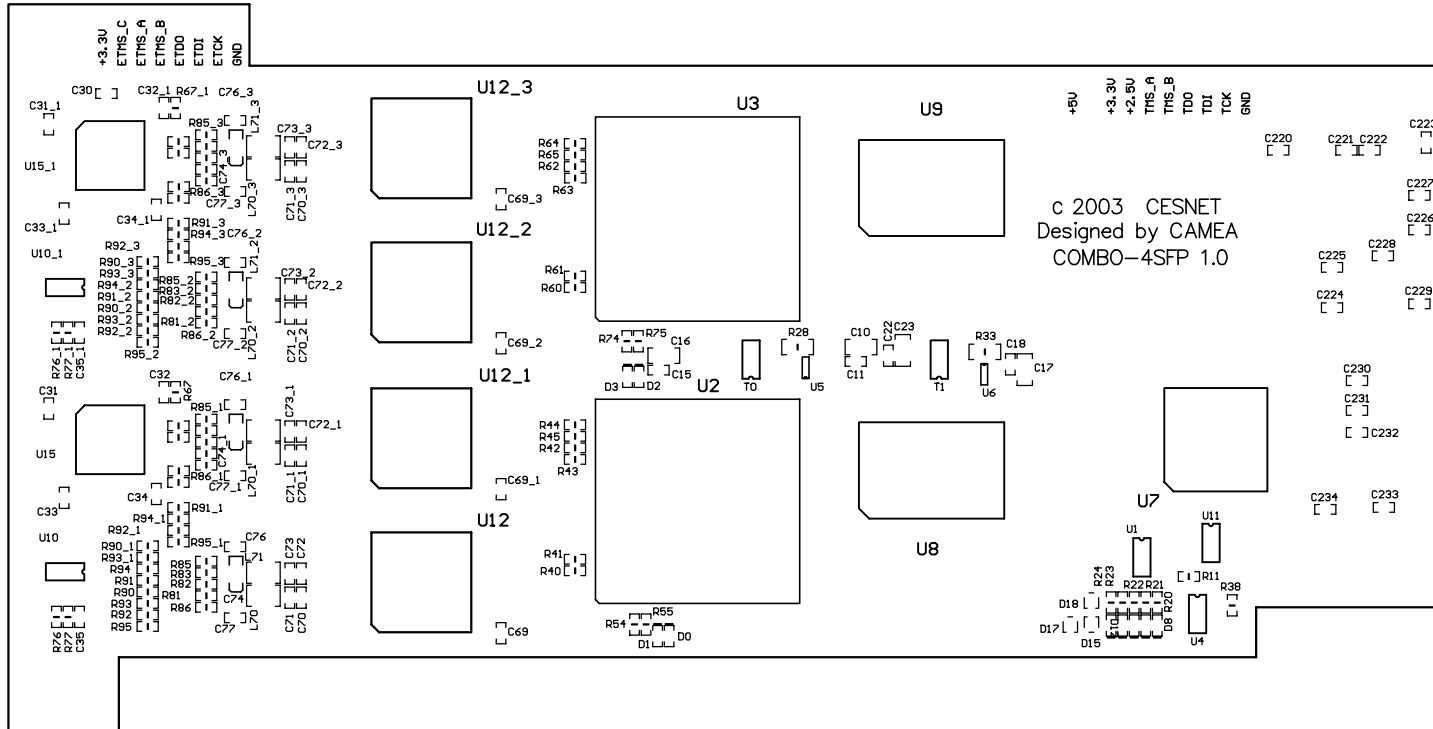


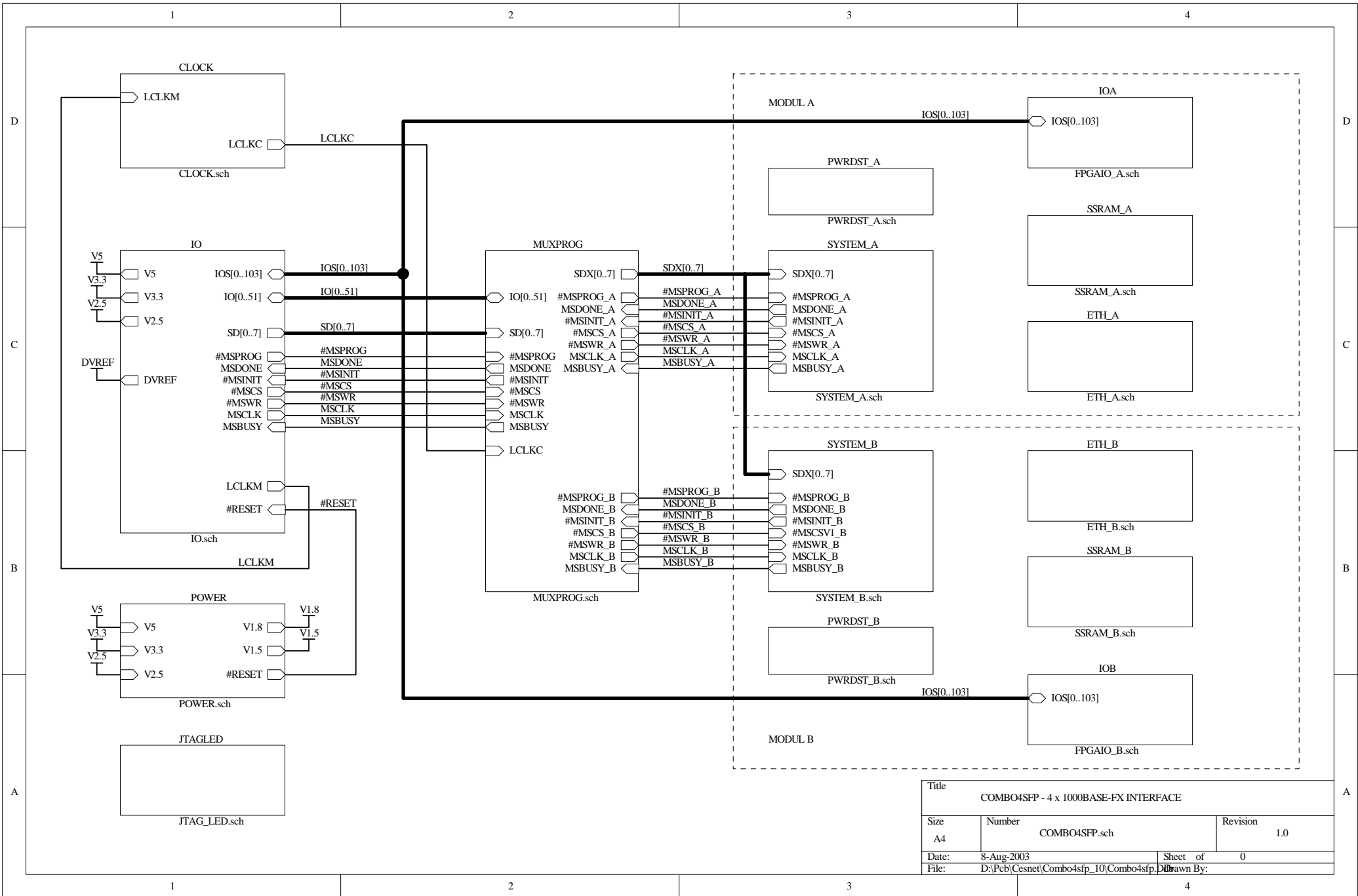
CESNET technical report number 12/2003

Schematic of COMBO-4SFP Card

Jiří Novotný, Otto Fučík, Radomír Bardas

2003-11-11





| | | | |
|---------------------------------------|--|----------|---|
| Title | | | |
| COMBO4SFP - 4 x 1000BASE-FX INTERFACE | | | |
| Size | Number | Revision | |
| A4 | COMBO4SFP.sch | 1.0 | |
| Date: | 8-Aug-2003 | Sheet of | 0 |
| File: | D:\Pcb\Cesnet\Combo4sfp_10\Combo4sfp.D | | |

D

D

C

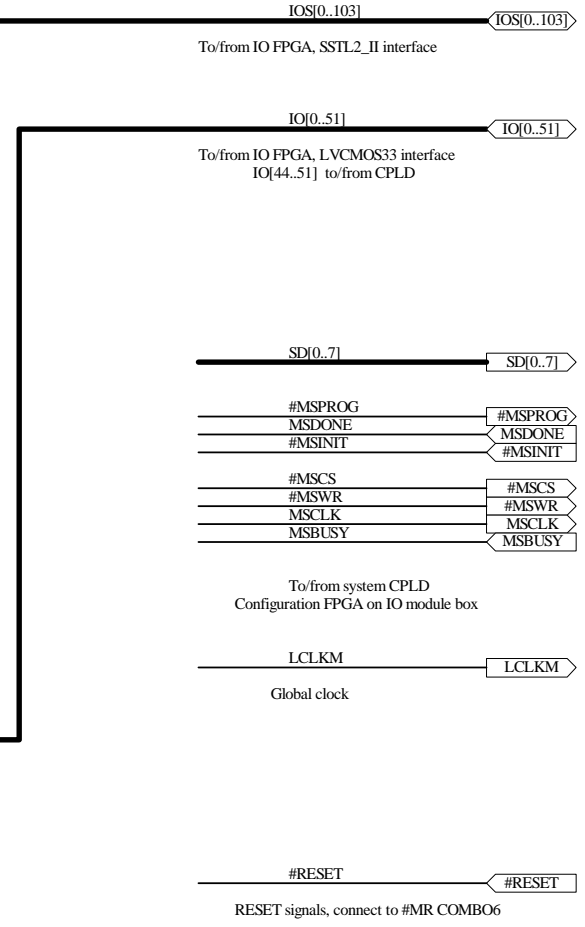
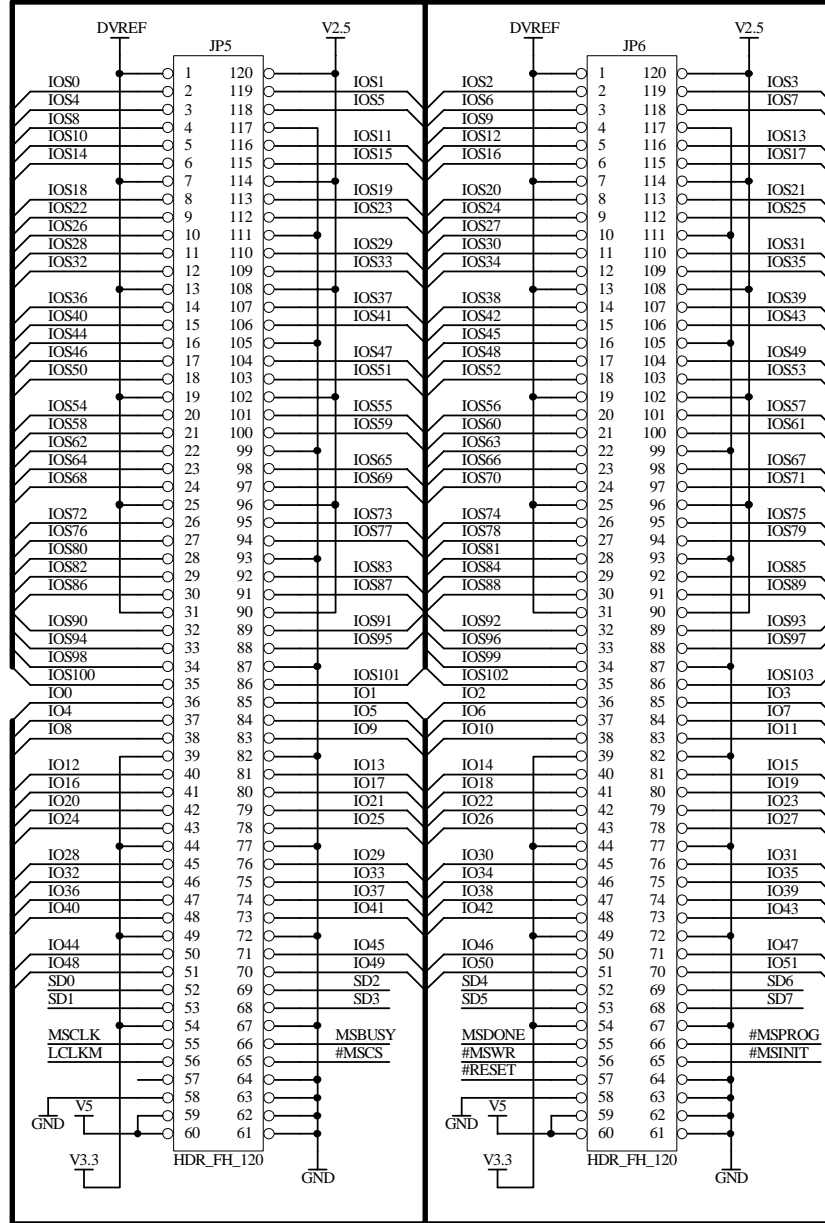
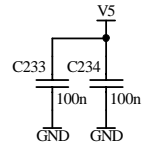
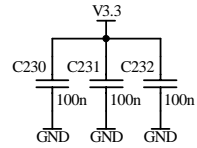
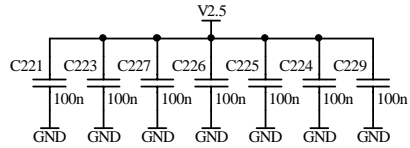
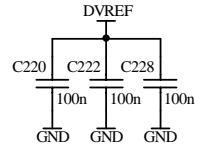
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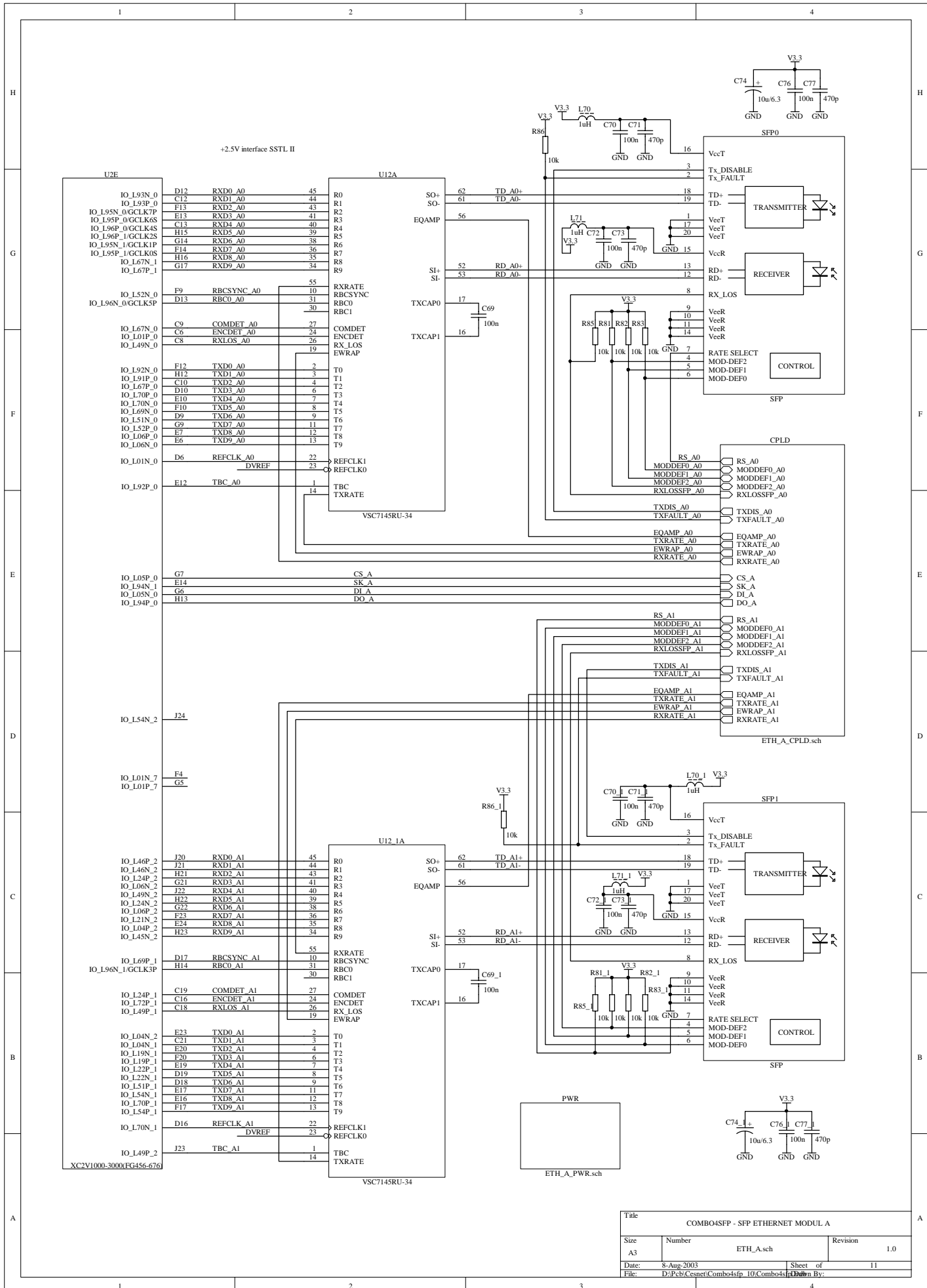
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A

A



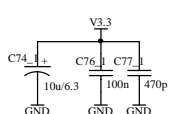
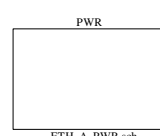
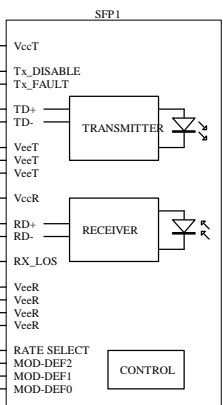
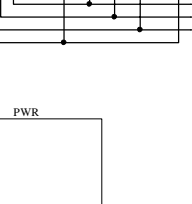
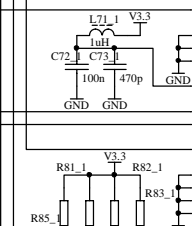
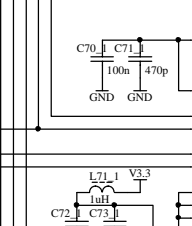
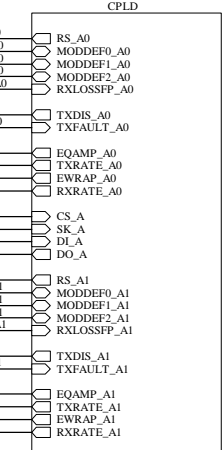
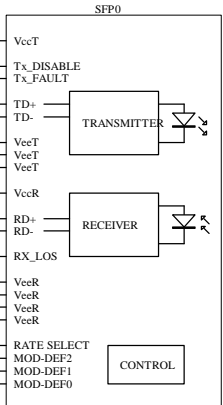
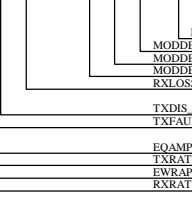
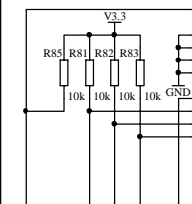
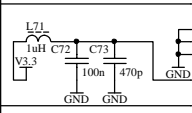
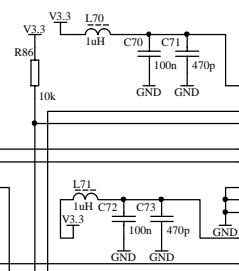
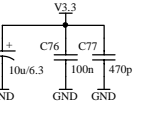
| | | | | | |
|-------|--|----------|--|-----|--|
| Title | | | COMBO4SFP - IO CONNECT TO COMBO6 BOARD | | |
| Size | Number | Revision | | 1.0 | |
| A4 | IO.sch | | | | |
| Date: | 8-Aug-2003 | Sheet of | 16 | | |
| File: | D:\Pcb\Cesnet\Combo4sfp_10\Combo4sfp.D | | | | |
| | Drawn By: | | | | |



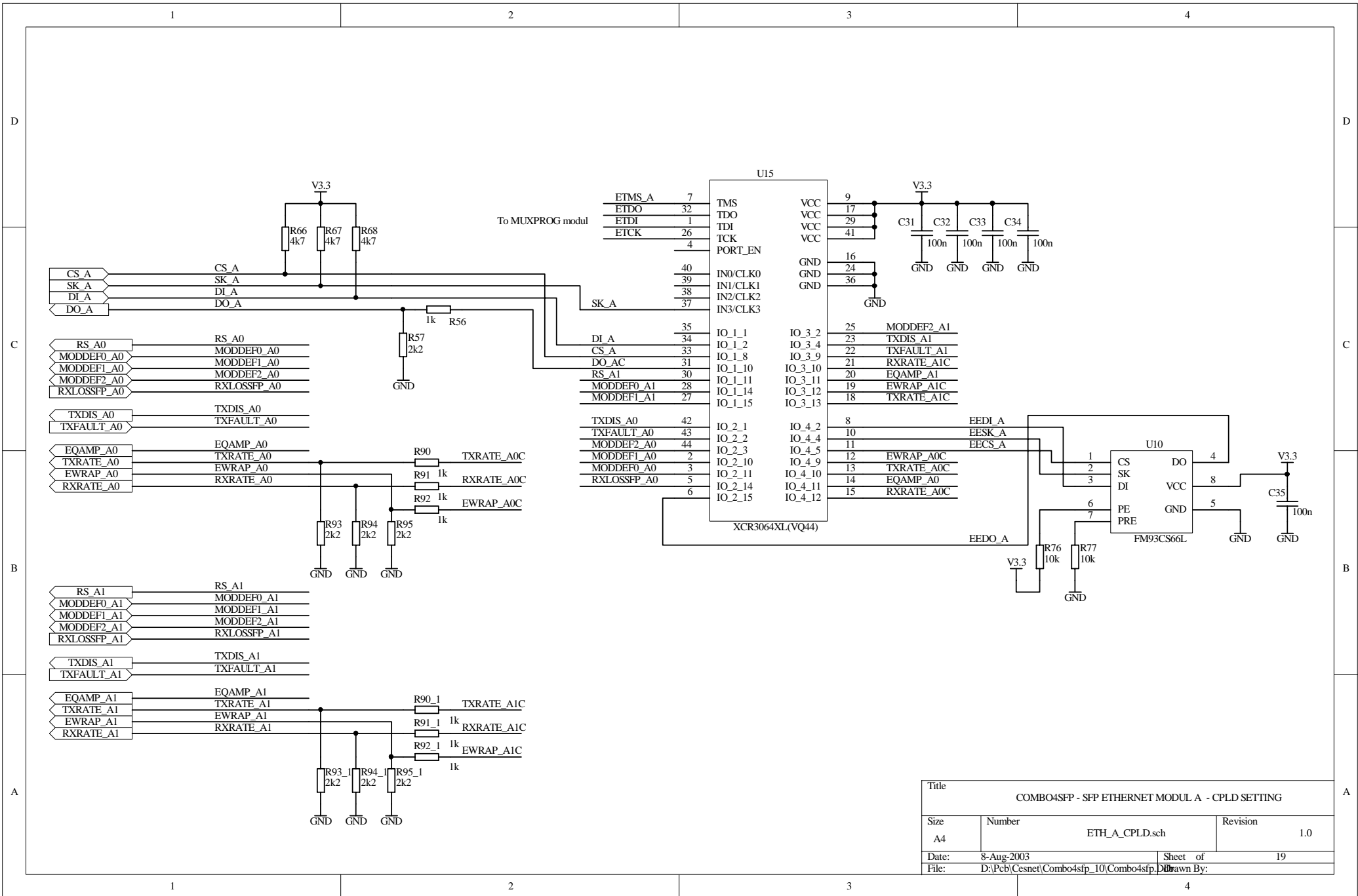
+2.5V interface SSTL II

| U2E | U12A | U12_1A |
|------------------|---------------|--------|
| IO_L93N_0 | D12 RXD0_A0 | R0 |
| IO_L93P_0 | C12 RXD1_A0 | R1 |
| IO_L95N_0GCLKP7 | F13 RXD2_A0 | R2 |
| IO_L95P_0GCLKK6S | E13 RXD3_A0 | R3 |
| IO_L96P_0GCLKK4S | C13 RXD4_A0 | R4 |
| IO_L96P_1GCLKK2S | H15 RXD5_A0 | R5 |
| IO_L95N_1GCLKK1P | G14 RXD6_A0 | R6 |
| IO_L95P_1GCLKK0S | H16 RXD8_A0 | R7 |
| IO_L67N_1 | H16 RXD8_A0 | R8 |
| IO_L67P_1 | G17 RXD9_A0 | R9 |
| IO_L52N_0 | F9 RBCSYNC_A0 | 55 |
| IO_L96N_0GCLKK5P | D13 RBC0_A0 | 31 |
| IO_L67N_0 | C9 COMDET_A0 | 27 |
| IO_L01P_0 | C6 ENCDDET_A0 | 24 |
| IO_L49N_0 | C8 RXLOS_A0 | 26 |
| IO_L92N_0 | F12 TXD0_A0 | 2 |
| IO_L91P_0 | H12 TXD1_A0 | 3 |
| IO_L67P_0 | C10 TXD2_A0 | 4 |
| IO_L70P_0 | D10 TXD3_A0 | 6 |
| IO_L70N_0 | E10 TXD4_A0 | 7 |
| IO_L69N_0 | F10 TXD5_A0 | 8 |
| IO_L51N_0 | D9 TXD6_A0 | 9 |
| IO_L52P_0 | G9 TXD7_A0 | 11 |
| IO_L06P_0 | E7 TXD8_A0 | 12 |
| IO_L06N_0 | E6 TXD9_A0 | 13 |
| IO_L01N_0 | D6 REFCLK_A0 | 22 |
| IO_L92P_0 | E12 TBC_A0 | 1 |
| IO_L05P_0 | G7 CS_A | CS_A |
| IO_L94N_1 | E14 SK_A | SK_A |
| IO_L05N_0 | G6 DJ_A | DJ_A |
| IO_L94P_0 | H13 DO_A | DO_A |

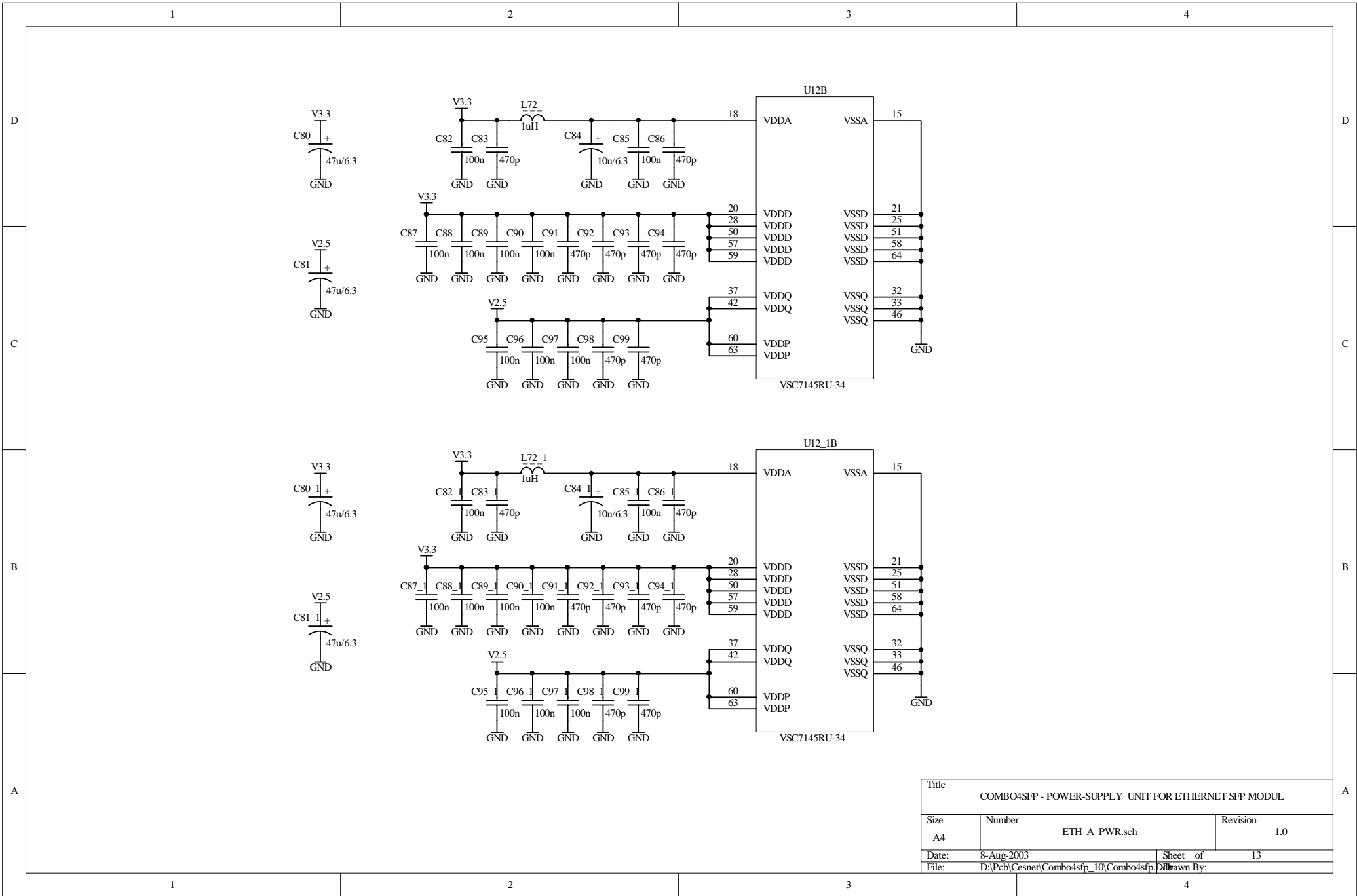
VSC7145RU-34



| Title | | | |
|----------------------------------|--|----------|----|
| COMBO4SFP - SFP ETHERNET MODUL A | | | |
| Size | Number | Revision | |
| A3 | ETH_A.sch | 1.0 | |
| Date: | 8-Aug-2003 | Sheet of | 11 |
| File: | D:\Pcb\Cesnet\Combo4sfp_10\Combo4sfp10.dsn By: | | |

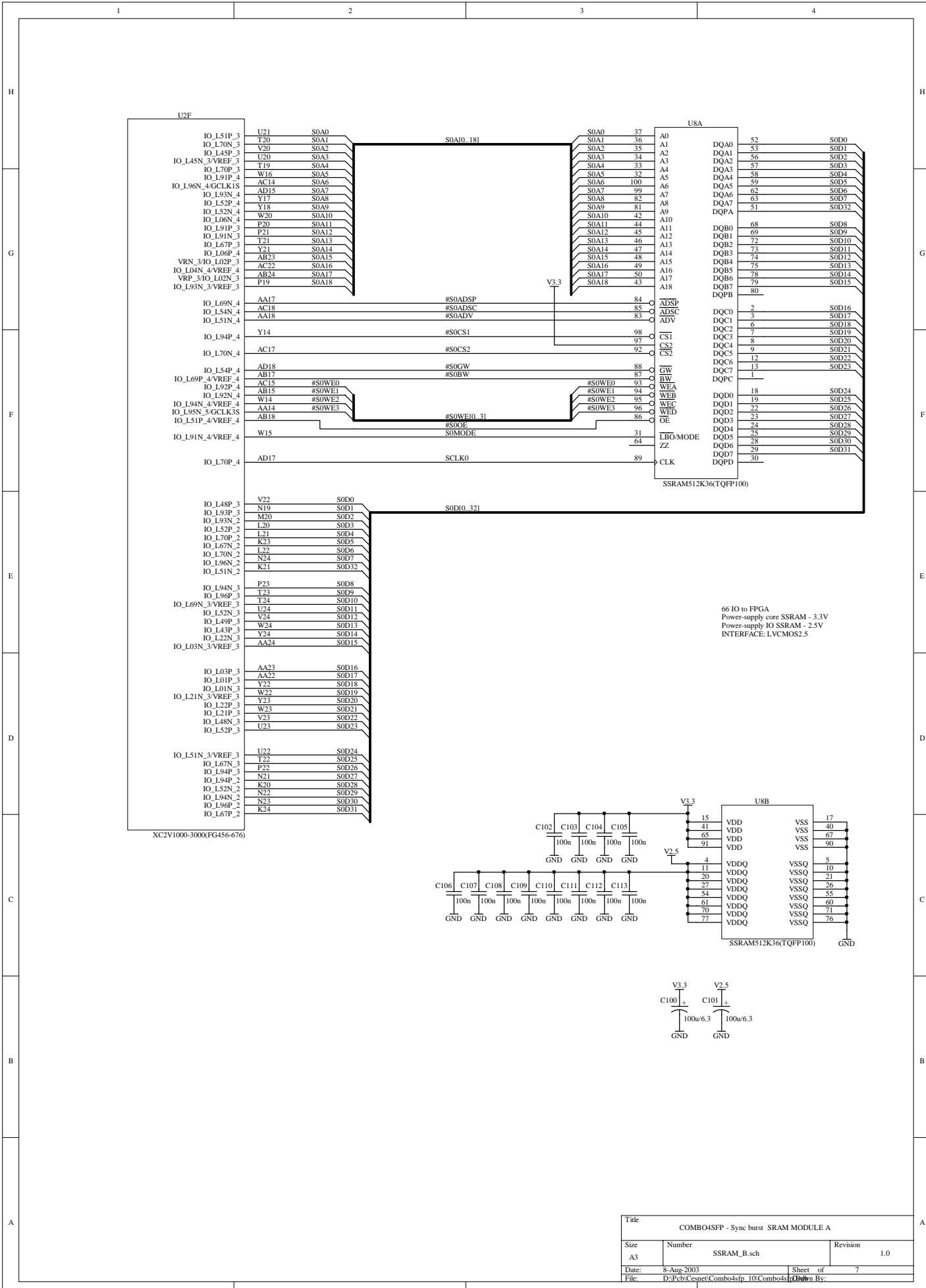


| | | | |
|---|--|----------|----|
| Title | | | |
| COMBO4SFP - SFP ETHERNET MODUL A - CPLD SETTING | | | |
| Size | Number | Revision | |
| A4 | ETH_A_CPLD.sch | 1.0 | |
| Date: | 8-Aug-2003 | Sheet of | 19 |
| File: | D:\Pcb\Cesnet\Combo4sfp_10\Combo4sfp.D | | |

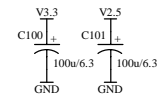
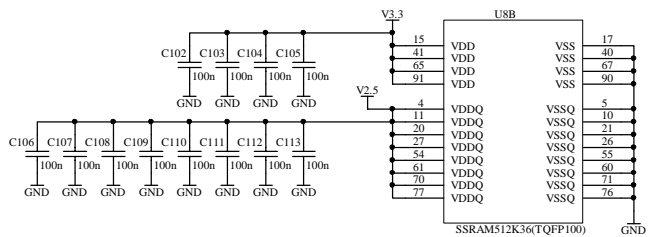


| | | |
|--|--|-------------|
| Title | | |
| COMBO4SFP - POWER-SUPPLY UNIT FOR ETHERNET SFP MODUL | | |
| Size | Number | Revision |
| A4 | ETH_A_PWR.sch | 1.0 |
| Date: | 8-Aug-2003 | Sheet of 13 |
| File: | D:\Pcb\Cesnet\Combo4sfp_10\Combo4sfp.D | |

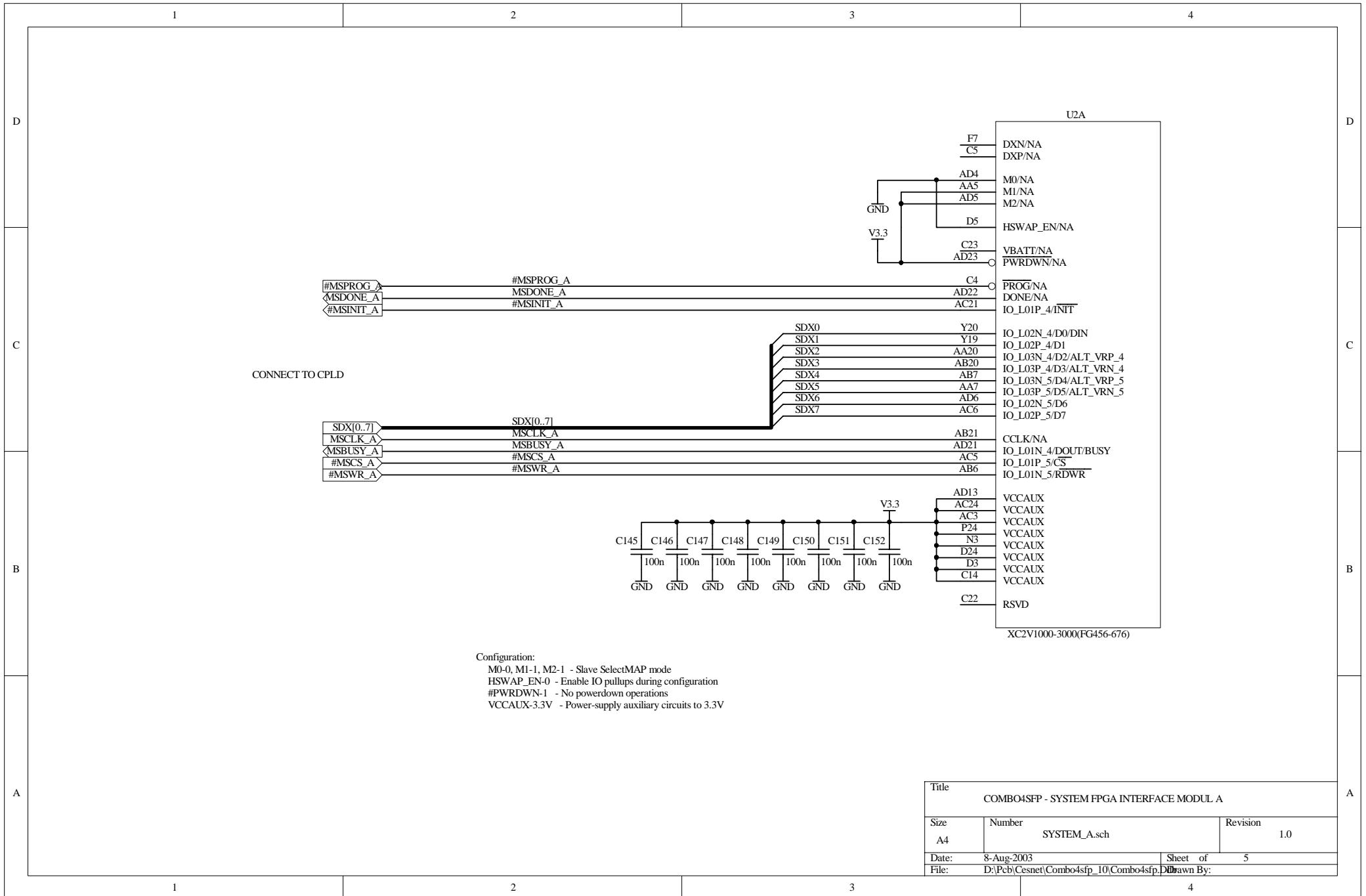
Drawn By:



66 IO to FPGA
 Power-supply core SSRAM - 3.3V
 Power-supply IO SSRAM - 2.5V
 INTERFACE: LVCMOS2.5



| | | | |
|--------------------------------------|--|----------|---|
| Title | | | |
| COMBO4SFP - Sync burst SRAM MODULE A | | | |
| Size | Number | Revision | |
| A3 | SSRAM_B.sch | 1.0 | |
| Date: | 8-Aug-2003 | Sheet of | 7 |
| File: | D:\Pcb\Cesnet\Combo4fp_10\Combo4fp_10.dsn By: [Name] | | |



U21

IOS[0..103]

IOS[0..103]

| | |
|-------|------|
| IOS2 | AC13 |
| IOS3 | AB13 |
| IOS22 | AA13 |
| IOS21 | Y13 |

| |
|------------------|
| IO_L96N_5/GCLK7S |
| IO_L96P_5/GCLK6P |
| IO_L95N_5/GCLK5S |
| IO_L95P_5/GCLK4P |

| | |
|-------|------|
| IOS20 | W13 |
| IOS25 | AC11 |
| IOS24 | AB11 |
| IOS26 | W11 |
| IOS30 | Y10 |
| IOS23 | AA11 |
| IOS31 | AD9 |
| IOS28 | AB10 |
| IOS27 | AA10 |
| IOS29 | AC10 |
| IOS32 | AB8 |
| IOS34 | AA8 |
| IOS35 | AD7 |
| IOS33 | Y8 |

| |
|-----------|
| IO_L94N_5 |
| IO_L72N_5 |
| IO_L72P_5 |
| IO_L70N_5 |
| IO_L70P_5 |
| IO_L69P_5 |
| IO_L54P_5 |
| IO_L52N_5 |
| IO_L52P_5 |
| IO_L51P_5 |
| IO_L22N_5 |
| IO_L22P_5 |
| IO_L21P_5 |
| IO_L04N_5 |

| | |
|-------|-----|
| IOS40 | AA4 |
| IOS41 | AA3 |
| IOS45 | Y6 |
| IOS44 | W6 |
| IOS43 | W7 |
| IOS46 | W5 |
| IOS42 | W4 |
| IOS51 | V6 |
| IOS49 | V7 |
| IOS53 | V5 |
| IOS47 | V4 |
| IOS48 | V3 |
| IOS50 | U7 |
| IOS56 | T7 |
| IOS54 | U4 |
| IOS55 | U3 |
| IOS52 | U6 |
| IOS89 | T5 |
| IOS88 | T6 |
| IOS59 | T8 |
| IOS60 | R8 |
| IOS90 | R7 |
| IOS91 | P6 |
| IOS92 | P5 |
| IOS93 | P4 |
| IOS65 | P3 |

| |
|-----------|
| IO_L19P_6 |
| IO_L19N_6 |
| IO_L21P_6 |
| IO_L22P_6 |
| IO_L22N_6 |
| IO_L43P_6 |
| IO_L43N_6 |
| IO_L48P_6 |
| IO_L48N_6 |
| IO_L49P_6 |
| IO_L49N_6 |
| IO_L51P_6 |
| IO_L54P_6 |
| IO_L54N_6 |
| IO_L67P_6 |
| IO_L67N_6 |
| IO_L69P_6 |
| IO_L70P_6 |
| IO_L70N_6 |
| IO_L72P_6 |
| IO_L72N_6 |
| IO_L93P_6 |
| IO_L94P_6 |
| IO_L94N_6 |
| IO_L96P_6 |
| IO_L96N_6 |

| | |
|--------|----|
| IOS66 | N4 |
| IOS94 | N5 |
| IOS71 | N7 |
| IOS69 | P8 |
| IOS70 | N8 |
| IOS97 | L5 |
| IOS96 | L6 |
| IOS98 | L4 |
| IOS67 | K3 |
| IOS99 | K4 |
| IOS101 | K5 |
| IOS86 | K6 |
| IOS95 | L7 |
| IOS68 | J3 |
| IOS100 | J4 |
| IOS102 | J5 |
| IOS87 | J6 |
| IOS82 | H4 |
| IOS84 | K7 |
| IOS85 | J7 |
| IOS83 | G3 |
| IOS103 | G4 |

| |
|-----------|
| IO_L94P_7 |
| IO_L94N_7 |
| IO_L93N_7 |
| IO_L91P_7 |
| IO_L91N_7 |
| IO_L70P_7 |
| IO_L70N_7 |
| IO_L69N_7 |
| IO_L54P_7 |
| IO_L54N_7 |
| IO_L52P_7 |
| IO_L52N_7 |
| IO_L51N_7 |
| IO_L48P_7 |
| IO_L48N_7 |
| IO_L46P_7 |
| IO_L46N_7 |
| IO_L45N_7 |
| IO_L43P_7 |
| IO_L43N_7 |
| IO_L22P_7 |
| IO_L22N_7 |

XC2V1000-3000(FG456-676)

D

D

C

C

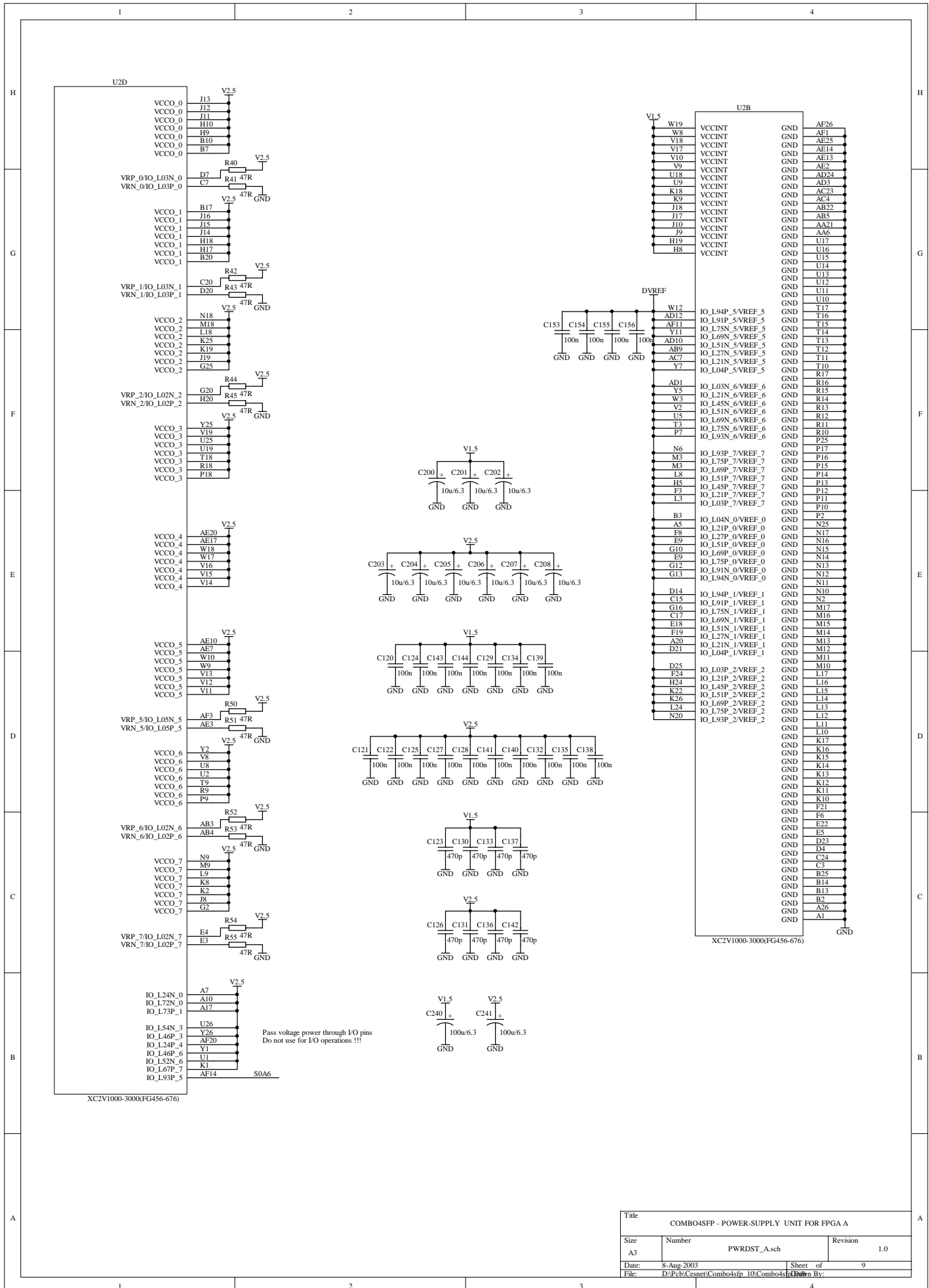
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B

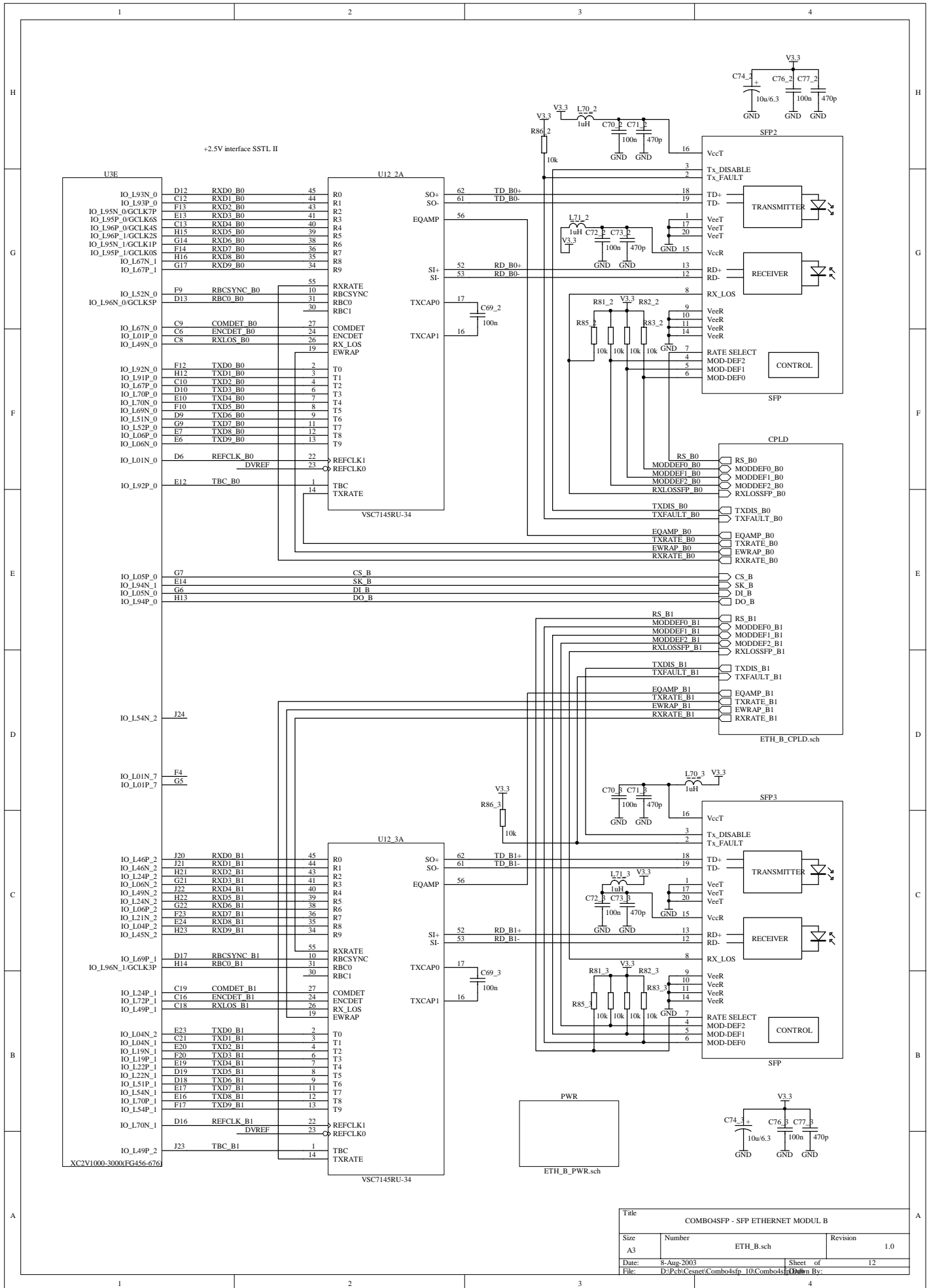
A

A

| | | | |
|-------------------------------|--|--------------|----------|
| Title | | | |
| COMBO4SFP - IO FPGA INTERFACE | | | |
| Size | Number | FPGAIO_A.sch | Revision |
| A4 | | | 1.0 |
| Date: | 8-Aug-2003 | Sheet of | 18 |
| File: | D:\Pcb\Cesnet\Combo4sfp_10\Combo4sfp.D | | |
| Drawn By: | | | |



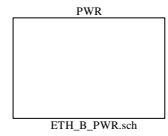
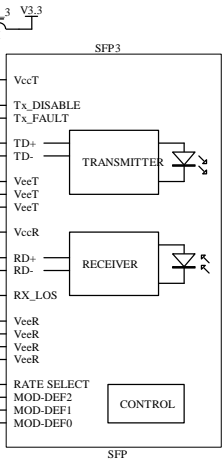
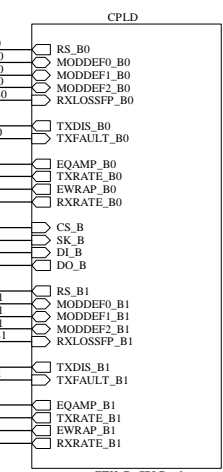
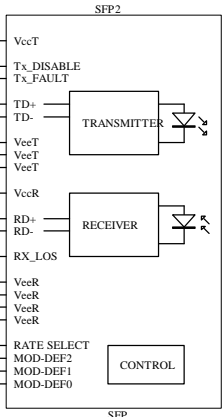
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|--|--|--------------|----------|
| Title | | | |
| COMBO4SFP - POWER-SUPPLY UNIT FOR FPGA A | | | |
| Size | Number | PWRDST_A.sch | Revision |
| A3 | | | 1.0 |
| Date: | 8-Aug-2003 | Sheet | 9 of 9 |
| File: | D:\Pcb\Cesnet\Combo4sfp_10\Combo4sfp_10.dsn By: [Name] | | |



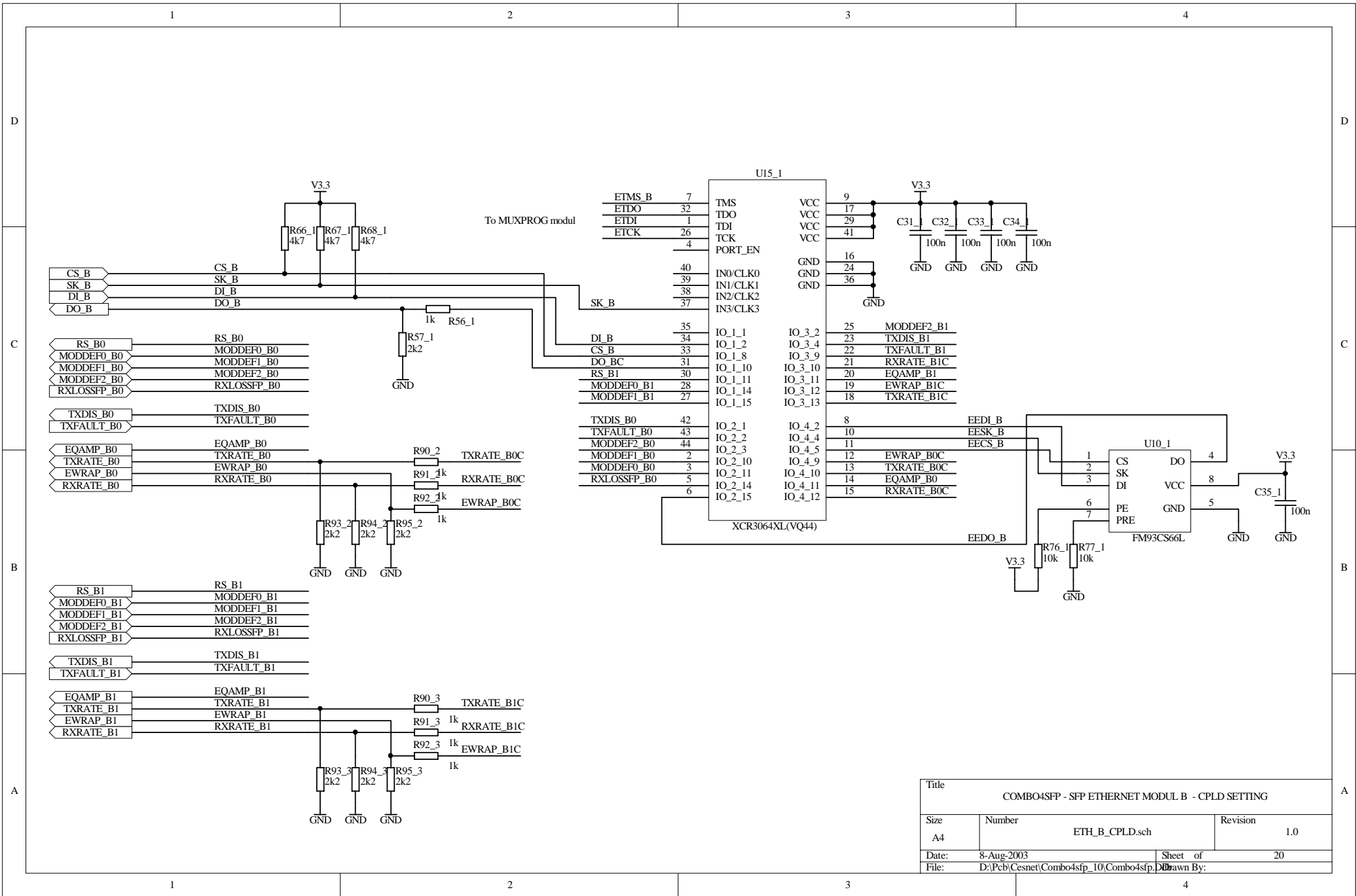
+2.5V interface SSTL II

U3E

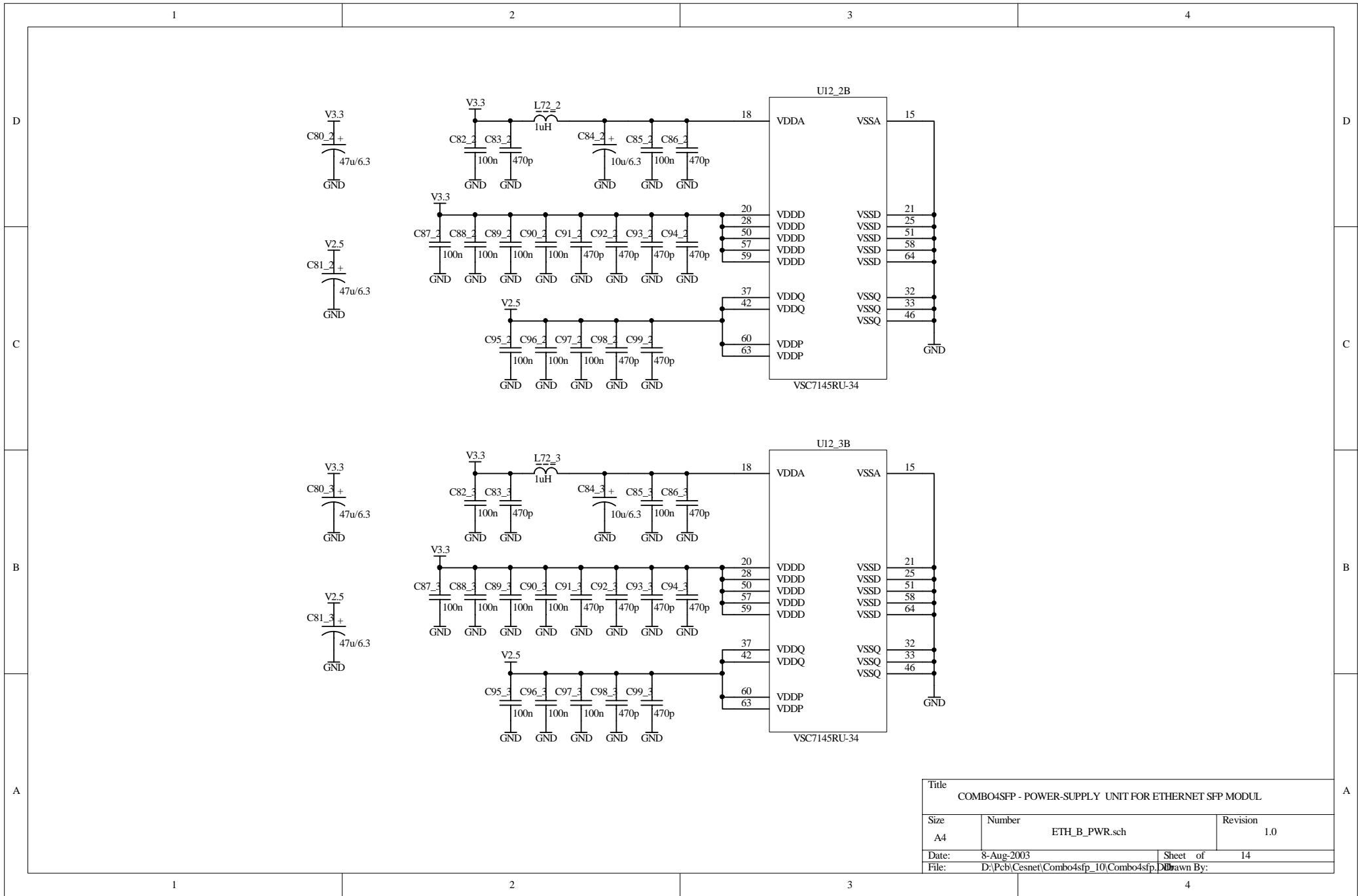
U12.2A



| | | | |
|----------------------------------|---|----------|-----|
| Title | | | |
| COMBO4SFP - SFP ETHERNET MODUL B | | | |
| Size | Number | Revision | 1.0 |
| A3 | ETH_B.sch | | |
| Date: | 8-Aug-2003 | Sheet of | 12 |
| File: | D:\Pcb\Cesnet\Combo4sfp_10\Combo4sfp_10.dsn | By: | |



| | | | |
|---|--|----------|----|
| Title | | | |
| COMBO4SFP - SFP ETHERNET MODUL B - CPLD SETTING | | | |
| Size | Number | Revision | |
| A4 | ETH_B_CPLD.sch | 1.0 | |
| Date: | 8-Aug-2003 | Sheet of | 20 |
| File: | D:\Pcb\Cesnet\Combo4sfp_10\Combo4sfp.D | | |
| | Drawn By: | | |



| | | |
|--|--|-------------|
| Title | | |
| COMBO4SFP - POWER-SUPPLY UNIT FOR ETHERNET SFP MODUL | | |
| Size | Number | Revision |
| A4 | ETH_B_PWR.sch | 1.0 |
| Date: | 8-Aug-2003 | Sheet of 14 |
| File: | D:\Pcb\Cesnet\Combo4sfp_10\Combo4sfp.D | |

1

2

3

4

D

D

C

C

B

B

A

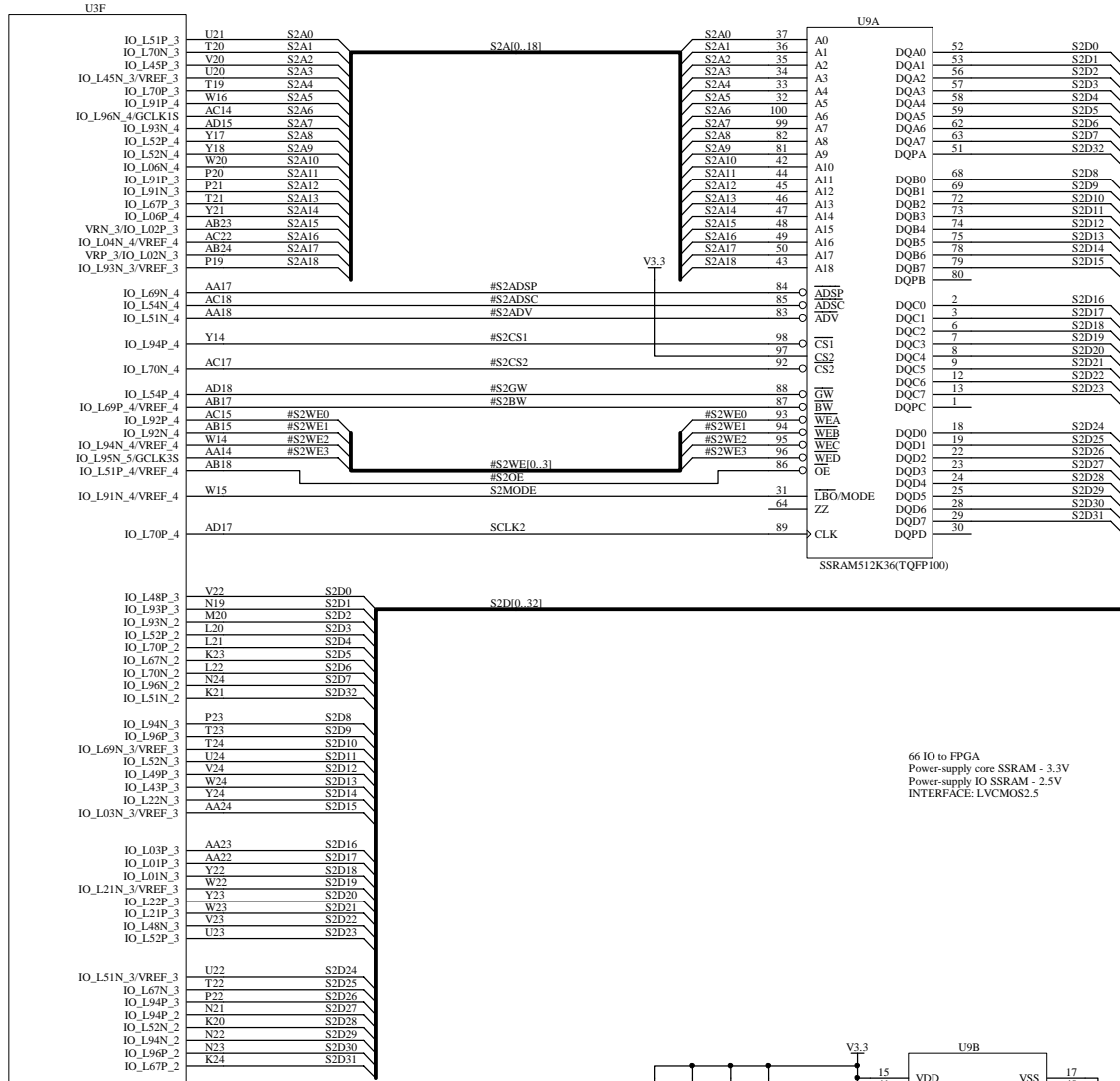
A

1

2

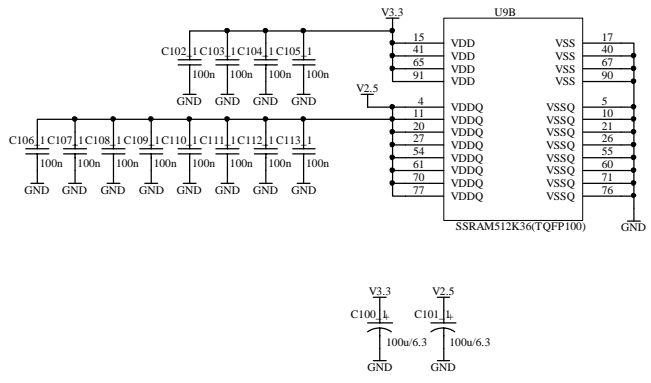
3

4

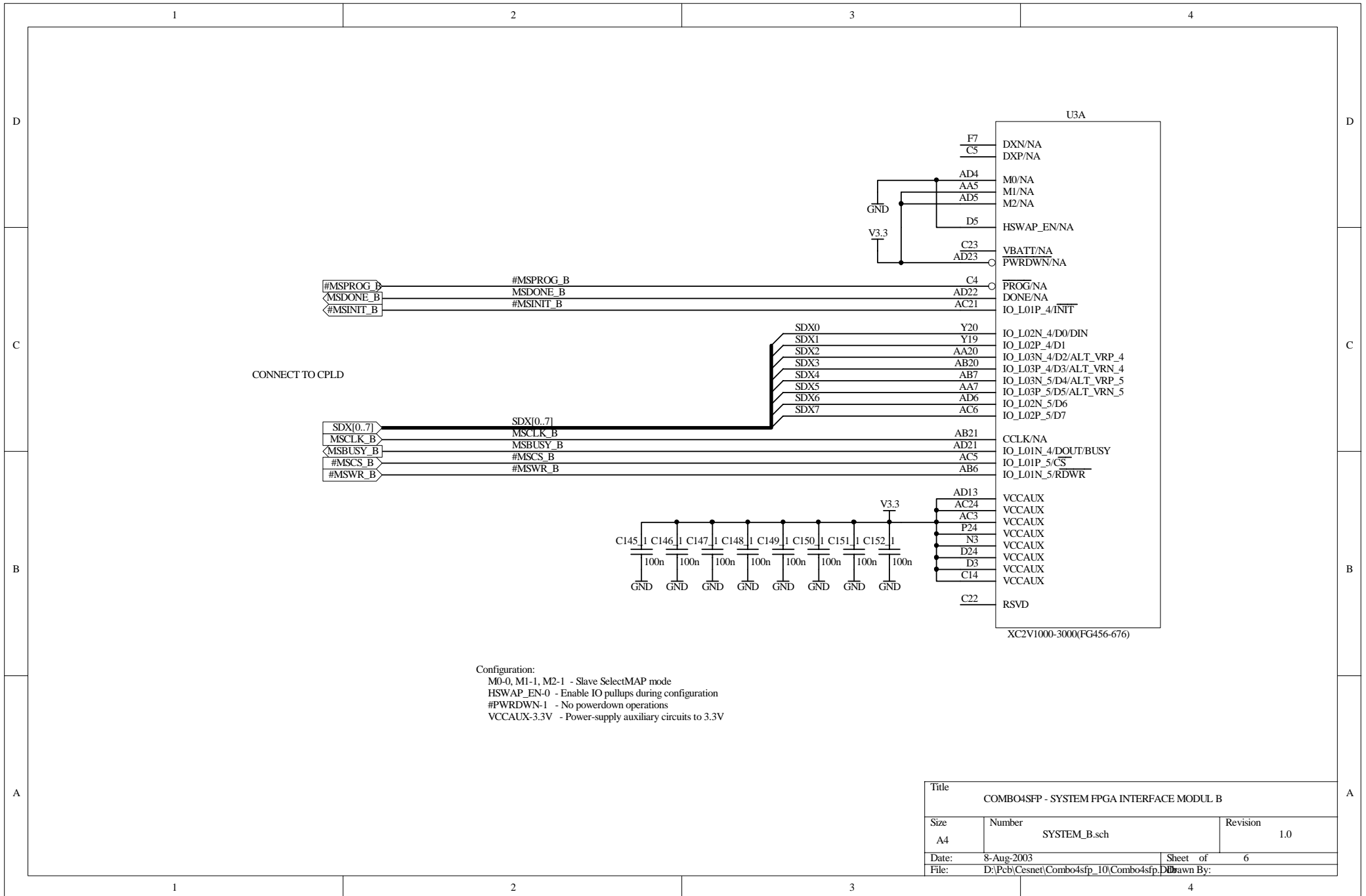


XC2V1000-3000(FG456-676)

66 IO to FPGA
 Power-supply core SSRAM - 3.3V
 Power-supply IO SSRAM - 2.5V
 INTERFACE: LVCMOS2.5



| | | | |
|--------------------------------------|--|----------|---|
| Title | | | |
| COMBO4SFP - Sync burst SRAM MODULE B | | | |
| Size | Number | Revision | |
| A3 | SSRAM_B.sch | 1.0 | |
| Date: | 8-Aug-2003 | Sheet of | 8 |
| File: | D:\Pcb\Cesnet\Combo4fp_10\Combo4fp_10.dsn By: [Name] | | |



| | | |
|---|--|------------|
| Title | | |
| COMBO4SFP - SYSTEM FPGA INTERFACE MODUL B | | |
| Size | Number | Revision |
| A4 | SYSTEM_B.sch | 1.0 |
| Date: | 8-Aug-2003 | Sheet of 6 |
| File: | D:\Pcb\Cesnet\Combo4sfp_10\Combo4sfp.D | |

U31

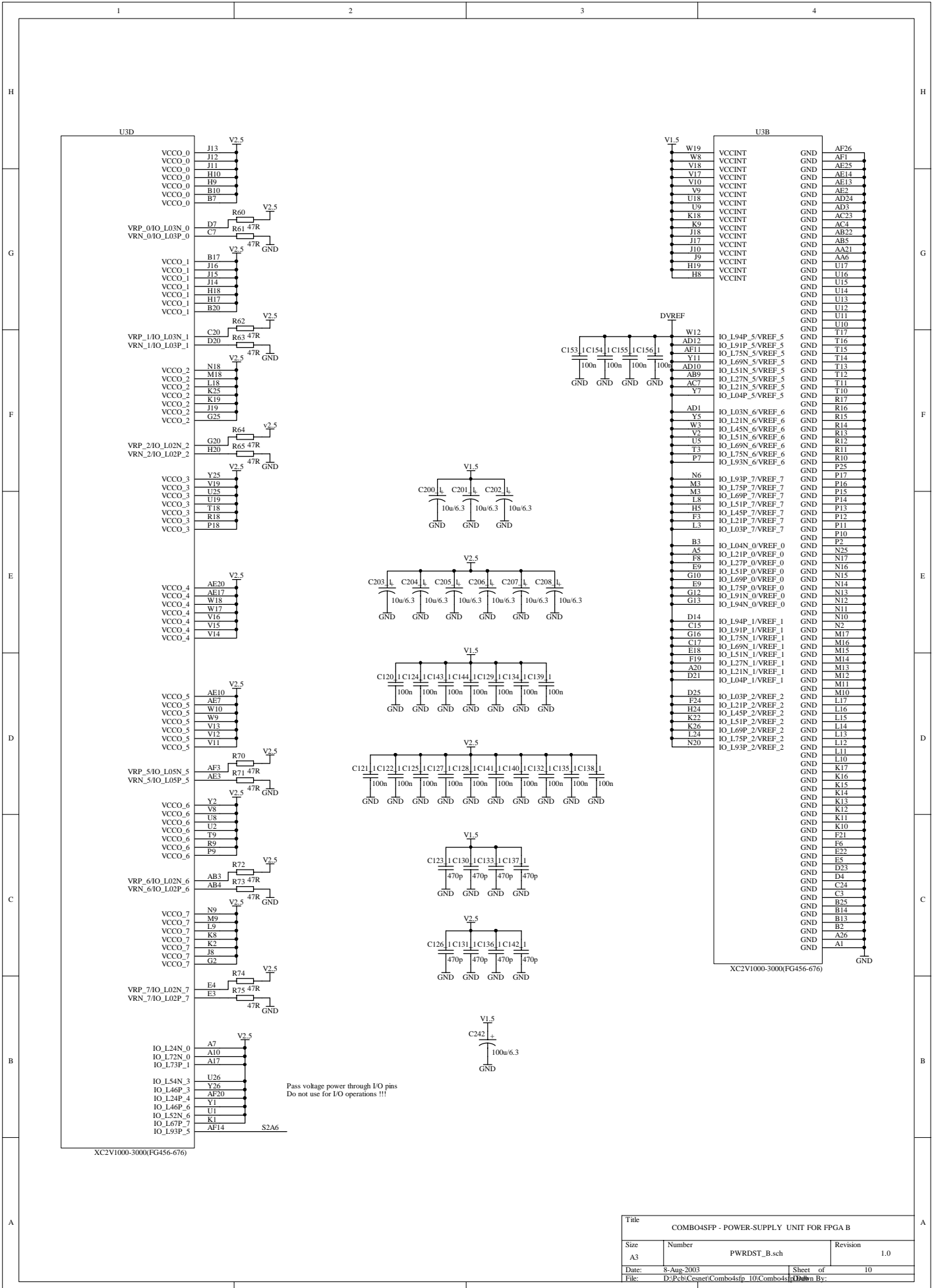
IOS[0..103]

IOS[0..103]

| | | |
|-------|------|------------------|
| IOS0 | AC13 | IO_L96N_5/GCLK7S |
| IOS1 | AB13 | IO_L96P_5/GCLK6P |
| IOS6 | AA13 | IO_L95N_5/GCLK5S |
| IOS5 | Y13 | IO_L95P_5/GCLK4P |
| IOS4 | W13 | IO_L94N_5 |
| IOS9 | AC11 | IO_L72N_5 |
| IOS8 | AB11 | IO_L72P_5 |
| IOS10 | W11 | IO_L70N_5 |
| IOS14 | Y10 | IO_L70P_5 |
| IOS7 | AA11 | IO_L69P_5 |
| IOS15 | AD9 | IO_L54P_5 |
| IOS12 | AB10 | IO_L52N_5 |
| IOS11 | AA10 | IO_L52P_5 |
| IOS13 | AC10 | IO_L51P_5 |
| IOS16 | AB8 | IO_L22N_5 |
| IOS18 | AA8 | IO_L22P_5 |
| IOS19 | AD7 | IO_L21P_5 |
| IOS17 | Y8 | IO_L04N_5 |
| IOS40 | AA4 | IO_L19P_6 |
| IOS41 | AA3 | IO_L19N_6 |
| IOS45 | Y6 | IO_L21P_6 |
| IOS44 | W6 | IO_L22P_6 |
| IOS43 | W7 | IO_L22N_6 |
| IOS46 | W5 | IO_L43P_6 |
| IOS42 | W4 | IO_L43N_6 |
| IOS51 | V6 | IO_L48P_6 |
| IOS49 | V7 | IO_L48N_6 |
| IOS53 | V5 | IO_L49P_6 |
| IOS47 | V4 | IO_L49N_6 |
| IOS48 | V3 | IO_L51P_6 |
| IOS50 | U7 | IO_L54P_6 |
| IOS56 | T7 | IO_L54N_6 |
| IOS54 | U4 | IO_L67P_6 |
| IOS55 | U3 | IO_L67N_6 |
| IOS52 | U6 | IO_L69P_6 |
| IOS58 | T5 | IO_L70P_6 |
| IOS57 | T6 | IO_L70N_6 |
| IOS59 | T8 | IO_L72P_6 |
| IOS60 | R8 | IO_L72N_6 |
| IOS61 | R7 | IO_L93P_6 |
| IOS62 | P6 | IO_L94P_6 |
| IOS63 | P5 | IO_L94N_6 |
| IOS64 | P4 | IO_L96P_6 |
| IOS65 | P3 | IO_L96N_6 |
| IOS66 | N4 | IO_L94P_7 |
| IOS72 | N5 | IO_L94N_7 |
| IOS71 | N7 | IO_L93N_7 |
| IOS69 | P8 | IO_L91P_7 |
| IOS70 | N8 | IO_L91N_7 |
| IOS75 | L5 | IO_L70P_7 |
| IOS74 | L6 | IO_L70N_7 |
| IOS76 | L4 | IO_L69N_7 |
| IOS67 | K3 | IO_L54P_7 |
| IOS77 | K4 | IO_L54N_7 |
| IOS79 | K5 | IO_L52P_7 |
| IOS86 | K6 | IO_L52N_7 |
| IOS73 | L7 | IO_L51N_7 |
| IOS68 | J3 | IO_L48P_7 |
| IOS78 | J4 | IO_L48N_7 |
| IOS80 | J5 | IO_L46P_7 |
| IOS87 | J6 | IO_L46N_7 |
| IOS82 | H4 | IO_L45N_7 |
| IOS84 | K7 | IO_L43P_7 |
| IOS85 | J7 | IO_L43N_7 |
| IOS83 | G3 | IO_L22P_7 |
| IOS81 | G4 | IO_L22N_7 |

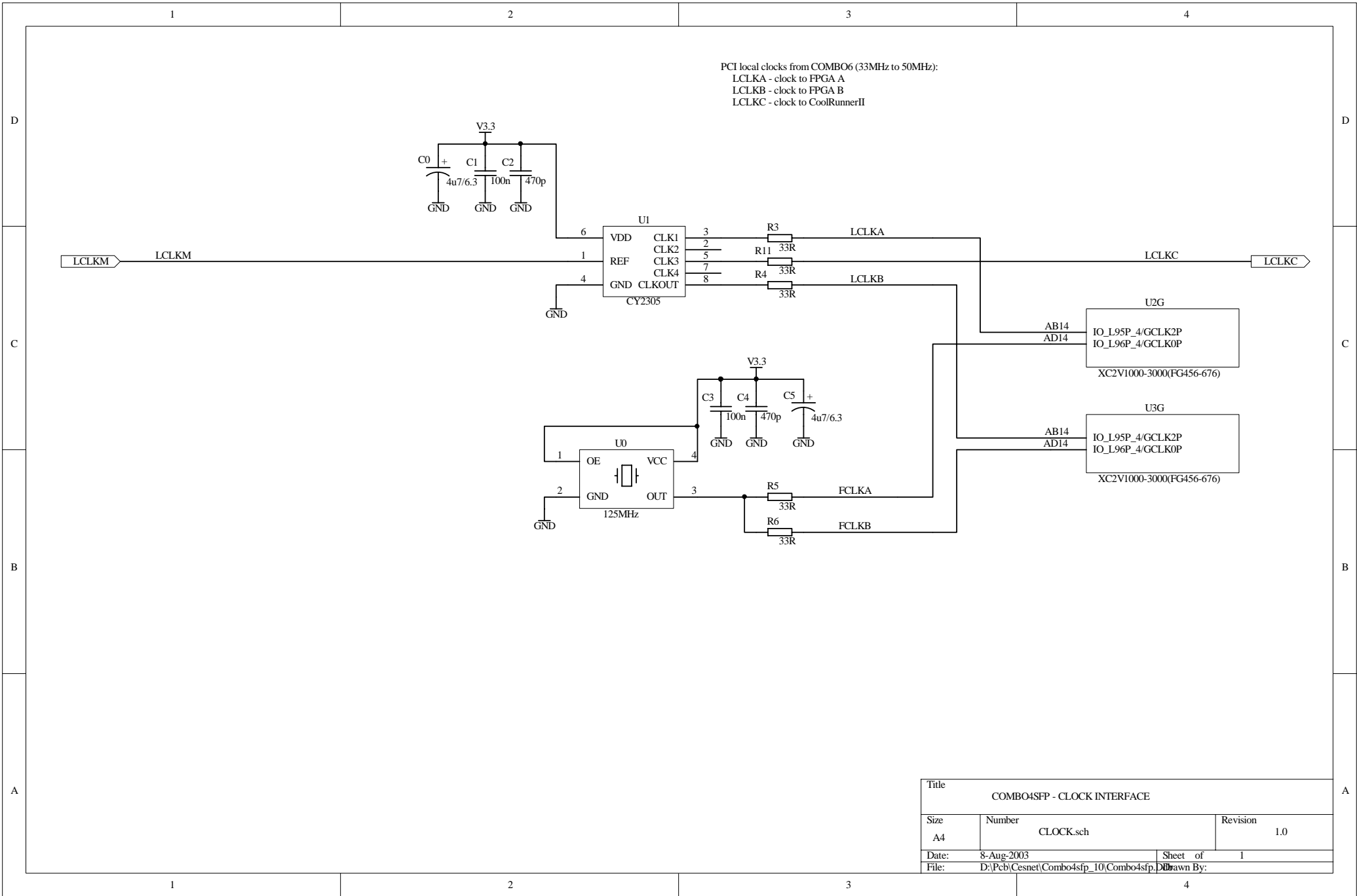
XC2V1000-3000(FG456-676)

| | | | |
|-------------------------------|--|--------------|----------|
| Title | | | |
| COMBO4SFP - IO FPGA INTERFACE | | | |
| Size | Number | FPGAIO_B.sch | Revision |
| A4 | | | 1.0 |
| Date: | 8-Aug-2003 | Sheet of | 17 |
| File: | D:\Pcb\Cesnet\Combo4sfp_10\Combo4sfp.D | | |
| Drawn By: | | | |

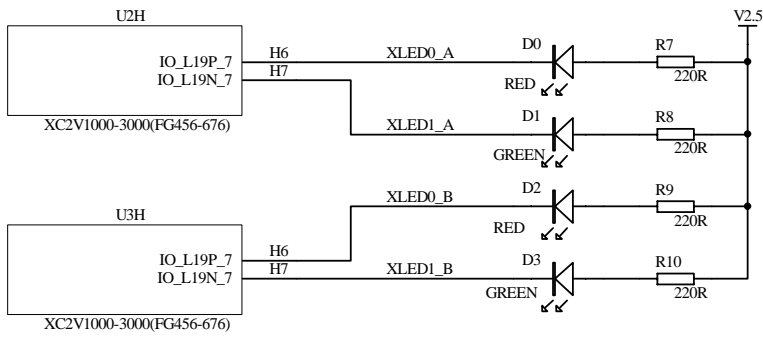
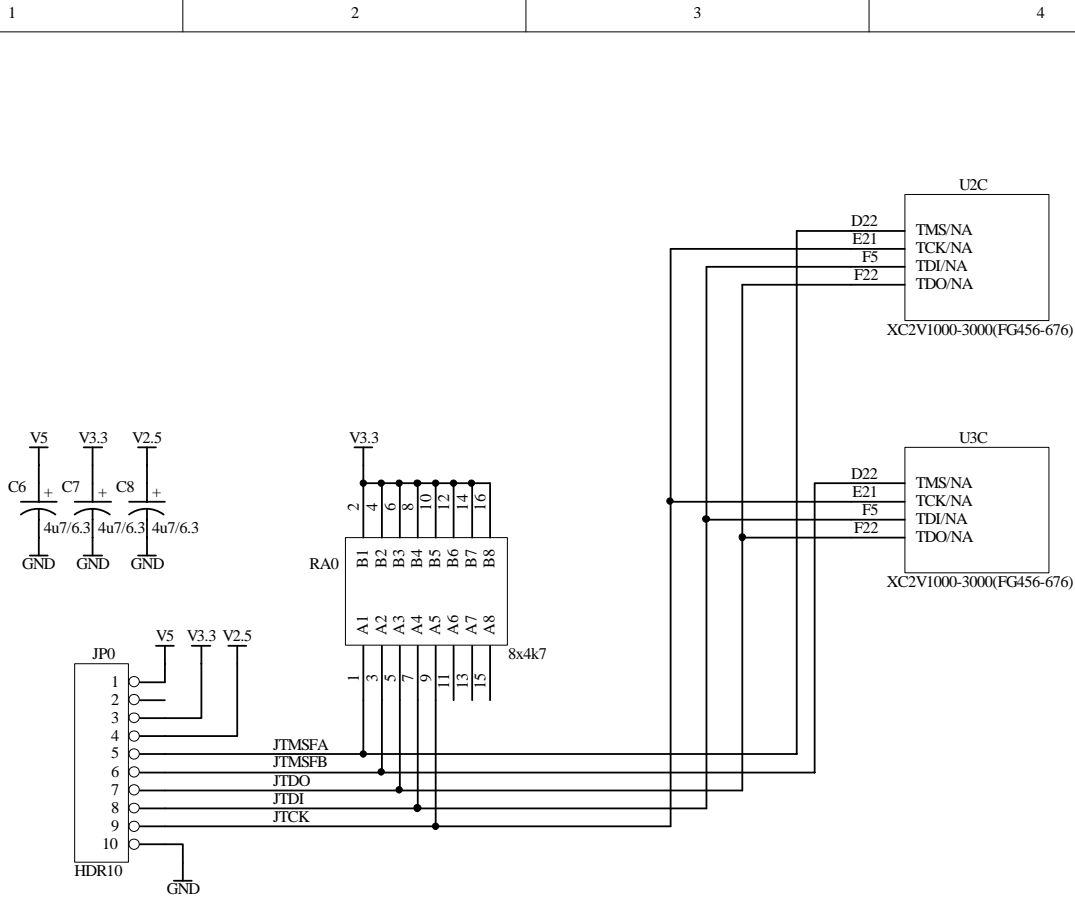


Pass voltage power through I/O pins
Do not use for I/O operations !!!

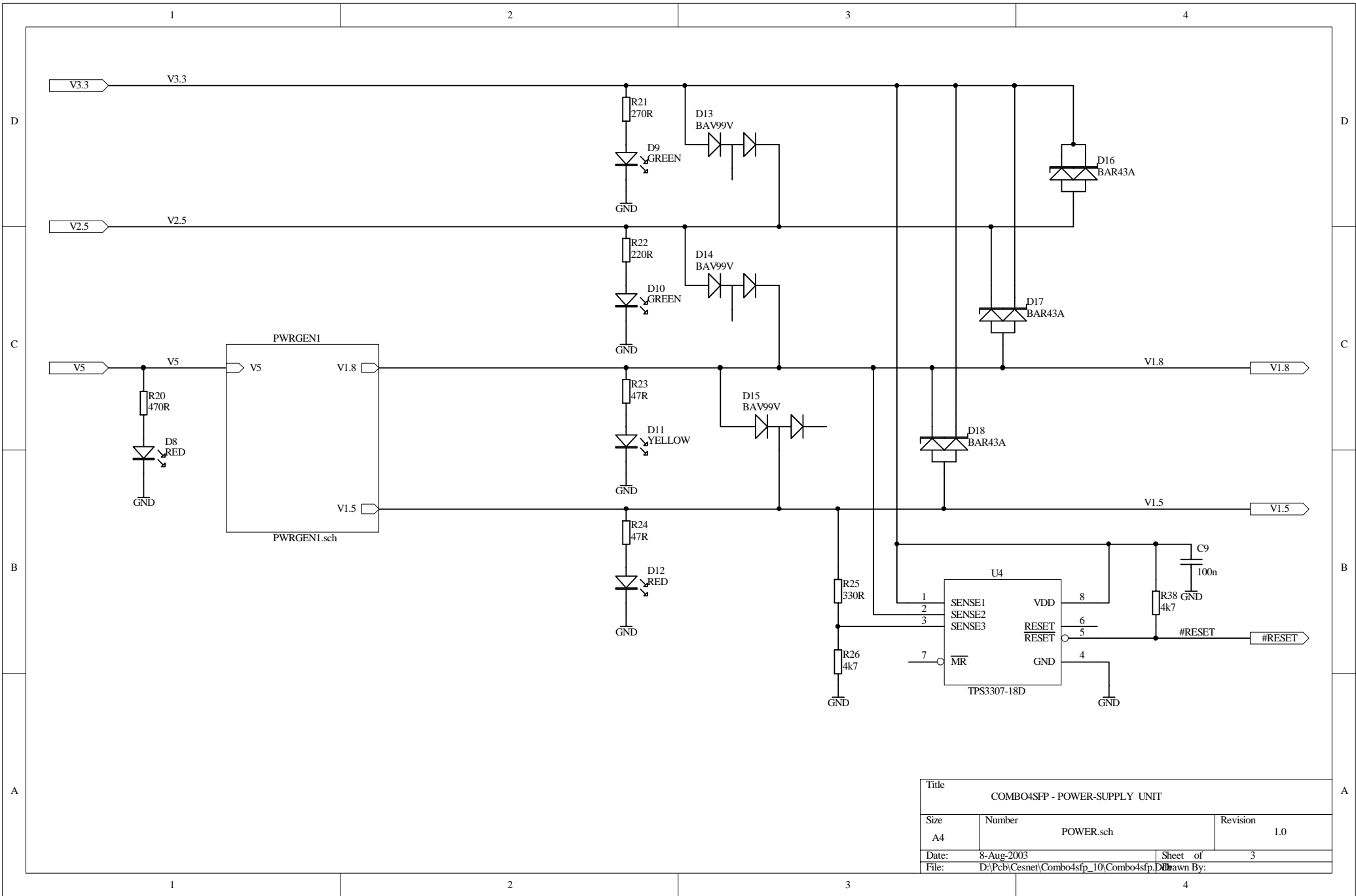
| Title | | | |
|--|--|--------------|----------|
| COMBO4SFP - POWER-SUPPLY UNIT FOR FPGA B | | | |
| Size | Number | PWRDST_B.sch | Revision |
| A3 | | | 1.0 |
| Date: | 8-Aug-2003 | Sheet of | 10 |
| File: | D:\Pcb\Csnet\Combo4sfp_10\Combo4sfp_10.dsn By: 4 | | |



| | | | |
|-----------------------------|--|----------|---|
| Title | | | |
| COMBO4SFP - CLOCK INTERFACE | | | |
| Size | Number | Revision | |
| A4 | CLOCK.sch | 1.0 | |
| Date: | 8-Aug-2003 | Sheet of | 1 |
| File: | D:\Pcb\Cesnet\Combo4sfp_10\Combo4sfp.D | | |

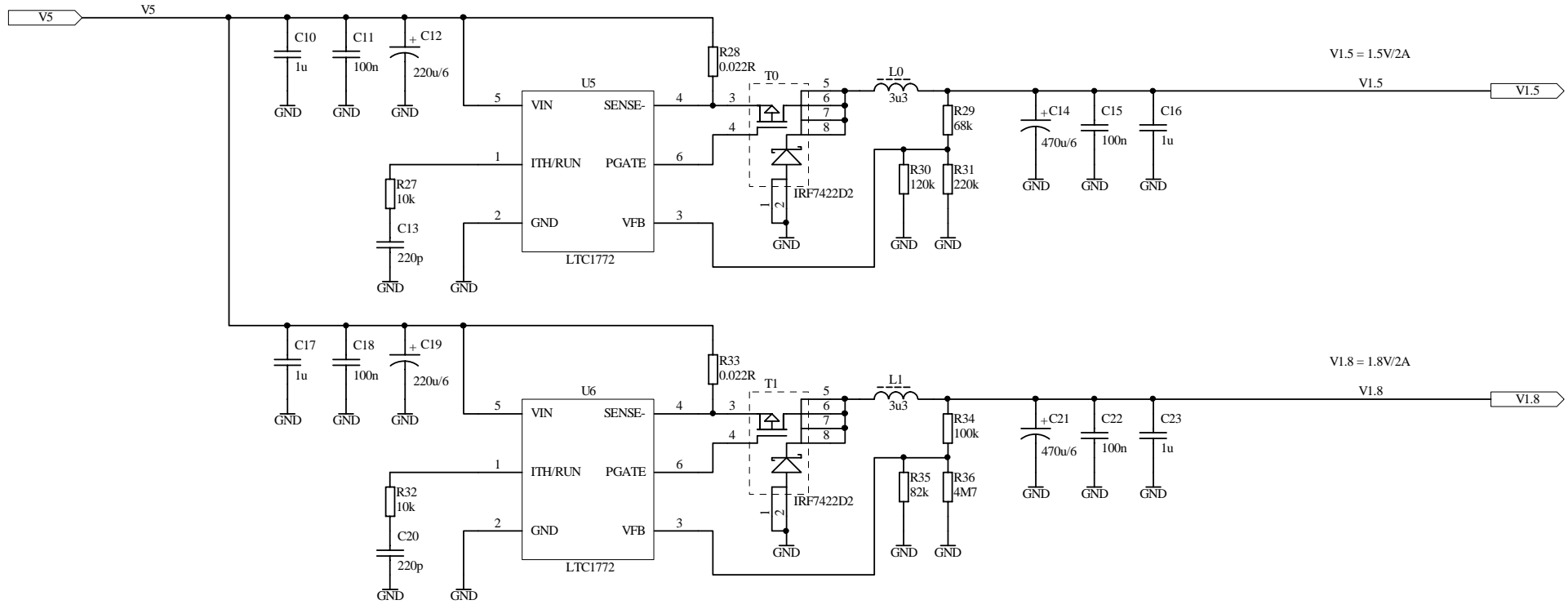


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|------------------------------------|---|----------|---|
| Title | | | |
| COMBO4SFP - JTAG AND LED INTERFACE | | | |
| Size | Number | Revision | |
| A4 | JTAG_LED.sch | 1.0 | |
| Date: | 8-Aug-2003 | Sheet of | 2 |
| File: | D:\Pcb\Cesnet\Combo4sfp_10\Combo4sfp_10.dwg | | |



| | | | |
|-------------------------------|--|----------|---|
| Title | | | |
| COMBO4SFP - POWER-SUPPLY UNIT | | | |
| Size | Number | Revision | |
| A4 | POWER.sch | 1.0 | |
| Date: | 8-Aug-2003 | Sheet of | 3 |
| File: | D:\Pcb\Cesnet\Combo4sfp_10\Combo4sfp.D | | |

Drawn By:



C12,C19 - AVX TPSD227M006R0100
 C14,C21 - AVX TPSV477M006R0055

| | | |
|-------------------------------------|--|------------|
| Title | | |
| COMBO4SFP - POWER-SUPPLY 1.8V, 1.5V | | |
| Size | Number | Revision |
| A4 | PWRGEN1.sch | 1.0 |
| Date: | 8-Aug-2003 | Sheet of 4 |
| File: | D:\Pcb\Cesnet\Combo4sfp_10\Combo4sfp.D | |