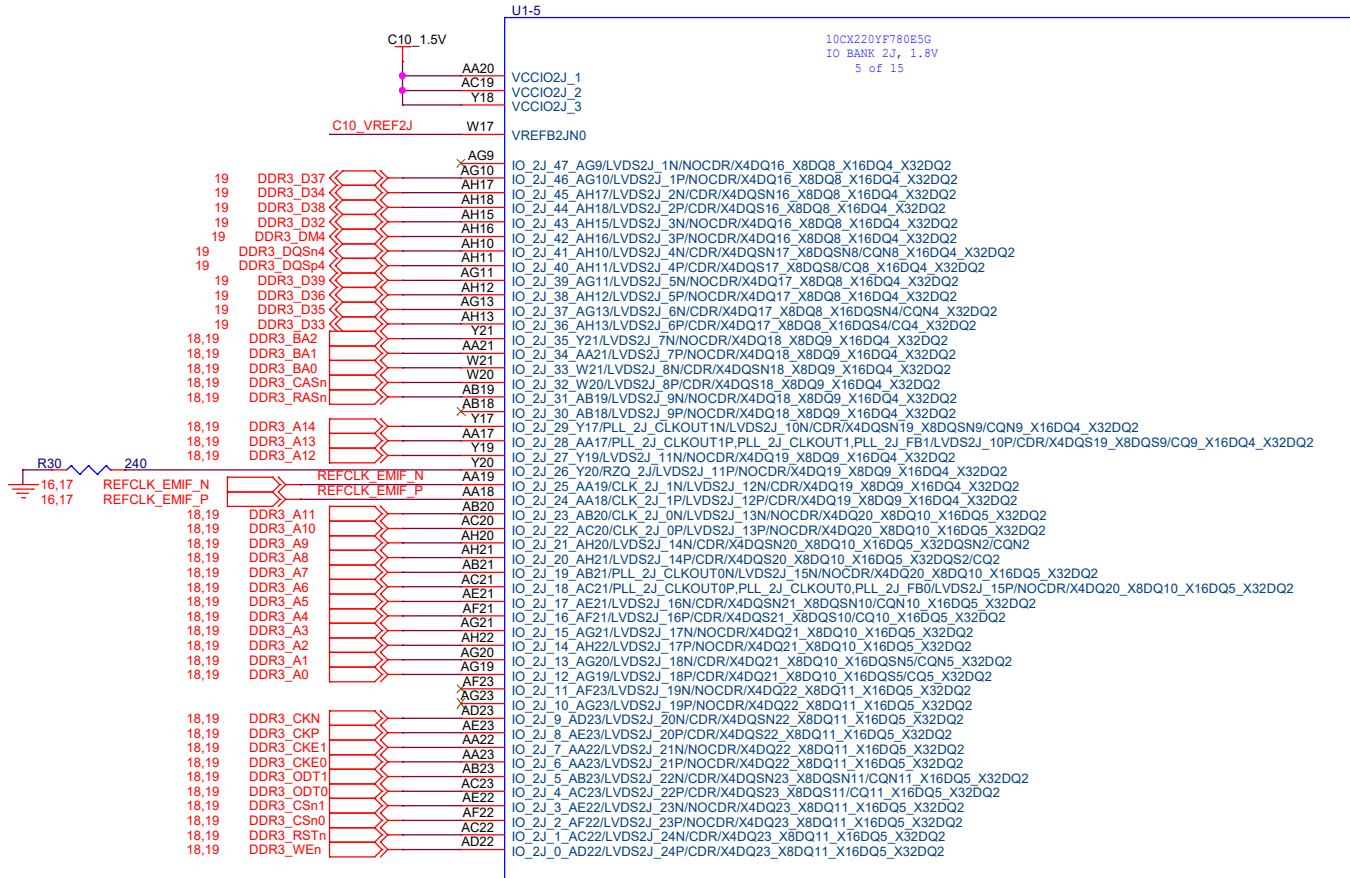


Intel Corporation, 301, Bibo Rd #888, Shanghai, China, 201203
Copyright (c) 2017, Intel Corporation. All Rights Reserved.

Title Cyclone 10 GX Development Kit Board

Size B	Document Number 6XX-44528R	Rev A1
Date:	Sunday, October 29, 2017	Sheet 7 of 43

C10GX BANK2J - EMIF



10CX220YF780E5G



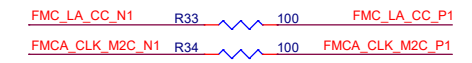
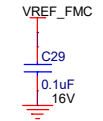
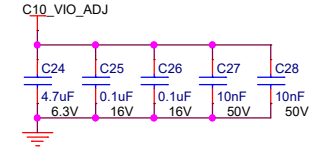
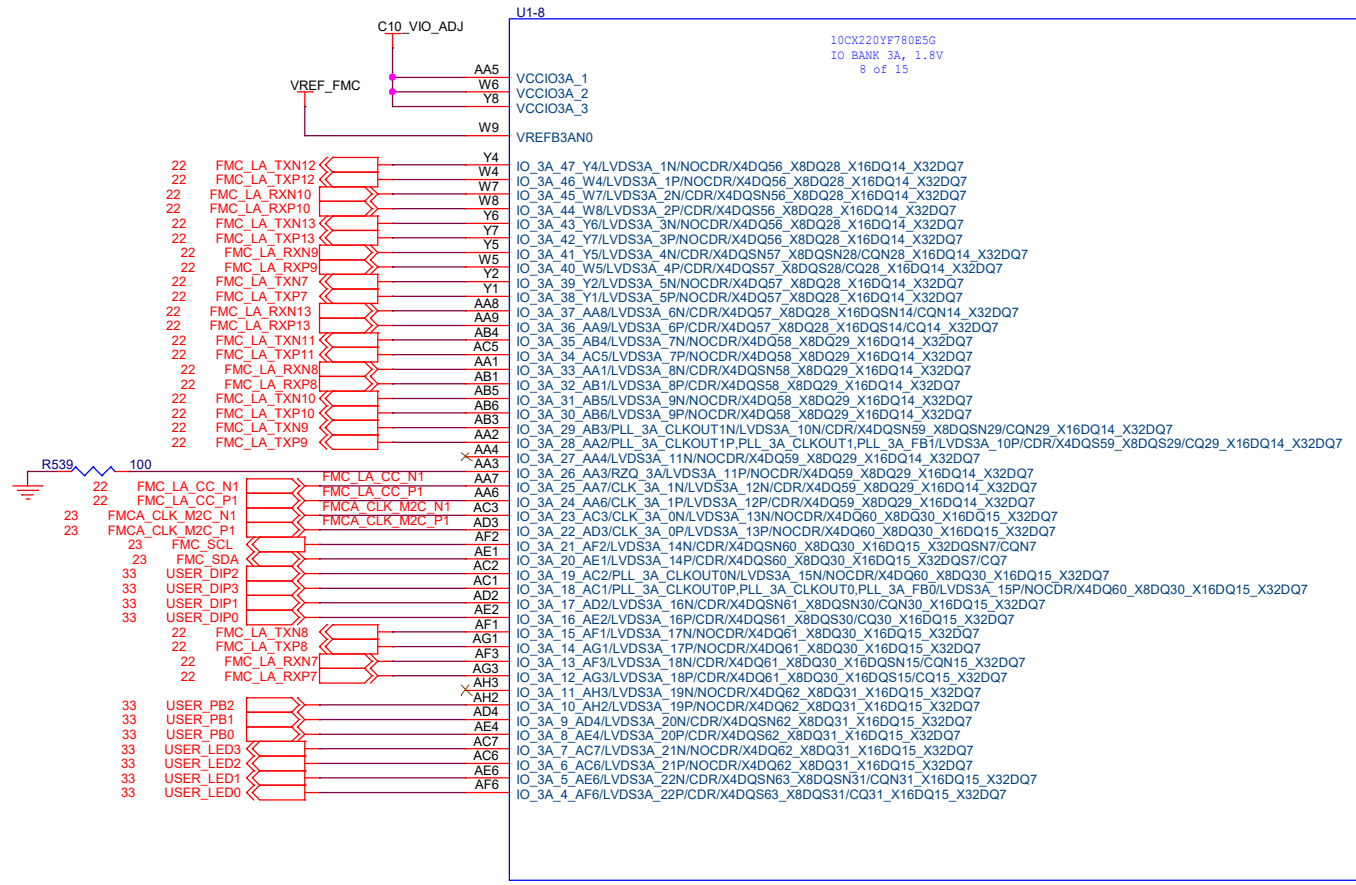
Intel Corporation, 301, Bibo Rd #888, Shanghai, China, 201203
Copyright (c) 2017, Intel Corporation. All Rights Reserved.

Title Cyclone 10 GX Development Kit Board

Size B	Document Number 6XX-44528R	Rev A1
--------	----------------------------	--------

Date: Sunday, October 29, 2017 Sheet 8 of 43

C10GX BANK3A - FMC LVDS

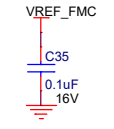
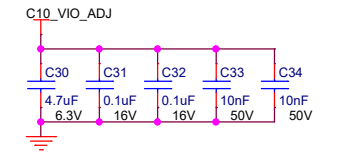
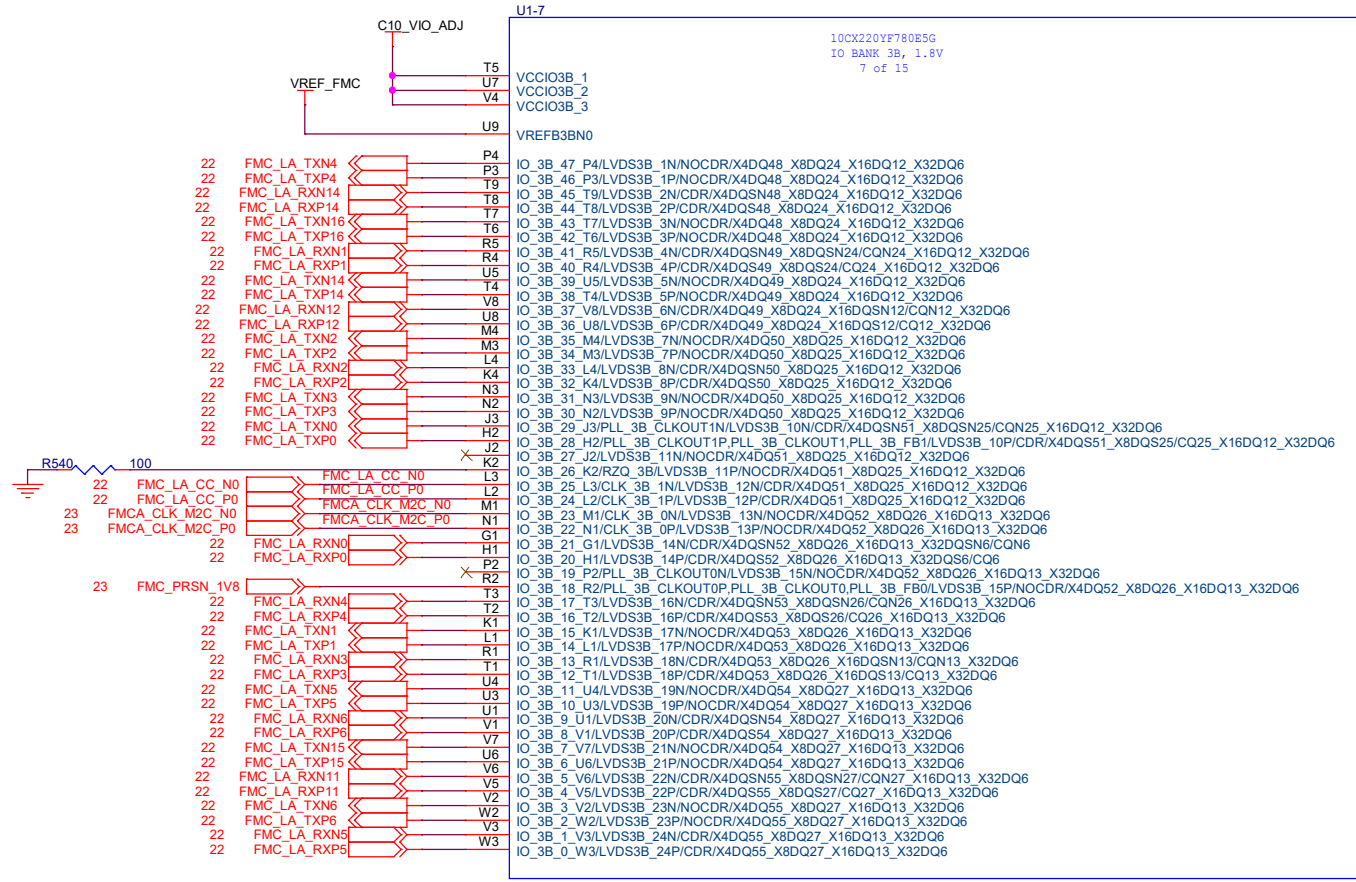


10CX220YF780E5G

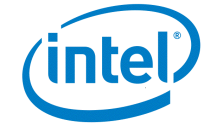


Intel Corporation, 301, Bibo Rd #888, Shanghai, China, 201203 Copyright (c) 2017, Intel Corporation. All Rights Reserved.		
Title Cyclone 10 GX Development Kit Board		
Size B	Document Number 6XX-44528R	Rev A1
Date: Sunday, October 29, 2017	Sheet 9	of 43

C10GX BANK3B - FMC LVDS

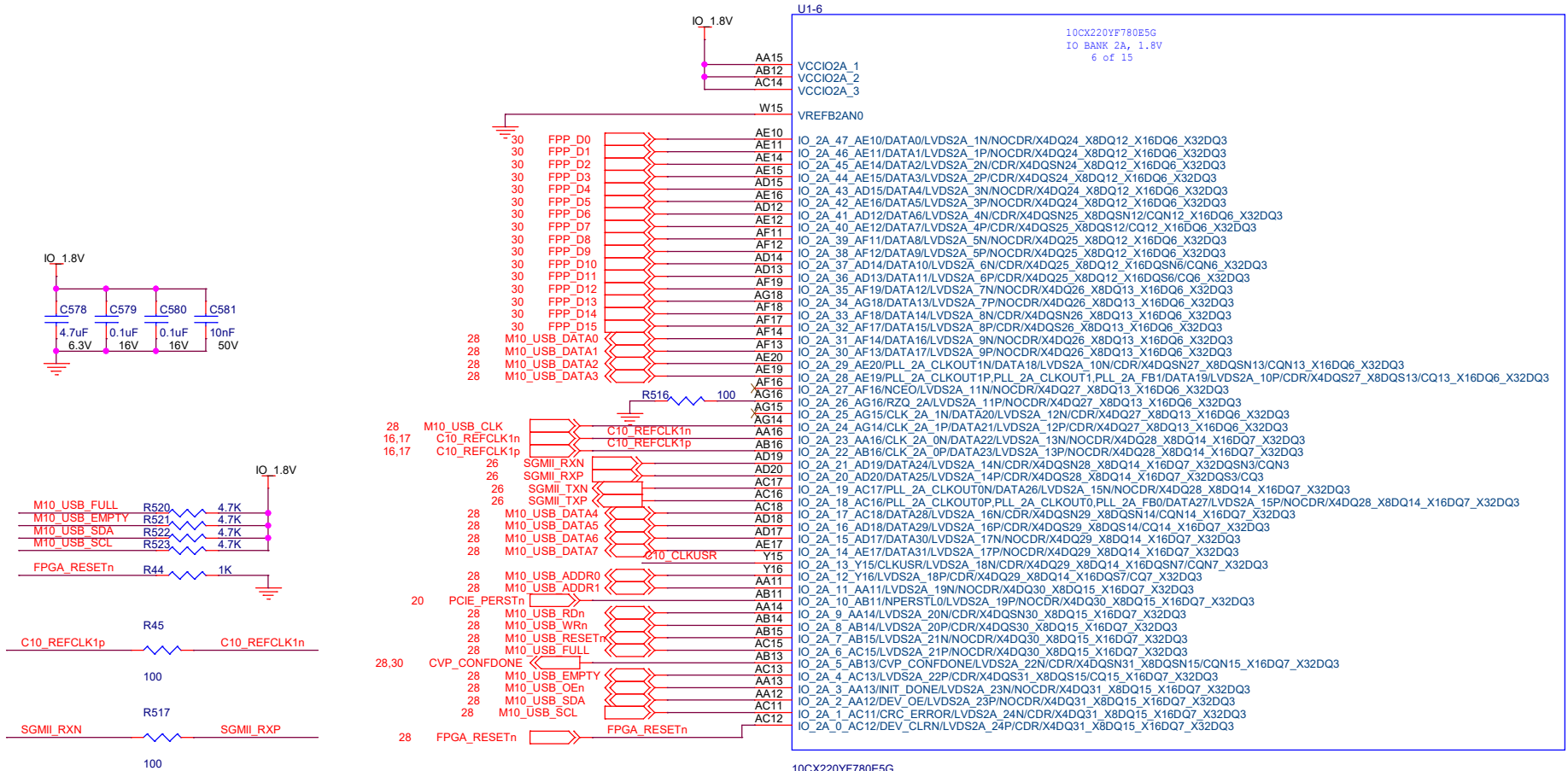


10CX220YF780E5G



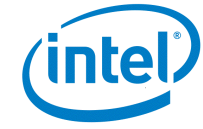
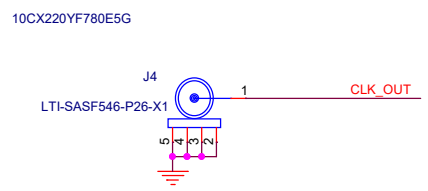
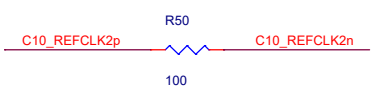
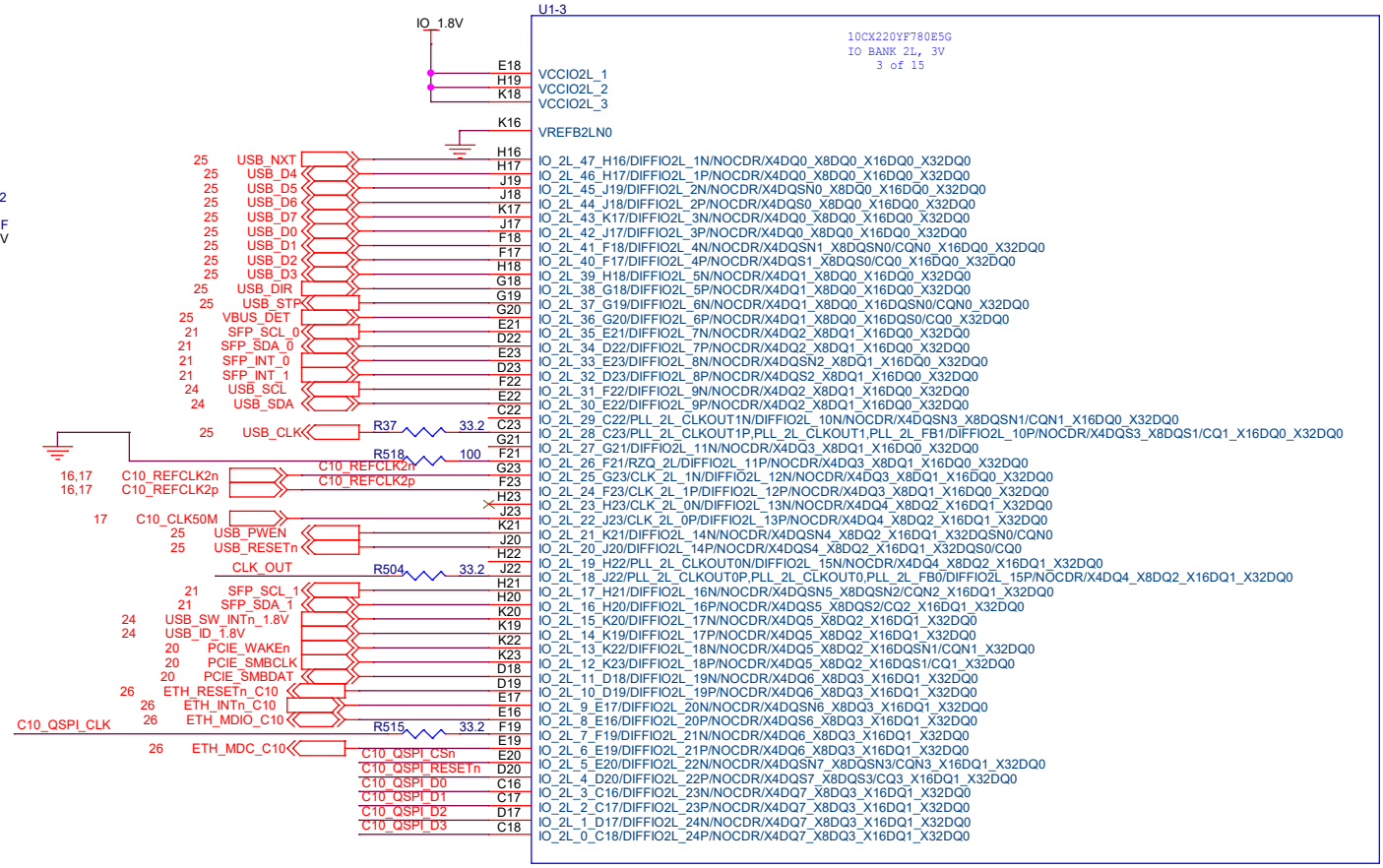
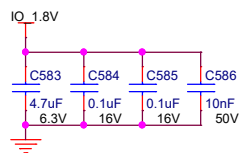
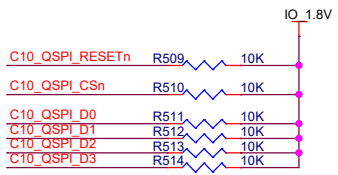
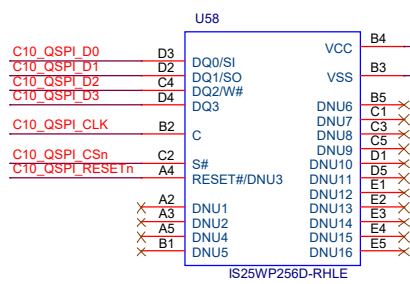
Intel Corporation, 301, Bibo Rd #888, Shanghai, China, 201203 Copyright (c) 2017, Intel Corporation. All Rights Reserved.		
Title Cyclone 10 GX Development Kit Board		
Size B	Document Number 6XX-44528R	Rev A1
Date: Sunday, October 29, 2017	Sheet 10	of 43

C10GX BANK2A - FPP/GPIO



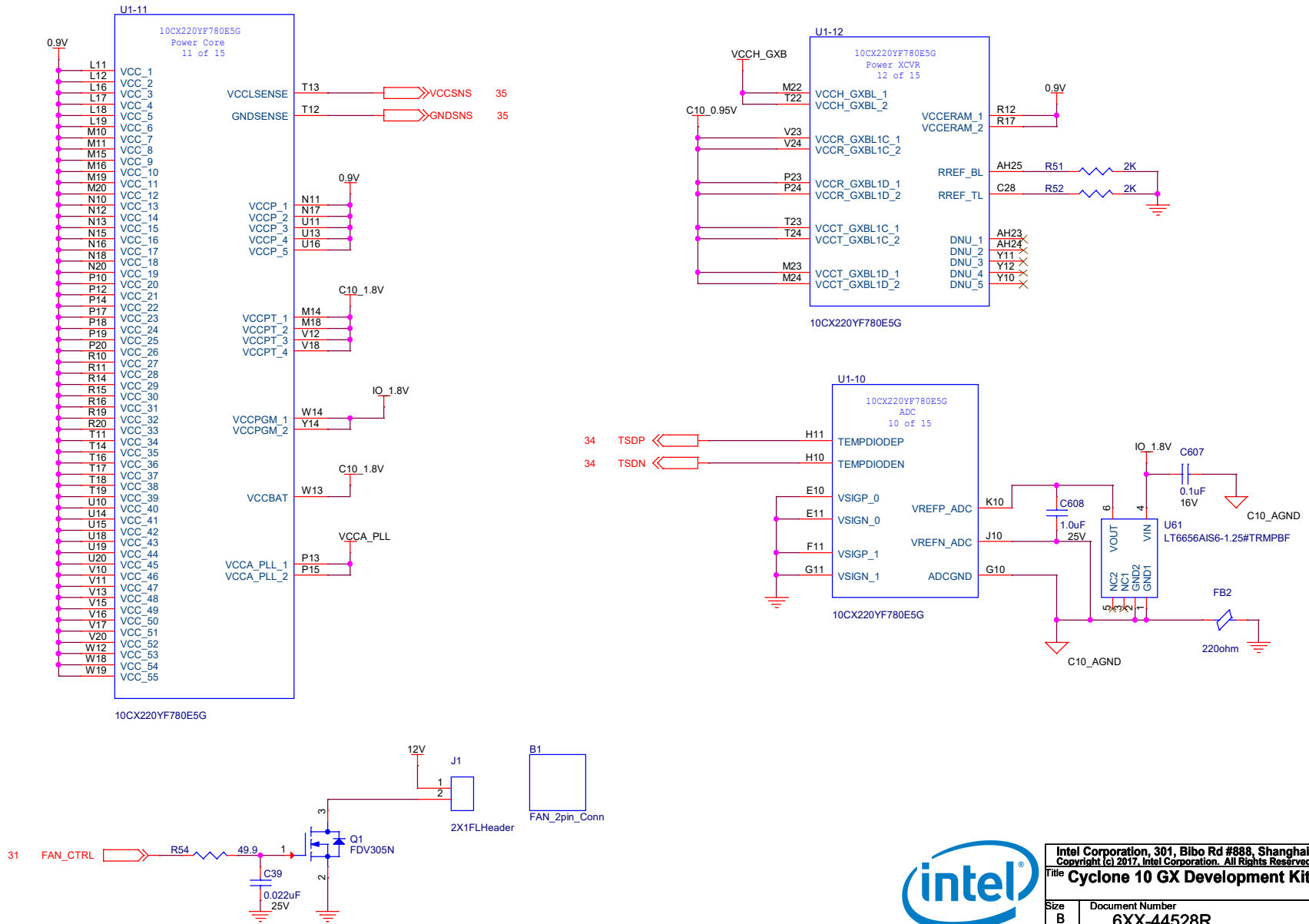
Intel Corporation, 301, Bibo Rd #888, Shanghai, China, 201203 Copyright (c) 2017, Intel Corporation. All Rights Reserved.		
Title Cyclone 10 GX Development Kit Board		
Size B	Document Number 6XX-44528R	Rev A1
Date: Sunday, October 29, 2017	Sheet 11	of 43

C10GX BANK2L - GPIO



Intel Corporation, 301, Bibo Rd #888, Shanghai, China, 201203 Copyright (c) 2017, Intel Corporation. All Rights Reserved.		
Title Cyclone 10 GX Development Kit Board		
Size B	Document Number 6XX-44528R	Rev A1
Date: Sunday, October 29, 2017	Sheet 12	of 43

C10GX POWER



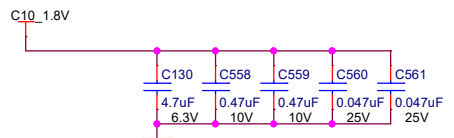
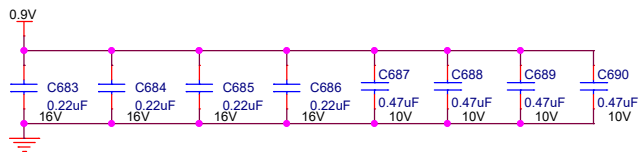
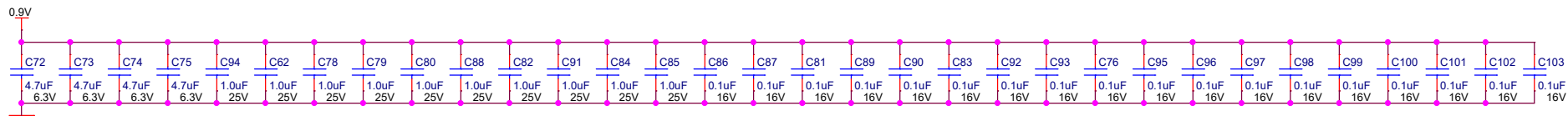
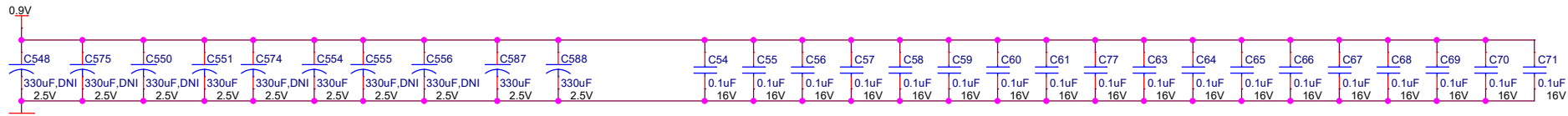
Intel Corporation, 301, Bibo Rd #888, Shanghai, China, 201203
 Copyright (c) 2017, Intel Corporation. All Rights Reserved.

Title **Cyclone 10 GX Development Kit Board**

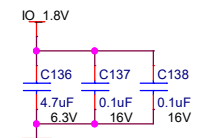
Size B	Document Number 6XX-44528R	Rev A1
--------	--------------------------------------	------------------

Date: Sunday, October 29, 2017 Sheet 13 of 43

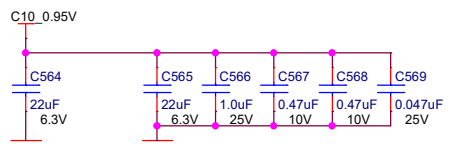
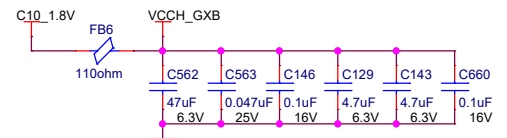
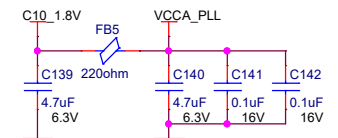
C10GX PWR Filter



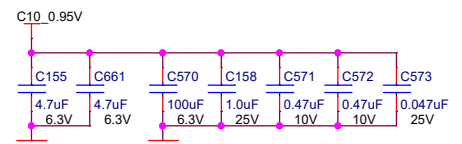
Placed at VCCPT pins



Placed at VCCPGM pins



Placed at VCCT_GXB pins

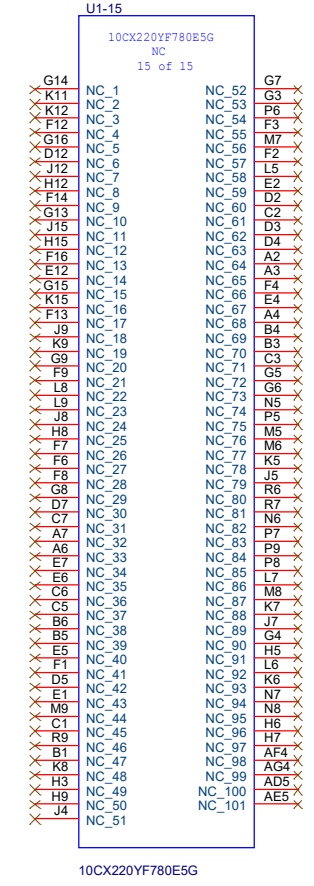
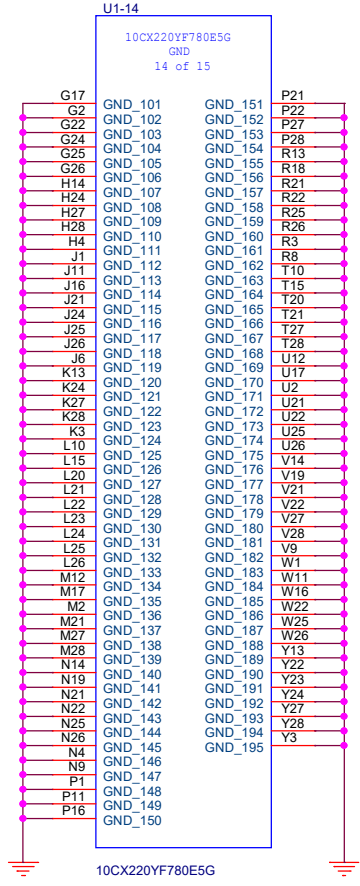
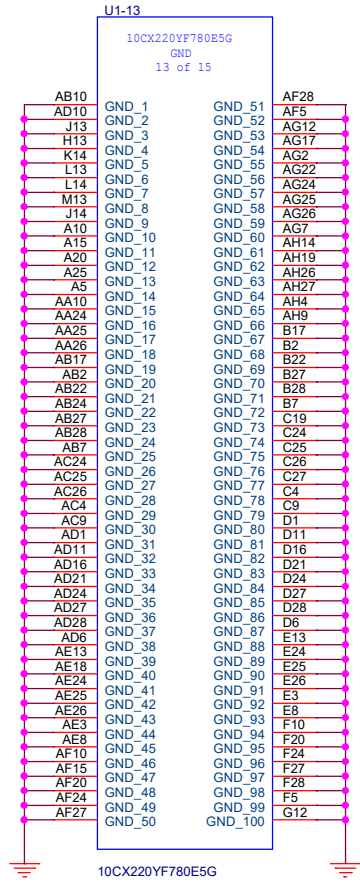


Placed at VCCR_GXB pins



Intel Corporation, 301, Bibo Rd #888, Shanghai, China, 201203 Copyright (c) 2017, Intel Corporation. All Rights Reserved.		
Title Cyclone 10 GX Development Kit Board		
Size B	Document Number 6XX-44528R	Rev A1
Date:	Sunday, October 29, 2017	Sheet 14 of 43

C10GX GND



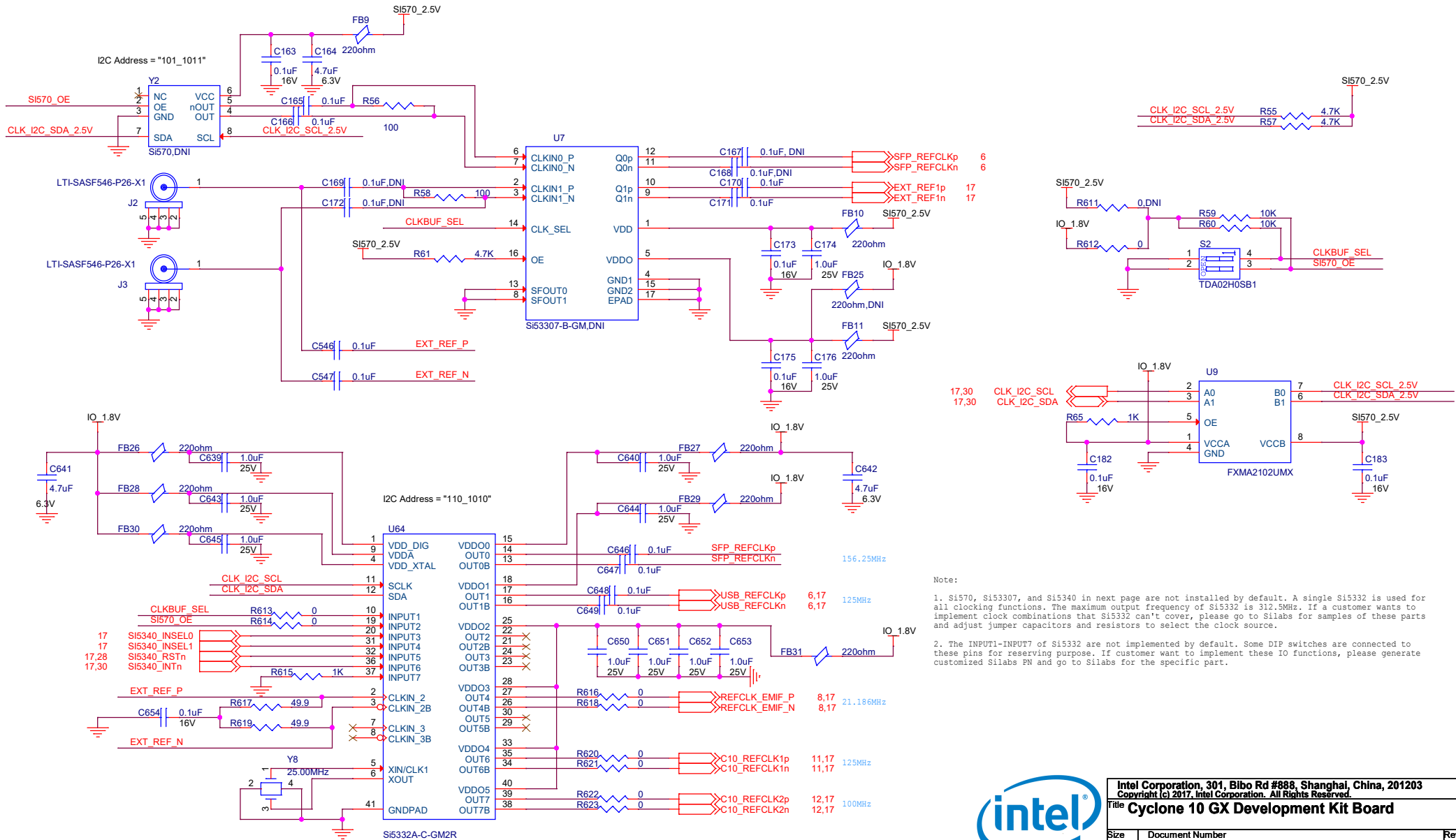
Intel Corporation, 301, Bibo Rd #888, Shanghai, China, 201203
Copyright (c) 2017, Intel Corporation. All Rights Reserved.

Title **Cyclone 10 GX Development Kit Board**

Size	Document Number	Rev
B	6XX-44528R	A1

Date: Sunday, October 29, 2017 Sheet 15 of 43

CLOCK - SI570/Si5332



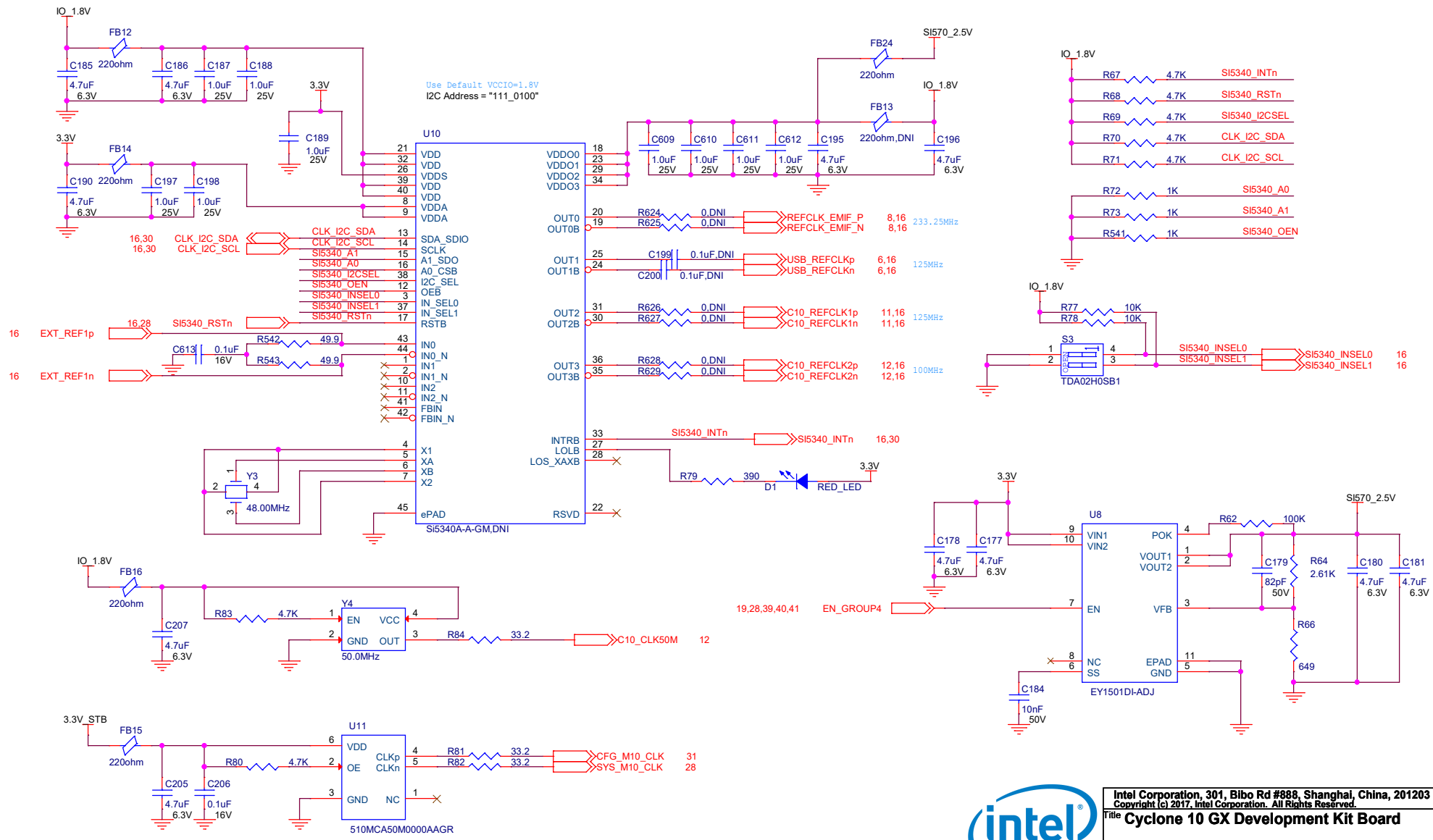
Intel Corporation, 301, Bibo Rd #888, Shanghai, China, 201203
 Copyright (c) 2017, Intel Corporation. All Rights Reserved.

Title **Cyclone 10 GX Development Kit Board**

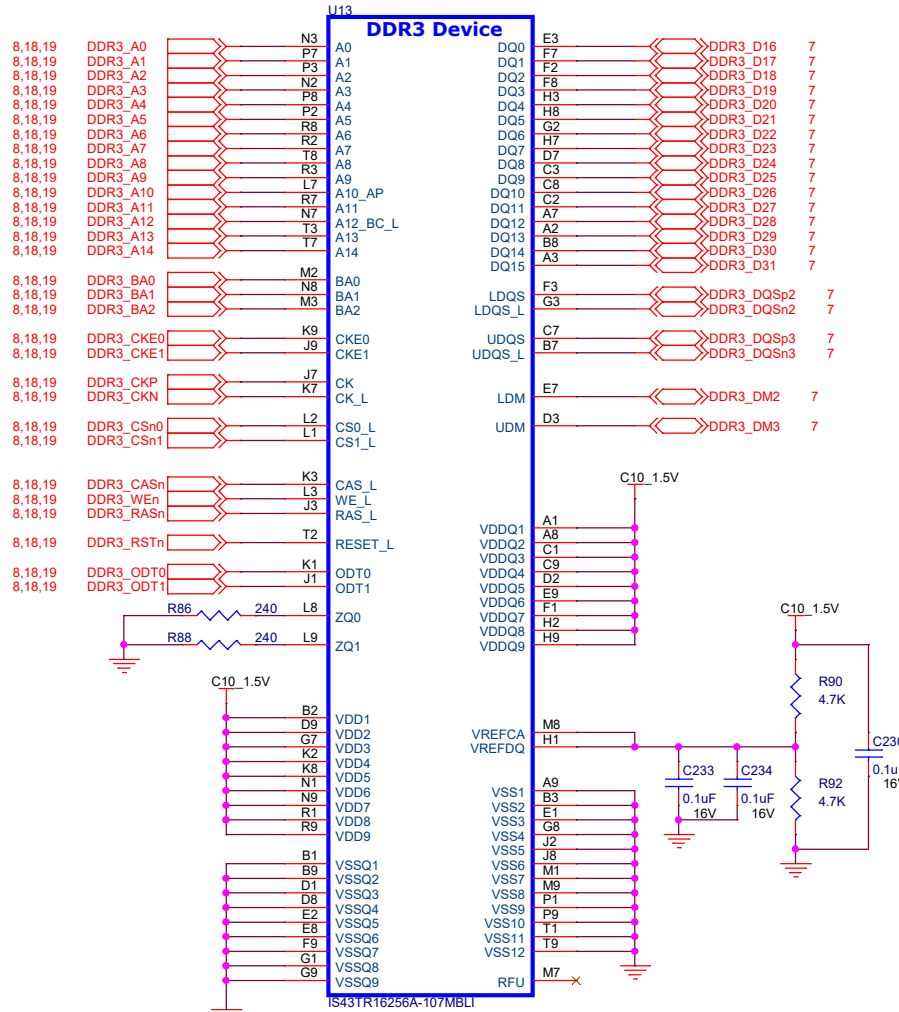
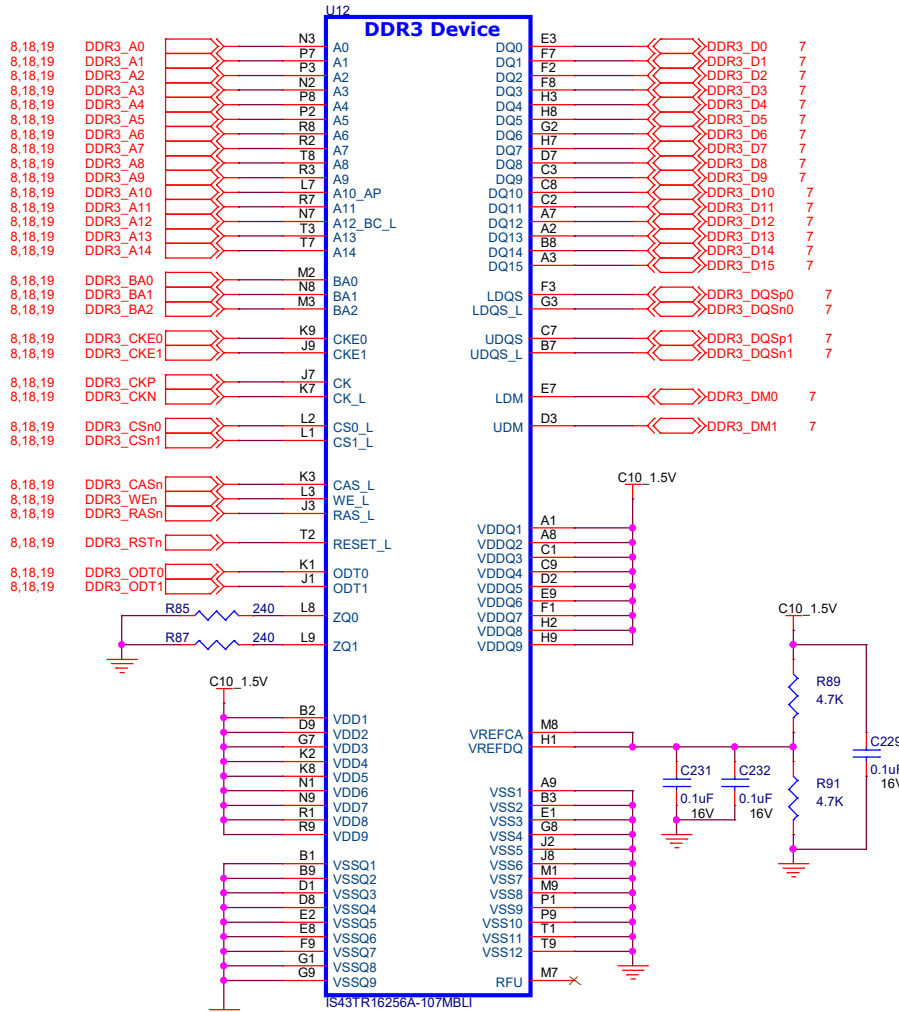
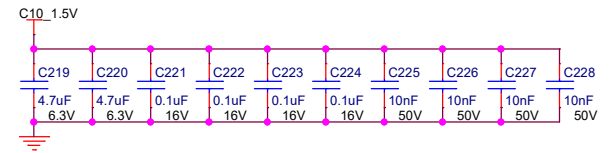
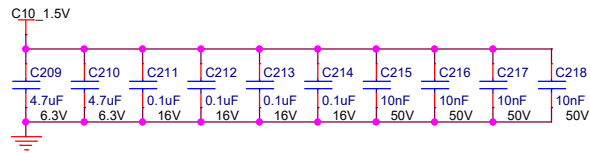
Size B	Document Number 6XX-44528R	Rev A1
-----------	--------------------------------------	------------------

Date: Sunday, October 29, 2017 Sheet 16 of 43

CLOCK - SI5340



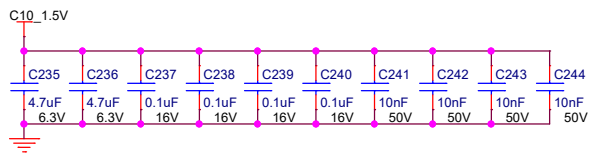
EMIF-DDR3-1



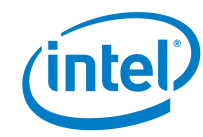
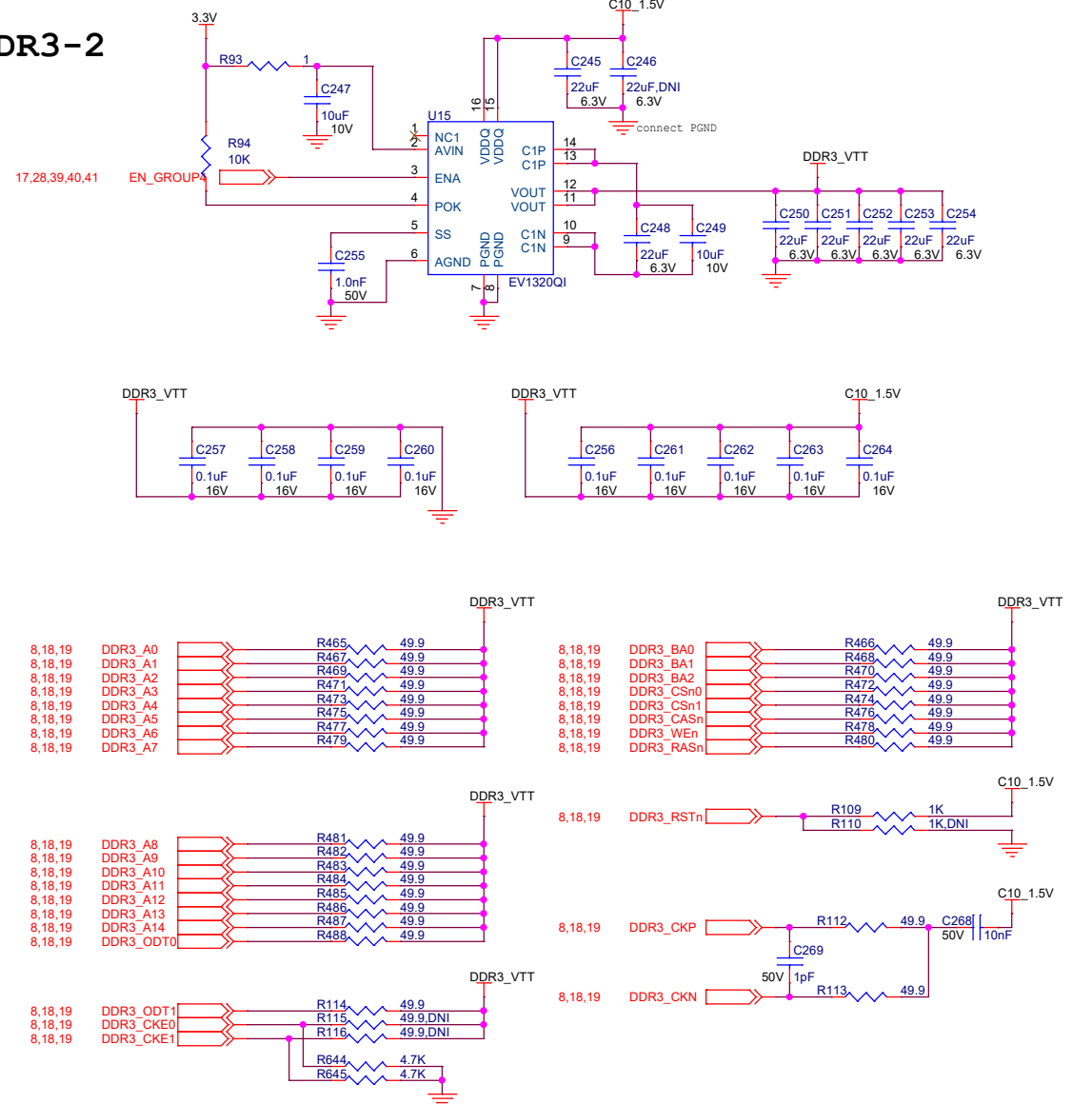
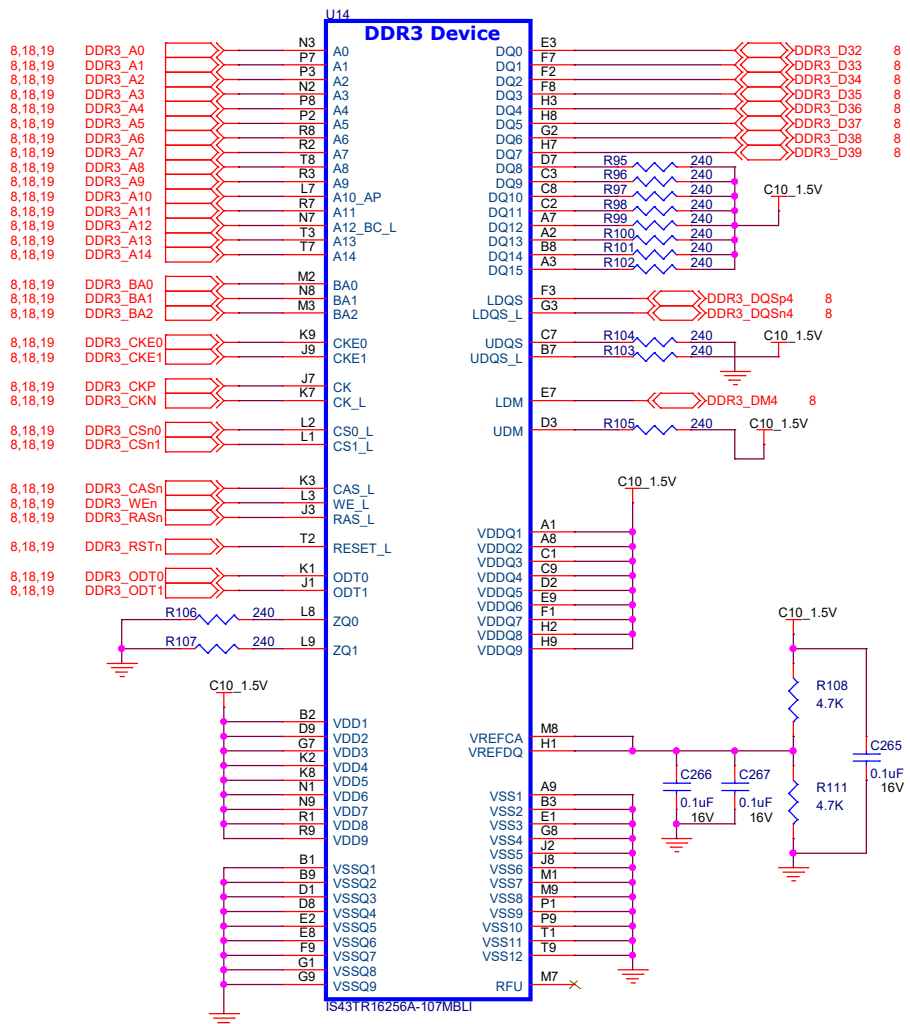
Intel Corporation, 301, Bibo Rd #888, Shanghai, China, 201203
Copyright (c) 2017, Intel Corporation. All Rights Reserved.

Title Cyclone 10 GX Development Kit Board

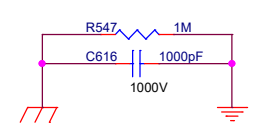
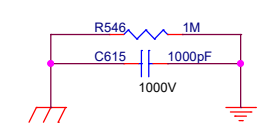
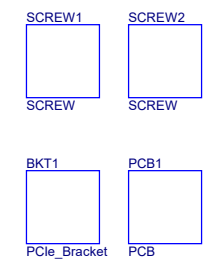
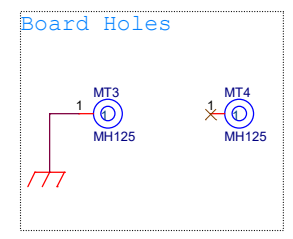
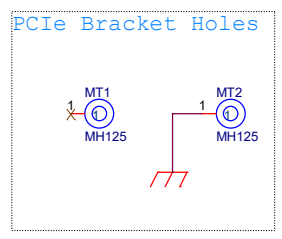
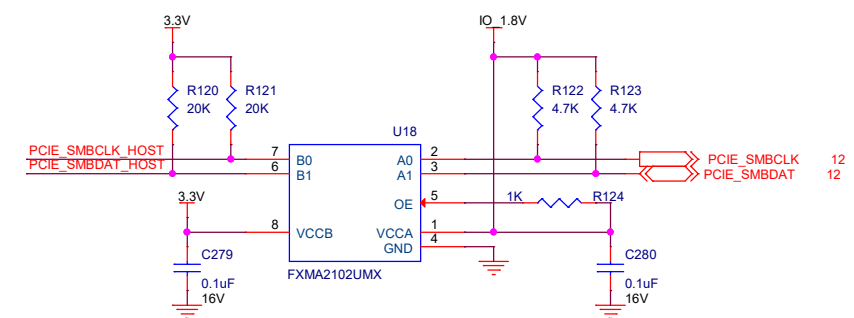
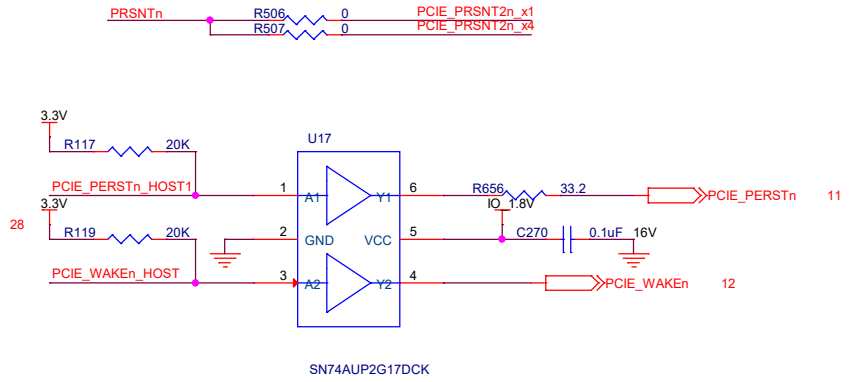
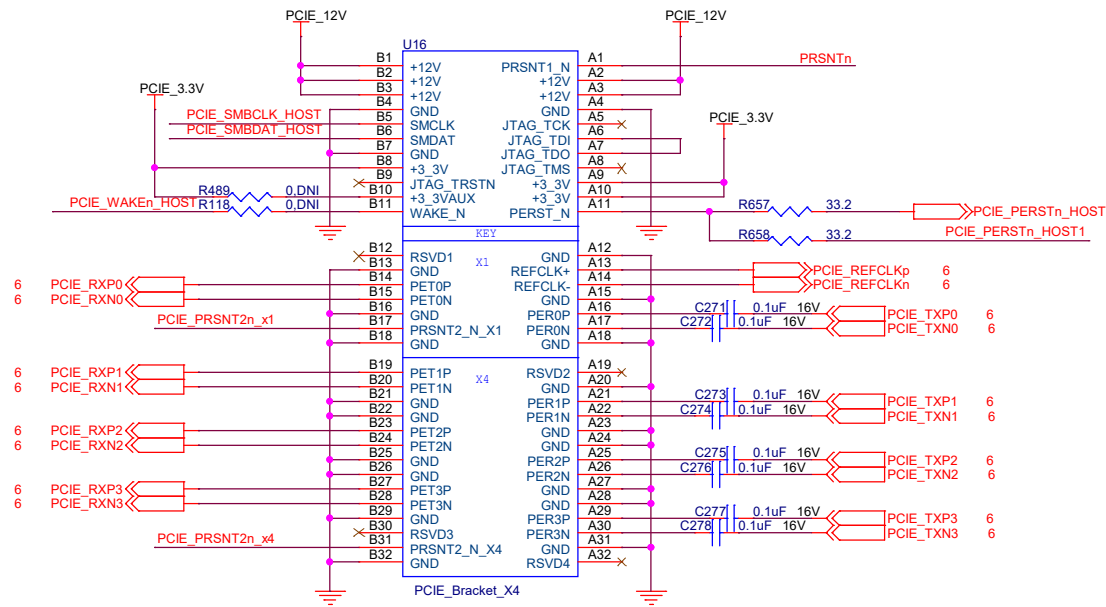
Size B	Document Number 6XX-44528R	Rev A1
Date:	Sunday, October 29, 2017	Sheet 18 of 43



EMIF-DDR3-2

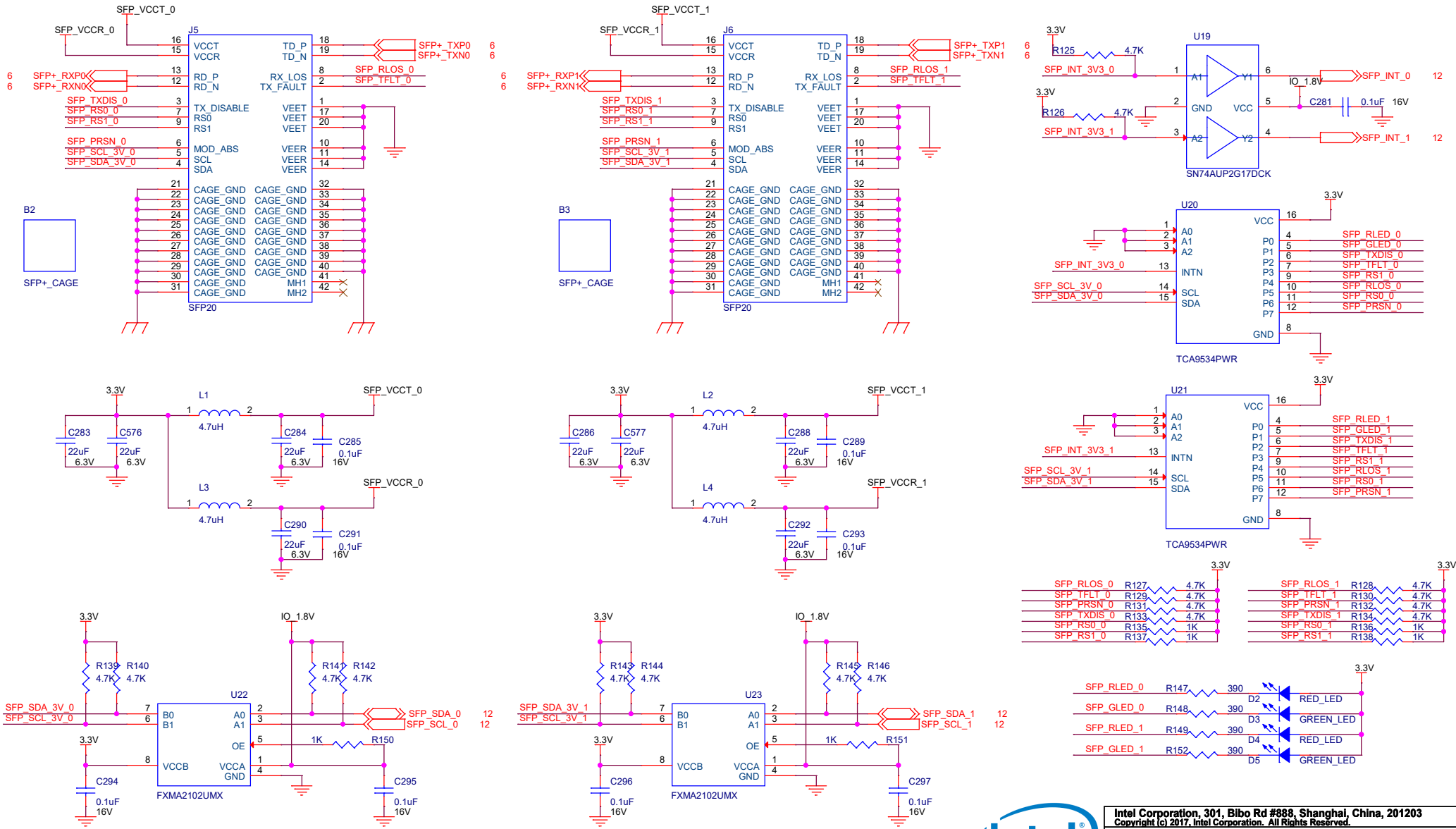


INTERFACE - PCIe



Intel Corporation, 301, Bibo Rd #888, Shanghai, China, 201203 Copyright (c) 2017, Intel Corporation. All Rights Reserved.		
Title Cyclone 10 GX Development Kit Board		
Size B	Document Number 6XX-44528R	Rev A1
Date:	Sunday, October 29, 2017	Sheet 20 of 43

INTERFACE - SFP+

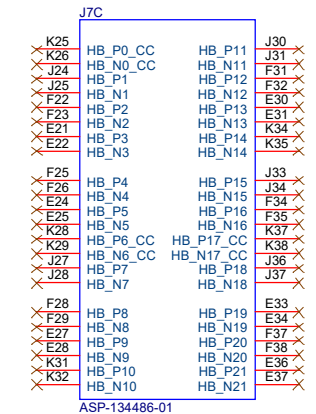
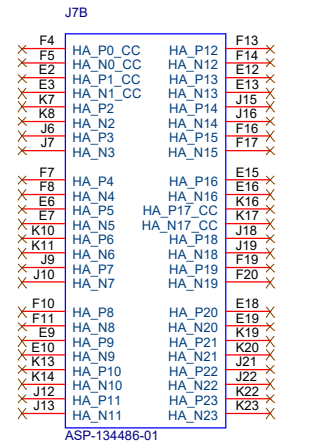
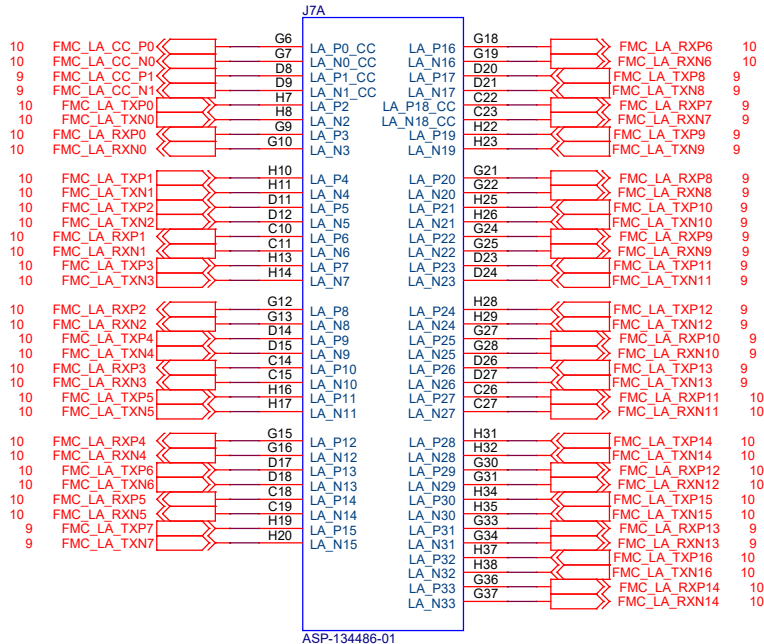
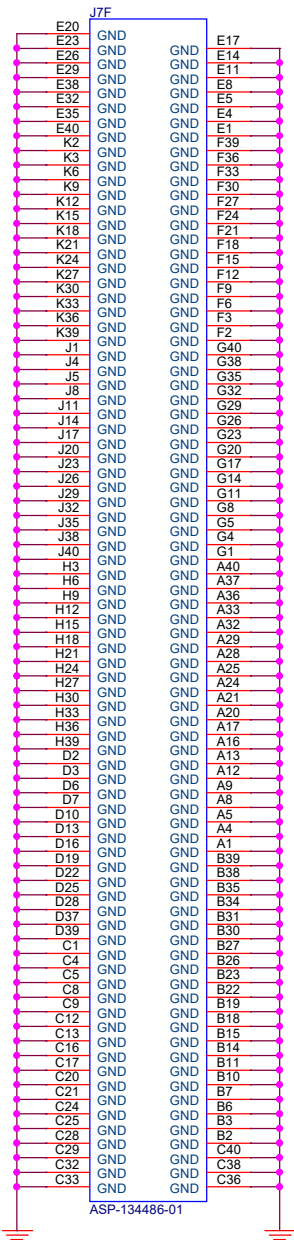


Intel Corporation, 301, Bibo Rd #888, Shanghai, China, 201203
Copyright (c) 2017, Intel Corporation. All Rights Reserved.

Title **Cyclone 10 GX Development Kit Board**

Size B	Document Number 6XX-44528R	Rev A1
Date:	Sunday, October 29, 2017	Sheet 21 of 43

INTERFACE - FMC - 1



FMC cards Supported:
 12G SDI: Semtech RDK-12GSRD-ALTRA00 Evaluation Board
 8G Displayport: Bitec FMC DisplayPort Daughter Card
 6G HDMI 2.0: Bitec FMC HDMI Daughter Card

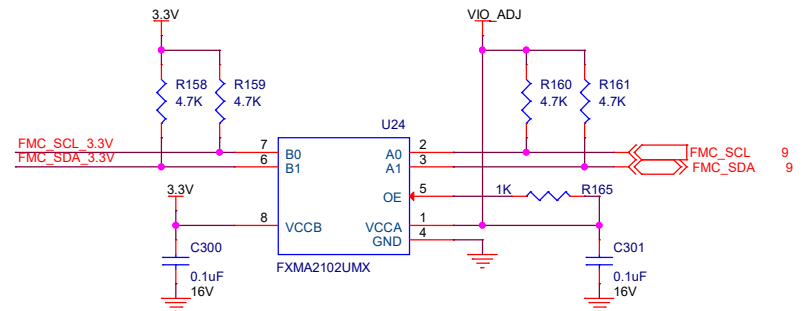
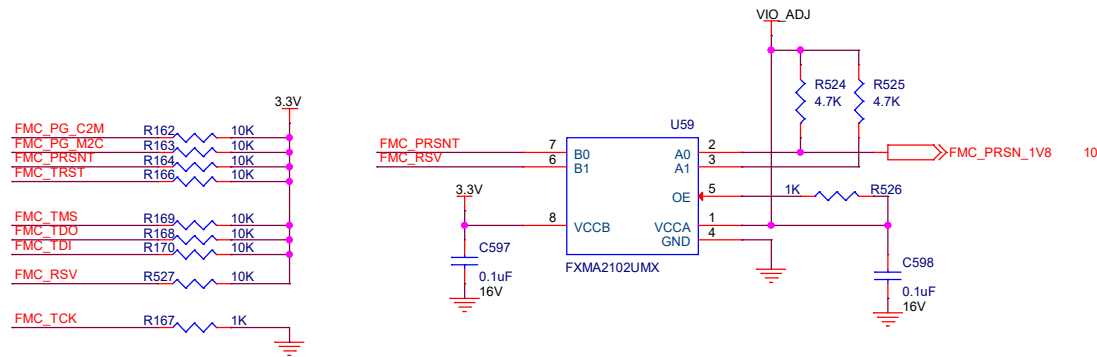
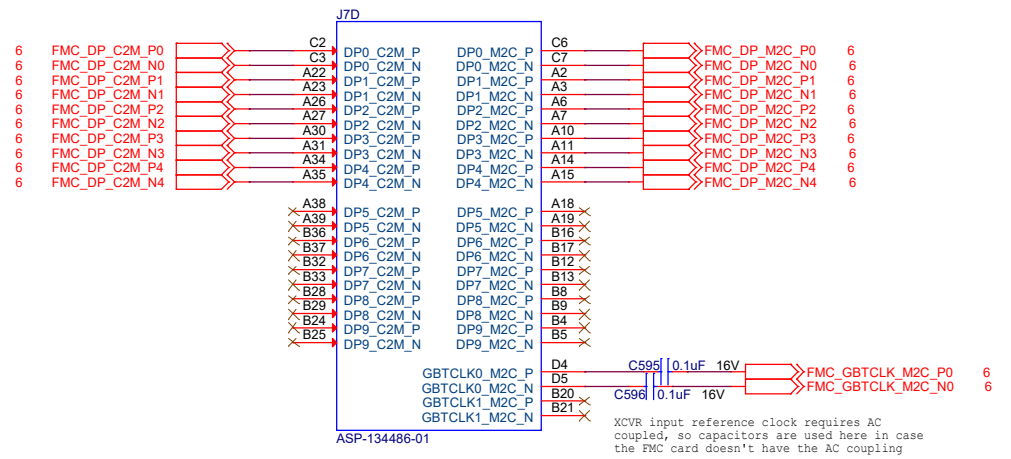
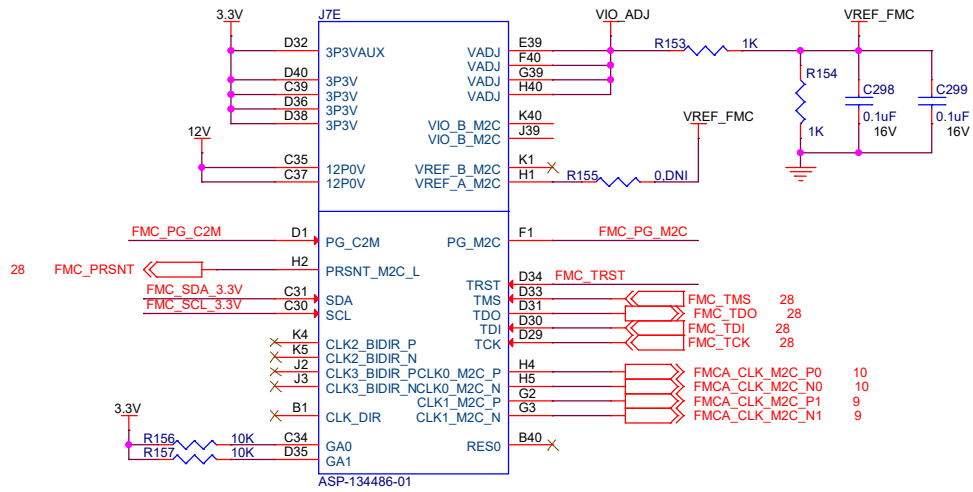


Intel Corporation, 301, Bibo Rd #888, Shanghai, China, 201203
 Copyright (c) 2017, Intel Corporation. All Rights Reserved.

Title: **Cyclone 10 GX Development Kit Board**

Size	Document Number	Rev
B	6XX-44528R	A1
Date:	Sunday, October 29, 2017	Sheet 22 of 43

INTERFACE - FMC - 2

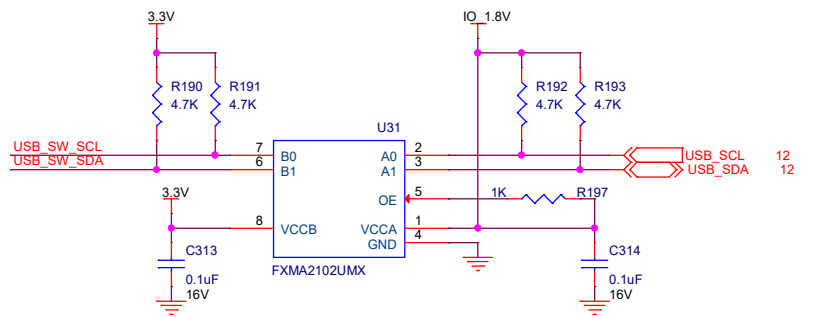
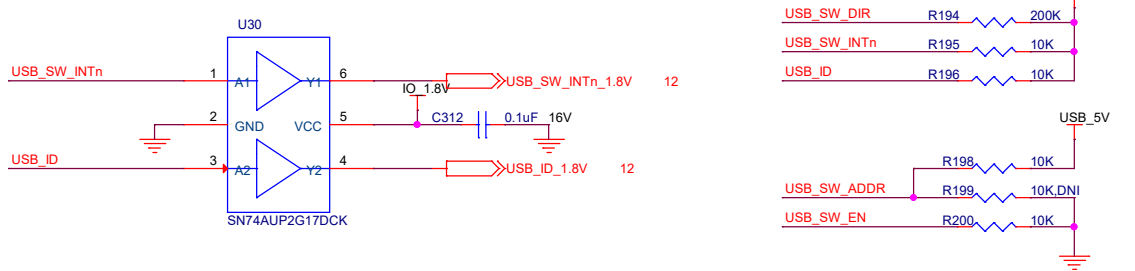
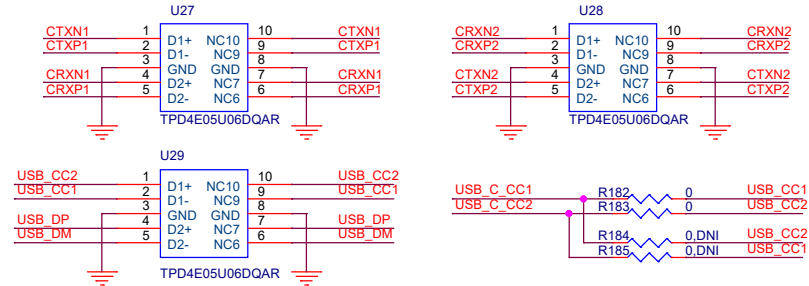
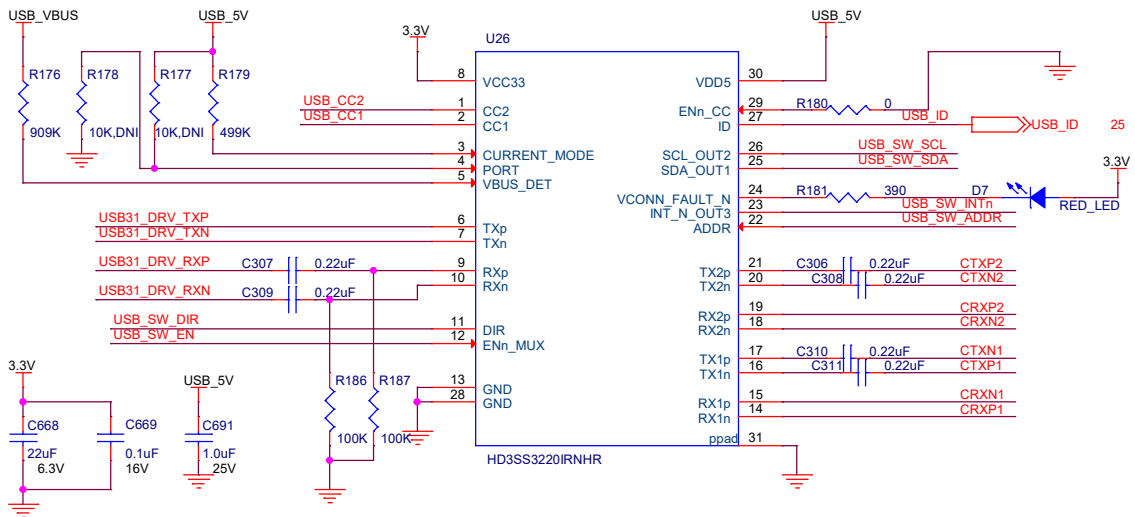
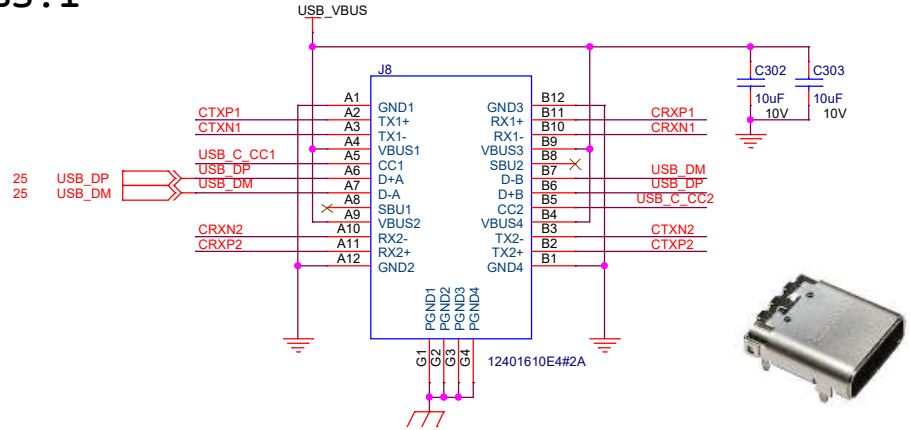
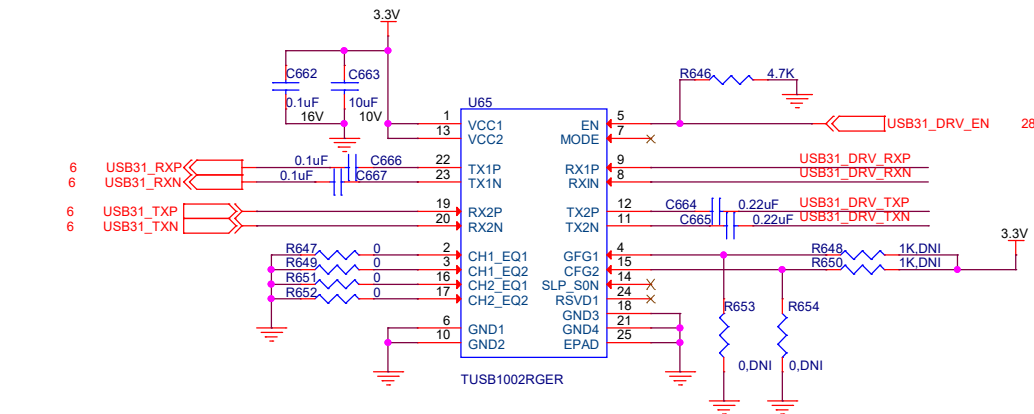


Intel Corporation, 301, Bibo Rd #888, Shanghai, China, 201203
Copyright (c) 2017, Intel Corporation. All Rights Reserved.

Title **Cyclone 10 GX Development Kit Board**

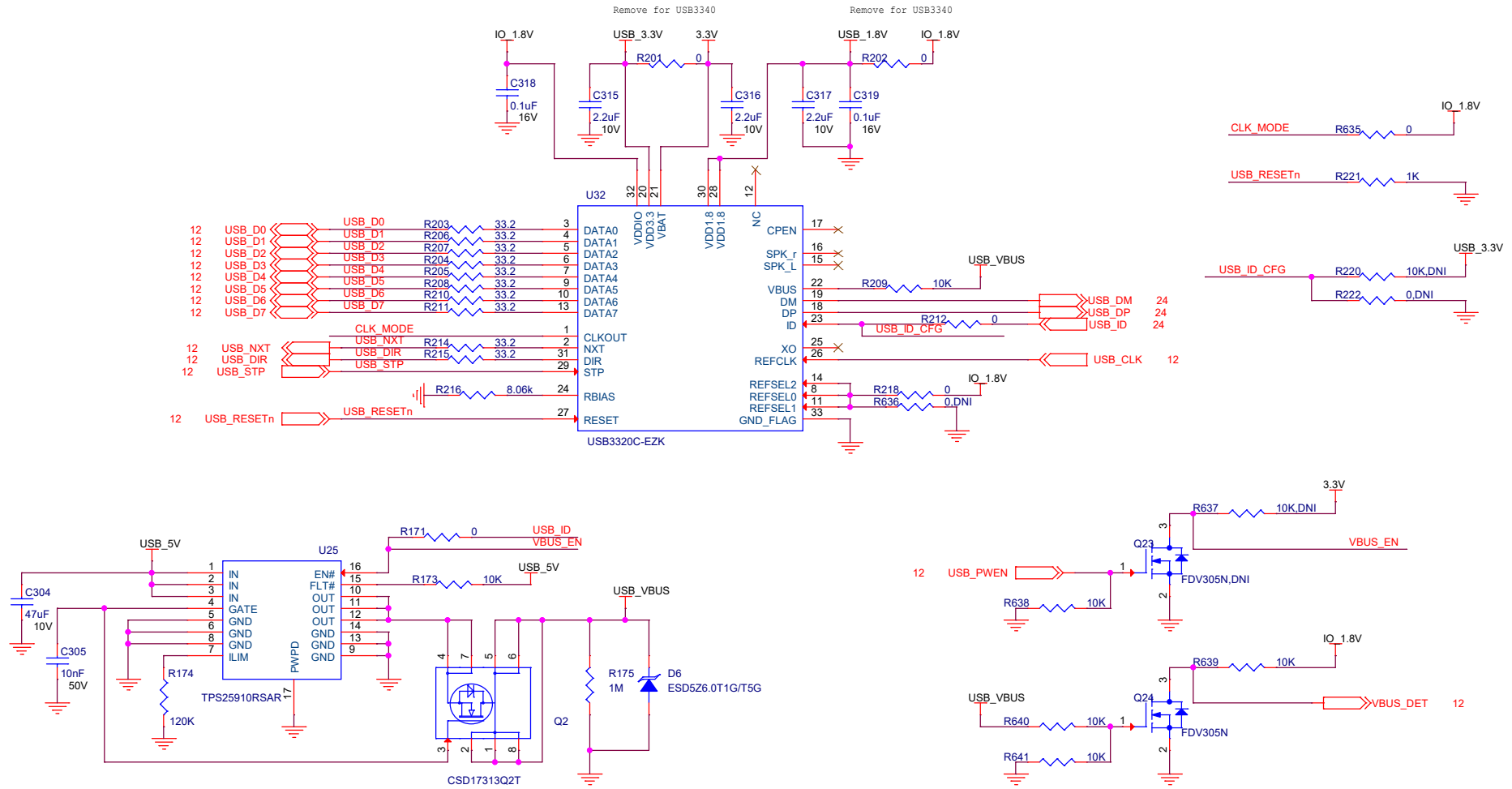
Size	Document Number	Rev
B	6XX-44528R	A1
Date:	Sunday, October 29, 2017	Sheet 23 of 43

INTERFACE - USB3.1



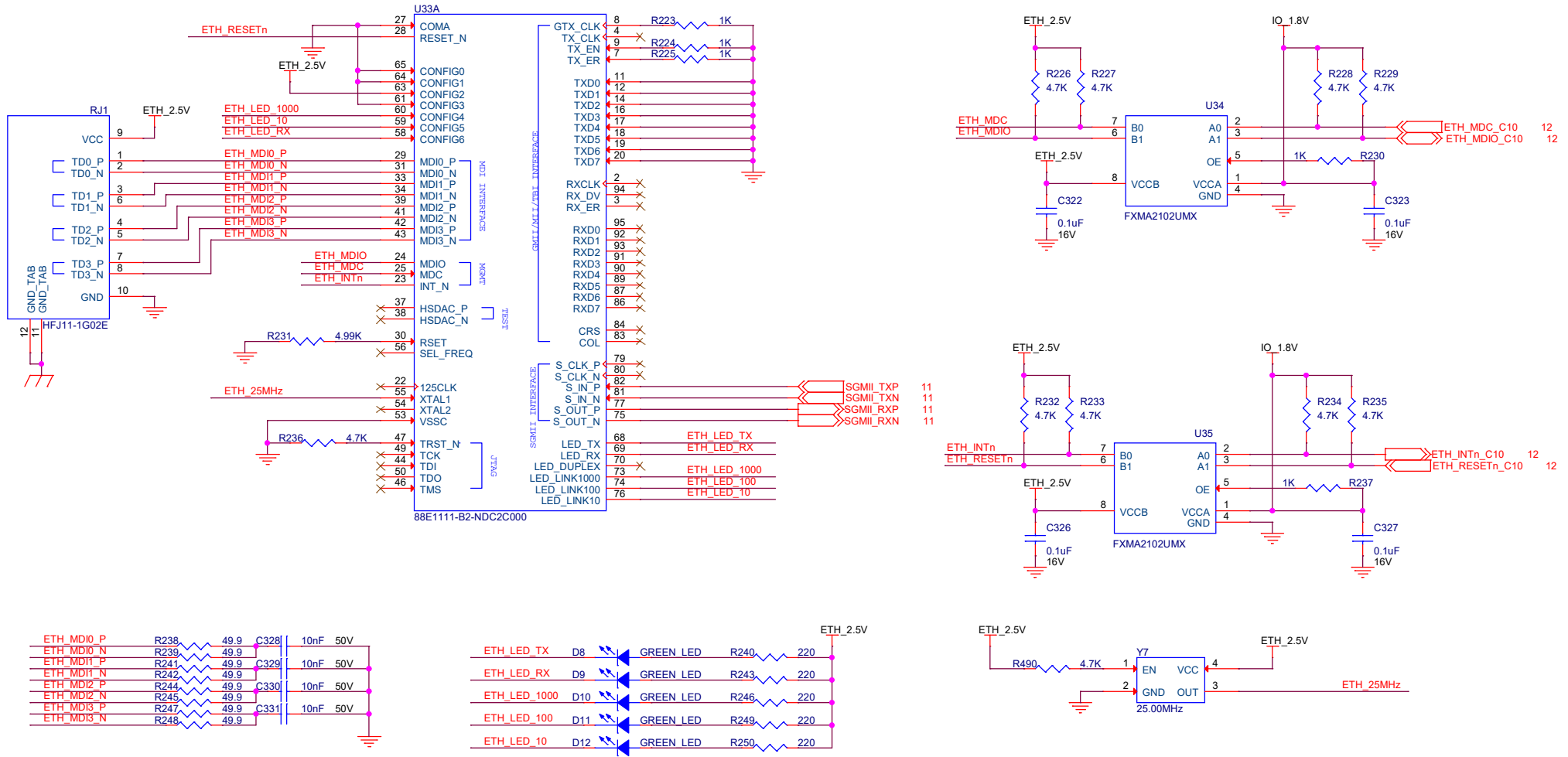
Intel Corporation, 301, Bibo Rd #888, Shanghai, China, 201203 Copyright (c) 2017, Intel Corporation. All Rights Reserved.		
Title Cyclone 10 GX Development Kit Board		
Size B	Document Number 6XX-44528R	Rev A1
Date: Sunday, October 29, 2017	Sheet 24	of 43

INTERFACE - USB2.0



Intel Corporation, 301, Bibo Rd #888, Shanghai, China, 201203 Copyright (c) 2017, Intel Corporation. All Rights Reserved.		
Title Cyclone 10 GX Development Kit Board		
Size B	Document Number 6XX-44528R	Rev A1
Date: Sunday, October 29, 2017	Sheet 25	of 43

INTERFACE - GIGE - 1



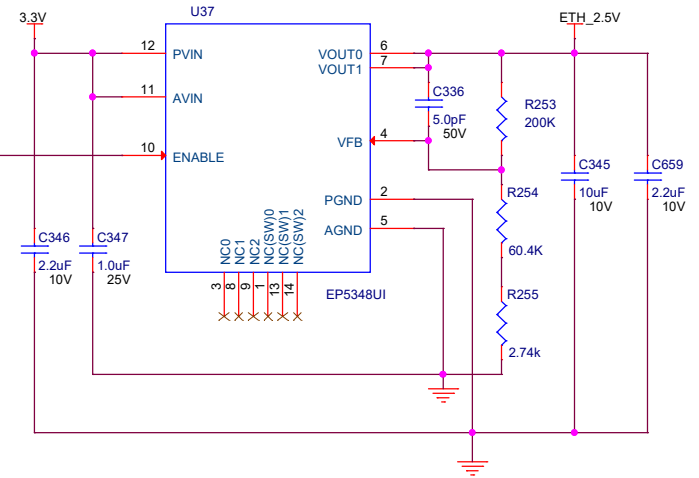
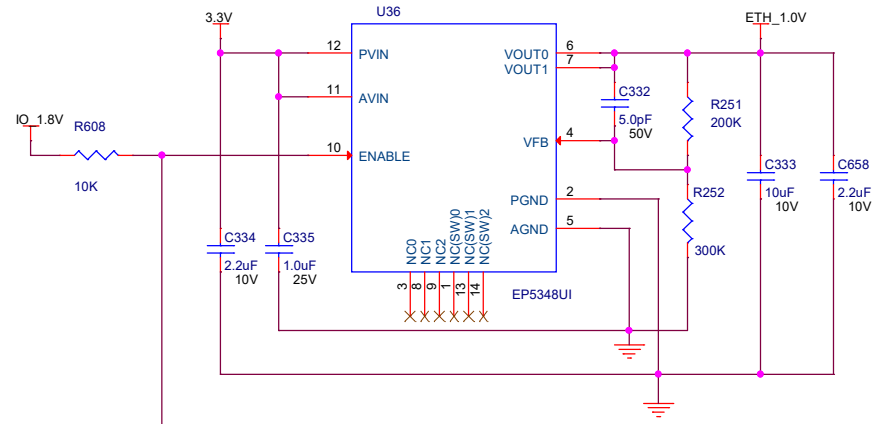
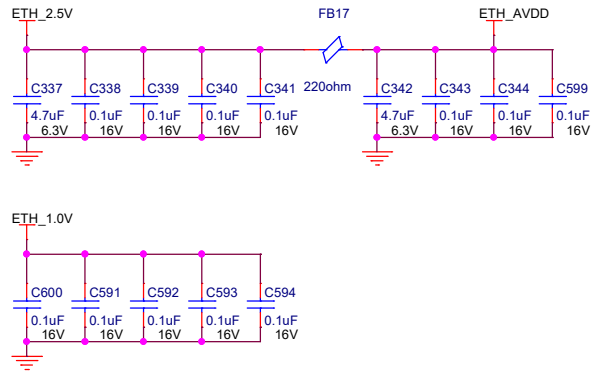
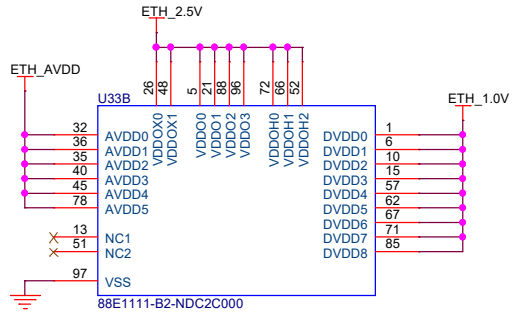
Intel Corporation, 301, Bibo Rd #888, Shanghai, China, 201203
Copyright (c) 2017, Intel Corporation. All Rights Reserved.

Title **Cyclone 10 GX Development Kit Board**

Size B	Document Number 6XX-44528R	Rev A1
-----------	--------------------------------------	------------------

Date: Sunday, October 29, 2017 Sheet 26 of 43

INTERFACE - GIGE - 2

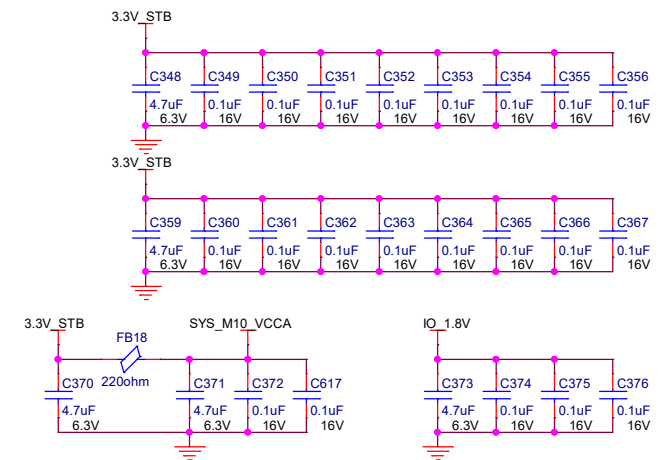
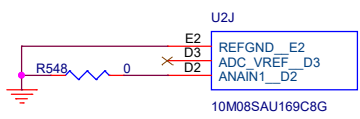
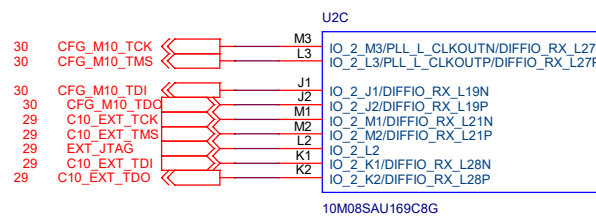
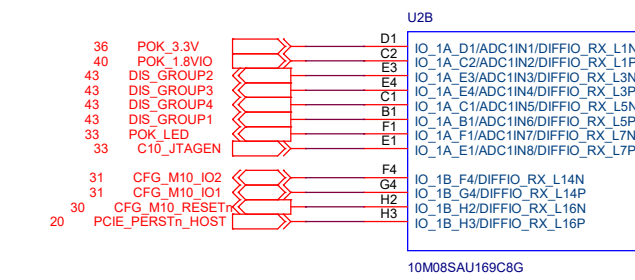
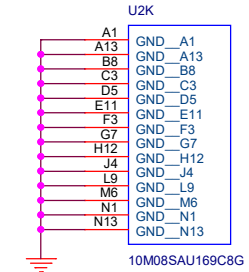
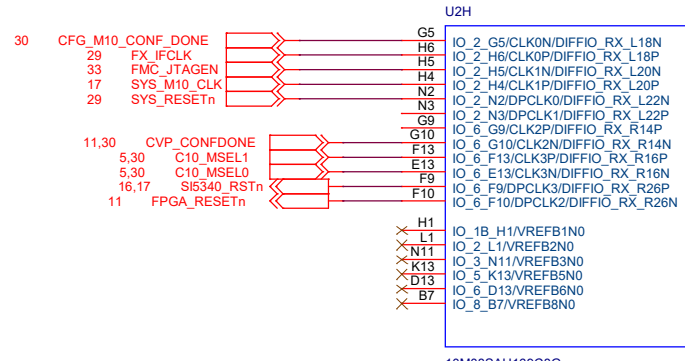
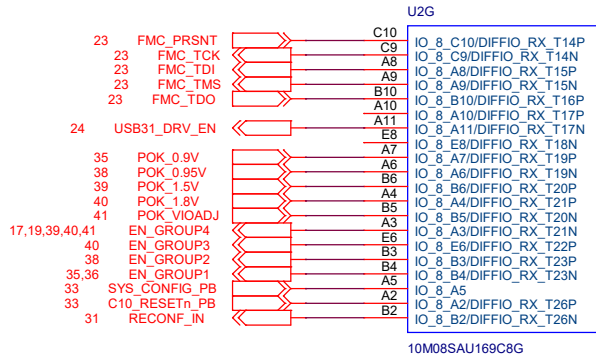
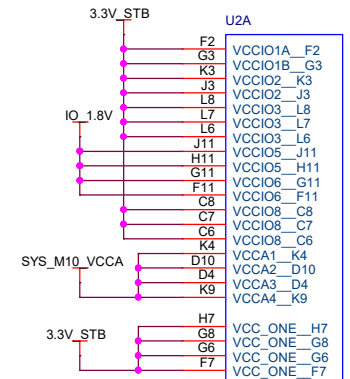
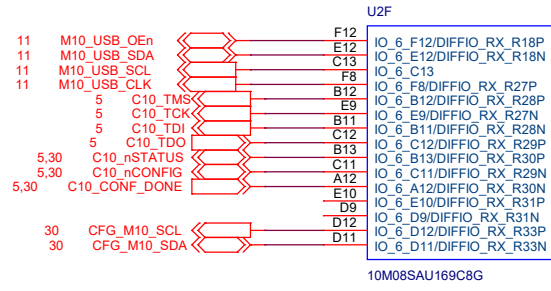
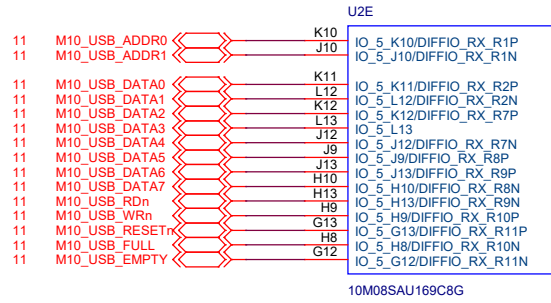


Intel Corporation, 301, Bibo Rd #888, Shanghai, China, 201203
Copyright (c) 2017, Intel Corporation. All Rights Reserved.

Title Cyclone 10 GX Development Kit Board

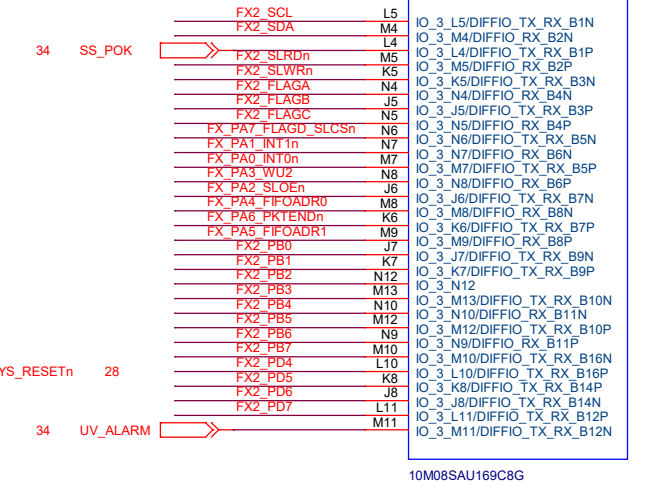
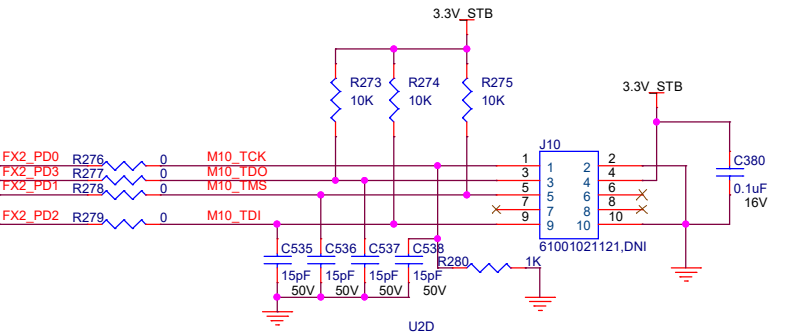
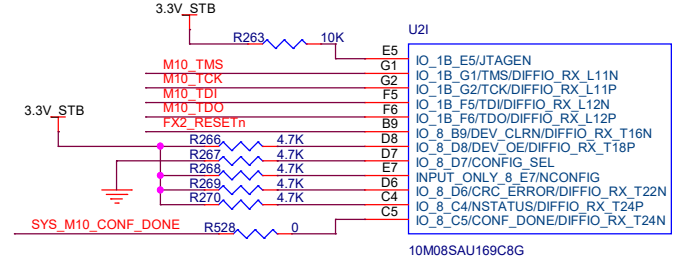
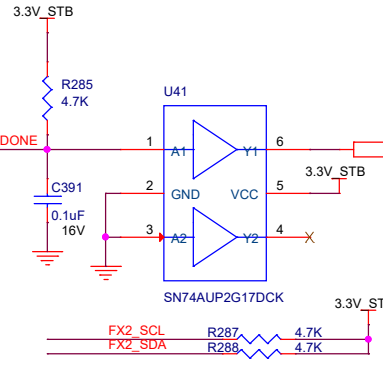
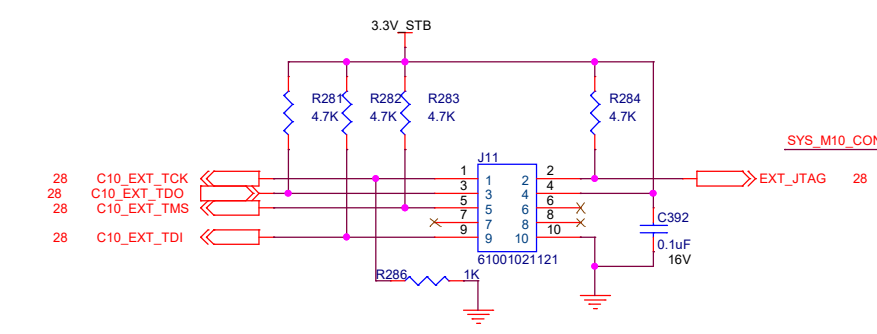
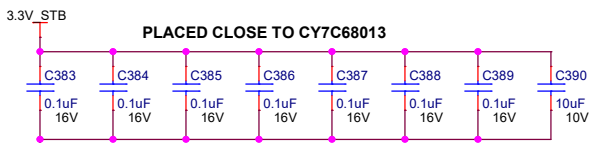
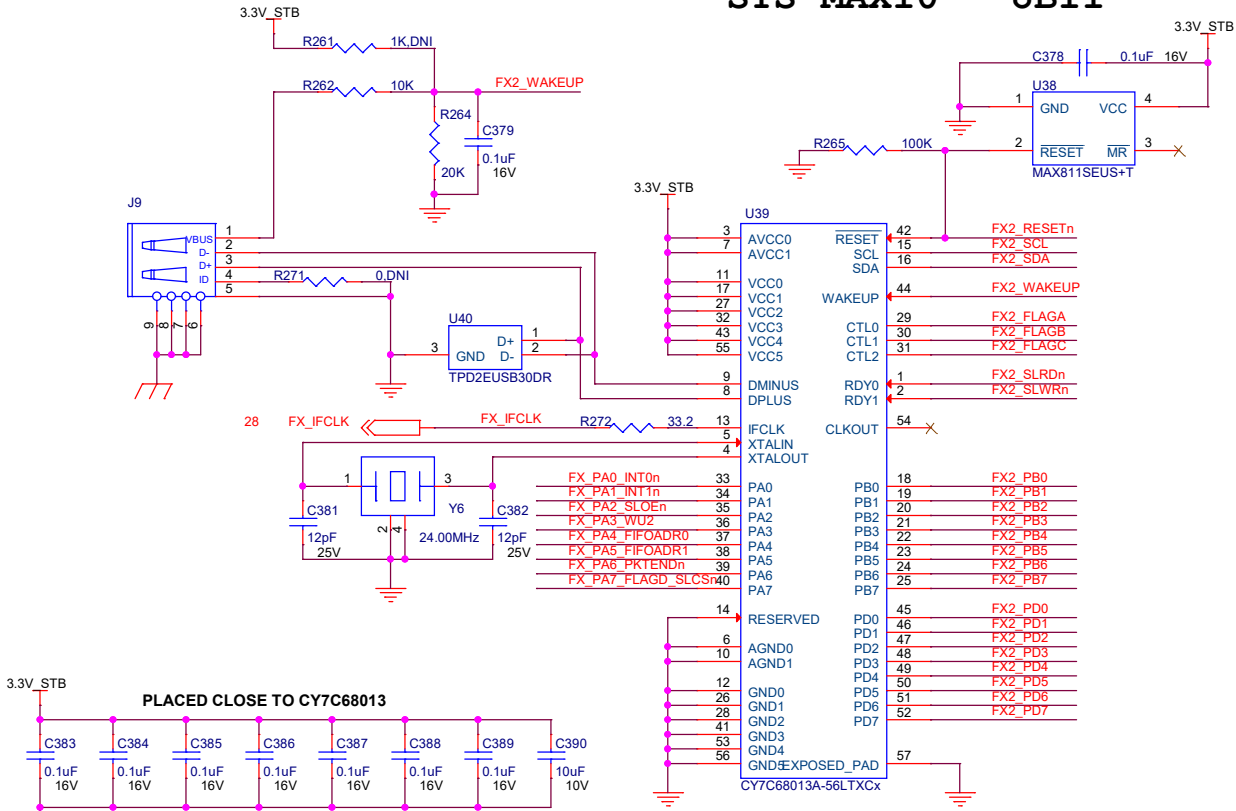
Size	Document Number	Rev
B	6XX-44528R	A1
Date:	Sunday, October 29, 2017	Sheet 27 of 43

SYS MAX10 - CTRL



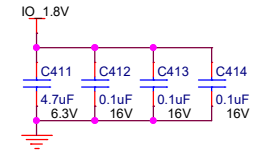
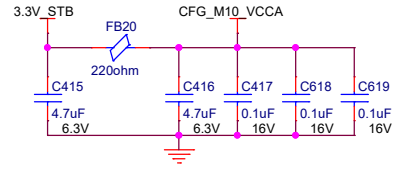
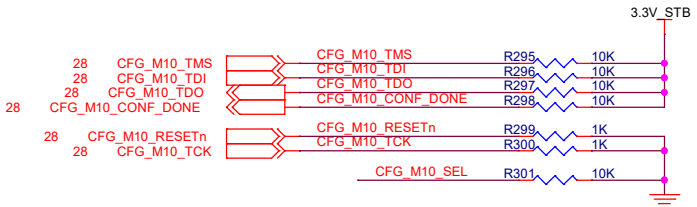
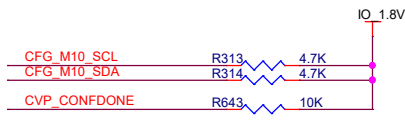
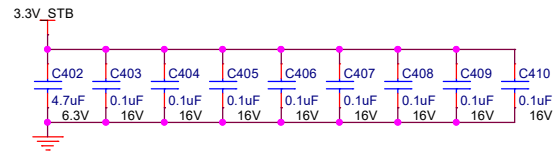
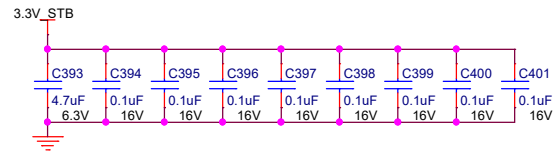
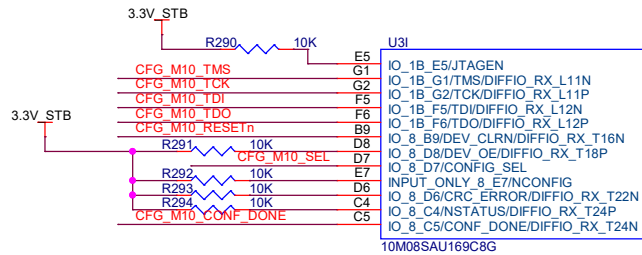
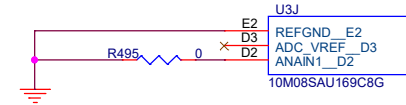
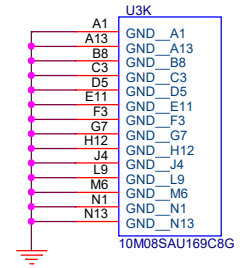
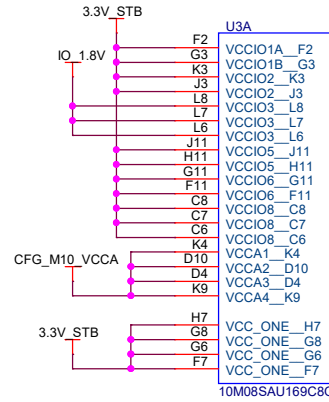
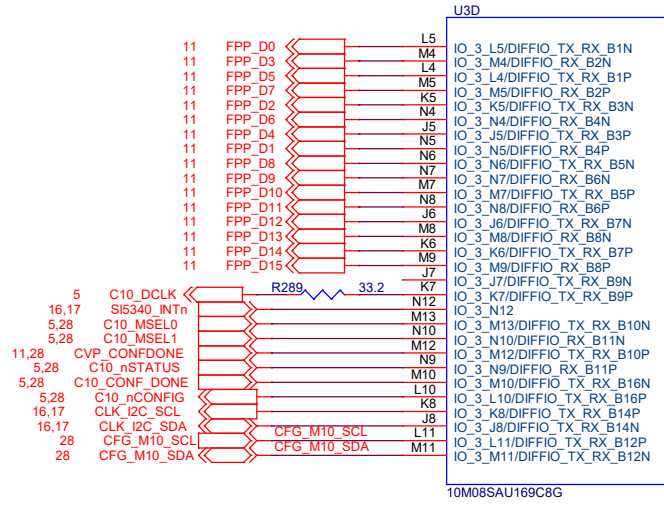
Intel Corporation, 301, Bibo Rd #888, Shanghai, China, 201203 Copyright (c) 2017, Intel Corporation. All Rights Reserved.		
Title Cyclone 10 GX Development Kit Board		
Size B	Document Number 6XX-44528R	Rev A1
Date: Sunday, October 29, 2017	Sheet 28	of 43

SYS MAX10 - UBII



Intel Corporation, 301, Bibo Rd #888, Shanghai, China, 201203 Copyright (c) 2017, Intel Corporation. All Rights Reserved.		
Title Cyclone 10 GX Development Kit Board		
Size B	Document Number 6XX-44528R	Rev A1
Date:	Sunday, October 29, 2017	Sheet 29 of 43

CFG MAX10 - FPP

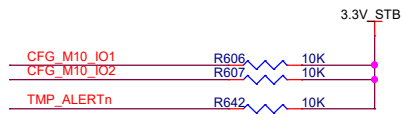
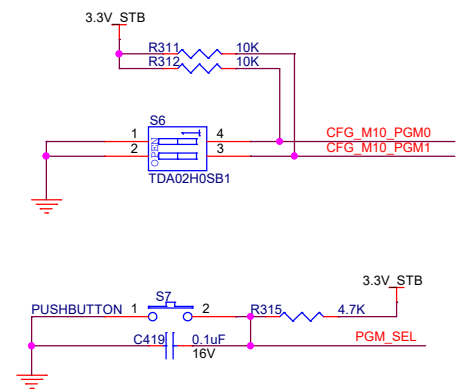
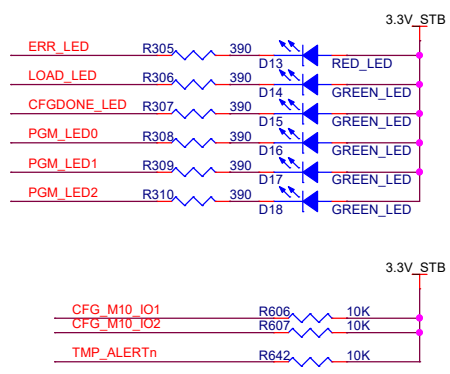
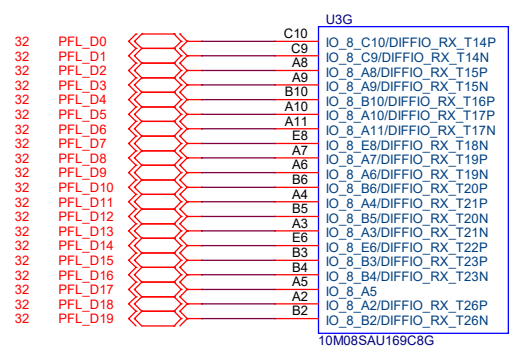
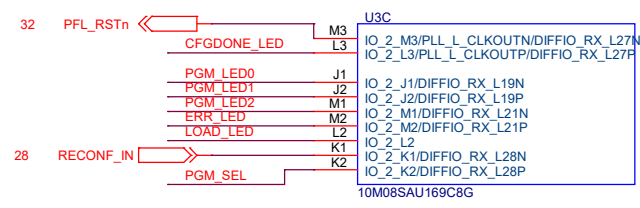
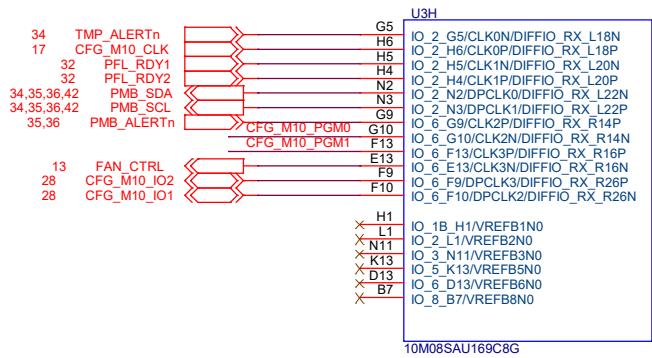
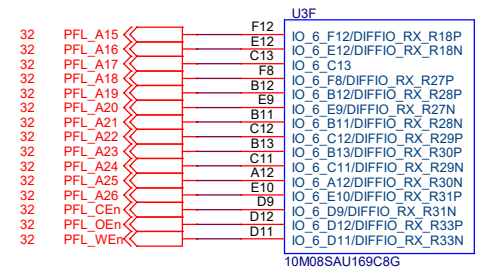
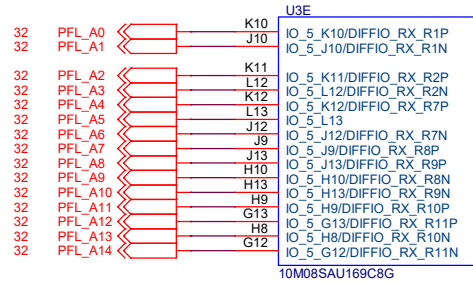
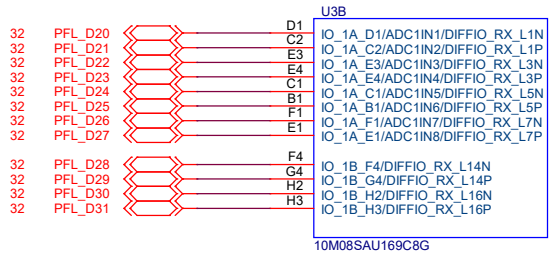


Intel Corporation, 301, Bibo Rd #888, Shanghai, China, 201203
Copyright (c) 2017, Intel Corporation. All Rights Reserved.

Title **Cyclone 10 GX Development Kit Board**

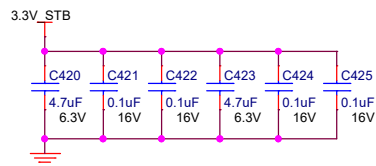
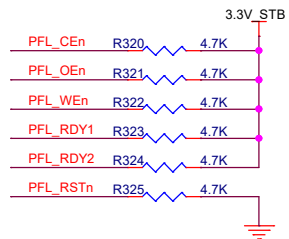
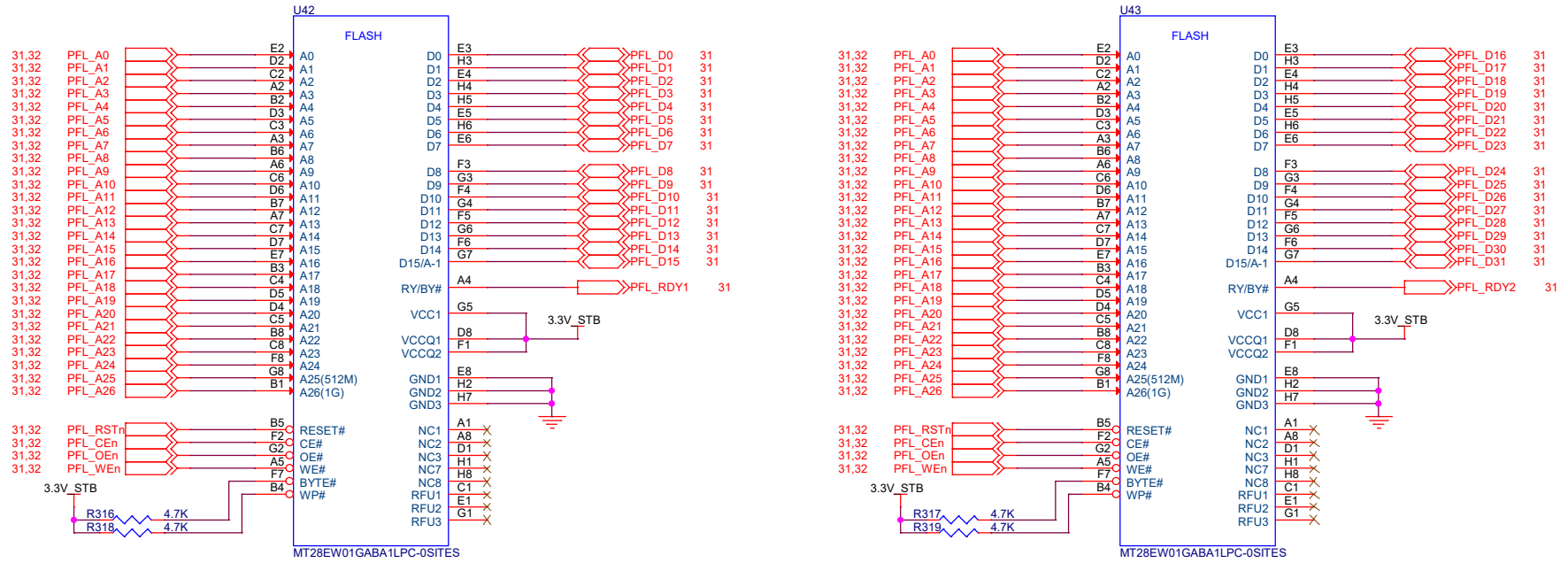
Size B	Document Number 6XX-44528R	Rev A1
Date:	Sunday, October 29, 2017	Sheet 30 of 43

CFG MAX10 - PFL



Intel Corporation, 301, Bibo Rd #888, Shanghai, China, 201203 Copyright (c) 2017, Intel Corporation. All Rights Reserved.		
Title Cyclone 10 GX Development Kit Board		
Size B	Document Number 6XX-44528R	Rev A1
Date:	Sunday, October 29, 2017	Sheet 31 of 43

CFG PFL FLASH



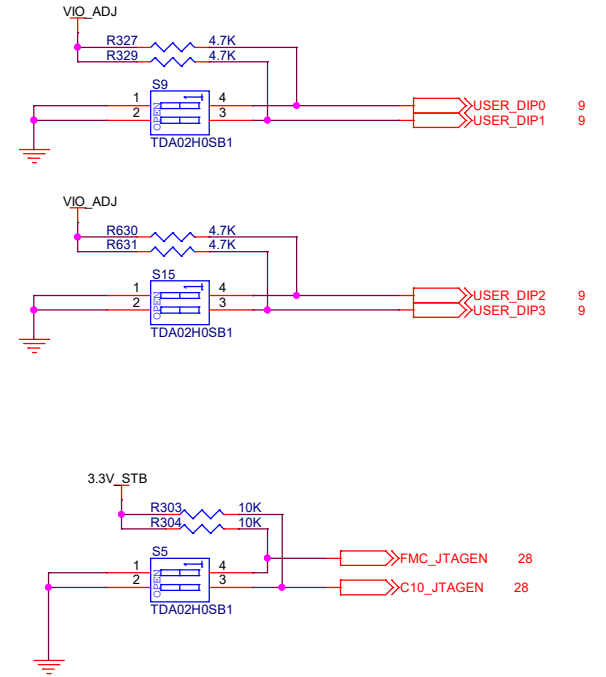
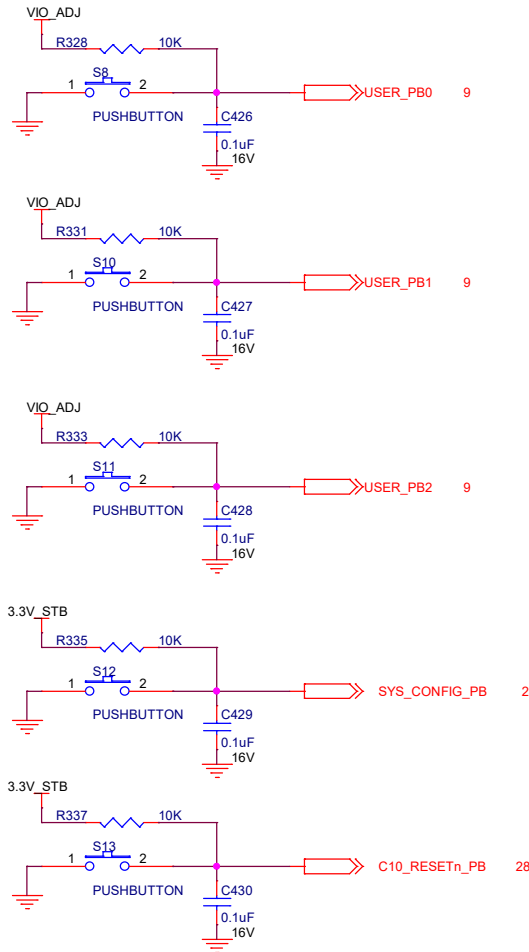
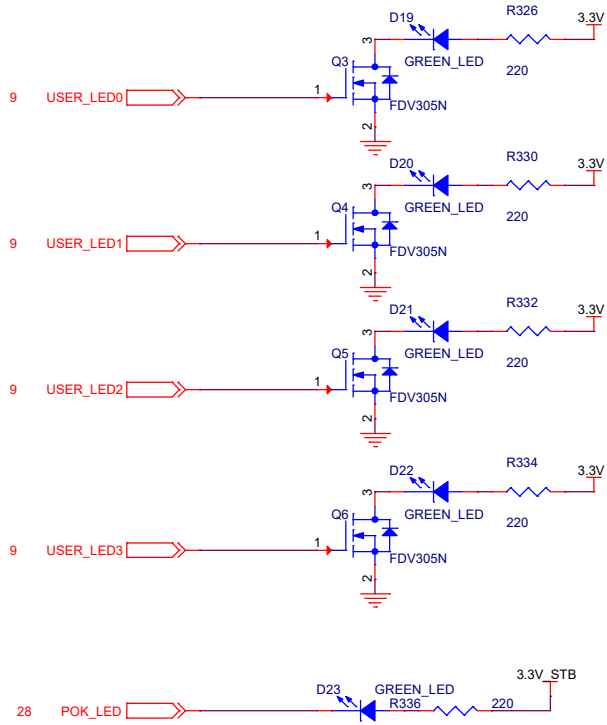
Intel Corporation, 301, Bibo Rd #888, Shanghai, China, 201203
Copyright (c) 2017, Intel Corporation. All Rights Reserved.

Title Cyclone 10 GX Development Kit Board

Size B	Document Number 6XX-44528R	Rev A1
--------	--------------------------------------	------------------

Date: Sunday, October 29, 2017 Sheet 32 of 43

LED & PB & SW

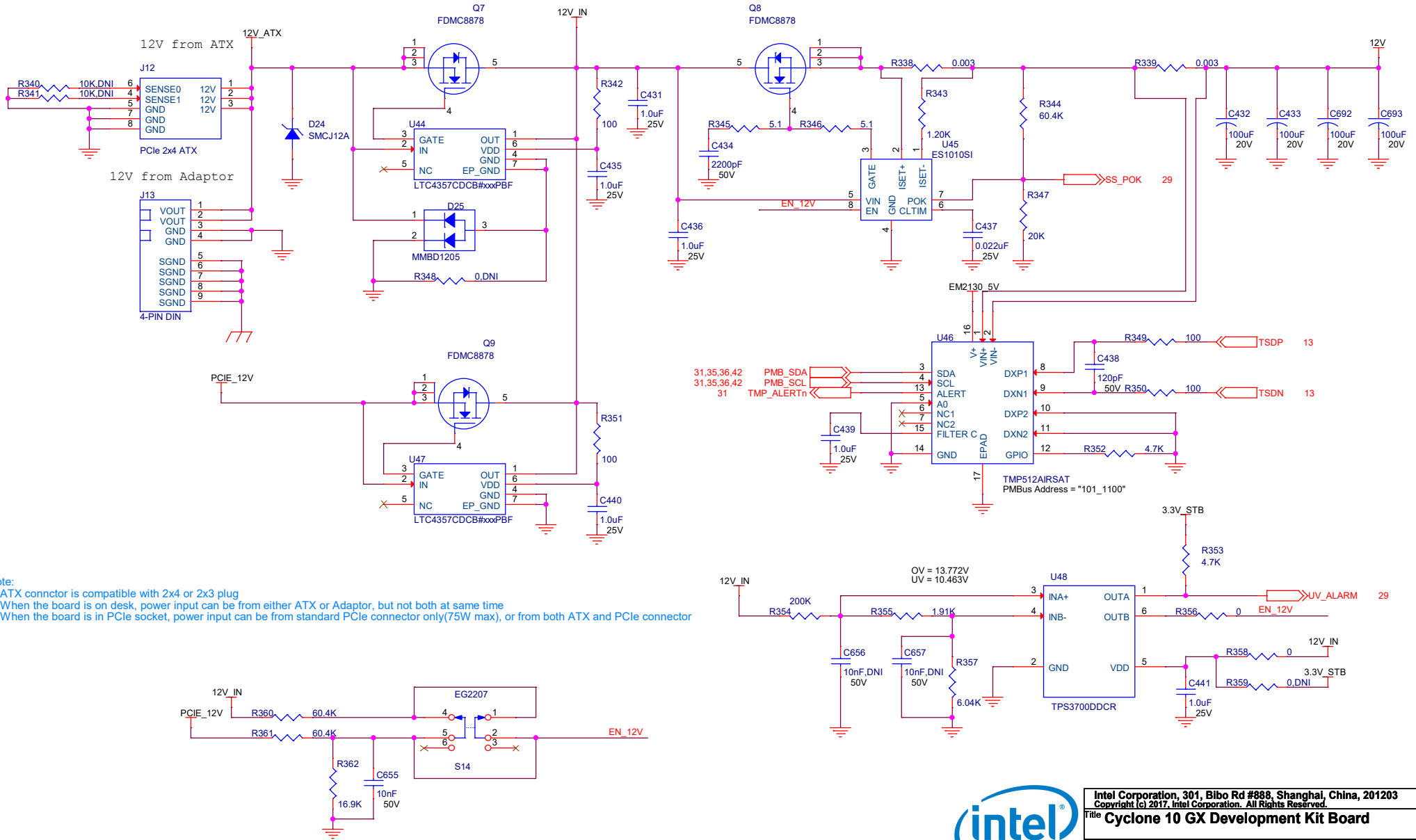


Intel Corporation, 301, Bibo Rd #888, Shanghai, China, 201203
 Copyright (c) 2017, Intel Corporation. All Rights Reserved.

Title Cyclone 10 GX Development Kit Board

Size	Document Number	Rev
B	6XX-44528R	A1
Date:	Sunday, October 29, 2017	Sheet 33 of 43

POWER - INPUT



- Note:
1. ATX connector is compatible with 2x4 or 2x3 plug
 2. When the board is on desk, power input can be from either ATX or Adaptor, but not both at same time
 3. When the board is in PCIe socket, power input can be from standard PCIe connector only(75W max), or from both ATX and PCIe connector

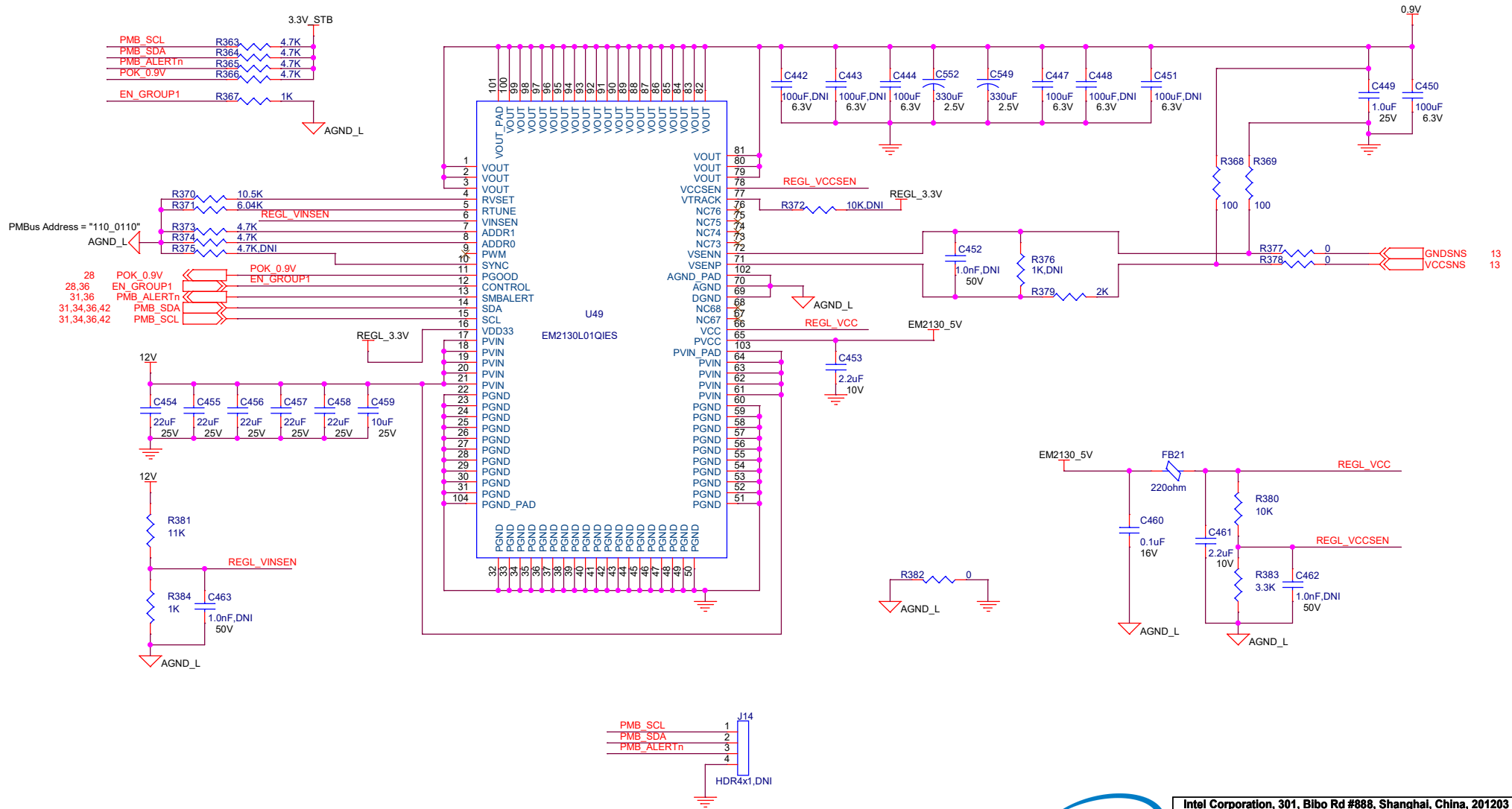


Intel Corporation, 301, Bibo Rd #888, Shanghai, China, 201203
Copyright (c) 2017, Intel Corporation. All Rights Reserved.

Title **Cyclone 10 GX Development Kit Board**

Size	Document Number	Rev
B	6XX-44528R	A1
Date:	Sunday, October 29, 2017	Sheet 34 of 43

POWER - 12V to 0.9V



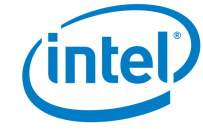
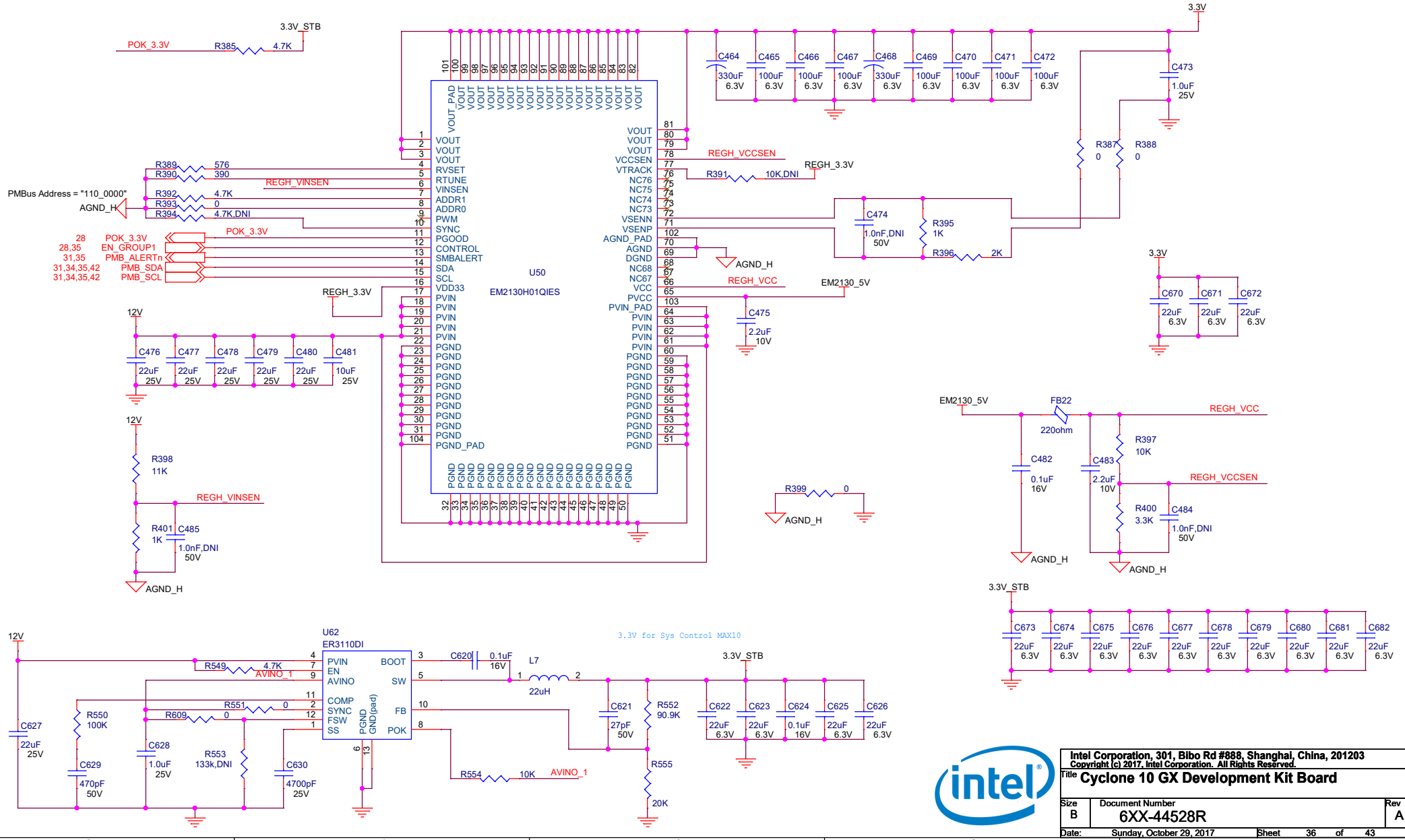
Intel Corporation, 301, Bibo Rd #888, Shanghai, China, 201203
Copyright (c) 2017, Intel Corporation. All Rights Reserved.

Title **Cyclone 10 GX Development Kit Board**

Size	Document Number	Rev
B	6XX-44528R	A1

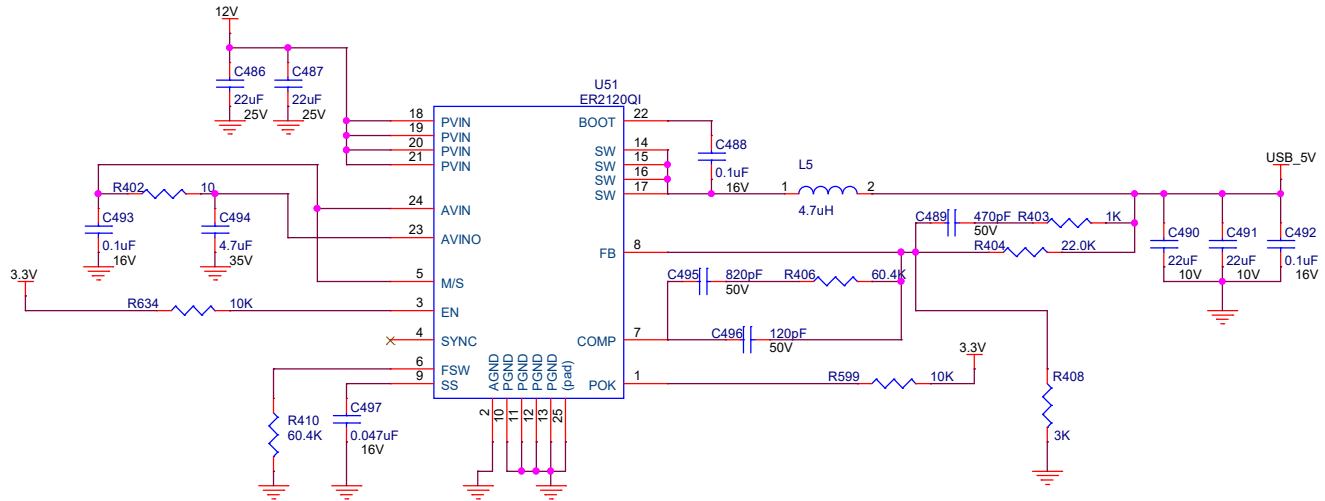
Date: Sunday, October 29, 2017 Sheet 35 of 43

POWER - 12V to 3.3V

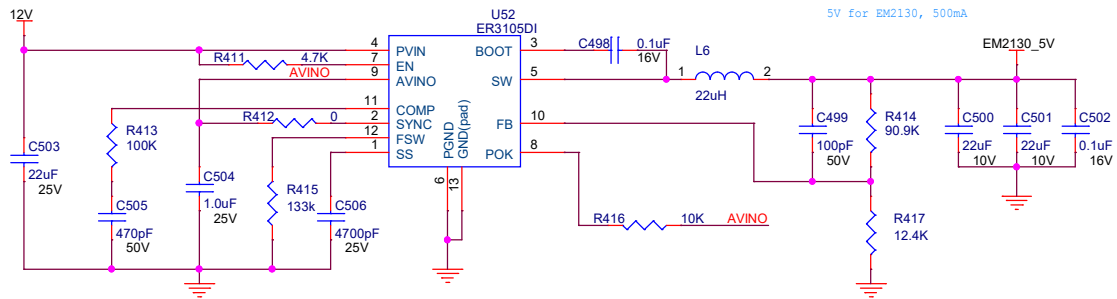


Intel Corporation, 301, Bibo Rd #888, Shanghai, China, 201203 Copyright (c) 2017, Intel Corporation. All Rights Reserved.		
Title Cyclone 10 GX Development Kit Board		
Size B	Document Number 6XX-44528R	Rev A1
Date:	Sunday, October 29, 2017	Sheet 36 of 43

POWER - 12V to 5V



GND of input/output filter and PGND shall be connected to GND layer directly, while all signal GND and AGND shall be connected together and then go to a single via away from the PGND area



GND of input/output filter and PGND shall be connected to GND layer directly, while all signal GND and AGND shall be connected together and then go to a single via away from the PGND area



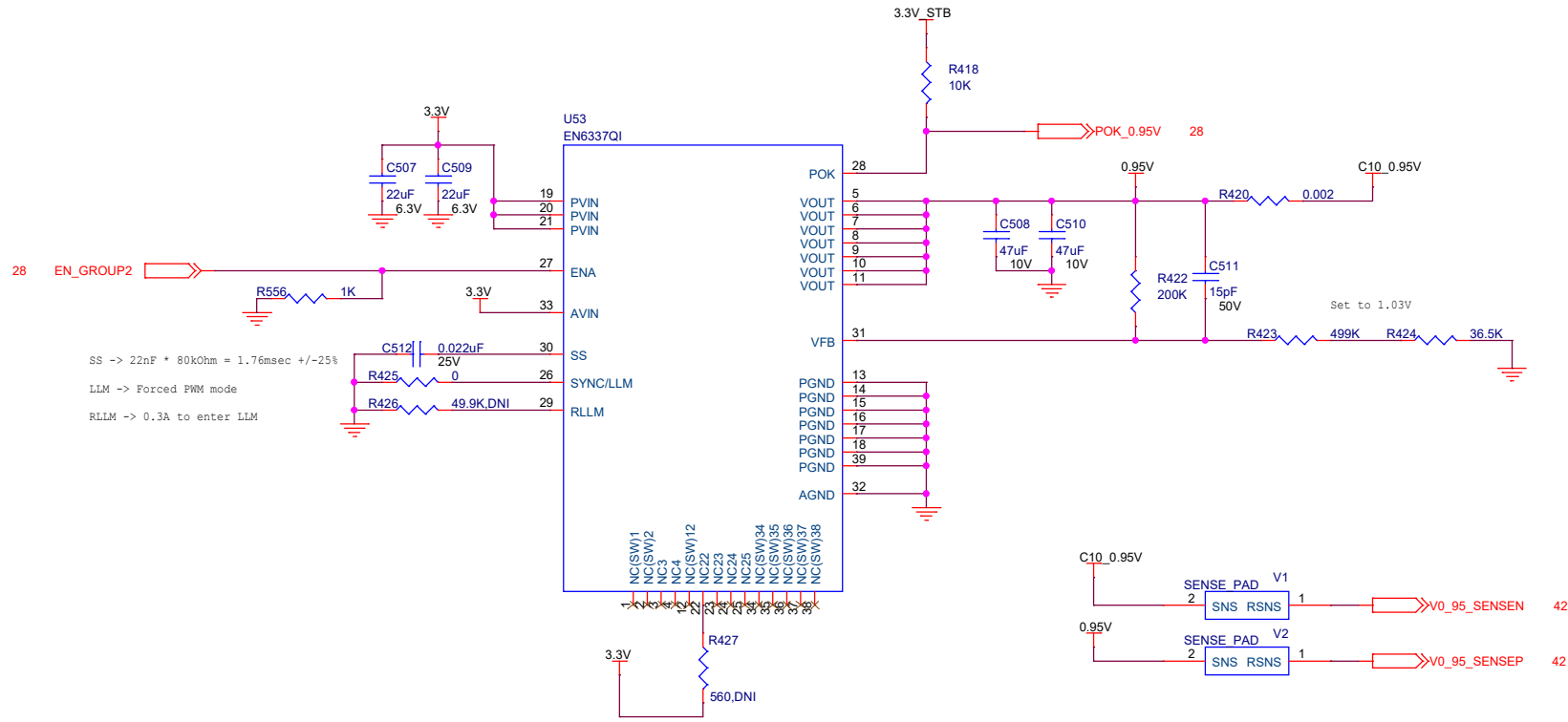
Intel Corporation, 301, Bibo Rd #888, Shanghai, China, 201203
Copyright (c) 2017, Intel Corporation. All Rights Reserved.

Title **Cyclone 10 GX Development Kit Board**

Size B	Document Number 6XX-44528R	Rev A1
-----------	--------------------------------------	------------------

Date: Sunday, October 29, 2017 Sheet 37 of 43

POWER - 3.3V to 0.95V

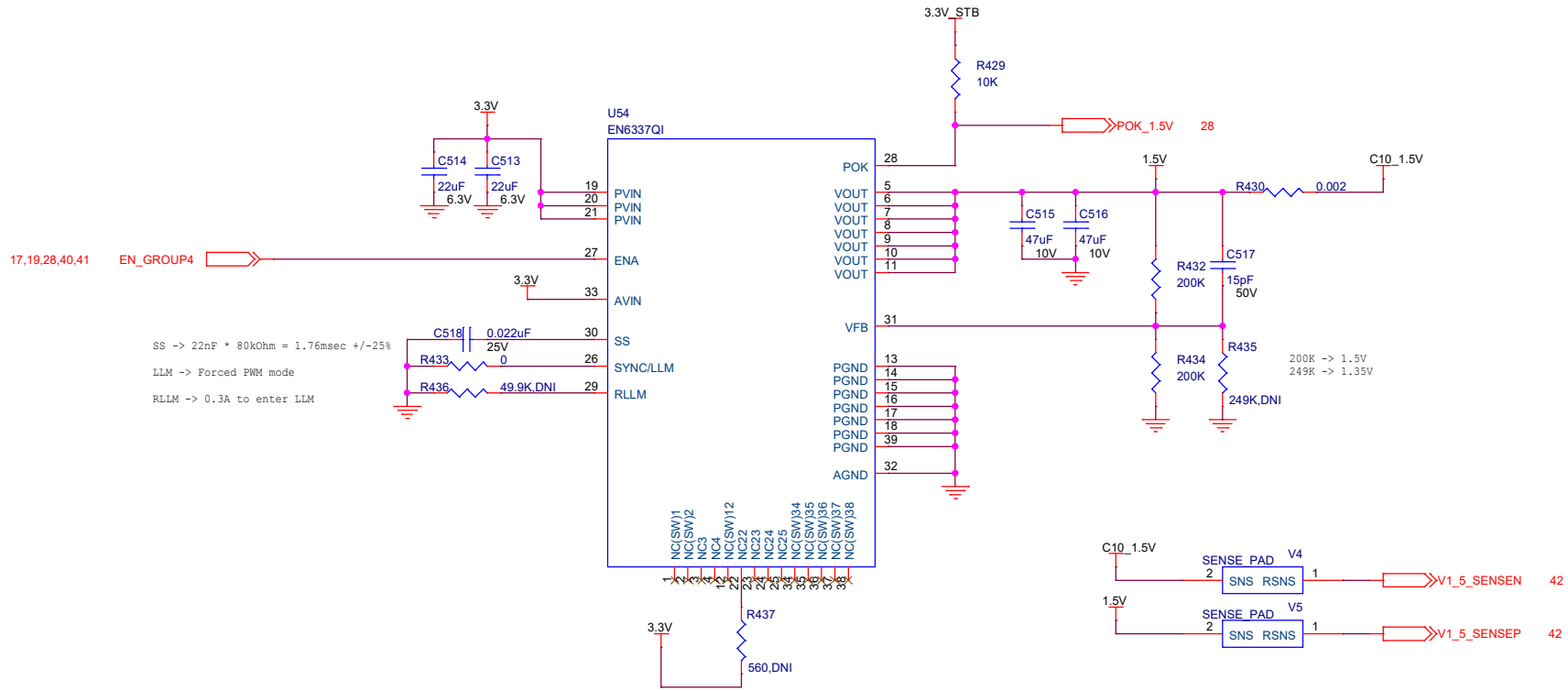


Intel Corporation, 301, Bibo Rd #888, Shanghai, China, 201203
 Copyright (c) 2017, Intel Corporation. All Rights Reserved.

Title **Cyclone 10 GX Development Kit Board**

Size B	Document Number 6XX-44528R	Rev A1
Date:	Sunday, October 29, 2017	Sheet 38 of 43

POWER - 3.3V to 1.5V

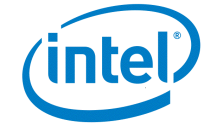
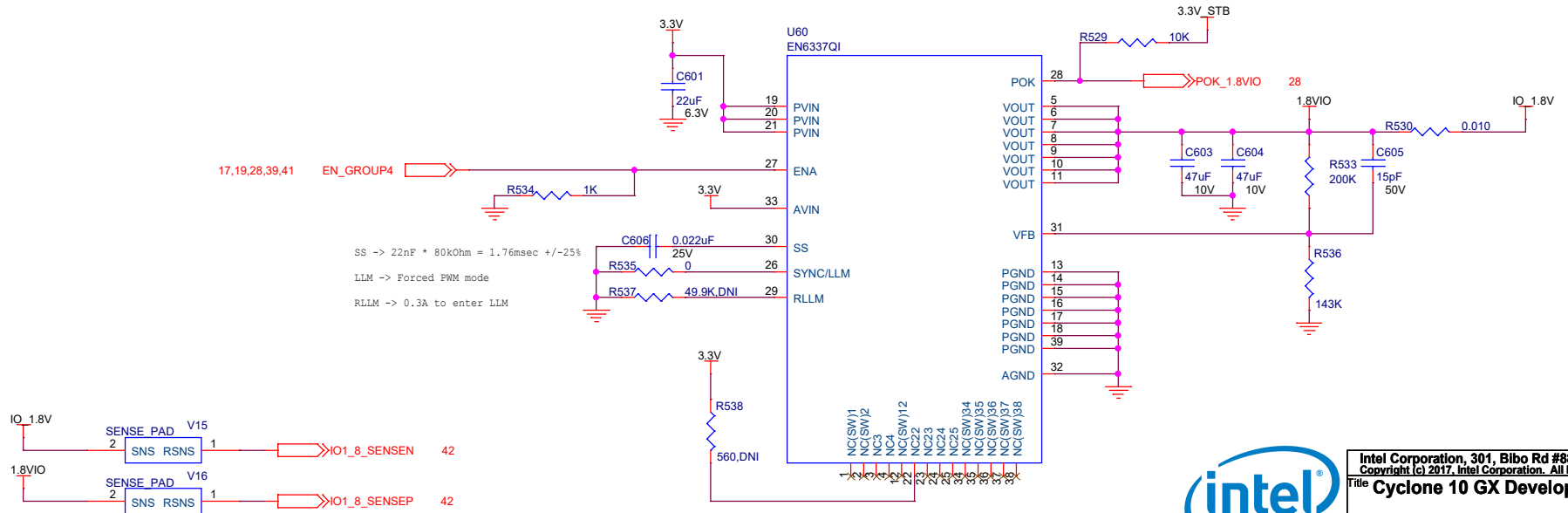
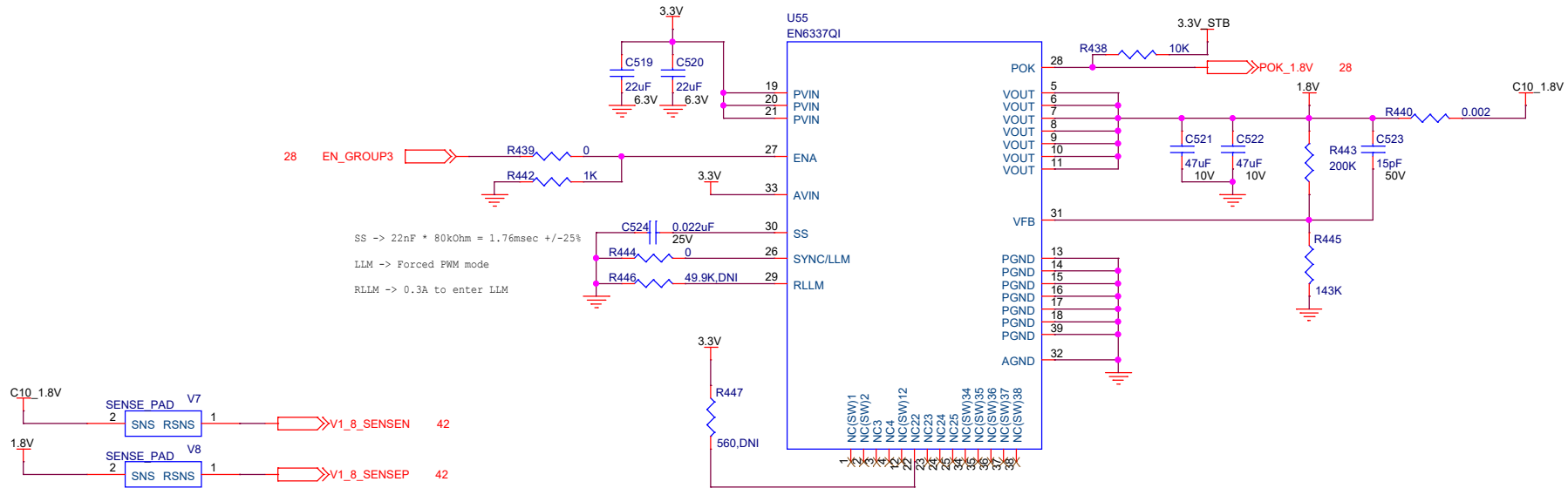


Intel Corporation, 301, Bibo Rd #888, Shanghai, China, 201203
 Copyright (c) 2017, Intel Corporation. All Rights Reserved.

Title Cyclone 10 GX Development Kit Board

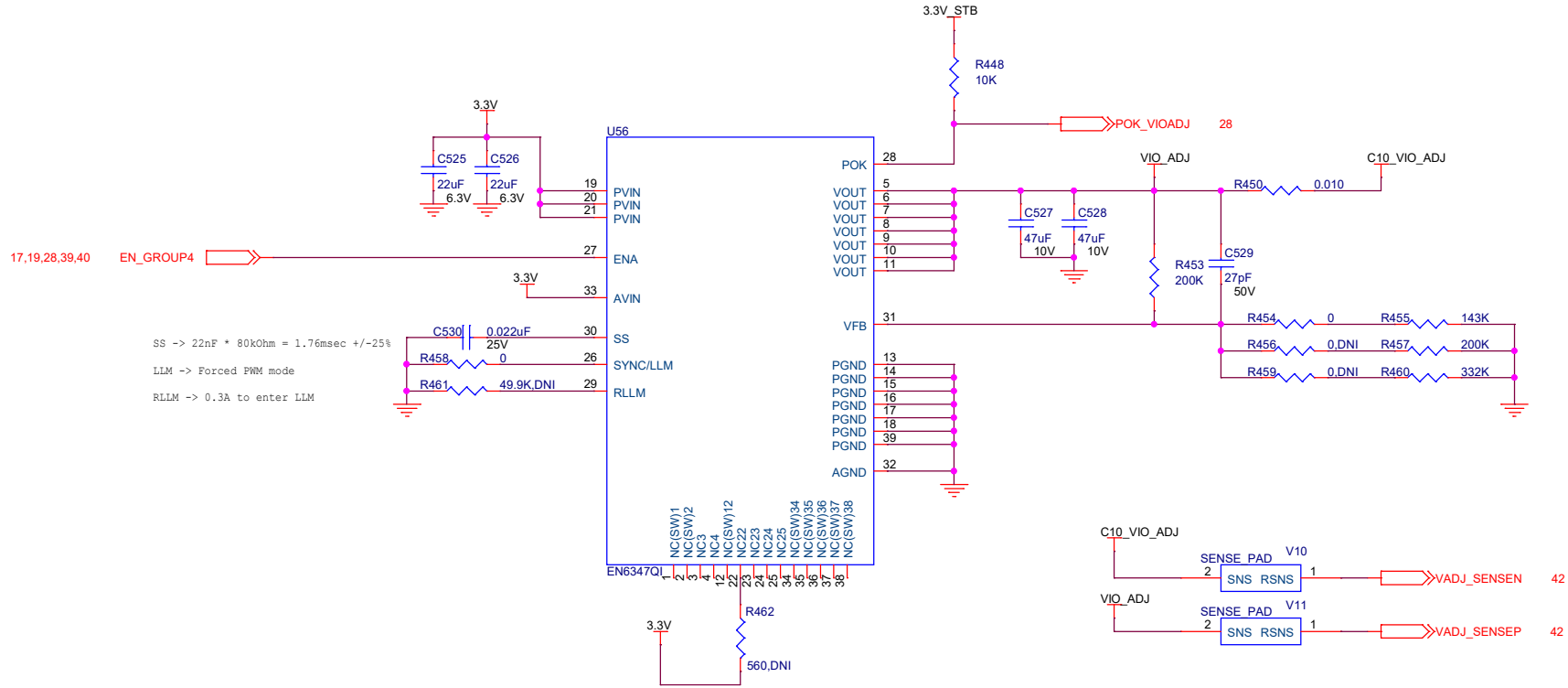
Size B	Document Number 6XX-44528R	Rev A1
Date:	Sunday, October 29, 2017	Sheet 39 of 43

POWER - 3.3V to 1.8V



Intel Corporation, 301, Bibo Rd #888, Shanghai, China, 201203 Copyright (c) 2017, Intel Corporation. All Rights Reserved.		
Title Cyclone 10 GX Development Kit Board		
Size B	Document Number 6XX-44528R	Rev A1
Date: Sunday, October 29, 2017	Sheet 40	of 43

POWER - 3.3V to VADJ

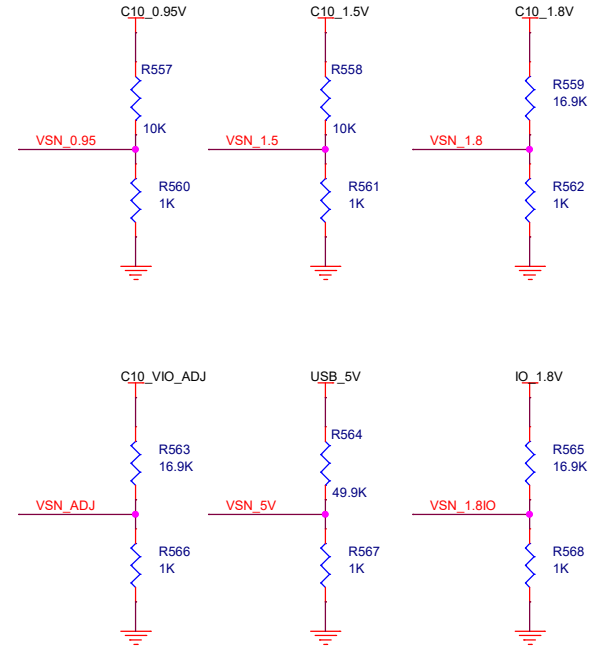
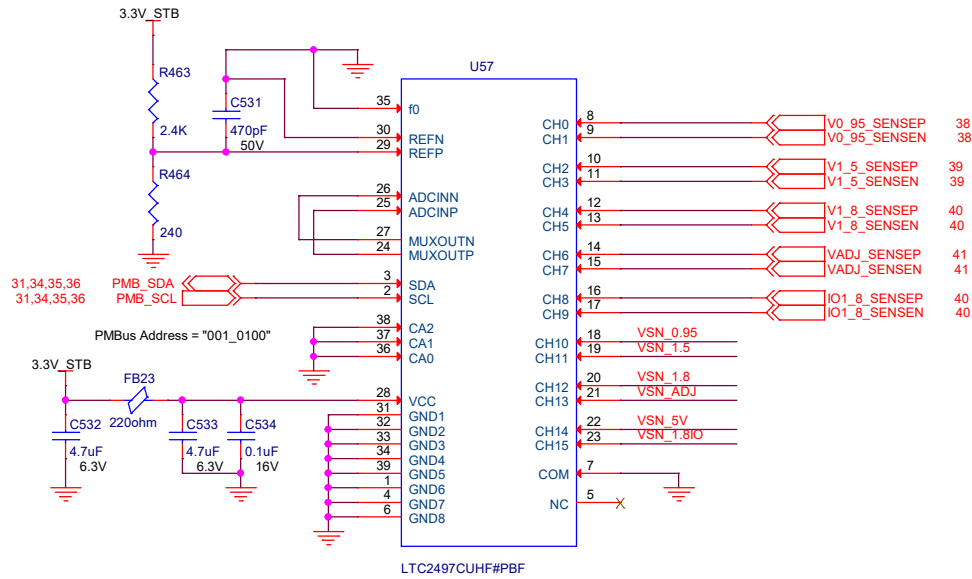


Intel Corporation, 301, Bibo Rd #888, Shanghai, China, 201203
 Copyright (c) 2017, Intel Corporation. All Rights Reserved.

Title Cyclone 10 GX Development Kit Board

Size B	Document Number 6XX-44528R	Rev A1
Date: Sunday, October 29, 2017	Sheet 41 of 43	

POWER - CURRENT SENSE



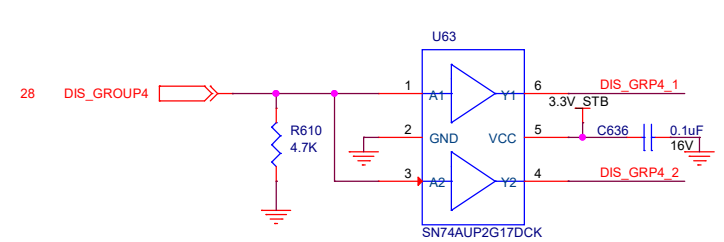
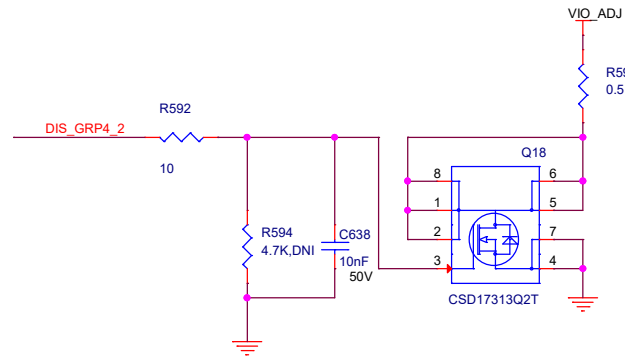
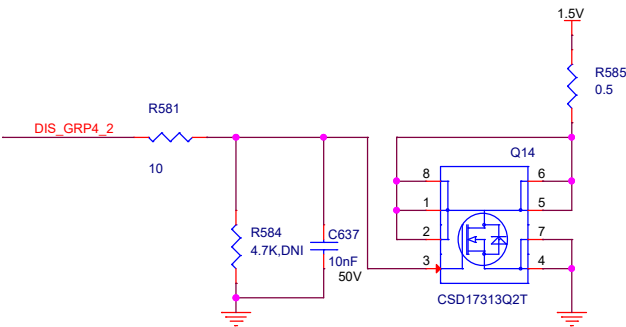
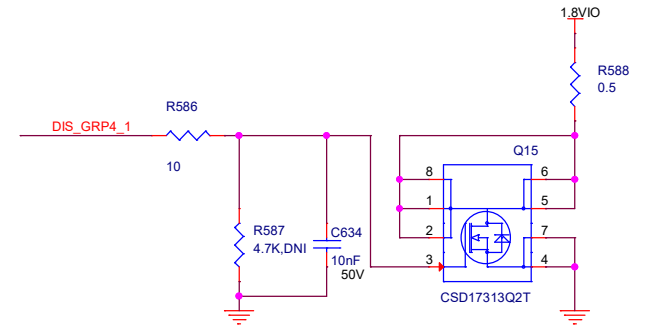
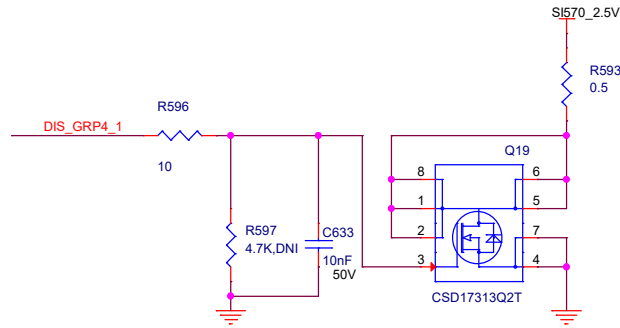
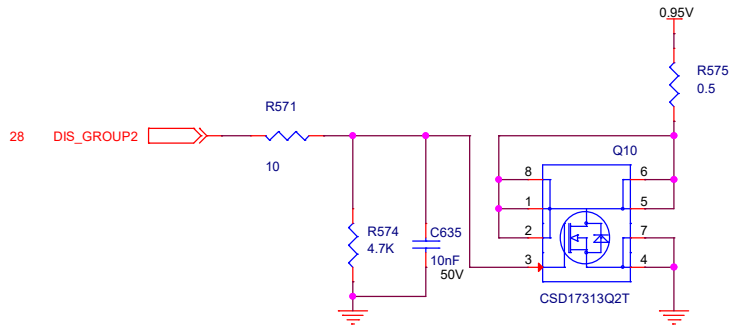
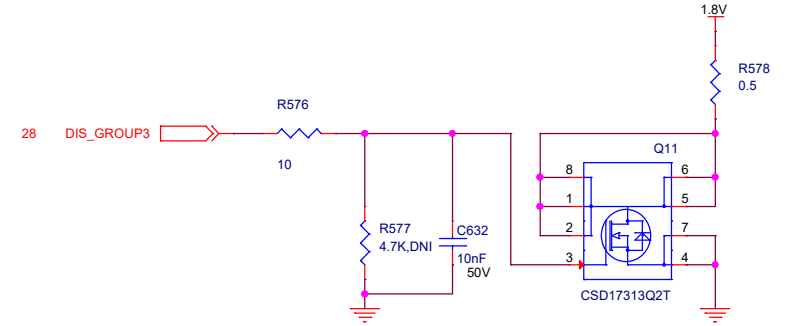
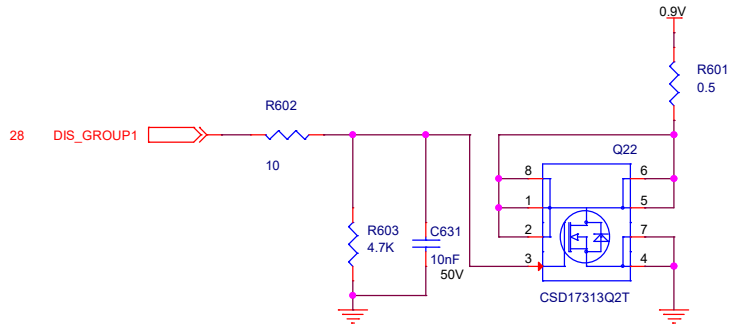
Intel Corporation, 301, Bibo Rd #888, Shanghai, China, 201203
Copyright (c) 2017, Intel Corporation. All Rights Reserved.

Title Cyclone 10 GX Development Kit Board

Size B	Document Number 6XX-44528R	Rev A1
--------	----------------------------	--------

Date: Sunday, October 29, 2017 Sheet 42 of 43

POWER - Fast Discharge



Intel Corporation, 301, Bibo Rd #888, Shanghai, China, 201203
Copyright (c) 2017, Intel Corporation. All Rights Reserved.

Title Cyclone 10 GX Development Kit Board

Size B	Document Number 6XX-44528R	Rev A1
--------	-------------------------------	-----------

Date: Sunday, October 29, 2017 Sheet 43 of 43