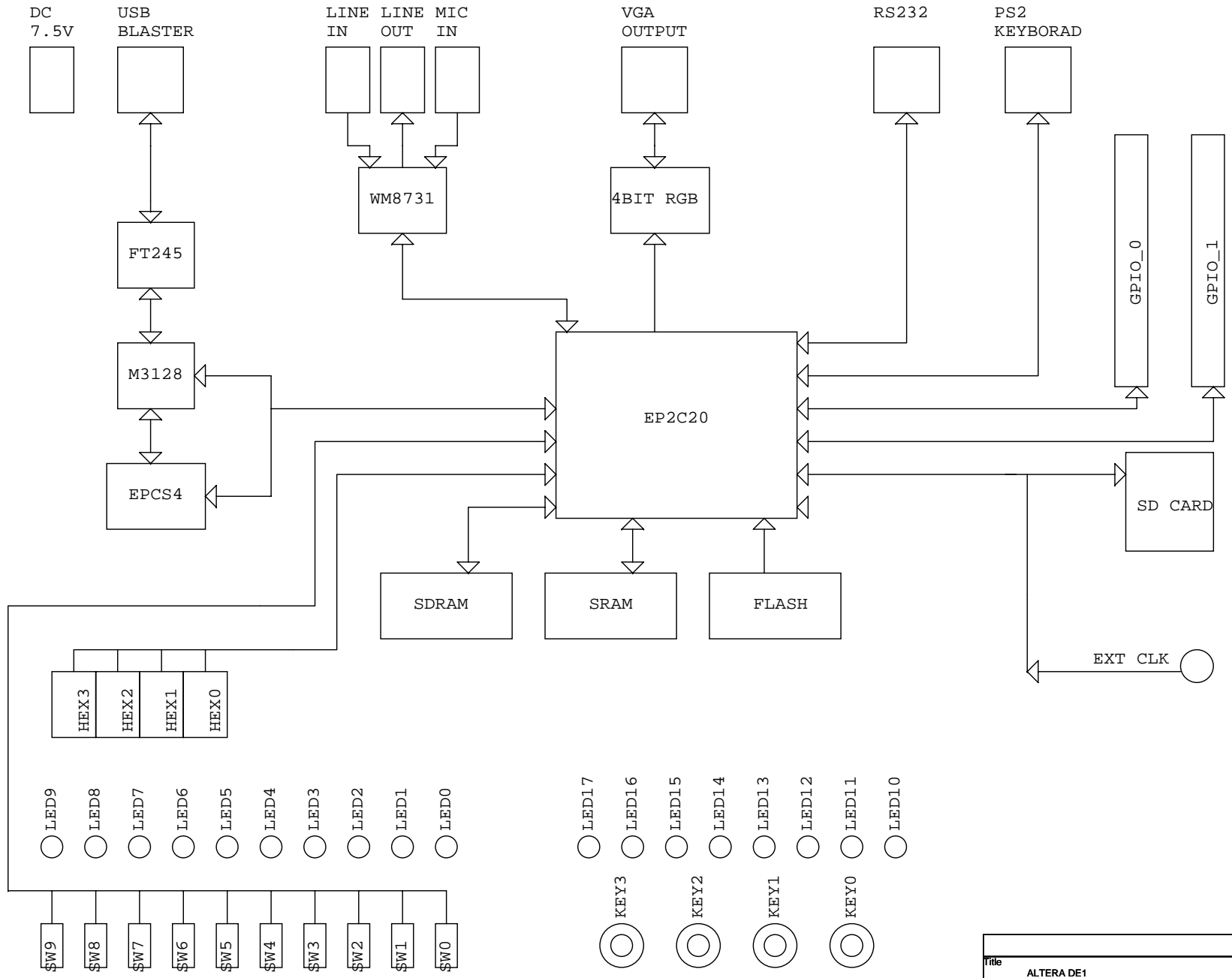
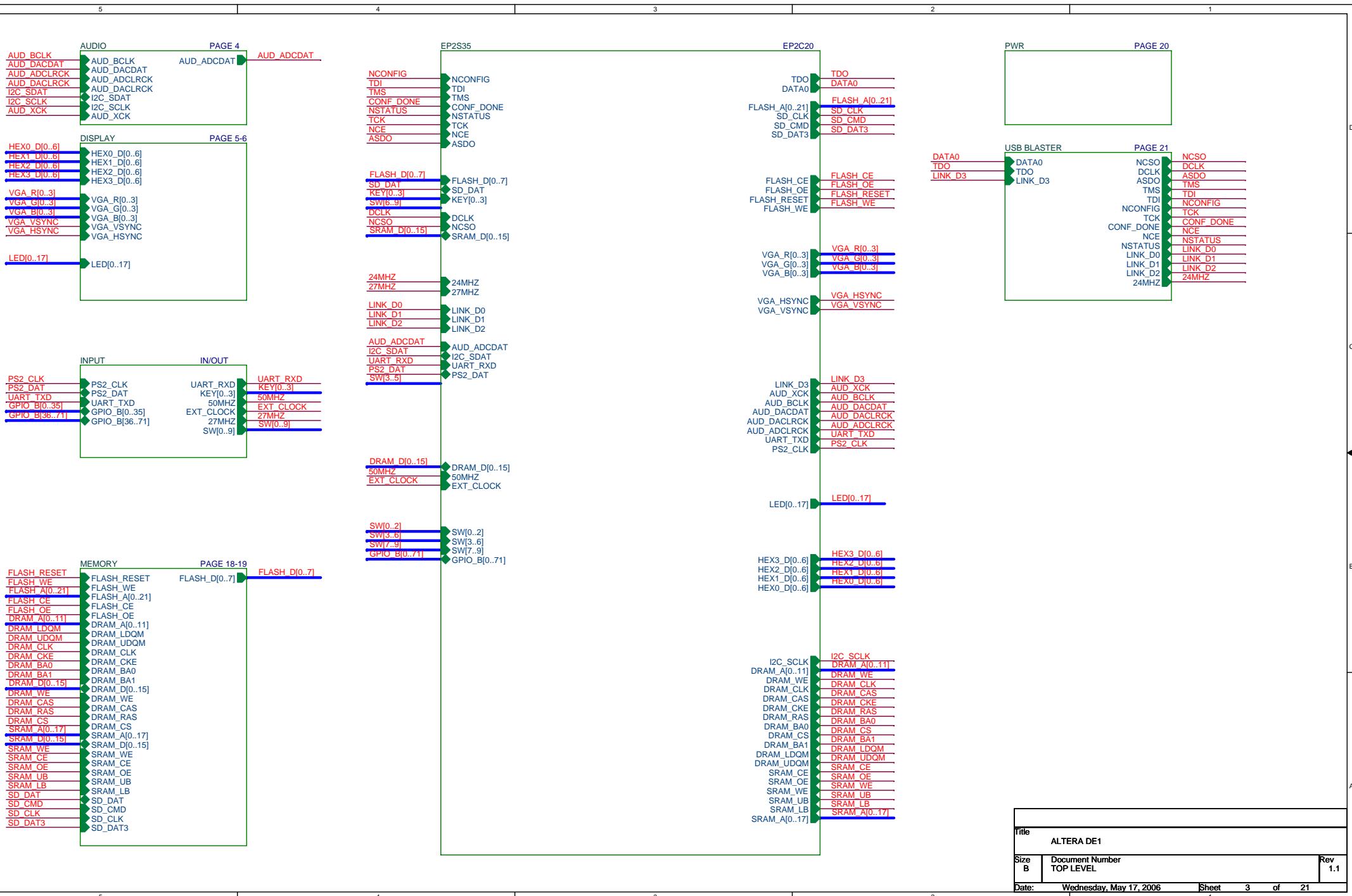


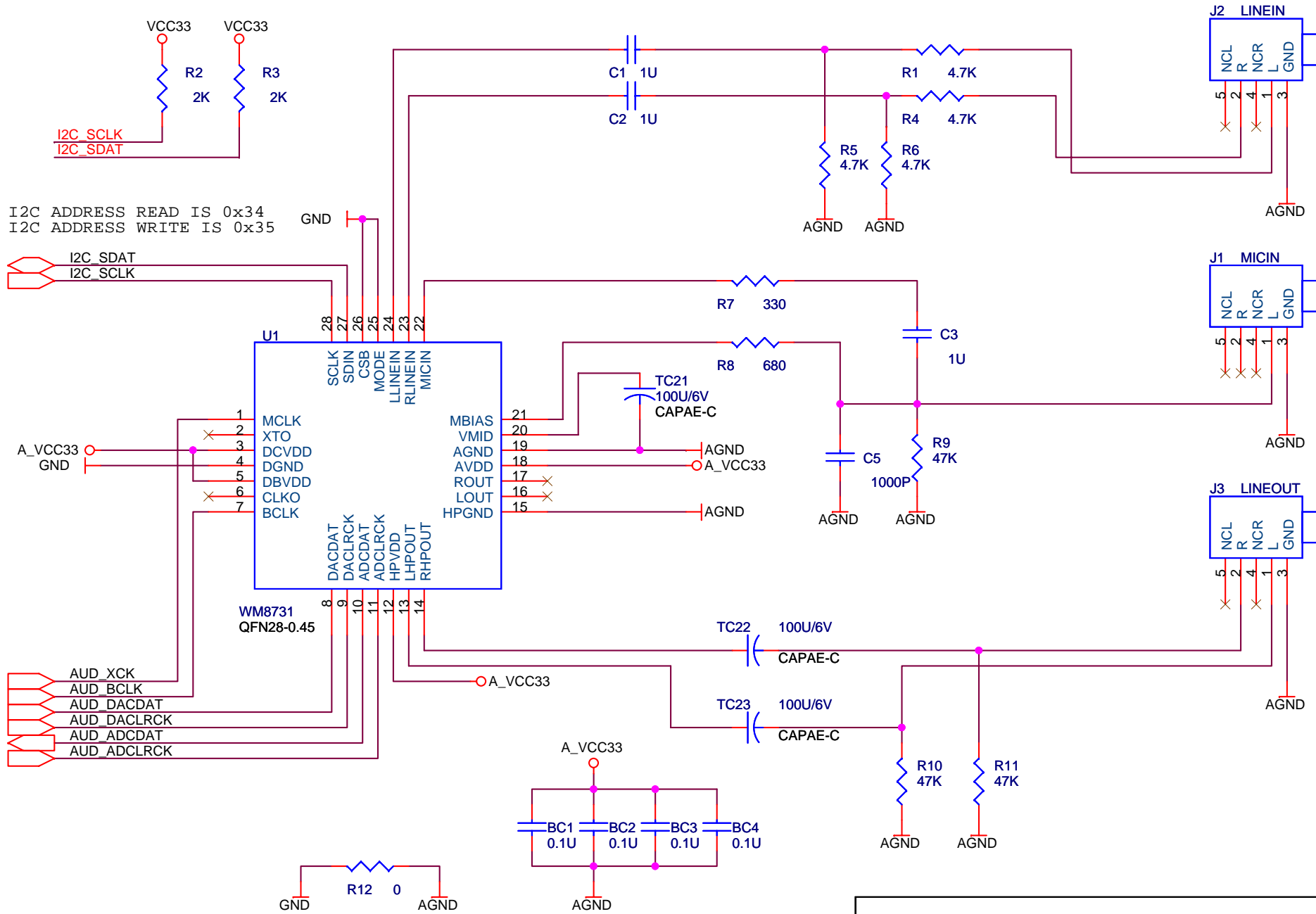
TERASIC CYCLONE II EP2C20 DAUGHTER BOARD

| SCHEMATIC | CONTENT | PAGE |
|-----------|--|---------|
| TOP | COVER PAGE , TOP | 01 ~ 03 |
| AUDIO | WM8731 | 04 ~ 04 |
| DISPLAY | VGA , 7SEGMENT ,LED | 05 ~ 07 |
| EP2C20 | EP2C20 BANK1..BANK8 , POWER , CONFIG | 08 ~ 12 |
| INPUT | CLOCK , PS2 , RS232 , KEY , SWITCH , CONNECT | 13 ~ 17 |
| MEMORY | SRAM , DRAM , FLASH , SD CARD | 18 ~ 19 |
| POWER | POWER | 20 ~ 20 |
| BLASTER | USB BLASTER | 21 ~ 21 |
| | | |
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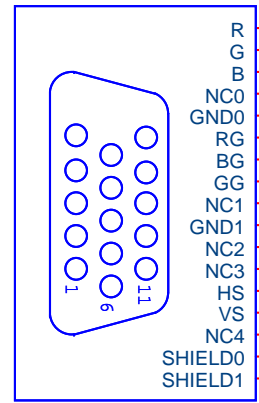


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| Title | | |
| ALTERA DE1 | | |
| Size | Document Number | Rev |
| B | TOP LEVEL | 1.1 |
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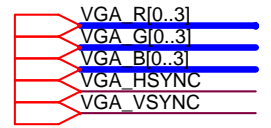
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| ALTERA DE1 | | |
| Size | Document Number | Rev |
| A | AUDIO | 1.1 |
| Date: | Wednesday, May 17, 2006 | Sheet 4 of 21 |

DB15-RA-F2
VGA



J4

GND



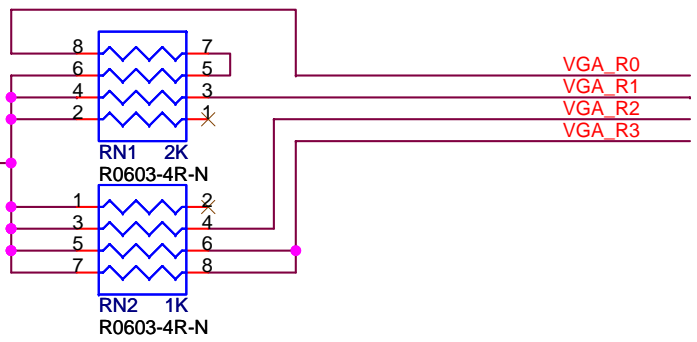
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G

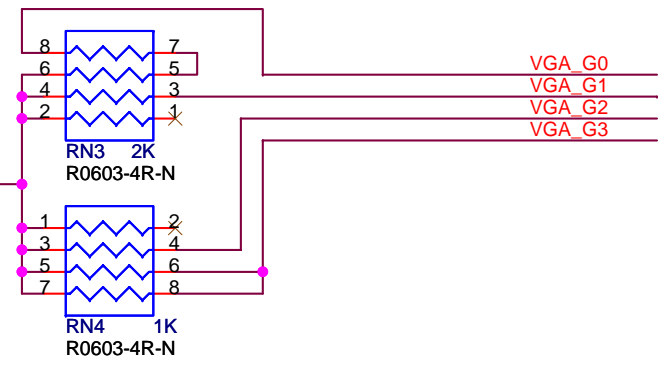
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H

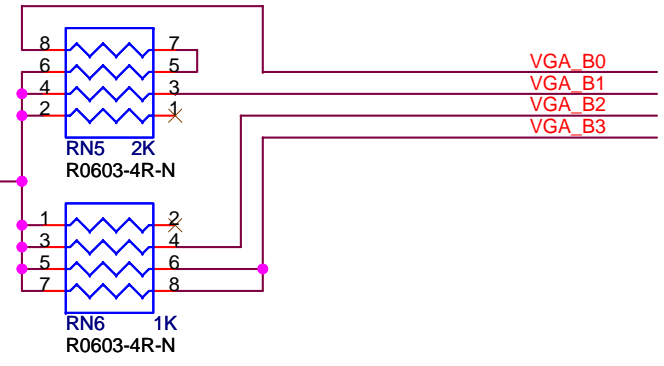
V



VGA_R0
VGA_R1
VGA_R2
VGA_R3



VGA_G0
VGA_G1
VGA_G2
VGA_G3



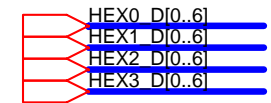
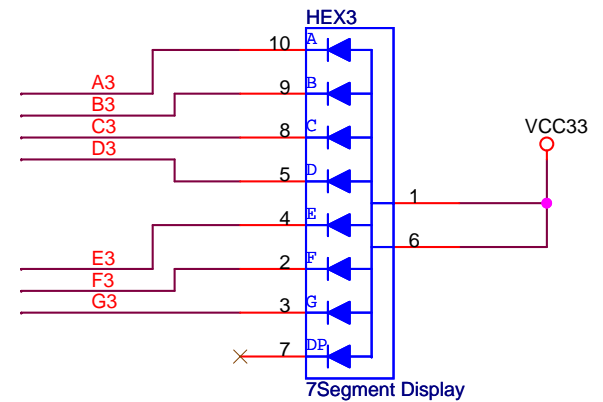
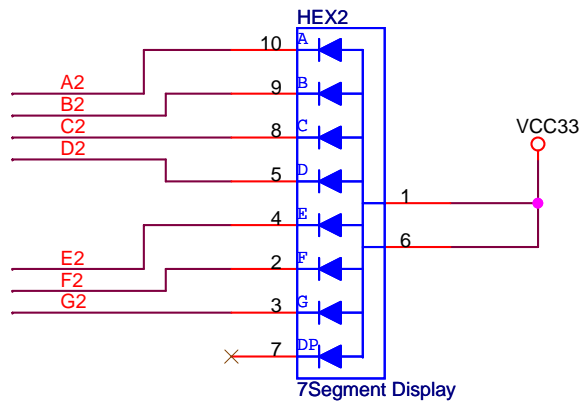
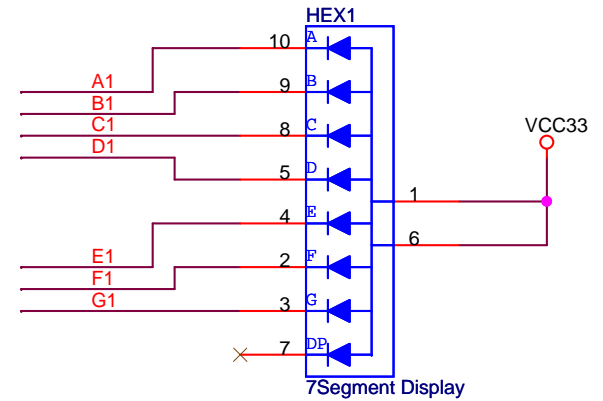
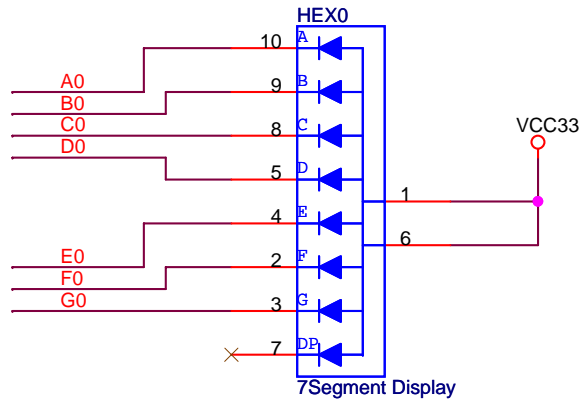
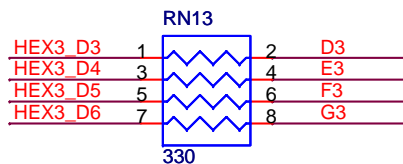
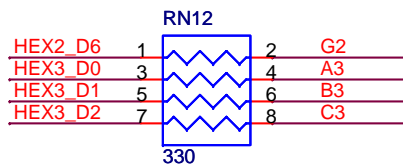
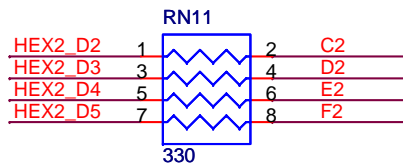
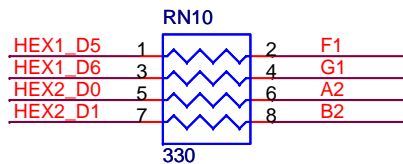
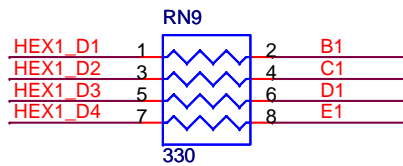
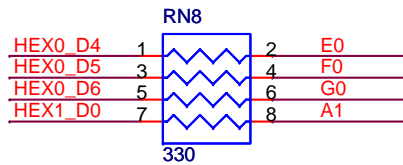
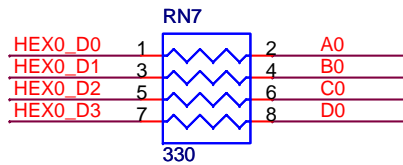
VGA_B0
VGA_B1
VGA_B2
VGA_B3

R-0603
R13 120

R14 120
R-0603

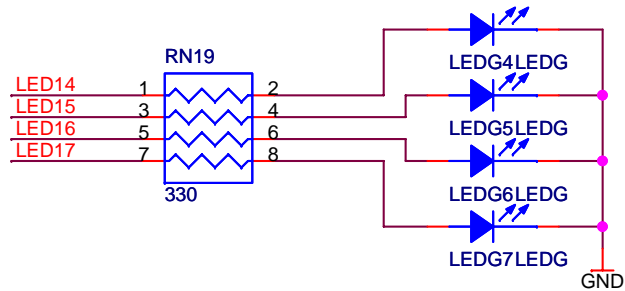
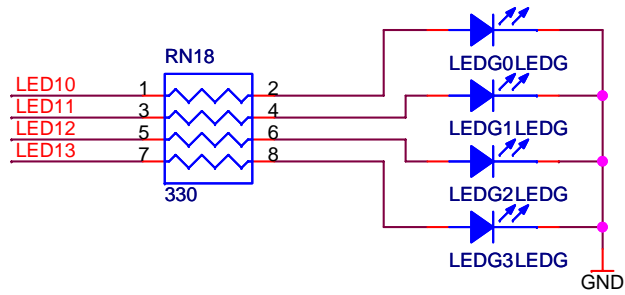
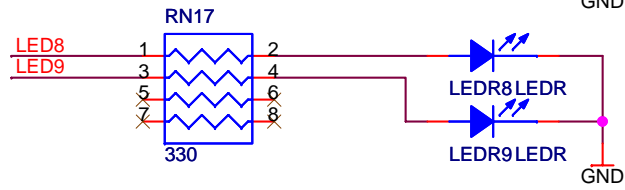
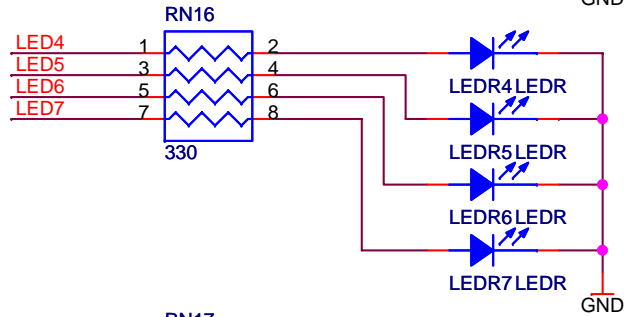
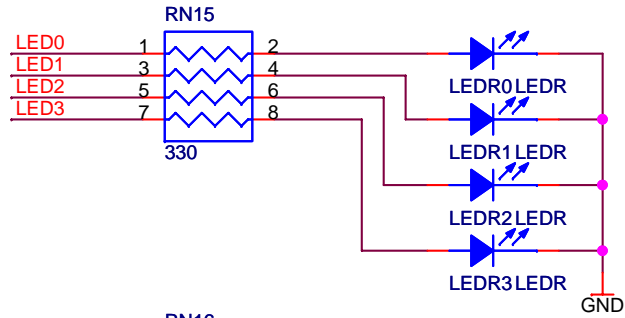
VGA_HSYNC
VGA_VSYNC

| | | |
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| Title | | |
| ALTERA DE1 | | |
| Size | Document Number | Rev |
| A | VGA | 1.1 |
| Date: | Wednesday, May 17, 2006 | Sheet 5 of 21 |

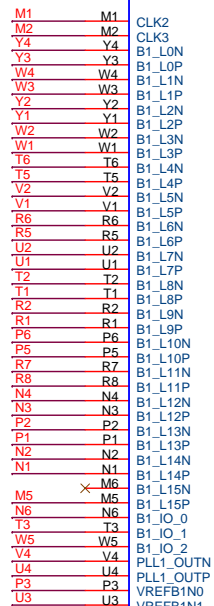
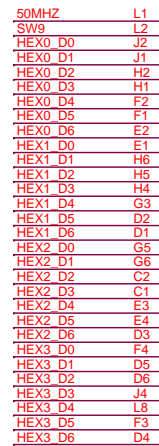
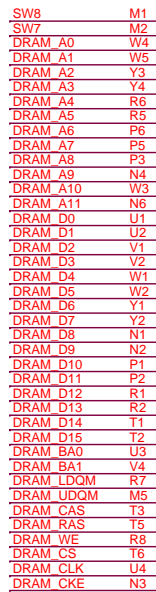
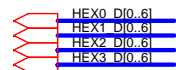
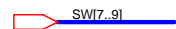
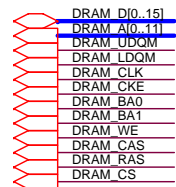


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| ALTERA DE1 | | |
| Size | Document Number | Rev |
| A | 7 SEGMENT | 1.1 |
| Date: | Wednesday, May 17, 2006 | Sheet 6 of 21 |

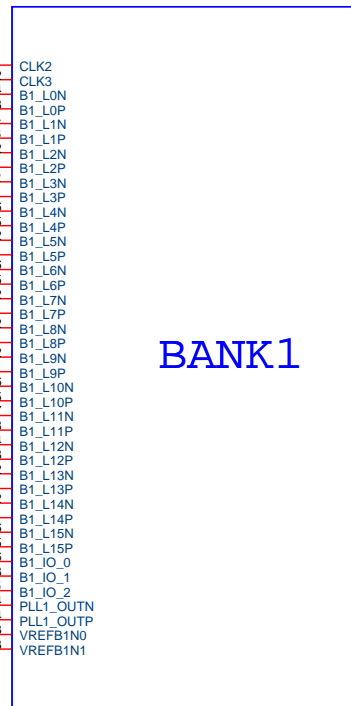
LED[0..17]



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|------------|--------------------------|---------------|
| Title | | |
| ALTERA DE1 | | |
| Size | Document Number | Rev |
| A | LED | 1.1 |
| Date: | Wednesday, July 05, 2006 | Sheet 7 of 21 |



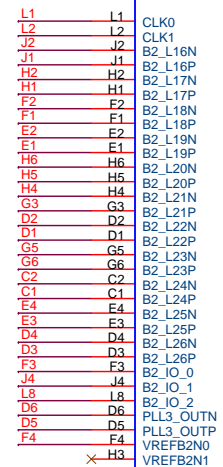
U2A



BANK1

CYCLONE II EP2C20

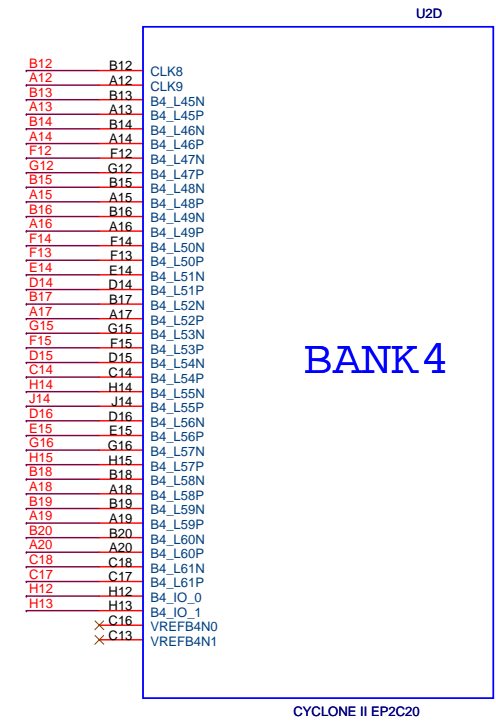
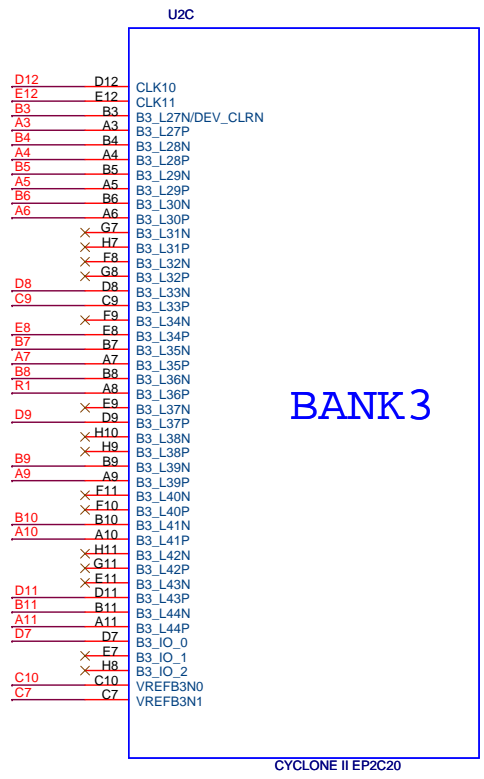
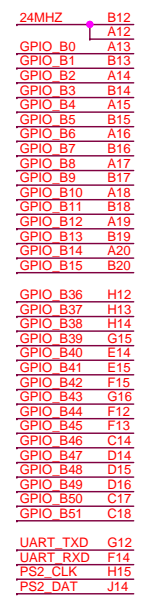
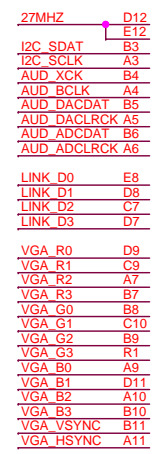
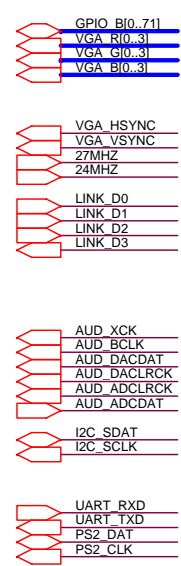
U2B



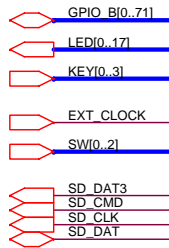
BANK 2

CYCLONE II EP2C20

| | | |
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| Title | | |
| ALTERA DE1 | | |
| Size | Document Number | Rev |
| B | EP2C20 BANK1 AND BANK 2 | 1.1 |
| Date: | Wednesday, May 17, 2006 | Sheet 8 of 21 |

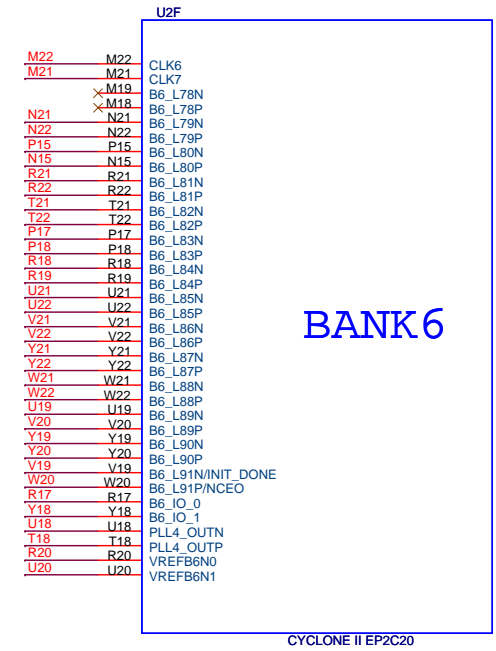
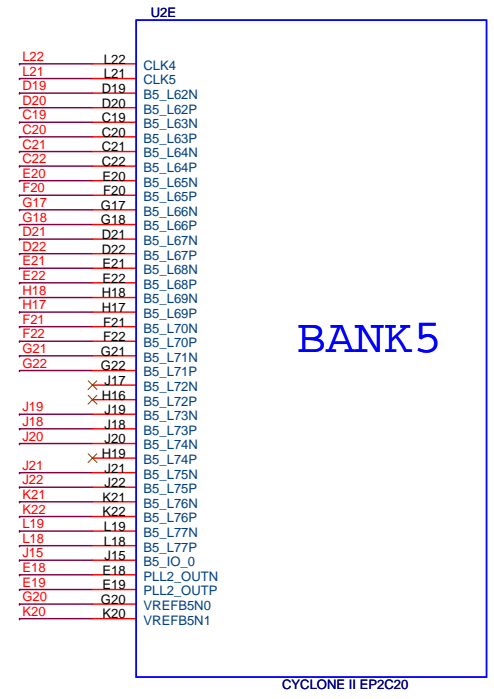


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| Title | | |
| ALTERA DE1 | | |
| Size | Document Number | Rev |
| B | EP2C35 BANK3 AND BANK 4 | 1.1 |
| Date: | Wednesday, May 17, 2006 | Sheet 9 of 21 |

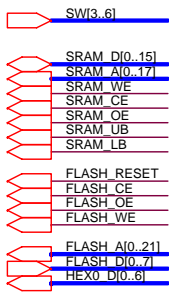


| | |
|----------|-----|
| SW0 | L22 |
| SW1 | L21 |
| GPIO B16 | C21 |
| GPIO B17 | C22 |
| GPIO B18 | D21 |
| GPIO B19 | D22 |
| GPIO B20 | E21 |
| GPIO B21 | E22 |
| GPIO B22 | F21 |
| GPIO B23 | F22 |
| GPIO B24 | G21 |
| GPIO B25 | G22 |
| GPIO B26 | J21 |
| GPIO B27 | J22 |
| GPIO B28 | K21 |
| GPIO B29 | K22 |
| GPIO B30 | J19 |
| GPIO B31 | J20 |
| GPIO B32 | J18 |
| GPIO B33 | K20 |
| GPIO B34 | L19 |
| GPIO B35 | L18 |
| GPIO B52 | C19 |
| GPIO B53 | C20 |
| GPIO B54 | D19 |
| GPIO B55 | D20 |
| GPIO B56 | E20 |
| GPIO B57 | F20 |
| GPIO B58 | E19 |
| GPIO B59 | E18 |
| GPIO B60 | G20 |
| GPIO B61 | G18 |
| GPIO B62 | G17 |
| GPIO B63 | H17 |
| GPIO B64 | J15 |
| GPIO B65 | H18 |
| GPIO B66 | N22 |
| GPIO B67 | N21 |
| GPIO B68 | P15 |
| GPIO B69 | N15 |
| GPIO B70 | P17 |
| GPIO B71 | P18 |

| | |
|-----------|-----|
| SW2 | M22 |
| EXT_CLOCK | M21 |
| KEY0 | R22 |
| KEY1 | R21 |
| KEY2 | T22 |
| KEY3 | T21 |
| SD_CLK | V20 |
| SD_CMD | Y20 |
| SD_DAT | W20 |
| SD_DAT3 | U20 |
| LED0 | R20 |
| LED1 | R19 |
| LED2 | U19 |
| LED3 | Y19 |
| LED4 | T18 |
| LED5 | V19 |
| LED6 | Y18 |
| LED7 | U18 |
| LED8 | R18 |
| LED9 | R17 |
| LED10 | U22 |
| LED11 | U21 |
| LED12 | V22 |
| LED13 | V21 |
| LED14 | W22 |
| LED15 | W21 |
| LED16 | Y22 |
| LED17 | Y21 |



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|------------|-------------------------|----------------|
| Title | | |
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| Size | Document Number | Rev |
| B | EP2C20 BANKS AND BANK 6 | 1.1 |
| Date: | Wednesday, May 17, 2006 | Sheet 10 of 21 |



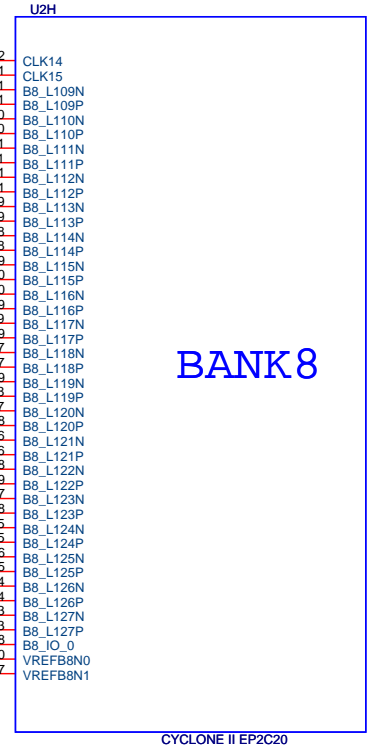
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| SW3 | V12 |
| SW4 | W12 |
| FLASH A0 | AB20 |
| FLASH A1 | AA14 |
| FLASH A2 | Y16 |
| FLASH A3 | R15 |
| FLASH A4 | T15 |
| FLASH A5 | U15 |
| FLASH A6 | V15 |
| FLASH A7 | W15 |
| FLASH A8 | R14 |
| FLASH A9 | Y13 |
| FLASH A10 | R12 |
| FLASH A11 | T12 |
| FLASH A12 | AB14 |
| FLASH A13 | AA13 |
| FLASH A14 | AB13 |
| FLASH A15 | AA12 |
| FLASH A16 | AB12 |
| FLASH A17 | AA20 |
| FLASH A18 | U14 |
| FLASH A19 | V14 |
| FLASH A20 | U13 |
| FLASH A21 | R13 |
| FLASH D0 | AB16 |
| FLASH D1 | AA16 |
| FLASH D2 | AB17 |
| FLASH D3 | AA17 |
| FLASH D4 | AB19 |
| FLASH D5 | AA18 |
| FLASH D6 | AB19 |
| FLASH D7 | AA19 |
| FLASH WE | Y14 |
| FLASH OE | AA15 |
| FLASH CE | AB15 |
| FLASH RESET | W14 |

| | |
|----------|------|
| SW5 | U12 |
| SW6 | U11 |
| SRAM A0 | AA3 |
| SRAM A1 | AB3 |
| SRAM A2 | AA4 |
| SRAM A3 | AB4 |
| SRAM A4 | AA5 |
| SRAM A5 | AB10 |
| SRAM A6 | AA11 |
| SRAM A7 | AB11 |
| SRAM A8 | V11 |
| SRAM A9 | W11 |
| SRAM A10 | R11 |
| SRAM A11 | T11 |
| SRAM A12 | Y10 |
| SRAM A13 | U10 |
| SRAM A14 | R10 |
| SRAM A15 | T7 |
| SRAM A16 | Y6 |
| SRAM A17 | Y5 |
| SRAM D0 | AA6 |
| SRAM D1 | AB6 |
| SRAM D2 | AA7 |
| SRAM D3 | AB7 |
| SRAM D4 | AA8 |
| SRAM D5 | AB8 |
| SRAM D6 | AA9 |
| SRAM D7 | AB9 |
| SRAM D8 | Y9 |
| SRAM D9 | W9 |
| SRAM D10 | V9 |
| SRAM D11 | U9 |
| SRAM D12 | R9 |
| SRAM D13 | W8 |
| SRAM D14 | V8 |
| SRAM D15 | U8 |
| SRAM LB | Y7 |
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| SRAM WE | AA10 |
| SRAM OE | T8 |
| SRAM CE | AB5 |

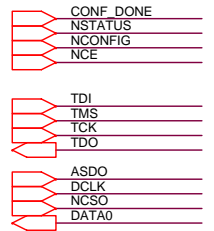
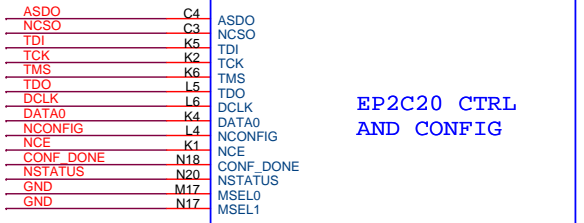
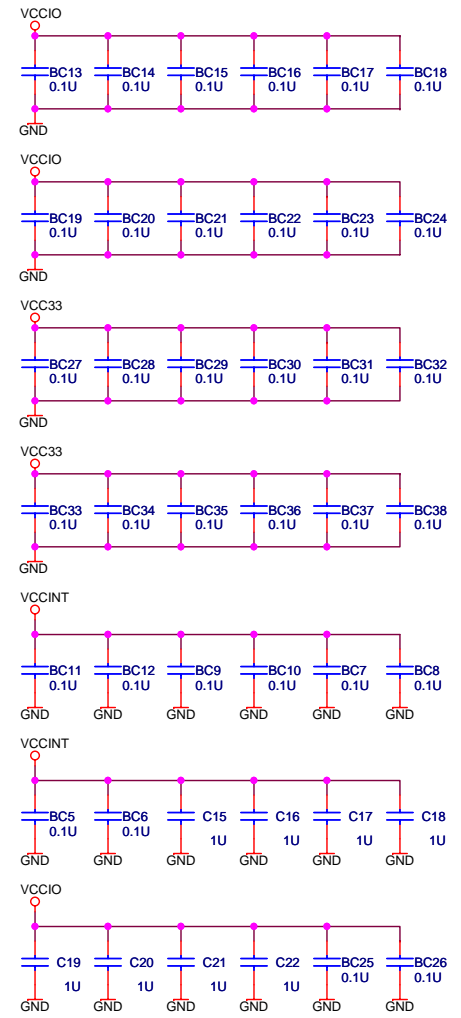
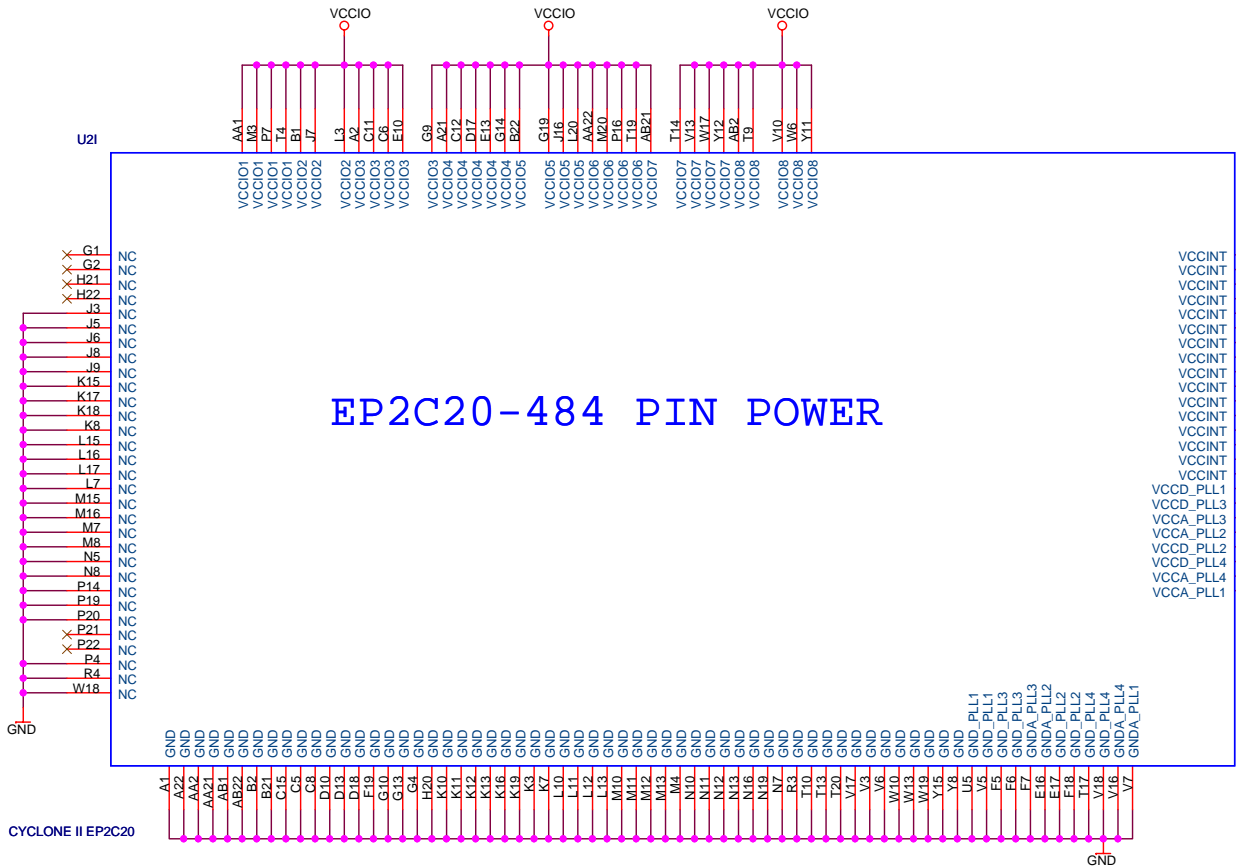
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|------|------|----------|
| V12 | V12 | CLK12 |
| W12 | W12 | CLK13 |
| AA20 | AA20 | B7_L92N |
| AB20 | AB20 | B7_L92P |
| AA19 | AA19 | B7_L93N |
| AB19 | AB19 | B7_L93P |
| | XW16 | B7_L94N |
| | XW17 | B7_L94P |
| V15 | XV15 | B7_L95N |
| U15 | U15 | B7_L95P |
| | XV16 | B7_L96N |
| | XV17 | B7_L96P |
| AA18 | AA18 | B7_L97N |
| AB18 | AB18 | B7_L97P |
| R15 | R15 | B7_L98N |
| R14 | R14 | B7_L98P |
| W15 | W15 | B7_L99N |
| Y14 | Y14 | B7_L99P |
| T15 | T15 | B7_L100N |
| U14 | U14 | B7_L100P |
| AA17 | AA17 | B7_L101N |
| AB17 | AB17 | B7_L101P |
| V14 | V14 | B7_L102N |
| W14 | W14 | B7_L102P |
| AA16 | AA16 | B7_L103N |
| AB16 | AB16 | B7_L103P |
| AA15 | AA15 | B7_L104N |
| AB15 | AB15 | B7_L104P |
| AA14 | AA14 | B7_L105N |
| AB14 | AB14 | B7_L105P |
| U13 | U13 | B7_L106N |
| T12 | T12 | B7_L106P |
| AA13 | AA13 | B7_L107N |
| AB13 | AB13 | B7_L107P |
| AA12 | AA12 | B7_L108N |
| AB12 | AB12 | B7_L108P |
| R12 | R12 | B7_IO_0 |
| R13 | R13 | B7_IO_1 |
| Y16 | Y16 | VREFB7N0 |
| Y13 | Y13 | VREFB7N1 |

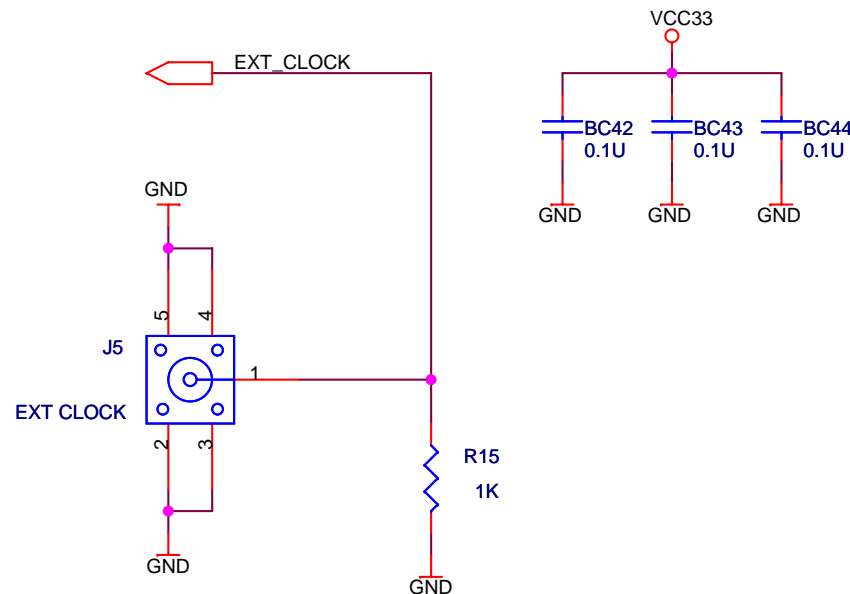
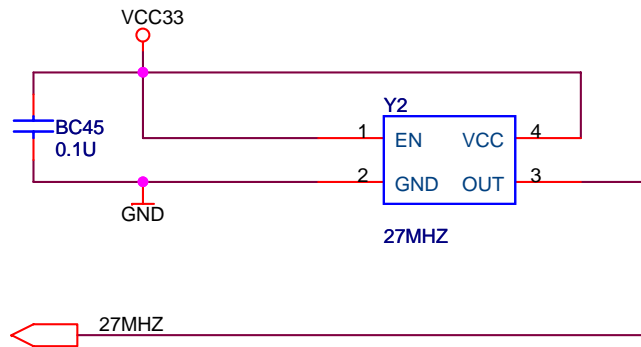
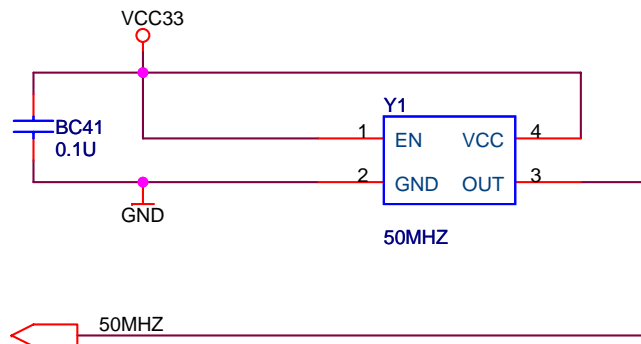


| | | |
|------|------|----------|
| U12 | U12 | CLK14 |
| U11 | U11 | CLK15 |
| AA11 | AA11 | B8_L109N |
| AB11 | AB11 | B8_L109P |
| AA10 | AA10 | B8_L110N |
| AB10 | AB10 | B8_L110P |
| V11 | V11 | B8_L111N |
| W11 | W11 | B8_L111P |
| R11 | R11 | B8_L112N |
| T11 | T11 | B8_L112P |
| AA9 | AA9 | B8_L113N |
| AB9 | AB9 | B8_L113P |
| AA8 | AA8 | B8_L114N |
| AB8 | AB8 | B8_L114P |
| R9 | R9 | B8_L115N |
| R10 | R10 | B8_L115P |
| U10 | U10 | B8_L116N |
| U9 | U9 | B8_L116P |
| W9 | W9 | B8_L117N |
| Y9 | Y9 | B8_L117P |
| AA7 | AA7 | B8_L118N |
| AB7 | AB7 | B8_L118P |
| V9 | V9 | B8_L119N |
| W8 | W8 | B8_L119P |
| W7 | W7 | B8_L120N |
| V8 | V8 | B8_L120P |
| AA6 | AA6 | B8_L121N |
| AB6 | AB6 | B8_L121P |
| | XP8 | B8_L122N |
| | XP9 | B8_L122P |
| T7 | T7 | B8_L123N |
| T8 | T8 | B8_L123P |
| AA5 | AA5 | B8_L124N |
| AB5 | AB5 | B8_L124P |
| Y6 | Y6 | B8_L125N |
| Y5 | Y5 | B8_L125P |
| AA4 | AA4 | B8_L126N |
| AB4 | AB4 | B8_L126P |
| AA3 | AA3 | B8_L127N |
| AB3 | AB3 | B8_L127P |
| U8 | U8 | B8_IO_0 |
| Y10 | Y10 | VREFB8N0 |
| Y7 | Y7 | VREFB8N1 |

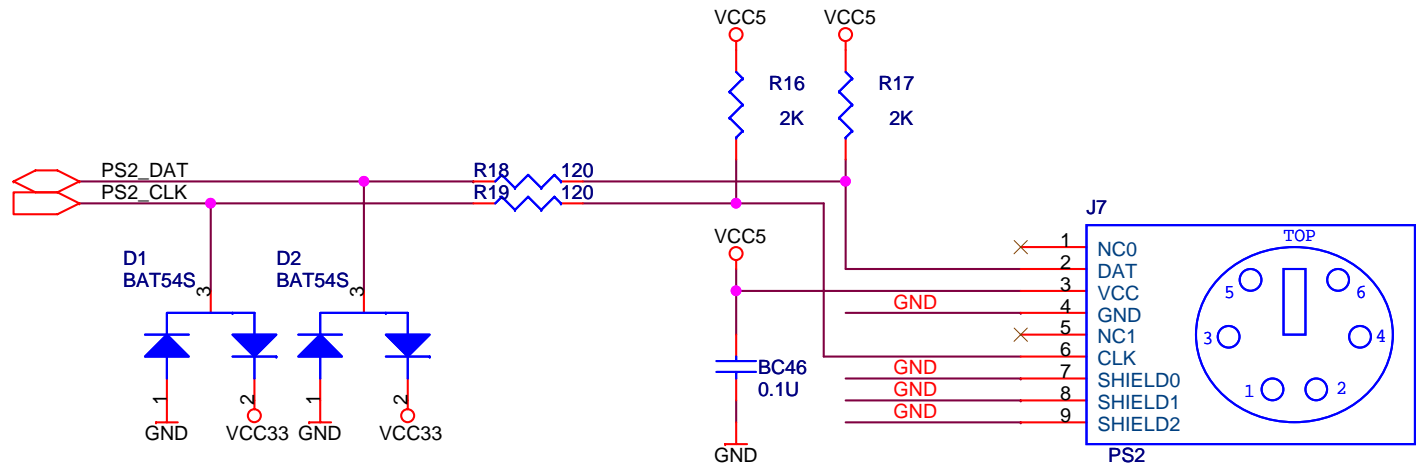
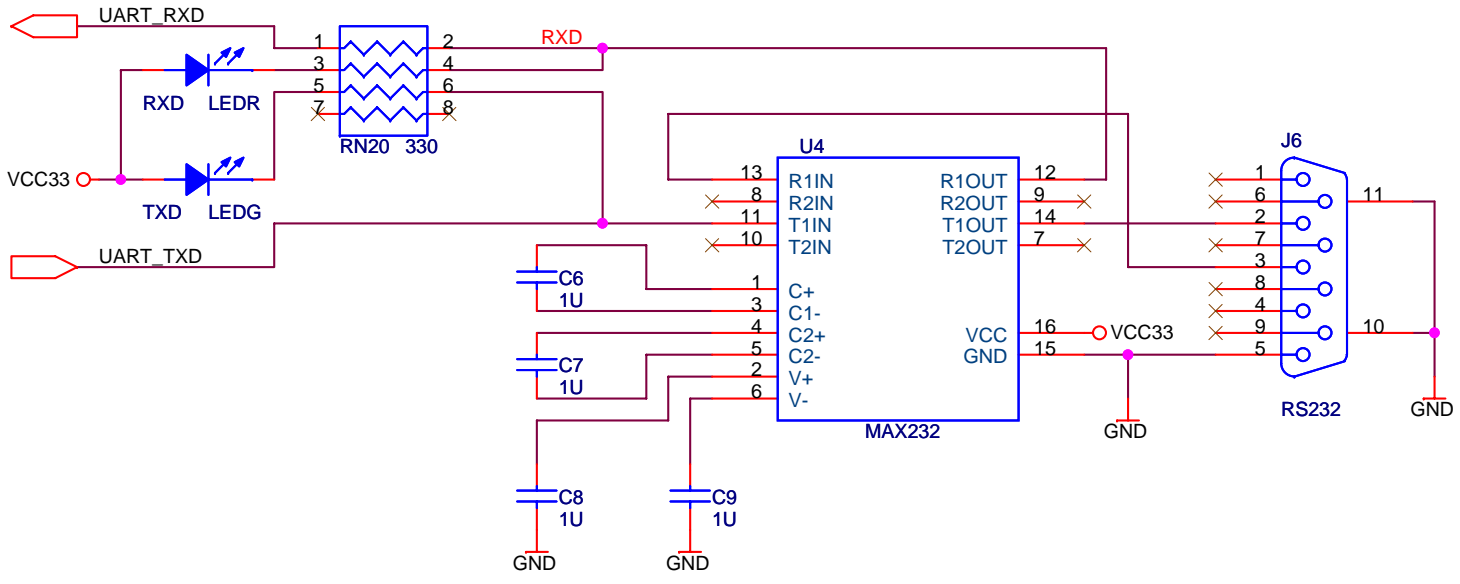


EP2C20-484 PIN POWER

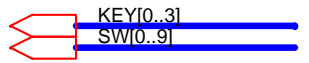
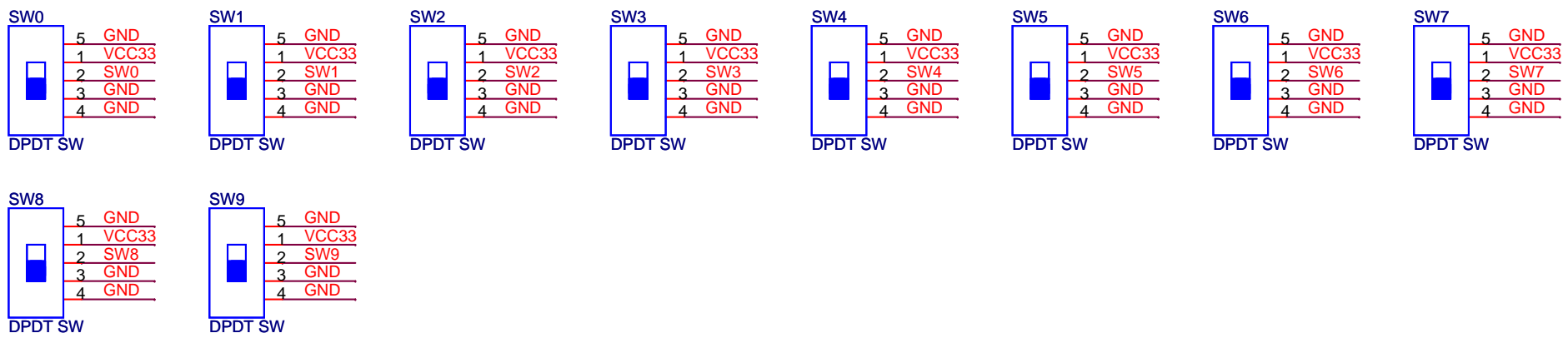
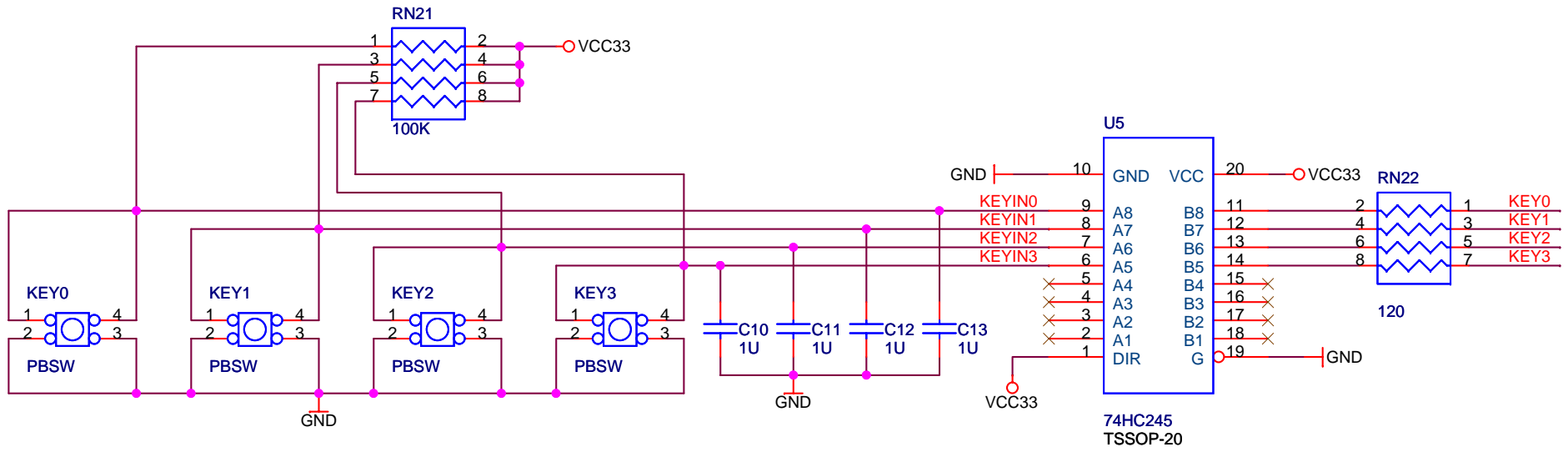




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| Title | | |
| ALTERA DE1 | | |
| Size | Document Number | Rev |
| A | CLOCK | 1.1 |
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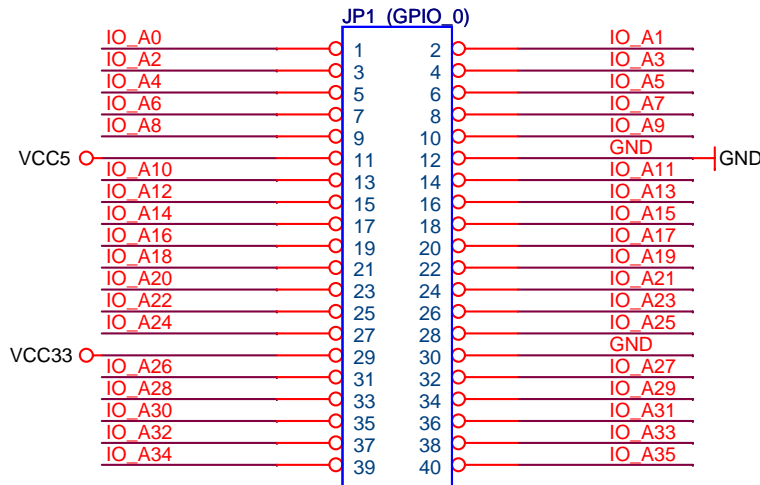
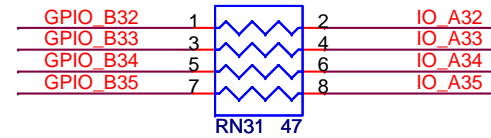
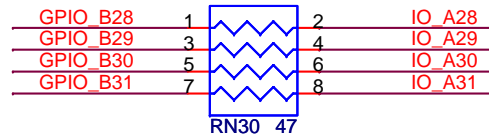
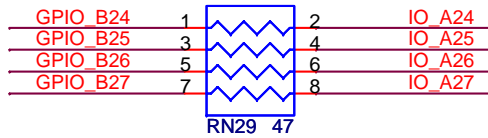
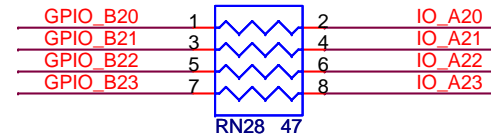
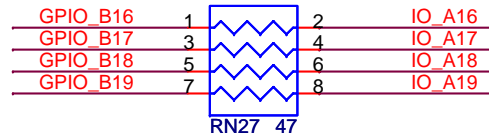
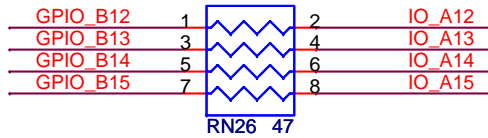
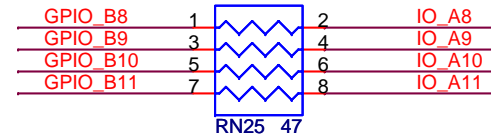
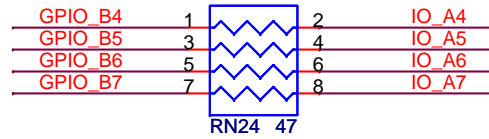
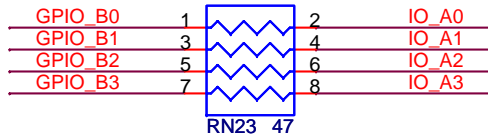


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| Title | | |
| ALTERA DE1 | | |
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| A | PS2 AND RS232 | 1.1 |
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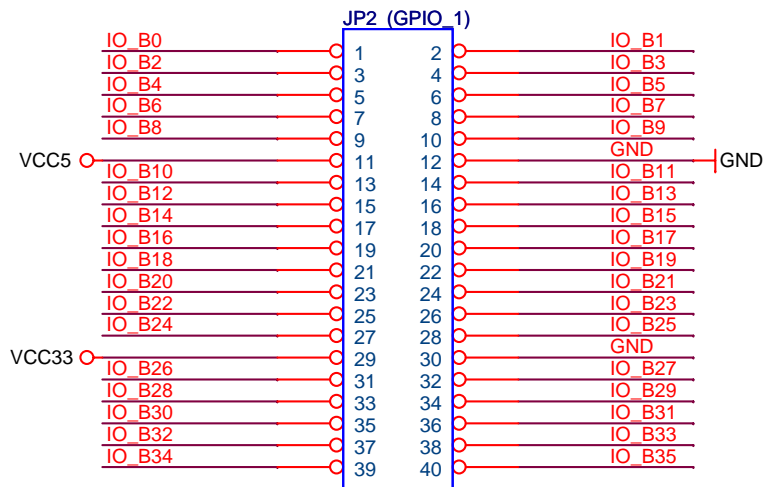
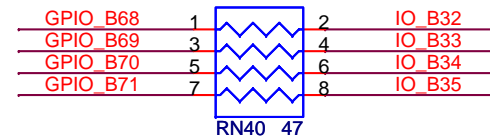
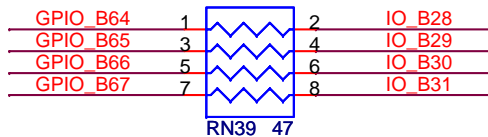
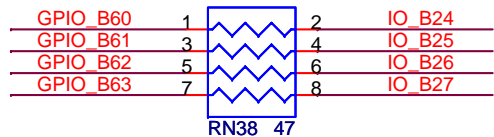
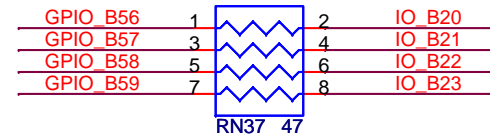
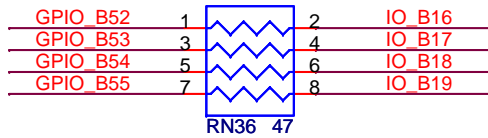
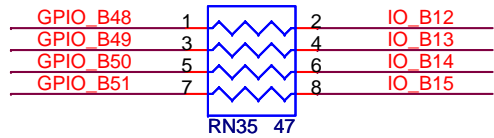
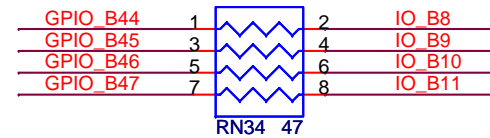
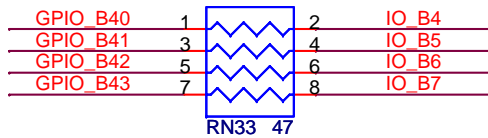
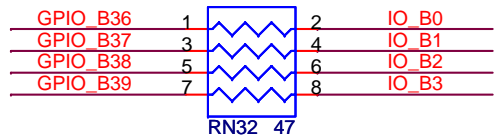
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| Title | | |
| ALTERA DE1 | | |
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| A | KEY AND SWITCH | 1.1 |
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GPIO_B[0..35]

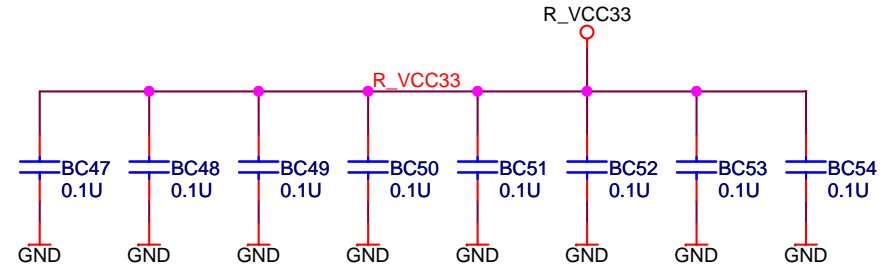
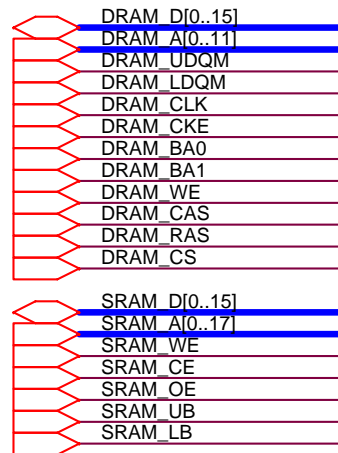
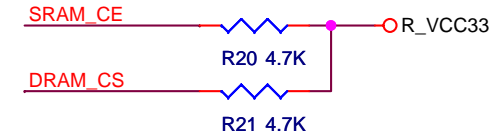
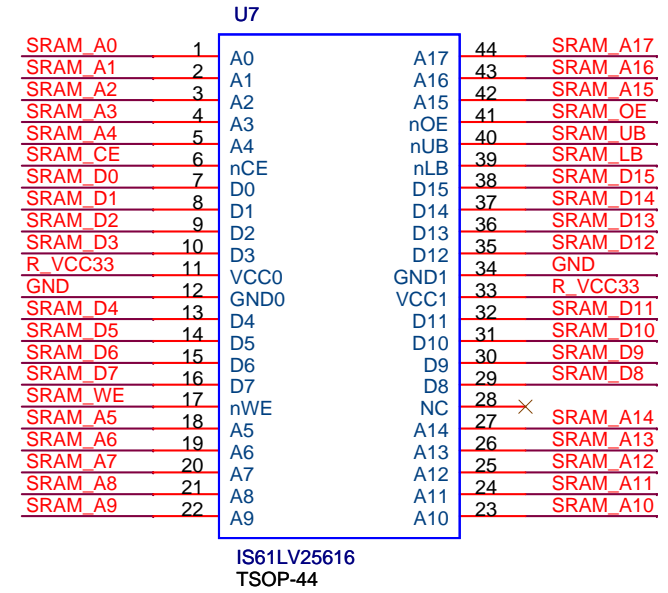
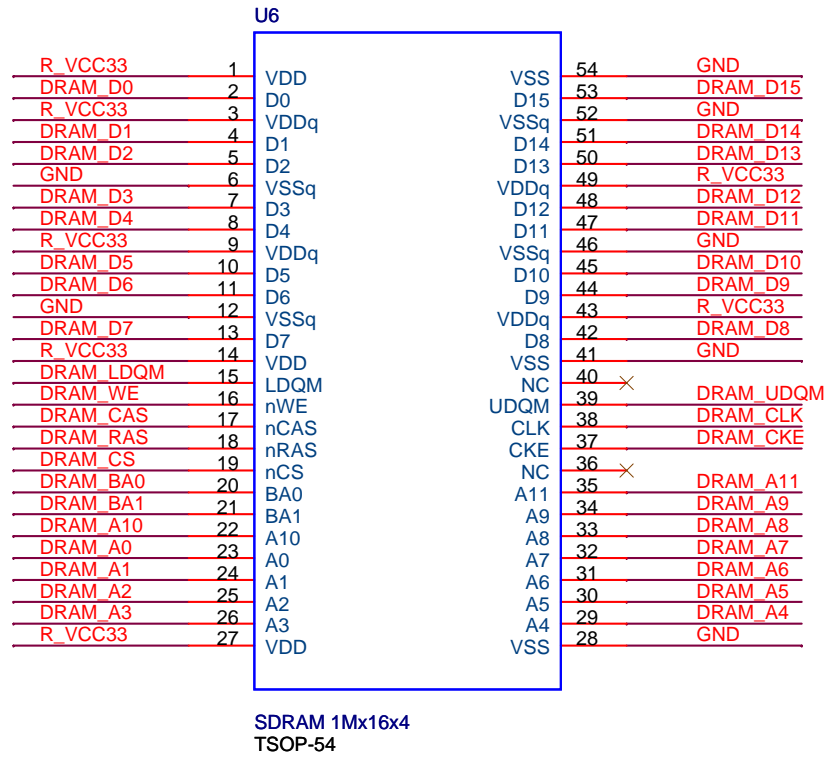


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| Title | | |
| ALTERA DE1 | | |
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| A | CONNECT A | 1.1 |
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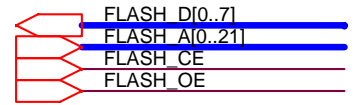
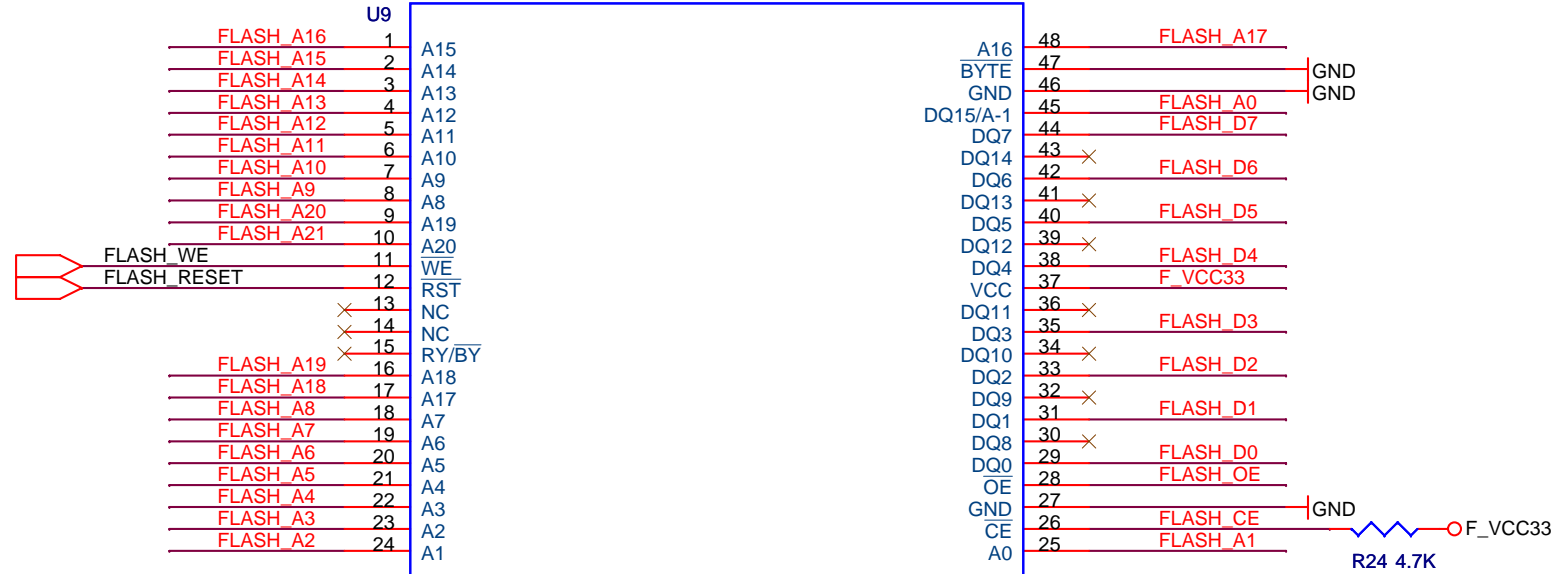
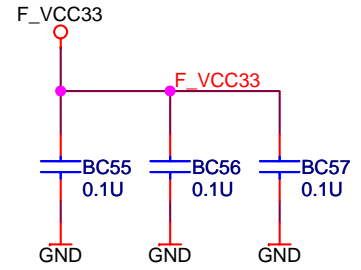
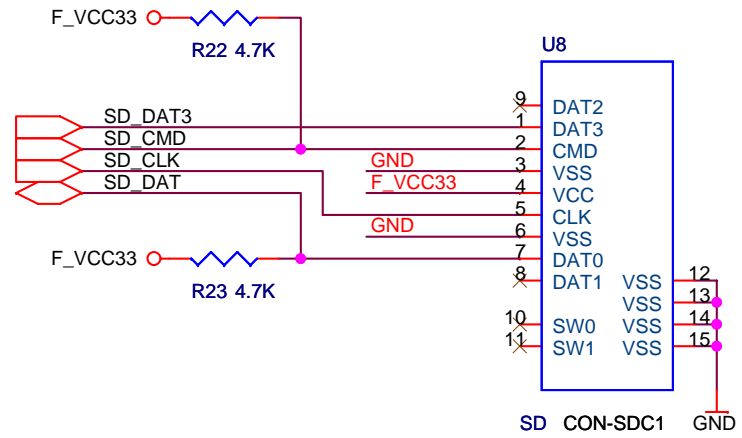
GPIO B[36..71]



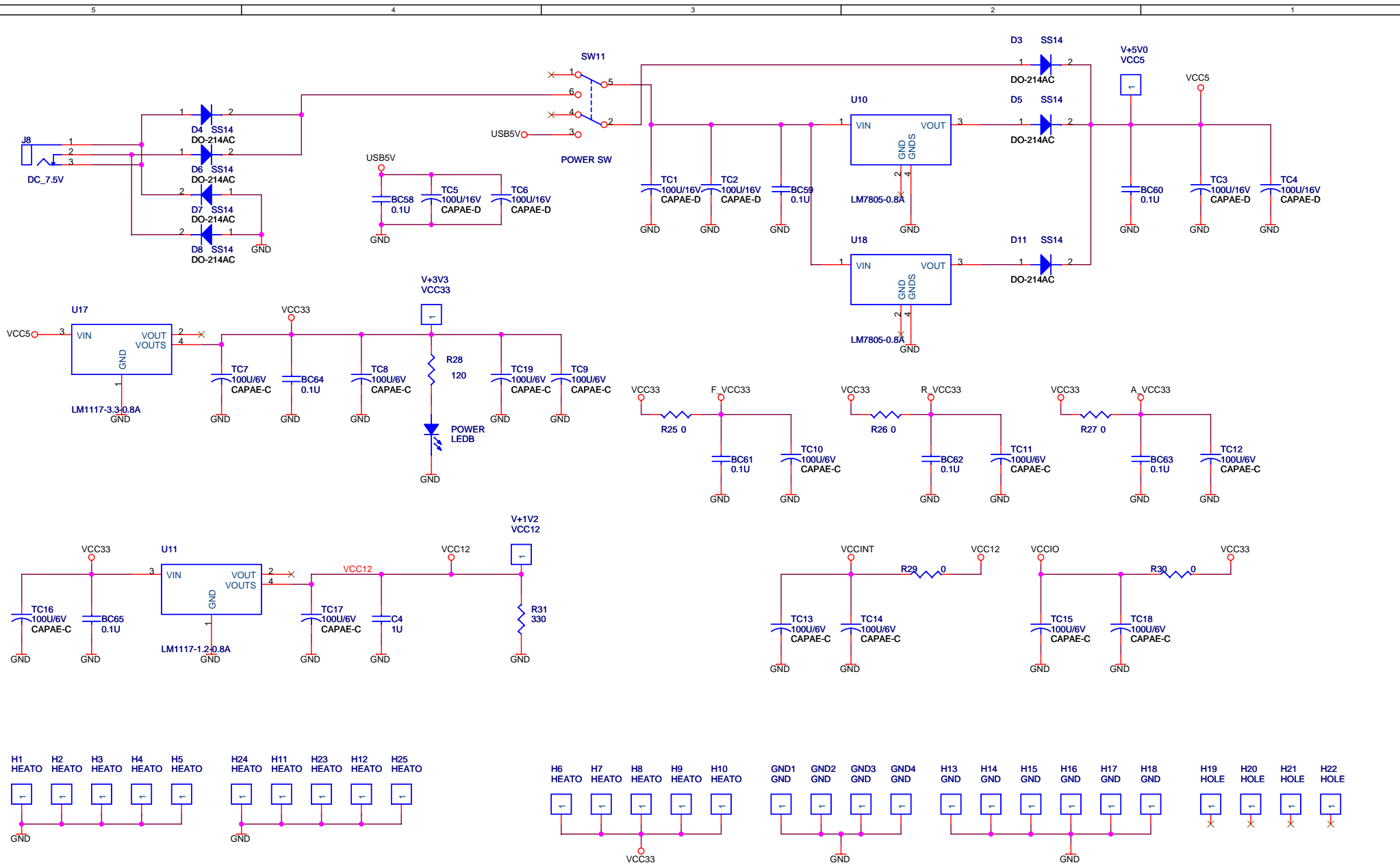
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| A | CONNECT B | 1.1 |
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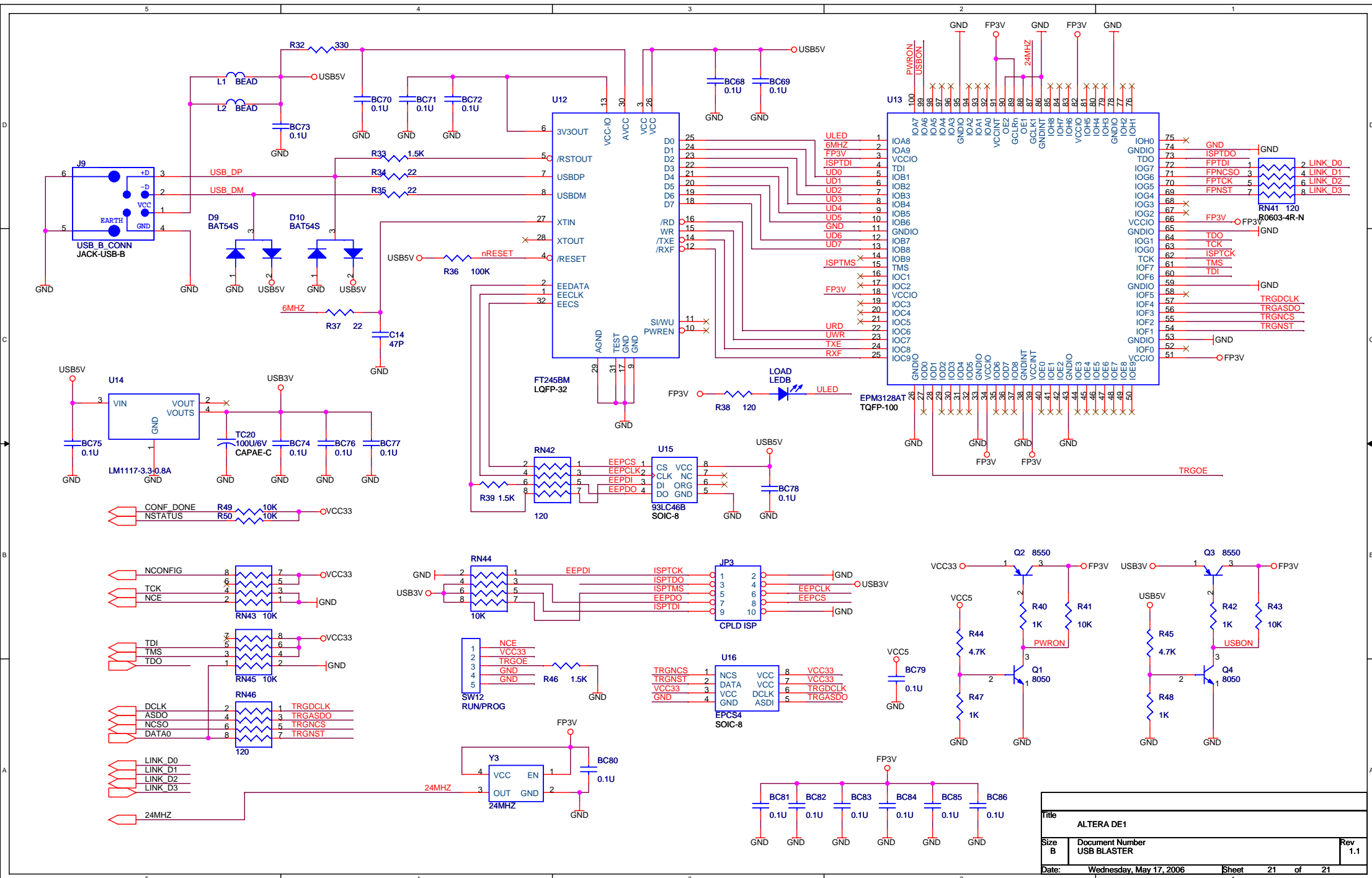
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| ALTERA DE1 | | |
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| A | SDRAM AND SRAM | 1.1 |
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| A | FLASH AND SD | 1.1 |
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| B | POWER | 1.1 |
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| ALTERA DE1 | | |
| Size | Document Number | Rev |
| B | USB BLASTER | 1.1 |
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