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SØRNES Per K

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8) ABSTRACT

This design is a multipurpose programmable processing card. It is based on three Field Programmable Arrays from Xilinx. This report describes the hardware and layout for usage of this card

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INNHOLD

REKONFIGURERBAR PROSESSERINGSMODUL - FPGAkort versjon1

1 INNLEDNING

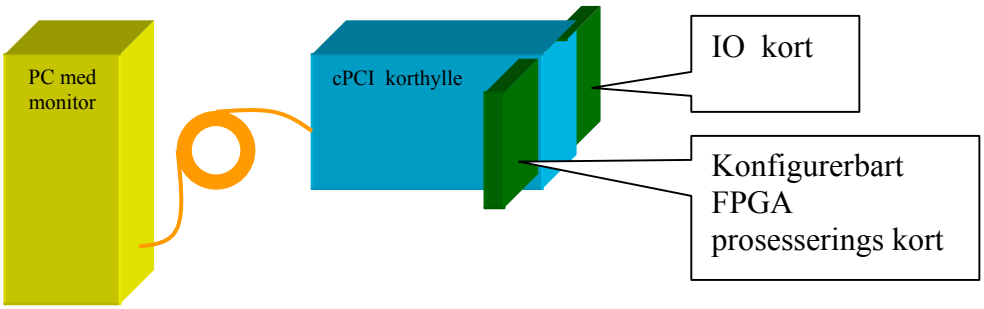
I prosjekt 726 Digital multistatisk radar er det utviklet en radarsender og -mottaker (1) for å verifisere et multistatisk radarkonseptet (2). Det er utviklet en demonstrator bestående av en sender og en mottaker slik at det pr dags dato er et bistatisk radarsystem.(3) I et bistatisk radaroppsett er sender og mottaker geografisk separert. Det bistatiske radarsystemet synkroniseres i tid og frekvens ved hjelp av GPS disiplinerte rubidium oscillatorer. Det er således ingen fysisk forbindelse mellom sender og mottaker. Senderenheten som er utviklet i prosjektet sender et kodet kontinuerlig signal (Continuous Wave - CW) og mottakeren mottar eventuelt reflektert signal. All nødvendig signalprosessering er tenkt utført på mottakerenheten i sann tid. Dette består av en korthylle med to forskjellige kort. Ett kort er et IOkort, det andre er prosesseringskort, laget i to versjoner. På det tidspunkt denne rapporten skrives er elektronikken for signalprosessering ikke fullført. Slik at mottakeren i demonstratoren fungerer som en datainnsamlingsenhet. All signalprosessering foregår pr dags dato på PC i etterkant av målingene.

2 HARDWARE SYSTEMBESKRIVELSE

Systemet består av 4 hovedmoduler.

- En PC med mulig nettilknytning
- En Compact PCI (cPCI) korthylle inneholdende bakplan og kommunikasjon til PC.
- Kort som utgjør selve regnekraften.
- IOkort. Et tilkoblingskort for digital og analog IO.

I denne dokumentasjonen vil FPGAkort1 prosesserings kortet bli beskrevet.



Figur 2.1 System oversikt

2.1 Systembetraktning

Prosesseringskortene og IOkortet designer vi selv, resten av systemet er innkjøpt. Forbindelsen mellom PC og korthylle er transparent slik at prosessorkortene opptrer logisk på PCens PCI buss. cPCI korthylla kan inneholde maksimalt 12 kort, det vil si minst ett kontroller kort og 11 prosesseringskort eller færre. I systemet trenger vi også ett IOkort.

PCen kan være en enkeltkort PC, eller som vi har valgt, et forlenger system til en vanlig PC. Hvis vi i systemet trenger noe annet enn våre egne spesialkort er dette fullt mulig, fordi vi har valgt en standard cPCI hylle med standard kontakter.

Prosesseringskortene er beregnet på å stå i en kjede, og regner da på en strøm av data. Dette er velegnet for blant annet FFTer og andre oppgaver som kan deles på denne måten. Hvert kort har tre minner, to blir brukt som minne for inndata og utdata, det tredje minne er tenkt brukt til filter minne ved eventuell FFTprosessering. Selve regnemodulen er brukerprogrammerbar og består av tre ”Field Programmable Gate Array”(FPGA) kretser. Se figur 1.2.

2.2 Prosesseringskort oversikt

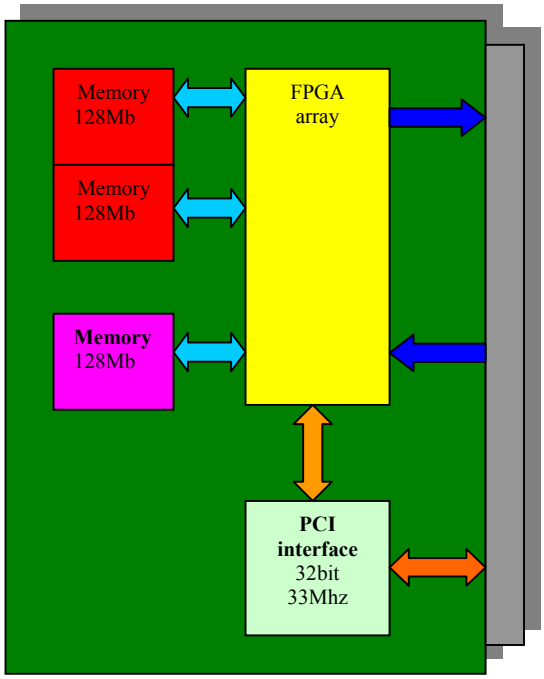
Dette kortet er oppdelt i flere moduler. Som systemkontroll og lavrate inngang og utgang sitter det et PCIinterface. Gjennom denne foregår all kontroll og konfigurasjon av systemet. For å få systemet definert ved påslag sitter det en enkel ”Programmable Logic Device”(PLD), for dette formålet. Den dekoder noen få signaler slik at systemet lar seg konfigurere fra software. Selve programmeringen av FPGAmatrisen foregår også her, via ”Joint Test Action Group”(JTAG) kjeden som finnes som en undermodul i PCIinterfacet.

Det sitter også en ”Compact Programmable Logic Device”(CPLD) her som kan styre display og en bakplan bus. Den er også tilkoblet PCIinterfacet slik at alt kan styres fra PCen. Temperatursensorer er også tilkoblet til denne.

JTAGmodulen består av en egen JTAGkontroller som tar seg av all datatransport og fysisk implementasjon av dette. Det sitter også en JTAGruter her slik at alle kort kan styres fra samme sted bare med å rute om JTAGbussen.

Ettersom PCI bussen allokeres dynamisk er det også implementert et id-register som forteller hvor i systemet kortet sitter med den spesifikke allokerte adressen. Dette er nødvendig på grunn av at vi må vite hvor i systemet hvert enkelt kort befinner seg. Id-koden er en kopi av posisjons signalene som er implementert i bakplanet.

Hvert kort er tilkoplet neste kort i kjeden via bakplanet. Dette er også en grunn til at vi må vite hvilket kort som sitter i de respektive posisjonene. PCI dekoderkretsen er også brukerkonfigurerbar. Dette brukes til å definere brukerområder og til minne allokering.



Figur 2.2 Prosesserings kort

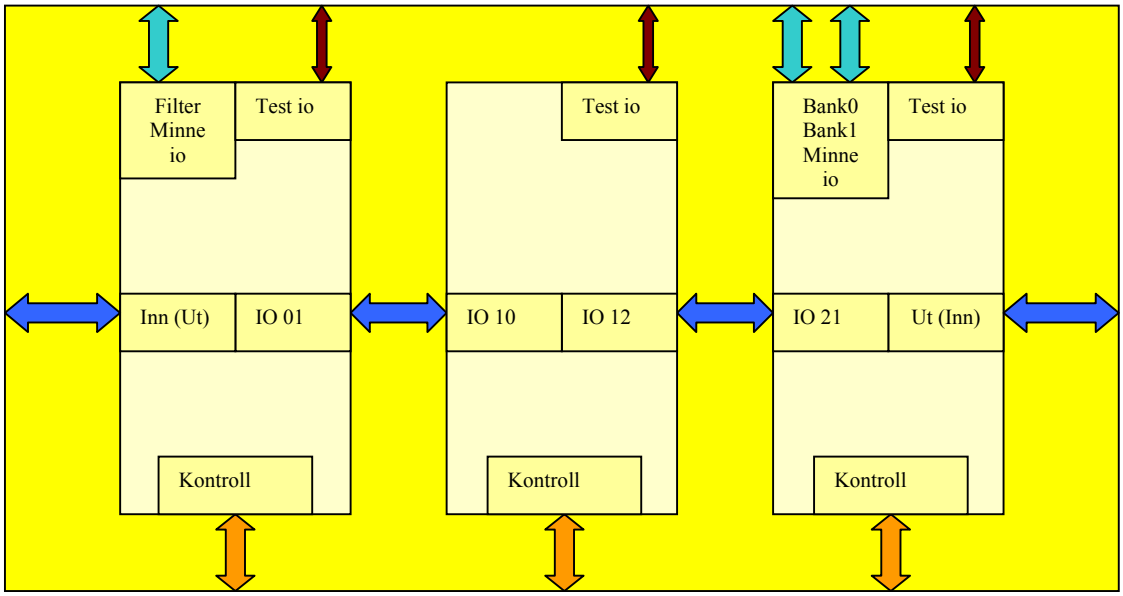
2.3 Beskrivelse av FPGA sammenkoblingen

FPGA modulen består av tre FPGAkretser som er koplet sammen med hverandre. To av kretsene har også forbindelse med bakplanet. Modul 0 som er koplet til inngangen har ett minne tilkoplet. Modul 1 er koplet til sine naboer og har også mulighet for å lese ut temperatur på kortet og chiptemperaturen i alle FPGAkretsene. Modul 2 som er tilkoplet til utgangen har to minner tilkoblet og må ta seg av minnehåndtering.

Pinneallokering i FPGAkretsene er beskrevet i Appendiks A. Appendiks A er oppdelt slik:

Appendiks A.1.1 Xilinx0 Input pinner
Appendiks A.1.2 Xilinx0 'Inter Connect' pinner til Xilinx1
Appendiks A.1.3 Xilinx0 Filter Minne
Appendiks A.1.4 Xilinx0 localbus
Appendiks A.1.5 Xilinx0 klokkepinner
Appendiks 0 Xilinx0 testpinner
Appendiks A.1.7 Xilinx0 prom, jtag, mode og temperaturdioder
Appendiks A.2.1 Xilinx1 'Inter Connect' pinner til Xilinx0
Appendiks A.2.2 Xilinx1 'Inter Connect' pinner til Xilinx2
Appendiks A.2.3 Xilinx1 localbus
Appendiks A.2.4 Xilinx1 bakplan bus
Appendiks A.2.5 Xilinx1 klokkepinner
Appendiks A.2.6 Xilinx1 testpinner
Appendiks A.2.7 Xilinx1 prom, jtag, mode og temperaturdioder
Appendiks A.3.1 Xilinx2 'Inter Connect' pinner til Xilinx1
Appendiks A.3.2 Xilinx2 'output' pinner
Appendiks A.3.3 Xilinx2 minne 1
Appendiks A.3.4 Xilinx2 minne 2

Appendiks A.3.5 Xilinx2 localbus
Appendiks A.3.6 Xilinx2 klokkepinner
Appendiks A.3.7 Xilinx2 testpinner
Appendiks A.3.8 Xilinx2 prom, jtag, mode og temperaturdioder



Figur 2.3 Oppdeling av de programmerbare FPGA resursene

2.4 Beskrivelse av delene i FPGA arrayet

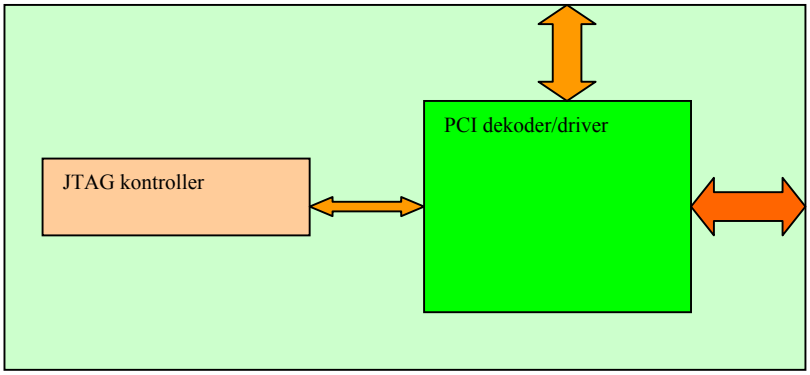
Logikk som er implementert rundt alle FPGAene:

- Hver FPGA har orginalt to PROMer som kan lastes opp ifra JTAG-bussen. Det er nå implementert større FPGAkretser og førte til at vi trengte mer PROM i hver kjede. Dette er ettermontert og strappet inn slik at det er tre PROMer på hver kjede.
- Hver FPGA har logikk for utlesing av temperatur. Det kan leses ut temperatur i kjernen på FPGAen og lufttemperaturen, målt ved utlesningskretsen. Dette blir lest ut serielt og utlesningslogikken er tilkoblet CPLDkretsen. Det er valgt å rute dette til Xilinx1 og gjøre utlesning og dekoding der.
- Det er satt inn noen testpinner, slik at noen pinner på FPGAkretsen kan brukes for test eller strapping.

2.5 Beskrivelse av PCI interface modulen og test support logikken

PCI interfacet består av en PCI9030 fra PLX som er kjøpt til formålet. Den er koblet til alle FPGAkretsene. I tillegg til dette er den også koblet til en JTAG-kontroller-JTAG-ruter par som tar seg av programmeringen av FPGAkretser og statisk oppkoblingstest av kortet. JTAG-rutereren gjør det mulig å nå andre kort fra en kontroller. JTAG-dekoderen er en 74LVT8980 kontroller fra Texsas Instruments. Denne kretsen tar seg av all fysisk tilkobling mot JTAG-bussen. Det er satt inn en jumper slik at den kan settes ut av funksjon og JTAG- bussen kan tilkobles direkte til en ekstern JTAG-kontroller gjennom kontakten 'jtagcon'. JTAG-rutekretsen er en SN74ABT8996.

For å definere PCI interface kretsen ved oppstart er det satt inn en 22V10 PLD. Det ble valgt 32bits PCI-interface, istedenfor 64bits interface, på grunn av at hoveddatastrømmen ikke er tenkt å gå via PCI-bussen, kun ferdig prosesserte data og kontroll informasjon. PCI 9030 kretsen har også en PROM tilkoblet slik at det ikke er nødvendig å laste opp kretsen etter påslag hvis det ikke er noen forandringer i oppsettet. Se appendiks B for jumpersetting.



Figur 2.4 PCI decoder

2.6 Beskrivelse av klokkegenerator

Klokkegenerator er laget fleksibel for å kunne velge klokkehastigheter etter ønske. Vi har også valgt å ha en driver til hver krets som bruker klokke for å unngå klokkeproblemer.

Modulen har 3 faselåste klokkekretser.

- Clk1 kretsen er satt i 1:1 modus og brukes bare som faselåst buffer. Den har en jumper (jmp1_clk) i front for å velge mellom ekstern inngang eller internt 50Mhz krystall.
- Clk2 kretsen er satt i 1:1 modus og brukes bare som faselåst buffer. Den er koblet til felles klokka (com_clk) som kommer fra bakplanet.
- Clk3 er en ren faselåst klokkebuffer og mater alle moduler i systemet med felles I/O klokke. Det sitter en jumper i front (jmp2_clk) som brukes til å velge mellom PCI klokka, felles klokka eller 50Mhz krystallet/ekstern inngang klokka (ref Clk1 tidligere i kapitlet).
- Clk4 kretsen er satt i 1:2 modus og multipliserer klokka valgt med jump4 med 2. Dette er gjort for å øke tidsoppløsningen på PCI klokka.

Klokkekonfigureringen er gjort med ’jmp3’ og ’jmp4’. Se Appendiks B for plassering av jumpere og settingen.

2.7 Kort kontroll og display beskrivelse

Dette del designet inneholder hovedsakelig en CPLD fra Xilinx som heter XC95144XL. Etter implementasjon fant vi ut at denne kretsen er overflødig og den er ikke tatt i bruk. Den inneholder kun noen enkle ligninger som ruter alle signaler videre til FPGA kretsene.
Det er satt inn en PLD for oppstart fordi det viste seg vanskelig å programmere CPLDkretsen aller første gang. PLDen er en forhåndsprogrammert krets. Den dekoder også ID-register, setter programmeringsmodus for Xinlinx og lager dekodingssignal for JTAGkretsen. Ligninger er vedlagt i Appendiks C.

IDregister logikken er også strappet inn. Dette er et buffer som leses direkte ifra posisjons ID som er implementert i bakplanet. Det forteller bruker hvor i bakplanet kortet er plassert.

Displayet består av en display driver. Denne styrer en 7x5 matrise og to syvsegmenter. I tillegg ble det satt inn to 3-farge lysdioder, men detter virker ikke godt, da vi ikke tok hensyn til at blå lysdioder trenger høyere spenning for å lyse bra.

3 IMPLEMENTASJON

I vårt design har vi valgt å bruke Virtex-E (FPGA) kretser fra Xilinx. Disse kretsene er så store at vi har mulighet til å implementere mange forskjellige algoritmer. Disse FPGAkretsene må også inneholde en del logikk for å få kortet til å virke. Dette vil spise av total plass som er til rådighet for implementasjonen av algoritmene.

For å spare plass og tid valgte vi en standard krets for tilpassing mot PCIbussen. Vi planla å programmere alle FPGA kretsene via PCI bussen og dette ble implementert med en JTAGkontroller. JTAG bruker en seriell protokoll og kjedes gjennom alle kretsene som har dette ”interfacet”. Dette kan også brukes til hardware testing av kort og loddinger i tillegg til programmering og opplasting av FPGAkretser.

Skjemaene er delt opp i 7 undernivåer, hvert undernivå kan bestå av ett eller flere ark.

Skema navn	**Antall ark**	**Innhold**
fpgaboard1 (top) Appendiks D.1	5	Ark1: Alle undernivåer og deres sammenkopling Ark2: Kant kontaktene Ark3: Testpunkter og PCI terminering Ark4: Avkoblings kondensatorer Ark5: Avkoblings kondensatorer
pciplx Appendiks D.2	2	Ark1: ’Mapping’ av signalene i ’localbus’ og PCI kontroller Ark2: PCI kontroller med ’flashprom’
clkgen Appendiks D.3	1	Oscillator og klokke drivere.
test_support Appendiks D.4	1	JTAGkontroller og JTAGruter
board_ctrl Appendiks D.5	1	CPLD
display Appendiks D.6	1	Display logikk og LED elementer.
arrayfpga Appendiks D.7	3	Ark1: FPGA0, ’flashprom’, temperatursensor og test punkter. Ark2: FPGA1, ’flashprom’, temperatursensor og test punkter. Ark3: FPGA2, ’flashprom’, temperatursensor og test punkter.
memory Appendiks D.8	1	Kontakt for ’SO-DIMM’ minnene.

Tabell 2.1 Oversikt over skjemaer

Alle skjemaer er lagt inn som Appendiks D. Fysisk utlegg er lagt inn i Appendiks E.

4 KONKLUSJON

Vi har to kort av denne typen testet og operative. Vi fant en del ting som var uheldige med dette kortet og har allerede designet oppfølgeren. Vi valgte større FPGA kretser enn først tenkt. Dette førte til omstendelig strapping for å få disse til å virke i dette kortet. Med disse kortene har vi fått testet mye av systemets funksjonalitet.

A PINNEALLOKERING

A.1 Xilinx0

A.1.1 Input pinner

```
PIN "PAD810" "AC39" input(0)
PIN "PAD809" "AC38" input(1)
PIN "PAD804" "AD39" input(2)
PIN "PAD802" "AD38" input(3)
PIN "PAD811" "AD37" input(4)
PIN "PAD805" "AD36" input(5)
PIN "PAD797" "AE39" input(6)
PIN "PAD790" "AE38" input(7)
PIN "PAD803" "AE37" input(8)
PIN "PAD798" "AE36" input(9)
PIN "PAD788" "AF39" input(10)
PIN "PAD796" "AF38" input(11)
PIN "PAD795" "AF37" input(12)
PIN "PAD789" "AF36" input(13)
PIN "PAD782" "AG39" input(14)
PIN "PAD780" "AG38" input(15)
PIN "PAD787" "AG37" input(16)
PIN "PAD781" "AG36" input(17)
PIN "PAD779" "AH39" input(18)
PIN "PAD775" "AH38" input(19)
PIN "PAD773" "AH37" input(20)
PIN "PAD774" "AJ39" input(21)
PIN "PAD772" "AJ38" input(22)
PIN "PAD768" "AJ37" input(23)
PIN "PAD766" "AJ36" input(24)
PIN "PAD767" "AK39" input(25)
PIN "PAD765" "AK38" input(26)
PIN "PAD760" "AK37" input(27)
PIN "PAD758" "AK36" input(28)
PIN "PAD759" "AL39" input(29)
PIN "PAD757" "AL38" input(30)
PIN "PAD752" "AL37" input(31)
PIN "PAD750" "AL36" input(32)
PIN "PAD751" "AM39" input(33)
PIN "PAD745" "AM38" input(34)
PIN "PAD749" "AM37" input(35)
PIN "PAD744" "AM36" input(36)
PIN "PAD743" "AN39" input(37)
PIN "PAD738" "AN38" input(38)
PIN "PAD742" "AN37" input(39)
PIN "PAD737" "AN36" input(40)
PIN "PAD736" "AP39" input(41)
PIN "PAD735" "AP38" input(42)
PIN "PAD730" "AP37" input(43)
PIN "PAD728" "AP36" input(44)
PIN "PAD733" "AR39" input(45)
PIN "PAD727" "AR38" input(46)
PIN "PAD725" "AR37" input(47)
PIN "PAD721" "AR36" input(48)
PIN "PAD729" "AT39" input(49)
PIN "PAD722" "AT38" input(50)
PIN "PAD706" "AW36" input(51)
PIN "PAD712" "AV36" input(52)
PIN "PAD714" "AU36" input(53)
PIN "PAD699" "AW35 input(54)
PIN "PAD704" "AV35 input(55)
PIN "PAD692" "AW34 input(56)
PIN "PAD697" "AV34 input(57)
PIN "PAD713" "AU34" input(58)
PIN "PAD716" "AT34" input(59)
PIN "PAD683" "AW33 input(60)
PIN "PAD689" "AV33 input(61)
PIN "PAD705" "AU33 input(62)
PIN "PAD711" "AT33" input(63)
PIN "PAD681" "AW32 input(64)
PIN "PAD696" "AV32 input(65)
PIN "PAD698" "AU32 input(66)
PIN "PAD703" "AT32 input(67)
PIN "PAD673" "AW31 input(68)
PIN "PAD675" "AV31 input(69)
PIN "PAD690" "AU31 input(70)
PIN "PAD691" "AT31 input(71)
PIN "PAD666" "AW30 input(72)
PIN "PAD668" "AV30 input(73)
PIN "PAD682" "AU30 input(74)
PIN "PAD825" "AC37" input(75)
```

A.1.2 Xilinx0 ’Inter Connect’ pinner til Xilinx1

```
PIN "PAD324" "P1 ic1(0)
PIN "PAD317" "N1 ic1(1)
PIN "PAD316" "N2 ic1(2)
PIN "PAD295" "N3 ic1(3)
PIN "PAD293" "N4 ic1(4)
PIN "PAD310" "M1 ic1(5)
PIN "PAD308" "M2 ic1(6)
PIN "PAD288" "M3 ic1(7)
PIN "PAD302" "L1 ic1(8)
PIN "PAD299" "L2 ic1(9)
PIN "PAD286" "L3 ic1(10)
PIN "PAD280" "L4 ic1(11)
PIN "PAD294" "K1 ic1(12)
PIN "PAD292" "K2 ic1(13)
PIN "PAD278" "K3 ic1(14)
PIN "PAD272" "K4 ic1(15)
PIN "PAD287" "J1 ic1(16)
PIN "PAD285" "J2 ic1(17)
PIN "PAD269" "J3 ic1(18)
PIN "PAD264" "J4 ic1(19)
PIN "PAD279" "H1 ic1(20)
PIN "PAD277" "H2 ic1(21)
PIN "PAD262" "H3 ic1(22)
PIN "PAD257" "H4 ic1(23)
PIN "PAD271" "G1 ic1(24)
PIN "PAD270" "G2 ic1(25)
PIN "PAD255" "G3 ic1(26)
PIN "PAD250" "G4 ic1(27)
PIN "PAD265" "F1 ic1(28)
PIN "PAD263" "F2 ic1(29)
PIN "PAD248" "F3 ic1(30)
PIN "PAD245" "F4 ic1(31)
PIN "PAD258" "E1 ic1(32)
PIN "PAD256" "E2 ic1(33)
PIN "PAD253" "D1 ic1(34)
PIN "PAD249" "D2 ic1(35)
PIN "PAD247" "D3 ic1(36)
PIN "PAD234" "A4 ic1(37)
PIN "PAD226" "A5 ic1(38)
PIN "PAD232" "B5 ic1(39)
PIN "PAD236" "C5 ic1(40)
PIN "PAD219" "A6 ic1(41)
PIN "PAD224" "B6 ic1(42)
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PIN "PAD188" "B11" ic1(62)
PIN "PAD189" "C11" ic1(63)
PIN "PAD194" "D11" ic1(64)
PIN "PAD174" "A12 ic1(65)
PIN "PAD181" "B12 ic1(66)
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PIN "PAD173" "C14 ic1(74)
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PIN "PAD129" "A18" ic1(89)
PIN "PAD134" "B18" ic1(90)
PIN "PAD135" "C18" ic1(91)
PIN "PAD141" "D18 ic1(92)
PIN "PAD143" "E18 ic1(93)
PIN "PAD121" "A19" ic1(94)
PIN "PAD127" "B19" ic1(95)
PIN "PAD128" "C19" ic1(96)
PIN "PAD133" "D19" ic1(97)
PIN "PAD113" "B20" ic1(98)
PIN "PAD108" "A21" ic1(99)
PIN "PAD106" "B21" ic1(100)
PIN "PAD126" "C21" ic1(101)
PIN "PAD100" "A22" ic1(102)
PIN "PAD98" "B22" ic1(103)
PIN "PAD120" "C22" ic1(104)
PIN "PAD114" "D22" ic1(105)
PIN "PAD112" "E22" ic1(106)
PIN "PAD92" "A23" ic1(107)
```

```
PIN "PAD90" "B23" ic1(108)
PIN "PAD107" "C23" ic1(109)
PIN "PAD105" "D23" ic1(110)
PIN "PAD99" "E23" ic1(111)
PIN "PAD89" "A24" ic1(112)
PIN "PAD97" "B24" ic1(113)
PIN "PAD91" "C24" ic1(114)
PIN "PAD85" "D24" ic1(115)
PIN "PAD84" "A25" ic1(116)
PIN "PAD82" "B25" ic1(117)
PIN "PAD83" "C25" ic1(118)
PIN "PAD78" "D25" ic1(119)
PIN "PAD77" "A26" ic1(120)
PIN "PAD70" "B26" ic1(121)
PIN "PAD76" "C26" ic1(122)
PIN "PAD75" "D26" ic1(123)
PIN "PAD68" "A27" ic1(124)
PIN "PAD62" "B27" ic1(125)
PIN "PAD69" "C27" ic1(126)
PIN "PAD67" "D27" ic1(127)
PIN "PAD60" "A28" ic1(128)
PIN "PAD59" "B28" ic1(129)
PIN "PAD61" "C28" ic1(130)
PIN "PAD54" "A29" ic1(131)
PIN "PAD55" "B29" ic1(132)
PIN "PAD53" "C29" ic1(133)
PIN "PAD48" "D29" ic1(134)
PIN "PAD52" "A30" ic1(135)
PIN "PAD47" "B30" ic1(136)
PIN "PAD46" "C30" ic1(137)
PIN "PAD40" "D30" ic1(138)
PIN "PAD45" "A31" ic1(139)
PIN "PAD38" "B31" ic1(140)
PIN "PAD32" "C31" ic1(141)
PIN "PAD30" "D31" ic1(142)
PIN "PAD39" "A32" ic1(143)
PIN "PAD37" "B32" ic1(144)
PIN "PAD29" "C32" ic1(145)
PIN "PAD24" "D32" ic1(146)
PIN "PAD31" "A33" ic1(147)
PIN "PAD25" "B33" ic1(148)
PIN "PAD22" "C33" ic1(149)
PIN "PAD17" "D33" ic1(150)
PIN "PAD23" "A34" ic1(151)
PIN "PAD18" "B34" ic1(152)
PIN "PAD15" "C34" ic1(153)
PIN "PAD9" "D34" ic1(154)
PIN "PAD16" "A35" ic1(155)
PIN "PAD10" "B35" ic1(156)
PIN "PAD7" "C35" ic1(157)
PIN "PAD2" "D35" ic1(158)
PIN "PAD8" "A36" ic1(159)
PIN "PAD5" "B36" ic1(160)
PIN "PAD959" "B37" ic1(161)
PIN "PAD956" "C38" ic1(162)
PIN "PAD946" "D39" ic1(163)
PIN "PAD951" "D38" ic1(164)
PIN "PAD953" "D37" ic1(165)
PIN "PAD939" "E39" ic1(166)
PIN "PAD944" "E38" ic1(167)
PIN "PAD954" "E37" ic1(168)
PIN "PAD932" "F39" ic1(169)
PIN "PAD937" "F38" ic1(170)
PIN "PAD948" "F37" ic1(171)
PIN "PAD952" "F36" ic1(172)
PIN "PAD929" "G39" ic1(173)
PIN "PAD930" "G38" ic1(174)
PIN "PAD943" "G37" ic1(175)
PIN "PAD945" "G36" ic1(176)
PIN "PAD921" "H39" ic1(177)
PIN "PAD923" "H38" ic1(178)
PIN "PAD936" "H37" ic1(179)
PIN "PAD938" "H36" ic1(180)
PIN "PAD913" "J39" ic1(181)
PIN "PAD915" "J38" ic1(182)
PIN "PAD924" "J37" ic1(183)
PIN "PAD931" "J36" ic1(184)
PIN "PAD906" "K39" ic1(185)
PIN "PAD908" "K38" ic1(186)
PIN "PAD916" "K37" ic1(187)
PIN "PAD922" "K36" ic1(188)
PIN "PAD894" "L39" ic1(189)
PIN "PAD901" "L38" ic1(190)
PIN "PAD909" "L37" ic1(191)
PIN "PAD914" "L36" ic1(192)
PIN "PAD886" "M39" ic1(193)
PIN "PAD892" "M38" ic1(194)
PIN "PAD907" "M37" ic1(195)
PIN "PAD883" "N39" ic1(196)
PIN "PAD884" "N38" ic1(197)
PIN "PAD900" "N37" ic1(198)
PIN "PAD902" "N36" ic1(199)
PIN "PAD876" "P39" ic1(200)
PIN "PAD878" "P38" ic1(201)
PIN "PAD893" "P37" ic1(202)
PIN "PAD899" "P36" ic1(203)
PIN "PAD864" "R39" ic1(204)
PIN "PAD871" "R38" ic1(205)
PIN "PAD885" "R37" ic1(206)
PIN "PAD891" "R36" ic1(207)
PIN "PAD856" "T39" ic1(208)
PIN "PAD862" "T38" ic1(209)
PIN "PAD877" "T37" ic1(210)
PIN "PAD879" "T36" ic1(211)
PIN "PAD849" "U39" ic1(212)
PIN "PAD854" "U38" ic1(213)
PIN "PAD869" "U37" ic1(214)
PIN "PAD870" "U36" ic1(215)
PIN "PAD872" "U35" ic1(216)
PIN "PAD847" "V39" ic1(217)
PIN "PAD853" "V38" ic1(218)
PIN "PAD855" "V37" ic1(219)
PIN "PAD861" "V36" ic1(220)
PIN "PAD863" "V35" ic1(221)
PIN "PAD840" "W39" ic1(222)
PIN "PAD842" "W38" ic1(223)
PIN "PAD846" "W37" ic1(224)
PIN "PAD848" "W36" ic1(225)
PIN "PAD833" "Y39" ic1(226)
PIN "PAD828" "Y38" ic1(227)
PIN "PAD826" "AA39" ic1(228)
PIN "PAD820" "AA38" ic1(229)
PIN "PAD841" "AA37" ic1(230)
PIN "PAD835" "AA36" ic1(231)
PIN "PAD818" "AB39" ic1(232)
PIN "PAD812" "AB38" ic1(233)
```

A.1.3 Xilinx0 Filter Minne

```
PIN "PAD565" "AR17 fltmemif(0)
PIN "PAD577" "AR18 fltmemif(1)
PIN "PAD608" "AR22 fltmemif(2)
PIN "PAD623" "AR23 fltmemif(3)
PIN "PAD487" "AT6 fltmemif(4)
PIN "PAD495" "AT7 fltmemif(5)
PIN "PAD502" "AT8 fltmemif(6)
PIN "PAD509" "AT9 fltmemif(7)
PIN "PAD518" "AT10 fltmemif(8)
PIN "PAD526" "AT11 fltmemif(9)
PIN "PAD535" "AT13 fltmemif(10)
PIN "PAD541" "AT14 fltmemif(11)
PIN "PAD549" "AT15 fltmemif(12)
PIN "PAD558" "AT16 fltmemif(13)
PIN "PAD570" "AT17 fltmemif(14)
PIN "PAD579" "AT18 fltmemif(15)
PIN "PAD587" "AT19 fltmemif(16)
PIN "PAD600" "AT21 fltmemif(17)
PIN "PAD601" "AT22 fltmemif(18)
PIN "PAD621" "AT23 fltmemif(19)
PIN "PAD637" "AT24 fltmemif(20)
PIN "PAD644" "AT25 fltmemif(21)
PIN "PAD653" "AT26 fltmemif(22)
PIN "PAD662" "AT27 fltmemif(23)
PIN "PAD676" "AT29 fltmemif(24)
PIN "PAD481" "AU4 fltmemif(25)
PIN "PAD489" "AU6 fltmemif(26)
PIN "PAD497" "AU7 fltmemif(27)
PIN "PAD504" "AU8 fltmemif(28)
PIN "PAD512" "AU9 fltmemif(29)
PIN "PAD520" "AU10 fltmemif(30)
PIN "PAD528" "AU11 fltmemif(31)
PIN "PAD533" "AU12 fltmemif(32)
PIN "PAD540" "AU13 fltmemif(33)
PIN "PAD547" "AU14 fltmemif(34)
PIN "PAD555" "AU15 fltmemif(35)
PIN "PAD563" "AU16 fltmemif(36)
PIN "PAD571" "AU17 fltmemif(37)
PIN "PAD585" "AU18 fltmemif(38)
PIN "PAD592" "AU19 fltmemif(39)
PIN "PAD594" "AU21 fltmemif(40)
PIN "PAD615" "AU23 fltmemif(41)
PIN "PAD632" "AU24 fltmemif(42)
PIN "PAD639" "AU25 fltmemif(43)
PIN "PAD651" "AU26 fltmemif(44)
PIN "PAD659" "AU27 fltmemif(45)
PIN "PAD667" "AU28 fltmemif(46)
PIN "PAD674" "AU29 fltmemif(47)
PIN "PAD485" "AV3 fltmemif(48)
PIN "PAD488" "AV4 fltmemif(49)
PIN "PAD482" "AV5 fltmemif(50)
PIN "PAD498" "AV6 fltmemif(51)
PIN "PAD505" "AV7 fltmemif(52)
PIN "PAD511" "AV8 fltmemif(53)
PIN "PAD519" "AV9 fltmemif(54)
PIN "PAD527" "AV10 fltmemif(55)
PIN "PAD534" "AV11 fltmemif(56)
PIN "PAD542" "AV12 fltmemif(57)
PIN "PAD550" "AV13 fltmemif(58)
PIN "PAD557" "AV14 fltmemif(59)
PIN "PAD564" "AV15 fltmemif(60)
PIN "PAD572" "AV16 fltmemif(61)
PIN "PAD580" "AV17 fltmemif(62)
PIN "PAD588" "AV18 fltmemif(63)
PIN "PAD595" "AV19 fltmemif(64)
PIN "PAD607" "AV20 fltmemif(65)
PIN "PAD616" "AV21 fltmemif(66)
PIN "PAD624" "AV22 fltmemif(67)
PIN "PAD613" "AV23 fltmemif(68)
PIN "PAD629" "AV24 fltmemif(69)
PIN "PAD638" "AV25 fltmemif(70)
PIN "PAD645" "AV26 fltmemif(71)
PIN "PAD652" "AV27 fltmemif(72)
PIN "PAD660" "AV28 fltmemif(73)
PIN "PAD669" "AV29 fltmemif(74)
PIN "PAD490" "AW4 fltmemif(75)
PIN "PAD496" "AW5 fltmemif(76)
PIN "PAD503" "AW6 fltmemif(77)
PIN "PAD510" "AW7 fltmemif(78)
PIN "PAD517" "AW8 fltmemif(79)
PIN "PAD525" "AW9 fltmemif(80)
PIN "PAD532" "AW10 fltmemif(81)
PIN "PAD539" "AW11 fltmemif(82)
PIN "PAD548" "AW12 fltmemif(83)
PIN "PAD556" "AW13 fltmemif(84)
PIN "PAD562" "AW14 fltmemif(85)
PIN "PAD569" "AW15 fltmemif(86)
PIN "PAD578" "AW16 fltmemif(87)
PIN "PAD586" "AW17 fltmemif(88)
PIN "PAD593" "AW18 fltmemif(89)
PIN "PAD609" "AW20 fltmemif(90)
PIN "PAD614" "AW21 fltmemif(91)
PIN "PAD622" "AW22 fltmemif(92)
PIN "PAD630" "AW23 fltmemif(93)
PIN "PAD631" "AW24 fltmemif(94)
PIN "PAD636" "AW25 fltmemif(95)
PIN "PAD643" "AW26 fltmemif(96)
```

A.1.4 Xilinx0 localbus

```
PIN "PAD322" "P2 localbus(0)"     PIN "PAD354" "AA4 localbus(27)"    PIN "PAD428" "AJ1 localbus(54)"
PIN "PAD329" "R2 localbus(1)"     PIN "PAD384" "AB1 localbus(28)"    PIN "PAD422" "AJ2 localbus(55)"
PIN "PAD309" "R3 localbus(2)"     PIN "PAD359" "AB2 localbus(29)"    PIN "PAD427" "AJ3 localbus(56)"
PIN "PAD307" "R4 localbus(3)"     PIN "PAD361" "AB3 localbus(30)"    PIN "PAD429" "AJ4 localbus(57)"
PIN "PAD340" "T1 localbus(4)"     PIN "PAD366" "AB4 localbus(31)"    PIN "PAD433" "AK1 localbus(58)"
PIN "PAD338" "T2 localbus(5)"     PIN "PAD368" "AB5 localbus(32)"    PIN "PAD435" "AK2 localbus(59)"
PIN "PAD318" "T3 localbus(6)"     PIN "PAD390" "AC1 localbus(33)"    PIN "PAD434" "AK3 localbus(60)"
PIN "PAD315" "T4 localbus(7)"     PIN "PAD373" "AC2 localbus(34)"    PIN "PAD436" "AK4 localbus(61)"
PIN "PAD348" "U1 localbus(8)"     PIN "PAD375" "AC3 localbus(35)"    PIN "PAD441" "AL1 localbus(62)"
PIN "PAD346" "U2 localbus(9)"     PIN "PAD381" "AC4 localbus(36)"    PIN "PAD442" "AL2 localbus(63)"
PIN "PAD330" "U3 localbus(10)"    PIN "PAD383" "AC5 localbus(37)"    PIN "PAD444" "AL3 localbus(64)"
PIN "PAD325" "U4 localbus(11)"    PIN "PAD391" "AD1 localbus(38)"    PIN "PAD450" "AL4 localbus(65)"
PIN "PAD323" "U5 localbus(12)"    PIN "PAD396" "AD2 localbus(39)"    PIN "PAD443" "AM1 localbus(66)"
PIN "PAD355" "V1 localbus(13)"    PIN "PAD392" "AD4 localbus(40)"    PIN "PAD449" "AM2 localbus(67)"
PIN "PAD353" "V2 localbus(14)"    PIN "PAD398" "AE1 localbus(41)"    PIN "PAD451" "AM3 localbus(68)"
PIN "PAD339" "V3 localbus(15)"    PIN "PAD403" "AE2 localbus(42)"    PIN "PAD456" "AM4 localbus(69)"
PIN "PAD337" "V4 localbus(16)"    PIN "PAD397" "AE3 localbus(43)"    PIN "PAD452" "AN1 localbus(70)"
PIN "PAD331" "V5 localbus(17)"    PIN "PAD399" "AE4 localbus(44)"    PIN "PAD458" "AN2 localbus(71)"
PIN "PAD367" "W1 localbus(18)"    PIN "PAD406" "AF1 localbus(45)"    PIN "PAD463" "AN3 localbus(72)"
PIN "PAD360" "W2 localbus(19)"    PIN "PAD412" "AF2 localbus(46)"    PIN "PAD457" "AP1 localbus(74)"
PIN "PAD347" "W3 localbus(20)"    PIN "PAD404" "AF3 localbus(47)"    PIN "PAD468" "AP3 localbus(76)"
PIN "PAD345" "W4 localbus(21)"    PIN "PAD405" "AF4 localbus(48)"    PIN "PAD459" "AP2 localbus(77)"
PIN "PAD374" "Y1 localbus(22)"    PIN "PAD414" "AG1 localbus(49)"    PIN "PAD464" "AR1 localbus(78)"
PIN "PAD369" "Y2 localbus(23)"    PIN "PAD411" "AG3 localbus(50)"    PIN "PAD471" "AR2 localbus(79)"
PIN "PAD376" "AA1 localbus(24)"   PIN "PAD413" "AG4 localbus(51)"    PIN "PAD474" "AR3 localbus(80)"
PIN "PAD382" "AA2 localbus(25)"   PIN "PAD426" "AH2 localbus(52)"    PIN "PAD466" "AT1 localbus(81)"
PIN "PAD352" "AA3 localbus(26)"   PIN "PAD419" "AH3 localbus(53)"
```

A.1.5 Xilinx0 klokkepinner

```
PIN "GCK0" "AW19" clk_bus(0)
PIN "GCK1" "AU22" clk_bus(3)
PIN "GCK2" "D21" clk_bus(6)
PIN "GCK3" "A20" clk_bus(9)
```

A.1.6 Xilinx0 testpinner

```
PIN "PAD465" "AN4" tp000          PIN "D3" "R1" tp004           PIN "D7" "AR4" tp008
PIN "PAD472" "AP4" tp001          PIN "D4" "AD3" tp005          PIN "WRITE" "B4" tp009
PIN "D1" "P4" tp002               PIN "D5" "AG2" tp006          PIN "CS" "D5" tp010
PIN "D2" "P3" tp003               PIN "D6" "AH1" tp007
```

A.1.7 Xilinx0 prom, jtag, mode og temperaturdioder

```
Kobling til init prom og JTAG     Intern 'mode' setting         Kobling til temperaturdioden

PIN "ERR_INIT" "AU2" init1#       PIN "M0" "AT37" mode0 (gnd)   PIN temp_anode  AU35 temp_pos
PIN "DONE" "AU5" done1            PIN "M1" "AU38" mode1 (gnd)   pin temp_katode AV37 temp_neg
PIN "TDO" "C4" tdoxilinx1#        PIN "M2" "AT35" mode2 (gnd)
PIN "TCK" "C36" jtag(0)                                         Ikke tilkoblet
PIN "TMS" "E36" jtag(1)           Reset pinner
PIN "TDI" "B3" tdopromsh3                                       PIN "BUSY_DOUT" "E3" NC
PIN "CCLK" "E4" cclk1             PIN "PAD819" "AC36"           PIN "PAD473" "AT2" NC
PIN "PROGRAM" "AT5" prog1#        pow_on_res#                   PIN "PAD476" "AT3" NC
                                  PIN "PAD817" "AC35" reset#    PIN "PAD654" "AW28" NC
                                                                PIN "PAD661" "AW29" NC
                                                                PIN "PAD684" "AT30" NC
                                                                PIN "PAD646" "AW27" NC
```

A.2 Xililnx1

A.2.1 Xilinx1 'Inter Connect' pinner til Xilinx0

```
PIN "PAD404" "AF3" ic1(0)         PIN "PAD428" "AJ1" ic1(7)         PIN "PAD436" "AK4" ic1(14)
PIN "PAD405" "AF4" ic1(1)         PIN "PAD422" "AJ2" ic1(8)         PIN "PAD441" "AL1" ic1(15)
PIN "PAD414" "AG1" ic1(2)         PIN "PAD427" "AJ3" ic1(9)         PIN "PAD442" "AL2" ic1(16)
PIN "PAD411" "AG3" ic1(3)         PIN "PAD429" "AJ4" ic1(10)        PIN "PAD444" "AL3" ic1(17)
PIN "PAD413" "AG4" ic1(4)         PIN "PAD433" "AK1" ic1(11)        PIN "PAD450" "AL4" ic1(18)
PIN "PAD426" "AH2" ic1(5)         PIN "PAD435" "AK2" ic1(12)        PIN "PAD443" "AM1" ic1(19)
PIN "PAD419" "AH3" ic1(6)         PIN "PAD434" "AK3" ic1(13)        PIN "PAD449" "AM2" ic1(20)
```

```
PIN "PAD451" "AM3" ic1(21)
PIN "PAD456" "AM4" ic1(22)
PIN "PAD452" "AN1" ic1(23)
PIN "PAD458" "AN2" ic1(24)
PIN "PAD463" "AN3" ic1(25)
PIN "PAD465" "AN4" ic1(26)
PIN "PAD457" "AP1" ic1(27)
PIN "PAD459" "AP2" ic1(28)
PIN "PAD468" "AP3" ic1(29)
PIN "PAD472" "AP4" ic1(30)
PIN "PAD464" "AR1" ic1(31)
PIN "PAD471" "AR2" ic1(32)
PIN "PAD474" "AR3" ic1(33)
PIN "PAD466" "AT1" ic1(34)
PIN "PAD473" "AT2" ic1(35)
PIN "PAD476" "AT3" ic1(36)
PIN "PAD485" "AV3" ic1(37)
PIN "PAD490" "AW4" ic1(38)
PIN "PAD488" "AV4" ic1(39)
PIN "PAD481" "AU4" ic1(40)
PIN "PAD496" "AW5" ic1(41)
PIN "PAD482" "AV5" ic1(42)
PIN "PAD503" "AW6" ic1(43)
PIN "PAD498" "AV6" ic1(44)
PIN "PAD489" "AU6" ic1(45)
PIN "PAD487" "AT6" ic1(46)
PIN "PAD510" "AW7" ic1(47)
PIN "PAD505" "AV7" ic1(48)
PIN "PAD497" "AU7" ic1(49)
PIN "PAD495" "AT7" ic1(50)
PIN "PAD517" "AW8" ic1(51)
PIN "PAD511" "AV8" ic1(52)
PIN "PAD504" "AU8" ic1(53)
PIN "PAD502" "AT8" ic1(54)
PIN "PAD525" "AW9" ic1(55)
PIN "PAD519" "AV9" ic1(56)
PIN "PAD512" "AU9" ic1(57)
PIN "PAD509" "AT9" ic1(58)
PIN "PAD532" "AW10" ic1(59)
PIN "PAD527" "AV10" ic1(60)
PIN "PAD520" "AU10" ic1(61)
PIN "PAD518" "AT10" ic1(62)
PIN "PAD539" "AW11" ic1(63)
PIN "PAD534" "AV11" ic1(64)
PIN "PAD528" "AU11" ic1(65)
PIN "PAD526" "AT11" ic1(66)
PIN "PAD548" "AW12" ic1(67)
PIN "PAD542" "AV12" ic1(68)
PIN "PAD533" "AU12" ic1(69)
PIN "PAD556" "AW13" ic1(70)
PIN "PAD550" "AV13" ic1(71)
PIN "PAD540" "AU13" ic1(72)
PIN "PAD535" "AT13" ic1(73)
PIN "PAD562" "AW14" ic1(74)
PIN "PAD557" "AV14" ic1(75)
PIN "PAD547" "AU14" ic1(76)
PIN "PAD541" "AT14" ic1(77)
PIN "PAD569" "AW15" ic1(78)
PIN "PAD564" "AV15" ic1(79)
PIN "PAD555" "AU15" ic1(80)
PIN "PAD549" "AT15" ic1(81)
PIN "PAD578" "AW16" ic1(82)
PIN "PAD572" "AV16" ic1(83)
PIN "PAD563" "AU16" ic1(84)
PIN "PAD558" "AT16" ic1(85)
PIN "PAD586" "AW17" ic1(86)
PIN "PAD580" "AV17" ic1(87)
PIN "PAD571" "AU17" ic1(88)
PIN "PAD570" "AT17" ic1(89)
PIN "PAD565" "AR17" ic1(90)
PIN "PAD593" "AW18" ic1(91)
PIN "PAD588" "AV18" ic1(92)
PIN "PAD585" "AU18" ic1(93)
PIN "PAD579" "AT18" ic1(94)
PIN "PAD577" "AR18" ic1(95)
PIN "PAD595" "AV19" ic1(96)
PIN "PAD592" "AU19" ic1(97)
PIN "PAD587" "AT19" ic1(98)
PIN "PAD609" "AW20" ic1(99)
PIN "PAD607" "AV20" ic1(100)
PIN "PAD614" "AW21" ic1(101)
PIN "PAD616" "AV21" ic1(102)
PIN "PAD594" "AU21" ic1(103)
PIN "PAD600" "AT21" ic1(104)
PIN "PAD622" "AW22" ic1(105)
PIN "PAD624" "AV22" ic1(106)
PIN "PAD601" "AT22" ic1(107)
PIN "PAD608" "AR22" ic1(108)
PIN "PAD630" "AW23" ic1(109)
PIN "PAD613" "AV23" ic1(110)
PIN "PAD615" "AU23" ic1(111)
PIN "PAD621" "AT23" ic1(112)
PIN "PAD623" "AR23" ic1(113)
PIN "PAD631" "AW24" ic1(114)
PIN "PAD629" "AV24" ic1(115)
PIN "PAD632" "AU24" ic1(116)
PIN "PAD637" "AT24" ic1(117)
PIN "PAD636" "AW25" ic1(118)
PIN "PAD638" "AV25" ic1(119)
PIN "PAD639" "AU25" ic1(120)
PIN "PAD644" "AT25" ic1(121)
PIN "PAD643" "AW26" ic1(122)
PIN "PAD645" "AV26" ic1(123)
PIN "PAD651" "AU26" ic1(124)
PIN "PAD653" "AT26" ic1(125)
PIN "PAD646" "AW27" ic1(126)
PIN "PAD652" "AV27" ic1(127)
PIN "PAD659" "AU27" ic1(128)
PIN "PAD662" "AT27" ic1(129)
PIN "PAD654" "AW28" ic1(130)
PIN "PAD660" "AV28" ic1(131)
PIN "PAD667" "AU28" ic1(132)
PIN "PAD661" "AW29" ic1(133)
PIN "PAD669" "AV29" ic1(134)
PIN "PAD674" "AU29" ic1(135)
PIN "PAD676" "AT29" ic1(136)
PIN "PAD666" "AW30" ic1(137)
PIN "PAD668" "AV30" ic1(138)
PIN "PAD682" "AU30" ic1(139)
PIN "PAD684" "AT30" ic1(140)
PIN "PAD673" "AW31" ic1(141)
PIN "PAD675" "AV31" ic1(142)
PIN "PAD690" "AU31" ic1(143)
PIN "PAD691" "AT31" ic1(144)
PIN "PAD681" "AW32" ic1(145)
PIN "PAD696" "AV32" ic1(146)
PIN "PAD698" "AU32" ic1(147)
PIN "PAD703" "AT32" ic1(148)
PIN "PAD683" "AW33" ic1(149)
PIN "PAD689" "AV33" ic1(150)
PIN "PAD705" "AU33" ic1(151)
PIN "PAD711" "AT33" ic1(152)
PIN "PAD692" "AW34" ic1(153)
PIN "PAD697" "AV34" ic1(154)
PIN "PAD713" "AU34" ic1(155)
PIN "PAD716" "AT34" ic1(156)
PIN "PAD699" "AW35" ic1(157)
PIN "PAD704" "AV35" ic1(158)
PIN "PAD706" "AW36" ic1(159)
PIN "PAD712" "AV36" ic1(160)
PIN "PAD714" "AU36" ic1(161)
PIN "PAD729" "AT39" ic1(162)
PIN "PAD722" "AT38" ic1(163)
PIN "PAD733" "AR39" ic1(164)
PIN "PAD727" "AR38" ic1(165)
PIN "PAD725" "AR37" ic1(166)
PIN "PAD721" "AR36" ic1(167)
PIN "PAD736" "AP39" ic1(168)
PIN "PAD735" "AP38" ic1(169)
PIN "PAD730" "AP37" ic1(170)
PIN "PAD728" "AP36" ic1(171)
PIN "PAD743" "AN39" ic1(172)
PIN "PAD738" "AN38" ic1(173)
PIN "PAD742" "AN37" ic1(174)
PIN "PAD737" "AN36" ic1(175)
PIN "PAD751" "AM39" ic1(176)
PIN "PAD745" "AM38" ic1(177)
PIN "PAD749" "AM37" ic1(178)
PIN "PAD744" "AM36" ic1(179)
PIN "PAD759" "AL39" ic1(180)
PIN "PAD757" "AL38" ic1(181)
PIN "PAD752" "AL37" ic1(182)
PIN "PAD750" "AL36" ic1(183)
PIN "PAD767" "AK39" ic1(184)
PIN "PAD765" "AK38" ic1(185)
PIN "PAD760" "AK37" ic1(186)
PIN "PAD758" "AK36" ic1(187)
PIN "PAD774" "AJ39" ic1(188)
PIN "PAD772" "AJ38" ic1(189)
PIN "PAD768" "AJ37" ic1(190)
PIN "PAD766" "AJ36" ic1(191)
PIN "PAD779" "AH39" ic1(192)
PIN "PAD775" "AH38" ic1(193)
PIN "PAD773" "AH37" ic1(194)
PIN "PAD782" "AG39" ic1(195)
PIN "PAD780" "AG38" ic1(196)
PIN "PAD787" "AG37" ic1(197)
PIN "PAD781" "AG36" ic1(198)
PIN "PAD788" "AF39" ic1(199)
PIN "PAD796" "AF38" ic1(200)
PIN "PAD795" "AF37" ic1(201)
PIN "PAD789" "AF36" ic1(202)
PIN "PAD797" "AE39" ic1(203)
PIN "PAD790" "AE38" ic1(204)
PIN "PAD803" "AE37" ic1(205)
PIN "PAD798" "AE36" ic1(206)
PIN "PAD804" "AD39" ic1(207)
PIN "PAD802" "AD38" ic1(208)
PIN "PAD811" "AD37" ic1(209)
PIN "PAD805" "AD36" ic1(210)
PIN "PAD810" "AC39" ic1(211)
PIN "PAD809" "AC38" ic1(212)
PIN "PAD825" "AC37" ic1(213)
PIN "PAD819" "AC36" ic1(214)
PIN "PAD817" "AC35" ic1(215)
PIN "PAD818" "AB39" ic1(216)
PIN "PAD812" "AB38" ic1(217)
PIN "PAD834" "AB37" ic1(218)
PIN "PAD832" "AB36" ic1(219)
PIN "PAD827" "AB35" ic1(220)
PIN "PAD826" "AA39" ic1(221)
PIN "PAD820" "AA38" ic1(222)
PIN "PAD841" "AA37" ic1(223)
PIN "PAD835" "AA36" ic1(224)
PIN "PAD833" "Y39" ic1(225)
PIN "PAD828" "Y38" ic1(226)
PIN "PAD840" "W39" ic1(227)
PIN "PAD842" "W38" ic1(228)
PIN "PAD846" "W37" ic1(229)
PIN "PAD848" "W36" ic1(230)
PIN "PAD847" "V39" ic1(231)
PIN "PAD853" "V38" ic1(232)
PIN "PAD855" "V37" ic1(233)
```

A.2.2 Xilinx1 ’Inter Connect’ pinner til Xilinx2

```
PIN "PAD234" "A4" ic2(0)
PIN "PAD226" "A5" ic2(1)
PIN "PAD232" "B5" ic2(2)
PIN "PAD236" "C5" ic2(3)
PIN "PAD219" "A6" ic2(4)
PIN "PAD224" "B6" ic2(5)
PIN "PAD231" "C6" ic2(6)
PIN "PAD233" "D6" ic2(7)
PIN "PAD212" "A7" ic2(8)
PIN "PAD217" "B7" ic2(9)
PIN "PAD223" "C7" ic2(10)
PIN "PAD225" "D7" ic2(11)
PIN "PAD209" "A8" ic2(12)
PIN "PAD210" "B8" ic2(13)
PIN "PAD216" "C8" ic2(14)
PIN "PAD218" "D8" ic2(15)
PIN "PAD201" "A9" ic2(16)
PIN "PAD203" "B9" ic2(17)
```

```
PIN "PAD204" "C9" ic2(18)
PIN "PAD211" "D9" ic2(19)
PIN "PAD193" "A10" ic2(20)
PIN "PAD195" "B10" ic2(21)
PIN "PAD196" "C10" ic2(22)
PIN "PAD202" "D10" ic2(23)
PIN "PAD186" "A11" ic2(24)
PIN "PAD188" "B11" ic2(25)
PIN "PAD189" "C11" ic2(26)
PIN "PAD194" "D11" ic2(27)
PIN "PAD174" "A12" ic2(28)
PIN "PAD181" "B12" ic2(29)
PIN "PAD187" "C12" ic2(30)
PIN "PAD166" "A13" ic2(31)
PIN "PAD172" "B13" ic2(32)
PIN "PAD180" "C13" ic2(33)
PIN "PAD182" "D13" ic2(34)
PIN "PAD163" "A14" ic2(35)
PIN "PAD164" "B14" ic2(36)
PIN "PAD173" "C14" ic2(37)
PIN "PAD179" "D14" ic2(38)
PIN "PAD156" "A15" ic2(39)
PIN "PAD158" "B15" ic2(40)
PIN "PAD165" "C15" ic2(41)
PIN "PAD171" "D15" ic2(42)
PIN "PAD144" "A16" ic2(43)
PIN "PAD151" "B16" ic2(44)
PIN "PAD157" "C16" ic2(45)
PIN "PAD159" "D16" ic2(46)
PIN "PAD136" "A17" ic2(47)
PIN "PAD142" "B17" ic2(48)
PIN "PAD149" "C17" ic2(49)
PIN "PAD150" "D17" ic2(50)
PIN "PAD152" "E17" ic2(51)
PIN "PAD129" "A18" ic2(52)
PIN "PAD134" "B18" ic2(53)
PIN "PAD135" "C18" ic2(54)
PIN "PAD141" "D18" ic2(55)
PIN "PAD143" "E18" ic2(56)
PIN "PAD121" "A19" ic2(57)
PIN "PAD127" "B19" ic2(58)
PIN "PAD128" "C19" ic2(59)
PIN "PAD133" "D19" ic2(60)
PIN "PAD113" "B20" ic2(61)
PIN "PAD108" "A21" ic2(62)
PIN "PAD106" "B21" ic2(63)
PIN "PAD126" "C21" ic2(64)
PIN "PAD100" "A22" ic2(65)
PIN "PAD98" "B22" ic2(66)
PIN "PAD120" "C22" ic2(67)
PIN "PAD114" "D22" ic2(68)
PIN "PAD112" "E22" ic2(69)
PIN "PAD92" "A23" ic2(70)
PIN "PAD90" "B23" ic2(71)
PIN "PAD107" "C23" ic2(72)
PIN "PAD105" "D23" ic2(73)
PIN "PAD99" "E23" ic2(74)
PIN "PAD89" "A24" ic2(75)
PIN "PAD97" "B24" ic2(76)
PIN "PAD91" "C24" ic2(77)
PIN "PAD85" "D24" ic2(78)
PIN "PAD84" "A25" ic2(79)
PIN "PAD82" "B25" ic2(80)
PIN "PAD83" "C25" ic2(81)
PIN "PAD78" "D25" ic2(82)
PIN "PAD77" "A26" ic2(83)
PIN "PAD70" "B26" ic2(84)
PIN "PAD76" "C26" ic2(85)
PIN "PAD75" "D26" ic2(86)
PIN "PAD68" "A27" ic2(87)
PIN "PAD62" "B27" ic2(88)
PIN "PAD69" "C27" ic2(89)
PIN "PAD67" "D27" ic2(90)
PIN "PAD59" "B28" ic2(91)
PIN "PAD60" "A28" ic2(92)
PIN "PAD61" "C28" ic2(93)
PIN "PAD54" "A29" ic2(94)
PIN "PAD55" "B29" ic2(95)
PIN "PAD53" "C29" ic2(96)
PIN "PAD48" "D29" ic2(97)
PIN "PAD52" "A30" ic2(98)
PIN "PAD47" "B30" ic2(99)
PIN "PAD46" "C30" ic2(100)
PIN "PAD40" "D30" ic2(101)
PIN "PAD45" "A31" ic2(102)
PIN "PAD38" "B31" ic2(103)
PIN "PAD32" "C31" ic2(104)
PIN "PAD30" "D31" ic2(105)
PIN "PAD39" "A32" ic2(106)
PIN "PAD37" "B32" ic2(107)
PIN "PAD29" "C32" ic2(108)
PIN "PAD24" "D32" ic2(109)
PIN "PAD31" "A33" ic2(110)
PIN "PAD25" "B33" ic2(111)
PIN "PAD22" "C33" ic2(112)
PIN "PAD17" "D33" ic2(113)
PIN "PAD23" "A34" ic2(114)
PIN "PAD18" "B34" ic2(115)
PIN "PAD15" "C34" ic2(116)
PIN "PAD9" "D34" ic2(117)
PIN "PAD16" "A35" ic2(118)
PIN "PAD10" "B35" ic2(119)
PIN "PAD7" "C35" ic2(120)
PIN "PAD2" "D35" ic2(121)
PIN "PAD8" "A36" ic2(122)
PIN "PAD5" "B36" ic2(123)
PIN "PAD959" "B37" ic2(124)
PIN "PAD956" "C38" ic2(125)
PIN "PAD946" "D39" ic2(126)
PIN "PAD951" "D38" ic2(127)
PIN "PAD953" "D37" ic2(128)
PIN "PAD939" "E39" ic2(129)
PIN "PAD944" "E38" ic2(130)
PIN "PAD954" "E37" ic2(131)
```

A.2.3 Xilinx1 localbus

```
PIN "PAD253" "D1" localbus(0)
PIN "PAD249" "D2" localbus(1)
PIN "PAD247" "D3" localbus(2)
PIN "PAD258" "E1" localbus(3)
PIN "PAD256" "E2" localbus(4)
PIN "PAD265" "F1" localbus(5)
PIN "PAD263" "F2" localbus(6)
PIN "PAD248" "F3" localbus(7)
PIN "PAD245" "F4" localbus(8)
PIN "PAD271" "G1" localbus(9)
PIN "PAD270" "G2" localbus(10)
PIN "PAD255" "G3" localbus(11)
PIN "PAD250" "G4" localbus(12)
PIN "PAD279" "H1" localbus(13)
PIN "PAD277" "H2" localbus(14)
PIN "PAD262" "H3" localbus(15)
PIN "PAD257" "H4" localbus(16)
PIN "PAD287" "J1" localbus(17)
PIN "PAD285" "J2" localbus(18)
PIN "PAD269" "J3" localbus(19)
PIN "PAD264" "J4" localbus(20)
PIN "PAD294" "K1" localbus(21)
PIN "PAD292" "K2" localbus(22)
PIN "PAD278" "K3" localbus(23)
PIN "PAD272" "K4" localbus(24)
PIN "PAD302" "L1" localbus(25)
PIN "PAD299" "L2" localbus(26)
PIN "PAD286" "L3" localbus(27)
PIN "PAD280" "L4" localbus(28)
PIN "PAD310" "M1" localbus(29)
PIN "PAD308" "M2" localbus(30)
PIN "PAD288" "M3" localbus(31)
PIN "PAD317" "N1" localbus(32)
PIN "PAD316" "N2" localbus(33)
PIN "PAD295" "N3" localbus(34)
PIN "PAD293" "N4" localbus(35)
PIN "PAD324" "P1" localbus(36)
PIN "PAD322" "P2" localbus(37)
PIN "PAD329" "R2" localbus(38)
PIN "PAD309" "R3" localbus(39)
PIN "PAD307" "R4" localbus(40)
PIN "PAD340" "T1" localbus(41)
PIN "PAD338" "T2" localbus(42)
PIN "PAD318" "T3" localbus(43)
PIN "PAD315" "T4" localbus(44)
PIN "PAD348" "U1" localbus(45)
PIN "PAD346" "U2" localbus(46)
PIN "PAD330" "U3" localbus(47)
PIN "PAD325" "U4" localbus(48)
PIN "PAD323" "U5" localbus(49)
PIN "PAD355" "V1" localbus(50)
PIN "PAD353" "V2" localbus(51)
PIN "PAD339" "V3" localbus(52)
PIN "PAD337" "V4" localbus(53)
PIN "PAD331" "V5" localbus(54)
PIN "PAD367" "W1" localbus(55)
PIN "PAD360" "W2" localbus(56)
PIN "PAD347" "W3" localbus(57)
PIN "PAD345" "W4" localbus(58)
PIN "PAD374" "Y1" localbus(59)
PIN "PAD369" "Y2" localbus(60)
PIN "PAD376" "AA1" localbus(61)
PIN "PAD382" "AA2" localbus(62)
PIN "PAD352" "AA3" localbus(63)
PIN "PAD354" "AA4" localbus(64)
PIN "PAD384" "AB1" localbus(65)
PIN "PAD359" "AB2" localbus(66)
PIN "PAD361" "AB3" localbus(67)
PIN "PAD366" "AB4" localbus(68)
PIN "PAD368" "AB5" localbus(69)
PIN "PAD390" "AC1" localbus(70)
PIN "PAD373" "AC2" localbus(71)
PIN "PAD375" "AC3" localbus(72)
PIN "PAD383" "AC5" localbus(74)
PIN "PAD396" "AD2" localbus(76)
PIN "PAD391" "AD1" localbus(77)
PIN "PAD398" "AE1" localbus(78)
PIN "PAD403" "AE2" localbus(79)
PIN "PAD397" "AE3" localbus(80)
PIN "PAD399" "AE4" localbus(81)
```

A.2.4 Xilinx1 bakplan bus

```
PIN "PAD945" "G36" bp_bus(0)
PIN "PAD921" "H39" bp_bus(1)
PIN "PAD923" "H38" bp_bus(2)
PIN "PAD936" "H37" bp_bus(3)
PIN "PAD938" "H36" bp_bus(4)
PIN "PAD913" "J39" bp_bus(5)
PIN "PAD915" "J38" bp_bus(6)
PIN "PAD924" "J37" bp_bus(7)
PIN "PAD931" "J36" bp_bus(8)
PIN "PAD906" "K39" bp_bus(9)
PIN "PAD908" "K38" bp_bus(10)
PIN "PAD916" "K37" bp_bus(11)
PIN "PAD922" "K36" bp_bus(12)
PIN "PAD894" "L39" bp_bus(13)
PIN "PAD901" "L38" bp_bus(14)
PIN "PAD909" "L37" bp_bus(15)
PIN "PAD914" "L36" bp_bus(16)
PIN "PAD886" "M39" bp_bus(17)
PIN "PAD892" "M38" bp_bus(18)
PIN "PAD907" "M37" bp_bus(19)
PIN "PAD883" "N39" bp_bus(20)
PIN "PAD884" "N38" bp_bus(21)
PIN "PAD900" "N37" bp_bus(22)
PIN "PAD902" "N36" bp_bus(23)
```

```
PIN "PAD876" "P39" bp_bus(24)
PIN "PAD878" "P38" bp_bus(25)
PIN "PAD893" "P37" bp_bus(26)
PIN "PAD899" "P36" bp_bus(27)
PIN "PAD864" "R39" bp_bus(28)
PIN "PAD871" "R38" bp_bus(29)
PIN "PAD885" "R37" bp_bus(30)
PIN "PAD891" "R36" bp_bus(31)
PIN "PAD856" "T39" bp_bus(32)
PIN "PAD862" "T38" bp_bus(33)
PIN "PAD877" "T37" bp_bus(34)
PIN "PAD879" "T36" bp_bus(35)
PIN "PAD872" "U35" bp_bus(36)
PIN "PAD932" "F39" bp_bus(37)
PIN "PAD937" "F38" bp_bus(38)
PIN "PAD948" "F37" bp_bus(39)
PIN "PAD952" "F36" bp_bus(40)
PIN "PAD929" "G39" bp_bus(41)
PIN "PAD930" "G38" bp_bus(42)
PIN "PAD943" "G37" bp_bus(43)
PIN "PAD861" "V36" bp_bus(44)
```

A.2.5 Xilinx1 klokkepinner

```
PIN "GCK0" "AW19" clk_bus(1)
PIN "GCK1" "AU22" clk_bus(4)
PIN "GCK2" "D21" clk_bus(7)
PIN "GCK3" "A20" clk_bus(10)
```

A.2.6 Xilinx1 testpinner

```
PIN "PAD381" "AC4" tp100
PIN "D0_DIN" "C2" din2
PIN "PAD392" "AD4" tp101
PIN "D1" "P4" tp102
PIN "D2" "P3" tp103
PIN "D3" "R1" tp104
PIN "D4" "AD3" tp105
PIN "D5" "AG2" tp106
PIN "D6" "AH1" tp107
PIN "D7" "AR4" tp108
PIN "WRITE" "B4" tp109
PIN "CS" "D5" tp110
```

A.2.7 Xilinx1 prom, jtag, mode og temperaturdioder

```
Kobling til init prom og JTAG

PIN "TCK" "C36" jtag(0)
PIN "TMS" "E36" jtag(1)
PIN "TDI" "B3" tdoxilinx#1
PIN "CCLK" "E4" cclk2
PIN "ERR_INIT" "AU2" init2#
PIN "DONE" "AU5" done2
PIN "TDO" "C4" tdoxilinx#2
PIN "PROGRAM" "AT5" prog2#

Intern 'mode' setting

PIN "M0" "AT37" m0 (gnd)
PIN "M1" "AU38" m1 (gnd)
PIN "M2" "AT35" m2 (gnd)
```

```
Reset pinner

PIN "PAD870" "U36" reset#
PIN "PAD869" "U37"
pwr_on_res#

Kobling til display bussen

PIN "PAD849" "U39" xd3x(3)
PIN "PAD863" "V35" xd3x(4)
PIN "PAD854" "U38" xd3x(5)
```

```
Kobling til temperaturdioden

PIN temp_anode  AU35 temp_pos
pin temp_katode AV37 temp_neg

Ikke tilkoblet

PIN "BUSY_DOUT" "E3" NC
PIN "PAD406" "AF1" NC
PIN "PAD412" "AF2" NC
```

A.3 Xilinx2

A.3.1 Xilinx2 'Inter Connect' pinner til Xilinx1

```
PIN "PAD855" "V37" ic2(0)
PIN "PAD609" "AW20" ic2(1)
PIN "PAD607" "AV20" ic2(2)
PIN "PAD614" "AW21" ic2(3)
PIN "PAD616" "AV21" ic2(4)
PIN "PAD622" "AW22" ic2(5)
PIN "PAD624" "AV22" ic2(6)
PIN "PAD601" "AT22" ic2(7)
PIN "PAD608" "AR22" ic2(8)
PIN "PAD630" "AW23" ic2(9)
PIN "PAD613" "AV23" ic2(10)
PIN "PAD615" "AU23" ic2(11)
PIN "PAD621" "AT23" ic2(12)
PIN "PAD623" "AR23" ic2(13)
PIN "PAD631" "AW24" ic2(14)
PIN "PAD629" "AV24" ic2(15)
PIN "PAD632" "AU24" ic2(16)
PIN "PAD637" "AT24" ic2(17)
PIN "PAD636" "AW25" ic2(18)
PIN "PAD638" "AV25" ic2(19)
PIN "PAD639" "AU25" ic2(20)
PIN "PAD644" "AT25" ic2(21)
PIN "PAD643" "AW26" ic2(22)
PIN "PAD645" "AV26" ic2(23)
PIN "PAD651" "AU26" ic2(24)
PIN "PAD653" "AT26" ic2(25)
PIN "PAD646" "AW27" ic2(26)
PIN "PAD652" "AV27" ic2(27)
PIN "PAD659" "AU27" ic2(28)
PIN "PAD662" "AT27" ic2(29)
PIN "PAD654" "AW28" ic2(30)
PIN "PAD660" "AV28" ic2(31)
PIN "PAD667" "AU28" ic2(32)
PIN "PAD661" "AW29" ic2(33)
PIN "PAD669" "AV29" ic2(34)
PIN "PAD674" "AU29" ic2(35)
PIN "PAD676" "AT29" ic2(36)
PIN "PAD666" "AW30" ic2(37)
PIN "PAD668" "AV30" ic2(38)
PIN "PAD682" "AU30" ic2(39)
PIN "PAD684" "AT30" ic2(40)
PIN "PAD673" "AW31" ic2(41)
PIN "PAD675" "AV31" ic2(42)
PIN "PAD690" "AU31" ic2(43)
PIN "PAD691" "AT31" ic2(44)
PIN "PAD681" "AW32" ic2(45)
PIN "PAD696" "AV32" ic2(46)
PIN "PAD698" "AU32" ic2(47)
PIN "PAD703" "AT32" ic2(48)
PIN "PAD683" "AW33" ic2(49)
PIN "PAD689" "AV33" ic2(50)
PIN "PAD705" "AU33" ic2(51)
PIN "PAD711" "AT33" ic2(52)
PIN "PAD692" "AW34" ic2(53)
PIN "PAD697" "AV34" ic2(54)
PIN "PAD713" "AU34" ic2(55)
PIN "PAD716" "AT34" ic2(56)
PIN "PAD699" "AW35" ic2(57)
PIN "PAD704" "AV35" ic2(58)
PIN "PAD706" "AW36" ic2(59)
PIN "PAD712" "AV36" ic2(60)
PIN "PAD714" "AU36" ic2(61)
PIN "PAD729" "AT39" ic2(62)
PIN "PAD722" "AT38" ic2(63)
PIN "PAD733" "AR39" ic2(64)
PIN "PAD727" "AR38" ic2(65)
PIN "PAD725" "AR37" ic2(66)
PIN "PAD721" "AR36" ic2(67)
PIN "PAD736" "AP39" ic2(68)
PIN "PAD735" "AP38" ic2(69)
PIN "PAD730" "AP37" ic2(70)
PIN "PAD728" "AP36" ic2(71)
PIN "PAD743" "AN39" ic2(72)
PIN "PAD738" "AN38" ic2(73)
PIN "PAD742" "AN37" ic2(74)
PIN "PAD737" "AN36" ic2(75)
PIN "PAD751" "AM39" ic2(76)
PIN "PAD745" "AM38" ic2(77)
PIN "PAD749" "AM37" ic2(78)
PIN "PAD744" "AM36" ic2(79)
PIN "PAD759" "AL39" ic2(80)
PIN "PAD757" "AL38" ic2(81)
PIN "PAD752" "AL37" ic2(82)
PIN "PAD750" "AL36" ic2(83)
```

```
PIN "PAD767" "AK39" ic2(84)
PIN "PAD765" "AK38" ic2(85)
PIN "PAD760" "AK37" ic2(86)
PIN "PAD758" "AK36" ic2(87)
PIN "PAD774" "AJ39" ic2(88)
PIN "PAD772" "AJ38" ic2(89)
PIN "PAD768" "AJ37" ic2(90)
PIN "PAD766" "AJ36" ic2(91)
PIN "PAD779" "AH39" ic2(92)
PIN "PAD775" "AH38" ic2(93)
PIN "PAD773" "AH37" ic2(94)
PIN "PAD782" "AG39" ic2(95)
PIN "PAD780" "AG38" ic2(96)
PIN "PAD787" "AG37" ic2(97)
PIN "PAD781" "AG36" ic2(98)
PIN "PAD788" "AF39" ic2(99)
PIN "PAD796" "AF38" ic2(100)
PIN "PAD795" "AF37" ic2(101)
PIN "PAD789" "AF36" ic2(102)
PIN "PAD797" "AE39" ic2(103)
PIN "PAD790" "AE38" ic2(104)
PIN "PAD803" "AE37" ic2(105)
PIN "PAD798" "AE36" ic2(106)
PIN "PAD804" "AD39" ic2(107)
PIN "PAD802" "AD38" ic2(108)
PIN "PAD811" "AD37" ic2(109)
PIN "PAD805" "AD36" ic2(110)
PIN "PAD810" "AC39" ic2(111)
PIN "PAD809" "AC38" ic2(112)
PIN "PAD825" "AC37" ic2(113)
PIN "PAD819" "AC36" ic2(114)
PIN "PAD817" "AC35" ic2(115)
PIN "PAD818" "AB39" ic2(116)
PIN "PAD812" "AB38" ic2(117)
PIN "PAD834" "AB37" ic2(118)
PIN "PAD832" "AB36" ic2(119)
PIN "PAD826" "AA39" ic2(120)
PIN "PAD820" "AA38" ic2(121)
PIN "PAD841" "AA37" ic2(122)
PIN "PAD835" "AA36" ic2(123)
PIN "PAD833" "Y39" ic2(124)
PIN "PAD828" "Y38" ic2(125)
PIN "PAD840" "W39" ic2(126)
PIN "PAD842" "W38" ic2(127)
PIN "PAD846" "W37" ic2(128)
PIN "PAD848" "W36" ic2(129)
PIN "PAD847" "V39" ic2(130)
PIN "PAD853" "V38" ic2(131)
```

A.3.2 Xilinx2 'output' pinner

```
PIN "PAD45" "A31" output(0)
PIN "PAD39" "A32" output(1)
PIN "PAD31" "A33" output(2)
PIN "PAD23" "A34" output(3)
PIN "PAD16" "A35" output(4)
PIN "PAD8" "A36" output(5)
PIN "PAD38" "B31" output(6)
PIN "PAD37" "B32" output(7)
PIN "PAD25" "B33" output(8)
PIN "PAD18" "B34" output(9)
PIN "PAD10" "B35" output(10)
PIN "PAD5" "B36" output(11)
PIN "PAD959" "B37" output(12)
PIN "PAD870" "U36" output(13)
PIN "PAD32" "C31" output(14)
PIN "PAD29" "C32" output(15)
PIN "PAD22" "C33" output(16)
PIN "PAD15" "C34" output(17)
PIN "PAD7" "C35" output(18)
PIN "PAD956" "C38" output(19)
PIN "PAD40" "D30" output(20)
PIN "PAD30" "D31" output(21)
PIN "PAD24" "D32" output(22)
PIN "PAD17" "D33" output(23)
PIN "PAD9" "D34" output(24)
PIN "PAD2" "D35" output(25)
PIN "PAD953" "D37" output(26)
PIN "PAD951" "D38" output(27)
PIN "PAD946" "D39" output(28)
PIN "PAD954" "E37" output(29)
PIN "PAD944" "E38" output(30)
PIN "PAD939" "E39" output(31)
PIN "PAD952" "F36" output(32)
PIN "PAD948" "F37" output(33)
PIN "PAD937" "F38" output(34)
PIN "PAD932" "F39" output(35)
PIN "PAD945" "G36" output(36)
PIN "PAD943" "G37" output(37)
PIN "PAD930" "G38" output(38)
PIN "PAD929" "G39" output(39)
PIN "PAD938" "H36" output(40)
PIN "PAD936" "H37" output(41)
PIN "PAD923" "H38" output(42)
PIN "PAD921" "H39" output(43)
PIN "PAD931" "J36" output(44)
PIN "PAD924" "J37" output(45)
PIN "PAD915" "J38" output(46)
PIN "PAD913" "J39" output(47)
PIN "PAD922" "K36" output(48)
PIN "PAD916" "K37" output(49)
PIN "PAD908" "K38" output(50)
PIN "PAD906" "K39" output(51)
PIN "PAD914" "L36" output(52)
PIN "PAD909" "L37" output(53)
PIN "PAD901" "L38" output(54)
PIN "PAD894" "L39" output(55)
PIN "PAD907" "M37" output(56)
PIN "PAD892" "M38" output(57)
PIN "PAD886" "M39" output(58)
PIN "PAD902" "N36" output(59)
PIN "PAD900" "N37" output(60)
PIN "PAD884" "N38" output(61)
PIN "PAD883" "N39" output(62)
PIN "PAD899" "P36" output(63)
PIN "PAD893" "P37" output(64)
PIN "PAD878" "P38" output(65)
PIN "PAD876" "P39" output(66)
PIN "PAD891" "R36" output(67)
PIN "PAD885" "R37" output(68)
PIN "PAD871" "R38" output(69)
PIN "PAD864" "R39" output(70)
PIN "PAD879" "T36" output(71)
PIN "PAD877" "T37" output(72)
PIN "PAD862" "T38" output(73)
PIN "PAD856" "T39" output(74)
PIN "PAD872" "U35" output(75)
```

A.3.3 Xilinx2 minne 1

```
PIN "PAD253" "D1" memport1(0)
PIN "PAD249" "D2" memport1(1)
PIN "PAD247" "D3" memport1(2)
PIN "PAD258" "E1" memport1(3)
PIN "PAD256" "E2" memport1(4)
PIN "PAD265" "F1" memport1(5)
PIN "PAD263" "F2" memport1(6)
PIN "PAD248" "F3" memport1(7)
PIN "PAD245" "F4" memport1(8)
PIN "PAD271" "G1" memport1(9)
PIN "PAD270" "G2" memport1(10)
PIN "PAD255" "G3" memport1(11)
PIN "PAD250" "G4" memport1(12)
PIN "PAD279" "H1" memport1(13)
PIN "PAD277" "H2" memport1(14)
PIN "PAD262" "H3" memport1(15)
PIN "PAD257" "H4" memport1(16)
PIN "PAD287" "J1" memport1(17)
PIN "PAD285" "J2" memport1(18)
PIN "PAD269" "J3" memport1(19)
PIN "PAD264" "J4" memport1(20)
PIN "PAD294" "K1" memport1(21)
PIN "PAD292" "K2" memport1(22)
PIN "PAD278" "K3" memport1(23)
PIN "PAD272" "K4" memport1(24)
PIN "PAD302" "L1" memport1(25)
PIN "PAD299" "L2" memport1(26)
PIN "PAD286" "L3" memport1(27)
PIN "PAD280" "L4" memport1(28)
PIN "PAD310" "M1" memport1(29)
PIN "PAD308" "M2" memport1(30)
PIN "PAD288" "M3" memport1(31)
PIN "PAD317" "N1" memport1(32)
PIN "PAD316" "N2" memport1(33)
PIN "PAD295" "N3" memport1(34)
PIN "PAD293" "N4" memport1(35)
PIN "PAD324" "P1" memport1(36)
PIN "PAD322" "P2" memport1(37)
PIN "PAD329" "R2" memport1(38)
PIN "PAD309" "R3" memport1(39)
PIN "PAD307" "R4" memport1(40)
PIN "PAD340" "T1" memport1(41)
PIN "PAD338" "T2" memport1(42)
PIN "PAD318" "T3" memport1(43)
PIN "PAD315" "T4" memport1(44)
PIN "PAD348" "U1" memport1(45)
PIN "PAD346" "U2" memport1(46)
PIN "PAD330" "U3" memport1(47)
PIN "PAD325" "U4" memport1(48)
PIN "PAD323" "U5" memport1(49)
PIN "PAD355" "V1" memport1(50)
PIN "PAD353" "V2" memport1(51)
PIN "PAD339" "V3" memport1(52)
PIN "PAD337" "V4" memport1(53)
PIN "PAD331" "V5" memport1(54)
PIN "PAD367" "W1" memport1(55)
PIN "PAD360" "W2" memport1(56)
PIN "PAD347" "W3" memport1(57)
PIN "PAD345" "W4" memport1(58)
PIN "PAD374" "Y1" memport1(59)
PIN "PAD369" "Y2" memport1(60)
PIN "PAD376" "AA1" memport1(61)
PIN "PAD382" "AA2" memport1(62)
PIN "PAD352" "AA3" memport1(63)
PIN "PAD354" "AA4" memport1(64)
PIN "PAD384" "AB1" memport1(65)
PIN "PAD359" "AB2" memport1(66)
PIN "PAD361" "AB3" memport1(67)
PIN "PAD366" "AB4" memport1(68)
PIN "PAD368" "AB5" memport1(69)
PIN "PAD390" "AC1" memport1(70)
PIN "PAD373" "AC2" memport1(71)
PIN "PAD375" "AC3" memport1(72)
PIN "PAD381" "AC4" memport1(73)
PIN "PAD383" "AC5" memport1(74)
PIN "PAD391" "AD1" memport1(75)
PIN "PAD396" "AD2" memport1(76)
PIN "PAD392" "AD4" memport1(77)
PIN "PAD398" "AE1" memport1(78)
PIN "PAD403" "AE2" memport1(79)
PIN "PAD397" "AE3" memport1(80)
PIN "PAD399" "AE4" memport1(81)
PIN "PAD406" "AF1" memport1(82)
PIN "PAD412" "AF2" memport1(83)
PIN "PAD404" "AF3" memport1(84)
PIN "PAD405" "AF4" memport1(85)
PIN "PAD414" "AG1" memport1(86)
PIN "PAD411" "AG3" memport1(87)
PIN "PAD413" "AG4" memport1(88)
PIN "PAD426" "AH2" memport1(89)
PIN "PAD419" "AH3" memport1(90)
PIN "PAD428" "AJ1" memport1(91)
PIN "PAD422" "AJ2" memport1(92)
```

```
PIN "PAD427" "AJ3" memport1(93)  PIN "PAD433" "AK1" memport1(95)
PIN "PAD429" "AJ4" memport1(94)  PIN "PAD435" "AK2" memport1(96)
```

A.3.4 Xilinx2 minne 2

```
PIN "PAD234" "A4" memport2(0)    PIN "PAD181" "B12" memport2(33)  PIN "PAD128" "C19" memport2(66)
PIN "PAD226" "A5" memport2(1)    PIN "PAD172" "B13" memport2(34)  PIN "PAD126" "C21" memport2(67)
PIN "PAD219" "A6" memport2(2)    PIN "PAD164" "B14" memport2(35)  PIN "PAD120" "C22" memport2(68)
PIN "PAD212" "A7" memport2(3)    PIN "PAD158" "B15" memport2(36)  PIN "PAD107" "C23" memport2(69)
PIN "PAD209" "A8" memport2(4)    PIN "PAD151" "B16" memport2(37)  PIN "PAD91" "C24" memport2(70)
PIN "PAD201" "A9" memport2(5)    PIN "PAD142" "B17" memport2(38)  PIN "PAD83" "C25" memport2(71)
PIN "PAD193" "A10" memport2(6)   PIN "PAD134" "B18" memport2(39)  PIN "PAD76" "C26" memport2(72)
PIN "PAD186" "A11" memport2(7)   PIN "PAD127" "B19" memport2(40)  PIN "PAD69" "C27" memport2(73)
PIN "PAD174" "A12" memport2(8)   PIN "PAD113" "B20" memport2(41)  PIN "PAD61" "C28" memport2(74)
PIN "PAD166" "A13" memport2(9)   PIN "PAD106" "B21" memport2(42)  PIN "PAD53" "C29" memport2(75)
PIN "PAD163" "A14" memport2(10)  PIN "PAD98" "B22" memport2(43)   PIN "PAD233" "D6" memport2(76)
PIN "PAD156" "A15" memport2(11)  PIN "PAD90" "B23" memport2(44)   PIN "PAD225" "D7" memport2(77)
PIN "PAD144" "A16" memport2(12)  PIN "PAD97" "B24" memport2(45)   PIN "PAD218" "D8" memport2(78)
PIN "PAD136" "A17" memport2(13)  PIN "PAD82" "B25" memport2(46)   PIN "PAD211" "D9" memport2(79)
PIN "PAD129" "A18" memport2(14)  PIN "PAD70" "B26" memport2(47)   PIN "PAD202" "D10" memport2(80)
PIN "PAD121" "A19" memport2(15)  PIN "PAD62" "B27" memport2(48)   PIN "PAD194" "D11" memport2(81)
PIN "PAD108" "A21" memport2(16)  PIN "PAD59" "B28" memport2(49)   PIN "PAD182" "D13" memport2(82)
PIN "PAD100" "A22" memport2(17)  PIN "PAD55" "B29" memport2(50)   PIN "PAD179" "D14" memport2(83)
PIN "PAD92" "A23" memport2(18)   PIN "PAD47" "B30" memport2(51)   PIN "PAD171" "D15" memport2(84)
PIN "PAD89" "A24" memport2(19)   PIN "PAD236" "C5" memport2(52)   PIN "PAD159" "D16" memport2(85)
PIN "PAD84" "A25" memport2(20)   PIN "PAD231" "C6" memport2(53)   PIN "PAD150" "D17" memport2(86)
PIN "PAD77" "A26" memport2(21)   PIN "PAD223" "C7" memport2(54)   PIN "PAD141" "D18" memport2(87)
PIN "PAD68" "A27" memport2(22)   PIN "PAD216" "C8" memport2(55)   PIN "PAD133" "D19" memport2(88)
PIN "PAD60" "A28" memport2(23)   PIN "PAD204" "C9" memport2(56)   PIN "PAD114" "D22" memport2(89)
PIN "PAD54" "A29" memport2(24)   PIN "PAD196" "C10" memport2(57)  PIN "PAD105" "D23" memport2(90)
PIN "PAD52" "A30" memport2(25)   PIN "PAD189" "C11" memport2(58)  PIN "PAD85" "D24" memport2(91)
PIN "PAD232" "B5" memport2(26)   PIN "PAD187" "C12" memport2(59)  PIN "PAD78" "D25" memport2(92)
PIN "PAD224" "B6" memport2(27)   PIN "PAD180" "C13" memport2(60)  PIN "PAD75" "D26" memport2(93)
PIN "PAD217" "B7" memport2(28)   PIN "PAD173" "C14" memport2(61)  PIN "PAD67" "D27" memport2(94)
PIN "PAD210" "B8" memport2(29)   PIN "PAD165" "C15" memport2(62)  PIN "PAD48" "D29" memport2(95)
PIN "PAD203" "B9" memport2(30)   PIN "PAD157" "C16" memport2(63)  PIN "PAD152" "E17" memport2(96)
PIN "PAD195" "B10" memport2(31)  PIN "PAD149" "C17" memport2(64)
PIN "PAD188" "B11" memport2(32)  PIN "PAD135" "C18" memport2(65)
```

A.3.5 Xilinx2 localbus

```
PIN "PAD595" "AV19" localbus(0)  PIN "PAD518" "AT10" localbus(27) PIN "PAD488" "AV4" localbus(54)
PIN "PAD444" "AL3" localbus(1)   PIN "PAD526" "AT11" localbus(28) PIN "PAD482" "AV5" localbus(55)
PIN "PAD450" "AL4" localbus(2)   PIN "PAD535" "AT13" localbus(29) PIN "PAD498" "AV6" localbus(56)
PIN "PAD443" "AM1" localbus(3)   PIN "PAD541" "AT14" localbus(30) PIN "PAD505" "AV7" localbus(57)
PIN "PAD449" "AM2" localbus(4)   PIN "PAD549" "AT15" localbus(31) PIN "PAD511" "AV8" localbus(58)
PIN "PAD451" "AM3" localbus(5)   PIN "PAD558" "AT16" localbus(32) PIN "PAD519" "AV9" localbus(59)
PIN "PAD456" "AM4" localbus(6)   PIN "PAD570" "AT17" localbus(33) PIN "PAD527" "AV10" localbus(60)
PIN "PAD452" "AN1" localbus(7)   PIN "PAD579" "AT18" localbus(34) PIN "PAD534" "AV11" localbus(61)
PIN "PAD458" "AN2" localbus(8)   PIN "PAD587" "AT19" localbus(35) PIN "PAD542" "AV12" localbus(62)
PIN "PAD463" "AN3" localbus(9)   PIN "PAD600" "AT21" localbus(36) PIN "PAD550" "AV13" localbus(63)
PIN "PAD465" "AN4" localbus(10)  PIN "PAD481" "AU4" localbus(37)  PIN "PAD557" "AV14" localbus(64)
PIN "PAD457" "AP1" localbus(11)  PIN "PAD489" "AU6" localbus(38)  PIN "PAD564" "AV15" localbus(65)
PIN "PAD459" "AP2" localbus(12)  PIN "PAD497" "AU7" localbus(39)  PIN "PAD572" "AV16" localbus(66)
PIN "PAD468" "AP3" localbus(13)  PIN "PAD504" "AU8" localbus(40)  PIN "PAD580" "AV17" localbus(67)
PIN "PAD472" "AP4" localbus(14)  PIN "PAD512" "AU9" localbus(41)  PIN "PAD588" "AV18" localbus(68)
PIN "PAD464" "AR1" localbus(15)  PIN "PAD520" "AU10" localbus(42) PIN "PAD490" "AW4" localbus(69)
PIN "PAD471" "AR2" localbus(16)  PIN "PAD528" "AU11" localbus(43) PIN "PAD496" "AW5" localbus(70)
PIN "PAD474" "AR3" localbus(17)  PIN "PAD533" "AU12" localbus(44) PIN "PAD503" "AW6" localbus(71)
PIN "PAD466" "AT1" localbus(18)  PIN "PAD540" "AU13" localbus(45) PIN "PAD510" "AW7" localbus(72)
PIN "PAD473" "AT2" localbus(19)  PIN "PAD547" "AU14" localbus(46) PIN "PAD525" "AW9" localbus(74)
PIN "PAD476" "AT3" localbus(20)  PIN "PAD555" "AU15" localbus(47) PIN "PAD539" "AW11" localbus(76)
PIN "PAD565" "AR17" localbus(21) PIN "PAD563" "AU16" localbus(48) PIN "PAD532" "AW10" localbus(77)
PIN "PAD577" "AR18" localbus(22) PIN "PAD571" "AU17" localbus(49) PIN "PAD556" "AW13" localbus(78)
PIN "PAD487" "AT6" localbus(23)  PIN "PAD585" "AU18" localbus(50) PIN "PAD562" "AW14" localbus(79)
PIN "PAD495" "AT7" localbus(24)  PIN "PAD592" "AU19" localbus(51) PIN "PAD569" "AW15" localbus(80)
PIN "PAD502" "AT8" localbus(25)  PIN "PAD594" "AU21" localbus(52) PIN "PAD578" "AW16" localbus(81)
PIN "PAD509" "AT9" localbus(26)  PIN "PAD485" "AV3" localbus(53)
```

A.3.6 Xilinx2 klokkepinner

```
PIN "GCK0" "AW19" clk_bus(2)
PIN "GCK1" "AU22" clk_bus(5)
PIN "GCK2" "D21" clk_bus(8)
PIN "GCK3" "A20" clk_bus(11)
```

A.3.7 Xilinx2 testpinner

```
PIN "PAD517" "AW8" tp200
PIN "PAD548" "AW12" tp201
PIN "D1" "P4" tp202
PIN "D2" "P3" tp203
PIN "D3" "R1" tp204
PIN "D4" "AD3" tp205
PIN "D5" "AG2" tp206
PIN "D6" "AH1" tp207
PIN "D7" "AR4" tp208
PIN "WRITE" "B4" tp209
PIN "CS" "D5" tp210
```

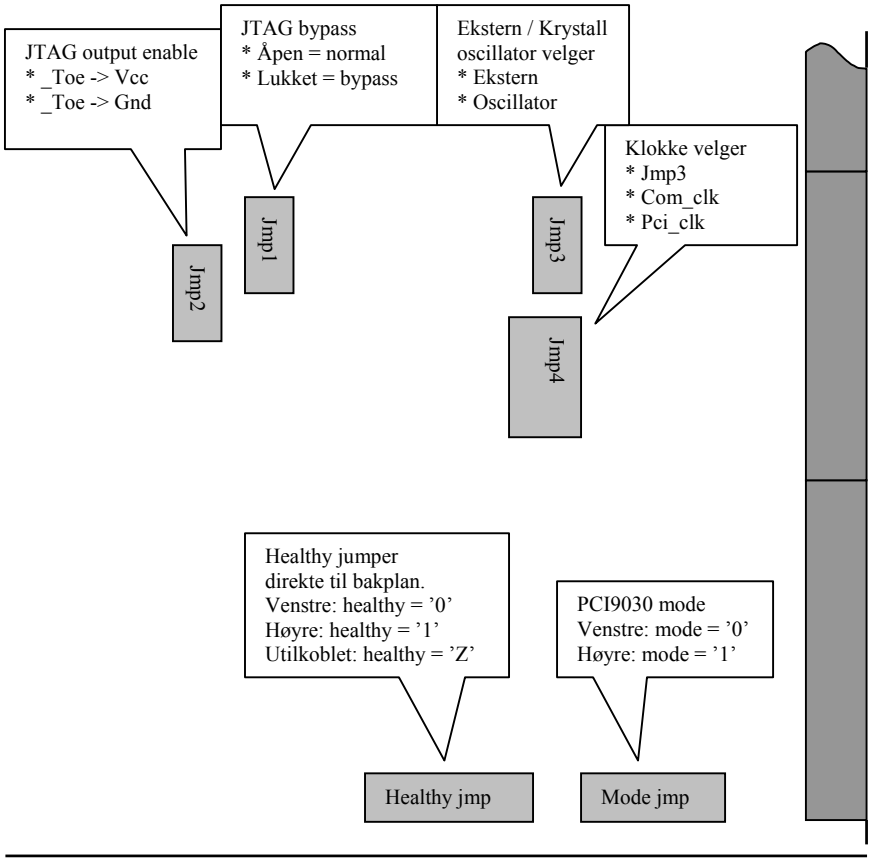
A.3.8 Xilinx2 prom, jtag, mode og temperaturdioder

```
Kobling til init prom og JTAG

PIN "D0_DIN" "C2" din3
PIN "ERR_INIT" "AU2" init3#
PIN "PROGRAM" "AT5" prog3#
PIN "DONE" "AU5" done3
PIN "TDO" "C4" tdo
PIN "TCK" "C36" jtag(0)
PIN "TMS" "E36" jtag(1)
PIN "TDI" "B3" tdoxilinx#2
PIN "CCLK" "E4" cclk3

Intern 'mode' setting

PIN "M0" "AT37" m0 (gnd)
PIN "M1" "AU38" m1 (gnd)
PIN "M2" "AT35" m2 (gnd)
```

```
Kobling til reset

PIN "PAD854" "U38" reset#
PIN "PAD849" "U39" pwr_on_res#

Kobling til displaybus

PIN "PAD863" "V35" xd3x(6)
PIN "PAD869" "U37" xd3x(7)
PIN "PAD861" "V36" xd3x(8)

Kobling til temperaturdioden

PIN temp_anode  AU35 temp_pos2
pin temp_katode AV37 temp_neg2
```

```
Ikke tilkoblet

PIN "BUSY_DOUT" "E3" NC
PIN "PAD586" "AW17" NC
PIN "PAD827" "AB35" NC
PIN "PAD46" "C30" NC
PIN "PAD434" "AK3" NC
PIN "PAD436" "AK4" NC
PIN "PAD441" "AL1" NC
PIN "PAD442" "AL2" NC
PIN "PAD593" "AW18" NC
PIN "PAD112" "E22" NC
PIN "PAD99" "E23" NC
PIN "PAD143" "E18" NC
```

B KONFIGURERINGS JUMPER PLASSERINGER

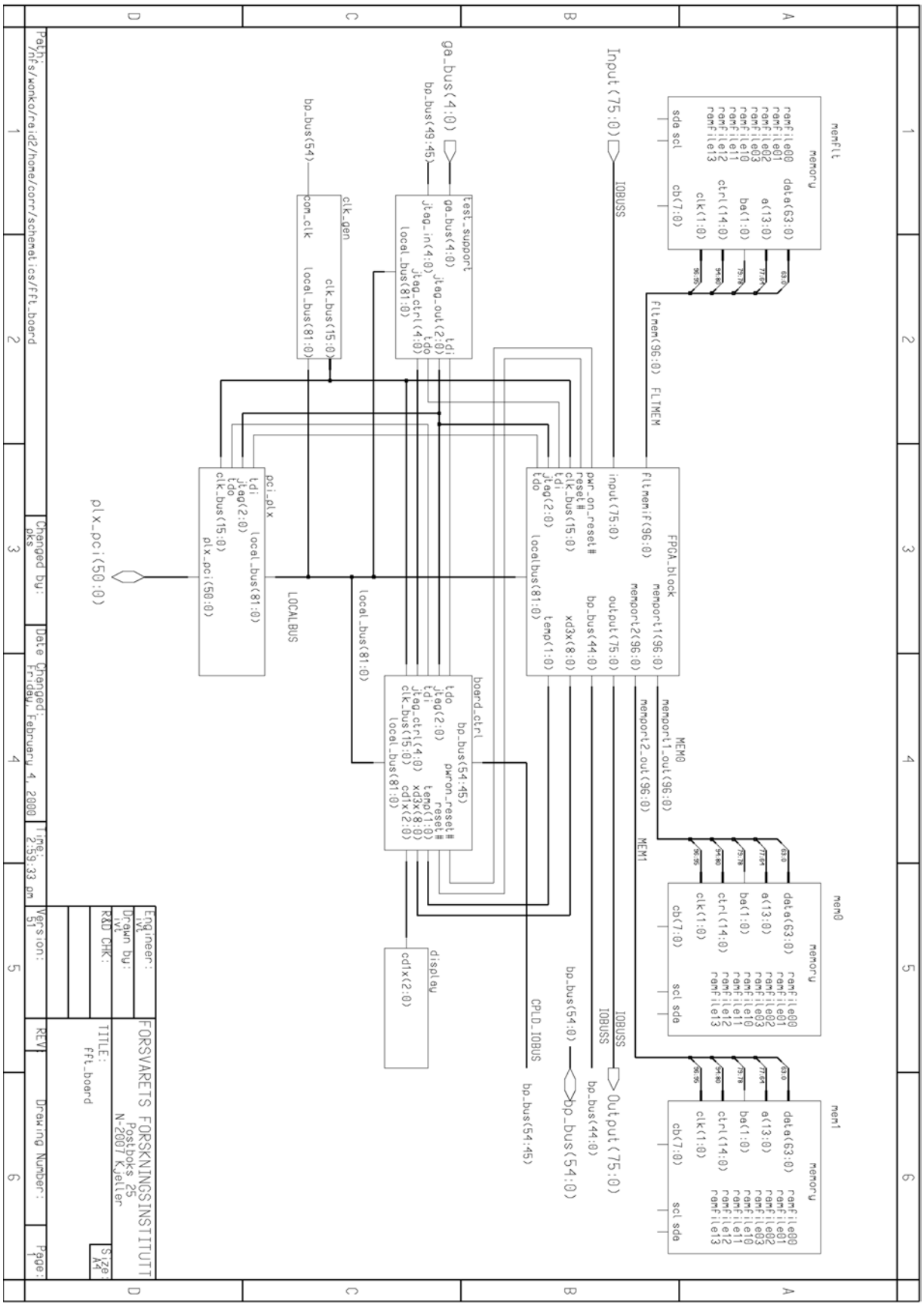


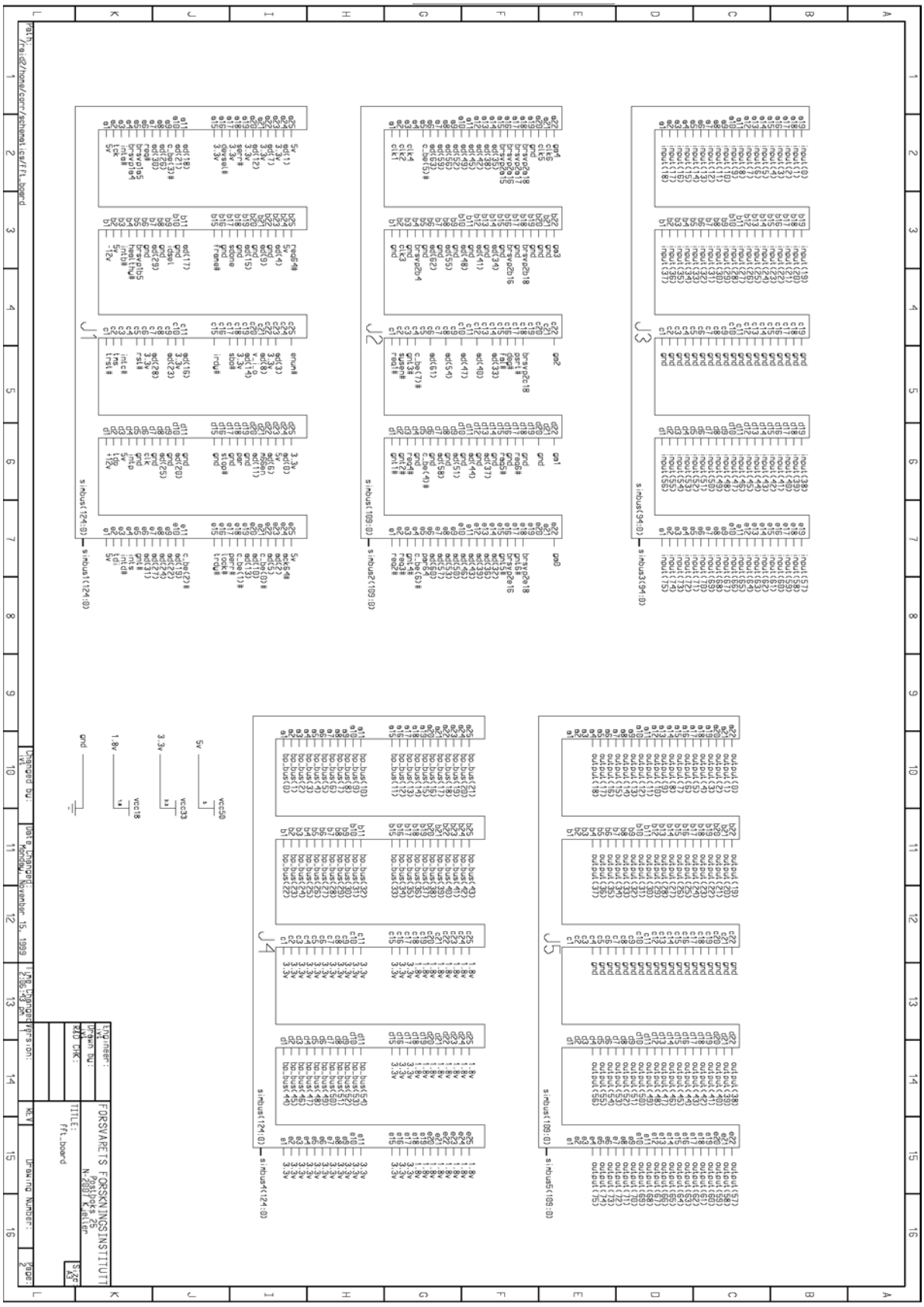
C PLD LIGNINGER

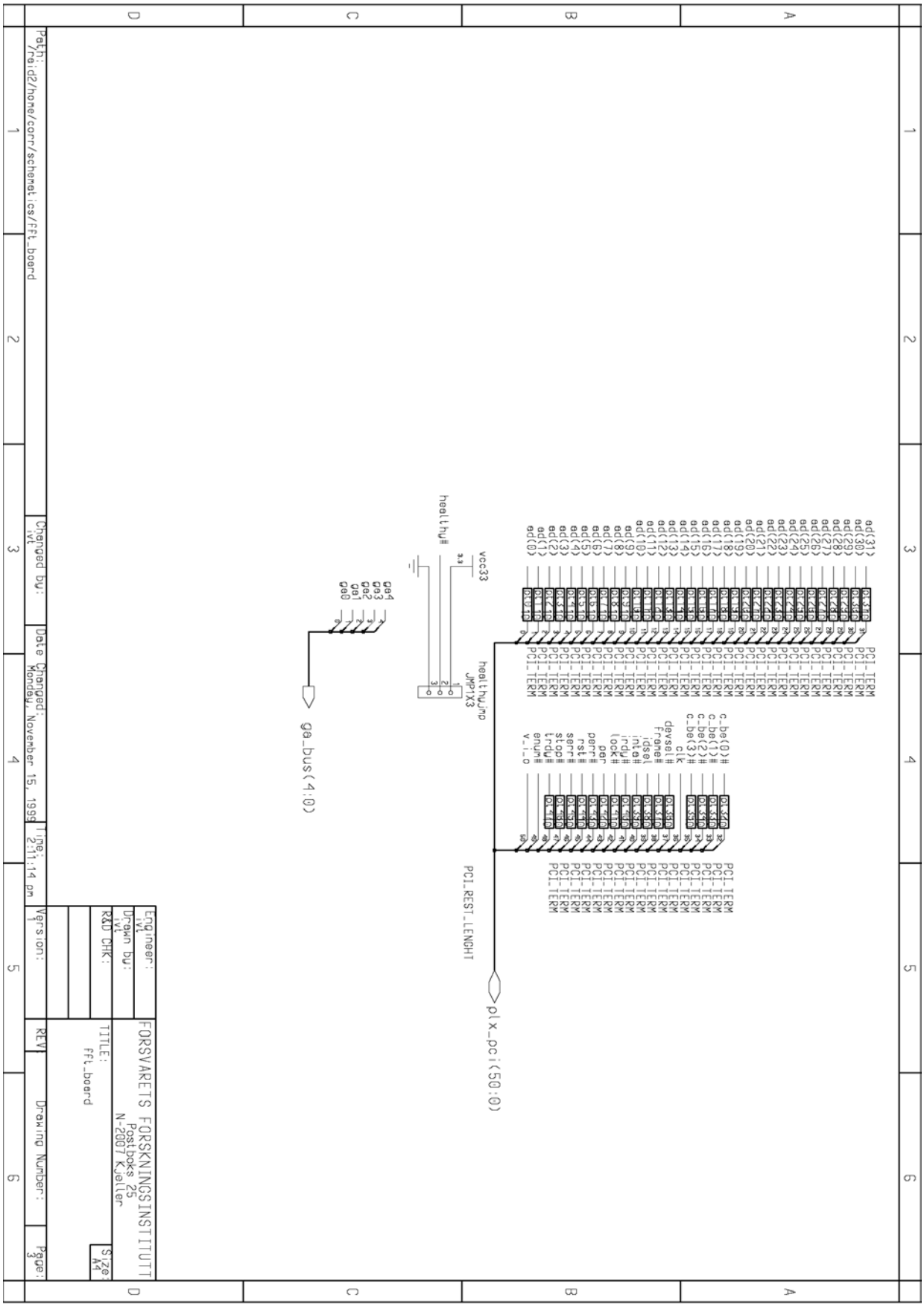
```
module repdec
title 'repair jtag decoder'
repdec device 'P22V10';

 clk,lclk                                pin 1,2;
 _cs,a15,a14,a13,a12,a11                 pin 3,4,5,6,7,8;
 _ads,w_r                                pin 9,10;
 _jtag_strobe                            pin 15;
 strbdly                                 pin 16;
 _program,_id_oe,r_w,invlclk             pin 18,19,22,23;

  X,Z,H,L = .x.,.z.,1,0;

  a = [a15,a14,a13,a12,a11,0,0,0];

equations

  invlclk       = !lclk;

  !_program     =  (!_ads & !_cs & (a == ^h20))
                 # (!_program & !(!_ads & !_cs & (a == ^h28)));

  strbdly       := !_ads & !_cs & (a == ^h00) & !w_r;

  !_jtag_strobe := !_ads & !_cs & (a == ^h00)
                 # strbdly;

  r_w           = !w_r;

  !_id_oe       =  (a == ^h08) & (_cs == 0) & (w_r == 0);

end;
```

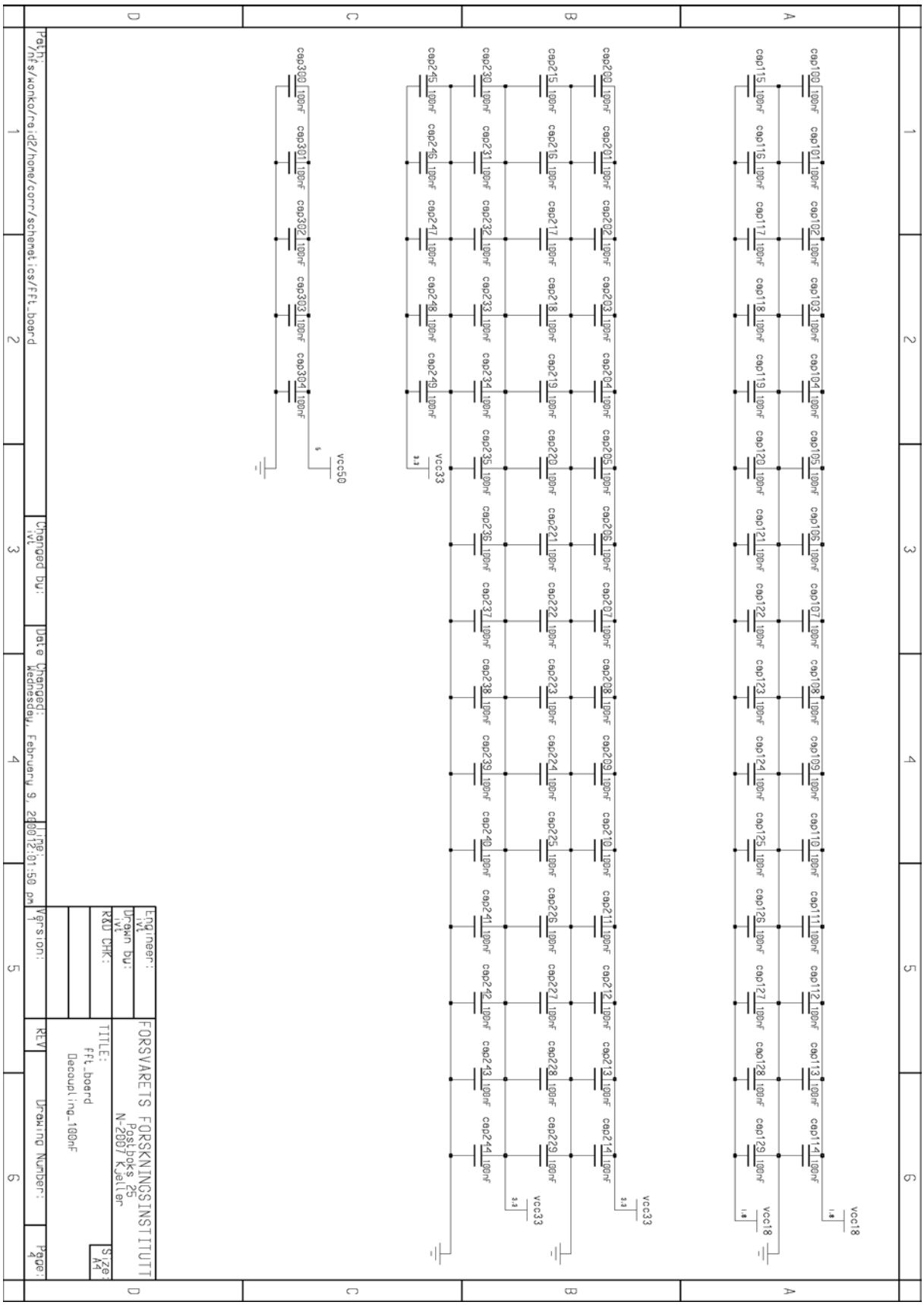
D SKEMAER

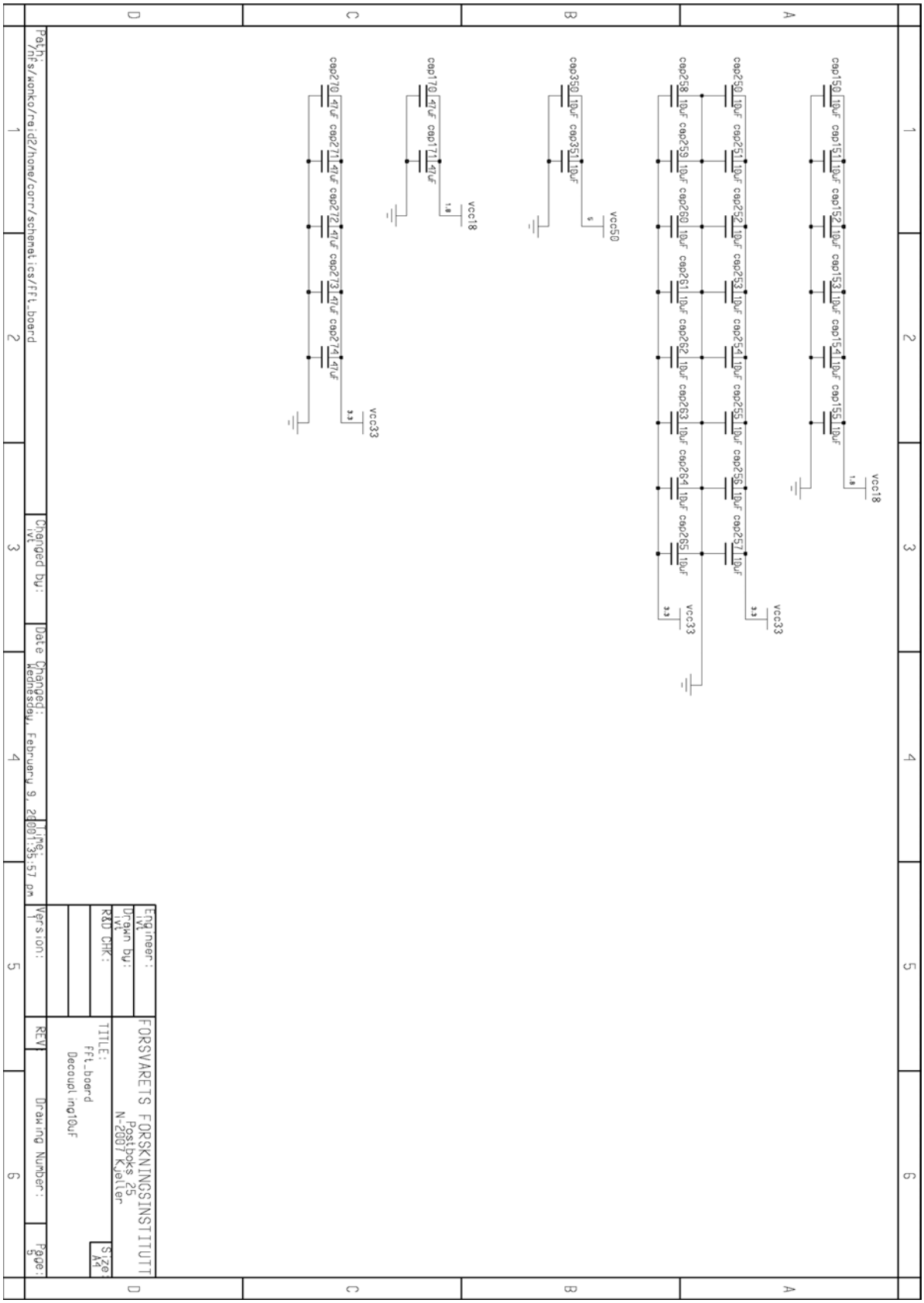
D.1 FPGA board toppnivå



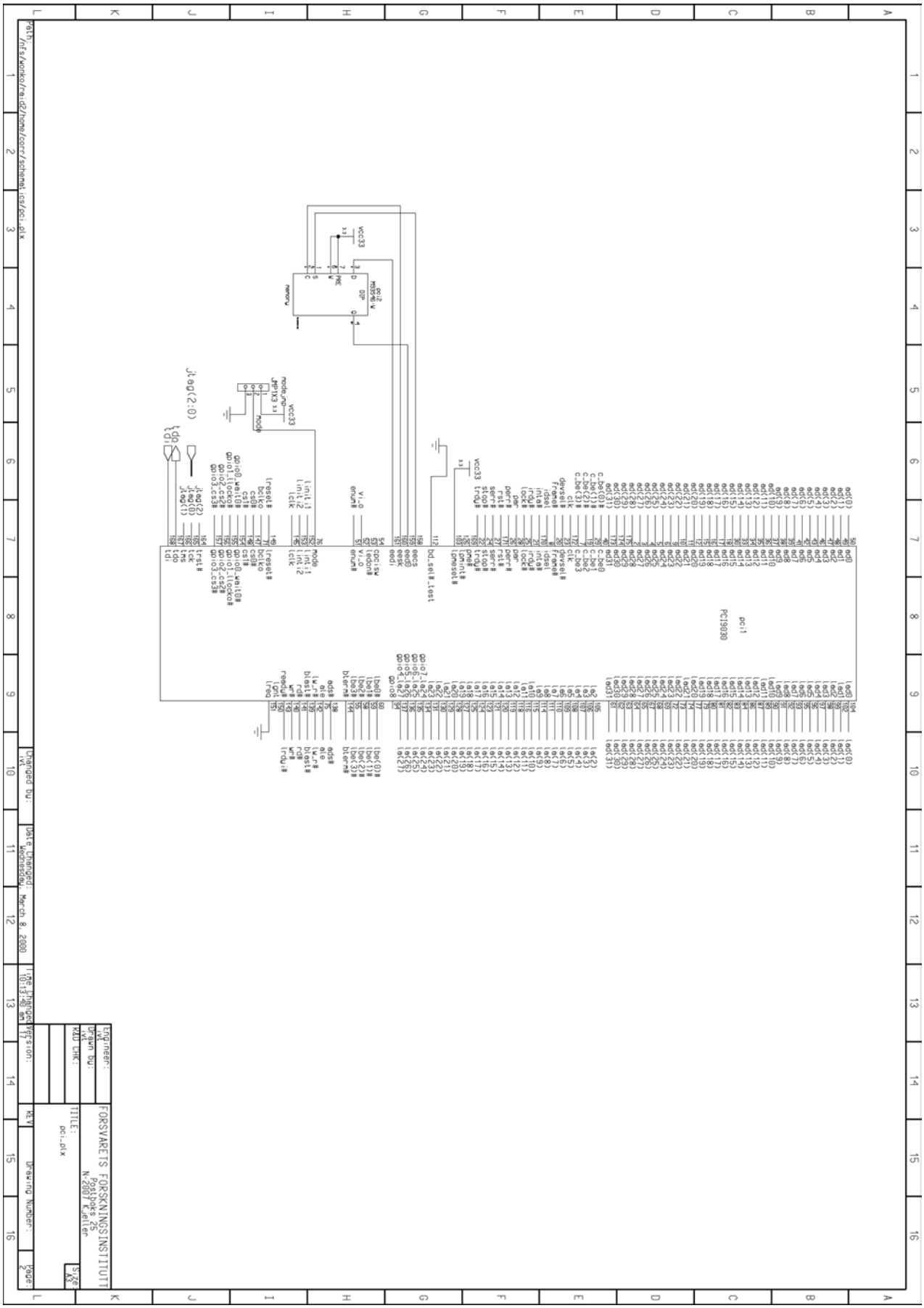


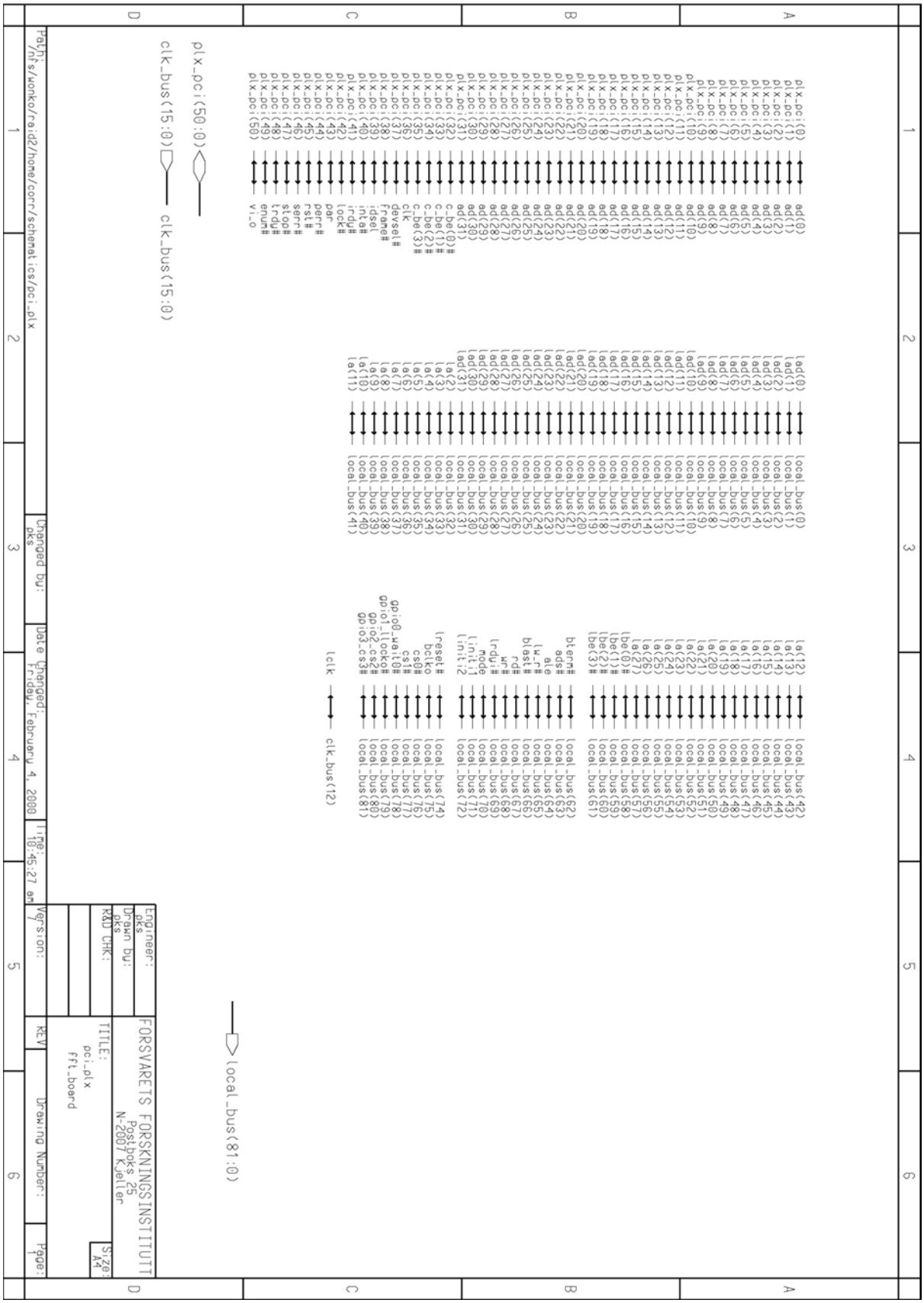

Path: /ra.d2/home/conr/schematics/fft_board
Changed by: ivt
Date Changed: Monday, November 15, 1999
Time: 2:11:14 pm
Version: 1
Engineer: ivt
Drawn by: ivt
R&D CHK:
TITLE: fft_board
REV:
Drawing Number:
Page: 3
Size: A4
FORSVARETS FORSKNINGSINSTITUTT
Postboks 25
N-2007 Kjeller
ga_bus(4:0)
ga4
ga3
ga2
ga1
ga0
healthy#
vcc33
3.3
healthyjmp
JMP1X3
plx_pci(50:0)
PCI_REST_LENGHT
PCI_TERM


cap100 100nF
cap101 100nF
cap102 100nF
cap103 100nF
cap104 100nF
cap105 100nF
cap106 100nF
cap107 100nF
cap108 100nF
cap109 100nF
cap110 100nF
cap111 100nF
cap112 100nF
cap113 100nF
cap114 100nF
cap115 100nF
cap116 100nF
cap117 100nF
cap118 100nF
cap119 100nF
cap120 100nF
cap121 100nF
cap122 100nF
cap123 100nF
cap124 100nF
cap125 100nF
cap126 100nF
cap127 100nF
cap128 100nF
cap129 100nF
vcc18
cap200 100nF
cap201 100nF
cap202 100nF
cap203 100nF
cap204 100nF
cap205 100nF
cap206 100nF
cap207 100nF
cap208 100nF
cap209 100nF
cap210 100nF
cap211 100nF
cap212 100nF
cap213 100nF
cap214 100nF
cap215 100nF
cap216 100nF
cap217 100nF
cap218 100nF
cap219 100nF
cap220 100nF
cap221 100nF
cap222 100nF
cap223 100nF
cap224 100nF
cap225 100nF
cap226 100nF
cap227 100nF
cap228 100nF
cap229 100nF
vcc33
cap230 100nF
cap231 100nF
cap232 100nF
cap233 100nF
cap234 100nF
cap235 100nF
cap236 100nF
cap237 100nF
cap238 100nF
cap239 100nF
cap240 100nF
cap241 100nF
cap242 100nF
cap243 100nF
cap244 100nF
cap245 100nF
cap246 100nF
cap247 100nF
cap248 100nF
cap249 100nF
vcc33
cap300 100nF
cap301 100nF
cap302 100nF
cap303 100nF
cap304 100nF
vcc50
Path: /nfs/wonko/raid2/home/corr/schematics/fft_board
Changed by: ivt
Date Changed: Wednesday, February 9, 2000 12:01:50 pm
Engineer: ivt
Drawn by: ivt
R&D CHK:
FORSVARETS FORSKNINGSINSTITUTT
Postboks 25
N-2007 Kjeller
TITLE: fft_board
Decoupling 100nF
Size: A4
REV
Version: 1
Drawing Number:
Page: 4

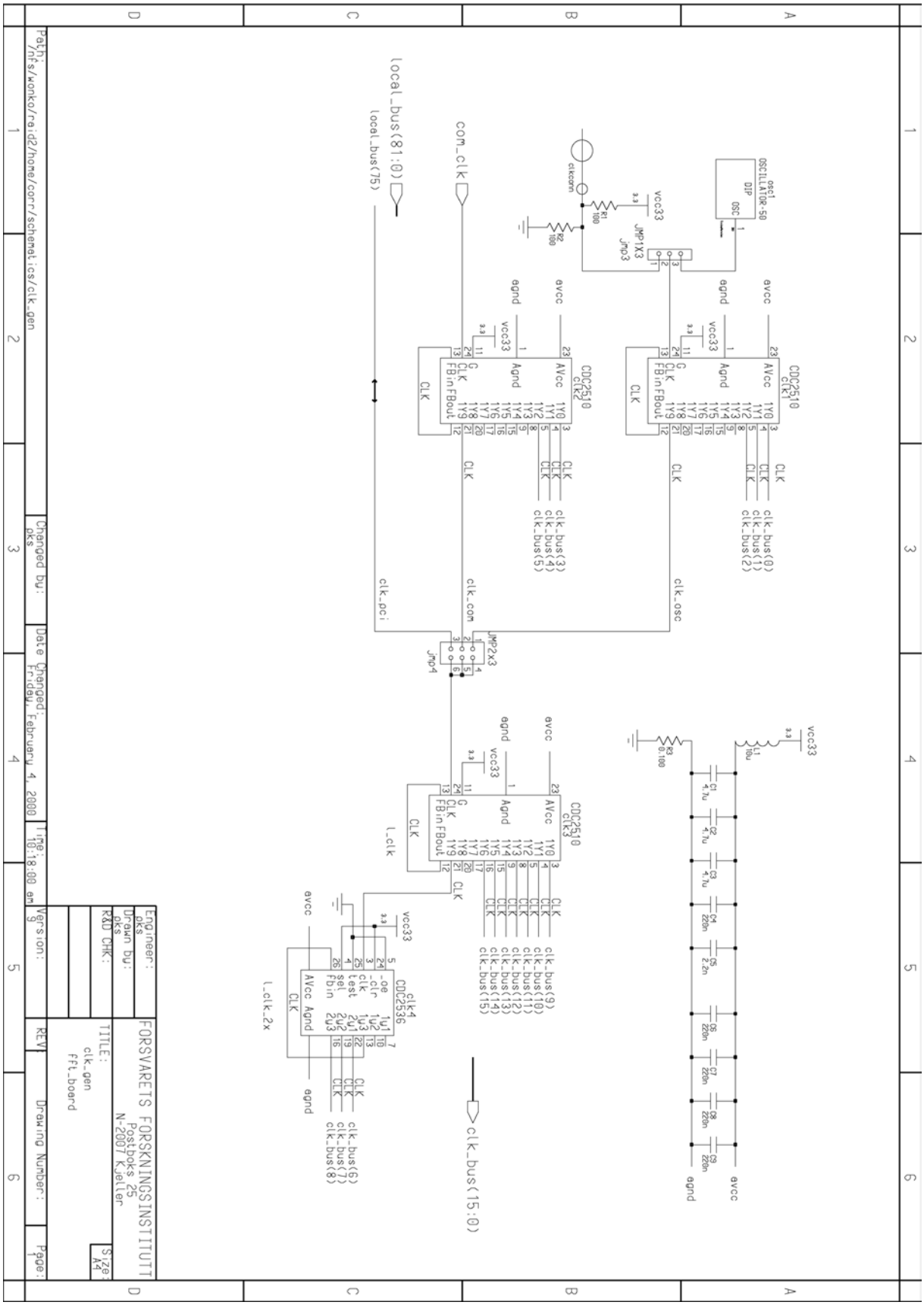

cap150 10uF
cap151 10uF
cap152 10uF
cap153 10uF
cap154 10uF
cap155 10uF
vcc18
1.8
cap250 10uF
cap251 10uF
cap252 10uF
cap253 10uF
cap254 10uF
cap255 10uF
cap256 10uF
cap257 10uF
vcc33
3.3
cap258 10uF
cap259 10uF
cap260 10uF
cap261 10uF
cap262 10uF
cap263 10uF
cap264 10uF
cap265 10uF
vcc33
3.3
cap350 10uF
cap351 10uF
vcc50
5
cap170 47uF
cap171 47uF
vcc18
1.8
cap270 47uF
cap271 47uF
cap272 47uF
cap273 47uF
cap274 47uF
vcc33
3.3
Path:
/nis/wonko/raid2/home/corr/schematics/fft_board
Changed by:
ivt
Date Changed:
Wednesday, February 9, 2000
Time:
1:35:57 pm
Engineer:
ivt
Drawn by:
ivt
R&D CHK:
Version:
REV:
TITLE:
fft_board
Decoupling10uF
FORSVARETS FORSKNINGSINSTITUTT
Postboks 25
N-2007 Kjeller
Drawing Number:
Size:
A4
Page:
5

D.2 pciplx

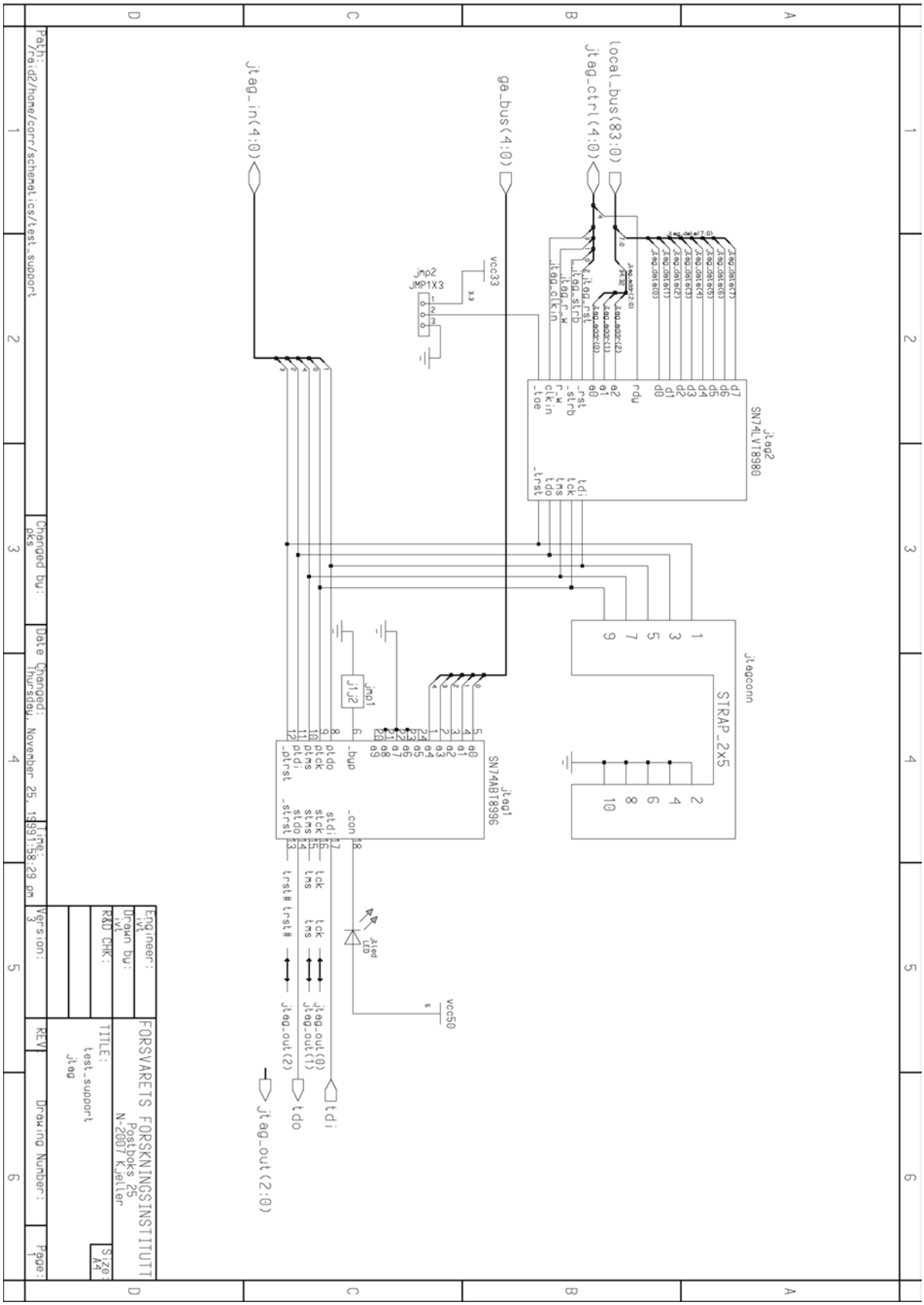

FORSVARETS FORSKNINGSINSTITUTT
Postboks 25
N-2007 Kjeller
TITLE:
pci-plx
jtag(2:0)
PCI9030
pci1
vcc33
memory
Path: /nfs/wonko/raid2/home/corr/schematics/pci.plx
Changed by:
Date Changed: Wednesday, March 8, 2000
Time Changed: 10:13:49 am
Engineer:
Drawn by:
R&D CHK:
Version:
KEY
Drawing Number:
Page 2


plx_pci(50:0)
clk_bus(15:0)
clk_bus(15:0)
local_bus(81:0)
FORSVARETS FORSKNINGSINSTITUTT
Postboks 25
N-2007 Kjeller
TITLE:
pci_plx
fft_board
Path:
/nfs/wonko/raid2/home/corr/schematics/pci_plx
Changed by:
pks
Date Changed:
Friday, February 4, 2000
Time:
10:45:27 am
Engineer:
pks
Drawn by:
pks
R&D CHK:
Version:
REV
Drawing Number:
Size:
A4
Page:

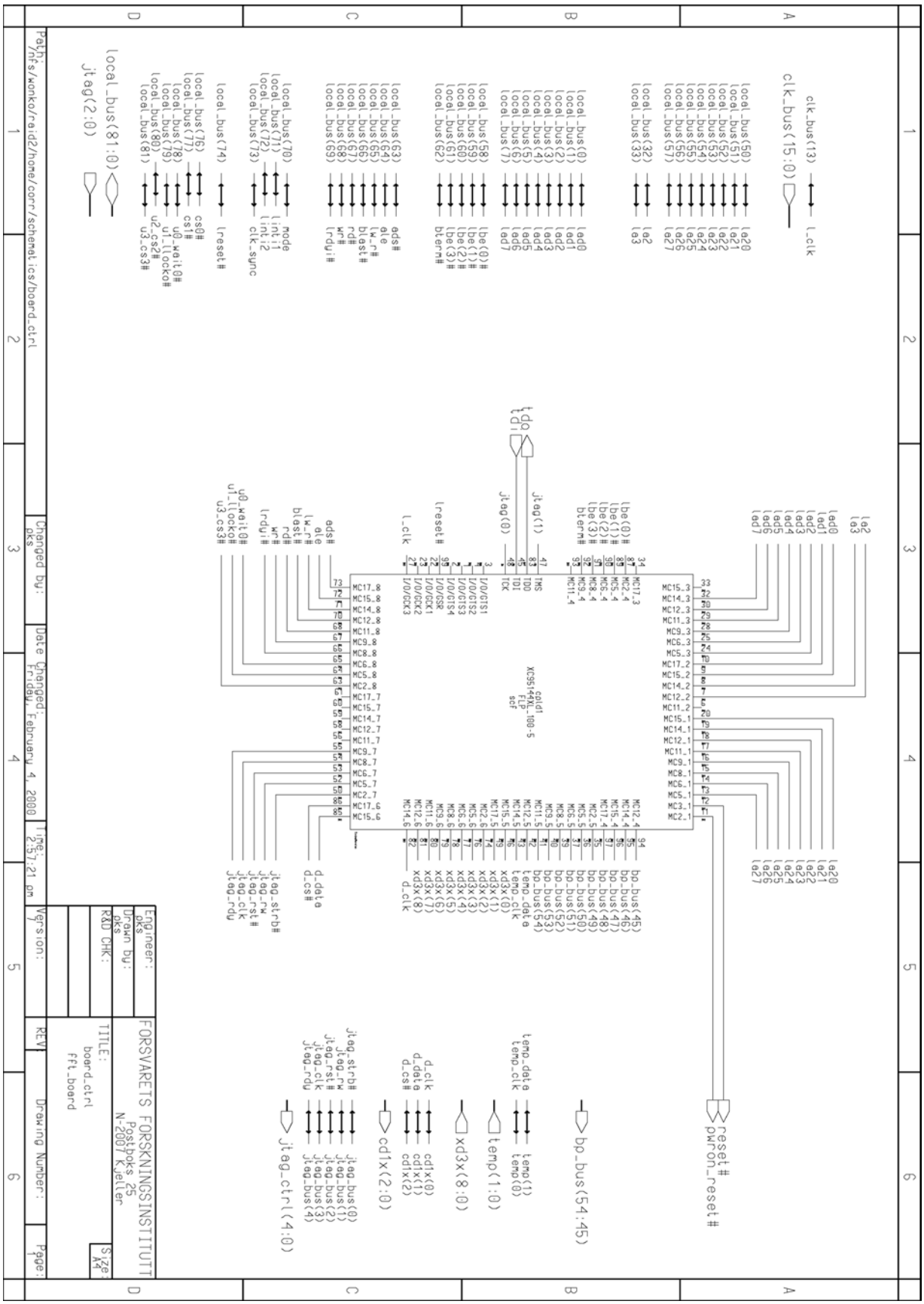
D.3 clkgen


Path:
/nfs/wonko/raid2/home/corr/schematics/clk_gen
Changed by:
oks
Date Changed:
Friday, February 4, 2000
Time:
10:18:00 am
Version:
0
Engineer:
oks
Drawn by:
oks
R&D CHK:
FORSVARETS FORSKNINGSINSTITUTT
Postboks 25
N-2007 Kjeller
TITLE:
clk_gen
fft_board
REV
Drawing Number:
Size
A4
Page:
1
osc1
OSCILLATOR-50
DIP
OSC
clkcomm
R1
100
R2
100
vcc33
JMP1X3
Jmp3
avcc
agnd
CDC2510
clk1
clk2
clk3
AVcc
Agnd
C
CLK
FBin
FBout
1Y0
1Y1
1Y2
1Y3
1Y4
1Y5
1Y6
1Y7
1Y8
1Y9
clk_bus(0)
clk_bus(1)
clk_bus(2)
clk_bus(3)
clk_bus(4)
clk_bus(5)
clk_bus(6)
clk_bus(7)
clk_bus(8)
clk_bus(9)
clk_bus(10)
clk_bus(11)
clk_bus(12)
clk_bus(13)
clk_bus(14)
clk_bus(15)
clk_bus(15:0)
local_bus(81:0)
local_bus(75)
com_clk
clk_pci
clk_com
clk_osc
l_clk
l_clk_2x
JMP2x3
Jmp1
L1
10u
R3
0.10R
C1
4.7u
C2
4.7u
C3
4.7u
C4
220n
C5
2.2n
C6
220n
C7
220n
C8
220n
C9
220n
clk4
CDC2536
-oe
-clr
clk
test
sel
Fbin
1u1
1u2
1u3
2u1
2u2
2u3

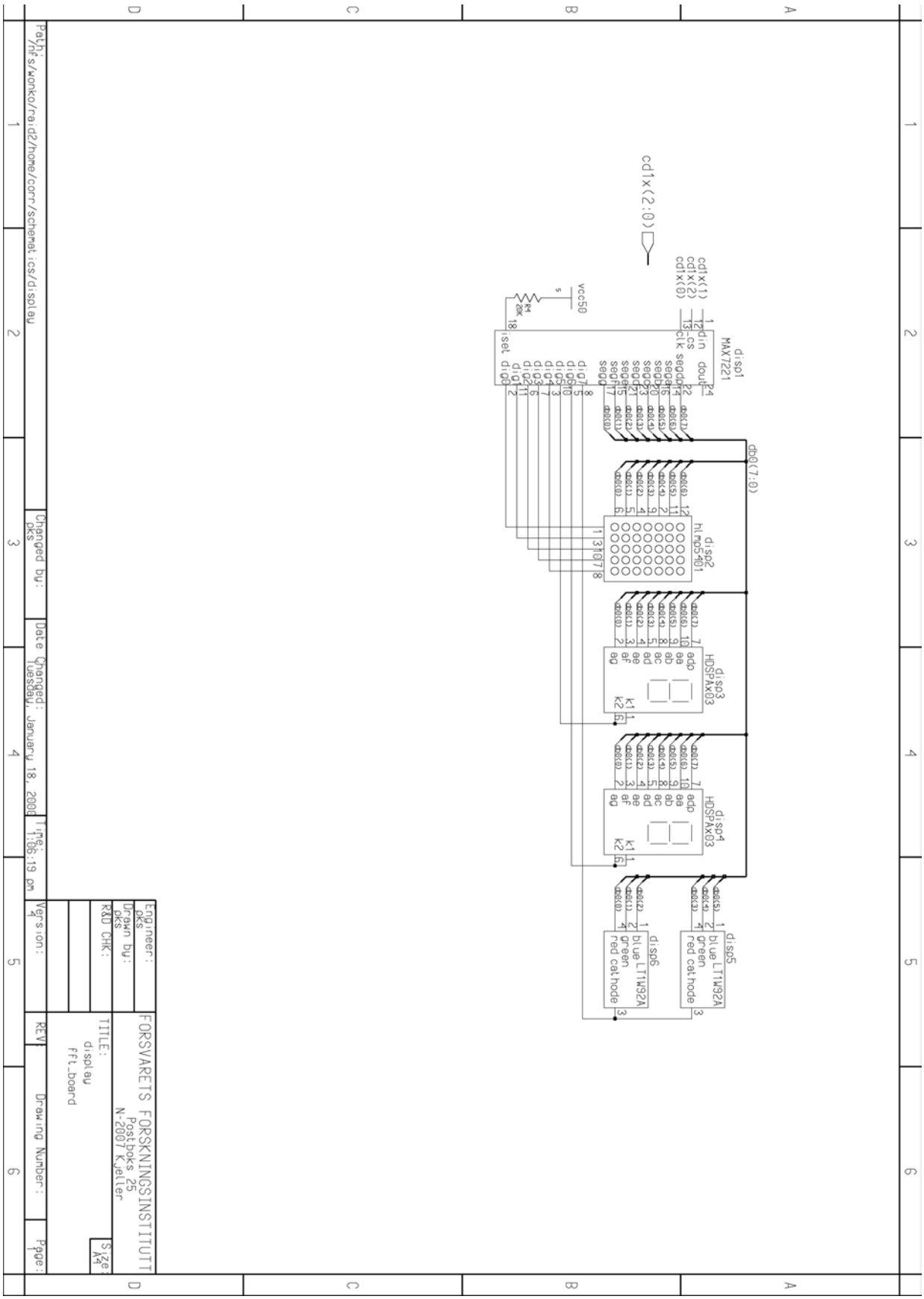
D.4 test_support



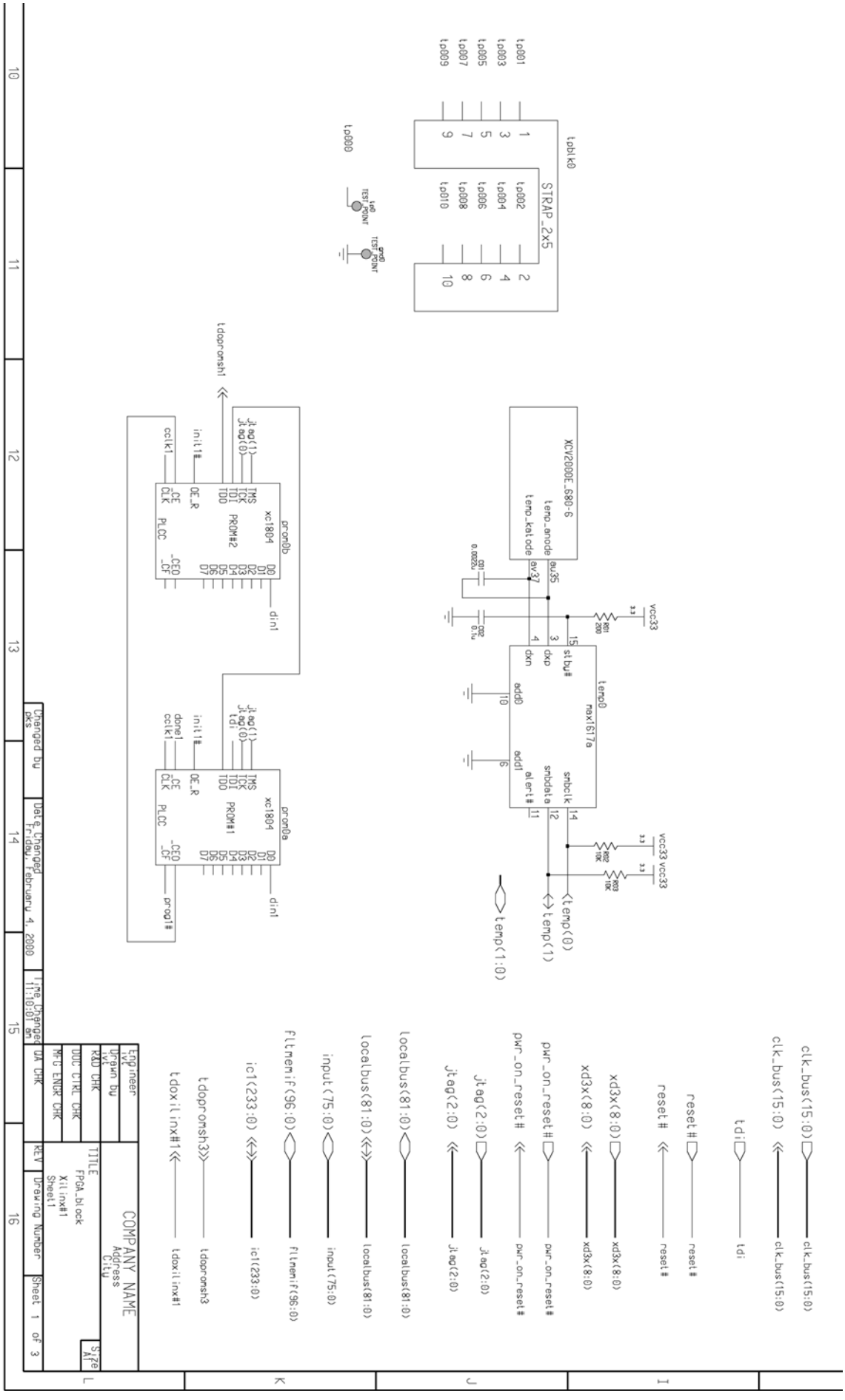
D.5 board_ctrl

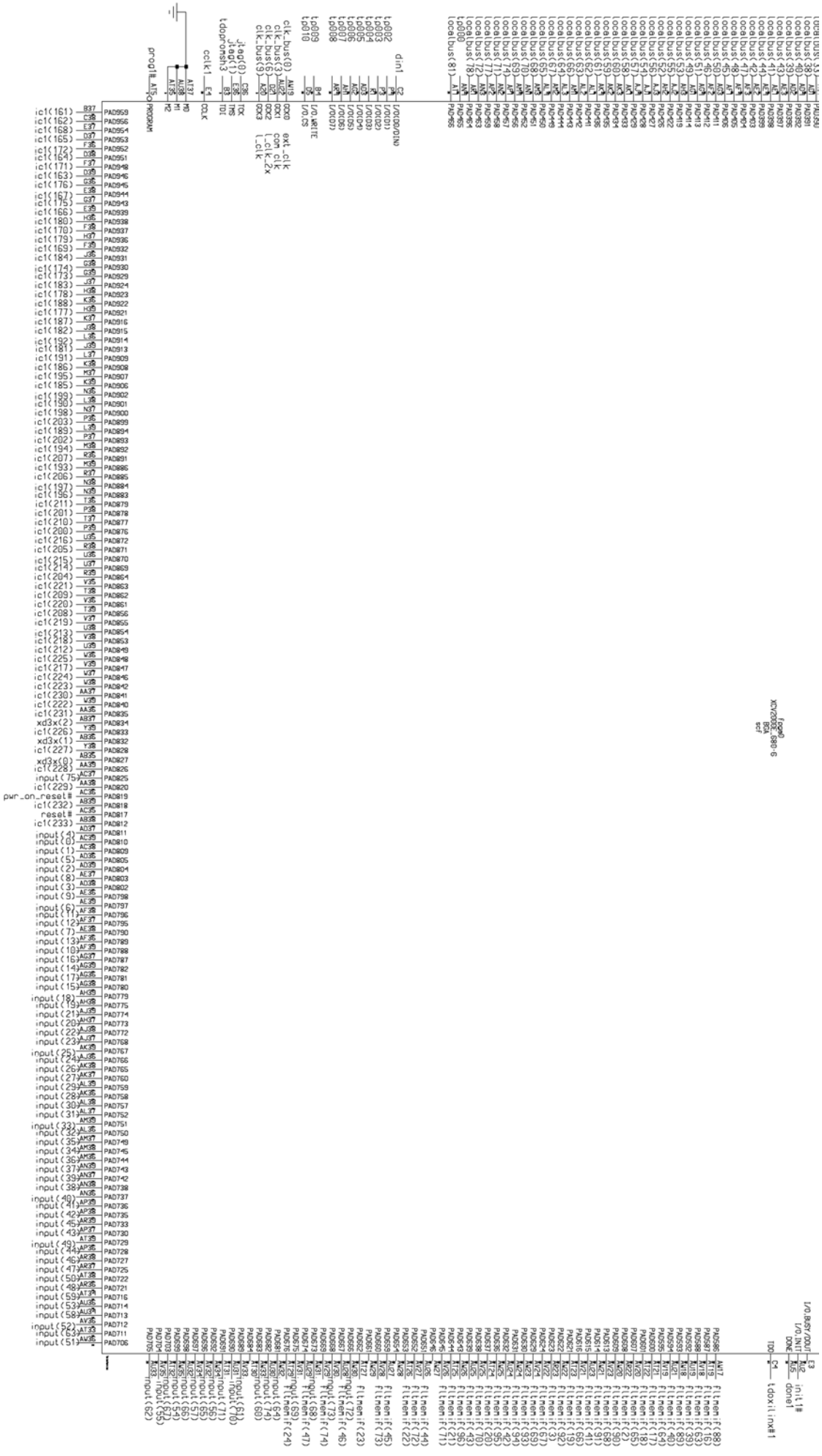


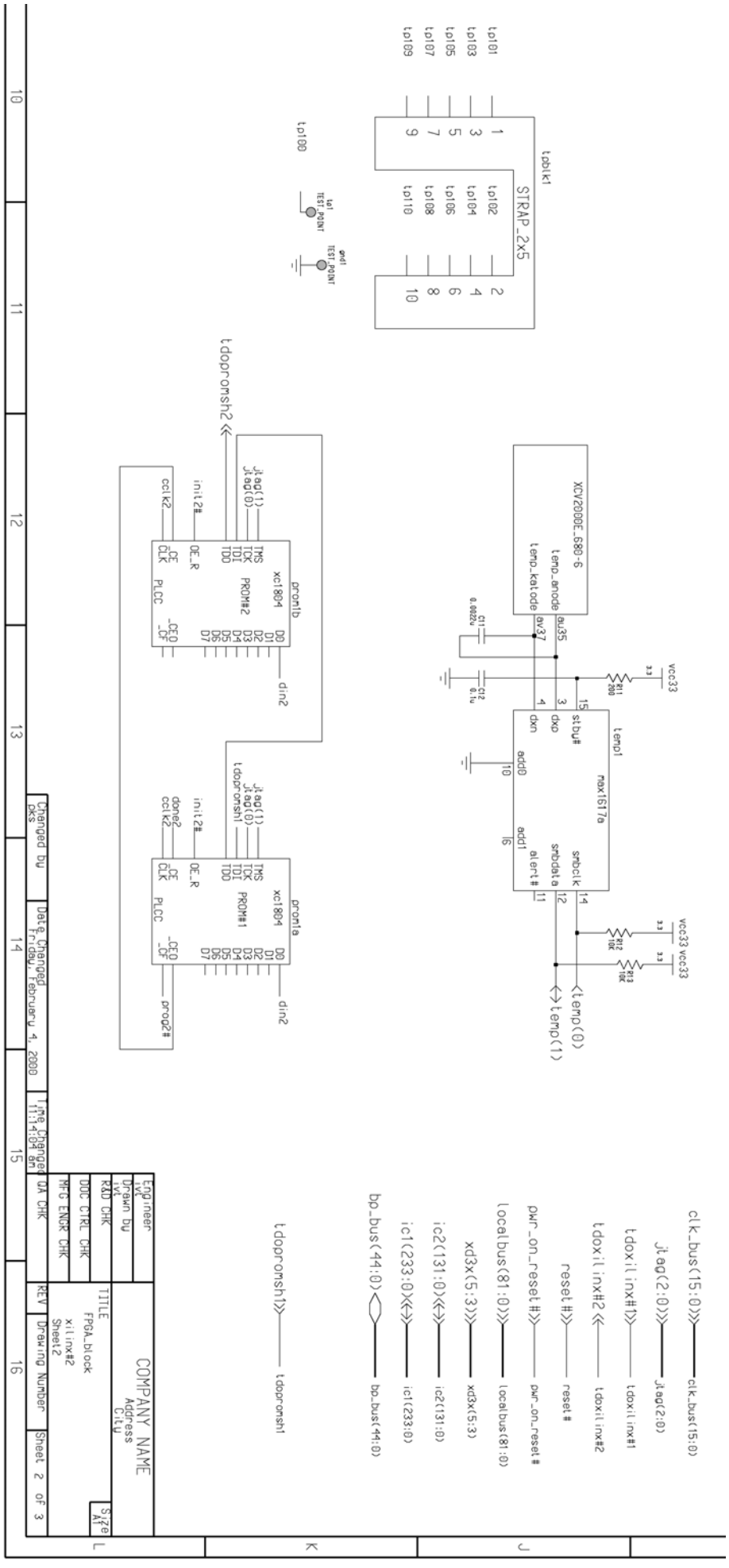
D.6 display

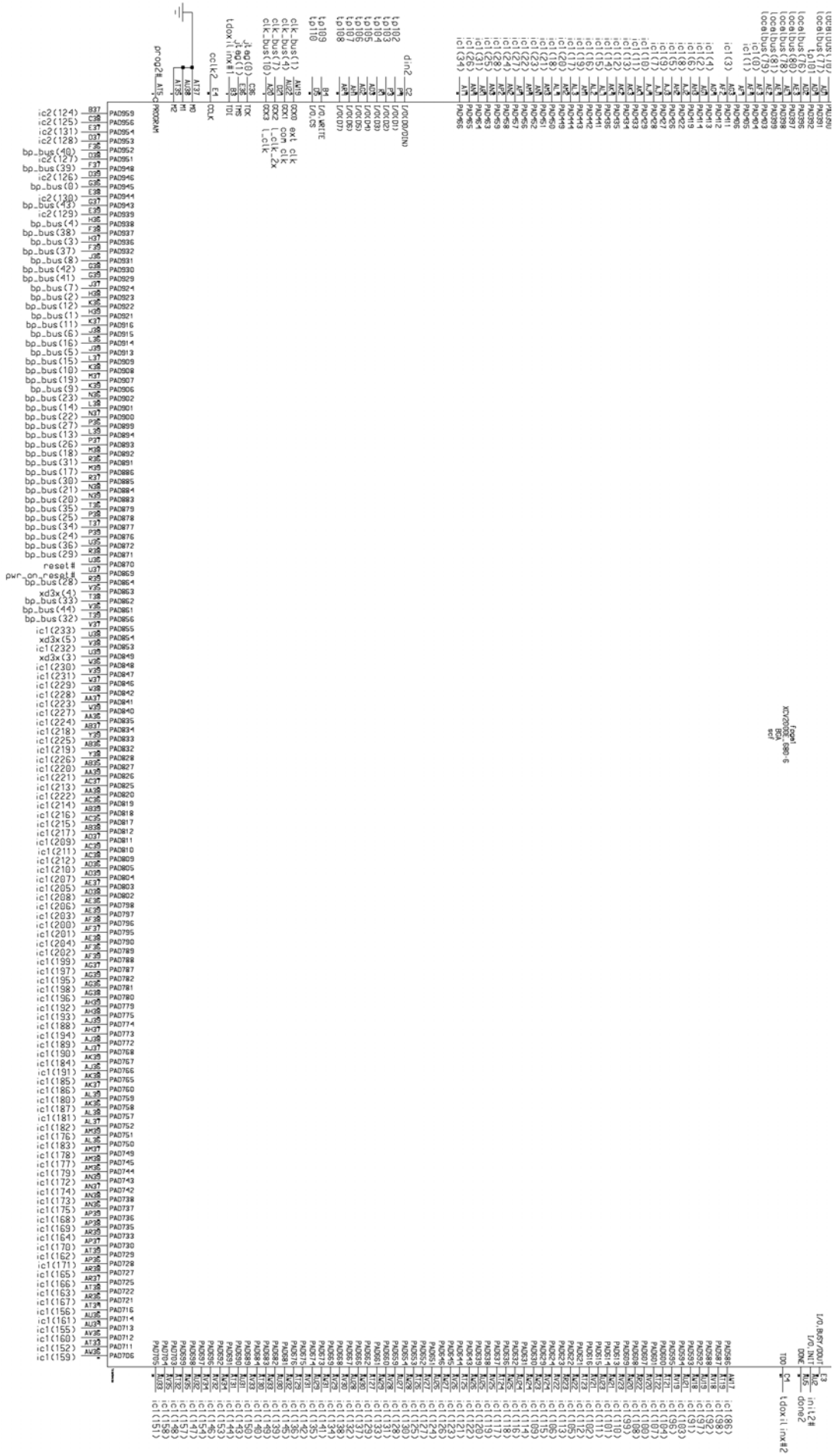

cd1x(2:0)
disp1
MAX7221
disp2
HLMP5401
disp3
HDSP-Ax03
disp4
HDSP-Ax03
disp5
LT1W92A
disp6
LT1W92A
vcc50
db0(7:0)
Path:
/nfs/wonko/raid2/home/corr/schematics/display
Changed by:
pks
Date Changed:
Tuesday, January 18, 2000
Time:
1:06:19 pm
Version:
4
Engineer:
pks
Drawn by:
pks
R&D CHK:
FORSVARETS FORSKNINGSINSTITUTT
Postboks 25
N-2007 Kjeller
TITLE:
display
fft_board
Size:
A4
REV:
Drawing Number:
Page:

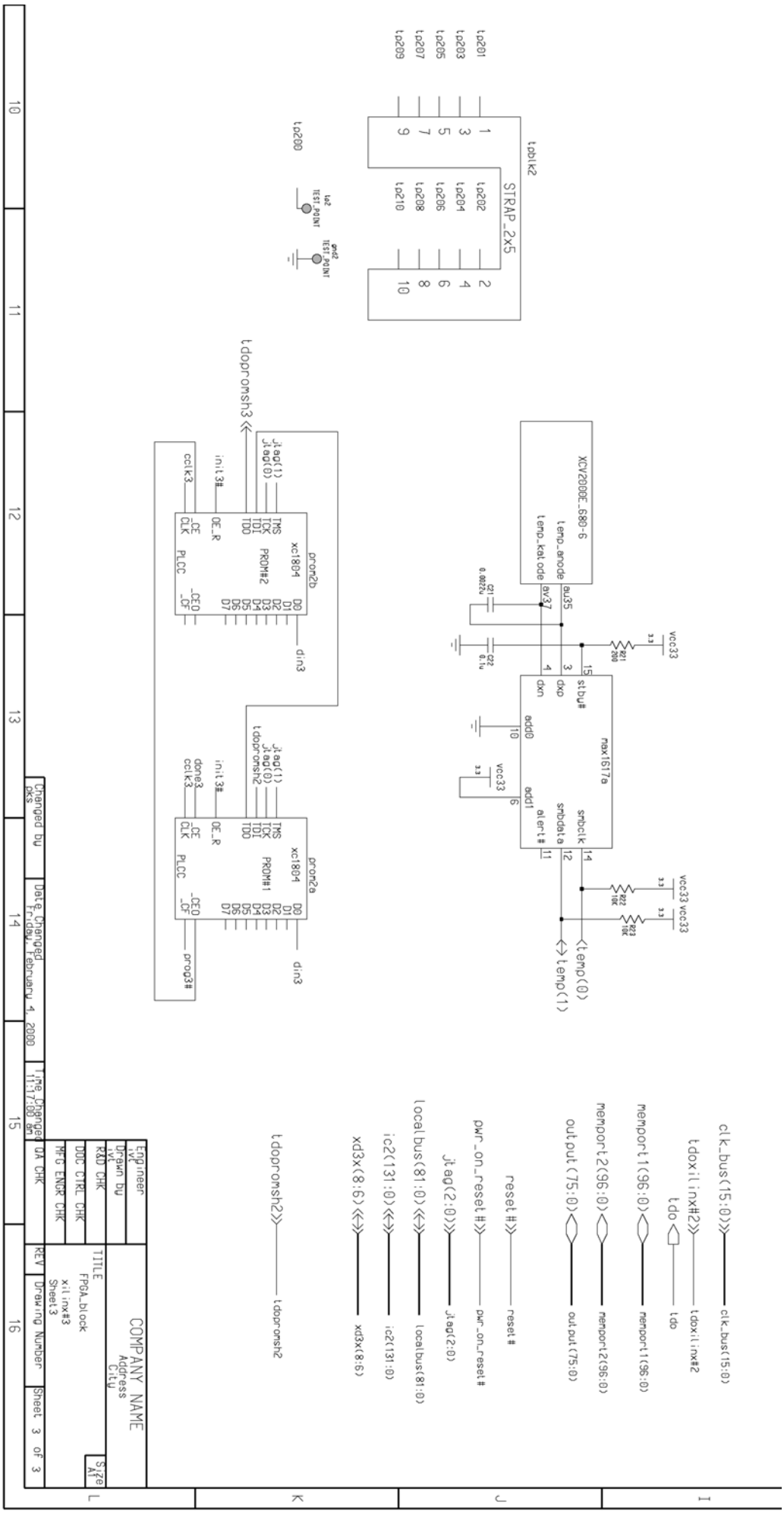
D.7 arrayfpga 0-2

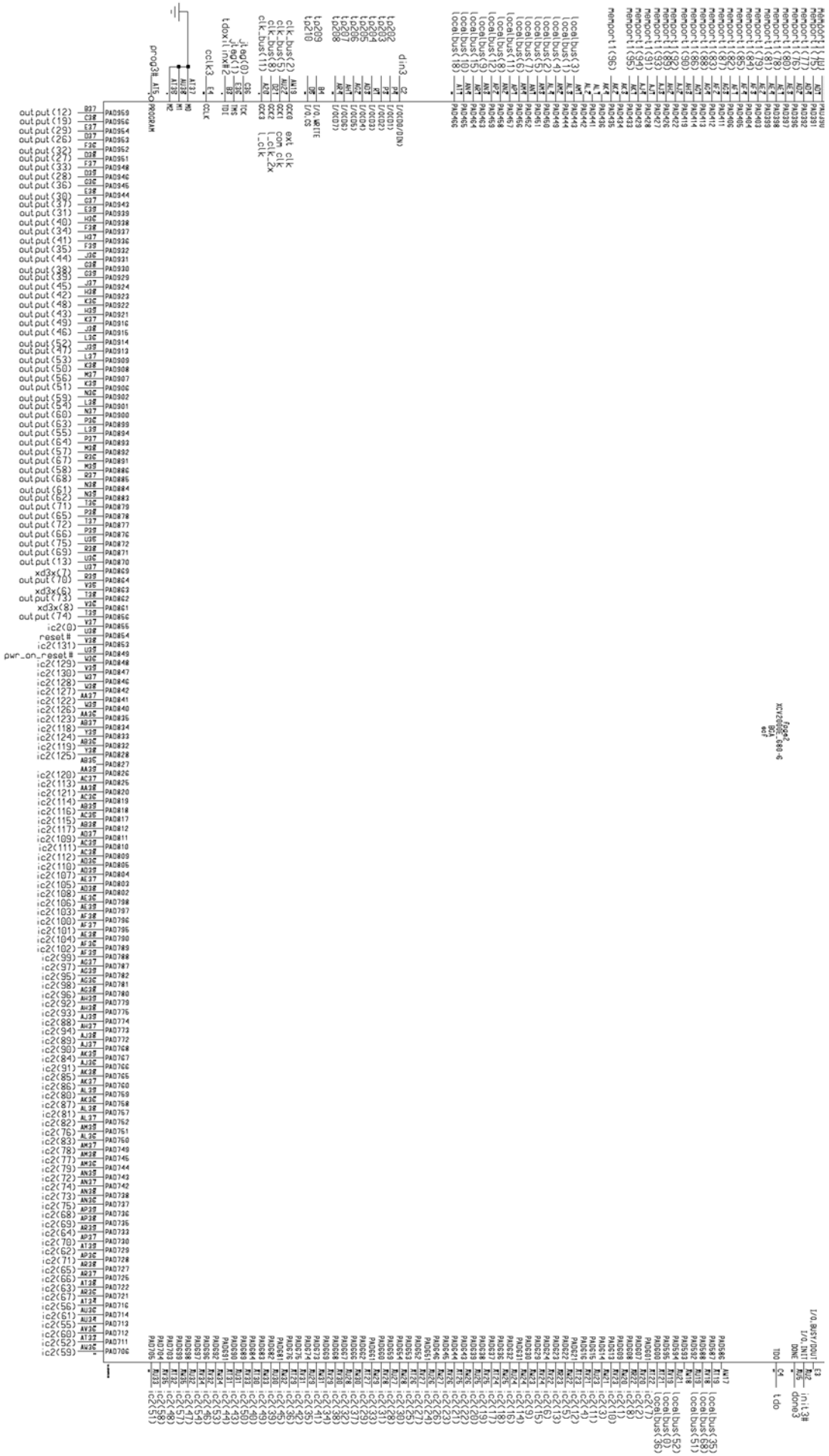




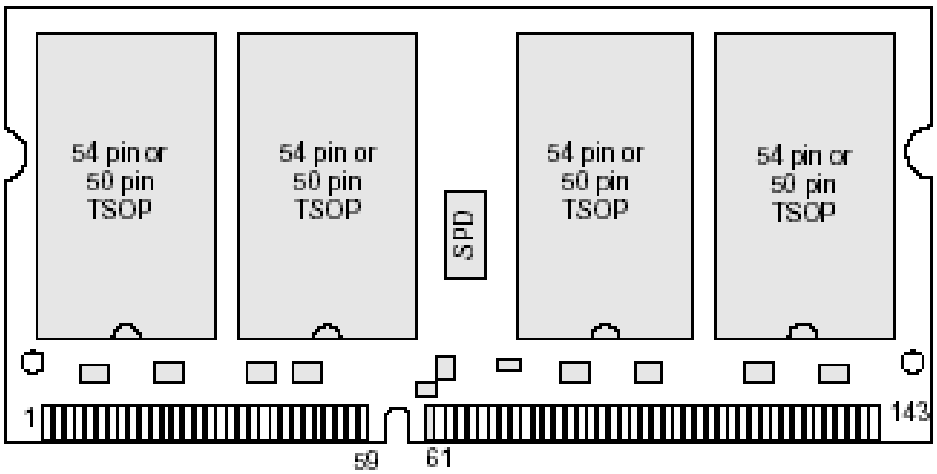

tp101
tp103
tp105
tp107
tp109
tpblk1
STRAP_2x5
tp102
tp104
tp106
tp108
tp110
tp100
tp1
TEST_POINT
gnd1
TEST_POINT
tdopromsh2
pron1b
xc1804
PROM#2
jtag(1)
jtag(0)
TMS
TCK
TDI
TDO
init2#
OE_R
cclk2
CE
CLK
PLCC
_CEO
_OF
D0
D1
D2
D3
D4
D5
D6
D7
din2
tdopromsh1
pron1a
PROM#1
done2
prog2#
XCV2000E_680-6
temp_anode
temp_katode
av37
au35
C11
0.0022u
C12
0.1u
vcc33
3.3
R81
200
temp1
max1617a
stby#
dxp
dxn
add0
add1
smbclk
smbdata
alert#
R82
10K
R83
10K
<temp(0)
<>temp(1)
clk_bus(15:0)
jtag(2:0)
tdoxilinx#1
tdoxilinx#2
reset#
pwr_on_reset#
localbus(81:0)
xd3x(5:3)
ic2(131:0)
ic1(233:0)
bp_bus(44:0)
Changed by
Date Changed
Friday, February 4, 2000
Time Changed
11:14:04 am
Engineer
Drawn by
R&D CHK
QA CHK
DOC CTRL CHK
MFG ENGR CHK
COMPANY NAME
Address
City
TITLE
FPGA_block
xilinx#2
Sheet2
REV
Drawing Number
Sheet 2 of 3
Size
A1




clk_bus(15:0)
tdoxilinx#2
tdo
memport1(96:0)
memport2(96:0)
output(75:0)
reset#
pwr_on_reset#
jtag(2:0)
localbus(81:0)
ic2(131:0)
xd3x(8:6)
tdopromsh2
tdopromsh3
STRAP_2X5
XCV200E_680-6
max1617a
vcc33
temp(0)
temp(1)
prom2b
prom2a
xc1804
PROM#2
PROM#1
Changed by
Date Changed
Friday, February 4, 2000
Time Changed
11:17:00 am
Engineer
Drawn by
DRC CHK
RAD CHK
DOC CTRL CHK
MFG ENGR CHK
QA CHK
COMPANY NAME
Address
City
TITLE
FPGA_block
xilinx#3
Sheet3
SIZE
A1
REV
Drawing Number
Sheet 3 of 3



D.8 Memory kort / kontakt



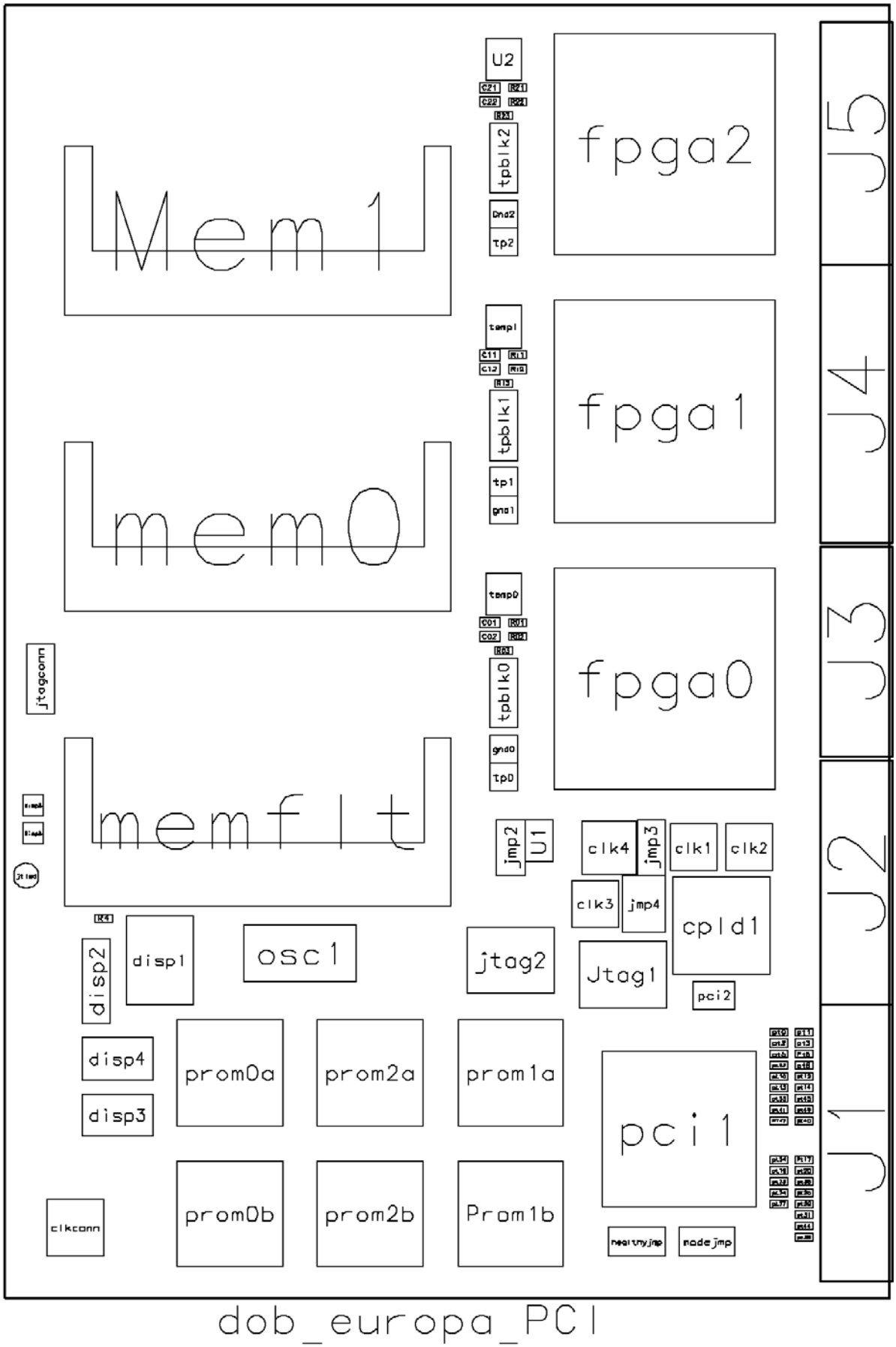
Signal Name	Pin	Pin	Signal Name
Vss	1	2	Vss
DQ0	3	4	DQ32
DQ1	5	6	DQ33
DQ2	7	8	DQ34
DQ3	9	10	DQ35
Vdd	11	12	Vdd
DQ4	13	14	DQ36
DQ5	15	16	DQ37
DQ6	17	18	DQ38
DQ7	19	20	DQ39
Vss	21	22	Vss
DQMB0	23	24	DQMB4
DQMB1	25	26	DQMB5
Vdd	27	28	Vdd
A0	29	30	A3
A1	31	32	A4
A2	33	34	A5
Vss	35	36	Vss
DQ8	37	38	DQ40
DQ9	39	40	DQ41
DQ10	41	42	DQ42
DQ11	43	44	DQ43
Vdd	45	46	Vdd
DQ12	47	48	DQ44
DQ13	49	50	DQ45
DQ14	51	52	DQ46
DQ15	53	54	DQ47
Vss	55	56	Vss
Reserved	57	58	Reserved
Reserved	59	60	Reserved
CLK0	61	62	CKE0
Vdd	63	64	Vdd
RAS#	65	66	CAS#
WE#	67	68	CKE1
S0#	69	70	A12

Signal Name	Pin	Pin	Signal Name
S1#	71	72	A13
Reserved	73	74	CLK1
Vss	75	76	Vss
Reserved	77	78	Reserved
Reserved	79	80	Reserved
Vdd	81	82	Vdd
DQ16	83	84	DQ48
DQ17	85	86	DQ49
DQ18	87	88	DQ50
DQ19	89	90	DQ51
Vss	91	92	Vss
DQ20	93	94	DQ52
DQ21	95	96	DQ53
DQ22	97	98	DQ54
DQ23	99	100	DQ55
Vdd	101	102	Vdd
A6	103	104	A7
A8	105	106	BA0
Vss	107	108	Vss
A9	109	110	BA1
A10	111	112	A11
Vdd	113	114	Vdd
DQMB2	115	116	DQMB6
DQMB3	117	118	DQMB7
Vss	119	120	Vss
DQ24	121	122	DQ56
DQ25	123	124	DQ57
DQ26	125	126	DQ58
DQ27	127	128	DQ59
Vdd	129	130	Vdd
DQ28	131	132	DQ60
DQ29	133	134	DQ61
DQ30	135	136	DQ62
DQ31	137	138	DQ63
Vss	139	140	Vss
SDA	141	142	SCL
Vdd	143	144	Vdd

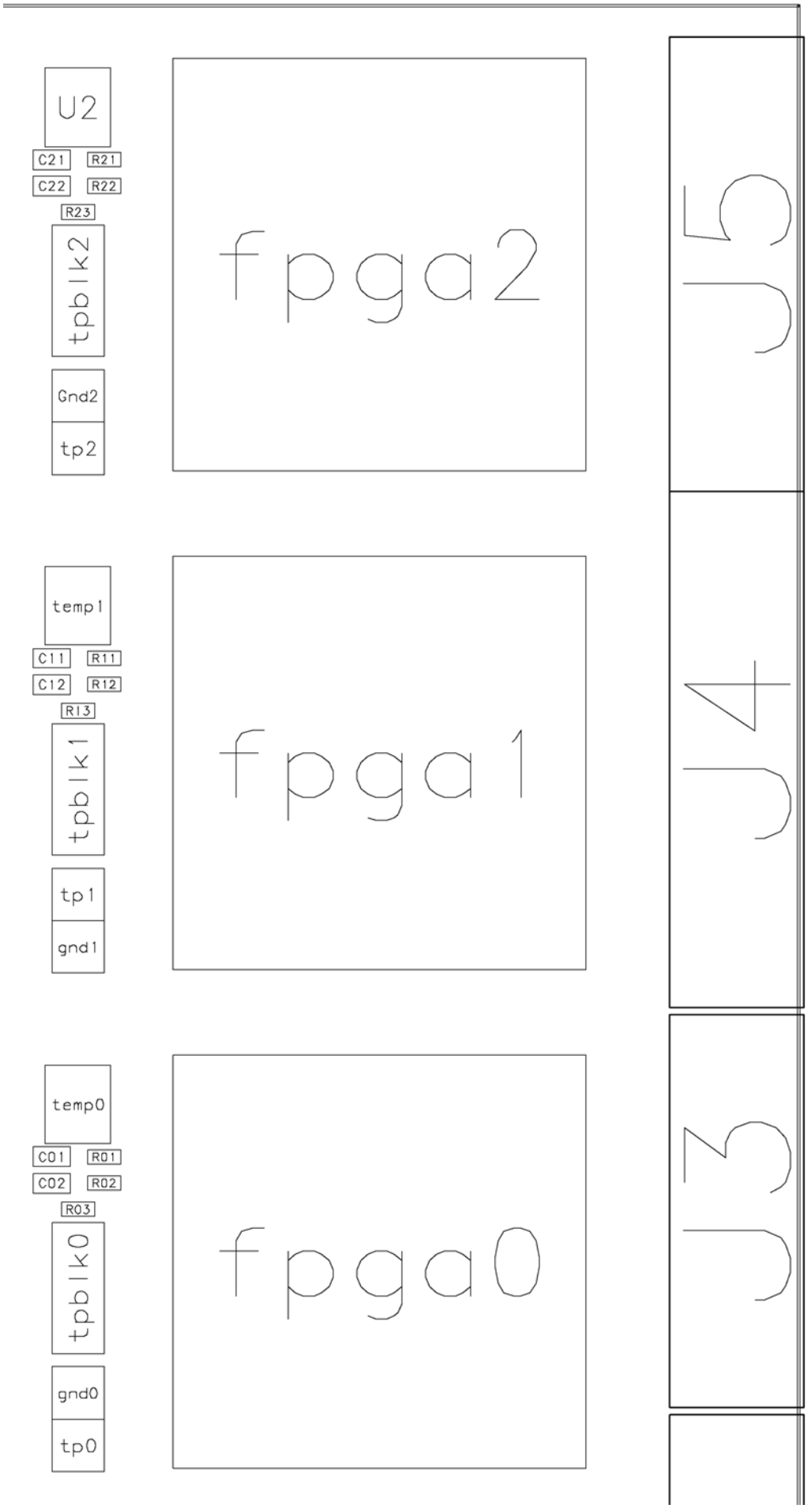
Note: Reserved = Do not connect

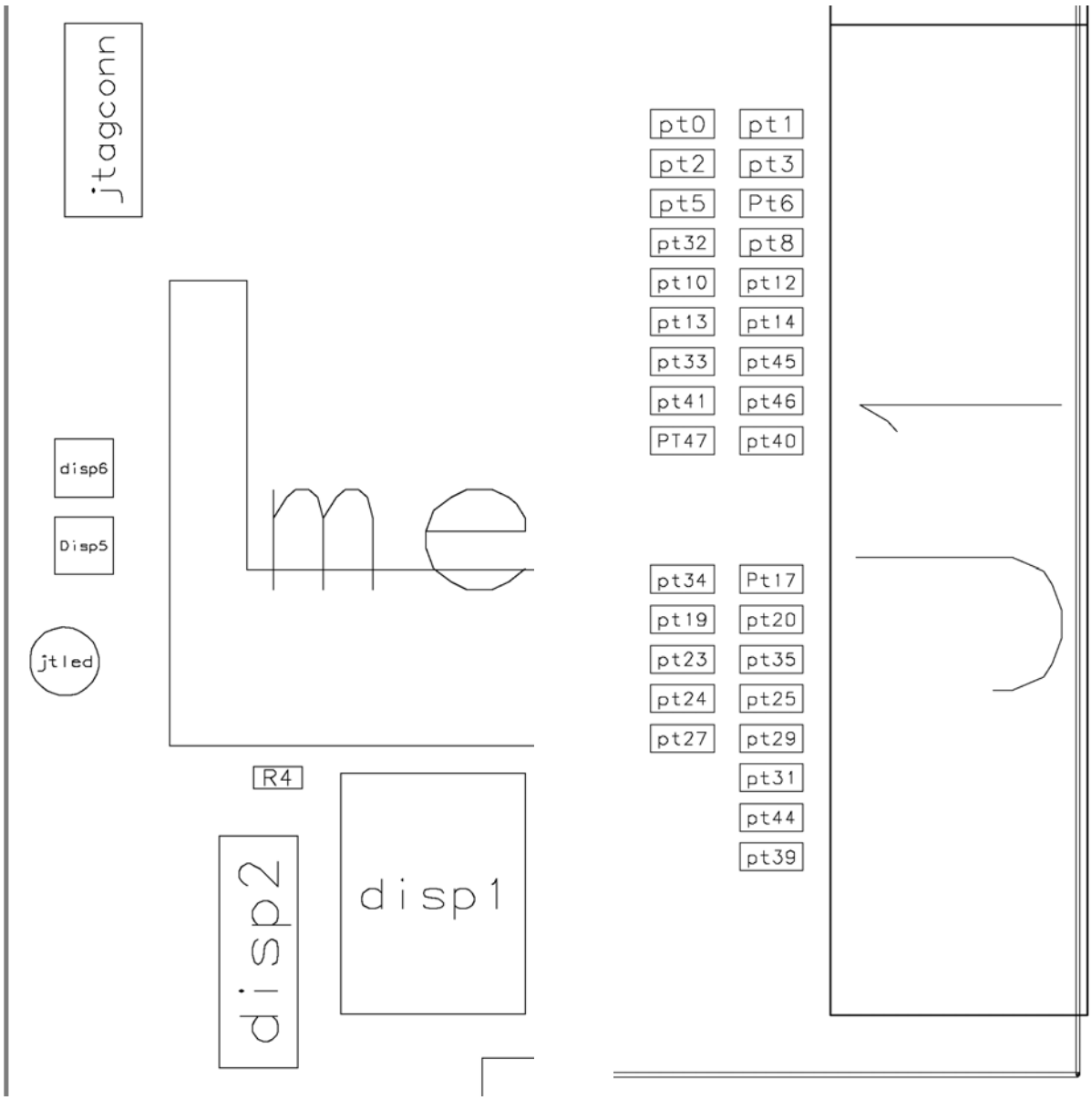
E FYSISK UTLEGG

E.1 Printkort oversikt

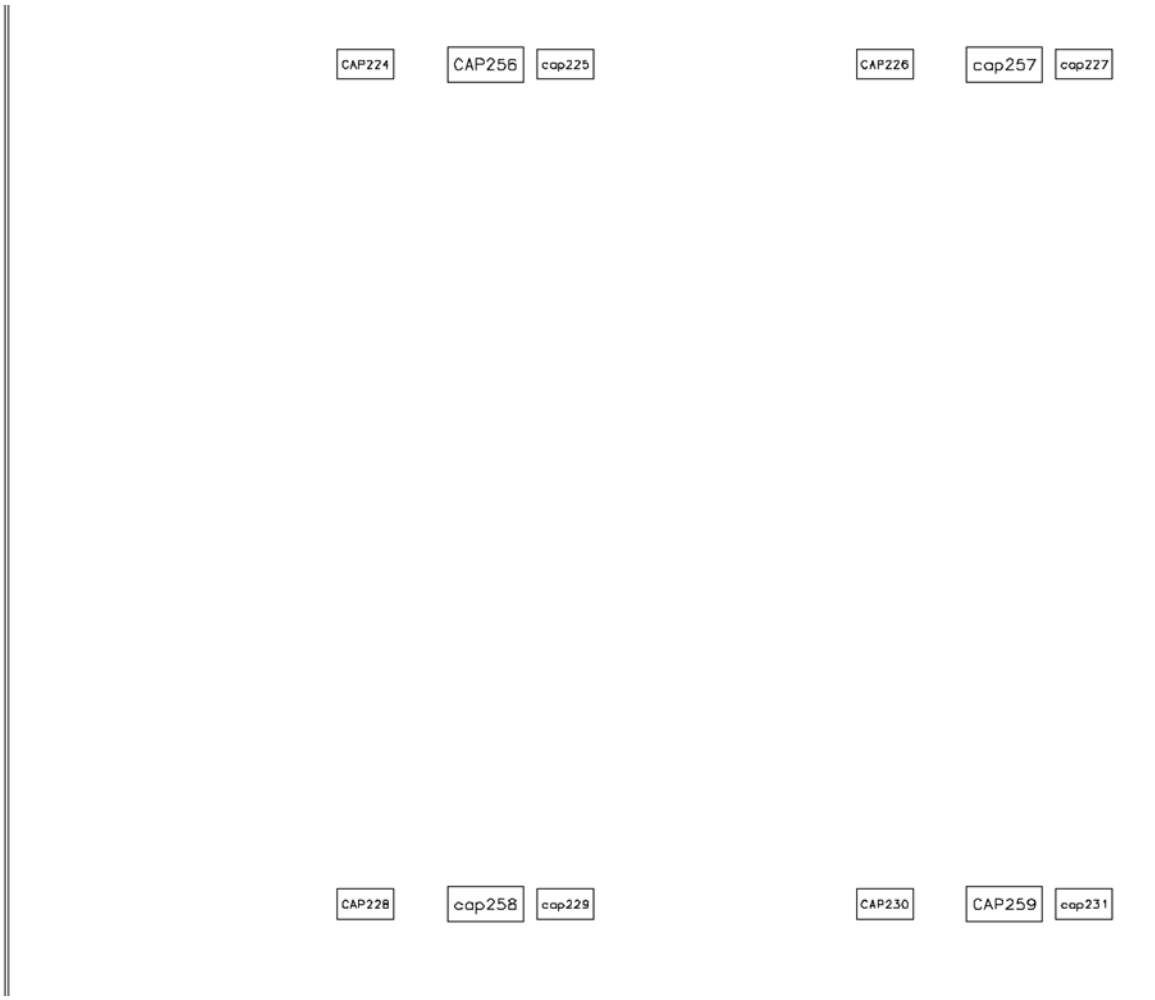


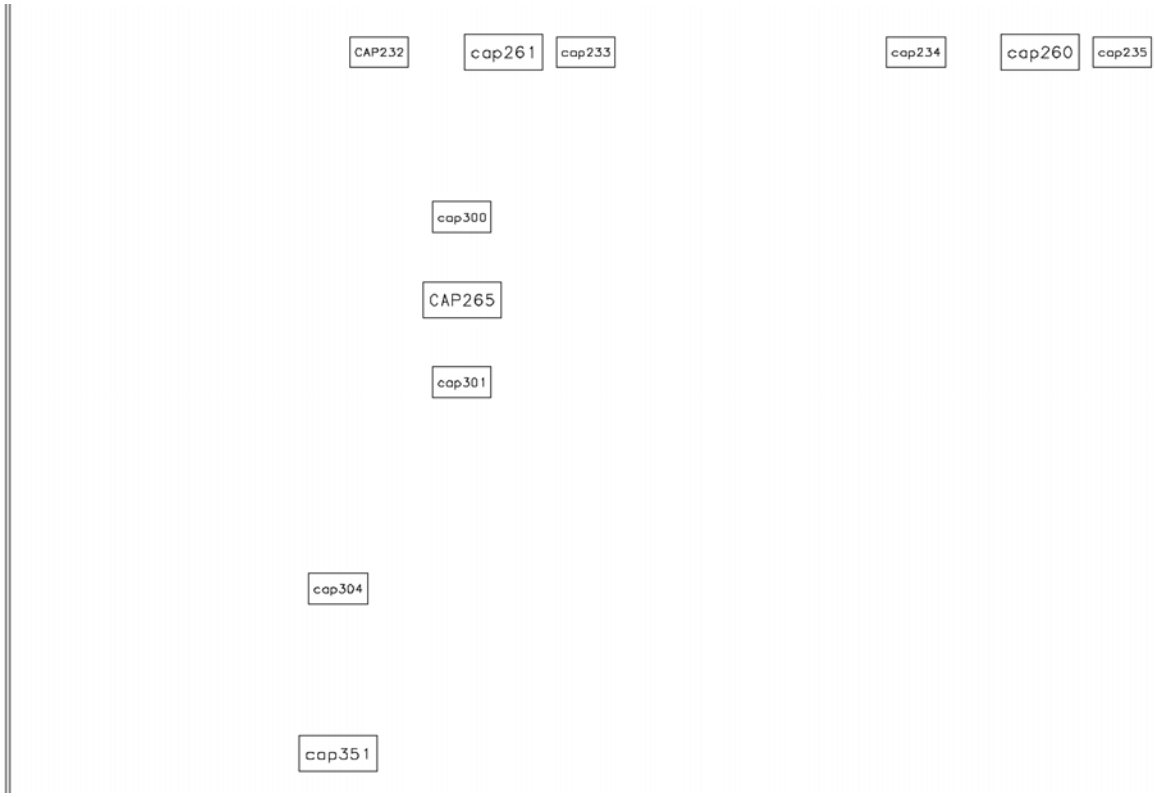
E.1.1 Detaljbilder forside

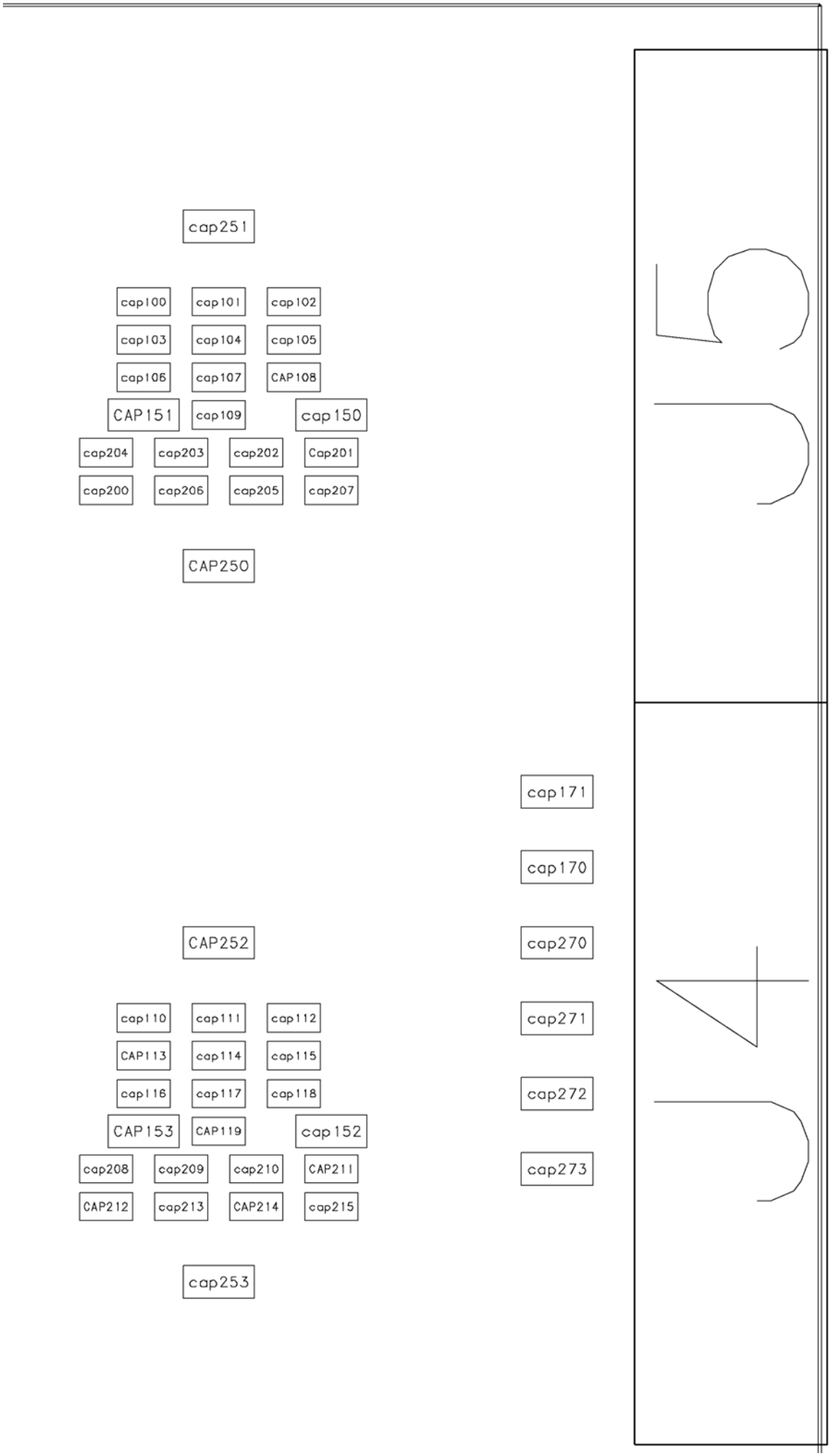


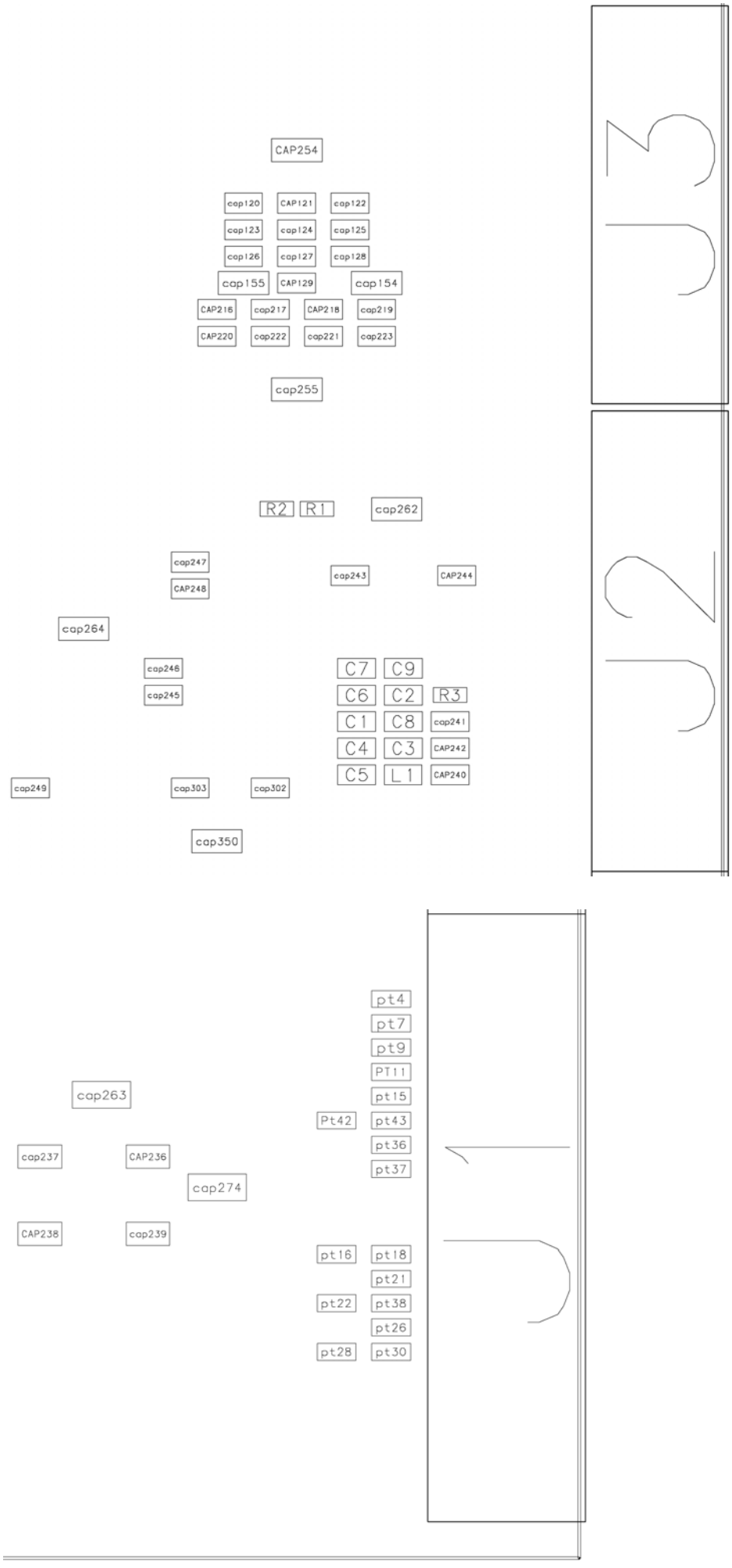

jtagconn
disp6
Disp5
jtled
R4
disp2
disp1
pt0
pt1
pt2
pt3
pt5
Pt6
pt32
pt8
pt10
pt12
pt13
pt14
pt33
pt45
pt41
pt46
PT47
pt40
pt34
Pt17
pt19
pt20
pt23
pt35
pt24
pt25
pt27
pt29
pt31
pt44
pt39

E.1.2 Detaljbilder bakside (sett fra forsiden)






cap251
cap100
cap101
cap102
cap103
cap104
cap105
cap106
cap107
CAP108
CAP151
cap109
cap150
cap204
cap203
cap202
Cap201
cap200
cap206
cap205
cap207
CAP250
cap171
cap170
CAP252
cap270
cap110
cap111
cap112
cap271
CAP113
cap114
cap115
cap116
cap117
cap118
cap272
CAP153
CAP119
cap152
cap208
cap209
cap210
CAP211
cap273
CAP212
cap213
CAP214
cap215
cap253


CAP254
cap120
CAP121
cap122
cap123
cap124
cap125
cap126
cap127
cap128
cap155
CAP129
cap154
CAP216
cap217
CAP218
cap219
CAP220
cap222
cap221
cap223
cap255
R2
R1
cap262
cap247
CAP248
cap243
CAP244
cap264
cap246
cap245
C7
C9
C6
C2
R3
C1
C8
cap241
C4
C3
CAP242
C5
L1
CAP240
cap249
cap303
cap302
cap350
J3
J2
J1
pt4
pt7
pt9
PT11
pt15
cap263
Pt42
pt43
pt36
pt37
cap237
CAP236
cap274
CAP238
cap239
pt16
pt18
pt21
pt22
pt38
pt26
pt28
pt30

Litteratur

(1) Johnsrud S, Tansem I (2002): Digital multistatisk radar, sender og mottaker, FFI/RAPPORT-2002/01931, Forsvarets forskningsinstitutt

(2) Johnsen T, Olsen K E, Johnsrud S, Gundersen R, Bjordal H, Tansem I, Sørnes P (2002): Multistatisk CW radar - Konsept, FFI/RAPPORT-2002/01767, Forsvarets forskningsinstiutt

(3) Tansem I, Gundersen R, Bjordal H, Johnsen T, Johnsrud S, Olsen K E, Sørnes P (2002): Digital multistatisk radar, overordnet maskinvarebeskrivelse, FFI/RAPPORT-2002/02453, Forsvarets forskingsinstitutt

FORDELINGSLISTE

FFIE **Dato:** 25 juli 2002

RAPPORTTYPE (KRYSS AV)	RAPPORT NR.	REFERANSE	RAPPORTENS DATO
X RAPP ☐ NOTAT ☐ RR	2002/02363	FFIE/726/170	25 juli 2002
RAPPORTENS BESKYTTELSESGRAD		ANTALL EKS UTSTEDT	ANTALL SIDER
UGRADERT		26	53
RAPPORTENS TITTEL		FORFATTER(E)	
REKONFIGURERBAR PROSESSERINGSMODUL - FPGAkort versjon1		SØRNES Per K	
FORDELING GODKJENT AV FORSKNINGSSJEF		FORDELING GODKJENT AV AVDELINGSSJEF:	
John-Mikal Størdal		Johnny Bardal	

EKSTERN FORDELING

ANTALL	EKS NR	TIL
1		Major Sverre Vestad, LVI
1		Rådgiver Tore Belsnes, FO/E
1		FO/SST

INTERN FORDELING

ANTALL	EKS NR	TIL
14		FFI-Bibl
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