UFPGA1M

POWER1

VCC_1	N13	+1V2
VCC_2	AB16	
VCC_3	N21	
VCC_4	N18	
VCC_5	AB21	
VCC_6	V22	
VCC_7	N19	
VCC_8	N14	
VCC_9	AB15	
VCC_10	AB20	
VCC_11	N15	
VCC_12	U22	
VCC_13	AB19	
VCC_14	P13	
VCC_15	U13	
VCC_16	R13	
VCC_17	AB14	
VCC_18	Y13	
VCC_19	N16	
VCC_20	AB18	
VCC_21	V15	
VCC_22	R22	
VCC_23	N20	
VCC_24	P22	
VCC_25	N22	
VCC_26	AB13	
VCC_27	AB22	
VCC_28	AB17	
VCC_29	Y22	
VCC_30	AA13	
VCC_31	AA22	
VCC_32	N17	

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+1V2 — 100u: 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 (4.7u / 100n); 47n: C80 C81 C75 C82 C83 C84 C85 C76 C86 C77 C78 C87 C88 C79 C89 C90 (10n)

+2V5 — 100u: C91 C92 C93 C94 C95 C96 C97 C98 C99 C100 C101 C102 C103 C104 C105 C106 C107 C108 C109 C110 C111 C112 C113 (4.7u / 100n / 47n); 10n

Caps distributed evenly, as close to device as possible

+1V2 — L5 BLM41PG471SN1L — C120 100u — +1.2V_VCCA: C122 C115 C123 C116 C124 C127 C128 C125 C117 C126 C118 C119 C121 (4.7u / 100n); C133 C134 C135 C136 C137 C138 C139 C140 C141 C142 C143 C144 C149 (47n / 10n)

UFPGA1N

POWER2

AD16	VCCA_1	VCCIO0_0_1	M17	
AD18	VCCA_2	VCCIO0_0_2	L13	
AE19	VCCA_3	VCCIO0_0_3	M13	
AC17	VCCA_4	VCCIO0_0_4	L17	
AC18	VCCA_5	VCCIO1_1_1	L22	
AD13	VCCA_6	VCCIO1_1_2	L18	
AE16	VCCA_7	VCCIO1_1_3	M22	
AD17	VCCA_8	VCCIO1_1_4	M18	
AC22	VCCA_9	VCCIO2_2_1	N24	
AE23	VCCA_10	VCCIO2_2_2	U23	
AE12	VCCA_11	VCCIO2_2_3	N23	
AD22	VCCA_12	VCCIO2_2_4	U24	
AE22	VCCA_13	VCCIO3_3_1	AB23	
AC13	VCCA_14	VCCIO3_3_2	AB24	
AE13	VCCA_15	VCCIO3_3_3	V24	
AD19	VCCA_16	VCCIO3_3_4	V23	
		VCCIO6_6_1	AB12	
		VCCIO6_6_2	V11	
Y23	VCCAUX_1	VCCIO6_6_3	V12	
AA23	VCCAUX_2	VCCIO6_6_4	AB11	
P12	VCCAUX_3	VCCIO7_7_1	U12	
AC20	VCCAUX_4	VCCIO7_7_2	U11	
AC14	VCCAUX_5	VCCIO7_7_3	N12	
M20	VCCAUX_6	VCCIO7_7_4	N11	
AA12	VCCAUX_7	VCCIO8_8_1	P25	
Y12	VCCAUX_8	VCCIO8_8_2	N25	
R12	VCCAUX_9			
AC15	VCCAUX_10			
AC21	VCCAUX_11			
M21	VCCAUX_12			
R23	VCCAUX_13			
M15	VCCAUX_14			
M14	VCCAUX_15			
P23	VCCAUX_16	VTT2_1	T25	
		VTT2_2	T24	
K10	VCCJ_40	VTT3_1	W25	
		VTT3_2	W24	
T13		VTT6_1	W11	
W13	VCCPLL_L_1	VTT6_2	W10	
T22	VCCPLL_L_2	VTT7_1	T11	
W22	VCCPLL_R_1	VTT7_2	T10	
	VCCPLL_R_2			

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+2V5 — C129 C130 C131 C132 C145 C146 C147 C148 (100n / 47n / 10n)

+3V3 — C166 C167 C168 C169 C170 C171 (100n / 47n)

+3V3 — C150 C151 C152 C153 C154 C155 C156 C157 C158 C159 C160 C161 C162 C163 C164 C165 (100u / 100n); C172 C173 C174 C175 C176 C177 (4.7u)

+3V3 — BLM18HD102SN — L6 — +3.3V_PLL — C178 C179 C180 C181 C182 C183 (10n / 47n / 100n)

+3V3 — C114 100n

Jumper2P: J5 J4 J3 (2 / 1) — R41 10k, R42 10k, R43 10k — CFG0 CFG1 CFG2 — R44 0R, R45 0R, R46 0R

UFPGA1A

JTAG

CCLK	C34	CCLK_I_8
CFG0	B33	CFG0_I_8
CFG1	F30	CFG1_I_8
CFG2	D32	CFG2_I_8
DONE	G31	DONE_IO_8
INITN	C33	INITN_IO_8
PROGN	B34	PROGRAMN_I_8
JTAG_TDI	E1	TDI_I_40
JTAG_TMS	D2	TMS_I_40
JTAG_TCK	D1	TCK_I_40
JTAG_TDO	C1	TDO_O_40
	W23	XRES_I
	AN4	RESERVE_I_1
	AP4	RESERVE_I_2

10k — R47

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+3V3 — JTAG1

PIN	
1	+3.3V
2	TMS
3	TCK
4	TDO
5	TDI
6	GND

JTAG_TMS JTAG_TCK JTAG_TDO JTAG_TDI — R40 4.7k

UFPGA1P

GND2

F20	GND_117	GND_233	F11
L3	GND_118	GND_232	AC16
B26	GND_119	GND_231	F14
T14	GND_120	GND_230	AJ15
E5	GND_121	GND_229	AC23
Y11	GND_122	GND_228	AJ23
L11	GND_123	GND_227	V32
AG27	GND_124	GND_226	AF5
AM15	GND_125	GND_225	AM21
AF33	GND_126	GND_224	Y14
C18	GND_127	GND_223	AK30
U17	GND_128	GND_222	AH25
M19	GND_129	GND_221	R20
AK26	GND_130	GND_220	R18
AJ9	GND_131	GND_219	AJ12
AM9	GND_132	GND_218	A34
AH21	GND_133	GND_217	T19
AD24	GND_134	GND_216	AH17
Y17	GND_135	GND_215	AJ20
AM26	GND_136	GND_214	L14
U16	GND_137	GND_213	T23
AA6	GND_138	GND_212	T16
AC12	GND_139	GND_211	AD12
Y20	GND_140	GND_210	U15
AJ11	GND_141	GND_209	Y18
AJ25	GND_142	GND_208	L12
T15	GND_143	GND_207	AP26
AH14	GND_144	GND_206	AA18
AD21	GND_145	GND_205	P19
P18	GND_146	GND_204	U19
AA11	GND_147	GND_203	U18
R17	GND_148	GND_202	AM14
AE17	GND_149	GND_201	AD15
AP34	GND_150	GND_200	R24
AH18	GND_151	GND_199	R14
AJ10	GND_152	GND_198	AP1
W18	GND_153	GND_197	P20
AK33	GND_154	GND_196	AM16
AA14	GND_155	GND_195	V18
V17	GND_156	GND_194	P14
AA32	GND_157	GND_193	E2
AH11	GND_158	GND_192	AD32
AN5	GND_159	GND_191	W17
R32	GND_160	GND_190	W16
V6	GND_161	GND_189	AM23
AG8	GND_162	GND_188	AJ18
L20	GND_163	GND_187	T18
C24	GND_164	GND_186	V14
H27	GND_165	GND_185	AE18
AK2	GND_166	GND_184	E9
AD11	GND_167	GND_183	L29
V16	GND_168	GND_182	M23
AF30	GND_169	GND_181	T12
AC19	GND_170	GND_180	C21
AA21	GND_171	GND_179	AM19
F23	GND_172	GND_178	AM12
AJ16	GND_173	GND_177	AN26
P24	GND_174	GND_176	AJ24
		GND_175	AM20

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UFPGA1Q

B29	NC_1	NC_59	J31
C7	NC_2	NC_60	J32
D7	NC_3	NC_61	K8
D8	NC_4	NC_62	K9
E6	NC_5	NC_63	K25
E7	NC_6	NC_64	K26
E8	NC_7	NC_65	K27
E14	NC_8	NC_66	K28
E25	NC_9	NC_67	L8
E28	NC_10	NC_68	L25
E29	NC_11	NC_69	L27
F4	NC_12	NC_70	AC27
F5	NC_13	NC_71	AD27
F6	NC_14	NC_72	AD28
F7	NC_15	NC_73	AD29
F8	NC_16	NC_74	AE6
F9	NC_17	NC_75	AE7
F15	NC_18	NC_76	AE8
F24	NC_19	NC_77	AE27
F25	NC_20	NC_78	AE28
F26	NC_21	NC_79	AF1
F27	NC_22	NC_80	AF3
F28	NC_23	NC_81	AF4
F29	NC_24	NC_82	AF6
G6	NC_25	NC_83	AF7
G7	NC_26	NC_84	AF8
G8	NC_27	NC_85	AF27
G9	NC_28	NC_86	AF28
G10	NC_29	NC_87	AF29
G14	NC_30	NC_88	AG1
G15	NC_31	NC_89	AG2
G22	NC_32	NC_90	AG3
G24	NC_33	NC_91	AG4
G27	NC_34	NC_92	AG5
G28	NC_35	NC_93	AG6
G29	NC_36	NC_94	AG7
H6	NC_37	NC_95	AG28
H7	NC_38	NC_96	AG29
H9	NC_39	NC_97	AG30
H10	NC_40	NC_98	AG31
H21	NC_41	NC_99	AG32
H24	NC_42	NC_100	AG33
H28	NC_43	NC_101	AH1
H29	NC_44	NC_102	AH2
H30	NC_45	NC_103	AH3
H31	NC_46	NC_104	AH4
H32	NC_47	NC_105	AH5
J4	NC_48	NC_106	AH6
J7	NC_49	NC_107	AH8
J8	NC_50	NC_108	AH28
J9	NC_51	NC_109	AH30
J10	NC_52	NC_110	AH31
J24	NC_53	NC_111	AH32
J25	NC_54	NC_112	AH34
J26	NC_55	NC_113	AJ29
J27	NC_56	NC_114	AJ30
J28	NC_57	NC_115	AJ31
J29	NC_58	NC_116	AJ32

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JGND1 — 1002-161-080

Place LED close to FPGA

GATE1 — +3V3 — 100n C184 — DONE — DONE1 — SML-P11MT — 1.47k R51 — +3V3 — SN74LVC1G57YZPR

RESET1 — KMR223GCT-ND — 100R R48, 10k R49 — +3V3 — PROGRAMN

RESET_OR1 — +3V3 — SN74LVC1G57YZPR — 0R R50 — PROGN

Bank 0,8: 3.3V

PCLK

UFPGA1F

BANK1-1

PT92A_IO_1_T_TDQ97 A17
PT92B_IO_1_C_TDQ97 B17
PT94A_IO_1_PCLKT1_0_T_TDQ97 E19
PT94B_IO_1_PCLKC1_0_C_TDQ97 E20
PT95A_IO_1_T_TDQ97 A18
PT95B_IO_1_C_TDQ97 B18
PT97A_IO_1_T_TDQS97_P J18
PT97B_IO_1_C_TDQS97_N H18
PT98A_IO_1_T_TDQ97 D18
PT98B_IO_1_C_TDQ97 E18
PT100A_IO_1_T_TDQ97 G19
PT100B_IO_1_C_TDQ97 H19

PT101A_IO_1_T_TDQ106 A19 TEST_LINE0
PT101B_IO_1_C_TDQ106 B19 TEST_LINE1
PT103A_IO_1_T_TDQ106 K20 TEST_LINE2
PT103B_IO_1_C_TDQ106 L19 TEST_LINE3
PT104A_IO_1_T_TDQ106 C19 TEST_LINE4
PT104B_IO_1_C_TDQ106 D19 TEST_LINE5
PT106A_IO_1_T_TDQS106_P J19 TEST_LINE6
PT106B_IO_1_C_TDQS106_N K19 TEST_LINE7
PT107A_IO_1_T_TDQ106 A20 TEST_LINE8
PT107B_IO_1_C_TDQ106 B20 TEST_LINE9
PT109A_IO_1_T_TDQ106 G20 TEST_LINE10
PT109B_IO_1_C_TDQ106 G21 TEST_LINE11

PT113A_IO_1_T_TDQ115 C20 TEST_LINE12
PT113B_IO_1_C_TDQ115 D20 TEST_LINE13
PT115A_IO_1_T_TDQS115_P F21 TEST_LINE14
PT115B_IO_1_C_TDQS115_N F22 TEST_LINE15
PT116A_IO_1_T_TDQ115 A21
PT116B_IO_1_C_TDQ115 B21
PT118A_IO_1_T_TDQ115 F16
PT118B_IO_1_C_TDQ115 E16

PT119A_IO_1_T_TDQ124 D21
PT119B_IO_1_C_TDQ124 E21
PT121A_IO_1_T_TDQ124 H20
PT121B_IO_1_C_TDQ124 J20
PT122A_IO_1_T_TDQ124 A22
PT122B_IO_1_C_TDQ124 B22
PT124A_IO_1_T_TDQS124_P J22
PT124B_IO_1_C_TDQS124_N J23
PT125A_IO_1_T_TDQ124 C22
PT125B_IO_1_C_TDQ124 D22
PT127A_IO_1_T_TDQ124 J21
PT127B_IO_1_C_TDQ124 H22

PT128A_IO_1_T_TDQ133 A23
PT128B_IO_1_C_TDQ133 B23
PT130A_IO_1_T_TDQ133 E22
PT130B_IO_1_C_TDQ133 E23
PT131A_IO_1_T_TDQ133 C23
PT131B_IO_1_C_TDQ133 D23
PT133A_IO_1_T_TDQS133_P K22
PT133B_IO_1_C_TDQS133_N K21
PT134A_IO_1_T_TDQ133 A24
PT134B_IO_1_C_TDQ133 B24
PT136A_IO_1_T_TDQ133 G23
PT136B_IO_1_C_TDQ133 H23 ENPIRION_CLOCK

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UFPGA1G

BANK1-2

PT137A_IO_1_T_TDQ142 D24 LED_GREEN
PT137B_IO_1_C_TDQ142 E24 LED_ORANGE
PT139A_IO_1_T_TDQ142 K23 LED_RED
PT139B_IO_1_C_TDQ142 K24 LED_YELLOW
PT140A_IO_1_T_TDQ142 A25
PT140B_IO_1_C_TDQ142 B25
PT142A_IO_1_T_TDQS142_P C28
PT142B_IO_1_C_TDQS142_N D28
PT143A_IO_1_T_TDQ142 C25 LED_CLOCK_GREEN
PT143B_IO_1_C_TDQ142 D25 LED_CLOCK_RED
PT145A_IO_1_T_TDQ142 G26 LED_TRIGGER_GREEN
PT145B_IO_1_C_TDQ142 G25 LED_TRIGGER_RED

PT157A_IO_1_T_TDQ160 C26
PT157B_IO_1_C_TDQ160 D26 BACK_GPIO_0
PT158A_IO_1_T_TDQ160 B27 BACK_GPIO_1
PT158B_IO_1_C_TDQ160 C27 BACK_GPIO_2
PT161A_IO_1_T_TDQ160 D27 BACK_GPIO_3
PT161B_IO_1_C_TDQ160 E27 BACK_GPIO_4
BACK_GPIO_5

PT164A_IO_1_T_TDQ169 B28
PT164B_IO_1_C_TDQ169 A28 BACK_GPIO_6
PT166A_IO_1_T_TDQ169 A26 BACK_GPIO_7
PT166B_IO_1_C_TDQ169 A27 BACK_GPIO_8
PT167A_IO_1_T_TDQ169 A29 BACK_GPIO_9
PT167B_IO_1_C_TDQ169 A30 BACK_GPIO_10
PT169A_IO_1_T_TDQS169_P H26 BACK_GPIO_11
PT169B_IO_1_C_TDQS169_N H25 BACK_GPIO_12
PT170A_IO_1_T_TDQ169 A31 BACK_GPIO_13
PT170B_IO_1_C_TDQ169 B31 BACK_GPIO_14
PT172A_IO_1_VREF1_1_T_TDQ169 C29 BACK_GPIO_15
PT172B_IO_1_VREF2_1_C_TDQ169 C30

IO-BANK8

PT176A_IO_8_T A32 LED_WHITE1
PT176B_IO_8_C A33 LED_WHITE2
PT178A_IO_8_T D30
PT178B_IO_8_C D29
PT179A_IO_8_T B32
PT179B_IO_8_C C32
PT181A_IO_8_T D31
PT181B_IO_8_C C31 PROGRAMN

PR5A_IO_8_T D33
PR5B_IO_8_DI/CSSPI0N/CSSPIN_C D34 SPI_CS
PR7A_IO_8_CS1N/HOLDN/CONT2N_T G30
PR7B_IO_8_CSN/SN/CONT1N_C F31
PR8A_IO_8_DOUT/CSON/CSSPI1N_T E34 SPI_CLK
PR8B_IO_8_MCLK_C F34
PR10A_IO_8_WRITEN_T E31
PR10B_IO_8_D0/SPIFASTN_C E32
PR11A_IO_8_D1_T G34
PR11B_IO_8_D2_C H33
PR13A_IO_8_D3/SI_T G33
PR13B_IO_8_D4/SO_C G32
PR14A_IO_8_D5_T H34
PR14B_IO_8_D6/SPID1_C J34
PR16A_IO_8_D7/SPID0_T F32 SPI_OUT
PR16B_IO_8_BUSY/SISPI_C F33 SPI_IN

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Bank 0,8: 3.3V

+3V3
100n C45
R28 4.7k
TEMP_SENSOR1
TEMP_OWB
VDD DQ GND NC1 NC2 NC3 NC4 NC5
DS18B20U+

UFPGA1L

IO-BANK6

PB2A_IO_6_T AH7
PB2B_IO_6_C AJ7
PB4A_IO_6_T AE9
PB4B_IO_6_C AD10
PB5A_IO_6_T AK6
PB5B_IO_6_C AL6
PB7A_IO_6_T AF9
PB7B_IO_6_C AG9
PB8A_IO_6_T AK7
PB8B_IO_6_C AL7
PB10A_IO_6_T AK8
PB10B_IO_6_C AL8
PB11A_IO_6_T AM7
PB11B_IO_6_C AM8
PB13A_IO_6_T AH9
PB13B_IO_6_C AJ8
PB14A_IO_6_T AN7
PB14B_IO_6_C AP7
PB16A_IO_6_T AN8
PB16B_IO_6_C AP8

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UFPGA1R

IO-BANK3

PB167A_IO_3_T AP28 HDR_IO_0_P
PB167B_IO_3_C AN28 HDR_IO_0_N
PB169A_IO_3_T AP27 HDR_IO_1_P
PB169B_IO_3_C AN27 HDR_IO_1_N
PB170A_IO_3_T AM27 HDR_IO_2_P
PB170B_IO_3_C AL27 HDR_IO_2_N
PB172A_IO_3_T AH26 HDR_IO_3_P
PB172B_IO_3_C AG26 HDR_IO_3_N
PB173A_IO_3_T AM28 HDR_IO_4_P
PB173B_IO_3_C AL28 HDR_IO_4_N
PB175A_IO_3_T AK27
PB175B_IO_3_C AJ27
PB176A_IO_3_T AK28
PB176B_IO_3_C AJ28
PB178A_IO_3_T AH27
PB178B_IO_3_C AH28
PB179A_IO_3_T AL29
PB179B_IO_3_C AK29
PB181A_IO_3_T AF26
PB181B_IO_3_C AE26

LFE3-150EA-8FN1156C

HPLA1

HPLA
CK
TEST_LINE0 19 CH0
TEST_LINE1 18 CH1
TEST_LINE2 17 CH2
TEST_LINE3 16 CH3
TEST_LINE4 15 CH4
TEST_LINE5 14 CH5
TEST_LINE6 13 CH6
TEST_LINE7 12 CH7
TEST_LINE8 11 CH8
TEST_LINE9 10 CH9 NC1 1
TEST_LINE10 9 CH10 NC2 2
TEST_LINE11 8 CH11
TEST_LINE12 7 CH12
TEST_LINE13 6 CH13
TEST_LINE14 5 CH14
TEST_LINE15 4 CH15 GND 20
ZF5-20-01

JGPIO1

HDR_IO_0_P 1 2 HDR_IO_0_N
HDR_IO_1_P 3 4 HDR_IO_1_N diff:prio 3
HDR_IO_2_P 5 6 HDR_IO_2_N
HDR_IO_3_P 7 8 HDR_IO_3_N
HDR_IO_4_P 9 10 HDR_IO_4_N
+3V3 11 12 +3V3
13 14
2514-6003

+2V5
680R R29 D5 green LED_GREEN
SML-P11MT
1.8k R30 D6 orange LED_ORANGE
SML-P11DT
1.8k R31 D7 red LED_RED
SML-P11UT
1.8k R32 D8 yellow LED_YELLOW
SML-P11YT

adjust currents to equalize brightness

+3V3
J2
Jumper2P
SPI fast mode
R37 100R
R38 0R

+3V3
R33 10k
R34 10k
R35 10k
R36 10k
FLASH_MEMORY1
SPI_IN
SPI_CLK
SPI_CS
near FPGA
R39 10k
Vcc SI SO SCLK CS WP HOLD GND
MX25L6405DZNI-12G
C46 100n
SPI_OUT

Bank 0,8: 3.3V

VREF

UFPGA1D

BANK0-1

PT2A_IO_0_T_TDQ7 C3 PCSSW_PE0
PT2B_IO_0_C_TDQ7 C4 PCSSW_PE1
PT4A_IO_0_VREF1_0_T_TDQ7 D3 PCSSW_PE2
PT4B_IO_0_VREF2_0_C_TDQ7 C2 PCSSW_PE3
PT5A_IO_0_T_TDQ7 B1 PCSSW_EQ0
PT5B_IO_0_C_TDQ7 B2 PCSSW_EQ1
PT7A_IO_0_T_TDQS7_P E4 PCSSW_EQ2
PT7B_IO_0_C_TDQS7_N D4 PCSSW_EQ3
PT8A_IO_0_T_TDQ7 B3 PCSSW_ENSMB
PT8B_IO_0_C_TDQ7 A2 PCSSW_SCL
PT10A_IO_0_T_TDQ7 D5 PCSSW_SCA
PT10B_IO_0_C_TDQ7 C6

PT11A_IO_0_T_TDQ16 B4 PCSD_LED_GREEN0
PT11B_IO_0_C_TDQ16 A3 PCSD_LED_RED0
PT13A_IO_0_T_TDQ16 D6 PCSD_TX_DIS0
PT13B_IO_0_C_TDQ16 C5 PCSD_TX_FAULT0
PT14A_IO_0_T_TDQ16 A4 PCSD_RATE_SEL0
PT14B_IO_0_C_TDQ16 A5 PCSD_MOD0_0
PT16A_IO_0_T_TDQS16_P B7 PCSD_MOD1_0
PT16B_IO_0_C_TDQS16_N A7 PCSD_MOD2_0
PT17A_IO_0_T_TDQ16 B6 PCSD_LOS0
PT17B_IO_0_C_TDQ16 A6 PCSD_LED_GREEN1
PT19A_IO_0_T_TDQ16 A8 PCSD_LED_RED1
PT19B_IO_0_C_TDQ16 A9 PCSD_TX_DIS1

PT20A_IO_0_T_TDQ25 B8
PT20B_IO_0_C_TDQ25 C8 PCSD_TX_FAULT1
PT22A_IO_0_T_TDQ25 K11 PCSD_RATE_SEL1
PT22B_IO_0_C_TDQ25 J11 PCSD_MOD0_1
PT26A_IO_0_T_TDQ25 D9 PCSD_MOD1_1
PT26B_IO_0_C_TDQ25 C9 PCSD_MOD2_1
PT28A_IO_0_T_TDQ25 H11 PCSD_LOS1
PT28B_IO_0_C_TDQ25 H12

PT38A_IO_0_T_TDQ43 A10
PT38B_IO_0_C_TDQ43 B10
PT40A_IO_0_T_TDQ43 J12
PT40B_IO_0_C_TDQ43 K12
PT41A_IO_0_T_TDQ43 C11
PT41B_IO_0_C_TDQ43 D11
PT43A_IO_0_T_TDQS43_P G11
PT43B_IO_0_C_TDQS43_N G12
PT44A_IO_0_T_TDQ43 A11
PT44B_IO_0_C_TDQ43 B11
PT46A_IO_0_T_TDQ43 K13
PT46B_IO_0_C_TDQ43 J13 TEMP_OWB

LFE3-150EA-8FN1156C

UFPGA1E

BANK0-2

PT47A_IO_0_T_TDQ52 E11 V3_3_GPIO_0
PT47B_IO_0_C_TDQ52 F12 V3_3_GPIO_1
PT49A_IO_0_T_TDQ52 F10 V3_3_GPIO_2
PT49B_IO_0_C_TDQ52 E10 V3_3_GPIO_3
PT50A_IO_0_T_TDQ52 A12
PT50B_IO_0_C_TDQ52 B12
PT52A_IO_0_T_TDQS52_P J14
PT52B_IO_0_C_TDQS52_N H13
PT53A_IO_0_T_TDQ52 D12
PT53B_IO_0_C_TDQ52 E12
PT55A_IO_0_T_TDQ52 K14
PT55B_IO_0_C_TDQ52 K15

PT56A_IO_0_T_TDQ61 E13
PT56B_IO_0_C_TDQ61 F13 PCSSW_S10
PT58A_IO_0_T_TDQ61 G13 PCSSW_S11
PT58B_IO_0_C_TDQ61 H14 PCSSW_S20
PT59A_IO_0_T_TDQ61 A13 PCSSW_S21
PT59B_IO_0_C_TDQ61 B13 PCSSW_S30
PT61A_IO_0_T_TDQS61_P D10 PCSSW_S31
PT61B_IO_0_C_TDQS61_N C10
PT62A_IO_0_T_TDQ61 C13
PT62B_IO_0_C_TDQ61 D13
PT64A_IO_0_T_TDQ61 J15
PT64B_IO_0_C_TDQ61 H15

PT68A_IO_0_T_TDQ70 C14
PT68B_IO_0_C_TDQ70 D14

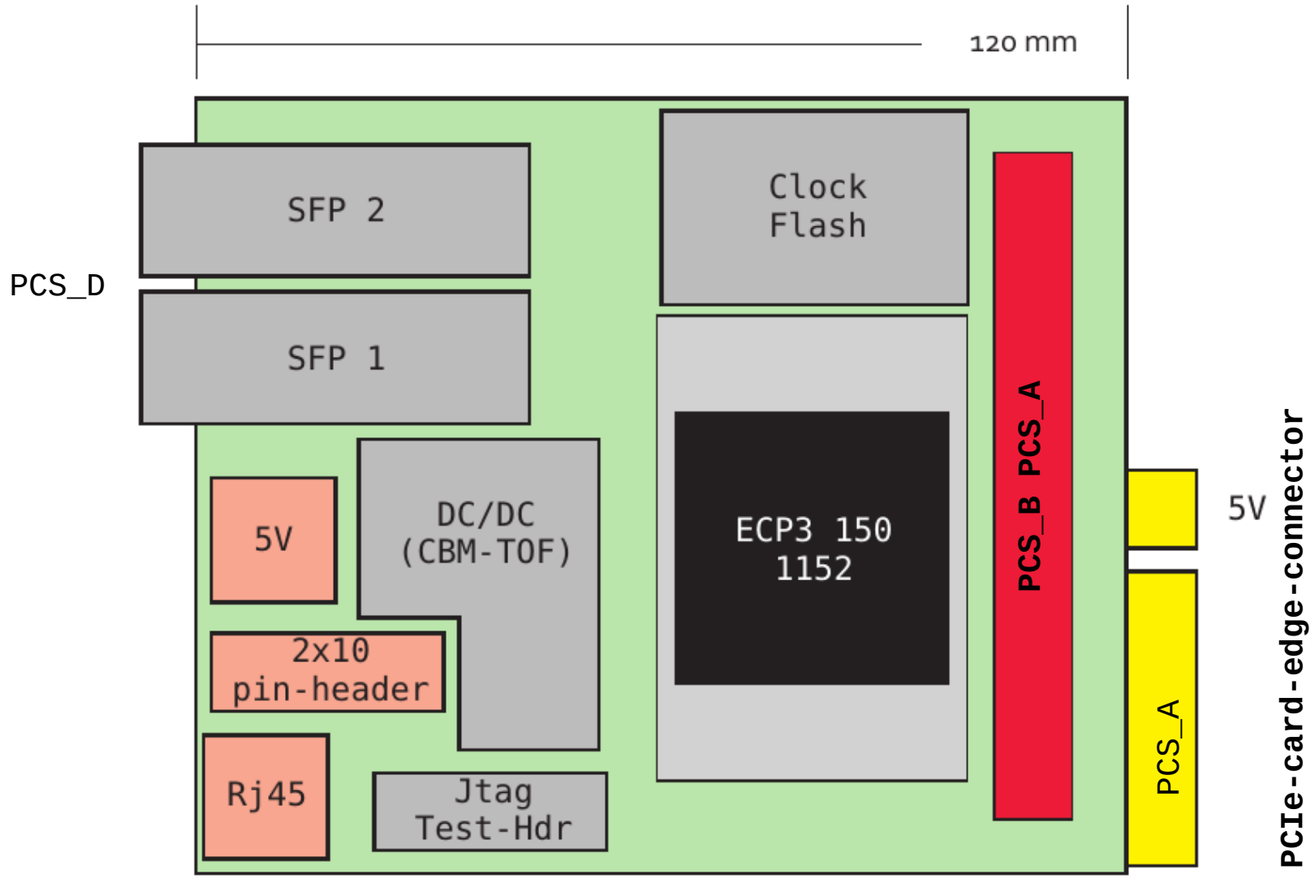
PT74A_IO_0_T_TDQ79 A14
PT74B_IO_0_C_TDQ79 B14
PT76A_IO_0_T_TDQ79 G16
PT76B_IO_0_C_TDQ79 G17
PT77A_IO_0_T_TDQ79 D15
PT77B_IO_0_C_TDQ79 E15
PT79A_IO_0_T_TDQS79_P J16
PT79B_IO_0_C_TDQS79_N H16
PT80A_IO_0_T_TDQ79 A15
PT80B_IO_0_C_TDQ79 B15
PT82A_IO_0_T_TDQ79 E17
PT82B_IO_0_C_TDQ79 F18

PT83A_IO_0_T_TDQ88 C16
PT83B_IO_0_C_TDQ88 D16
PT85A_IO_0_T_TDQ88 K16
PT85B_IO_0_C_TDQ88 L16
PT86A_IO_0_T_TDQ88 A16
PT86B_IO_0_C_TDQ88 B16
PT88A_IO_0_T_TDQS88_P G18
PT88B_IO_0_C_TDQS88_N F19
PT89A_IO_0_T_TDQ88 C17
PT89B_IO_0_C_TDQ88 D17
PT91A_IO_0_PCLKT0_0_T_TDQ88 J17
PT91B_IO_0_PCLKC0_0_C_TDQ88 H17

PCLK

LFE3-150EA-8FN1156C

+3V3_LIN
R92 4.7k
R91 4.7k
C399 100n
C400 100n
+2V5_LIN
+1V2_LIN
U1
VDD
AIN0 AIN1 AIN2 AIN3
SCLK CS DOUT DIN GND
C401 100n
+6V
R93 4.7k
R94 4.7k
C402 100n
C403 100n
ADS1018IRUGT



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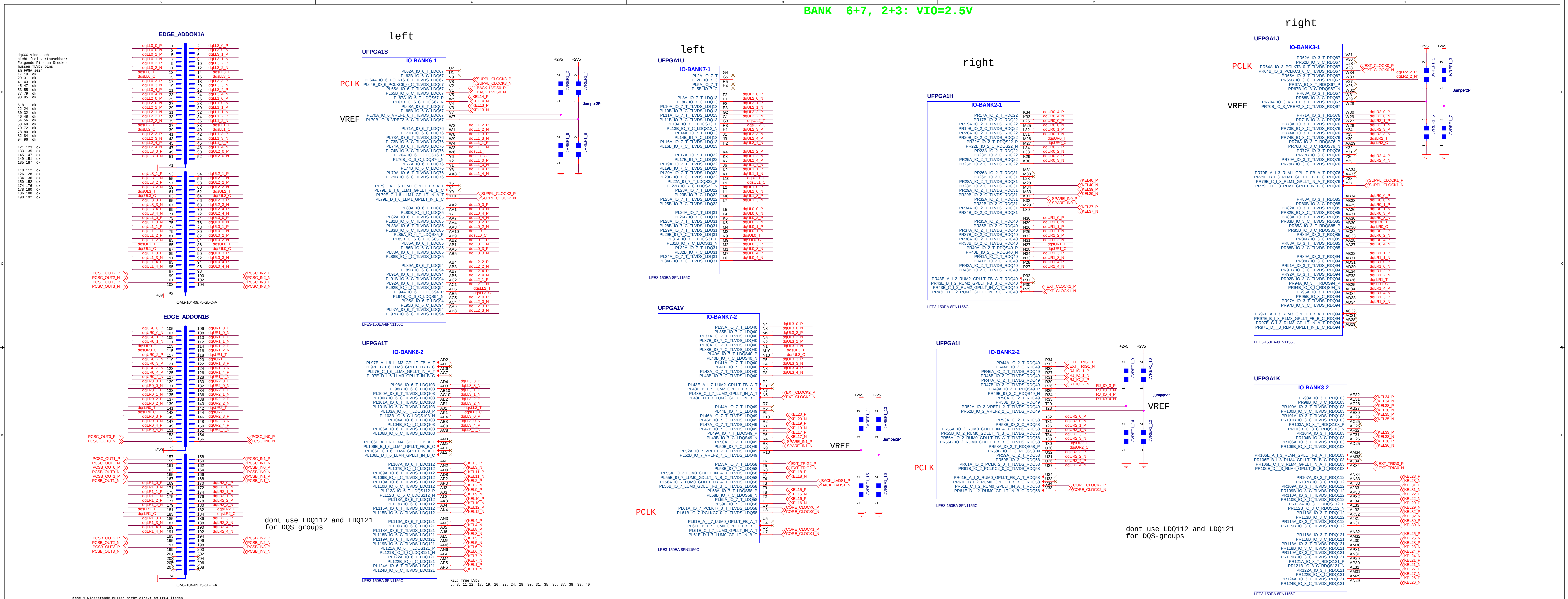
00_LAYOUT

Design: K:\GSIJOB\HADES\TRBV3\TRB3SC1\TRBV3SC1.DSN	
Modified: Friday, January 30, 2015	Size: A3 Page: 1 / 15
Designer: <Designer>	Layouter: <Layouter>



Notes for Peter:
In bank 0: Alle Signale frei vertauschbar
In bank 1: Alle Signale frei vertauschbar
TEST_LINE und LED in bank 0 und 1 duerfen die Baenke wechseln
Ebenso: alle 3.3V von Bank 0&1 darf auch an Bank 3 & 6
HDR_IO ist nicht notwendigerweise differentiell. single ended ist auch in Ordnung
KEL Stecker dürfen beliebig platziert werden
AddOn Stecker nach Möglichkeit nicht näher als 4.5cm zum hinteren Rand (bei <16cm langer Platine aber auch näher am hinteren Rand möglich)
BACK_GPIO: Falls es hilft, 12 Leitungen statt 16 sind auch in Ordnung.

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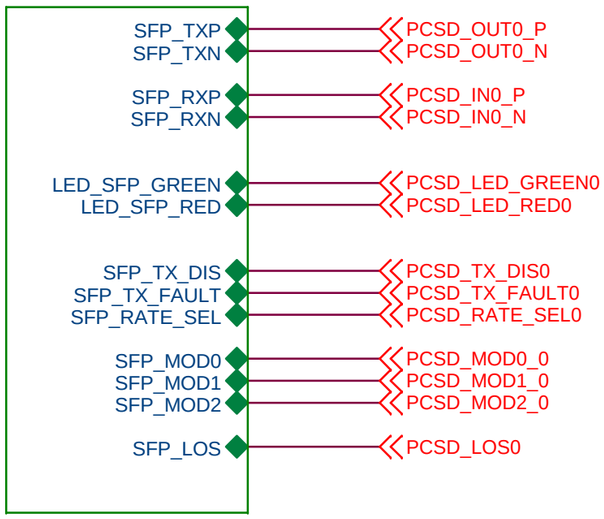
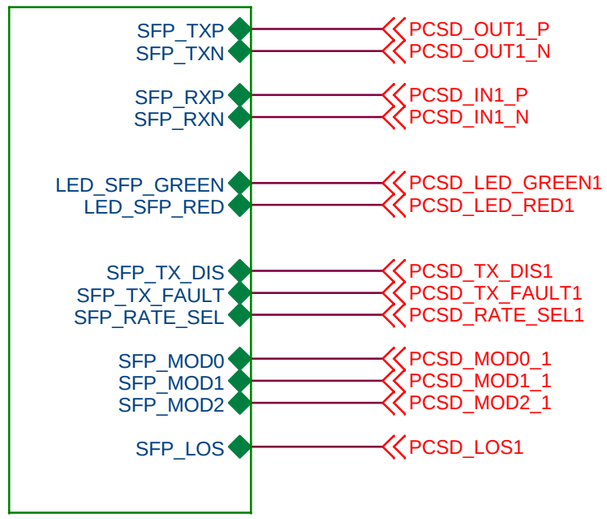
01_ADDON_CONNECTORS

Modified: Friday, January 30, 2015 — Size: Custom — Page: 2 / 18

SFP_TRBNET1



SFP_TRBNET2



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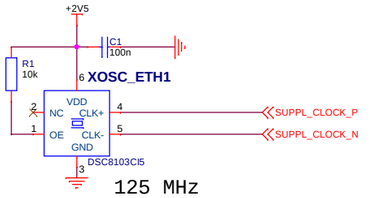
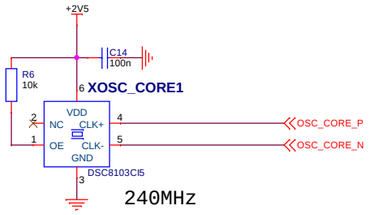
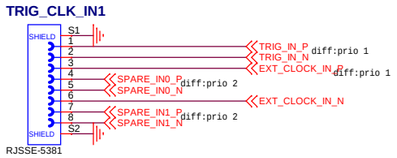
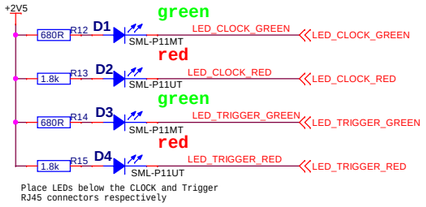
02_SFP

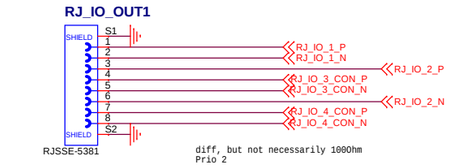
Design: K:\GSIJOB\HADES\TRBV3\TRB3SC1\TRBV3SC1.DSN	
Modified: Friday, January 30, 2015	Size: A4 Page: 3 / 15
Designer: <Designer>	Layouter: <Layouter>

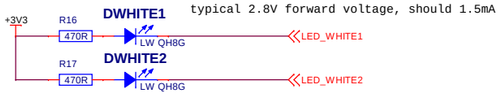


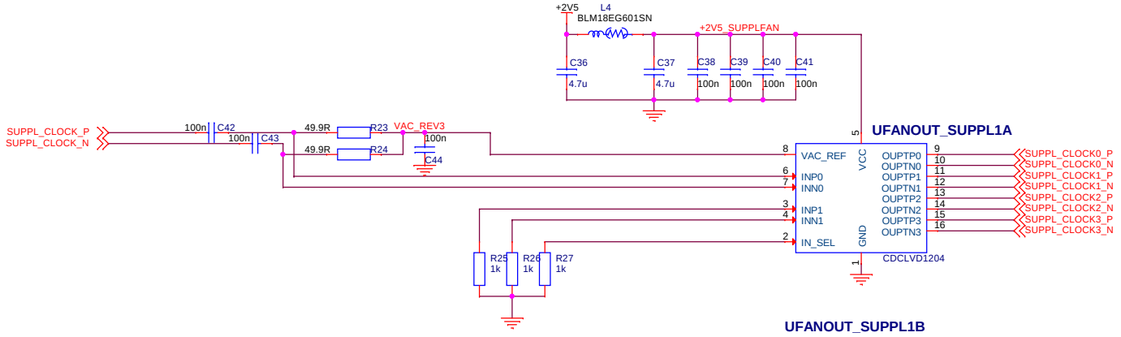


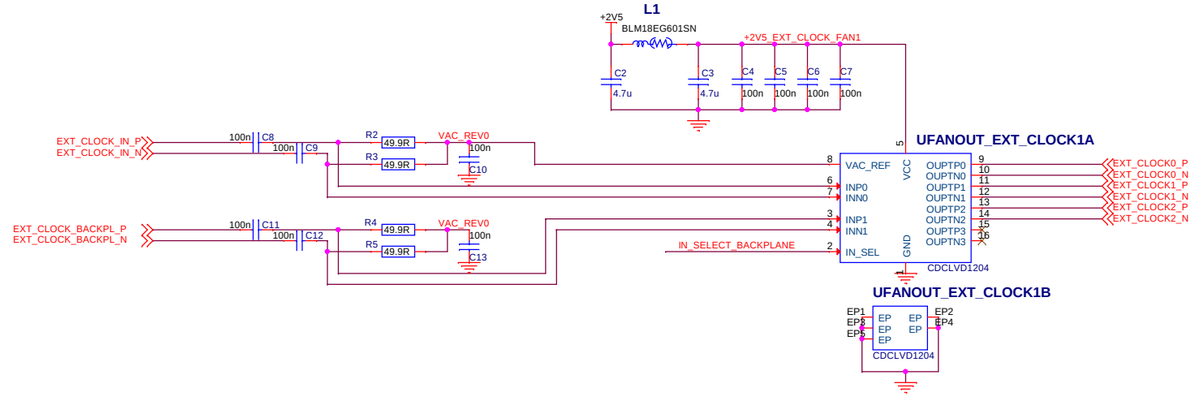




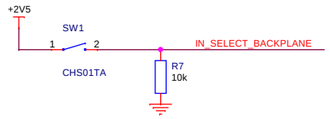


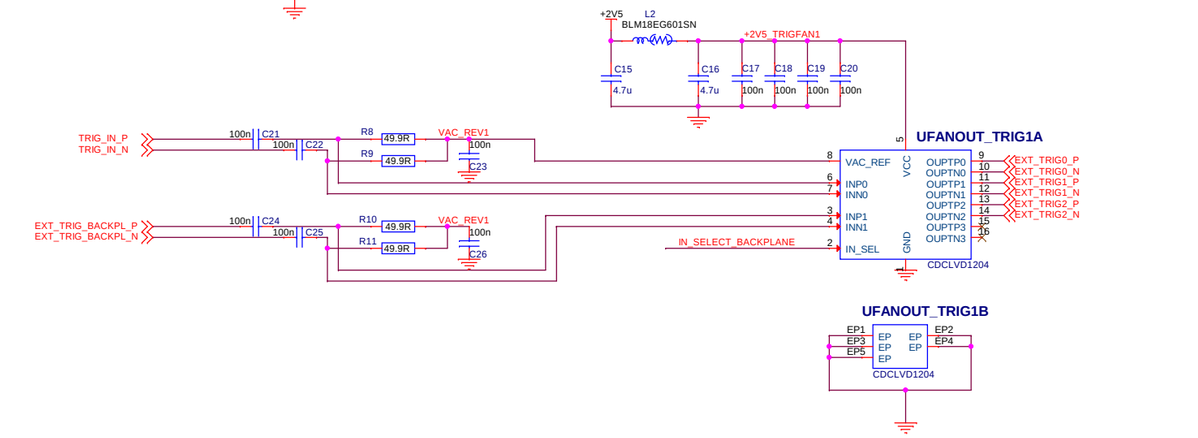


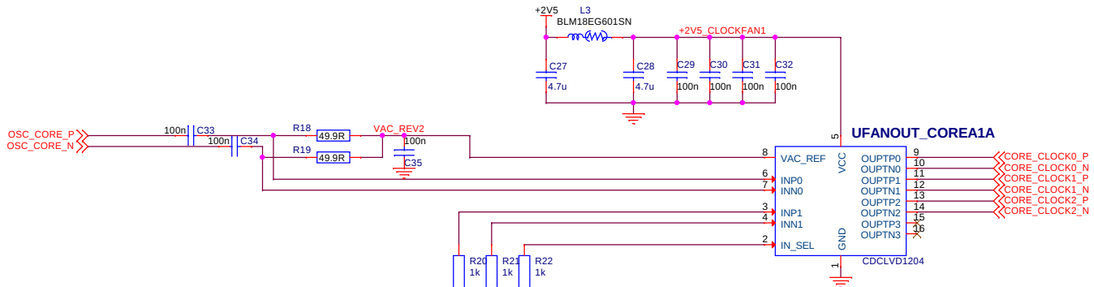




Mark Switch well on board!
Text:
External Trigger + External Clock:
OPEN => from RJ45
CLOSED => from backplane







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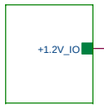
03_CLOCKING

Design: K:\GSI\OB\HADES\TRBV3\TRB3SC1\TRBV3SC1.DSN	
Modified: Friday, January 30, 2015	Size: A2 Page: 4 / 15
Designer: <Designer>	Layouter: <Layouter>

UFPGA1B

DECOUP1



DECOUPLING_PCS

+1.2V_IO_PCSA

AF21 AF20 AF19 AF18 AG21 AG20 AG19 AG18

PCSA_VCCIB0_50 PCSA_VCCIB1_50 PCSA_VCCIB2_50 PCSA_VCCIB3_50 PCSA_VCCOB0_50 PCSA_VCCOB1_50 PCSA_VCCOB2_50 PCSA_VCCOB3_50

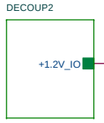
PCSA

PCSA_HDINP0_50_T	AL21	PCSA_IN0_P
PCSA_HDINN0_50_C	AK21	PCSA_IN0_N
PCSA_HDINP1_50_T	AL20	PCSA_IN1_P
PCSA_HDINN1_50_C	AK20	PCSA_IN1_N
PCSA_HDINP2_50_T	AL19	PCSA_IN2_P
PCSA_HDINN2_50_C	AK19	PCSA_IN2_N
PCSA_HDINP3_50_T	AL18	PCSA_IN3_P
PCSA_HDINN3_50_C	AK18	PCSA_IN3_N
PCSA_HDOUTP0_50_T	AP21	PCSA_OUT0_P
PCSA_HDOUTN0_50_C	AN21	PCSA_OUT0_N
PCSA_HDOUTP1_50_T	AP20	PCSA_OUT1_P
PCSA_HDOUTN1_50_C	AN20	PCSA_OUT1_N
PCSA_HDOUTP2_50_T	AP19	PCSA_OUT2_P
PCSA_HDOUTN2_50_C	AN19	PCSA_OUT2_N
PCSA_HDOUTP3_50_T	AP18	PCSA_OUT3_P
PCSA_HDOUTN3_50_C	AN18	PCSA_OUT3_N
PCSA_REFCLKP_50_T	AH19	J6
PCSA_REFCLKN_50_C	AH20	J7

PCSB

PCSB_HDINP0_51_T	AL17	PCSB_IN0_P
PCSB_HDINN0_51_C	AK17	PCSB_IN0_N
PCSB_HDINP1_51_T	AL16	PCSB_IN1_P
PCSB_HDINN1_51_C	AK16	PCSB_IN1_N
PCSB_HDINP2_51_T	AL15	PCSB_IN2_P
PCSB_HDINN2_51_C	AK15	PCSB_IN2_N
PCSB_HDINP3_51_T	AL14	PCSB_IN3_SWITCH_P
PCSB_HDINN3_51_C	AK14	PCSB_IN3_SWITCH_N
PCSB_HDOUTP0_51_T	AP17	PCSB_OUT0_P
PCSB_HDOUTN0_51_C	AN17	PCSB_OUT0_N
PCSB_HDOUTP1_51_T	AP16	PCSB_OUT1_P
PCSB_HDOUTN1_51_C	AN16	PCSB_OUT1_N
PCSB_HDOUTP2_51_T	AP15	PCSB_OUT2_P
PCSB_HDOUTN2_51_C	AN15	PCSB_OUT2_N
PCSB_HDOUTP3_51_T	AP14	PCSB_OUT3_SWITCH_P
PCSB_HDOUTN3_51_C	AN14	PCSB_OUT3_SWITCH_N
PCSB_REFCLKP_51_T	AH15	J10
PCSB_REFCLKN_51_C	AH16	J11

DECOUP2



DECOUPLING_PCS

+1.2V_IO_PCSB

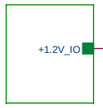
AF17 AF16 AF15 AF14 AG17 AG16 AG15 AG14

PCSB_VCCIB0_51 PCSB_VCCIB1_51 PCSB_VCCIB2_51 PCSB_VCCIB3_51 PCSB_VCCOB0_51 PCSB_VCCOB1_51 PCSB_VCCOB2_51 PCSB_VCCOB3_51

LFE3-150EA-8FN1156C

UFPGA1C

DECOUP3



DECOUPLING_PCS

+1.2V_IO_PCSC

AF24 AF23 AF22 AE20 AG24 AG23 AG22 AE21

PCSC_VCCIB0_52 PCSC_VCCIB1_52 PCSC_VCCIB2_52 PCSC_VCCIB3_52 PCSC_VCCOB0_52 PCSC_VCCOB1_52 PCSC_VCCOB2_52 PCSC_VCCOB3_52

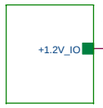
PCSC

PCSC_HDINP0_52_T	AL25	PCSC_IN0_P
PCSC_HDINN0_52_C	AK25	PCSC_IN0_N
PCSC_HDINP1_52_T	AL24	PCSC_IN1_P
PCSC_HDINN1_52_C	AK24	PCSC_IN1_N
PCSC_HDINP2_52_T	AL23	PCSC_IN2_P
PCSC_HDINN2_52_C	AK23	PCSC_IN2_N
PCSC_HDINP3_52_T	AL22	PCSC_IN3_P
PCSC_HDINN3_52_C	AK22	PCSC_IN3_N
PCSC_HDOUTP0_52_T	AP25	PCSC_OUT0_P
PCSC_HDOUTN0_52_C	AN25	PCSC_OUT0_N
PCSC_HDOUTP1_52_T	AP24	PCSC_OUT1_P
PCSC_HDOUTN1_52_C	AN24	PCSC_OUT1_N
PCSC_HDOUTP2_52_T	AP23	PCSC_OUT2_P
PCSC_HDOUTN2_52_C	AN23	PCSC_OUT2_N
PCSC_HDOUTP3_52_T	AP22	PCSC_OUT3_P
PCSC_HDOUTN3_52_C	AN22	PCSC_OUT3_N
PCSC_REFCLKP_52_T	AH22	J8
PCSC_REFCLKN_52_C	AH23	J9

PCSD

PCSD_HDINP0_53_T	AL13	PCSD_IN0_P
PCSD_HDINN0_53_C	AK13	PCSD_IN0_N
PCSD_HDINP1_53_T	AL12	PCSD_IN1_SWITCH_P
PCSD_HDINN1_53_C	AK12	PCSD_IN1_SWITCH_N
PCSD_HDINP2_53_T	AL11	PCSD_IN2_P
PCSD_HDINN2_53_C	AK11	PCSD_IN2_N
PCSD_HDINP3_53_T	AL10	PCSD_IN3_P
PCSD_HDINN3_53_C	AK10	PCSD_IN3_N
PCSD_HDOUTP0_53_T	AP13	PCSD_OUT0_P
PCSD_HDOUTN0_53_C	AN13	PCSD_OUT0_N
PCSD_HDOUTP1_53_T	AP12	PCSD_OUT1_SWITCH_P
PCSD_HDOUTN1_53_C	AN12	PCSD_OUT1_SWITCH_N
PCSD_HDOUTP2_53_T	AP11	PCSD_OUT2_P
PCSD_HDOUTN2_53_C	AN11	PCSD_OUT2_N
PCSD_HDOUTP3_53_T	AN10	PCSD_OUT3_P
PCSD_HDOUTN3_53_C	AP10	PCSD_OUT3_N
PCSD_REFCLKP_53_T	AH12	0R R52 SUPPL_CLOCK0_P
PCSD_REFCLKN_53_C	AH13	0R R53 SUPPL_CLOCK0_N

DECOUP4



DECOUPLING_PCS

+1.2V_IO_PCSD

AE15 AF13 AF12 AF11 AE14 AG13 AG12 AG11

PCSD_VCCIB0_53 PCSD_VCCIB1_53 PCSD_VCCIB2_53 PCSD_VCCIB3_53 PCSD_VCCOB0_53 PCSD_VCCOB1_53 PCSD_VCCOB2_53 PCSD_VCCOB3_53

LFE3-150EA-8FN1156C

UPCSSW1A

PCSSW_EQ0	40	EQ0	PE0 31 PCSSW_PE0
PCSB_IN3_P	1	IN0+	OUT0+ 29 PCSB_IN3_SWITCH_P
PCSB_IN3_N	2	IN0-	OUT0- 28 PCSB_IN3_SWITCH_N
PCSSW_EQ1	39	EQ1	PE1 20 PCSSW_PE1
PCSB_OUT3_SWITCH_P	4	IN1+	OUT1+ 27 PCSB_OUT3_P
PCSB_OUT3_SWITCH_N	5	IN1-	OUT1- 26 PCSB_OUT3_N
PCSSW_EQ2	11	EQ2	PE2 19 PCSSW_PE2
PCSD_IN1_P	6	IN2+	OUT2+ 24 PCSD_IN1_SWITCH_P
PCSD_IN1_N	7	IN2-	OUT2- 23 PCSD_IN1_SWITCH_N
PCSSW_EQ3	12	EQ3	PE3 18 PCSSW_PE3
PCSD_OUT1_SWITCH_P	9	IN3+	OUT3+ 22 PCSD_OUT1_P
PCSD_OUT1_SWITCH_N	10	IN3-	OUT3- 21 PCSD_OUT1_N
PCSSW_SCL	37	S00/SCL	
PCSSW_SCA	36	S01/SDA	PWDN 38 R100 1k +3V3
PCSSW_S10	35	S10/ADDR0	EN-smb 17 PCSSW_ENSMB
PCSSW_S11	34	S11/ADDR1	S30 13 PCSSW_S30
PCSSW_S20	33	S20/ADDR2	S31 14 PCSSW_S31
PCSSW_S21	32	S21/ADDR3	

DS25CP104A

R101 10k

UPCSSW1B

+3V3

VDD 3, 8, 15, 25, 30; GND 16; DAP1 41

DS25CP104A

C404 C405 C406 C407 C408 100n 100n 100n 100n 100n

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06_FPGA_SERDES

Design: K:\GSIJOB\HADES\TRBV3\TRB3SC1\TRBV3SC1.DSN	
Modified: Friday, January 30, 2015	Size: A2 Page: 7 / 15
Designer: <Designer>	Layouter: <Layouter>

LARGE HIGH CURRENT SOLDER JUMPERS

Put Text on PCB next to connector
1: GND
2: 5-6V
3: GND

37203-1AE0-003 PL
JDCINP1

F1
5A

6.2V breakdown
D9
SMBJ5341B-TP

+6V
C193 4.7n
C194 4.7u
C195 100u
C196 100n

DCDC3V3

PVIN PVIN PVIN
AVIN
ENABLE
LLM/SYNC
POK
AGND
PGND PGND PGND
E-PAD
EN6337QI

VOUT VOUT VOUT VOUT VOUT VOUT VOUT VOUT
RLLM
SS
VFB
PGND PGND PGND

R56 1k
ENPIRION_CLOCK
Low -> PWM
POK3V3
R57 4.3k
POK3V3
D3V3_OK1
SML-P11MT

Maximum 2.5V signal to LLM input!

R54 160k
C203 15p
C210 15n
J13
R59 43k
RB = (0.75 * RA)/(VOUT - 0.75V)
Widerstände für 3.5407V:
R1: 160kOhm
R2: 43kOhm (1%)

C197 100u
C198 4.7u
C199 4.7u
C200 4.7u
C201 4.7u
C202 100n

+3V3DC
J12
Jumper2P
L7
BLM41PG471SN1L

C187 100u
C188 4.7u
C189 4.7u
C190 4.7u
C191 4.7u
C192 100n

+3V3_LIN
+VBIAS

ULDO33

IN IN
BIAS
EN
SS
PG
OUT OUT
FB
GND EP4 EP5
EP1 EP2 EP3
TPS74801

C211 10n
C212 100n
C213 4.7u

+3V3
R55 3.57k
R58 1.15k
C204 100u
C205 4.7u
C206 4.7u
C207 4.7u
C208 4.7u
C209 100n

+6V
R60 4.3k
POK2V5
D2V5_OK1
SML-P11MT

DCDC2V5

PVIN PVIN PVIN
AVIN
ENABLE
LLM/SYNC
POK
AGND
PGND PGND PGND
E-PAD
EN6337QI

VOUT VOUT VOUT VOUT VOUT VOUT VOUT VOUT
RLLM
SS
VFB
PGND PGND PGND

C217 4.7n
C218 4.7u
C219 100u
C220 100n
R63 1k
ENPIRION_CLOCK
POK2V5
R61 160k
C230 15p
C237 15n
J15
R64 62k
RB = (0.75 * RA)/(VOUT - 0.75V)
Widerstände für 2.6855V:
R1: 160kOhm
R2: 62kOhm (1%)

C224 100u
C225 4.7u
C226 4.7u
C227 4.7u
C228 4.7u
C229 100n

+2V5DC
J14
Jumper2P
L8
BLM41PG471SN1L

C214 100u
C215 4.7u
C216 4.7u
C221 4.7u
C222 4.7u
C223 100n

+2V5_LIN
+VBIAS

ULDO25

IN IN
BIAS
EN
SS
PG
OUT OUT
FB
GND EP4 EP5
EP1 EP2 EP3
TPS74801

C240 10n
C238 100n
C239 4.7u

+2V5
R62 3.57k
R65 1.69k
C231 100u
C232 4.7u
C233 4.7u
C234 4.7u
C235 4.7u
C236 100n

+6V
R66 4.3k
POK1V2
D1V2_O1K1
SML-P11MT

GND test pins for
connection of probe

DCDC1V2

PVIN PVIN PVIN
AVIN
ENABLE
LLM/SYNC
POK
AGND
PGND PGND PGND
E-PAD
EN6337QI

VOUT VOUT VOUT VOUT VOUT VOUT VOUT VOUT
RLLM
SS
VFB
PGND PGND PGND

C241 4.7n
C242 4.7u
C243 100u
C244 100n
R69 1k
ENPIRION_CLOCK
POK1V2
200k R68
C257 15p
C266 15n
J17
R71 240k
RB = (0.75 * RA)/(VOUT - 0.75V)
Widerstände für 1.375V:
R1: 200kOhm
R2: 240kOhm (1%)

C245 100u
C246 4.7u
C247 4.7u
C248 4.7u
C249 4.7u
C250 100n

+1V2DC
J16
Jumper2P

0.05Ohm => 100mV drop @2A
therefore two ferrite beads => 50mV drop
L9
BLM41PG471SN1L
L10
BLM41PG471SN1L

C251 100u
C252 4.7u
C253 4.7u
C254 4.7u
C255 4.7u
C256 100n

+1V2_LIN
+VBIAS

ULDO12

TPS74401
IN IN IN IN
EN
BIAS
SS
PG
OUT OUT OUT OUT
FB
EP1 EP2 EP3 EP4 EP5 EP6 EP7 EP8 EP9 EP10 EP11 EP12 GND

C267 10n
C264 100n
C265 4.7u

+1V2
R67 2.49k
R70 4.99k
C258 100u
C259 4.7u
C260 4.7u
C261 4.7u
C262 4.7u
C263 100n

+3V3_LIN and +2V5_LIN can be shorted at the power supply to be able to run with 2 external voltages only

+6V +3V3 +2V5 +3V3 +2V5 +6V
J18
2510-6002

GND
+2.5V
+3.3V
+6V
+6V

Put Text on PCB next to connector

JLIN_INPUT1
37204-1AE0-004 PL
GND
5A F1V3 +3V3_LIN → +3V3_LIN
5A F1V4 +2V5_LIN → +2V5_LIN
5A F1V2 +1V2_LIN → +1V2_LIN
D10 SMBJ5333B-TP
D11 SMBJ5335B-TP
D12 SMBJ5335B-TP

+3V3_LIN

UPUMP1

VIN C1+ C1- GND
VOUT C2+ C2- EN
TPS60241

C268 100n
C269 4.7u
C270 4.7u
C273 1u
C274 1u
+VBIAS
C271 100n
C272 4.7u
+3V3_LIN

5V output, max. 25mA

Frontplane
BO1 60807-181
BO2 20817-327

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GERMANY
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09_POWER

Design: K:\GSI\OB\HADES\TRBV3\TRB3SC1\TRBV3SC1.DSN	
Modified: Friday, January 30, 2015	Size: A2 Page: 8 / 15
Designer: <Designer>	Layouter: <Layouter>

uneven: to edge of PCB

All PCS need
good diff pairs

J19

PCSA_IN2_P 1 2 BACK_LVDS0_P
PCSA_IN2_N 3 4 BACK_LVDS0_N
5 6
PCSA_OUT2_P 7 8 BACK_LVDS1_P
PCSA_OUT2_N 9 10 BACK_LVDS1_N
11 12
PCSA_IN3_P 13 14
PCSA_IN3_N 15 16 PCSA_IN0_P
17 18 PCSA_IN0_N
PCSA_OUT3_P 19 20
PCSA_OUT3_N 21 22 PCSA_OUT0_P
23 24 PCSA_OUT0_N
EXT_CLOCK_BACKPL_P 25 26
EXT_CLOCK_BACKPL_N 27 28 PCSA_IN1_P
29 30 PCSA_IN1_N
EXT_TRIG_BACKPL_P 31 32
EXT_TRIG_BACKPL_N 33 34 PCSA_OUT1_P
35 36 PCSA_OUT1_N
37 38
39 40
41 42
V3_3_GPIO_0 43 44
V3_3_GPIO_1 45 46
47 48 BACK_GPIO_8
V3_3_GPIO_2 49 50 BACK_GPIO_9
V3_3_GPIO_3 51 52
53 54
BACK_GPIO_0 55 56 BACK_GPIO_10
BACK_GPIO_1 57 58 BACK_GPIO_11
59 60
BACK_GPIO_2 61 62 BACK_GPIO_12
BACK_GPIO_3 63 64 BACK_GPIO_13
65 66
BACK_GPIO_4 67 68 BACK_GPIO_14
BACK_GPIO_5 69 70 BACK_GPIO_15
71 72
BACK_GPIO_6 73 74
BACK_GPIO_7 75 76
77 78
79 80
81 82 +6V
+2V5_LIN 83 84
F2V5L 85 86
DNP 87 88
5A 89 90
F3V3L 91 92 +3V3_LIN
DNP 5A 93 94
95 96
DNP 5A 97 98 +1V2_LIN
F1V2L 99 100

ERF5-050-01-L-D-RA

good diff pairs

diff, but not necessarily 100Ohm

True LVDS
5, 8, 11, 18, 19, 20, 22, 24, 28, 30, 31, 35, 36, 37, 38, 39, 40

JKEL1

KEL1_P 1 2 KEL1_N
KEL2_P 3 4 KEL2_N
KEL3_P 5 6 KEL3_N
KEL4_P 7 8 KEL4_N
KEL5_P 9 10 KEL5_N
KEL6_P 11 12 KEL6_N
KEL7_P 13 14 KEL7_N
KEL8_P 15 16 KEL8_N
KEL9_P 17 18 KEL9_N
KEL10_P 19 20 KEL10_N
KEL11_P 21 22 KEL11_N
KEL12_P 23 24 KEL12_N
KEL13_P 25 26 KEL13_N
KEL14_P 27 28 KEL14_N
KEL15_P 29 30 KEL15_N
KEL16_P 31 32 KEL16_N
KEL17_P 33 34 KEL17_N
KEL18_P 35 36 KEL18_N
KEL19_P 37 38 KEL19_N
KEL20_P 39 40 KEL20_N

8930E-040-178-MS

diff, but not necessarily 100Ohm

JKEL2

KEL21_P 1 2 KEL21_N
KEL22_P 3 4 KEL22_N
KEL23_P 5 6 KEL23_N
KEL24_P 7 8 KEL24_N
KEL25_P 9 10 KEL25_N
KEL26_P 11 12 KEL26_N
KEL27_P 13 14 KEL27_N
KEL28_P 15 16 KEL28_N
KEL29_P 17 18 KEL29_N
KEL30_P 19 20 KEL30_N
KEL31_P 21 22 KEL31_N
KEL32_P 23 24 KEL32_N
25 26
27 28 KEL34_N
KEL34_P 29 30 KEL35_N
KEL35_P 31 32 KEL36_N
KEL36_P 33 34 KEL37_N
KEL37_P 35 36 KEL38_N
KEL38_P 37 38 KEL39_N
KEL39_P 39 40 KEL40_N
KEL40_P

8930E-040-178-MS

KEL33_P R98 0R 2 J20 Jumper2P 1

R99 0R 2 J21 Jumper2P 1 KEL33_N

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<Title>

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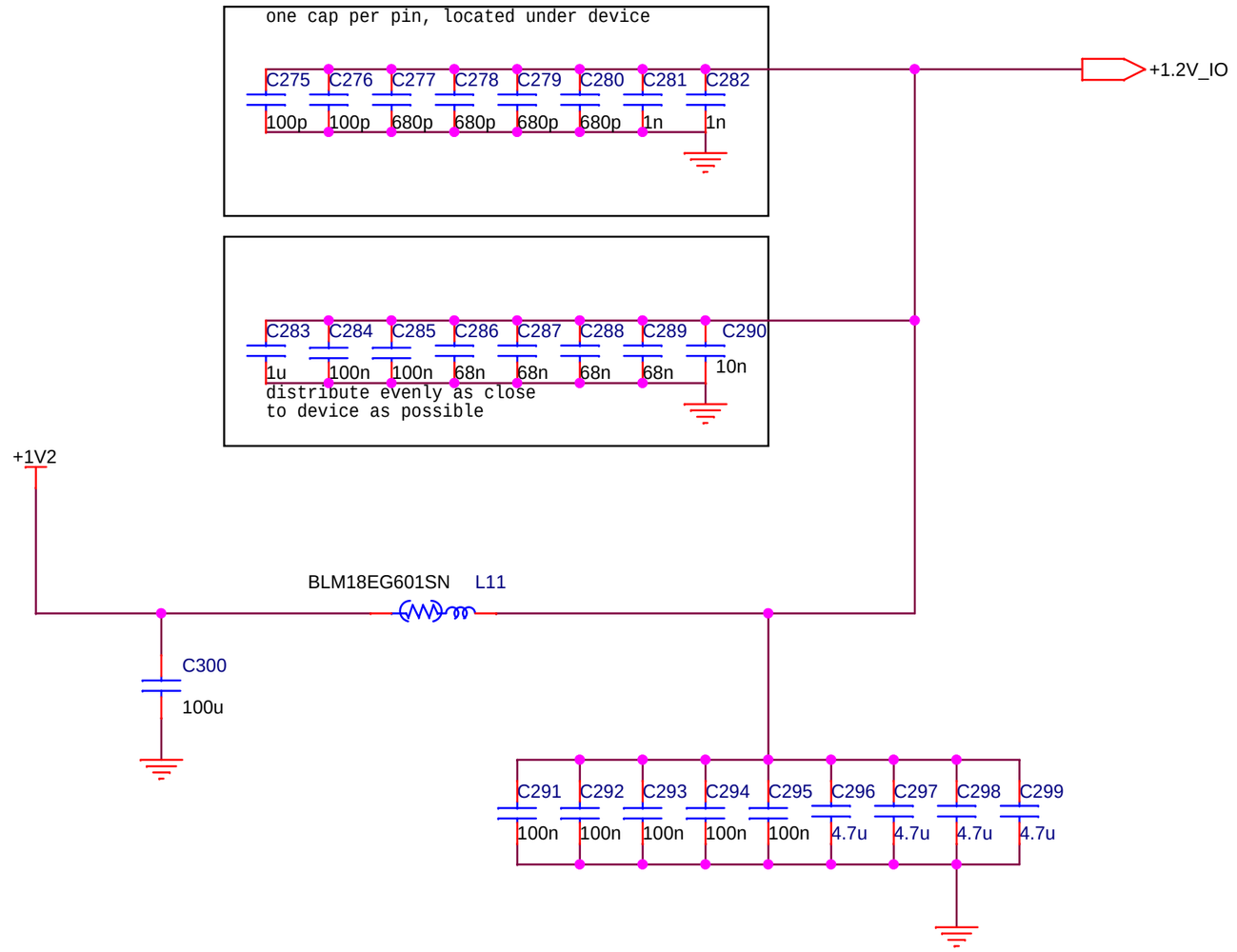
Modified: Friday, January 30, 2015	Size: A3 Page: 9 / 15
Designer: <Designer>	Layouter: <Layouter>



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<Title>

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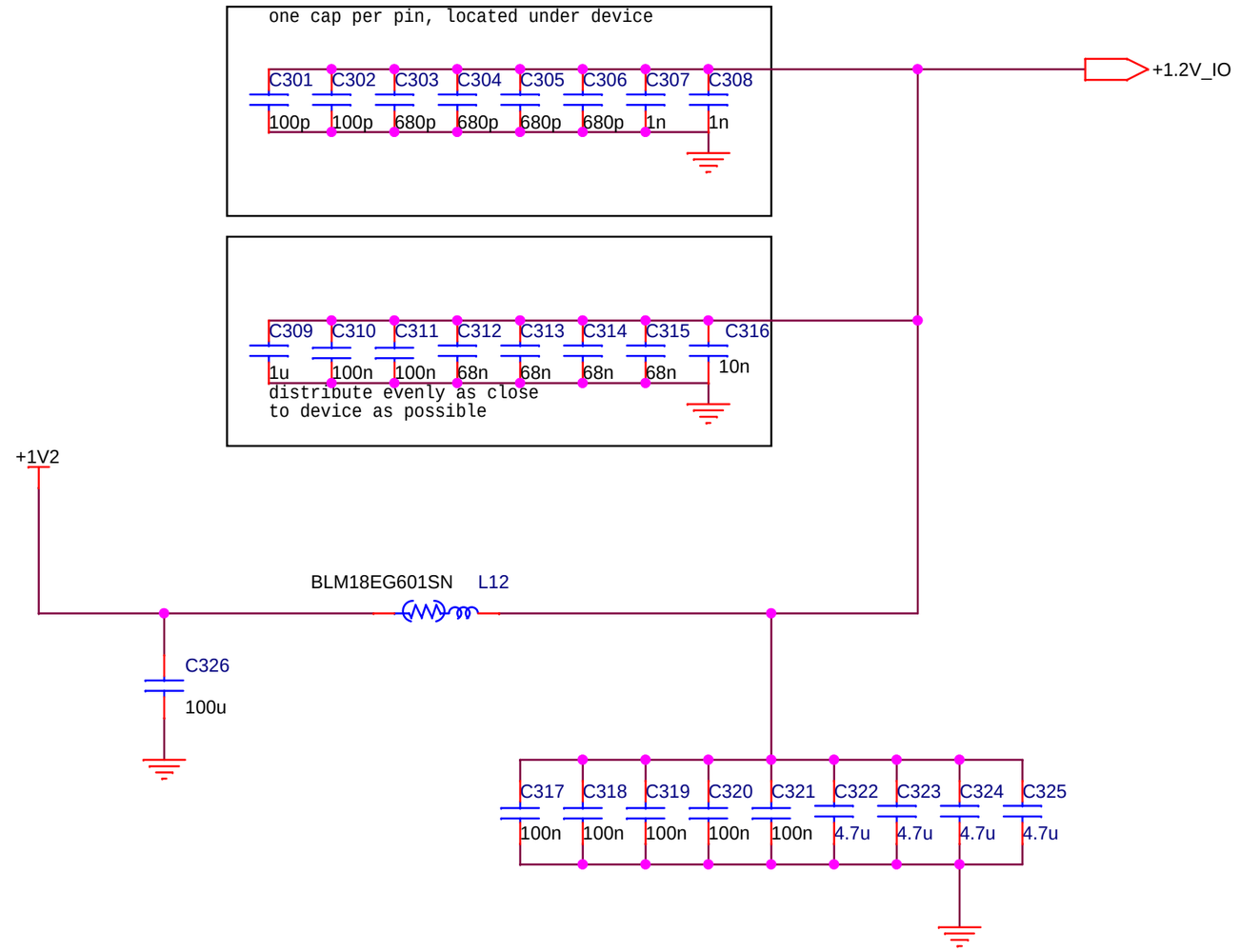
Modified: Friday, January 30, 2015	Size: A4 Page: 10/ 15
Designer: <Designer>	Layouter: <Layouter>



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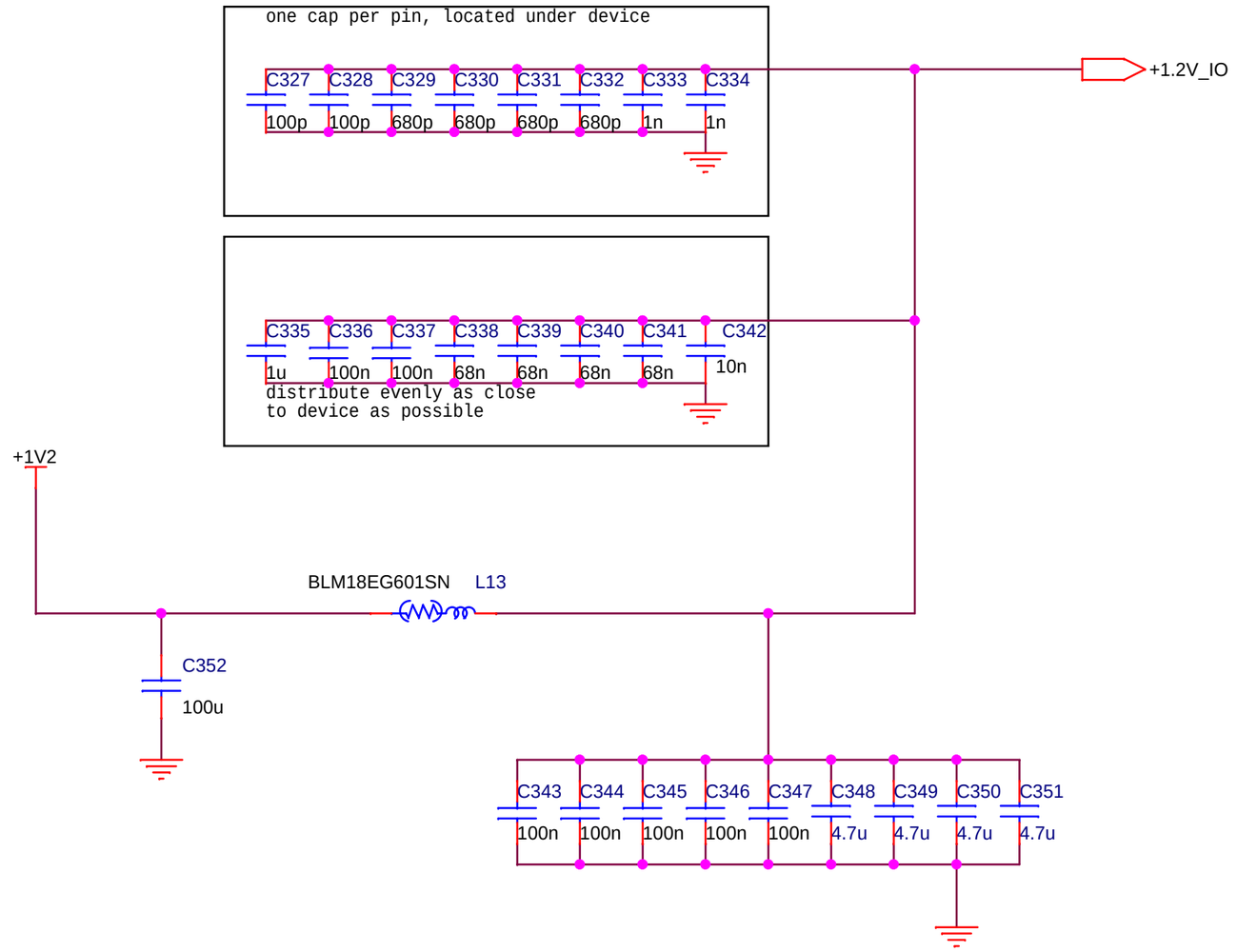
Designer: <Designer>	Layouter: <Layouter>



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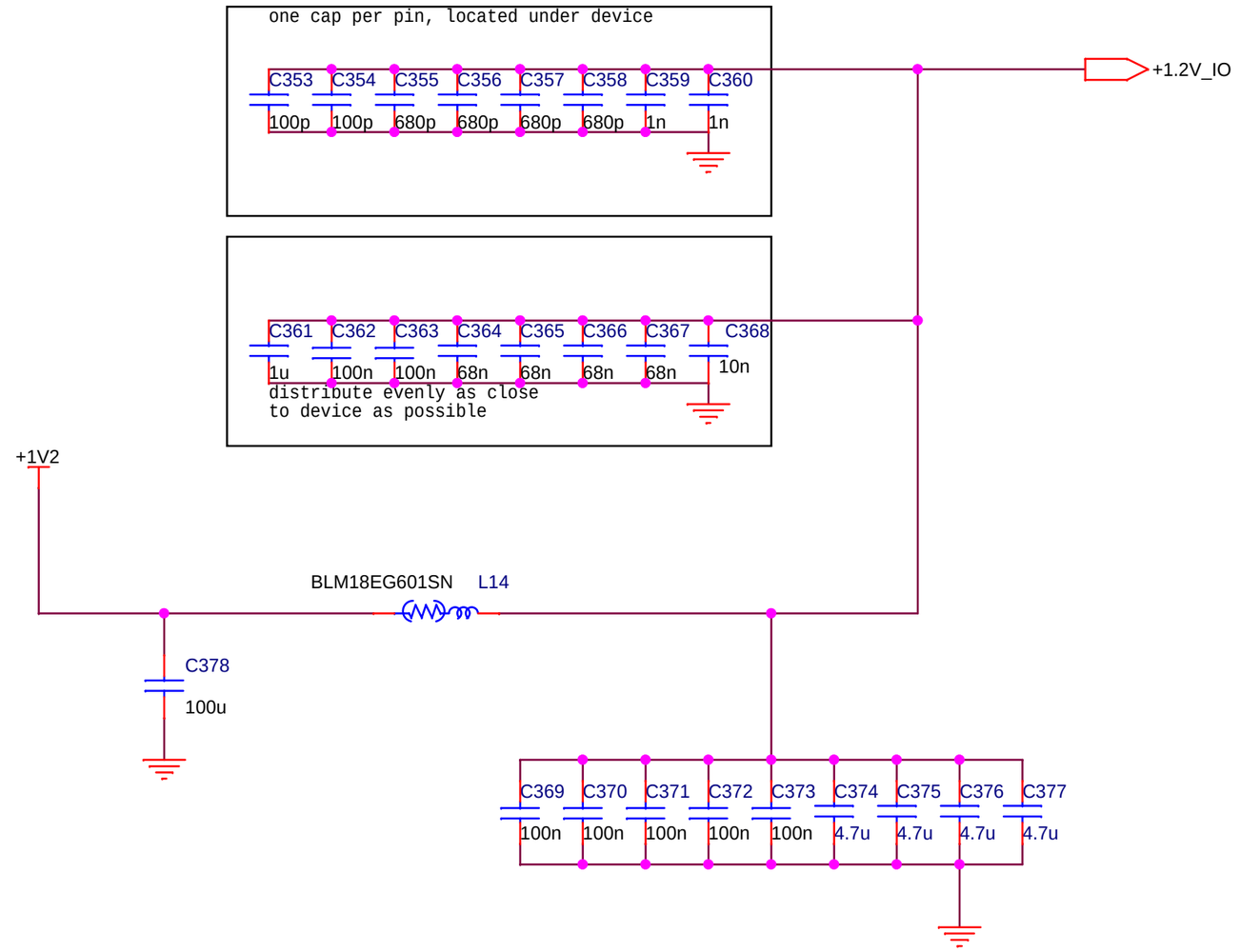
Modified: Friday, January 30, 2015	Size: A4 Page: 12/ 15
Designer: <Designer>	Layouter: <Layouter>



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Modified: Friday, January 30, 2015	Size: A4 Page: 13/ 15
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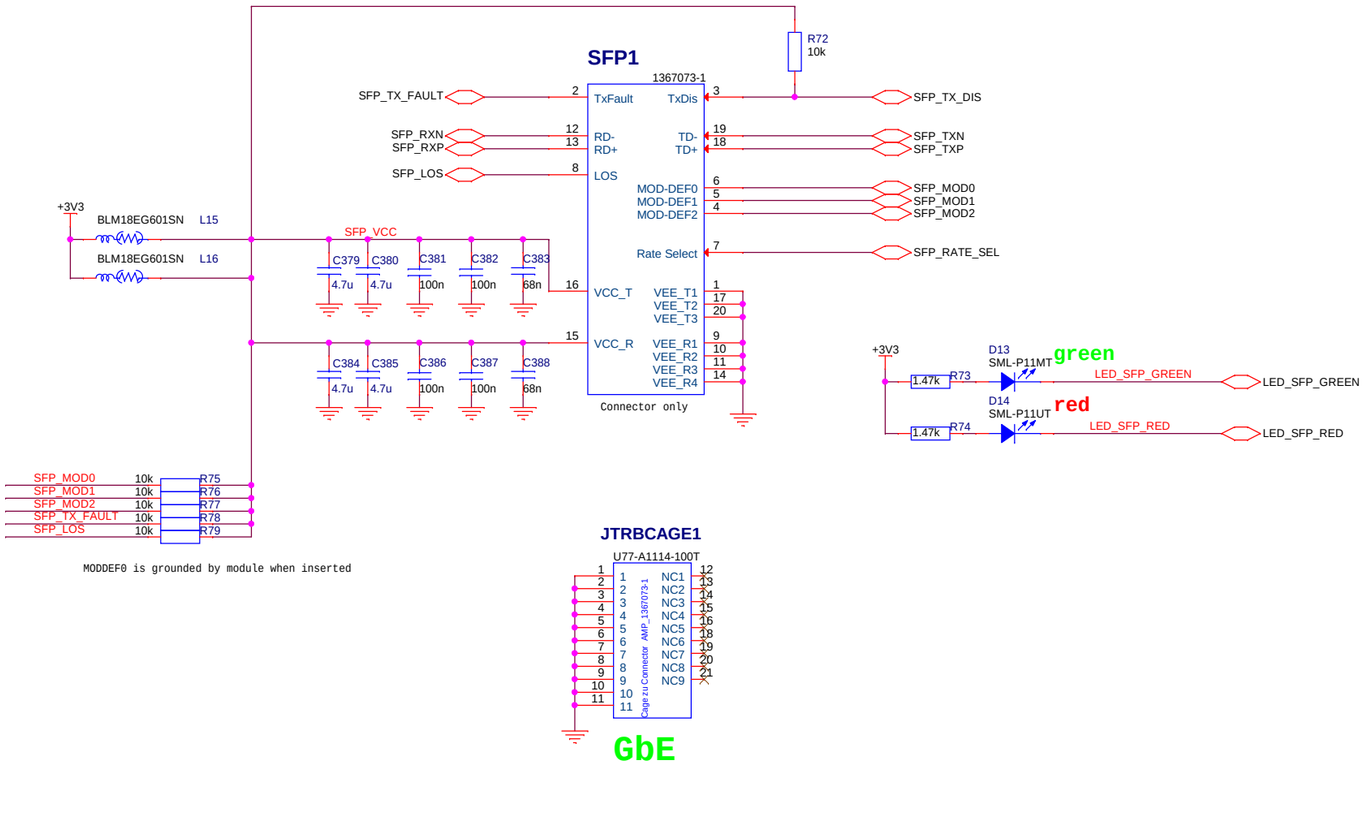

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<Title>

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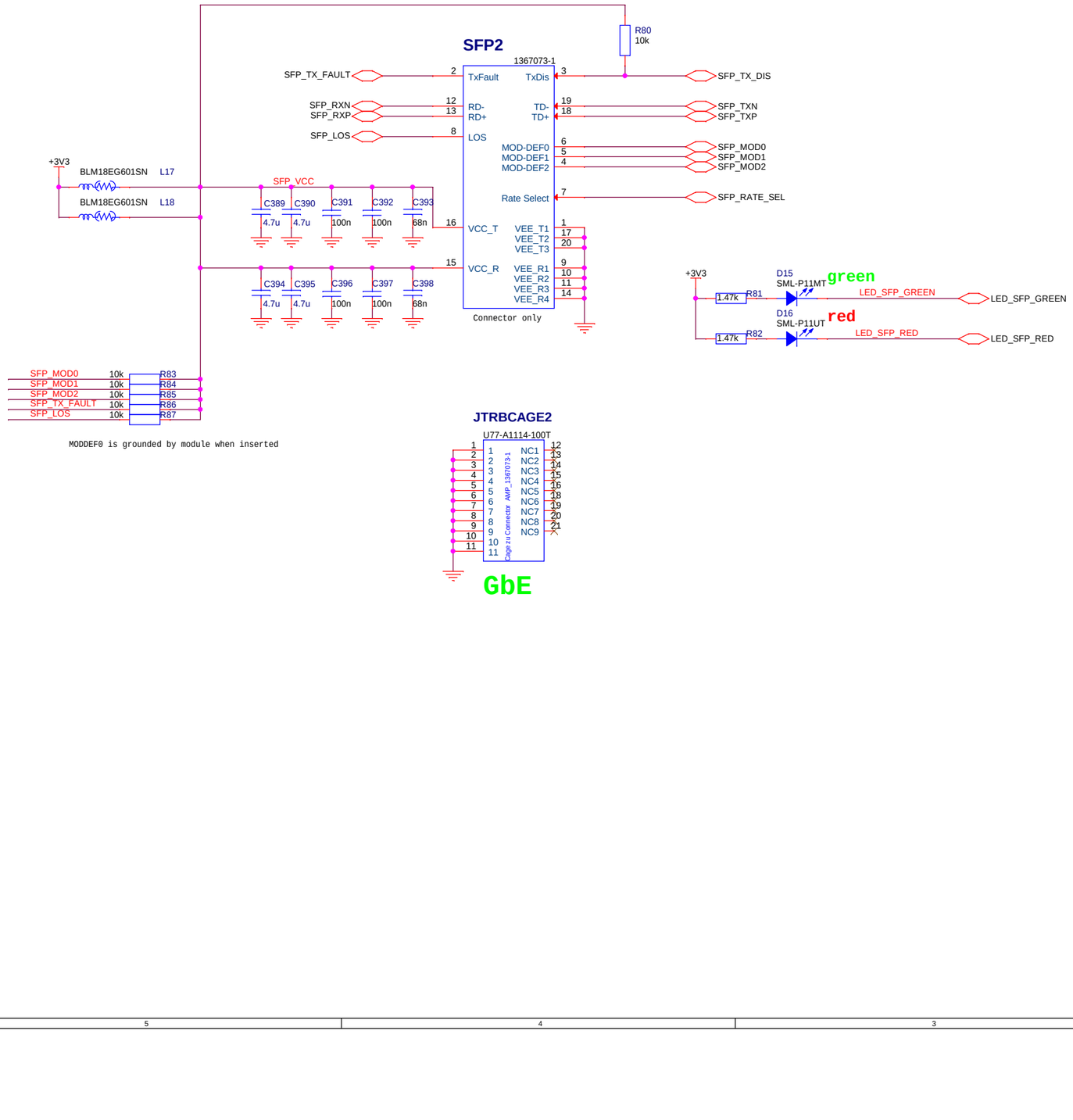
Modified: Friday, January 30, 2015	Size: Custom	Page: 14/ 15
Designer: <Designer>	Layouter: <Layouter>	



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<Title>

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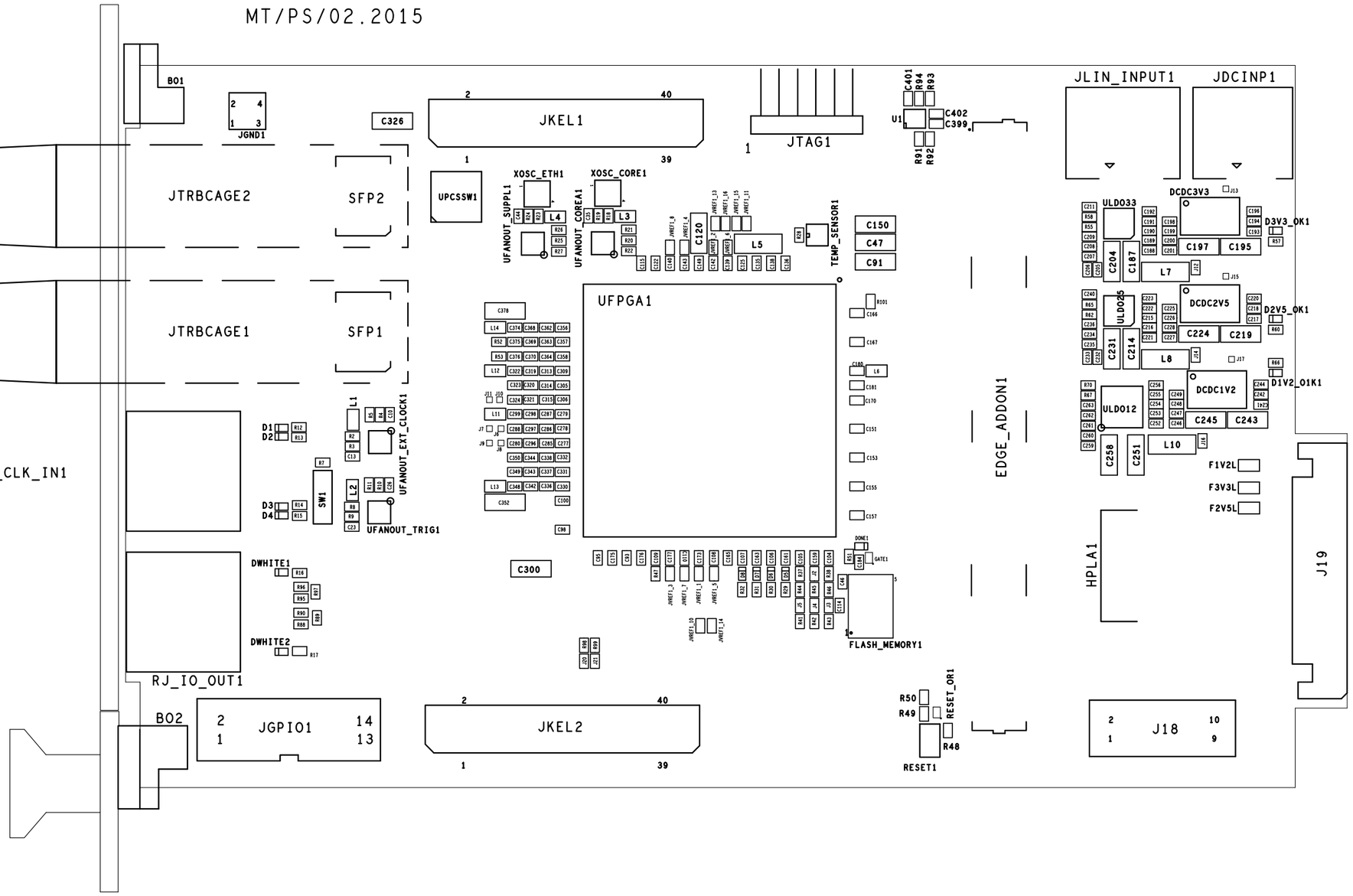
Modified: Friday, January 30, 2015	Size: Custom Page: 15/ 15
Designer: <Designer>	Layouter: <Layouter>

TRB3SC1 AST

GSI-Darmstadt

MT/PS/02.2015



Jobname	Date	Designer	Layouter
TRB3SC1	02.2015	m.traxler@gsi.de	p.skott@gsi.de

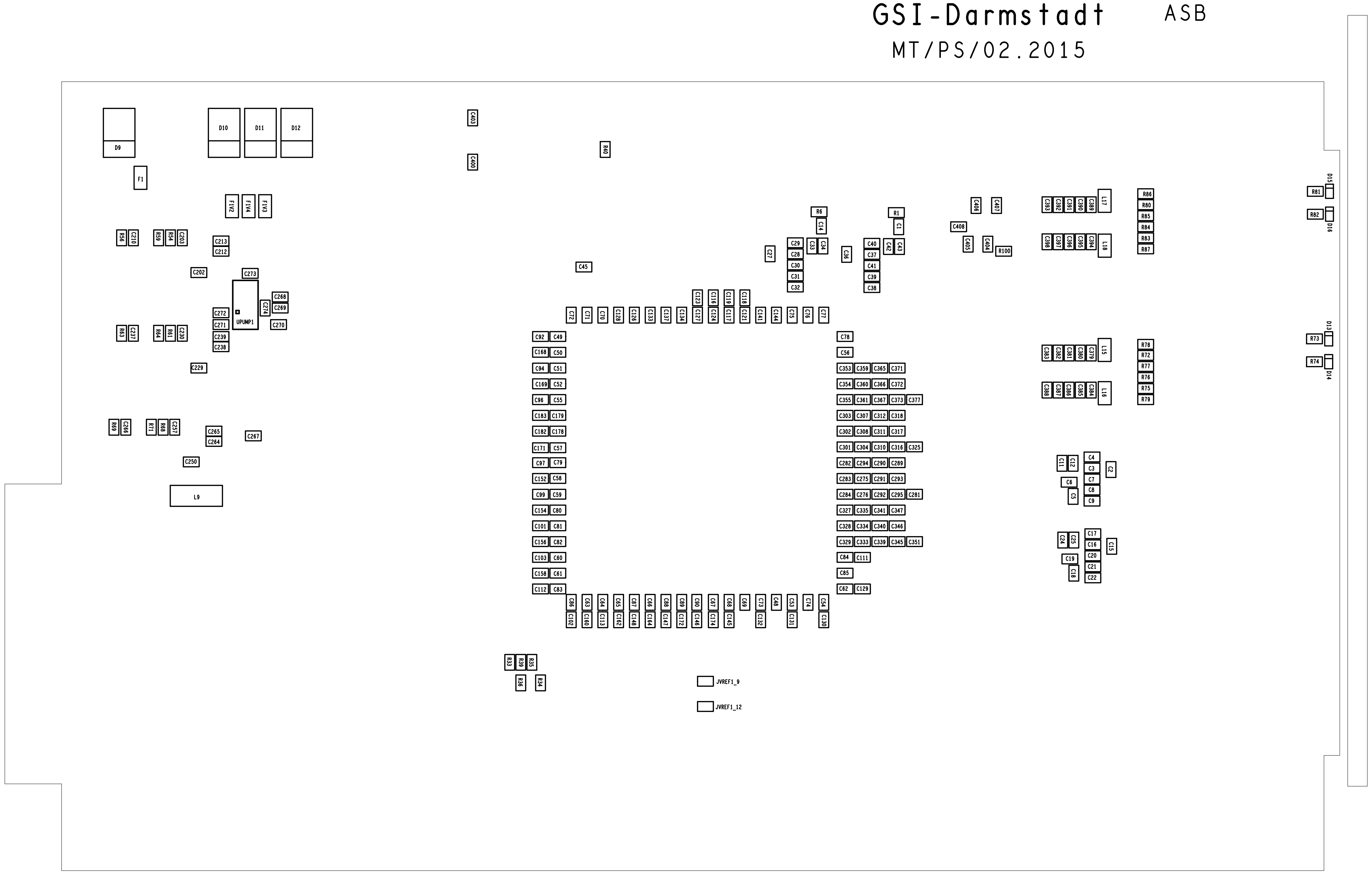
Layer Nickname

Ast

TRB3SC1

GSI-Darmstadt ASB

MT/PS/02.2015



Jobname TRB3SC1

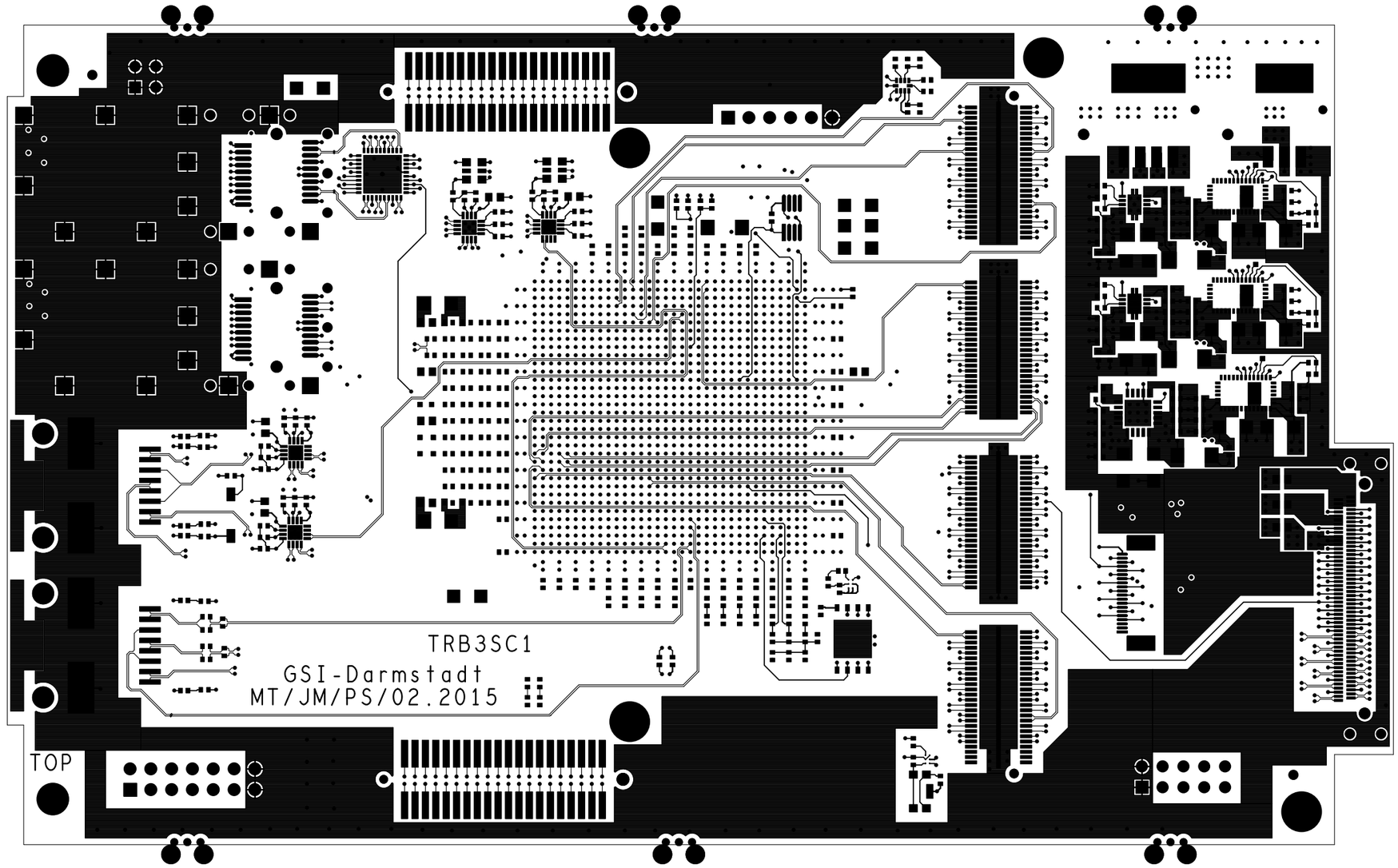
Date 02.2015

Designer m.traxler@gsi.de

Layouter p.skott@gsi.de

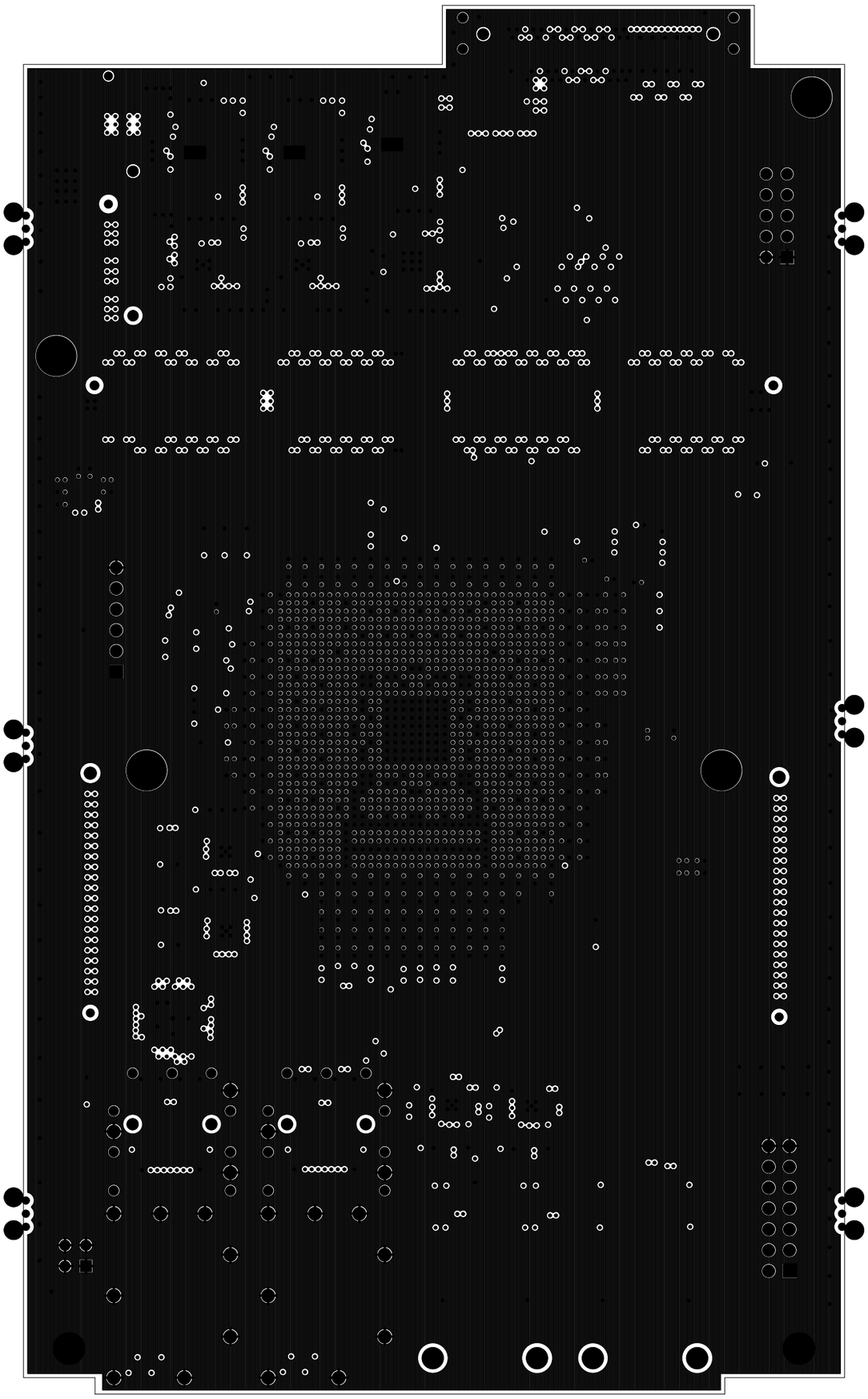
Asb

Layer Nickname



Jobname	Date	Designer	Layouter
TRB3SC1	02.2015	m.traxler@gsi.de	p.skott@gsi.de

Layer Nickname Top



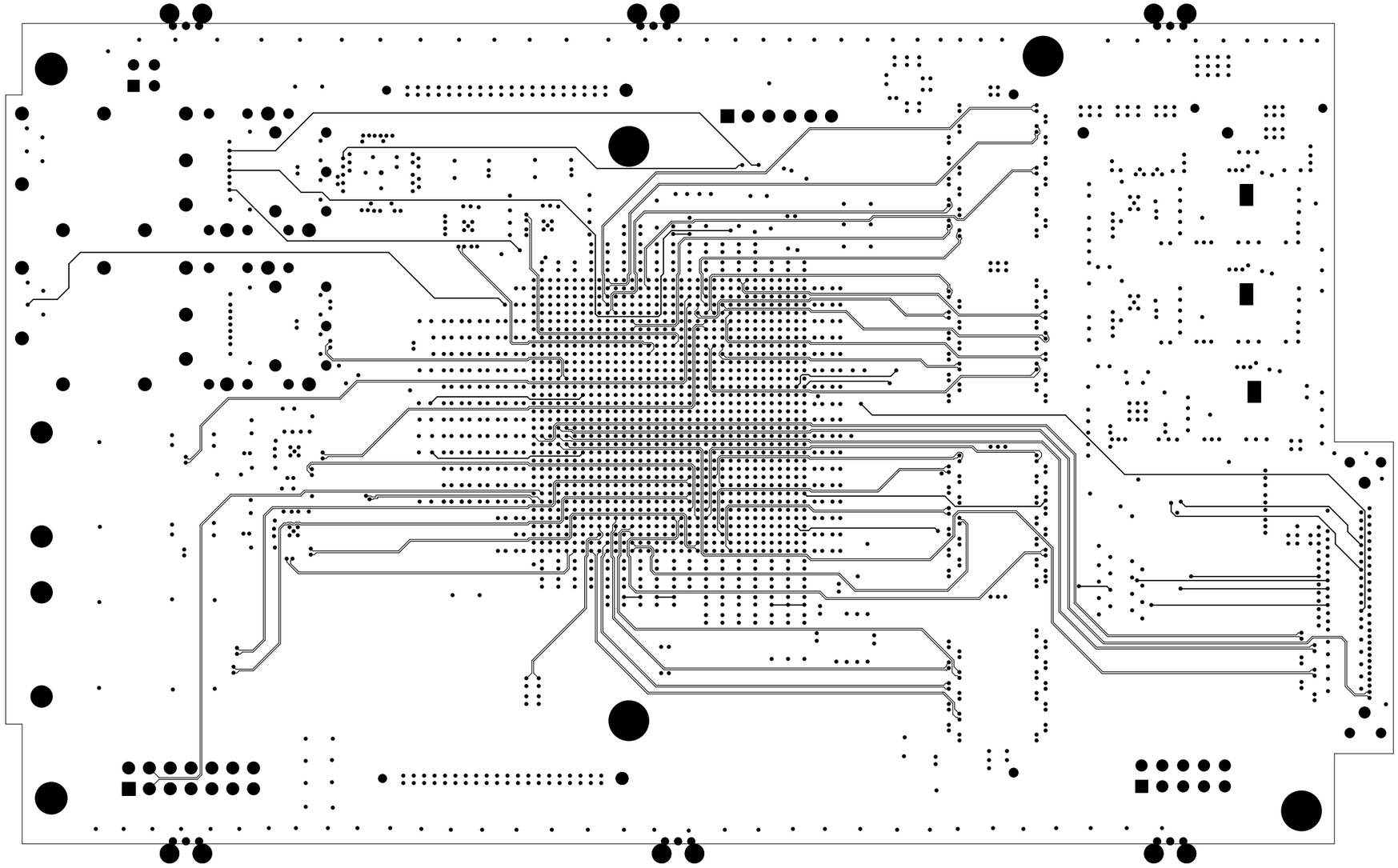
Layer Nickname
I01

Jobname
TRB3SC1

Date
02.2015

Designer
m.traxler@gsi.de

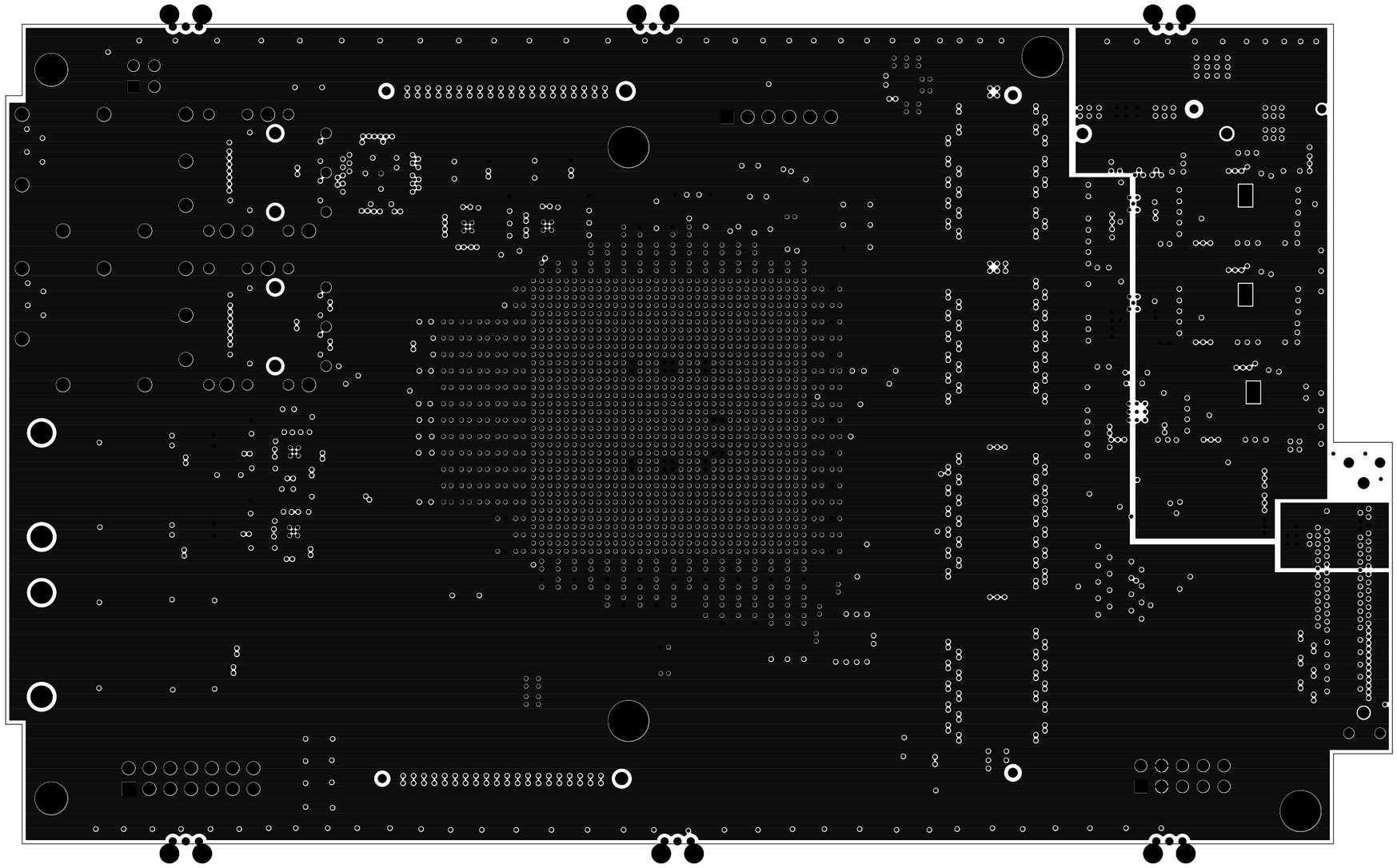
Layouter
p.skott@gsi.de



Jobname	Date	Designer	Layouter
TRB3SC1	02.2015	m.traxler@gsi.de	p.skott@gsi.de

Layer Nickname

I02



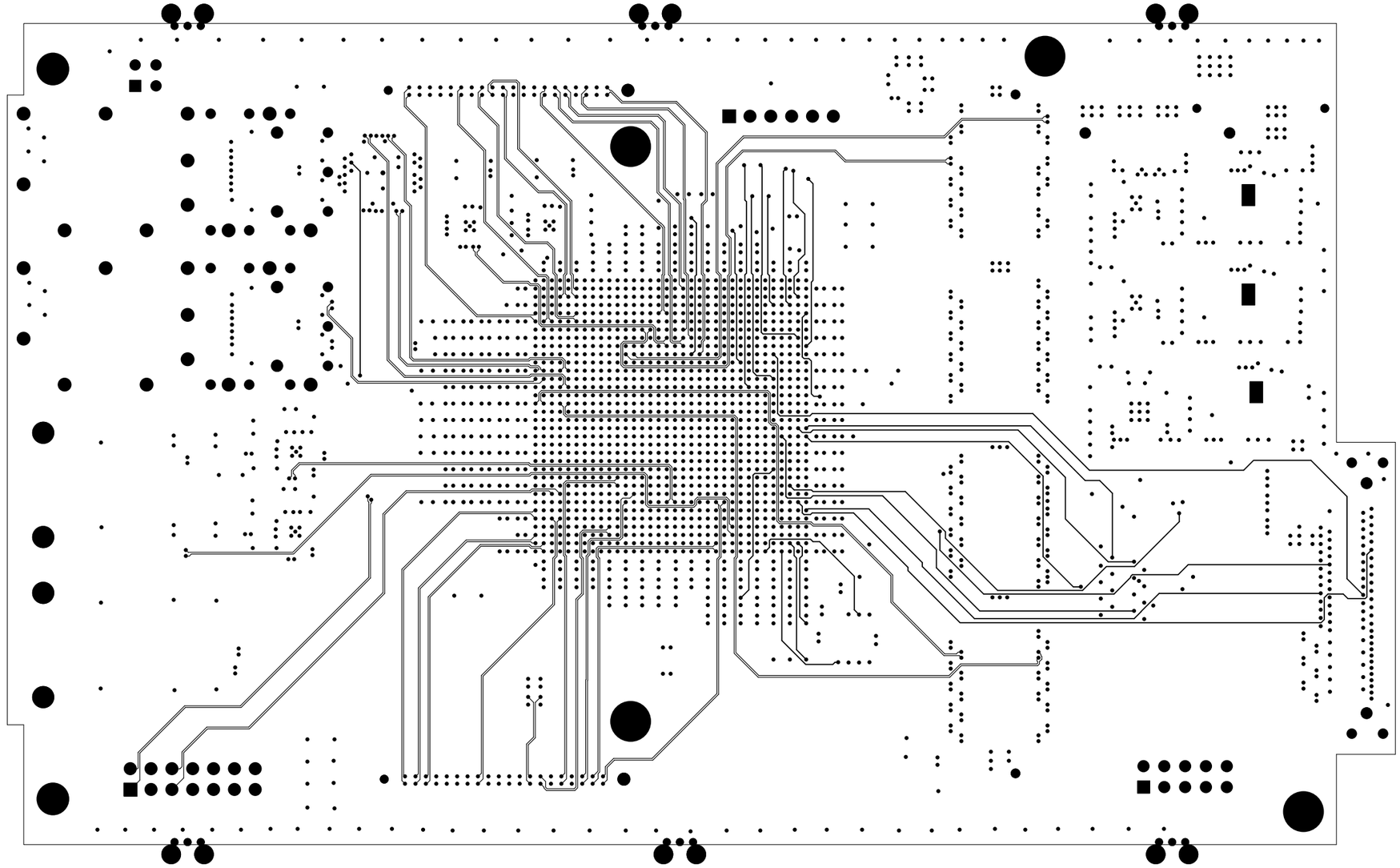
Jobname
TRB3SC1

Date
02.2015

Designer
m.traxler@gsi.de

Layouter
p.skott@gsi.de

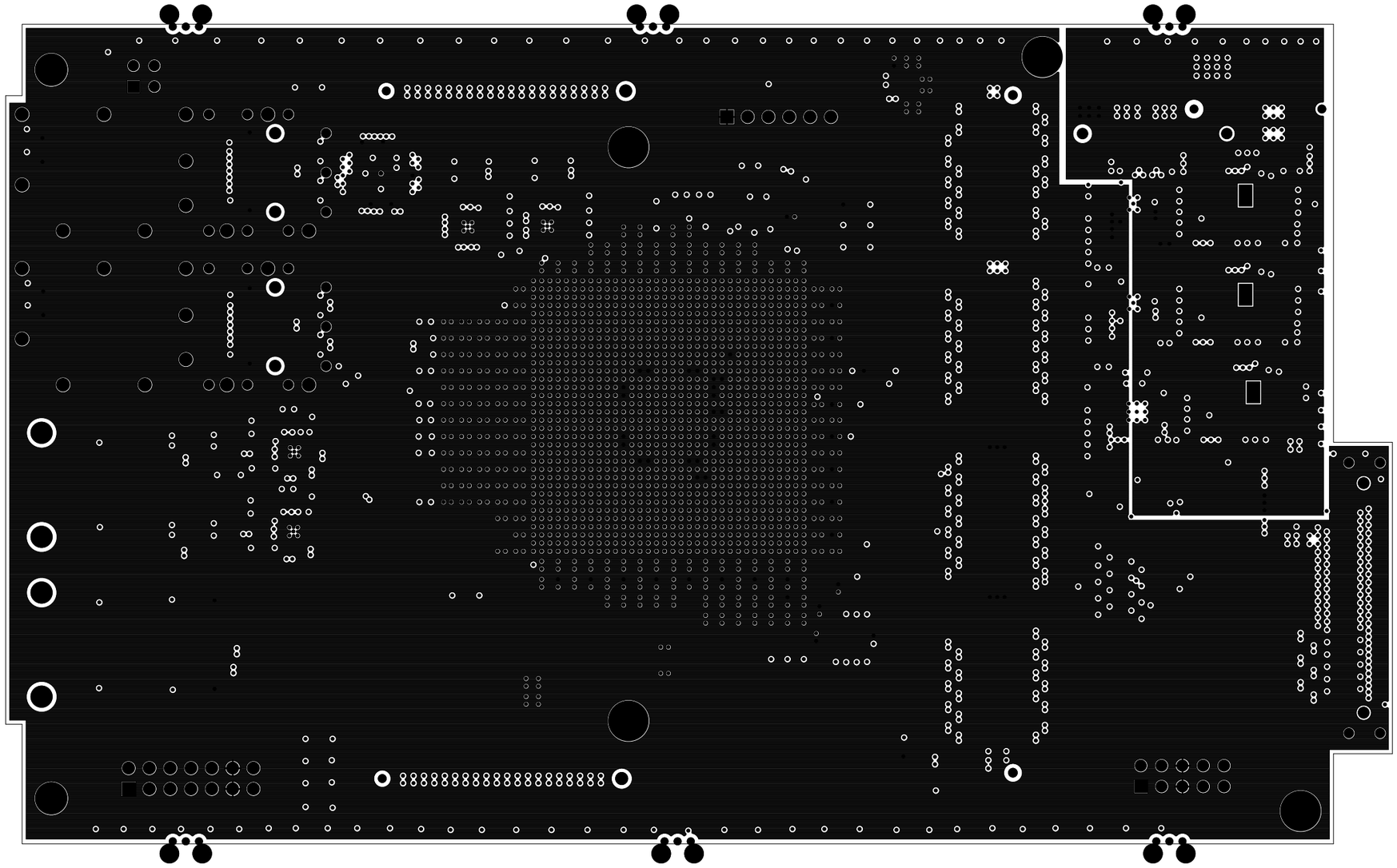
Layer Nickname
I03



Jobname	Date	Designer	Layouter
TRB3SC1	02.2015	m.traxler@gsi.de	p.skott@gsi.de

Layer Nickname

I04



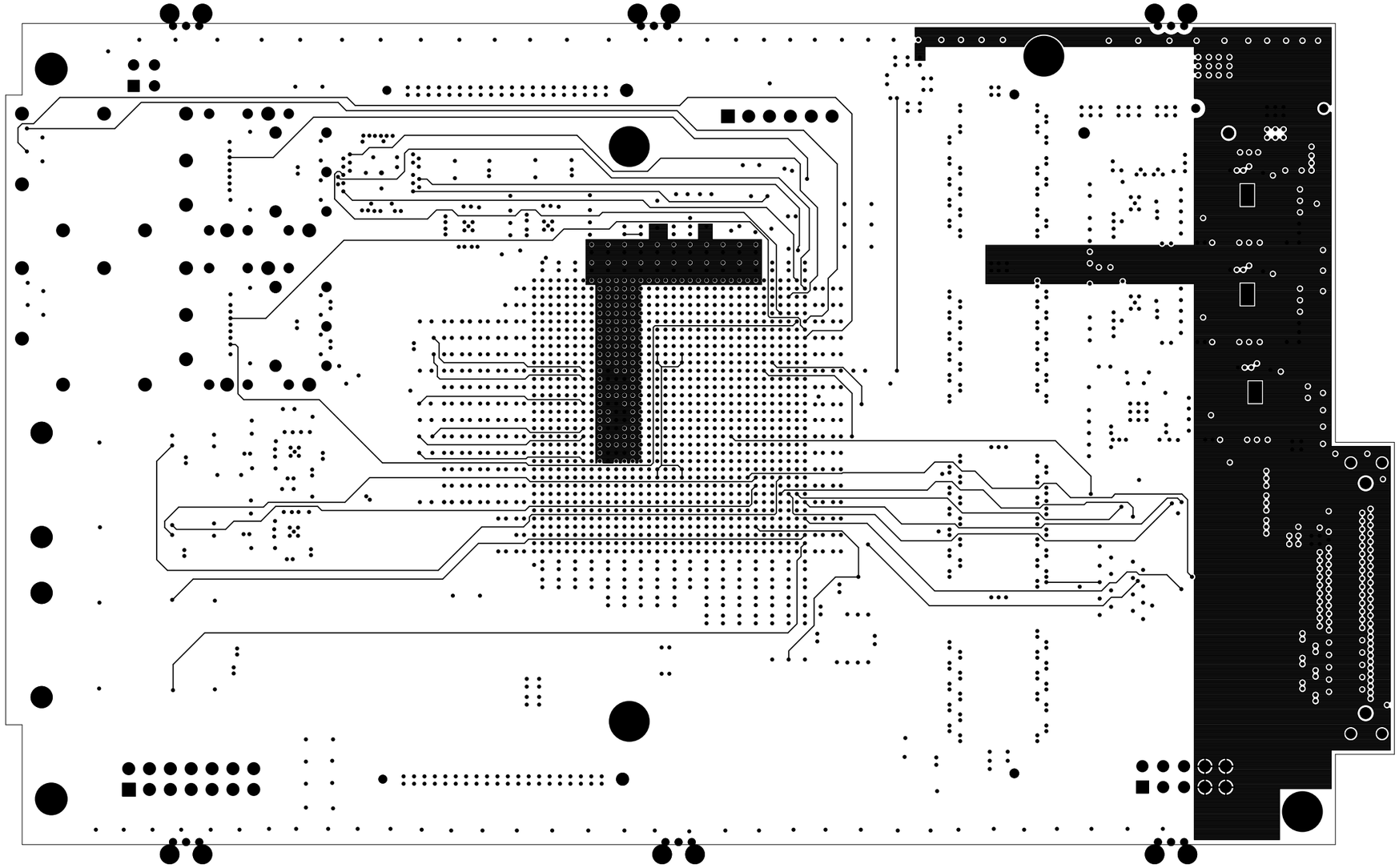
Jobname
TRB3SC1

Date
02.2015

Designer
m.traxler@gsi.de

Layouter
p.skott@gsi.de

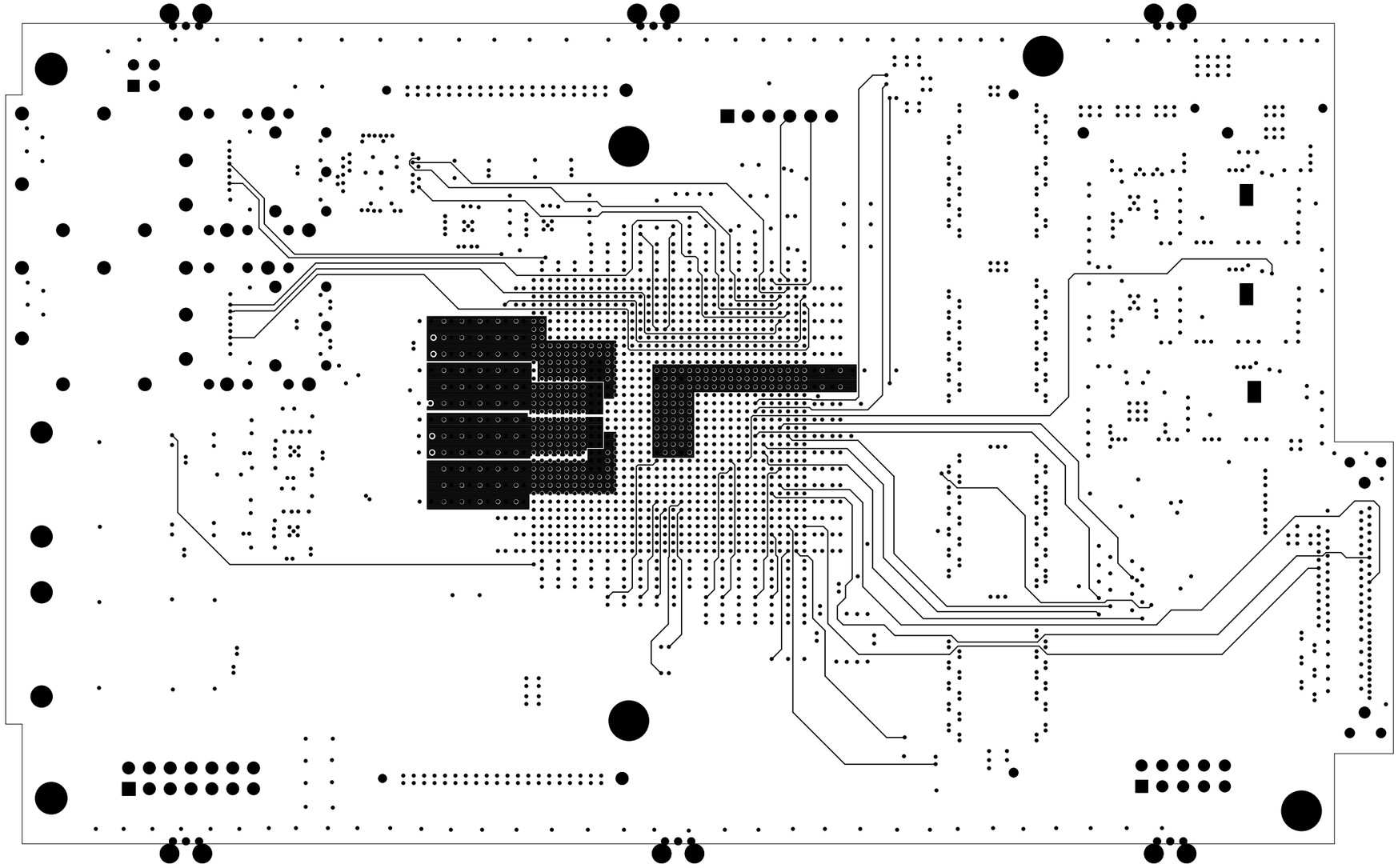
Layer Nickname
I05



Jobname	Date	Designer	Layouter
TRB3SC1	02.2015	m.traxler@gsi.de	p.skott@gsi.de

Layer Nickname

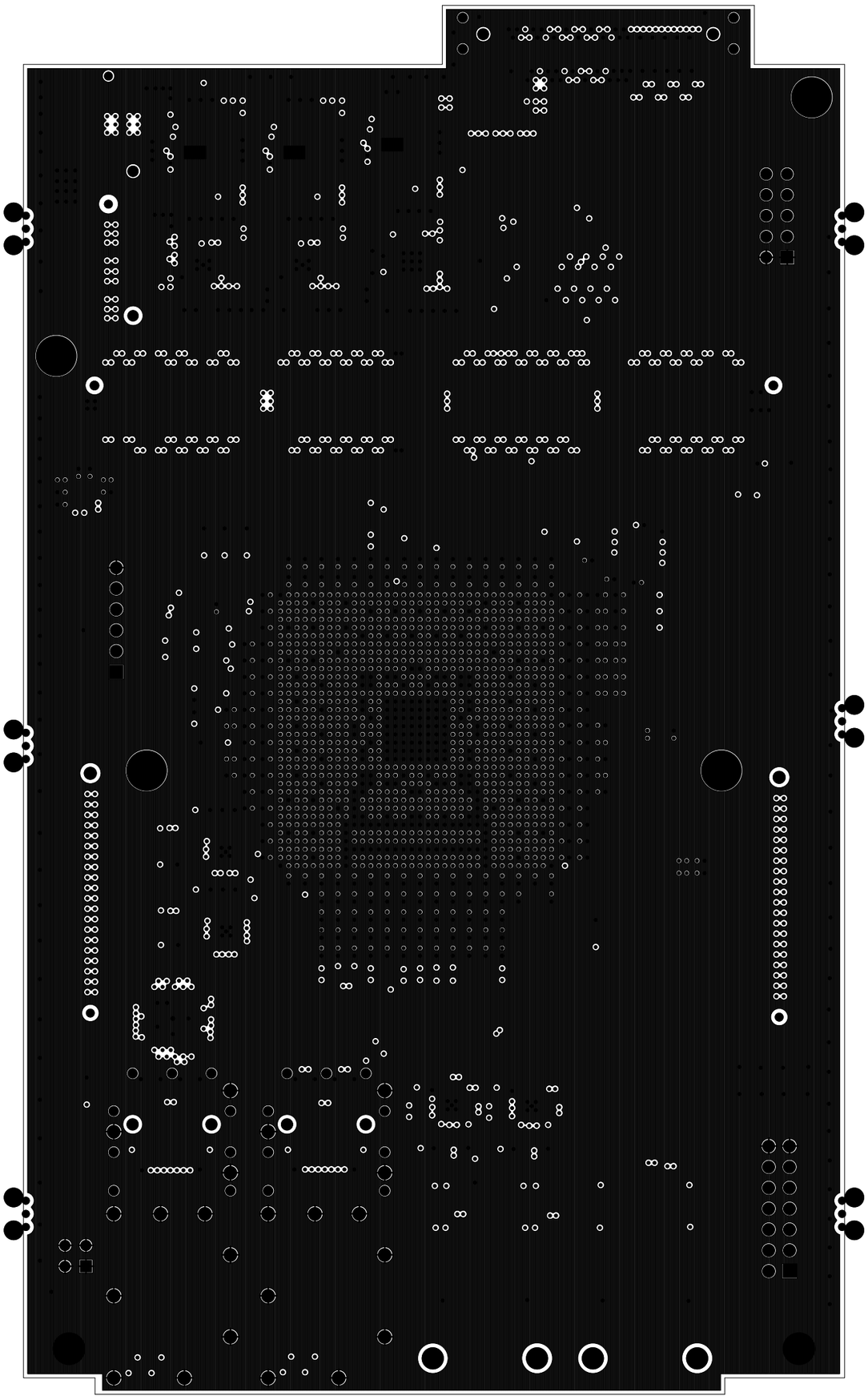
Layer I06



Jobname	Date	Designer	Layouter
TRB3SC1	02.2015	m.traxler@gsi.de	p.skott@gsi.de

Layer Nickname

I07



Layer Nickname

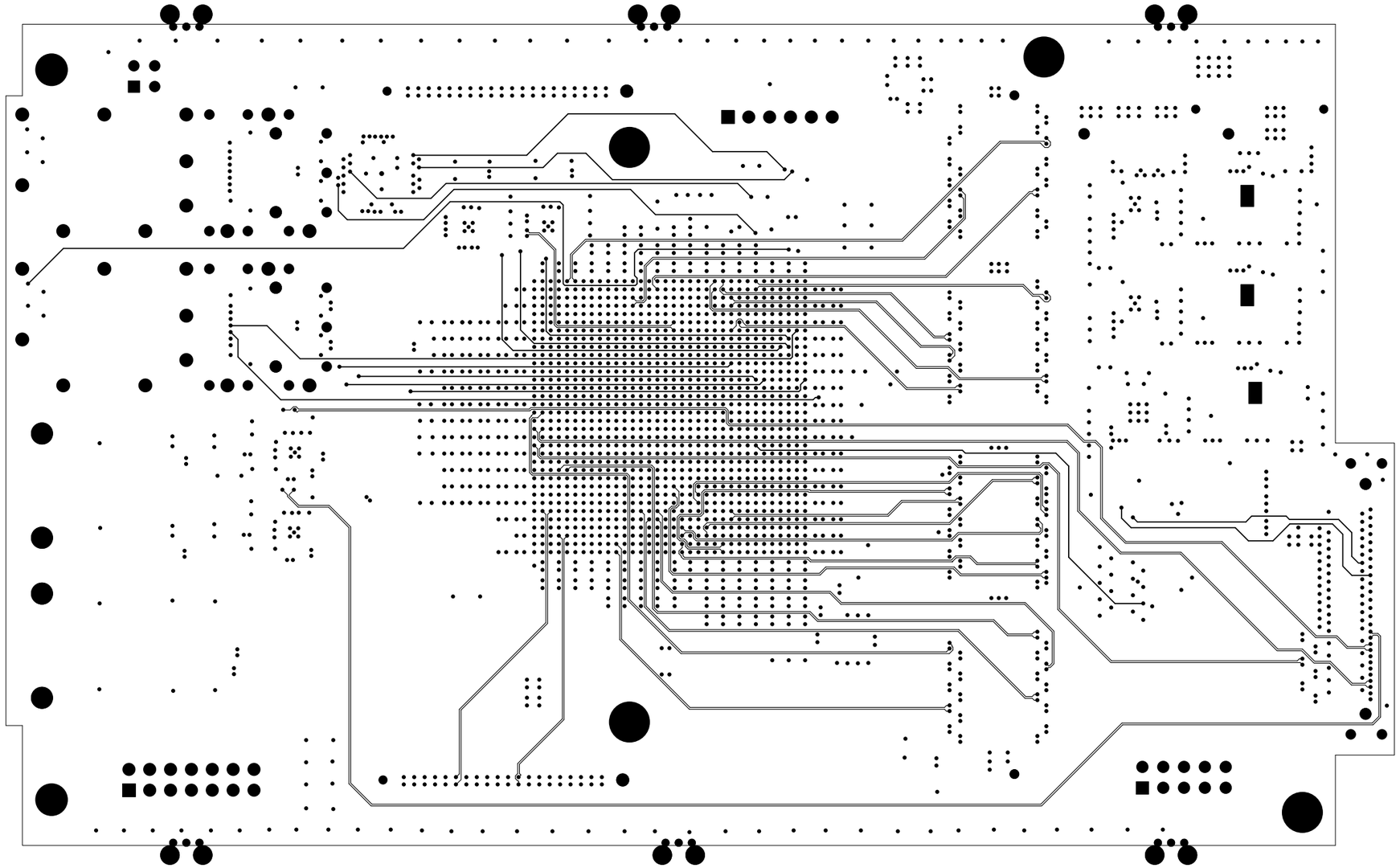
801

Jobname
TRB3SC1

Date
02.2015

Designer
m.traxler@gsi.de

Layouter
p.skott@gsi.de



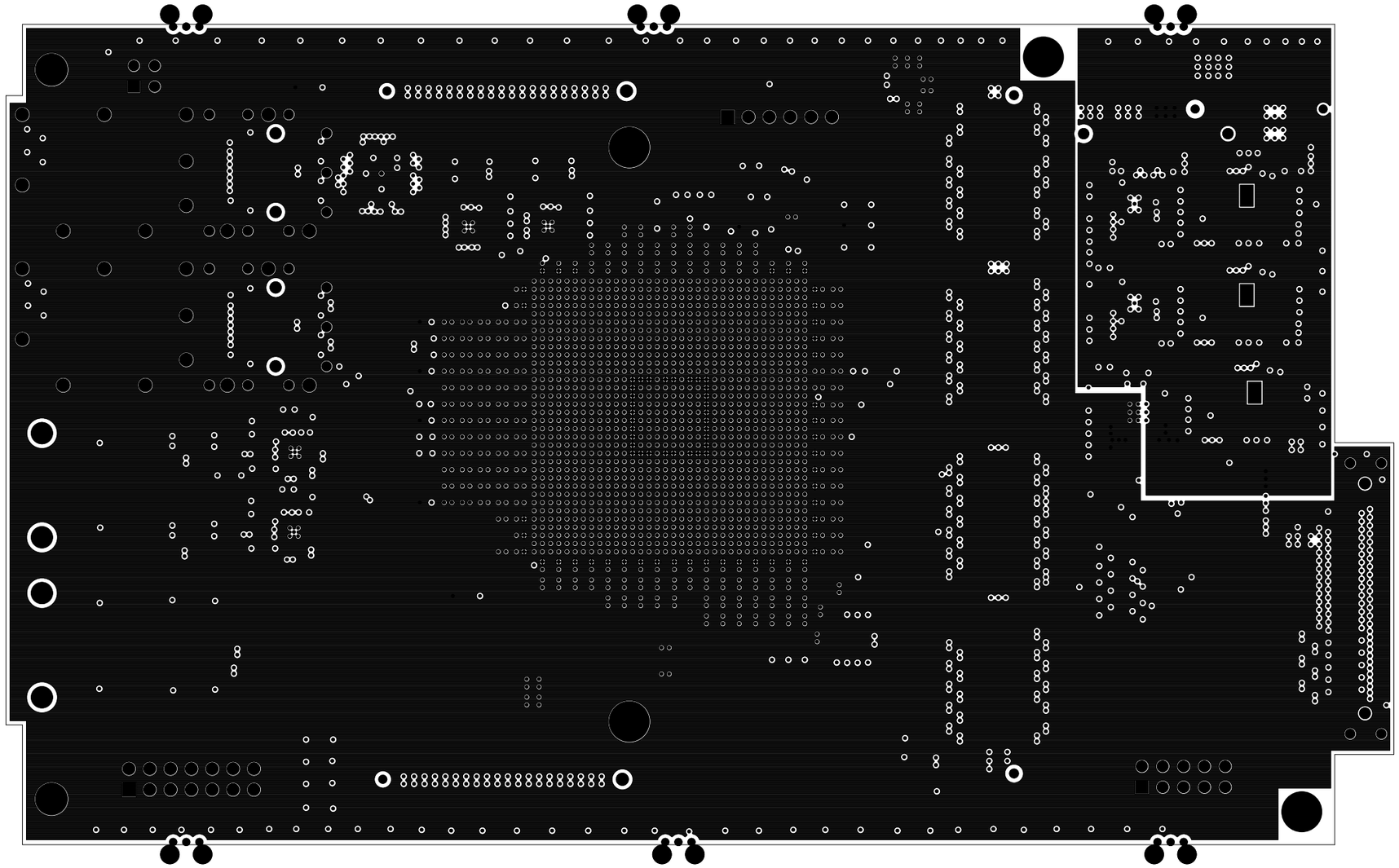
Jobname
TRB3SC1

Date
02.2015

Designer
m.traxler@gsi.de

Layouter
p.skott@gsi.de

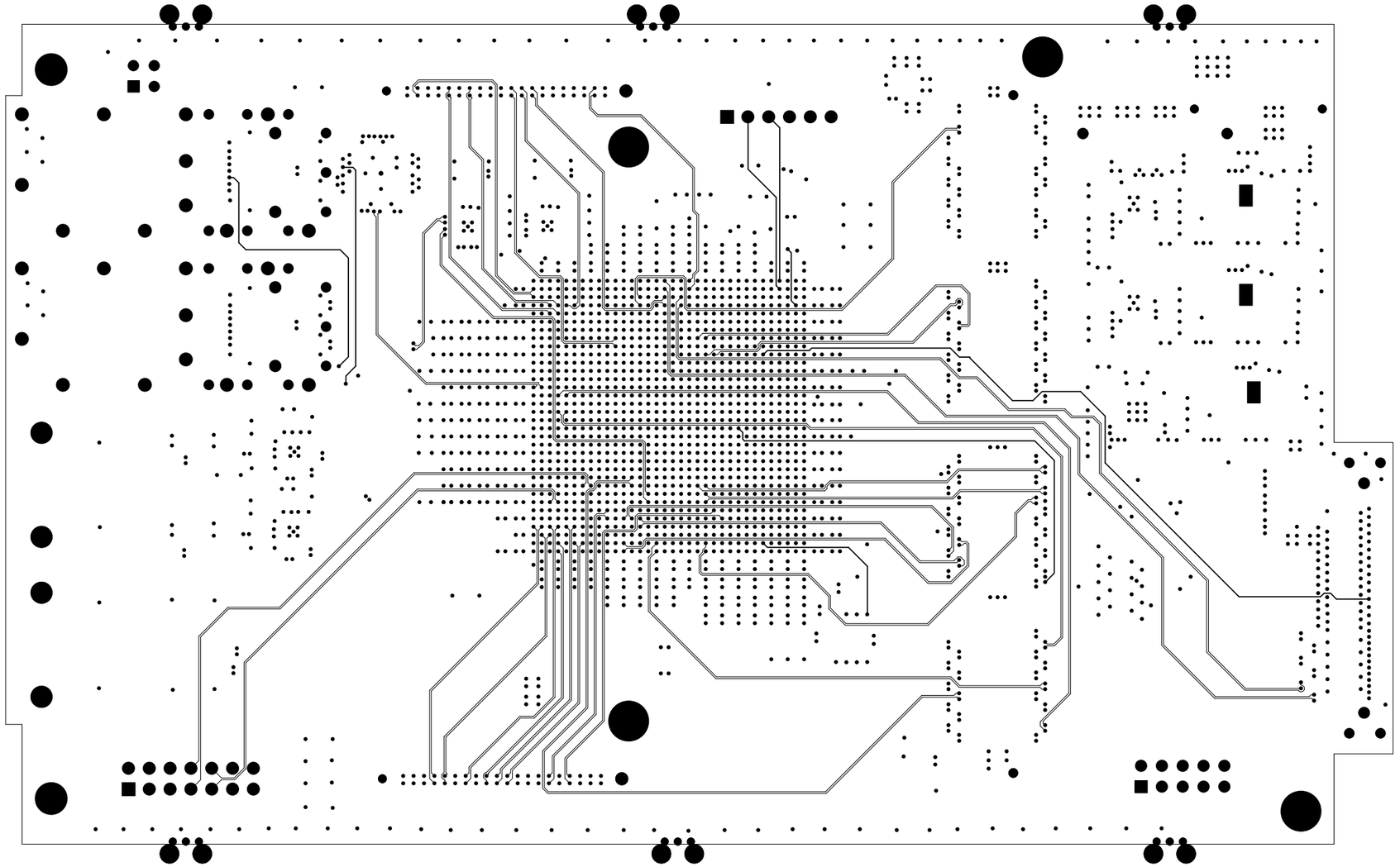
Layer Nickname
I09



Jobname	Date	Designer	Layouter
TRB3SC1	02.2015	m.traxler@gsi.de	p.skott@gsi.de

Layer Nickname

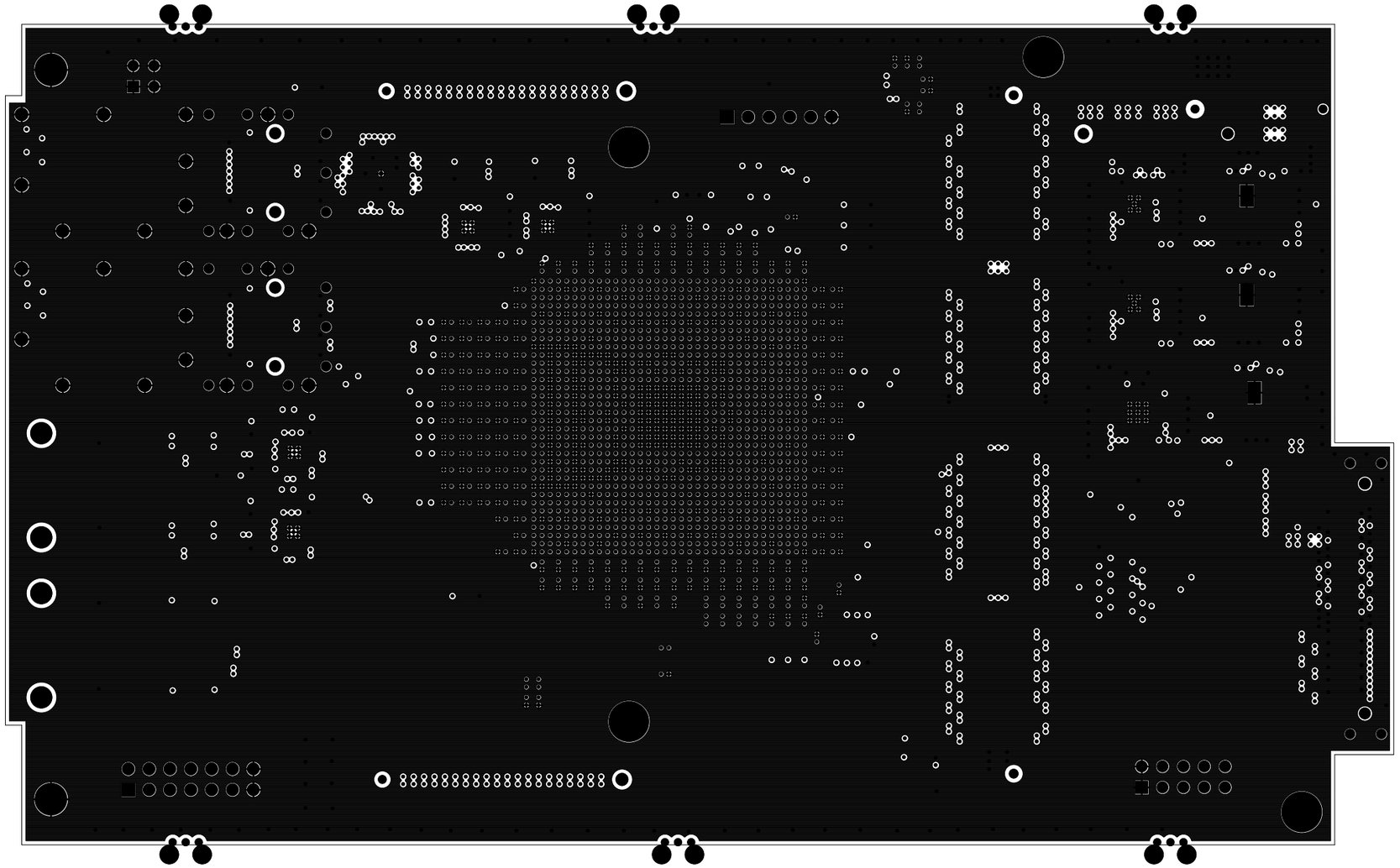
I10



Jobname	Date	Designer	Layouter
TRB3SC1	02.2015	m.traxler@gsi.de	p.skott@gsi.de

Layer Nickname

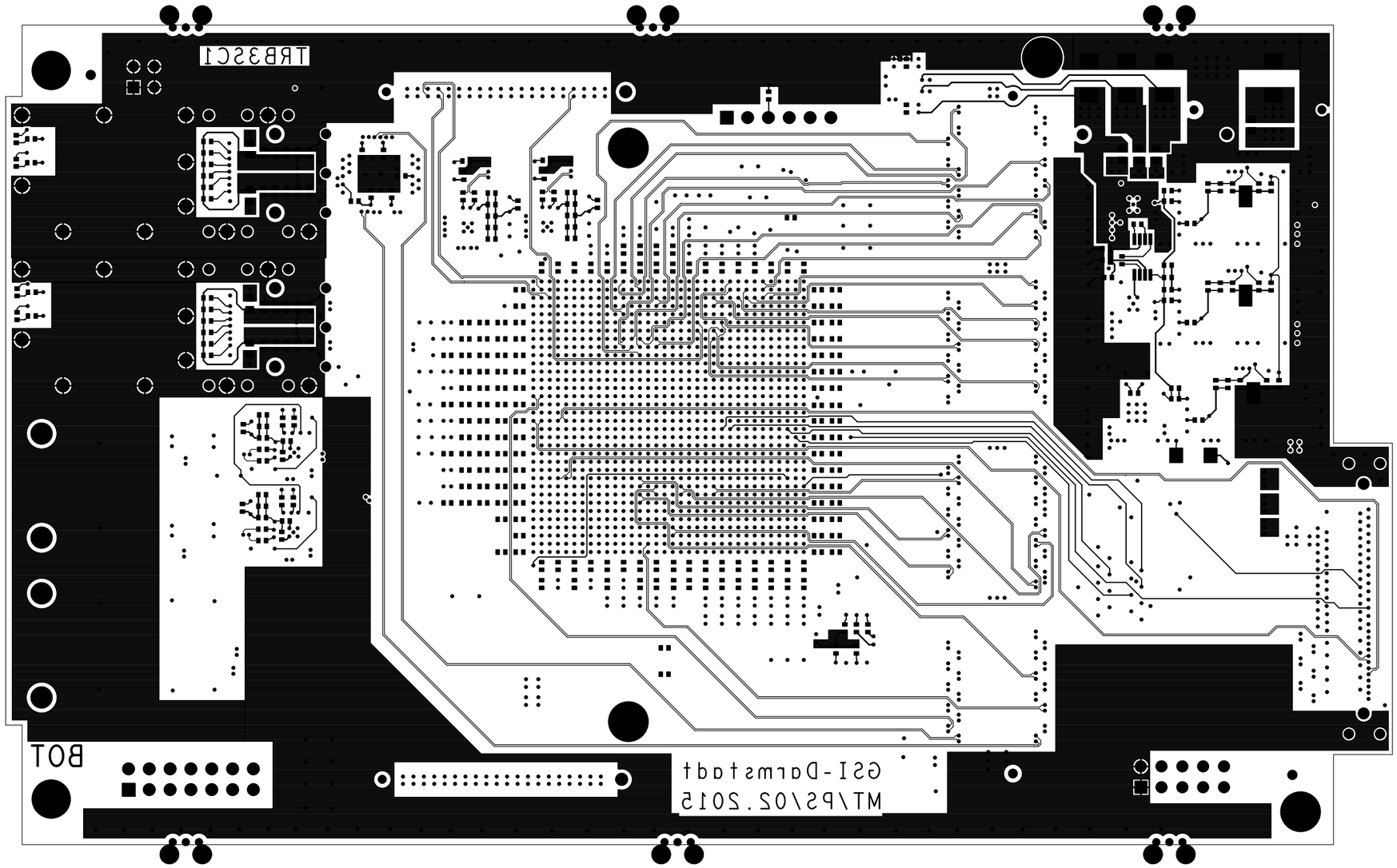
I11



Jobname	Date	Designer	Layouter
TRB3SC1	02.2015	m.traxler@gsi.de	p.skott@gsi.de

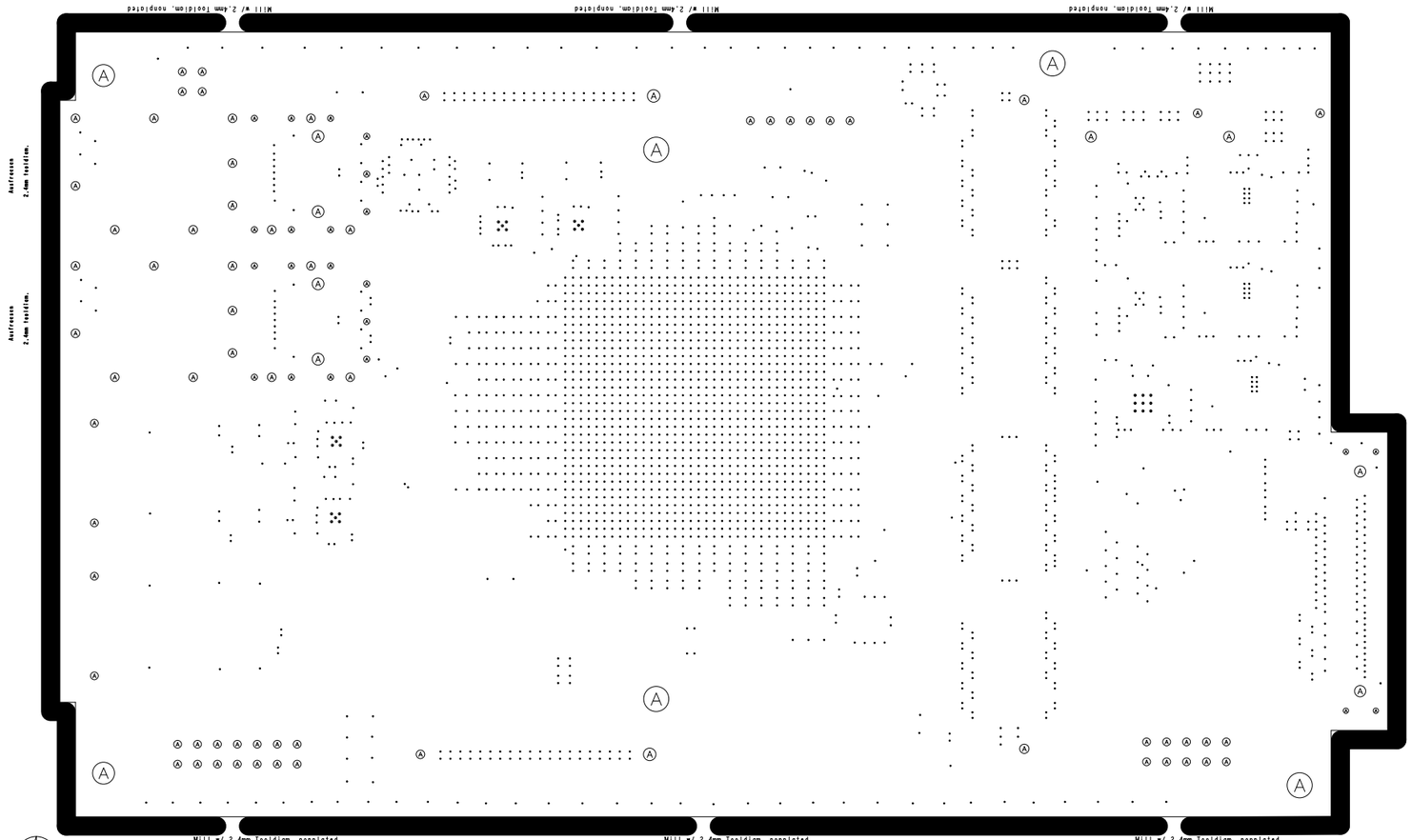
Layer Nickname

I12



Jobname	Date	Designer	Layouter
TRB3SC1	02.2015	m.traxler@gsi.de	p.skott@gsi.de

Layer Nickname Bot



Jobname TRB3SC1

Date 02.2015

Designer m.traxler@gsi.de

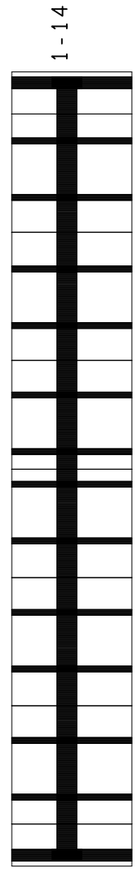
Layouter p.skott@gsi.de

Layer Nickname

Drd

DRILL CHART: TOP to BOTTOM			
ALL UNITS ARE IN MILLIMETERS			
FIGURE	SIZE	PLATED	QTY
·	0.2	PLATED	2595
•	0.3	PLATED	29
•	0.4	PLATED	1
⊗	0.7	PLATED	4
Ⓐ	0.8	PLATED	18
Ⓐ	1.0	PLATED	34
Ⓐ	1.1	PLATED	22
Ⓐ	2.8	PLATED	2
Ⓐ	3.2	PLATED	4
Ⓐ	1.1	NON-PLATED	4
Ⓐ	1.2	NON-PLATED	2
Ⓐ	1.4	NON-PLATED	2
Ⓐ	1.45	NON-PLATED	2
Ⓐ	1.5	NON-PLATED	4
Ⓐ	1.6	NON-PLATED	2
Ⓐ	2.7	NON-PLATED	4

TOTAL HOLES: 2729



* SURFACE - AIR 0 MM
* DIELECTRIC - COATING 0.015 MM
L1: TOP CONDUCTOR - COPPER 0.034 MM
* DIELECTRIC - NP-155F_1080 0.075 MM
* DIELECTRIC - NP-155F_1080 0.071 MM
L2: INNER1 PLANE - COPPER 0.017 MM
* DIELECTRIC - NP-155F-TL 0.15 MM
L3: INNER2 CONDUCTOR - COPPER 0.017 MM
* DIELECTRIC - NP-155F_2125 0.094 MM
* DIELECTRIC - NP-155F_2125 0.1 MM
L4: INNER3 PLANE - COPPER 0.017 MM
* DIELECTRIC - NP-155F-TL 0.15 MM
L5: INNER4 CONDUCTOR - COPPER 0.017 MM
* DIELECTRIC - NP-155F_2125 0.094 MM
* DIELECTRIC - NP-155F_2125 0.094 MM
L6: INNER5 PLANE - COPPER 0.017 MM
* DIELECTRIC - NP-155F-TL 0.15 MM
L7: INNER6 CONDUCTOR - COPPER 0.017 MM
* DIELECTRIC - NP-155F_106 0.043 MM
* DIELECTRIC - NP-155F_106 0.036 MM
L8: INNER7 CONDUCTOR - COPPER 0.017 MM
* DIELECTRIC - NP-155F-TL 0.15 MM
L9: INNER8 PLANE - COPPER 0.017 MM
* DIELECTRIC - NP-155F_2125 0.1 MM
* DIELECTRIC - NP-155F_2125 0.094 MM
L10: INNER9 CONDUCTOR - COPPER 0.017 MM
* DIELECTRIC - NP-155F-TL 0.15 MM
L11: INNER10 PLANE - COPPER 0.017 MM
* DIELECTRIC - NP-155F_2125 0.1 MM
* DIELECTRIC - NP-155F_2125 0.094 MM
L12: INNER11 CONDUCTOR - COPPER 0.017 MM
* DIELECTRIC - NP-155F-TL 0.15 MM
L13: INNER12 PLANE - COPPER 0.017 MM
* DIELECTRIC - NP-155F_1080 0.071 MM
* DIELECTRIC - NP-155F_1080 0.075 MM
L14: BOTTOM CONDUCTOR - COPPER 0.034 MM
* DIELECTRIC - COATING 0.015 MM
* SURFACE - AIR 0 MM

DESIGN CROSS SECTION CHART
TOTAL THICKNESS 2.343 MM

Jobname	Date	Designer	Layouter
TRB3SC1	02.2015	m.traxler@gsi.de	p.skott@gsi.de

Layer Nickname

Fab

14Lagen Multilayer 2,36mm dick
Feinleitertechnik 90u Leiterbreite.
Impedanzberechnete Leiterfuehrung geringster Abstand 100u
Vias mit 0,2mm Drill mit PLUGGING

Capture CIS Standard Bill Of Materials - Compressed Report

Report Created on Friday Jan 30 10:21:53 2015

Layouter = P.Skott

Designer = M.Traxler/J.Michel

Design File Name = K:\GSIJOB\HADES\TRBV3\TRB3SC1\TRBV3SC1.DSN

Item Number	Quantity	Part Reference	DESCRIPTION	PART_CASE	Value	MANUFACTUF	MANUFACTUF	DATASHEET	GSI_STOCK_N	COMMISSION	APPROVED	COMPONENT_
1	1	BO1	Housing, Acce		60807-181	60807-181	Schroff		2000	R.Hartmann	S.Voltz	24719
2	1	BO2	Housing, Acce		20817-327	20817-327	Schroff		2276	R.Hartmann	S.Voltz	24738
3	163	C1,C4-C14,C1	Capacitor, Cer	SMD-0402	100n					G.May	G.May	24583
4	102	C2,C3,C15,C1	Capacitor, Cer	SMD-0402	4.7u	C1005X5R0J47	TDK	K:\GsiLib\Data		M.Traxler	P.Skott	25745
5	20	C47,C91,C120	Capacitor, Cer	SMD-1206	100u	GRM31CR60J1	Murata	K:\GsiLib\Data		M.Traxler	P.Skott	25187
6	33	C75-C77,C80-(	Capacitor, Cer	SMD-0402	47n					G.May	G.May	21810
7	15	C78,C79,C87-(	Capacitor, Cer	SMD-0402	10n	GRM36X7R10	Murata			G.May	G.May	21804
8	6	C143,C144,C1	Capacitor, Cer	SMD-0402	10n	GRM155R71E	Murata			G.May	P.Skott	24600
9	3	C193,C217,C2	Capacitor, Cer	SMD-0402	4.7n	GRM155R72A	Murata			H.G.Koenig	P.Skott	25281
10	3	C203,C230,C2	Capacitor, Cer	SMD-0402	15p					E.Badura	G.May	21779
11	3	C210,C237,C2	Capacitor, Cer	SMD-0402	15n					G.May	G.May	21807
12	6	C273,C274,C2	Capacitor, Cer	SMD-0402	1u	GRM155R61A	Murata			G.May	G.May	21815
13	8	C275,C276,C3	Capacitor, Cer	SMD-0402	100p					E.Badura	G.May	21789
14	16	C277-C280,C3	Capacitor, Cer	SMD-0402	680p					G.May	G.May	21796
15	8	C281,C282,C3	Capacitor, Cer	SMD-0402	1n	GRM155R71H	Murata			G.May	G.May	21798
16	20	C286-C289,C3	Capacitor, Cer	SMD-0402	68n					G.May	G.May	21811
17	9	D1,D1V2_O1K	LED, Single, Gr	SMD-0402	SML-P11MT	SML-P11MT	Rohm	K:\GsiLib\Data		M.Traxler	P.Skott	25441
18	5	D2,D4,D7,D14	LED, Single, Re	SMD-0402	SML-P11UT	SML-P11UT	Rohm	K:\GsiLib\Data		M.Traxler	P.Skott	25444
19	1	D6	LED, Single, Or	SMD-0402	SML-P11DT	SML-P11DT	Rohm	K:\GsiLib\Data		M.Traxler	P.Skott	25443
20	1	D8	LED, Single, Ye	SMD-0402	SML-P11YT	SML-P11YT	Rohm	K:\GsiLib\Data		M.Traxler	P.Skott	25442
21	1	D9	Diode, Zener,	DO-214AA	SMBJ5341B-TI	SMBJ5341B-TI	Microsemi	K:\GsiLib\Data		M.Traxler	P.Skott	25880
22	1	D10	Diode, Zener,	DO-214AA	SMBJ5333B-TI	SMBJ5333B-TI	Microsemi	K:\GsiLib\Data		M.Traxler	P.Skott	25878
23	2	D11,D12	Diode, Zener,	DO-214AA	SMBJ5335B-TI	SMBJ5335B-TI	Microsemi	K:\GsiLib\Data		M.Traxler	P.Skott	25879
24	3	DCDC1V2,DCI	IC-Power, DC-	QFN-38	EN6337QI	EN6337QI-T	Enpirion	K:\GsiLib\Data		M.Traxler	S.Voltz	25591
25	2	DWHITE1,DW	LED, Single, W	SMD-0402	LW QH8G	LW QH8G-Q2S	Osram	K:\GsiLib\Data		J.Hoffmann	S.Voltz	25489
26	1	EDGE_ADDON	Connector, Pir		QMS-104-09.7	QMS-104-09.7	Samtec	K:\GsiLib\Data		M.Traxler	P.Skott	25422
27	7	F1,F1V2,F1V2I	Fuse, SMD, Ve		5A	0467005.NRHI	Littelfuse	K:\GsiLib\Data		W.Panschow	S.Voltz	25479
28	1	FLASH_MEMC	IC-Digital, Mer	WSON-8	MX25L6405D2	MX25L6405D2	Macronix	K:\GsiLib\Data		J.Hoffmann	S.Voltz	25113
29	2	GATE1,RESET_	IC-Digital, Logi	DSBGA-6	SN74LVC1G57	SN74LVC1G57	Texas Instrum	K:\GsiLib\Data		M.Traxler	P.Skott	25033
30	1	HPLA1	Connector, So		ZF5-20-01	ZF5S-20-01-T-	Samtec	K:\GsiLib\Data		J.Hoffmann	S.Voltz	20936
31	25	J2-J5,J12,J14,J	Connector, Jur	SMD-0402	Jumper2P	Do not order	None			M.Traxler	S.Voltz	21914

32	9	J6-J11,J13,J15,	Connector, Te		Testpin-0402					M.Traxler	S.Voltz	22992
33	1	J18	Connector, Pir		2510-6002	2510-6002	3M	K:\GsiLib\Data	2211	J.Hoffmann	S.Voltz	23931
34	1	J19	Connector, So		ERF5-050-01-L	ERF5-050-01-L	Samtec	K:\GsiLib\Data		M.Traxler	P.Skott	25882
35	1	JDCINP1	Connector, So		37203-1AE0-0	37203-1AE0-0	3M	K:\GsiLib\Data		J.Hoffmann	S.Voltz	25193
36	1	JGND1	Connector, Pir		1002-161-080	1002-161-080	Preci-Dip	K:\GsiLib\Data	2502	M.Traxler	S.Voltz	25592
37	1	JGPIO1	Connector, Pir		2514-6003	2514-6003-UC	3M	K:\GsiLib\Data		M.Traxler	P.Skott	25884
38	2	JKEL1,JKEL2	Connector, Pir		8930E-040-17	8930E-040-17	KEL	K:\GsiLib\Data		M.Traxler	S.Voltz	25633
39	1	JLIN_INPUT1	Connector, So		37204-1AE0-0	37204-1AE0-0	3M	K:\GsiLib\Data		J.Hoffmann	S.Voltz	25194
40	1	JTAG1	Connector, Pir		890-19-072-2(	890-19-072-2(	Preci-Dip	K:\GsiLib\Data		M.Traxler	P.Skott	25876
41	2	JTRBCAGE1,JT	Connector, Ca		U77-A1114-1(	U77-A1114-1(	AMP	K:\GsiLib\Data		M.Traxler	S.Voltz	20874
42	12	L1-L4,L11-L18	Inductor, RF-C	SMD-0603	BLM18EG601S	BLM18EG601S	Murata	K:\GsiLib\Data		M.Traxler	P.Skott	25264
43	5	L5,L7-L10	Inductor, RF-C	SMD-1806	BLM41PG471S	BLM41PG471S	Murata	K:\GsiLib\Data		M.Traxler	S.Voltz	24601
44	1	L6	Inductor, RF-C	SMD-0603	BLM18HD102S	BLM18HD102S	Murata	K:\GsiLib\Data		M.Traxler	P.Skott	25263
45	26	R1,R6,R7,R33-	Resistor, Thick	SMD-0402	10k	RC1005F103C	Samsung			G.May	G.May	21248
46	12	R2-R5,R8-R11,	Resistor, Thick	SMD-0402	49.9R					G.May	G.May	21028
47	3	R12,R14,R29	Resistor, Thick	SMD-0402	680R					G.May	G.May	22821
48	5	R13,R15,R30-F	Resistor, Thick	SMD-0402	1.8k					G.May	G.May	22826
49	2	R16,R17	Resistor, Thick	SMD-0402	470R					G.May	G.May	22817
50	10	R20-R22,R25-F	Resistor, Thick	SMD-0402	1k					G.May	G.May	21153
51	6	R28,R40,R91-F	Resistor, Thick	SMD-0402	4.7k					G.May	G.May	22835
52	2	R37,R48	Resistor, Thick	SMD-0402	100R					G.May	G.May	21057
53	9	R38,R44-R46,F	Resistor, Thick	SMD-0402	0R	CRCW040200(	Vishay	K:\GsiLib\Data		E.Badura	G.May	4950
54	5	R51,R73,R74,F	Resistor, Thick	SMD-0402	1.47k					G.May	G.May	21169
55	2	R54,R61	Resistor, Thick	SMD-0402	160k					G.May	G.May	22861
56	2	R55,R62	Resistor, Thick	SMD-0402	3.57k					G.May	G.May	21205
57	3	R57,R60,R66	Resistor, Thick	SMD-0402	4.3k					G.May	G.May	22834
58	1	R58	Resistor, Thick	SMD-0402	1.15k					G.May	G.May	21159
59	1	R59	Resistor, Thick	SMD-0402	43k					G.May	G.May	22852
60	1	R64	Resistor, Thick	SMD-0402	62k					G.May	G.May	22856
61	1	R65	Resistor, Thick	SMD-0402	1.69k					G.May	G.May	21175
62	1	R67	Resistor, Thick	SMD-0402	2.49k					G.May	G.May	21190
63	1	R68	Resistor, Thick	SMD-0402	200k					G.May	G.May	21372
64	1	R70	Resistor, Thick	SMD-0402	4.99k					G.May	G.May	21219
65	1	R71	Resistor, Thick	SMD-0402	240k					G.May	G.May	22864
66	4	R88,R90,R95,F	Resistor, Thick	SMD-0402	158R					G.May	G.May	21076
67	2	R89,R97	Resistor, Thick	SMD-0402	140R					G.May	G.May	21071
68	1	RESET1	Switch, Pushb		KMR223GCT-N	KMR223GCT-N	ITT-Cannon	K:\GsiLib\Data		J.Hoffmann	S.Voltz	23119
69	2	RJ_IO_OUT1,T	Connector, Jac		RJSSE-5381	RJSSE-5381	Amphenol	K:\GsiLib\Data		M.Traxler	S.Voltz	25470

70	2	SFP1,SFP2	Connector, So	1367073-1	1367073-1	AMP	K:\GsiLib\Data	M.Traxler	S.Voltz	20871
71	1	SW1	Switch, DIP, SI	CHS01TA	CHS-01TA	Copal	K:\GsiLib\Data	M.Traxler	P.Skott	25873
72	1	TEMP_SENSOI	IC-Mixedsigna	uSOP-8	DS18B20U+	DS18B20U+	Maxim	K:\GsiLib\Data	M.Traxler	S.Voltz	24395
73	1	U1	IC-Mixedsigna	PQFP-N10	ADS1018IRUG	ADS1018IRUG	Texas Instrum	K:\GsiLib\Data	M.Traxler	P.Skott	25865
74	4	UFANOUT_CO	IC-Digital, Cloc	PVQFN-16	CDCLVD1204	CDCLVD1204R	Texas Instrum	K:\GsiLib\Data	W.F.J.Mueller	G.May	25581
75	1	UFPGA1	IC-Digital, FPG	FPBGA-1156	LFE3-150EA-8I	LFE3-150EA-8I	Lattice	K:\GsiLib\Data	M.Traxler	S.Voltz	25421
76	1	ULDO12	IC-Power, Volt	PVQFN-N20	TPS74401	TPS74401RGW	Texas Instrum	K:\GsiLib\Data	G.May	G.May	25557
77	2	ULDO25,ULDC	IC-Power, Volt	SON-10	TPS74801	TPS74801DRC	Texas Instrum	K:\GsiLib\Data	A.Klaus	G.May	25509
78	1	UPCSSW1	IC-Mixedsigna	WQFN-40	DS25CP104A	D25CP104A	Texas Instrum	K:\GsiLib\Data	M.Traxler	P.Skott	25888
79	1	UPUMP1	IC-Power, DC-I	MSOP-8	TPS60241	TPS60241DGK	Texas Instrum	K:\GsiLib\Data	M.Traxler	P.Skott	25859
80	2	XOSC_CORE1,	Crystal, Oscilla		DSC8103CI5	DSC8103CI5	Micrel	K:\GsiLib\Data	M.Traxler	P.Skott	25874

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