

8	7	6	5	4	3	2	1
E							E
D							D
C							C
B							B
A							A

PAGE 02: SRAMS

PAGE 03: FPGA PART1

PAGE 04: FPGA PART2

PAGE 05: FMC#1

PAGE 06: FMC#2

PAGE 07: CONFIGURATION

PAGE 08: CLOCK DISTRIBUTION 1 OF 2

PAGE 09: CLOCK DISTRIBUTION 2 OF 2

PAGE 10: FPGA TRANSCEIVERS

PAGE 11: BOARD MANAGEMENT

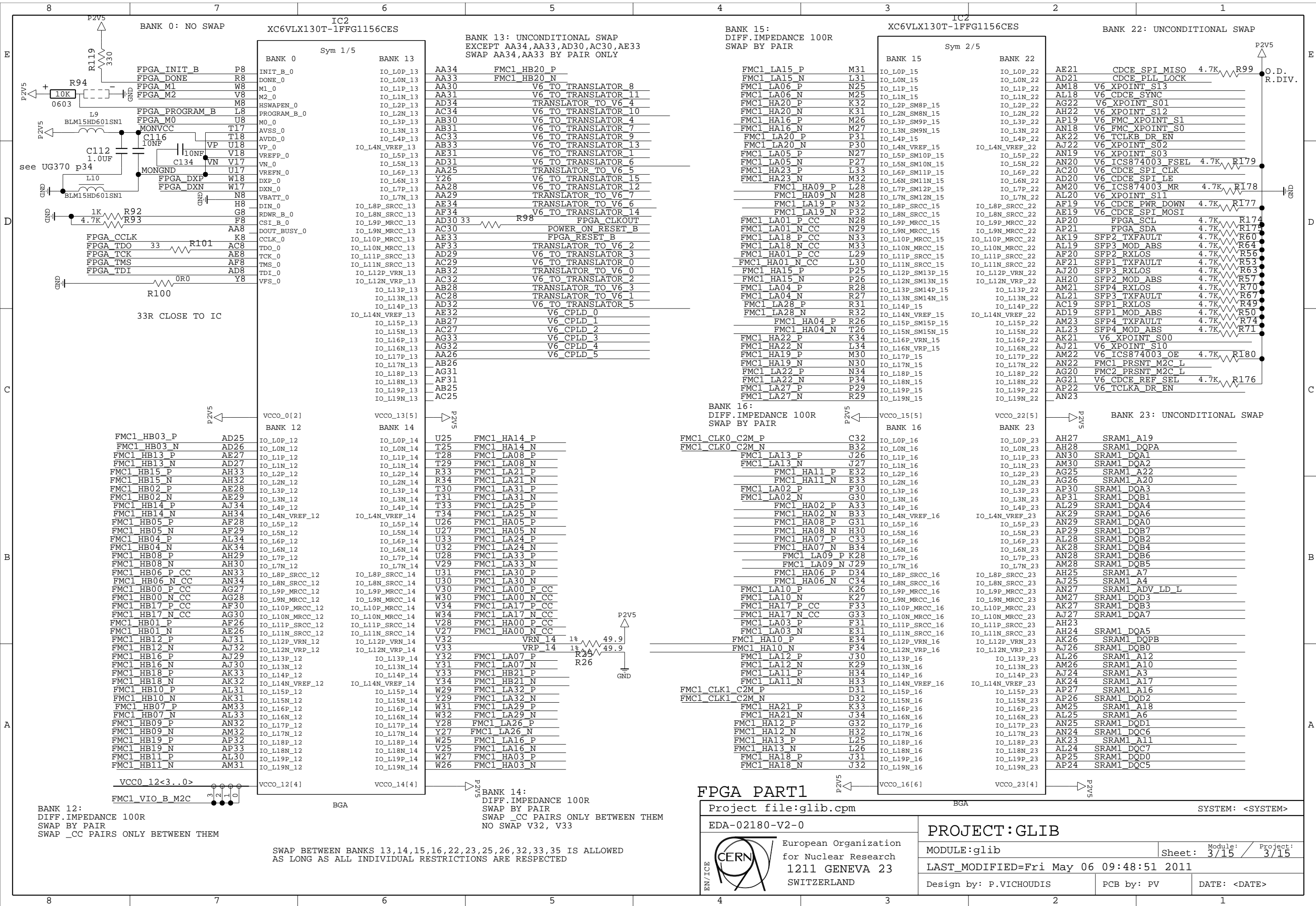
PAGE 12: GBE PHY

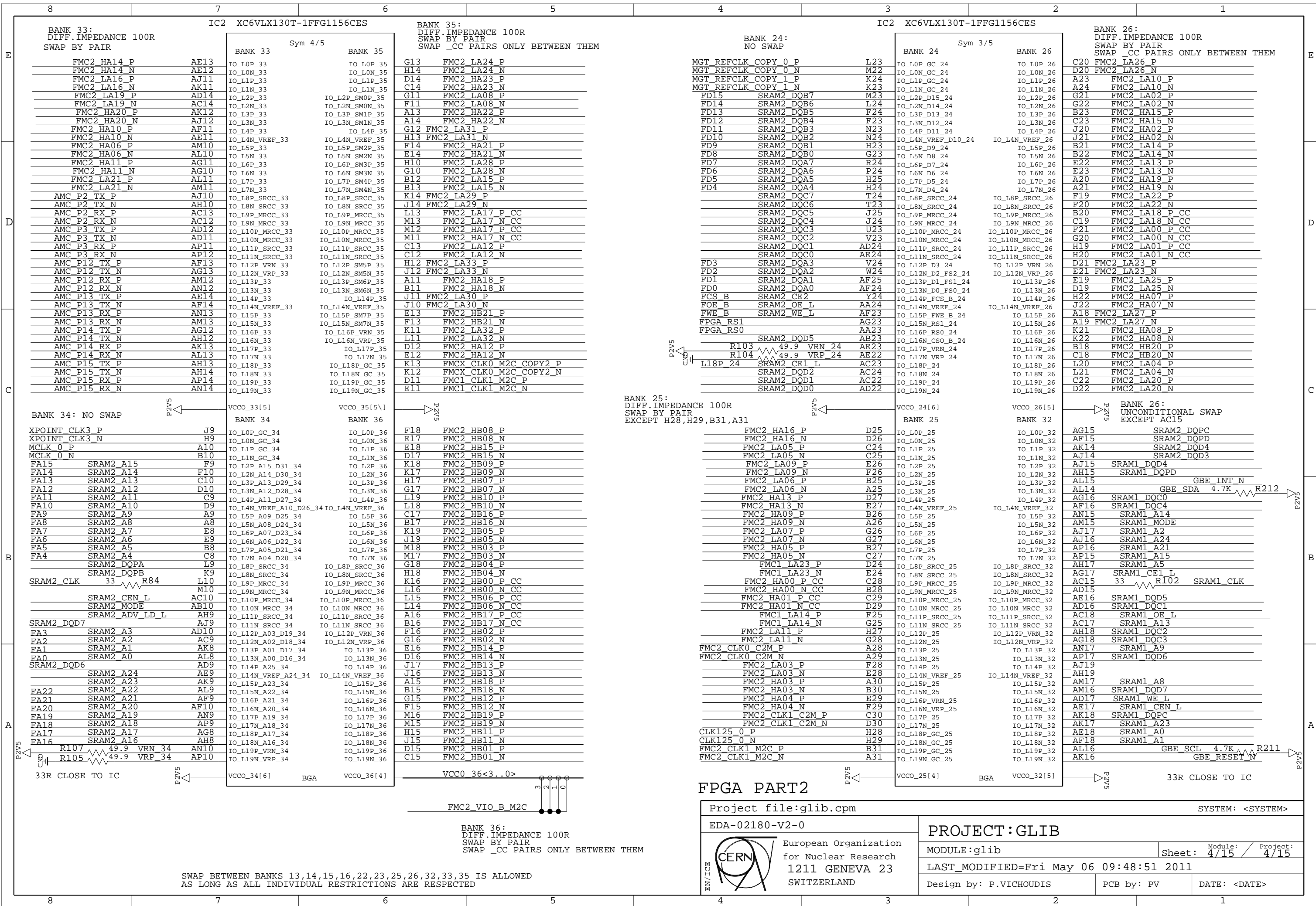
PAGE 13: FPGA DECOUPLING CAPACITORS

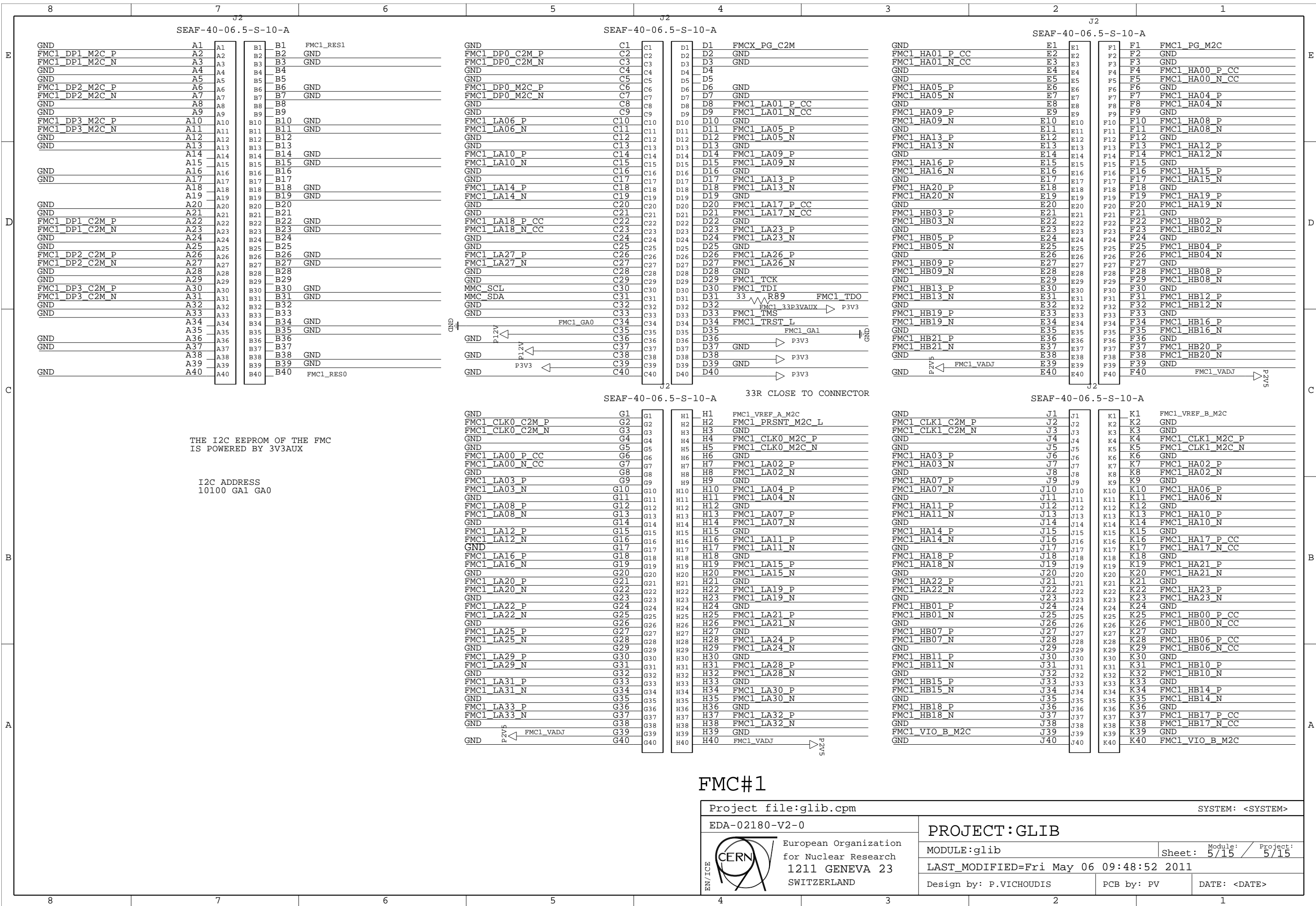
PAGE 14: MLVDS FOR MTCA.4 + LEVEL TRANSLATORS

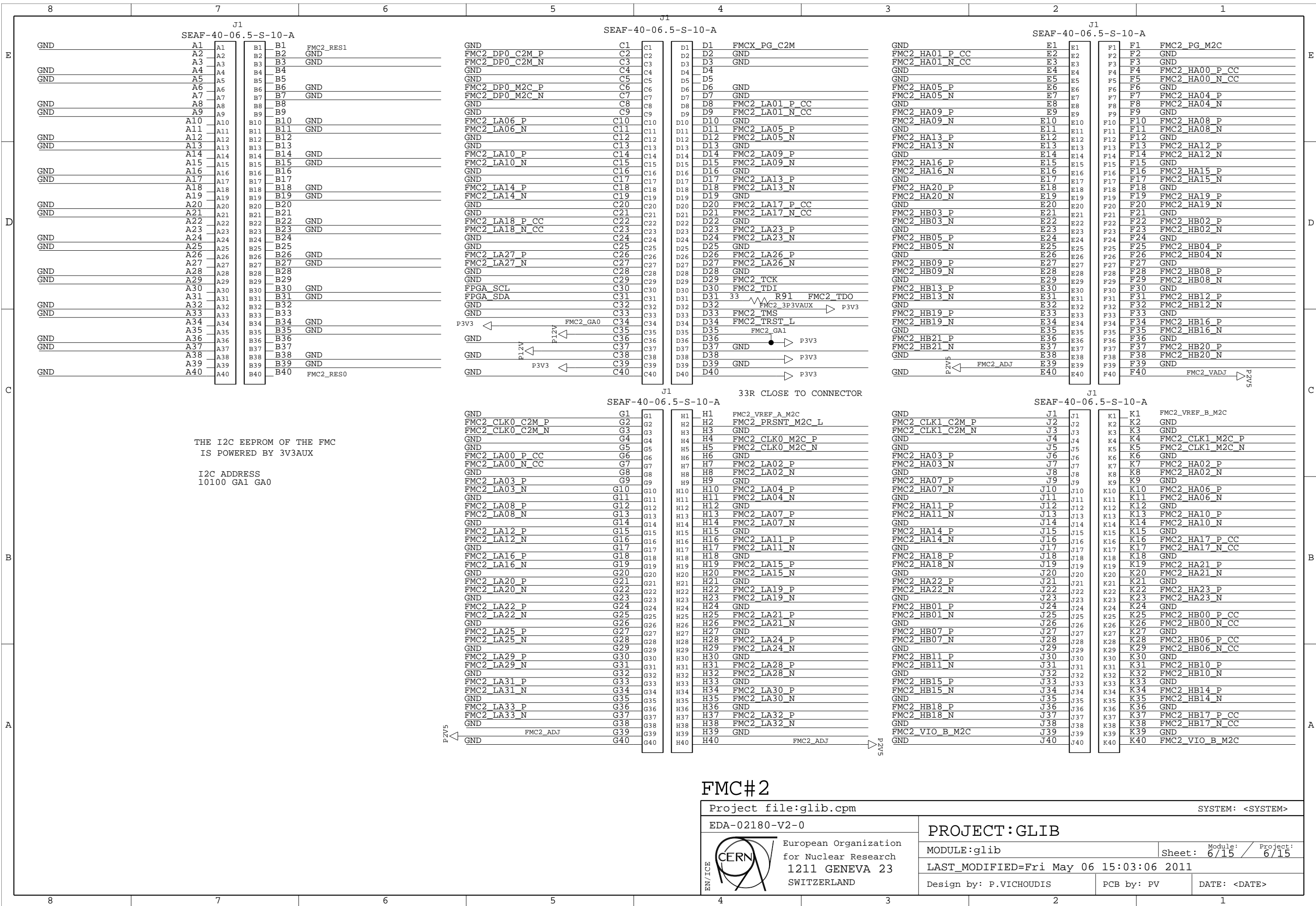
PAGE 15: POWERING

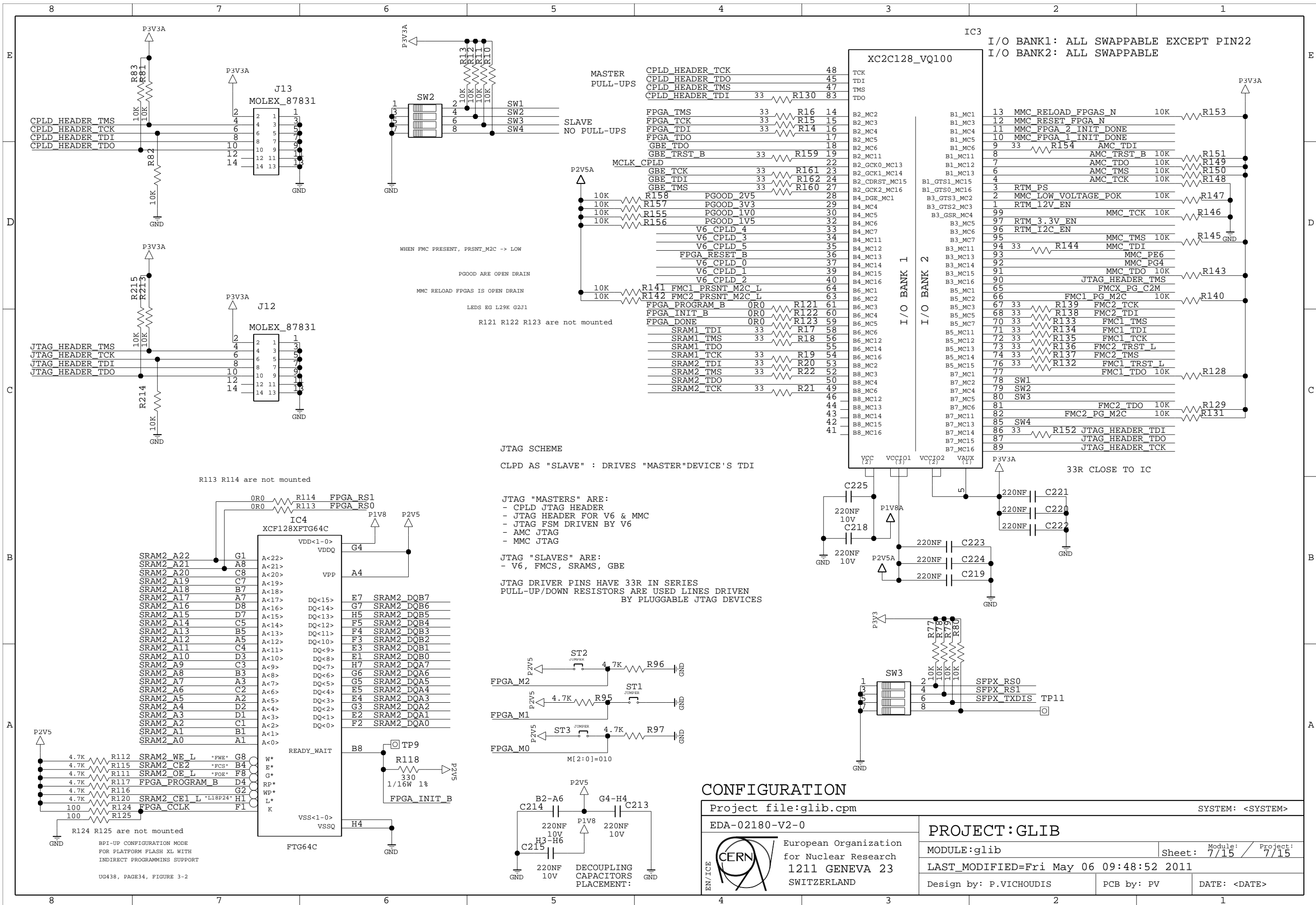






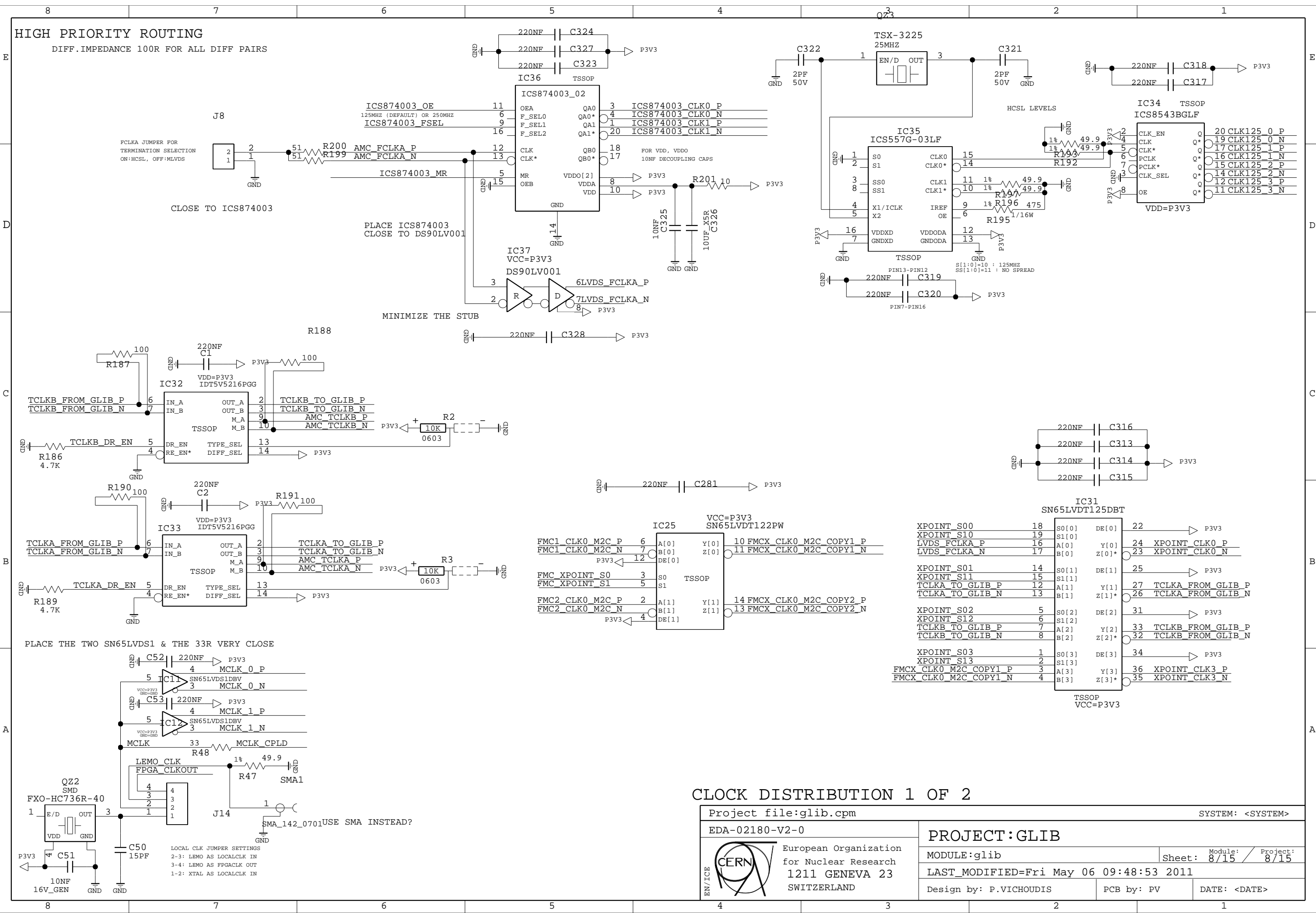






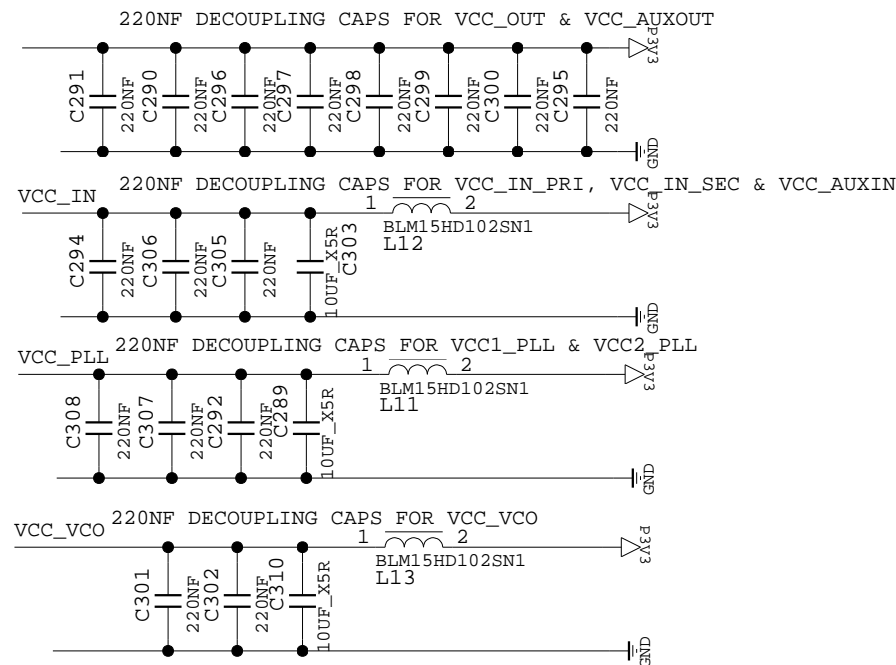
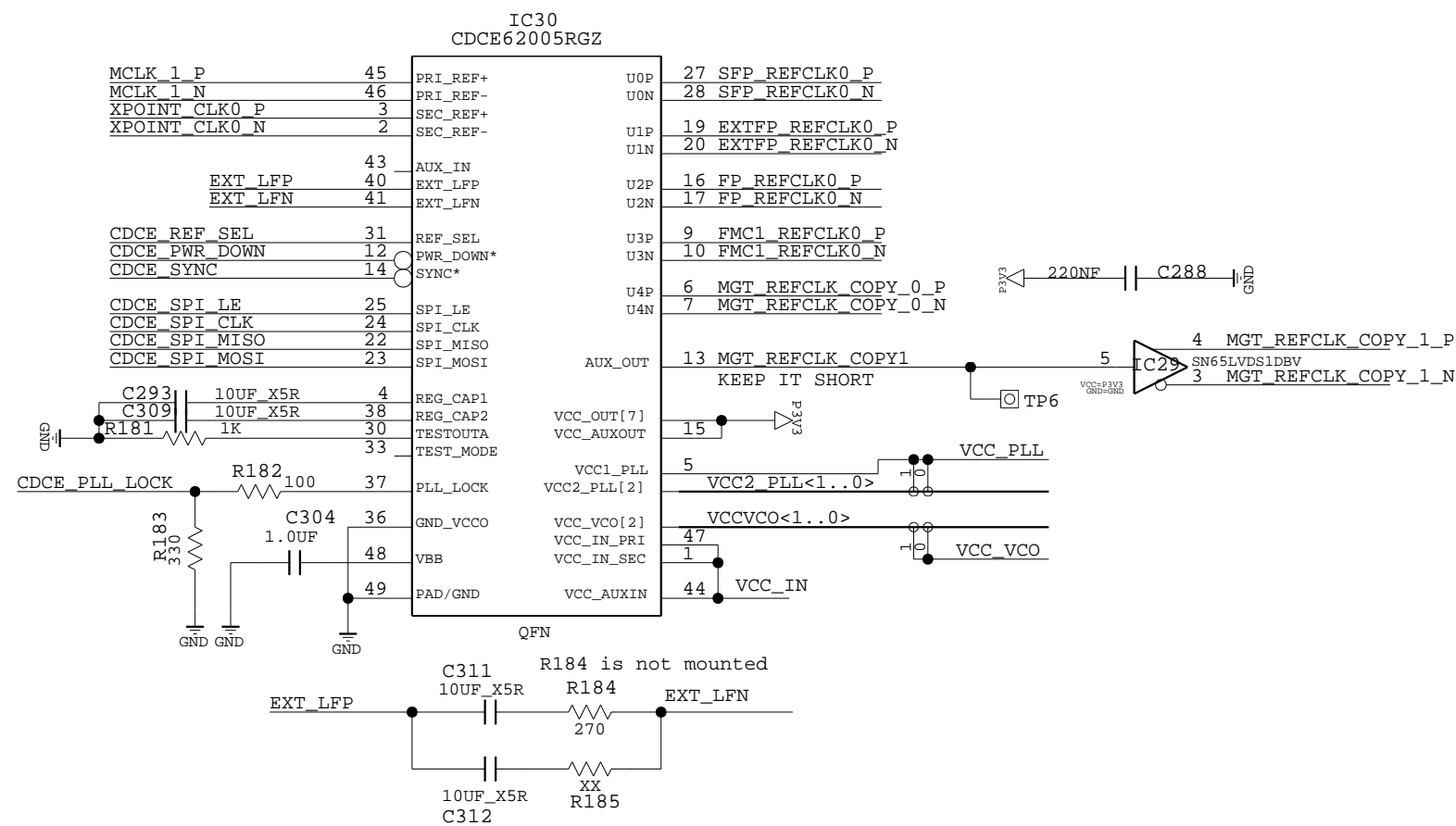
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DIFF.IMPEDANCE 100R FOR ALL DIFF PAIRS



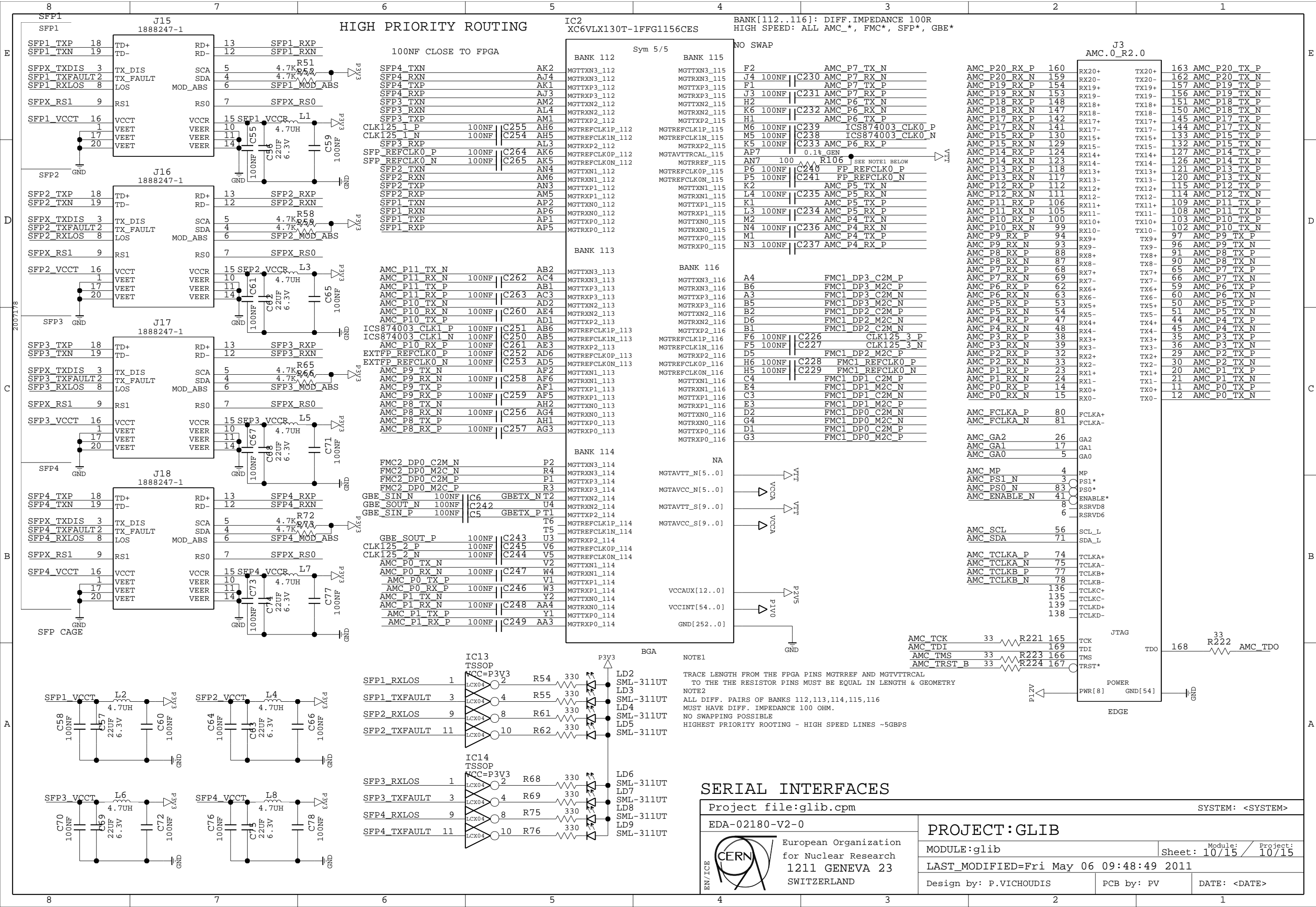


HIGH PRIORITY ROUTING

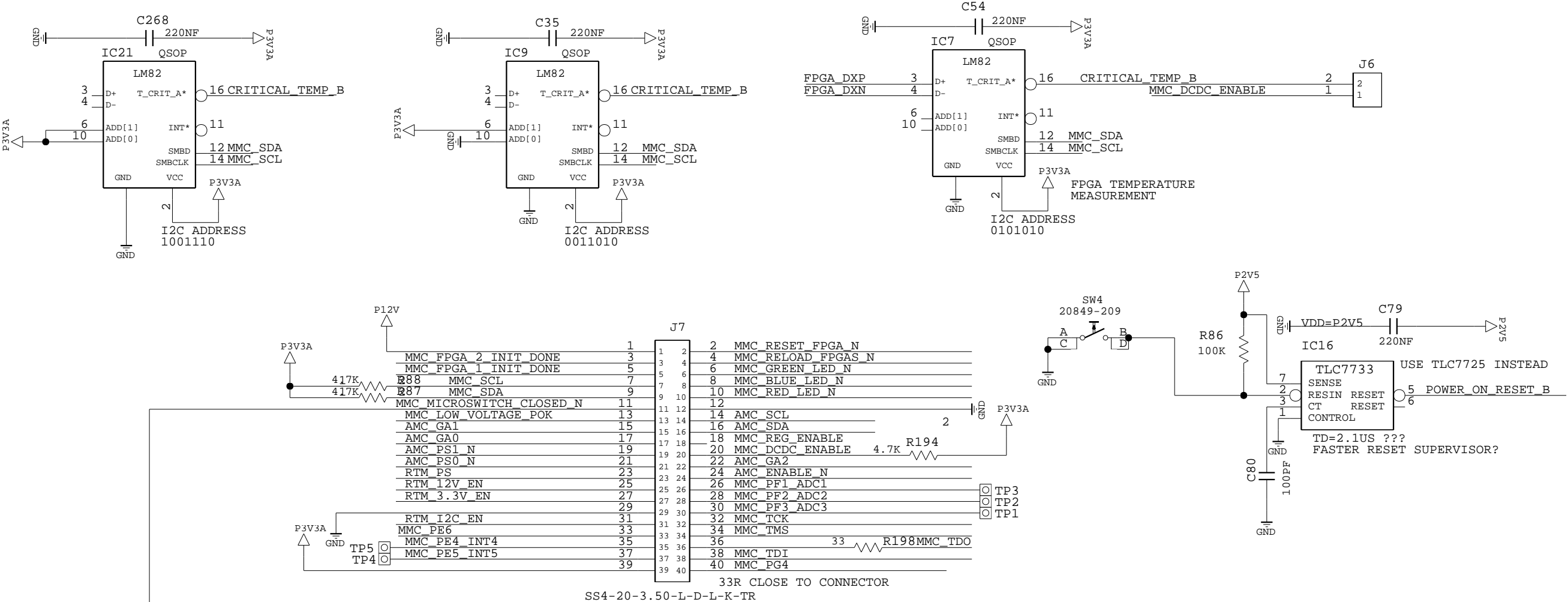


CLOCK DISTRIBUTION 2 OF 2

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EDA-02180-v2-0		PROJECT:GLIB	
	European Organization for Nuclear Research 1211 GENEVA 23 SWITZERLAND		Module: 9/15 / Project: 9/15
	LAST_MODIFIED=Fri May 06 09:48:53 2011		Sheet: 9/15 / Project: 9/15
	Design by: P.VICHOUDIS	PCB by: PV	DATE: <DATE>



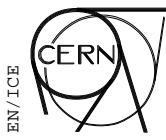
TRI-LEVEL I2C ADDRESSING

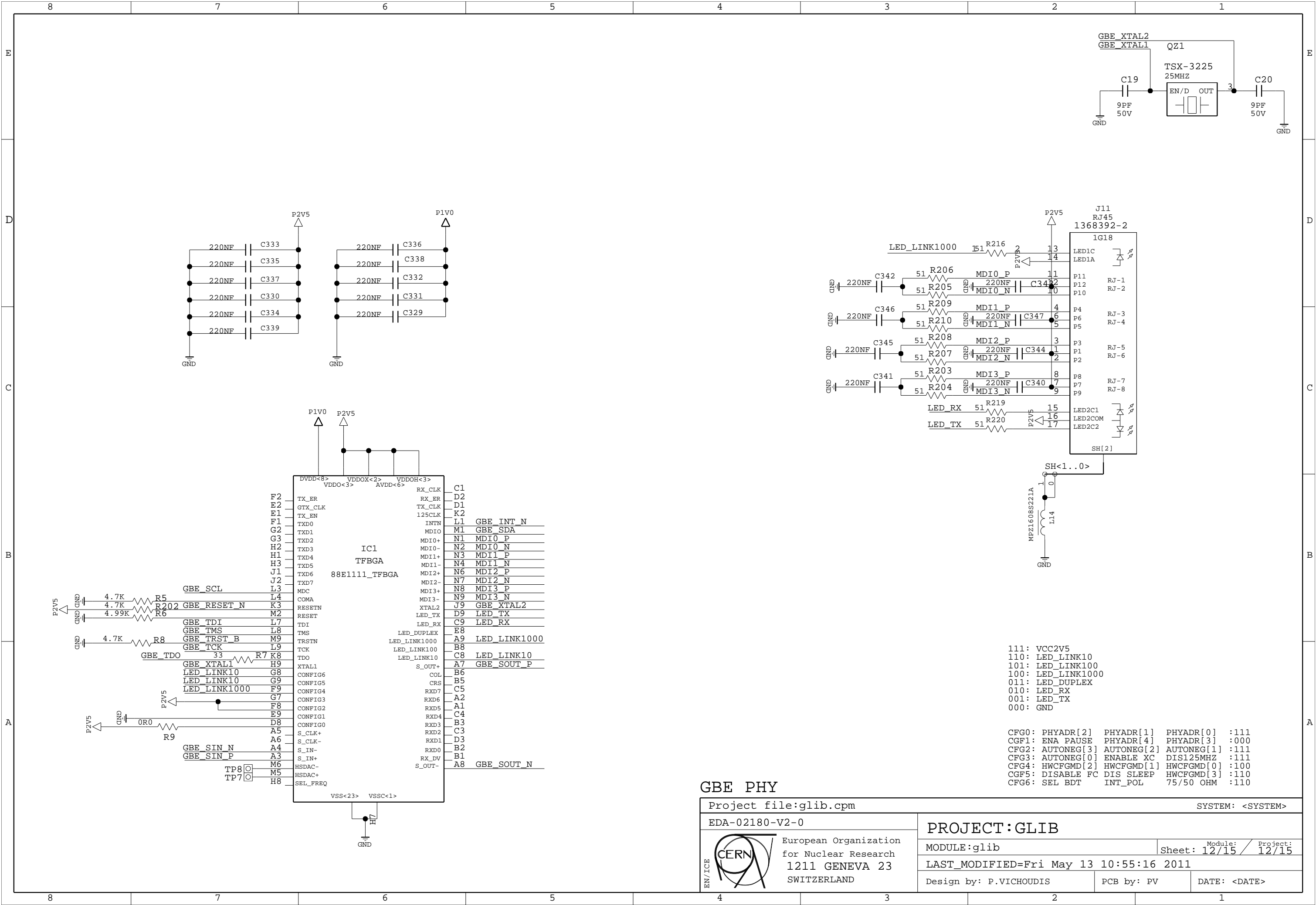


I2C ADDRESSING


I2CBUS1: I2C MASTER: MMC  
0101010: GLIB FPGA TEMPERATURE  
0011010: GLIB BOARD TEMPERATURE #1  
1001110: GLIB BOARD TEMPERATURE #2  
XXXXX00: FMC#1  
XXXXX11: FMC#2  
  
I2CBUS2: I2C MASTER: FPGA  
1010110: GLIB EEPROM

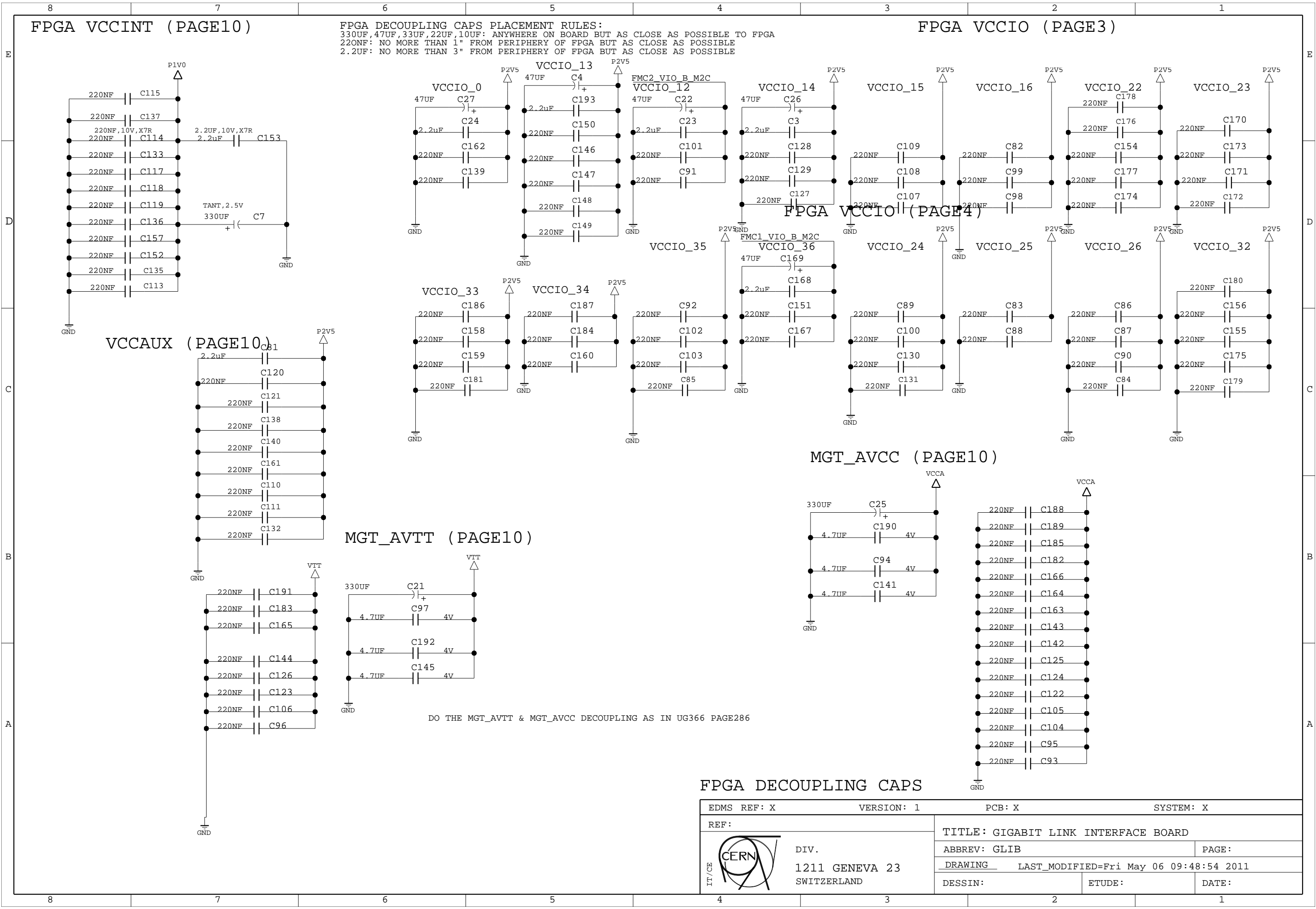
MODULE MANAGEMENT

Project file:glib.cpm		SYSTEM: <SYSTEM>	
EDA-02180-v2-0		PROJECT:GLIB	
	European Organization for Nuclear Research 1211 GENEVA 23 SWITZERLAND		Module: 11/15 / Project: 11/15
	LAST_MODIFIED=Fri May 06 15:03:42 2011		
	Design by: P.VICHOUDIS	PCB by: PV	DATE: <DATE>



## GBE PHY

Project file:glib.cpm		SYSTEM: <SYSTEM>	
EDA-02180-V2-0		PROJECT:GLIB	
	European Organization for Nuclear Research 1211 GENEVA 23 SWITZERLAND		Module: 12/15 / Project: 12/15
	LAST_MODIFIED=Fri May 13 10:55:16 2011		
	Design by: P.VICHOUDIS	PCB by: PV	DATE: <DATE>



8 7 6 5 4 3 2 1

FPGA VCCINT (PAGE10)

FPGA DECOUPLING CAPS PLACEMENT RULES:  
330UF,47UF,33UF,22UF,10UF: ANYWHERE ON BOARD BUT AS CLOSE AS POSSIBLE TO FPGA  
220NF: NO MORE THAN 1" FROM PERIPHERY OF FPGA BUT AS CLOSE AS POSSIBLE  
2.2UF: NO MORE THAN 3" FROM PERIPHERY OF FPGA BUT AS CLOSE AS POSSIBLE

FPGA VCCIO (PAGE3)

FPGA VCCIO (PAGE4)

VCCAUX (PAGE10)

MGT\_AVTT (PAGE10)

MGT\_AVCC (PAGE10)

FPGA DECOUPLING CAPS

EDMS REF: X VERSION: 1 PCB: X SYSTEM: X

REF:

CERN

DIV.  
1211 GENEVA 23  
SWITZERLAND

IT/CE

TITLE: GIGABIT LINK INTERFACE BOARD

ABBREV: GLIB

DRAWING

LAST\_MODIFIED=Fri May 06 09:48:54 2011

DESSIN:

ETUDE:

DATE:

8 7 6 5 4 3 2 1

The schematic diagram illustrates the decoupling capacitor placement for various power planes of a Gigabit Link Interface Board. The components are organized into several sections:

- FPGA VCCINT (PAGE10):** Shows a series of 220NF capacitors (C113-C157) connected to P1V0 and GND. A 330UF capacitor (C7) is connected to P1V0 and GND. A 2.2UF capacitor (C153) is connected to P1V0 and GND.
- FPGA VCCIO (PAGE3):** Shows a series of 220NF capacitors (C170-C179) connected to P2V5 and GND. A 47UF capacitor (C4) is connected to P2V5 and GND.
- FPGA VCCIO (PAGE4):** Shows a series of 220NF capacitors (C180-C189) connected to P2V5 and GND. A 47UF capacitor (C4) is connected to P2V5 and GND.
- VCCAUX (PAGE10):** Shows a series of 220NF capacitors (C120-C132) connected to P2V5 and GND. A 2.2UF capacitor (C81) is connected to P2V5 and GND.
- MGT\_AVTT (PAGE10):** Shows a series of 220NF capacitors (C191-C196) connected to VTT and GND. A 330UF capacitor (C21) is connected to VTT and GND.
- MGT\_AVCC (PAGE10):** Shows a series of 220NF capacitors (C188-C193) connected to VCCA and GND. A 330UF capacitor (C25) is connected to VCCA and GND.

The diagram also includes a title block with the following information:

- EDMS REF: X
- VERSION: 1
- PCB: X
- SYSTEM: X
- REF:
- CERN
- DIV. 1211 GENEVA 23 SWITZERLAND
- IT/CE
- TITLE: GIGABIT LINK INTERFACE BOARD
- ABBREV: GLIB
- DRAWING
- LAST\_MODIFIED=Fri May 06 09:48:54 2011
- DESSIN:
- ETUDE:
- DATE:

8 7 6 5 4 3 2 1

FPGA VCCINT (PAGE10)

FPGA DECOUPLING CAPS PLACEMENT RULES:  
330UF,47UF,33UF,22UF,10UF: ANYWHERE ON BOARD BUT AS CLOSE AS POSSIBLE TO FPGA  
220NF: NO MORE THAN 1" FROM PERIPHERY OF FPGA BUT AS CLOSE AS POSSIBLE  
2.2UF: NO MORE THAN 3" FROM PERIPHERY OF FPGA BUT AS CLOSE AS POSSIBLE

FPGA VCCIO (PAGE3)

FPGA VCCIO (PAGE4)

VCCAUX (PAGE10)

MGT\_AVTT (PAGE10)

MGT\_AVCC (PAGE10)

FPGA DECOUPLING CAPS

EDMS REF: X VERSION: 1 PCB: X SYSTEM: X

REF:

CERN

DIV.  
1211 GENEVA 23  
SWITZERLAND

IT/CE

TITLE: GIGABIT LINK INTERFACE BOARD

ABBREV: GLIB

DRAWING

LAST\_MODIFIED=Fri May 06 09:48:54 2011

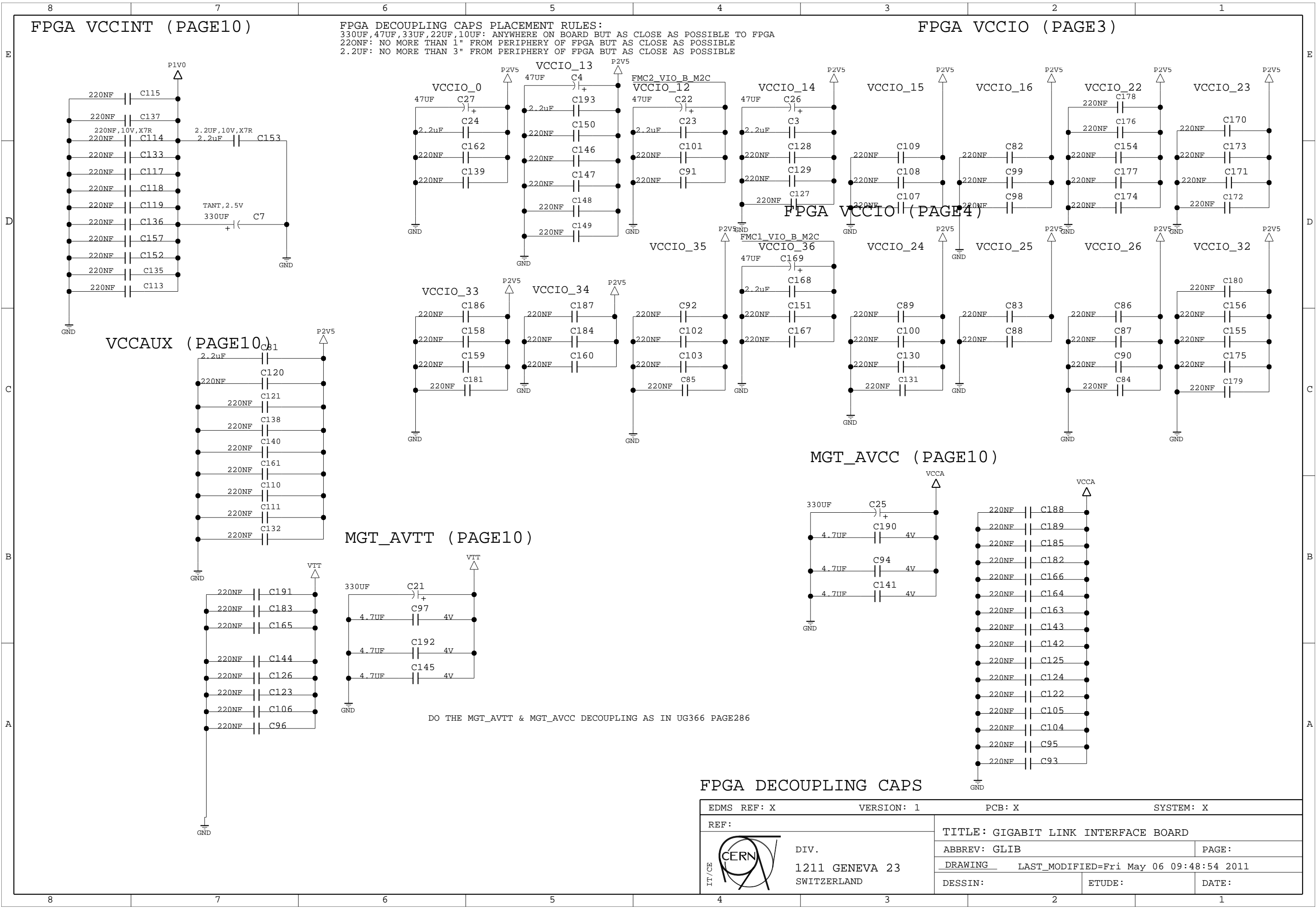
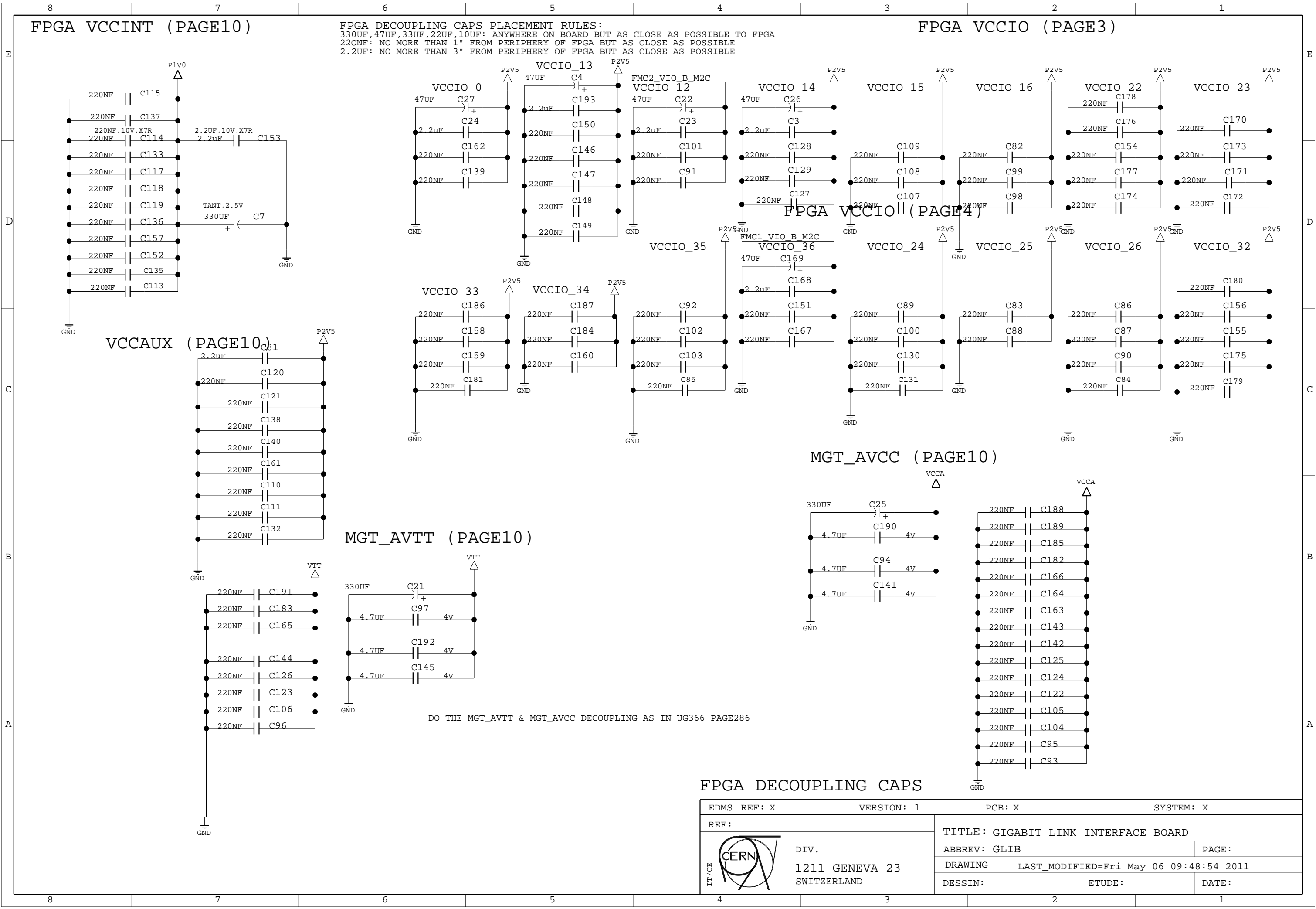
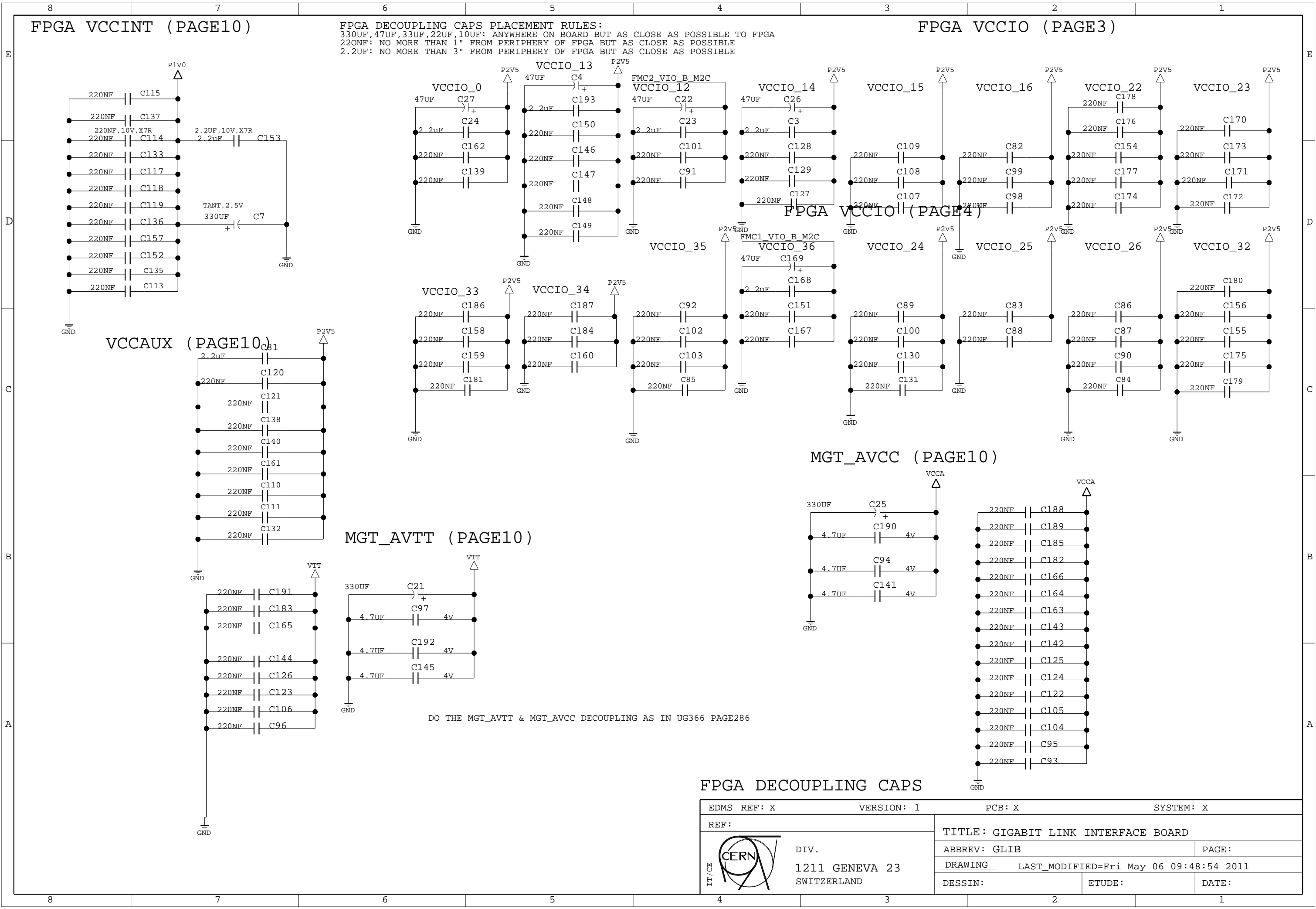
DESSIN:

ETUDE:

DATE:

8 7 6 5 4 3 2 1

The figure is a multi-page schematic diagram for a Gigabit Link Interface Board, specifically focusing on decoupling capacitor placement. It is organized into a grid with columns labeled 1 through 8 and rows labeled A through E. The main content area is divided into several sections, each representing a different power plane or component. The 'FPGA VCCINT (PAGE10)' section shows a vertical stack of capacitors (C113 to C157) connected to a P1V0 pin and a 330UF capacitor (C7) connected to a TANT, 2.5V source. The 'FPGA VCCIO (PAGE3)' and 'FPGA VCCIO (PAGE4)' sections show multiple columns of capacitors (C170 to C179, C180 to C189) connected to P2V5 pins. The 'VCCAUX (PAGE10)' section shows a vertical stack of capacitors (C110 to C132) connected to a P2V5 pin. The 'MGT\_AVTT (PAGE10)' section shows a vertical stack of capacitors (C96 to C191) connected to a VTT pin. The 'MGT\_AVCC (PAGE10)' section shows a vertical stack of capacitors (C93 to C141) connected to a VCCA pin. The 'FPGA DECOUPLING CAPS' section at the bottom provides a summary of the capacitor placement rules and a title block with project information. The title block includes fields for EDMS REF, VERSION, PCB, SYSTEM, REF, TITLE, ABBREV, DRAWING, LAST\_MODIFIED, DESSIN, ETUDE, and DATE. The project information is as follows: EDMS REF: X, VERSION: 1, PCB: X, SYSTEM: X, REF: (blank), TITLE: GIGABIT LINK INTERFACE BOARD, ABBREV: GLIB, DRAWING: (blank), LAST\_MODIFIED: Fri May 06 09:48:54 2011, DESSIN: (blank), ETUDE: (blank), DATE: (blank). The CERN logo is also present in the title block.



8 7 6 5 4 3 2 1

FPGA VCCINT (PAGE10)

FPGA DECOUPLING CAPS PLACEMENT RULES:  
330UF,47UF,33UF,22UF,10UF: ANYWHERE ON BOARD BUT AS CLOSE AS POSSIBLE TO FPGA  
220NF: NO MORE THAN 1" FROM PERIPHERY OF FPGA BUT AS CLOSE AS POSSIBLE  
2.2UF: NO MORE THAN 3" FROM PERIPHERY OF FPGA BUT AS CLOSE AS POSSIBLE

FPGA VCCIO (PAGE3)

FPGA VCCIO (PAGE4)

VCCAUX (PAGE10)

MGT\_AVTT (PAGE10)

MGT\_AVCC (PAGE10)

FPGA DECOUPLING CAPS

EDMS REF: X VERSION: 1 PCB: X SYSTEM: X

REF:

CERN

DIV.  
1211 GENEVA 23  
SWITZERLAND

IT/CE

TITLE: GIGABIT LINK INTERFACE BOARD

ABBREV: GLIB

DRAWING

LAST\_MODIFIED=Fri May 06 09:48:54 2011

DESSIN:

ETUDE:

DATE:

8 7 6 5 4 3 2 1

The figure is a multi-page schematic diagram for a Gigabit Link Interface Board, specifically focusing on decoupling capacitor placement. It is organized into a grid with horizontal labels 1 through 8 and vertical labels A through E. The diagram includes several sections: 1. **FPGA VCCINT (PAGE10)**: Shows a series of 220nF capacitors (C113-C157) connected to a P1V0 supply and a 330uF tantalum capacitor (C7) connected to a 2.5V supply. 2. **FPGA VCCIO (PAGE3)**: Shows decoupling for various VCCIO pins (0, 13, 12, 14, 15, 16, 22, 23, 35, 36, 33, 34, 24, 25, 26, 32) using 47uF, 2.2uF, and 220nF capacitors. 3. **FPGA VCCIO (PAGE4)**: Shows decoupling for additional VCCIO pins (24, 25, 26, 32) using 220nF capacitors. 4. **VCCAUX (PAGE10)**: Shows decoupling for the VCCAUX supply using 220nF capacitors (C81-C132). 5. **MGT\_AVTT (PAGE10)**: Shows decoupling for the MGT\_AVTT supply using 330uF, 4.7uF, and 220nF capacitors. 6. **MGT\_AVCC (PAGE10)**: Shows decoupling for the MGT\_AVCC supply using 330uF, 4.7uF, and 220nF capacitors. 7. **FPGA DECOUPLING CAPS**: A section detailing the placement rules for decoupling capacitors: 330uF, 47uF, 33uF, 22uF, and 10uF should be placed as close as possible to the FPGA; 220nF capacitors should be no more than 1 inch from the FPGA periphery; 2.2uF capacitors should be no more than 3 inches from the FPGA periphery. 8. **Title Block**: Located at the bottom right, it contains project information including EDMS REF: X, VERSION: 1, PCB: X, SYSTEM: X, REF:, CERN logo, DIV. 1211 GENEVA 23 SWITZERLAND, IT/CE, TITLE: GIGABIT LINK INTERFACE BOARD, ABBREV: GLIB, DRAWING, LAST\_MODIFIED=Fri May 06 09:48:54 2011, DESSIN:, ETUDE:, and DATE:.

8 7 6 5 4 3 2 1

FPGA VCCINT (PAGE10)

FPGA DECOUPLING CAPS PLACEMENT RULES:  
330UF,47UF,33UF,22UF,10UF: ANYWHERE ON BOARD BUT AS CLOSE AS POSSIBLE TO FPGA  
220NF: NO MORE THAN 1" FROM PERIPHERY OF FPGA BUT AS CLOSE AS POSSIBLE  
2.2UF: NO MORE THAN 3" FROM PERIPHERY OF FPGA BUT AS CLOSE AS POSSIBLE

FPGA VCCIO (PAGE3)

FPGA VCCIO (PAGE4)

VCCAUX (PAGE10)

MGT\_AVTT (PAGE10)

MGT\_AVCC (PAGE10)

FPGA DECOUPLING CAPS

EDMS REF: X VERSION: 1 PCB: X SYSTEM: X

REF:

CERN

DIV.  
1211 GENEVA 23  
SWITZERLAND

IT/CE

TITLE: GIGABIT LINK INTERFACE BOARD

ABBREV: GLIB

DRAWING

LAST\_MODIFIED=Fri May 06 09:48:54 2011

DESSIN:

ETUDE:

DATE:

8 7 6 5 4 3 2 1

The figure is a multi-page schematic diagram for a Gigabit Link Interface Board, detailing the placement of decoupling capacitors for various power planes. The pages are labeled 1 through 8, with page 1 at the top right and page 8 at the bottom left. The components shown include:

- VCCINT (PAGE10):** Decoupling capacitors for the FPGA internal power supply, including 220NF capacitors (C113-C157) and a 330UF capacitor (C7) connected to a 2.5V tantalum capacitor (TANT).
- VCCIO (PAGE3 & PAGE4):** Decoupling capacitors for the FPGA I/O power supply, including 47UF capacitors (C2, C4, C12, C14, C16, C18, C20, C22, C24, C26, C28, C30, C32, C34, C36, C38, C40, C42, C44, C46, C48, C50, C52, C54, C56, C58, C60, C62, C64, C66, C68, C70, C72, C74, C76, C78, C80, C82, C84, C86, C88, C90, C92, C94, C96, C98, C100, C102, C104, C106, C108, C110, C112, C114, C116, C118, C120, C122, C124, C126, C128, C130, C132, C134, C136, C138, C140, C142, C144, C146, C148, C150, C152, C154, C156, C158, C160, C162, C164, C166, C168, C170, C172, C174, C176, C178, C180, C182, C184, C186, C188, C190, C192, C194, C196, C198, C200, C202, C204, C206, C208, C210, C212, C214, C216, C218, C220, C222, C224, C226, C228, C230, C232, C234, C236, C238, C240, C242, C244, C246, C248, C250, C252, C254, C256, C258, C260, C262, C264, C266, C268, C270, C272, C274, C276, C278, C280, C282, C284, C286, C288, C290, C292, C294, C296, C298, C300, C302, C304, C306, C308, C310, C312, C314, C316, C318, C320, C322, C324, C326, C328, C330, C332, C334, C336, C338, C340, C342, C344, C346, C348, C350, C352, C354, C356, C358, C360, C362, C364, C366, C368, C370, C372, C374, C376, C378, C380, C382, C384, C386, C388, C390, C392, C394, C396, C398, C400, C402, C404, C406, C408, C410, C412, C414, C416, C418, C420, C422, C424, C426, C428, C430, C432, C434, C436, C438, C440, C442, C444, C446, C448, C450, C452, C454, C456, C458, C460, C462, C464, C466, C468, C470, C472, C474, C476, C478, C480, C482, C484, C486, C488, C490, C492, C494, C496, C498, C500, C502, C504, C506, C508, C510, C512, C514, C516, C518, C520, C522, C524, C526, C528, C530, C532, C534, C536, C538, C540, C542, C544, C546, C548, C550, C552, C554, C556, C558, C560, C562, C564, C566, C568, C570, C572, C574, C576, C578, C580, C582, C584, C586, C588, C590, C592, C594, C596, C598, C600, C602, C604, C606, C608, C610, C612, C614, C616, C618, C620, C622, C624, C626, C628, C630, C632, C634, C636, C638, C640, C642, C644, C646, C648, C650, C652, C654, C656, C658, C660, C662, C664, C666, C668, C670, C672, C674, C676, C678, C680, C682, C684, C686, C688, C690, C692, C694, C696, C698, C700, C702, C704, C706, C708, C710, C712, C714, C716, C718, C720, C722, C724, C726, C728, C730, C732, C734, C736, C738, C740, C742, C744, C746, C748, C750, C752, C754, C756, C758, C760, C762, C764, C766, C768, C770, C772, C774, C776, C778, C780, C782, C784, C786, C788, C790, C792, C794, C796, C798, C800, C802, C804, C806, C808, C810, C812, C814, C816, C818, C820, C822, C824, C826, C828, C830, C832, C834, C836, C838, C840, C842, C844, C846, C848, C850, C852, C854, C856, C858, C860, C862, C864, C866, C868, C870, C872, C874, C876, C878, C880, C882, C884, C886, C888, C890, C892, C894, C896, C898, C900, C902, C904, C906, C908, C910, C912, C914, C916, C918, C920, C922, C924, C926, C928, C930, C932, C934, C936, C938, C940, C942, C944, C946, C948, C950, C952, C954, C956, C958, C960, C962, C964, C966, C968, C970, C972, C974, C976, C978, C980, C982, C984, C986, C988, C990, C992, C994, C996, C998, C1000, C1002, C1004, C1006, C1008, C1010, C1012, C1014, C1016, C1018, C1020, C1022, C1024, C1026, C1028, C1030, C1032, C1034, C1036, C1038, C1040, C1042, C1044, C1046, C1048, C1050, C1052, C1054, C1056, C1058, C1060, C1062, C1064, C1066, C1068, C1070, C1072, C1074, C1076, C1078, C1080, C1082, C1084, C1086, C1088, C1090, C1092, C1094, C1096, C1098, C1100, C1102, C1104, C1106, C1108, C1110, C1112, C1114, C1116, C1118, C1120, C1122, C1124, C1126, C1128, C1130, C1132, C1134, C1136, C1138, C1140, C1142, C1144, C1146, C1148, C1150, C1152, C1154, C1156, C1158, C1160, C1162, C1164, C1166, C1168, C1170, C1172, C1174, C1176, C1178, C1180, C1182, C1184, C1186, C1188, C1190, C1192, C1194, C1196, C1198, C1200, C1202, C1204, C1206, C1208, C1210, C1212, C1214, C1216, C1218, C1220, C1222, C1224, C1226, C1228, C1230, C1232, C1234, C1236, C1238, C1240, C1242, C1244, C1246, C1248, C1250, C1252, C1254, C1256, C1258, C1260, C1262, C1264, C1266, C1268, C1270, C1272, C1274, C1276, C1278, C1280, C1282, C1284, C1286, C1288, C1290, C1292, C1294, C1296, C1298, C1300, C1302, C1304, C1306, C1308, C1310, C1312, C1314, C1316, C1318, C1320, C1322, C1324, C1326, C1328, C1330, C1332, C1334, C1336, C1338, C1340, C1342, C1344, C13

8 7 6 5 4 3 2 1

FPGA VCCINT (PAGE10)

FPGA DECOUPLING CAPS PLACEMENT RULES:  
330UF,47UF,33UF,22UF,10UF: ANYWHERE ON BOARD BUT AS CLOSE AS POSSIBLE TO FPGA  
220NF: NO MORE THAN 1" FROM PERIPHERY OF FPGA BUT AS CLOSE AS POSSIBLE  
2.2UF: NO MORE THAN 3" FROM PERIPHERY OF FPGA BUT AS CLOSE AS POSSIBLE

FPGA VCCIO (PAGE3)

FPGA VCCIO (PAGE4)

VCCAUX (PAGE10)

MGT\_AVTT (PAGE10)

MGT\_AVCC (PAGE10)

FPGA DECOUPLING CAPS

EDMS REF: X VERSION: 1 PCB: X SYSTEM: X

REF:

CERN

DIV.  
1211 GENEVA 23  
SWITZERLAND

IT/CE

TITLE: GIGABIT LINK INTERFACE BOARD

ABBREV: GLIB

DRAWING

LAST\_MODIFIED=Fri May 06 09:48:54 2011

DESSIN:

ETUDE:

DATE:

8 7 6 5 4 3 2 1

The figure is a multi-page schematic diagram for a Gigabit Link Interface Board, detailing the placement of decoupling capacitors for various power planes. The pages are labeled 1 through 8, with page 1 at the top right and page 8 at the bottom left. The components shown include:

- VCCINT (PAGE10):** Decoupling capacitors for the FPGA internal power supply, including 220NF capacitors (C113-C157) and a 330UF capacitor (C7) connected to a 2.5V tantalum capacitor (TANT).
- VCCIO (PAGE3 & PAGE4):** Decoupling capacitors for the FPGA I/O power supply, including 47UF capacitors (C4, C22, C23, C26, C27, C28, C29, C30, C31, C32, C33, C34, C35, C36, C37, C38, C39, C40, C41, C42, C43, C44, C45, C46, C47, C48, C49, C50, C51, C52, C53, C54, C55, C56, C57, C58, C59, C60, C61, C62, C63, C64, C65, C66, C67, C68, C69, C70, C71, C72, C73, C74, C75, C76, C77, C78, C79, C80, C81, C82, C83, C84, C85, C86, C87, C88, C89, C90, C91, C92, C93, C94, C95, C96, C97, C98, C99, C100, C101, C102, C103, C104, C105, C106, C107, C108, C109, C110, C111, C112, C113, C114, C115, C116, C117, C118, C119, C120, C121, C122, C123, C124, C125, C126, C127, C128, C129, C130, C131, C132, C133, C134, C135, C136, C137, C138, C139, C140, C141, C142, C143, C144, C145, C146, C147, C148, C149, C150, C151, C152, C153, C154, C155, C156, C157, C158, C159, C160, C161, C162, C163, C164, C165, C166, C167, C168, C169, C170, C171, C172, C173, C174, C175, C176, C177, C178, C179, C180, C181, C182, C183, C184, C185, C186, C187, C188, C189, C190, C191, C192, C193, C194, C195, C196, C197, C198, C199, C200, C201, C202, C203, C204, C205, C206, C207, C208, C209, C210, C211, C212, C213, C214, C215, C216, C217, C218, C219, C220, C221, C222, C223, C224, C225, C226, C227, C228, C229, C230, C231, C232, C233, C234, C235, C236, C237, C238, C239, C240, C241, C242, C243, C244, C245, C246, C247, C248, C249, C250, C251, C252, C253, C254, C255, C256, C257, C258, C259, C260, C261, C262, C263, C264, C265, C266, C267, C268, C269, C270, C271, C272, C273, C274, C275, C276, C277, C278, C279, C280, C281, C282, C283, C284, C285, C286, C287, C288, C289, C290, C291, C292, C293, C294, C295, C296, C297, C298, C299, C300, C301, C302, C303, C304, C305, C306, C307, C308, C309, C310, C311, C312, C313, C314, C315, C316, C317, C318, C319, C320, C321, C322, C323, C324, C325, C326, C327, C328, C329, C330, C331, C332, C333, C334, C335, C336, C337, C338, C339, C340, C341, C342, C343, C344, C345, C346, C347, C348, C349, C350, C351, C352, C353, C354, C355, C356, C357, C358, C359, C360, C361, C362, C363, C364, C365, C366, C367, C368, C369, C370, C371, C372, C373, C374, C375, C376, C377, C378, C379, C380, C381, C382, C383, C384, C385, C386, C387, C388, C389, C390, C391, C392, C393, C394, C395, C396, C397, C398, C399, C400, C401, C402, C403, C404, C405, C406, C407, C408, C409, C410, C411, C412, C413, C414, C415, C416, C417, C418, C419, C420, C421, C422, C423, C424, C425, C426, C427, C428, C429, C430, C431, C432, C433, C434, C435, C436, C437, C438, C439, C440, C441, C442, C443, C444, C445, C446, C447, C448, C449, C450, C451, C452, C453, C454, C455, C456, C457, C458, C459, C460, C461, C462, C463, C464, C465, C466, C467, C468, C469, C470, C471, C472, C473, C474, C475, C476, C477, C478, C479, C480, C481, C482, C483, C484, C485, C486, C487, C488, C489, C490, C491, C492, C493, C494, C495, C496, C497, C498, C499, C500, C501, C502, C503, C504, C505, C506, C507, C508, C509, C510, C511, C512, C513, C514, C515, C516, C517, C518, C519, C520, C521, C522, C523, C524, C525, C526, C527, C528, C529, C530, C531, C532, C533, C534, C535, C536, C537, C538, C539, C540, C541, C542, C543, C544, C545, C546, C547, C548, C549, C550, C551, C552, C553, C554, C555, C556, C557, C558, C559, C560, C561, C562, C563, C564, C565, C566, C567, C568, C569, C570, C571, C572, C573, C574, C575, C576, C577, C578, C579, C580, C581, C582, C583, C584, C585, C586, C587, C588, C589, C590, C591, C592, C593, C594, C595, C596, C597, C598, C599, C600, C601, C602, C603, C604, C605, C606, C607, C608, C609, C610, C611, C612, C613, C614, C615, C616, C617, C618, C619, C620, C621, C622, C623, C624, C625, C626, C627, C628, C629, C630, C631, C632, C633, C634, C635, C636, C637, C638, C639, C640, C641, C642, C643, C644, C645, C646, C647, C648, C649, C650, C651, C652, C653, C654, C655, C656, C657, C658, C659, C660, C661, C662, C663, C664, C665, C666, C667, C668, C669, C670, C671, C672, C673, C674, C675, C676, C677, C678, C679, C680, C681, C682, C683, C684, C685, C686, C687, C688, C689, C690, C691, C692, C693, C694, C695, C696, C697, C698, C699, C700, C701, C702, C703, C704, C705, C706, C707, C708, C709, C710, C711, C712, C713, C714, C715, C716, C717, C718, C719, C720, C721, C722, C723, C724, C725, C726, C727, C728, C729, C730, C731, C732, C



