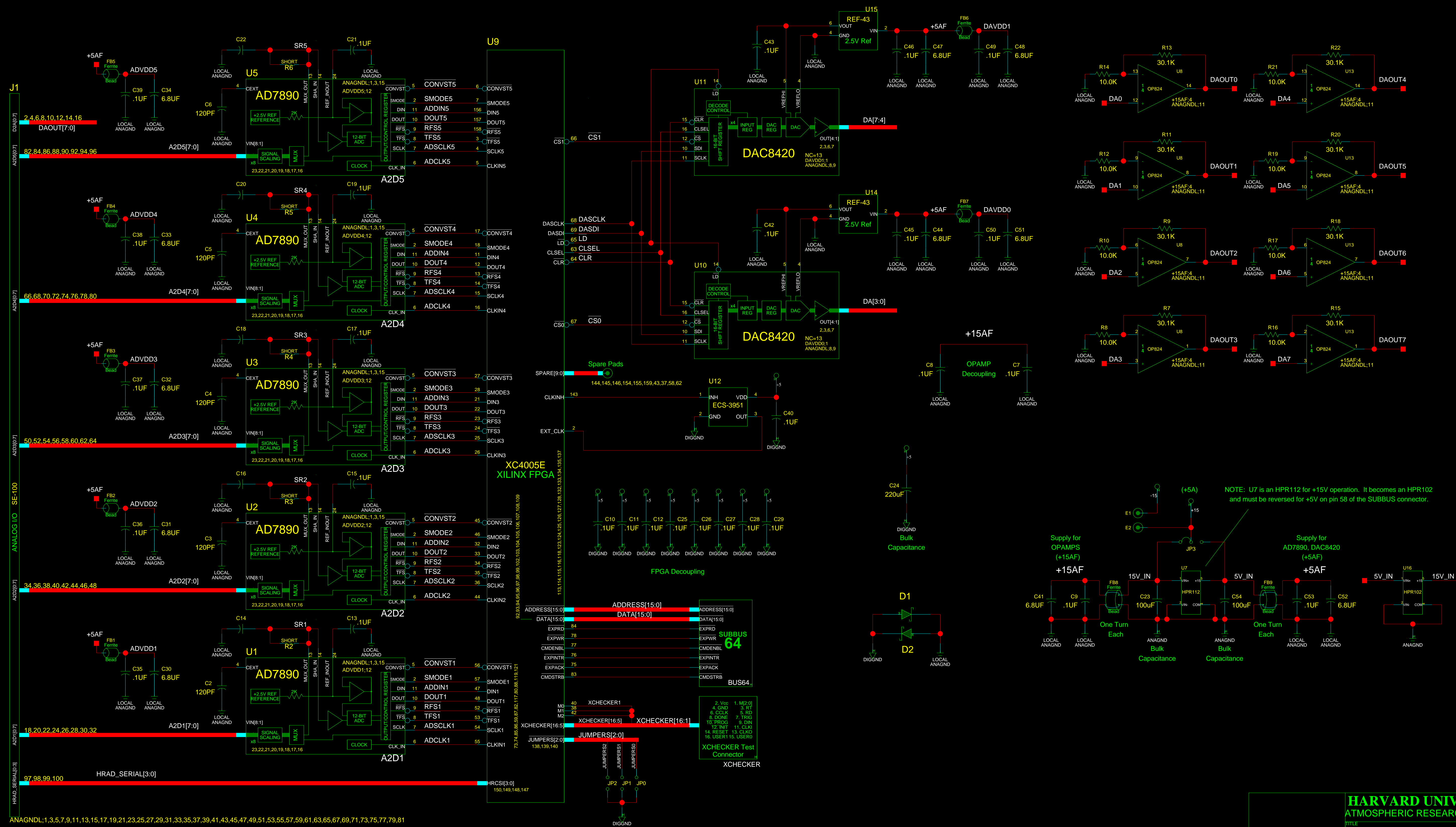


Revisions				
Zone	Tr	Description	Date	Approved



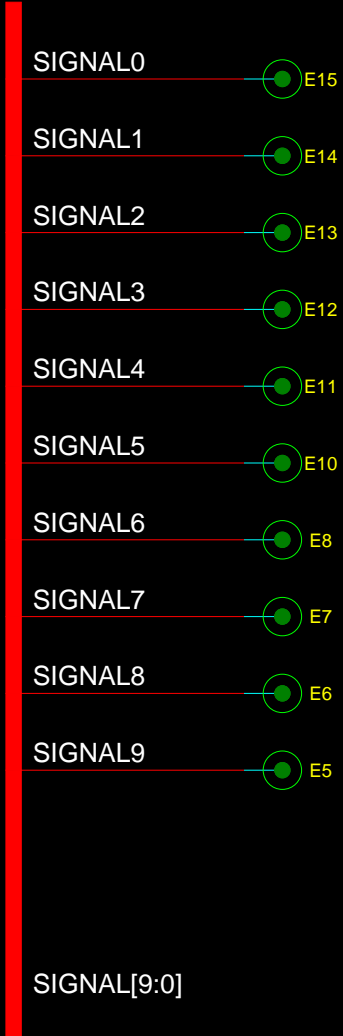
ANAGNDL:1,3,5,7,9,11,13,15,17,19,21,23,25,27,29,31,33,35,37,39,41,43,45,47,49,51,53,55,57,59,61,63,65,67,69,71,73,75,77,79,81

GND:1,10,19,29,39,51,61,70,79,91,101,110,122,131,141,151
VDD:20,41,60,81,100,120,142,160

HARVARD UNIVERSITY
ATMOSPHERIC RESEARCH PROJECT

TITLE
ANALOG I/O Board
Main board schematic

PREPARED: MR	SIZE: D	Code ID No: 34-7002	rev: A
CHECKED:	ENGINEER:	Drawing No. 1-18-2006_15:04	Scale: sheet 1

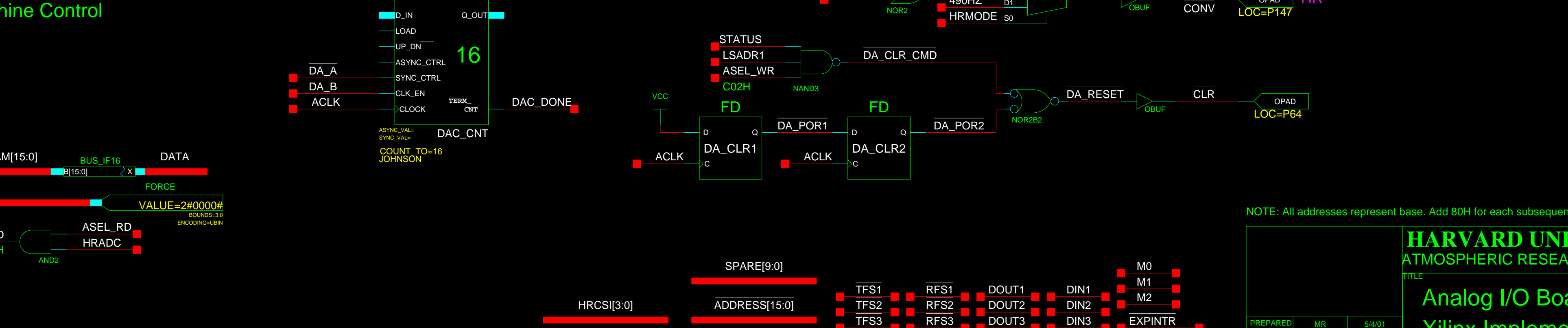
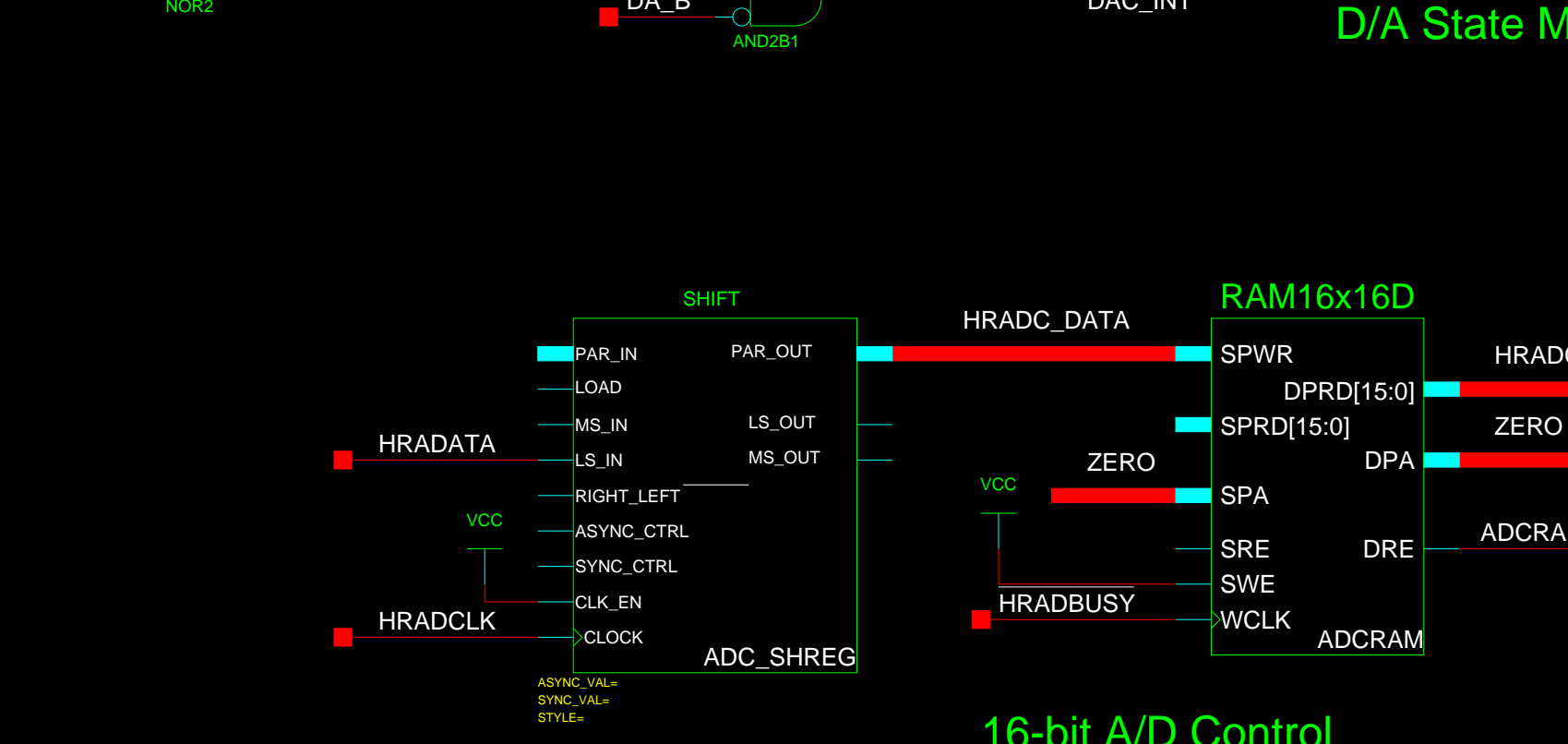
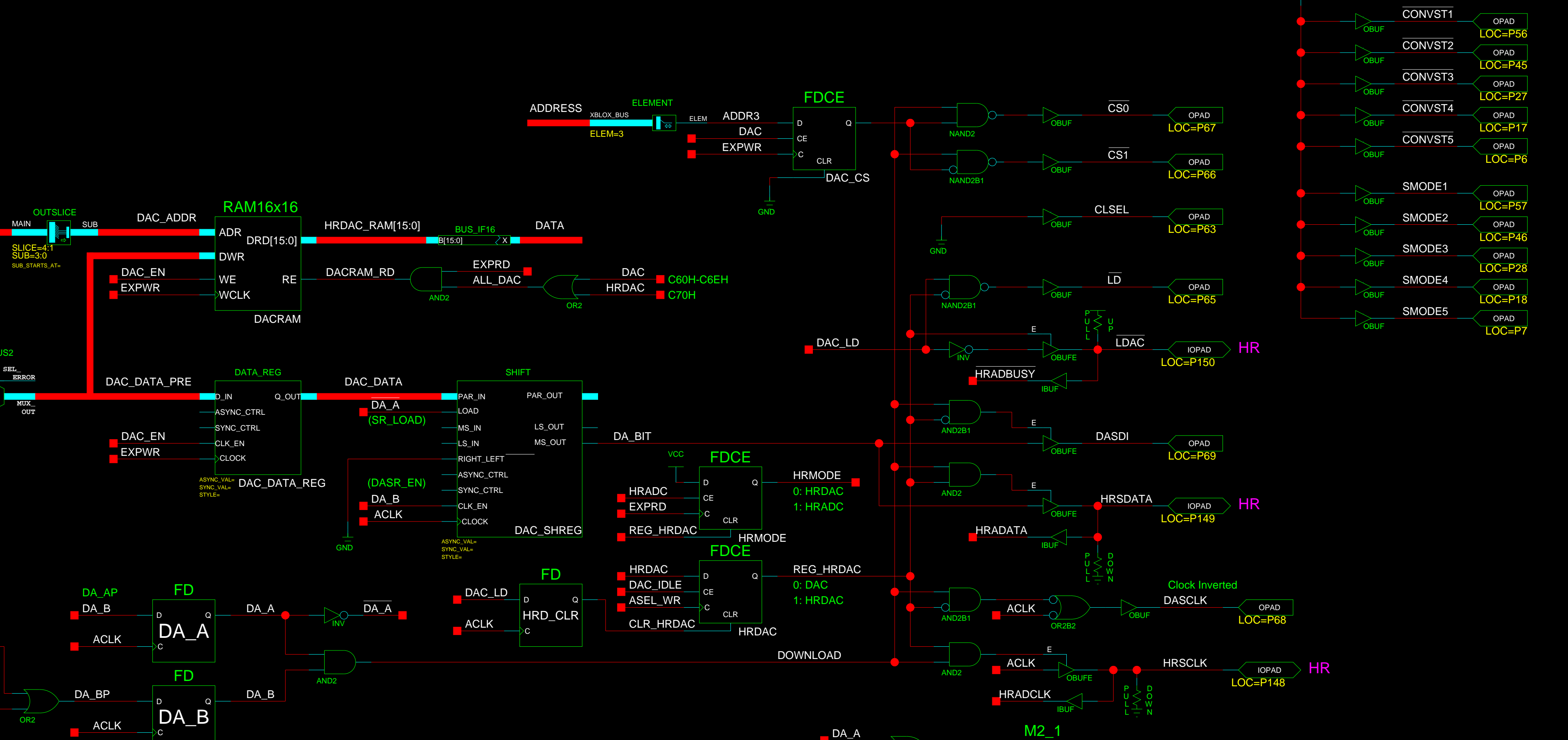
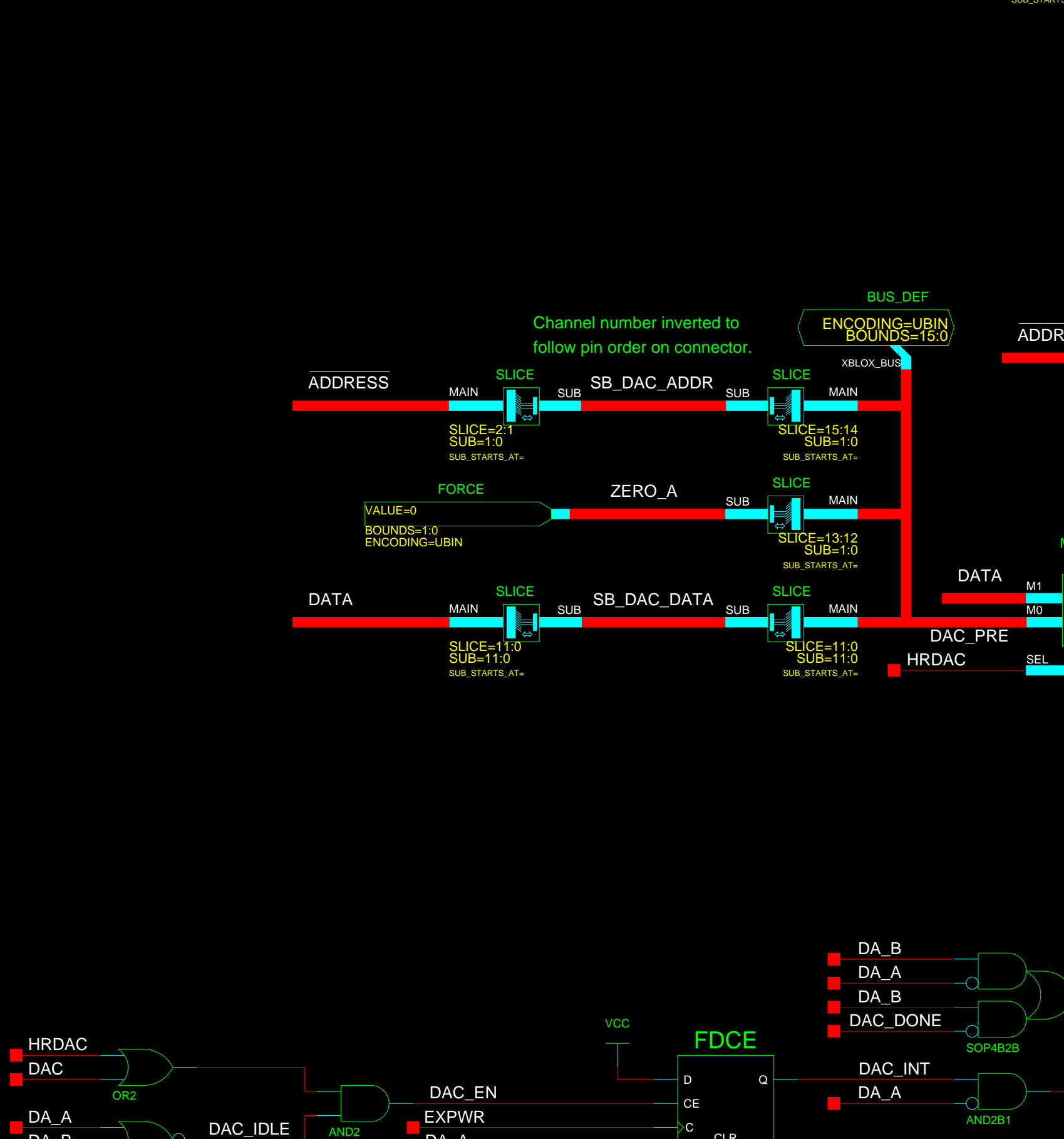
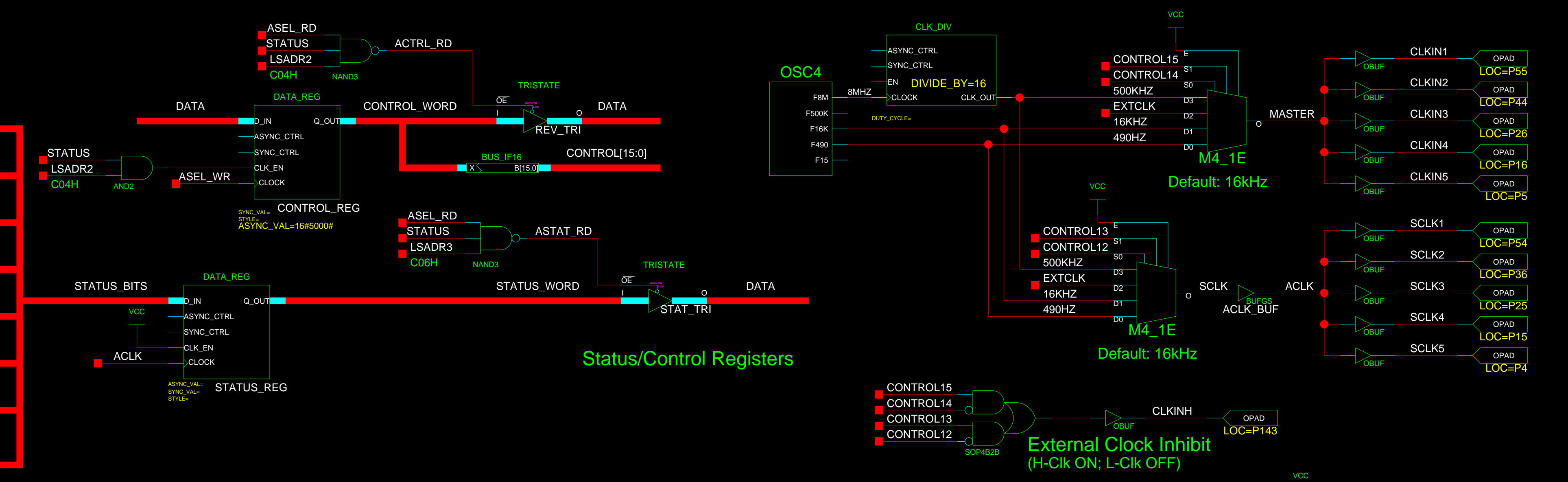
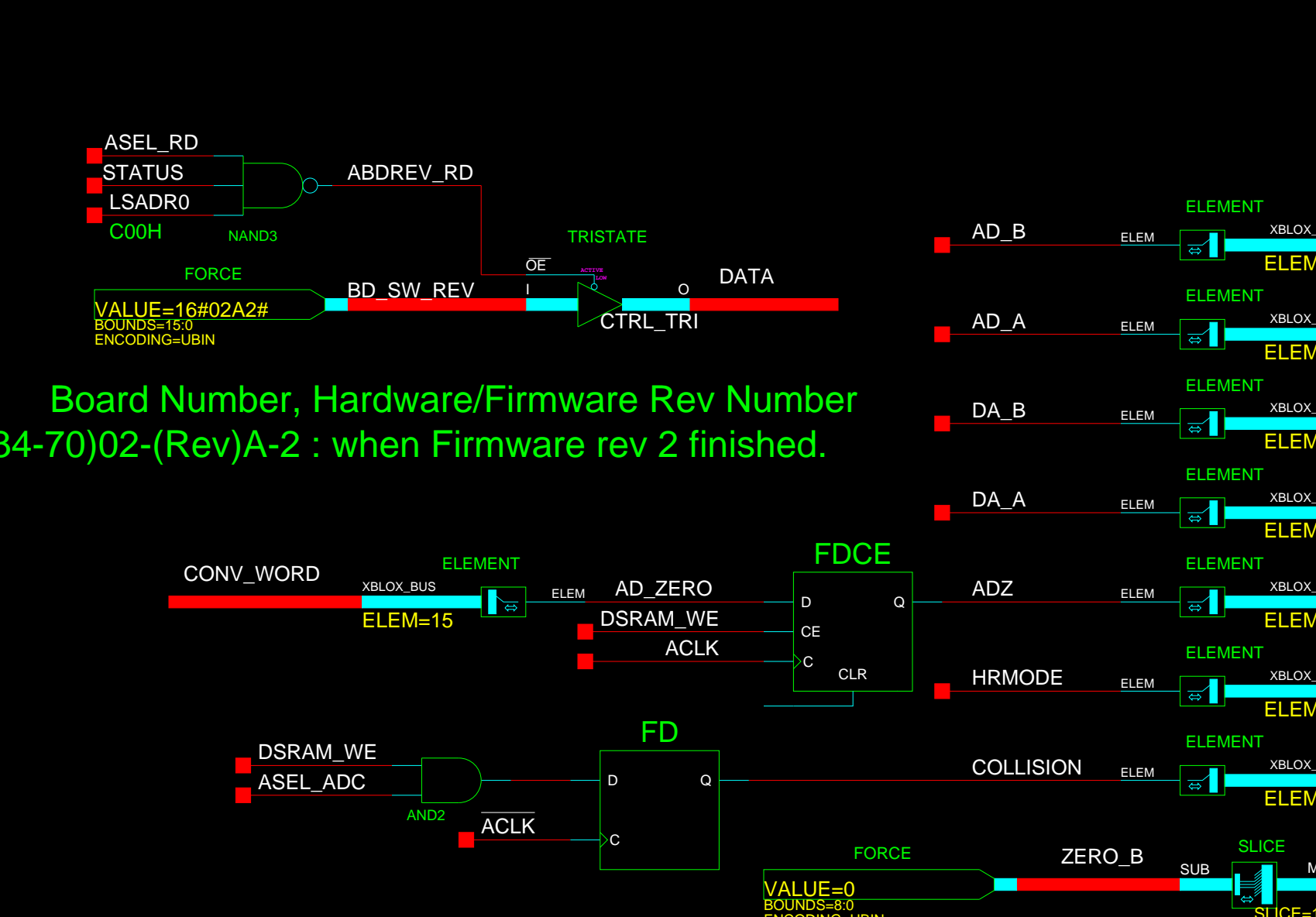
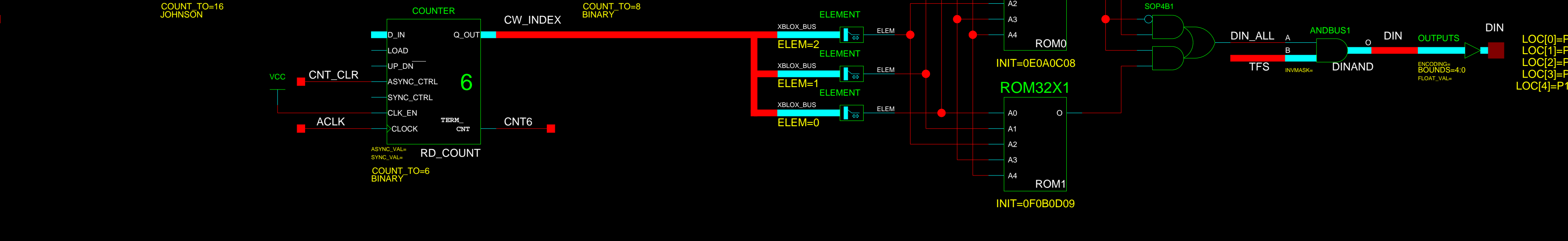
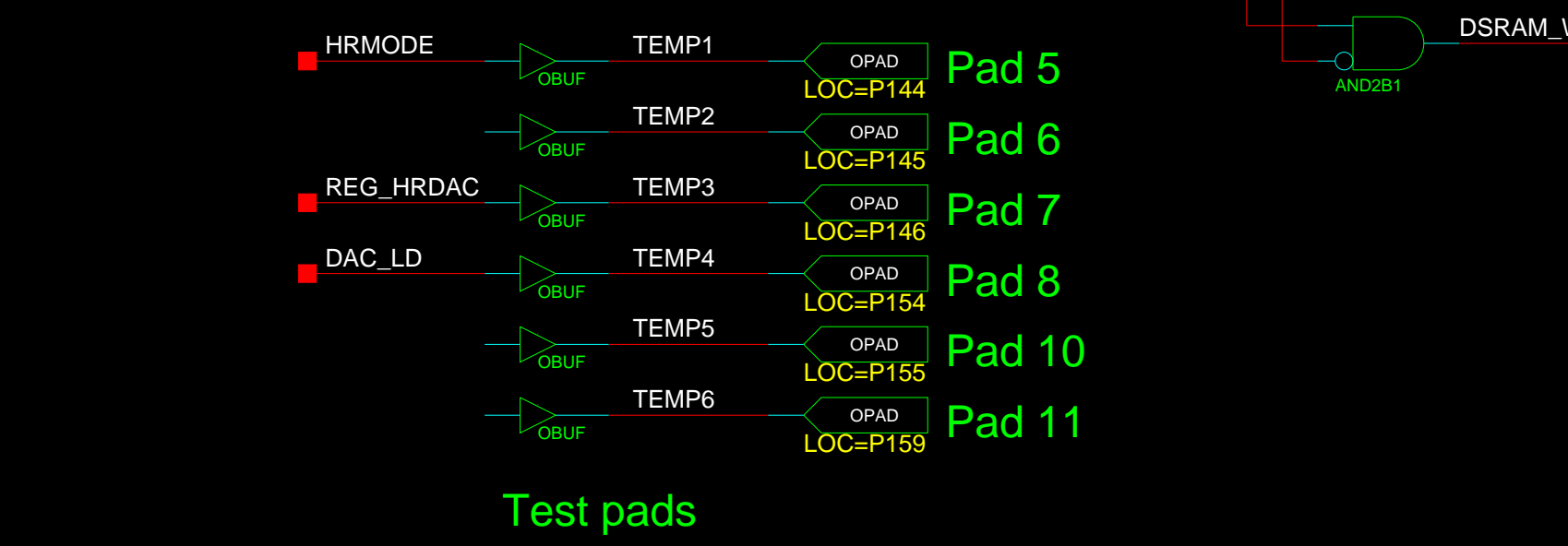
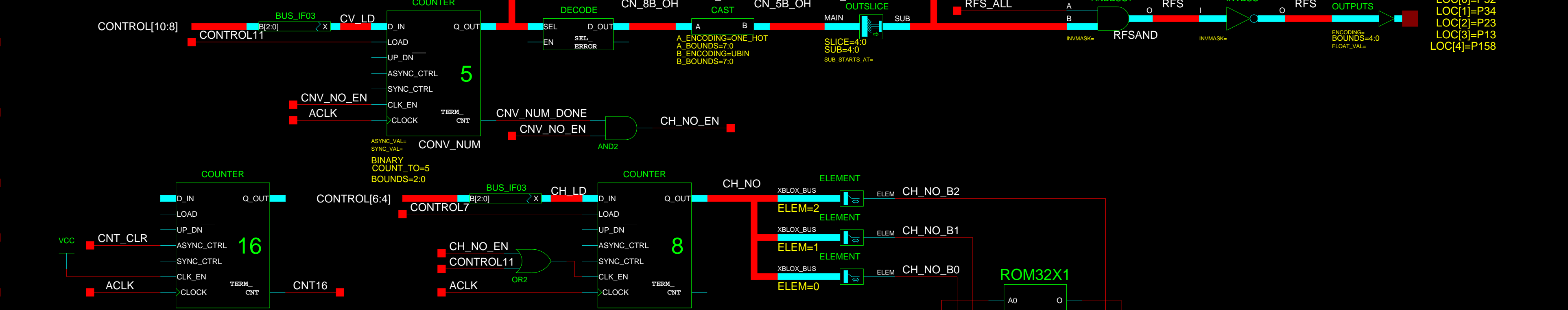
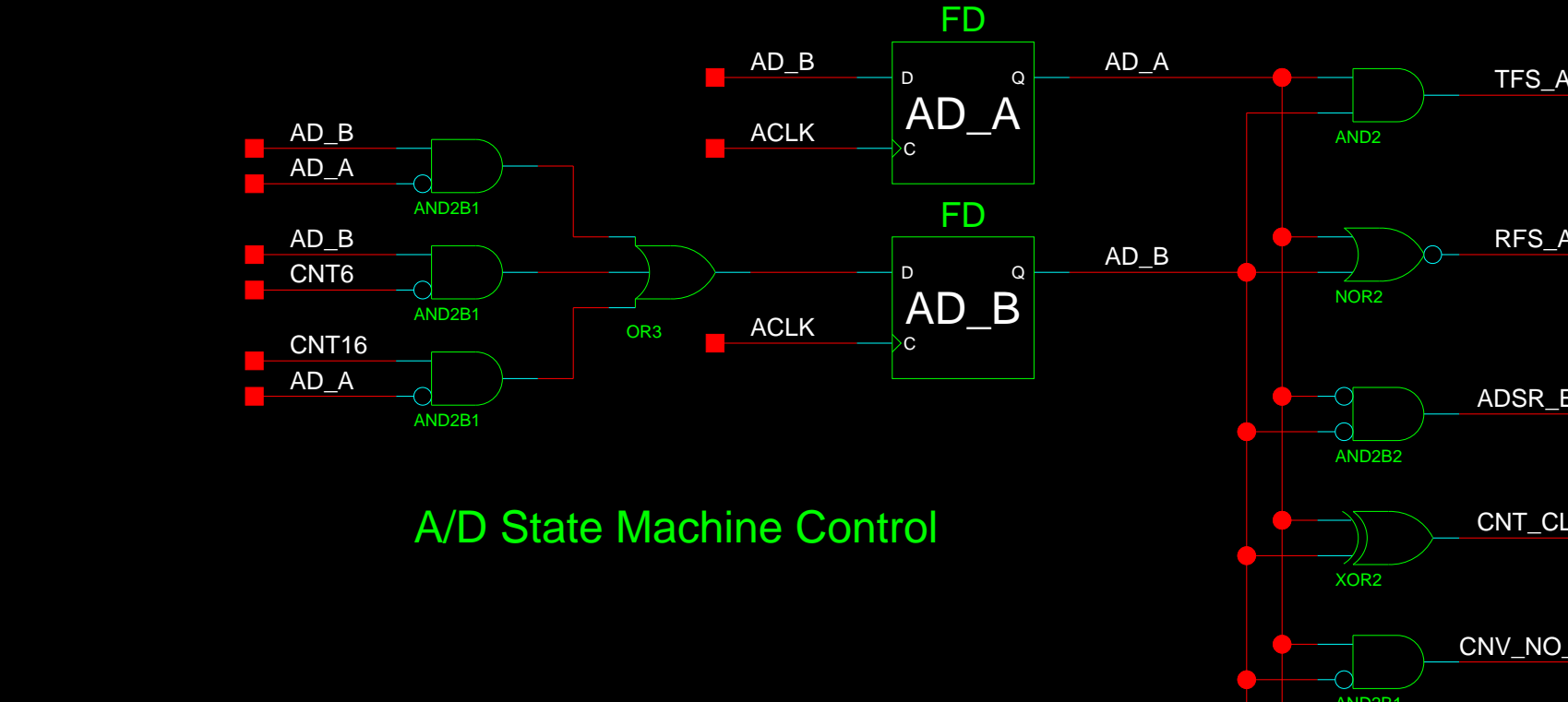
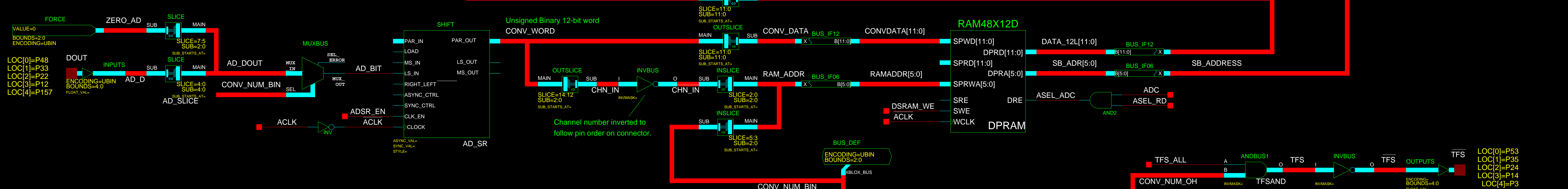
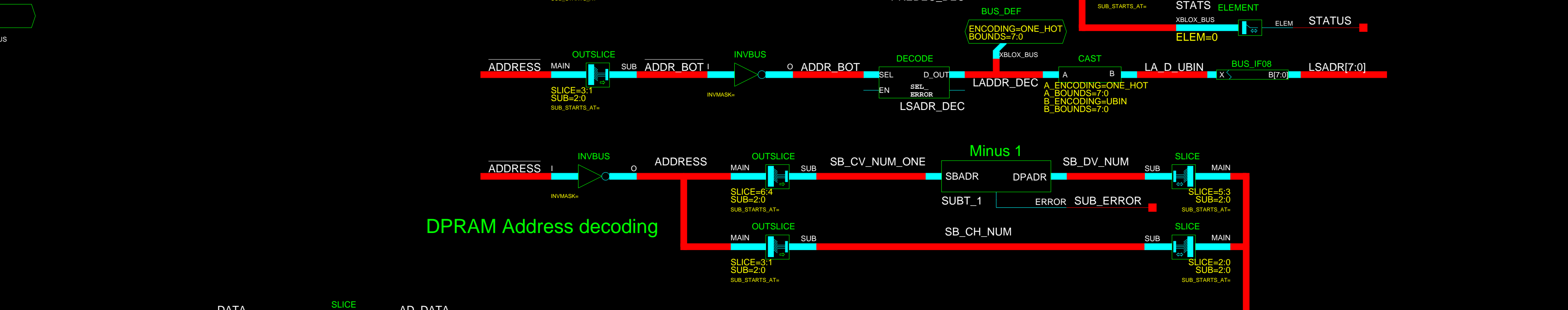
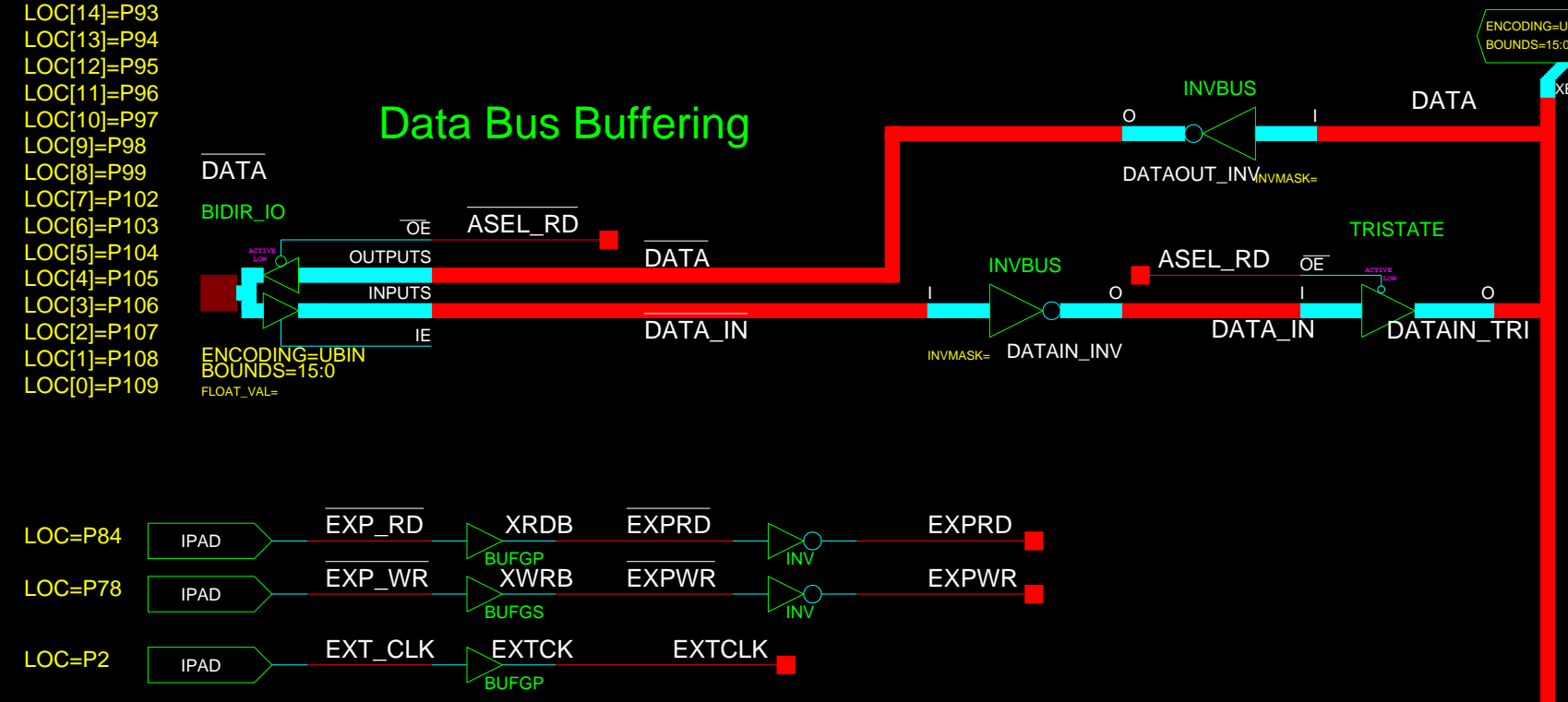
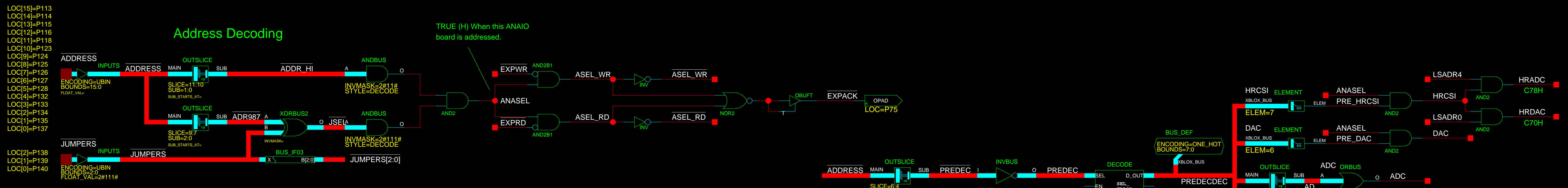


HARVARD UNIVERSITY
ATMOSPHERIC RESEARCH PROJECT

TITLE
ANALOG I/O Board
spare pin pads

PREPARED	MR				
CHECKED					
ENGINEER					
BIGPIN			size	Code ID No.	Drawing No.
			A		
11-26-1996_20:02			Scale		sheet 1

Revisions			
Zone	Tr	Description	Date
		Initial Release	10/20/01
		Revision 2: HRCSI added	10/25/01
		Rev2.2: HRDAC Not-Idle Flx	10/26/01
			MR - NTA



NOTE: All addresses represent base. Add 80H for each subsequent board.

PREPARED BY		DATE	SCALE
ENGINEER		SCALE	SHEET
XANAIO		5-4-2001_15.11	2

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ATMOSPHERIC RESEARCH PROJECT

Analog I/O Board
Xilinx Implementation

PARTTYPE=4005EPQ160-4

A

B

1

1

2

2

3

3

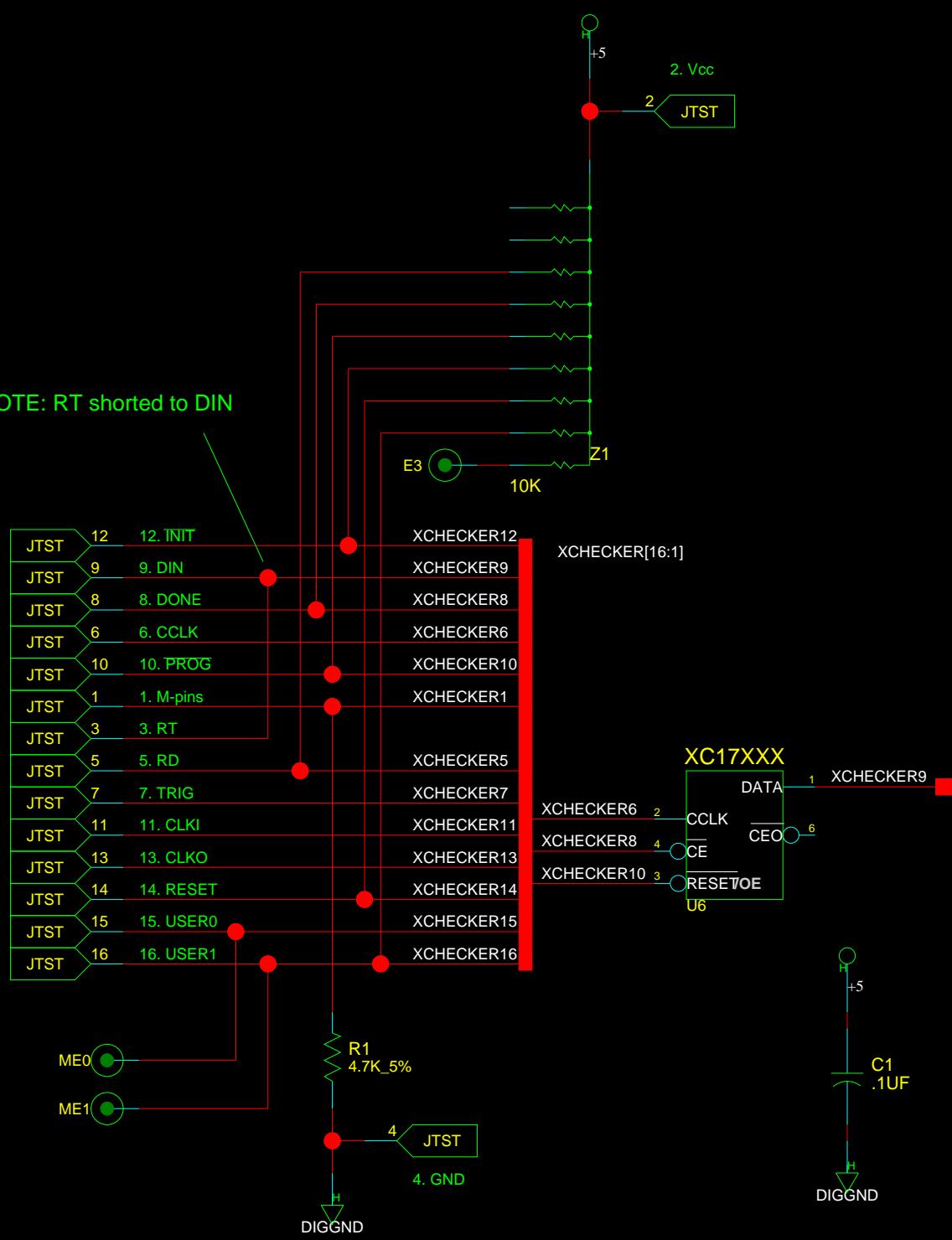
4

4

5

5

NOTE: RT shorted to DIN

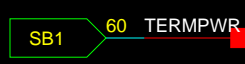
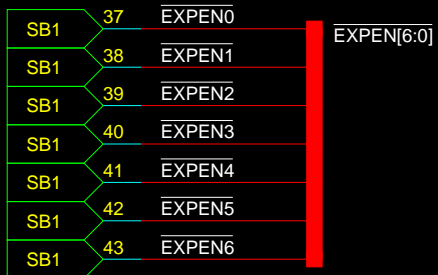
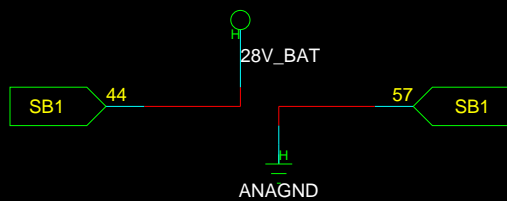
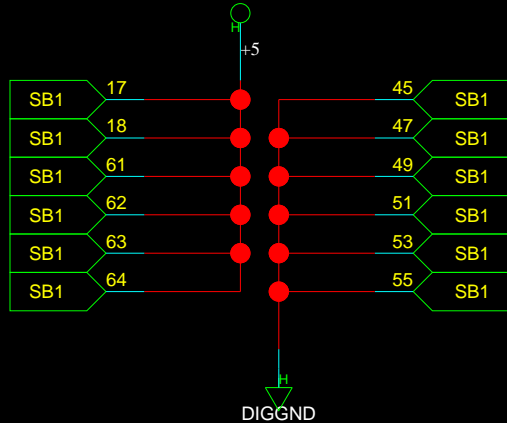
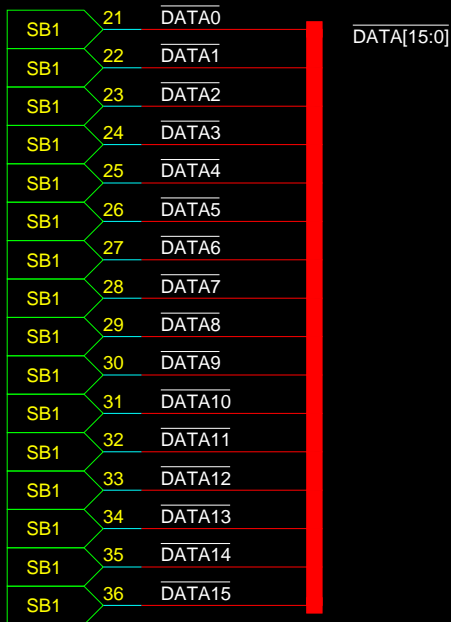
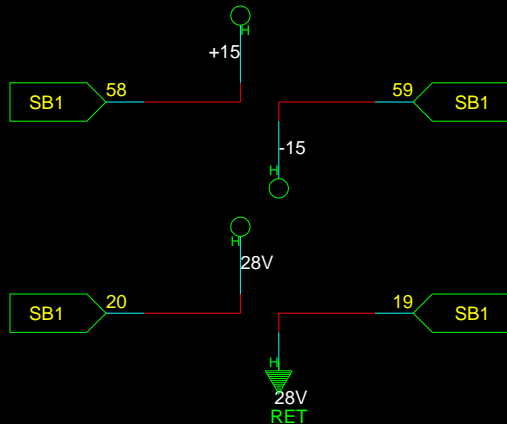
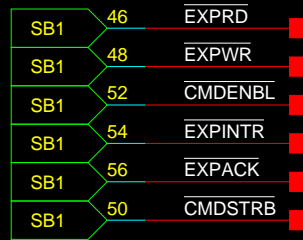
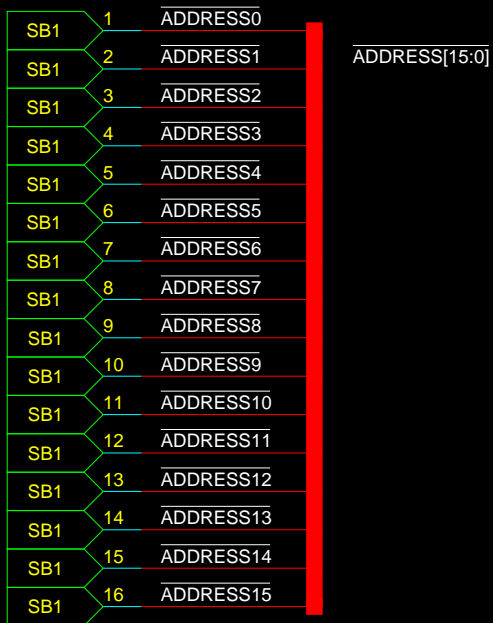


HARVARD UNIVERSITY
ATMOSPHERIC RESEARCH PROJECT

TITLE
XCHECKER Test Interface
Connector Definition

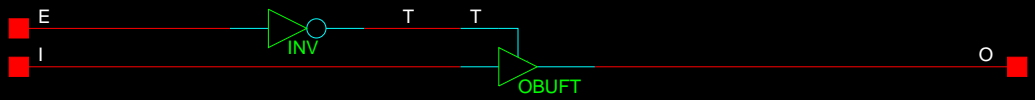
PREPARED	MR	
CHECKED		
ENGINEER	MR	

XCHECKER		size	Code ID No.	Drawing No.	rev
11-26-1996_16:59		A			A
Scale	NO	sheet		1 of 1	



HARVARD UNIVERSITY
ATMOSPHERIC RESEARCH PROJECT

PREPARED			MR		TITLE			
CHECKED					SUBBUS Connector Definition			
ENGINEER			MR		size	Code ID No.	Drawing No.	rev
					A			4
					Scale		sheet	



Title: XC4000E Family OBUFE Macro

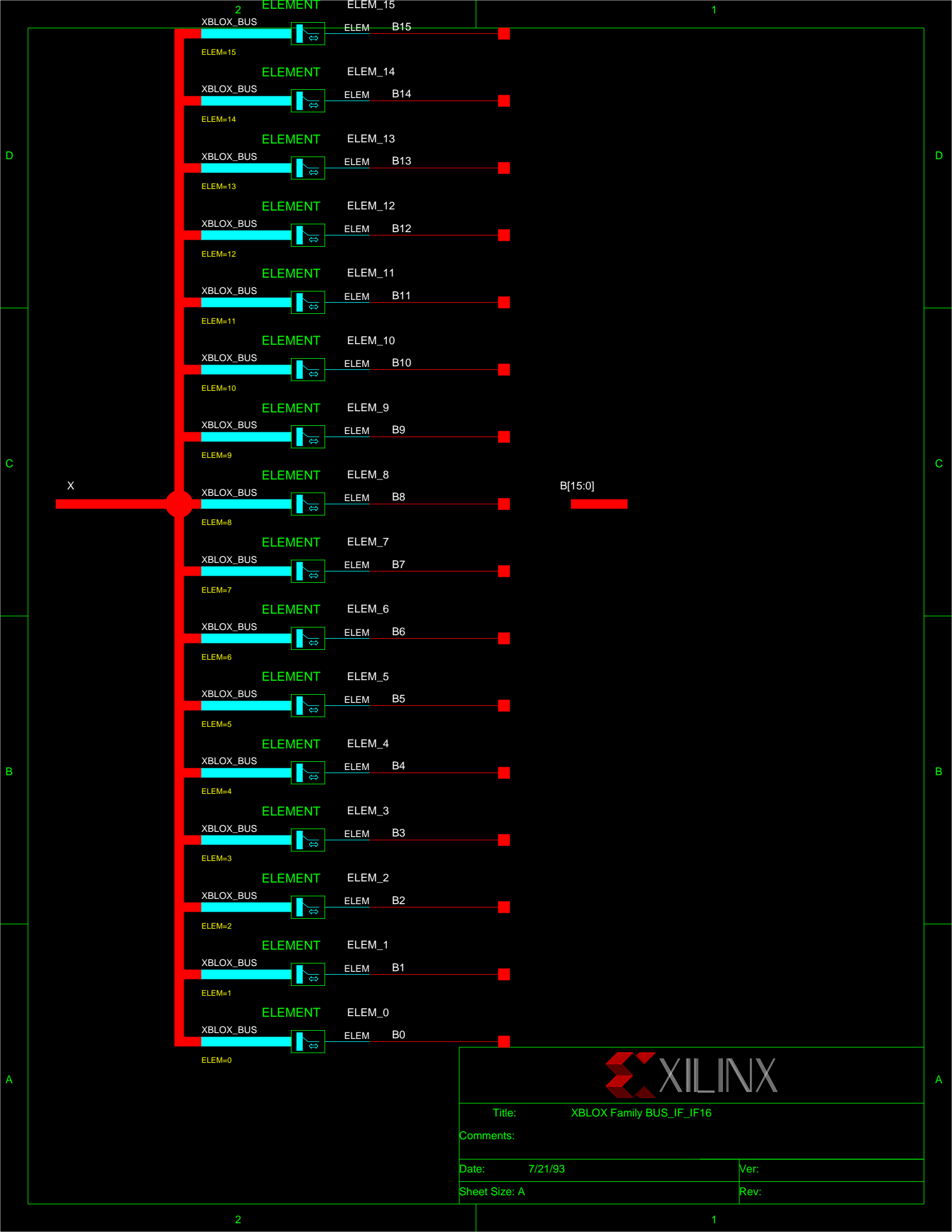
Comments: 3-State Output Buffer with Active High Enable

Date: 22nd February 1995

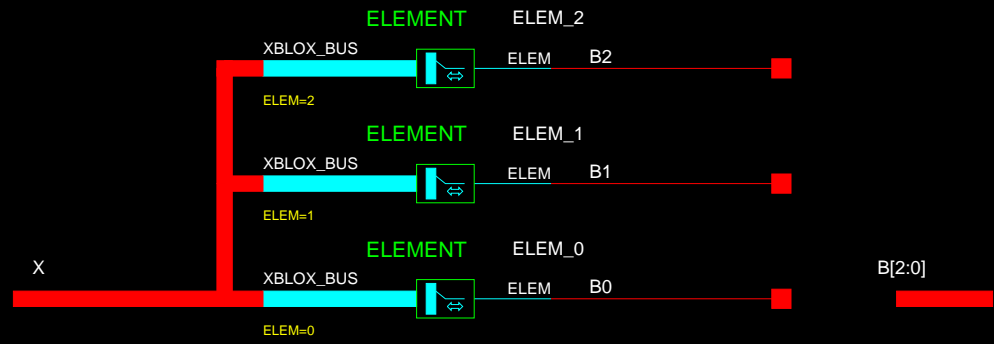
Ver: 1

Sheet Size: A

Rev: A



Title: XBLOX Family BUS_IF_IF16	
Comments:	
Date: 7/21/93	Ver:
Sheet Size: A	Rev:



Title: XBLOX Family BUS_IF03

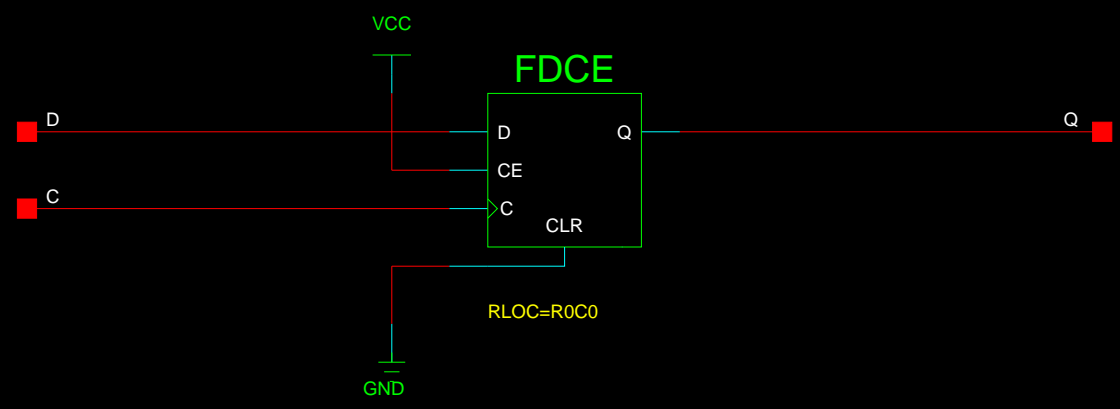
Comments:

Date: 7/21/93

Ver: 1

Sheet Size: A

Rev: A



Title: XC4000E Family FD Macro

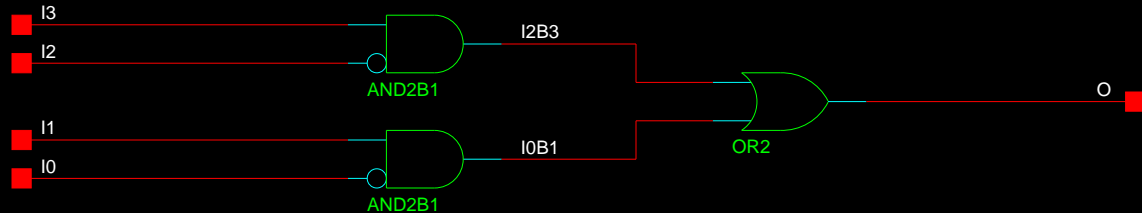
Comments: D Flip-Flop

Date: 23rd December 1992

Ver: 1

Sheet Size: A

Rev: A



Title: XC4000E Family SOP4B2B Macro

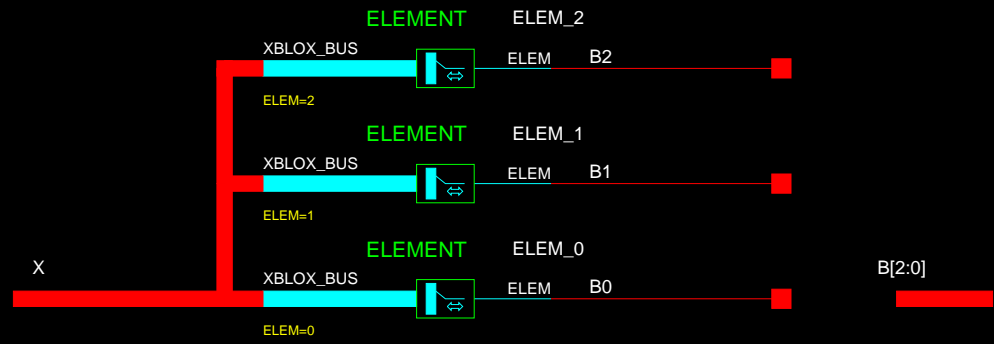
Comments: 4-Input Sum-of-Products

Date: 3rd March 1995

Ver: 1

Sheet Size: A

Rev: A



Title: XBLOX Family BUS_IF03

Comments:

Date: 7/21/93

Ver: 1

Sheet Size: A

Rev: A



Title: XBLOX Family BUS_IF06

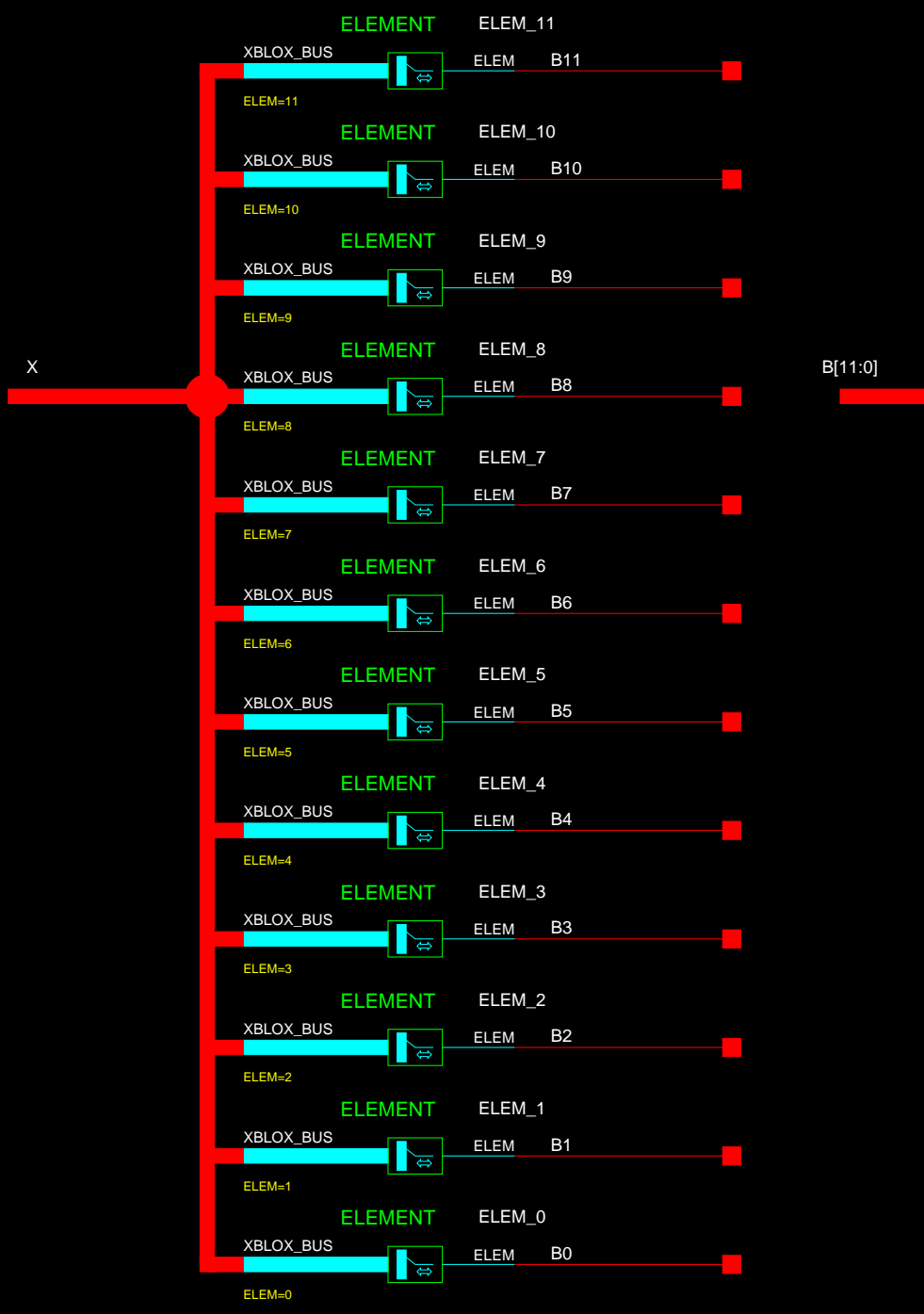
Comments:

Date: 7/21/93

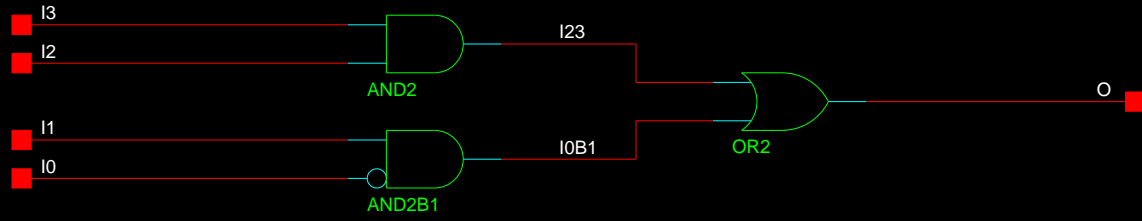
Ver: 1

Sheet Size: A

Rev: A



Title: XBLOX Family BUS_IF12	
Comments:	
Date: 7/21/93	Ver:
Sheet Size: A	Rev:



Title: XC4000E Family SOP4B1 Macro

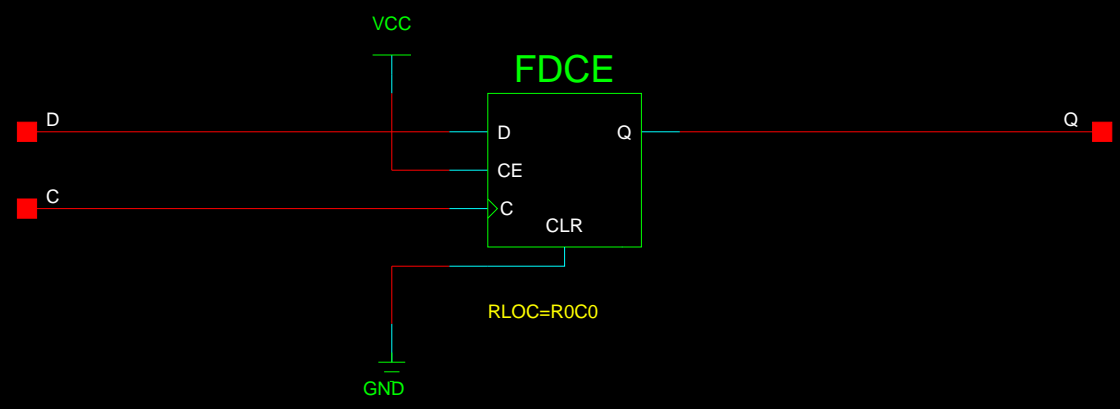
Comments: 4-Input Sum-of-Products

Date: 1st March 1995

Ver: 1

Sheet Size: A

Rev: A



Title: XC4000E Family FD Macro

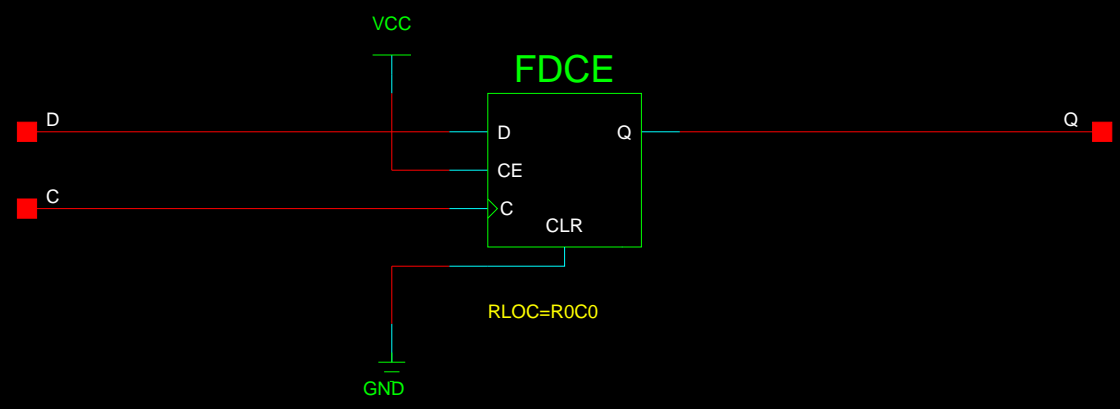
Comments: D Flip-Flop

Date: 23rd December 1992

Ver: 1

Sheet Size: A

Rev: A



Title: XC4000E Family FD Macro

Comments: D Flip-Flop

Date: 23rd December 1992

Ver: 1

Sheet Size: A

Rev: A



Title: XBLOX Family BUS_IF08

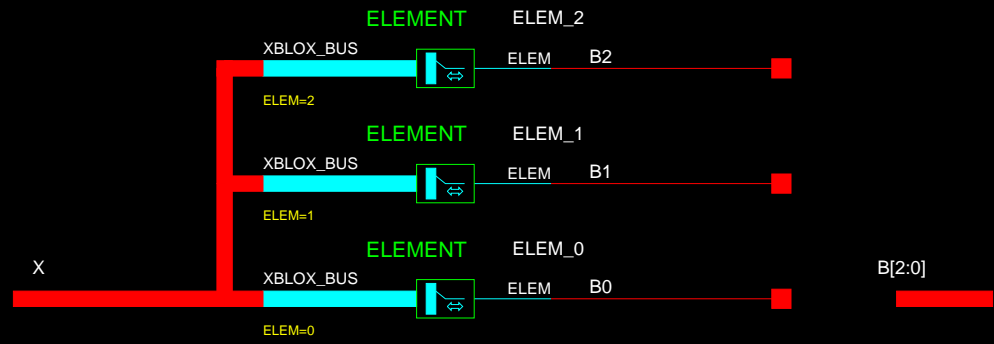
Comments:

Date: 7/21/93

Ver: 1

Sheet Size: A

Rev: A



Title: XBLOX Family BUS_IF03

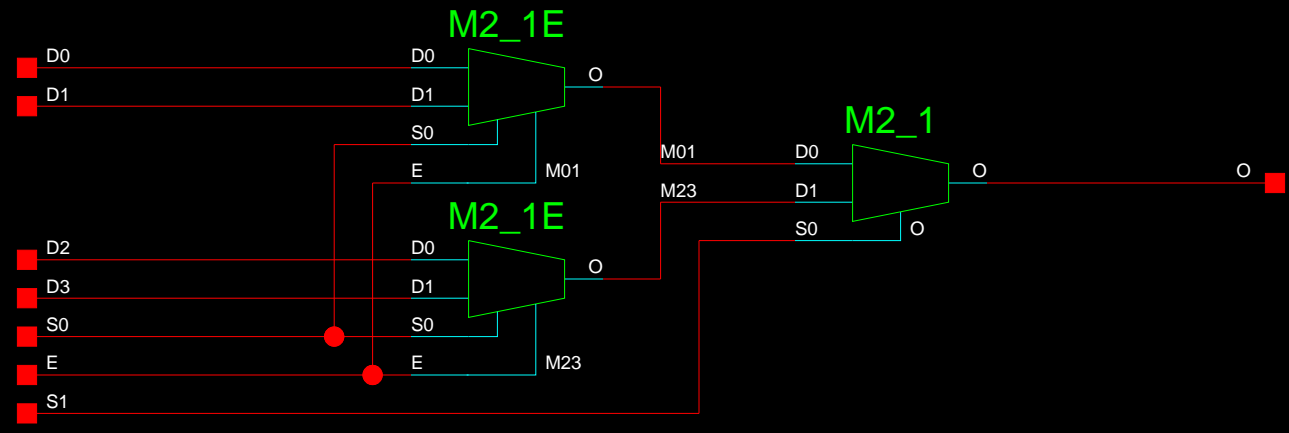
Comments:

Date: 7/21/93

Ver: 1

Sheet Size: A

Rev: A



Title: XC4000E Family M4_1E Macro

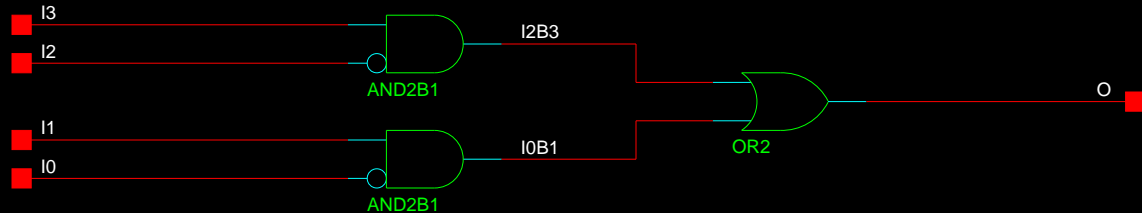
Comments: 4-to-1 Multiplexer with Enable

Date: 1st December 1994

Ver: 1

Sheet Size: A

Rev: B



Title: XC4000E Family SOP4B2B Macro

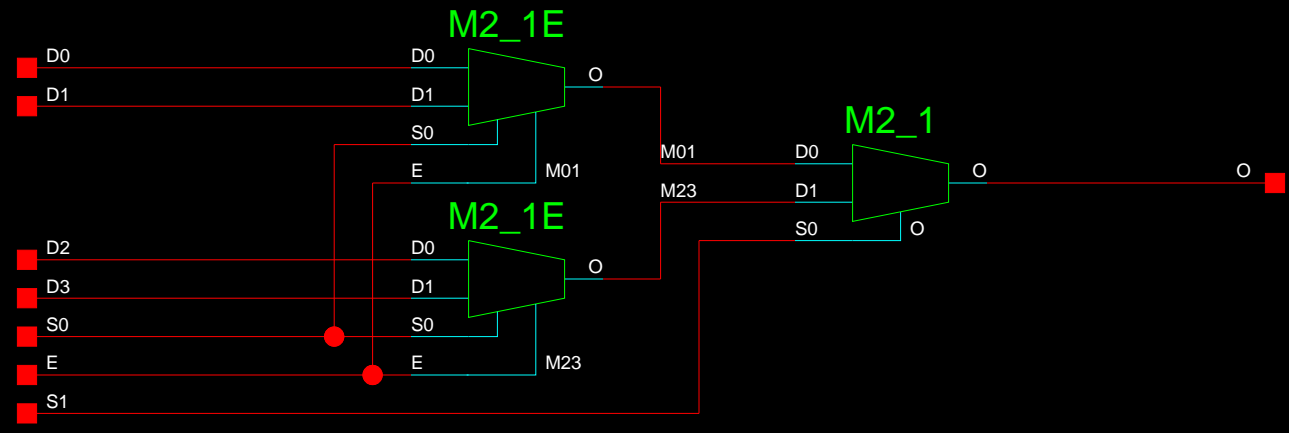
Comments: 4-Input Sum-of-Products

Date: 3rd March 1995

Ver: 1

Sheet Size: A

Rev: A



Title: XC4000E Family M4_1E Macro

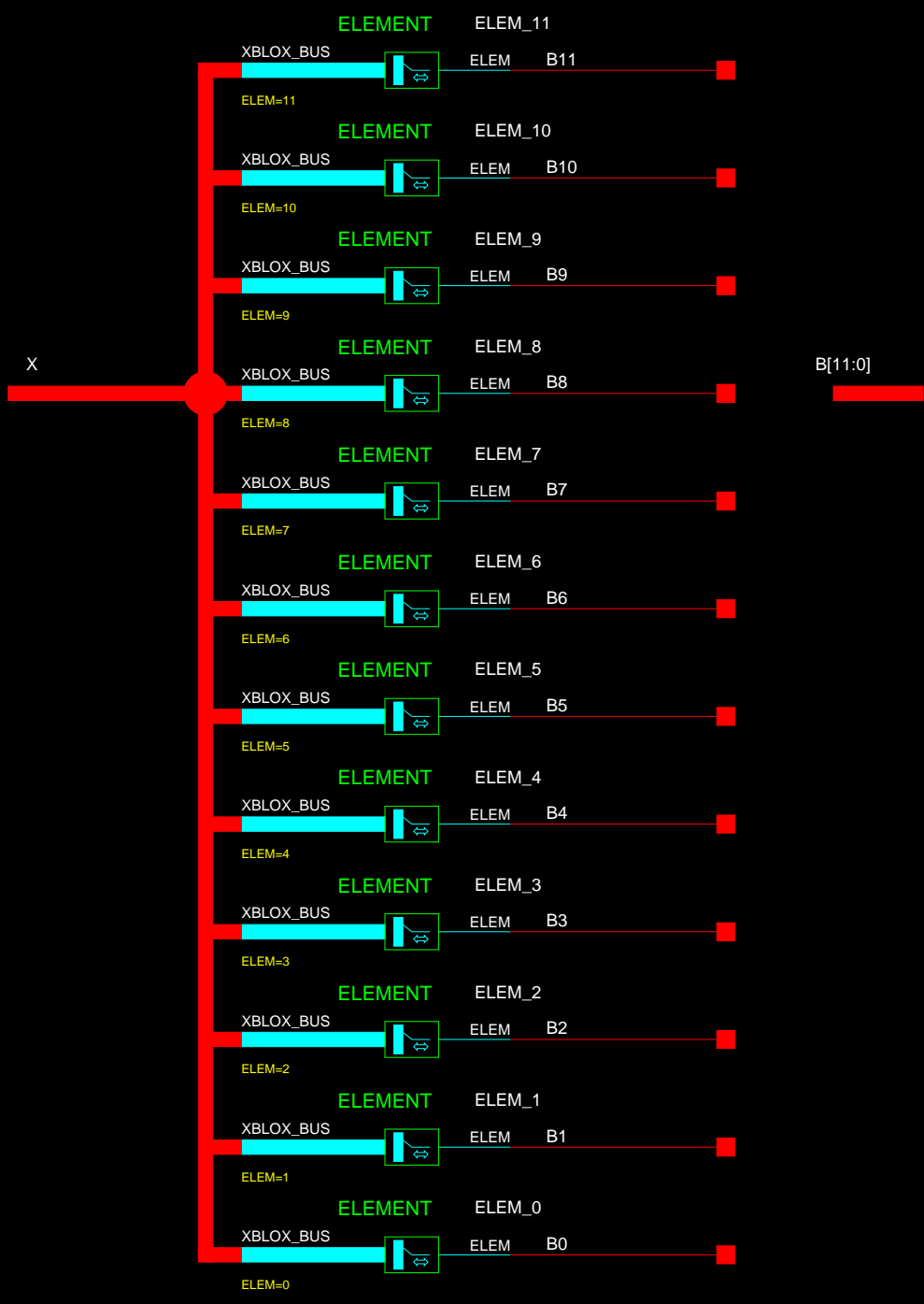
Comments: 4-to-1 Multiplexer with Enable

Date: 1st December 1994

Ver: 1

Sheet Size: A

Rev: B



Title: XBLOX Family BUS_IF12	
Comments:	
Date: 7/21/93	Ver:
Sheet Size: A	Rev:



Title: XBLOX Family BUS_IF06

Comments:

Date: 7/21/93

Ver: 1

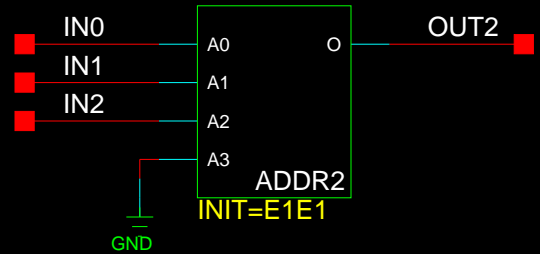
Sheet Size: A

Rev: A

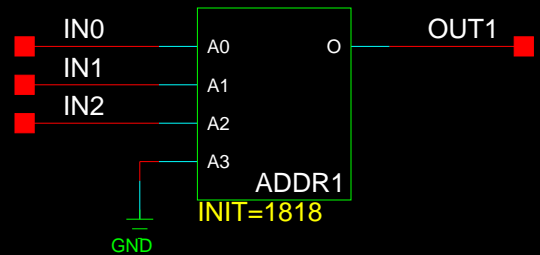
SBADR BUS_IF03 IN[2:0]

X < B[2:0]

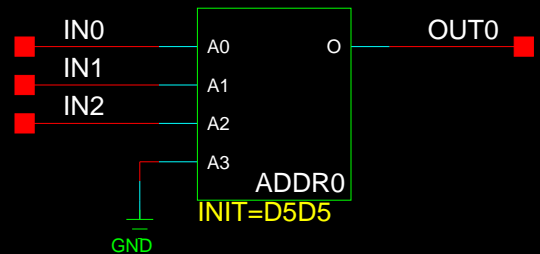
ROM16X1



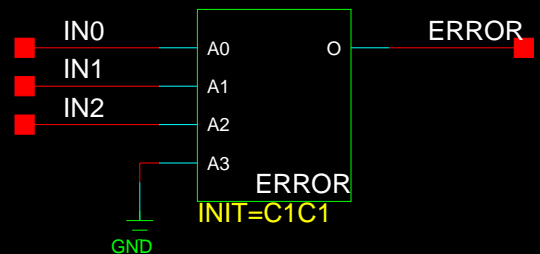
ROM16X1



ROM16X1



ROM16X1



OUT[2:0] BUS_IF03 DPADR

B[2:0] > X

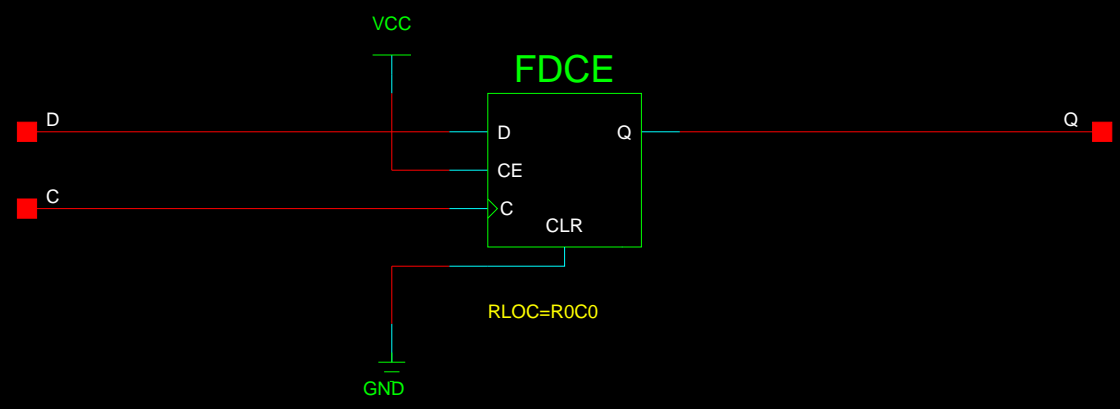
HARVARD UNIVERSITY

ATMOSPHERIC RESEARCH PROJECT

TITLE
Minus-1 block
Analog I/O

PREPARED	MR	
CHECKED		
ENGINEER		

size	Code ID No.	Drawing No.	rev
A		7002	1
Scale		sheet	



Title: XC4000E Family FD Macro

Comments: D Flip-Flop

Date: 23rd December 1992

Ver: 1

Sheet Size: A

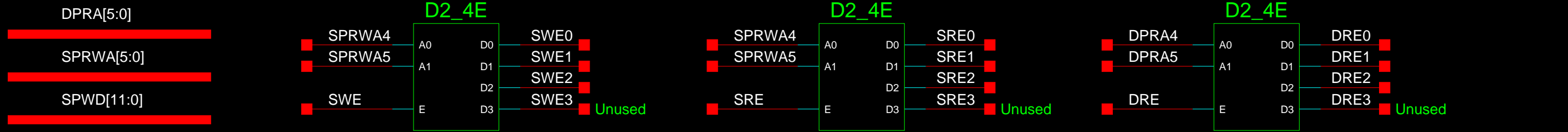
Rev: A

Revisions			
Zone	ltr	Description	Approved

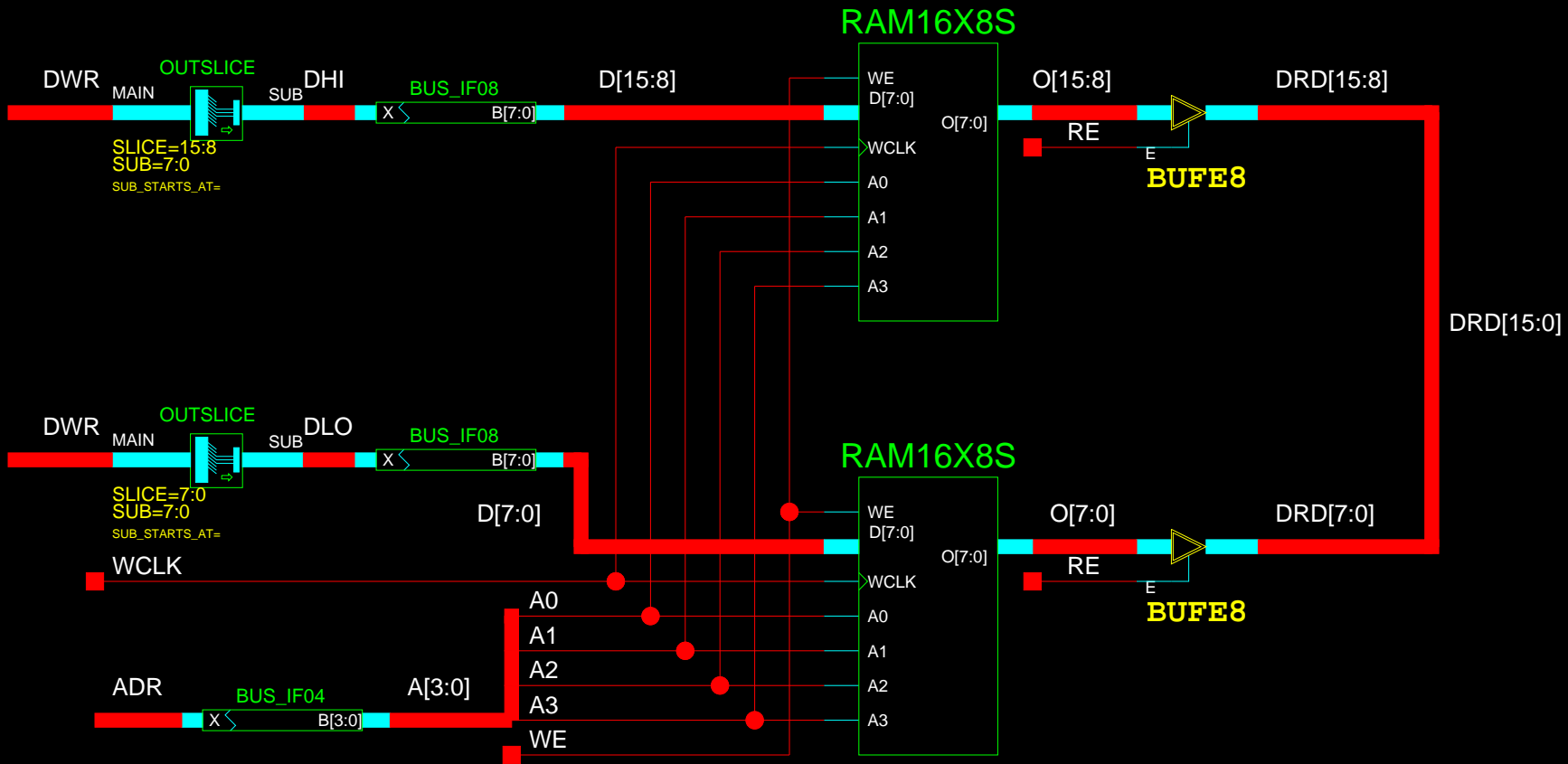
Primary Port
Write Enable Decoder

Primary Port
Read Enable Decoder

Secondary Port
Read Enable Decoder



HARVARD UNIVERSITY			
ATMOSPHERIC RESEARCH PROJECT			
TITLE			
48-Deep by 12-Wide Dual Port Synchronous RAM Analog I/O Board			
PREPARED	MR	size	Code ID No.
CHECKED		C	
ENGINEER		RAM48D12	Drawing No.
		8-21-1997_15:26	34-7002
		Scale	rev
			1
			sheet



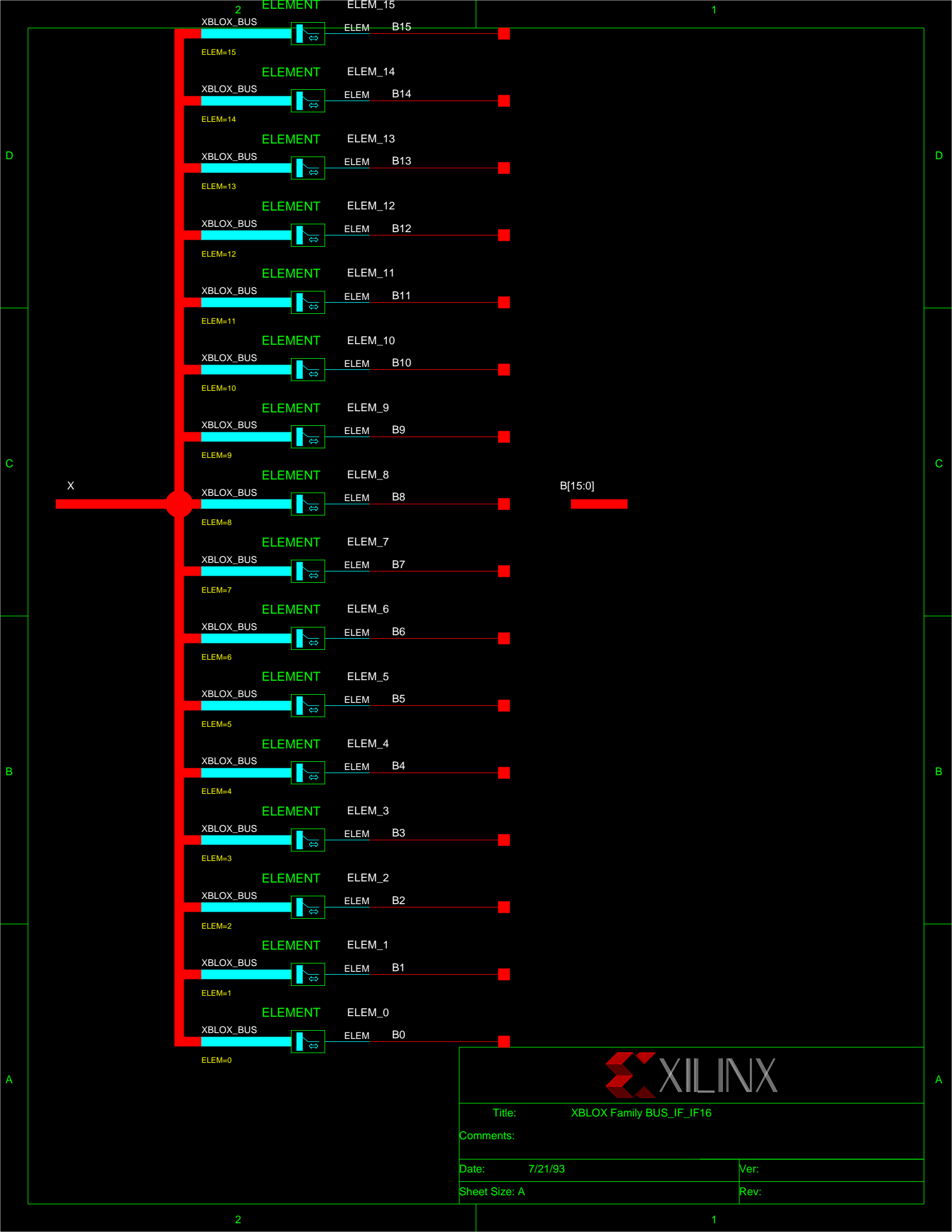
HARVARD UNIVERSITY
ATMOSPHERIC RESEARCH PROJECT

TITLE
**16-Deep by 16-Wide
 Asynchronous RAM
 - Analog I/O Board -**

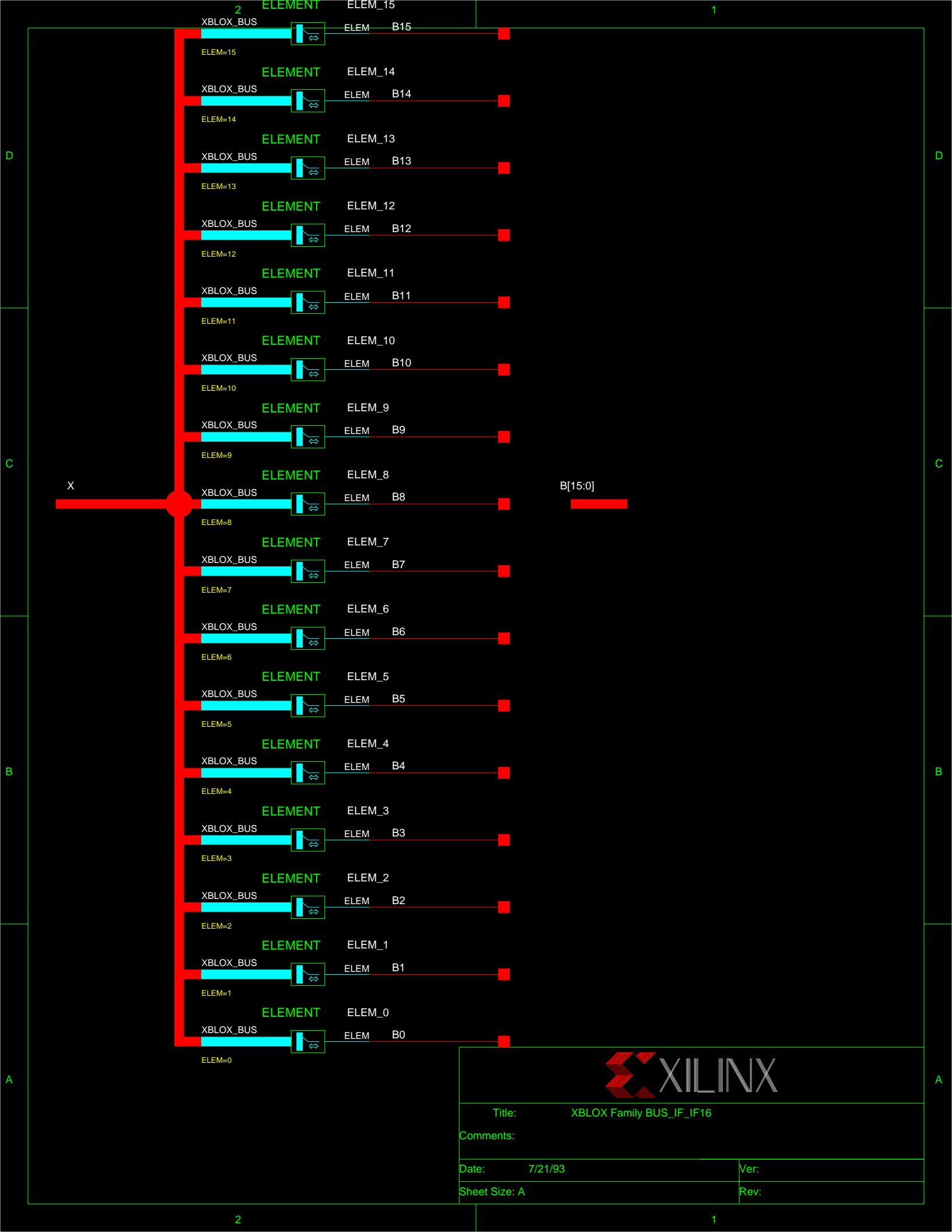
PREPARED	MR	
CHECKED		
ENGINEER		

RAM16S16
 8-18-1999_14:13

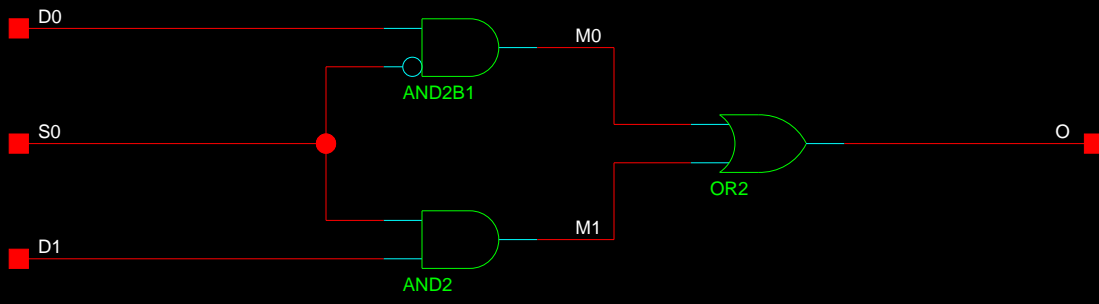
size	Code ID No.	Drawing No.	rev
AI		34-7002	1
Scale			sheet



Title: XBLOX Family BUS_IF_IF16	
Comments:	
Date: 7/21/93	Ver:
Sheet Size: A	Rev:



Title: XBLOX Family BUS_IF_IF16	
Comments:	
Date: 7/21/93	Ver:
Sheet Size: A	Rev:



Title: XC4000E Family M2_1 Macro

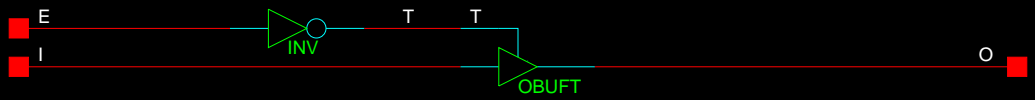
Comments: 2-to-1 Multiplexer

Date: 14th December 1992

Ver: 1

Sheet Size: A

Rev: A



Title: XC4000E Family OBUFE Macro

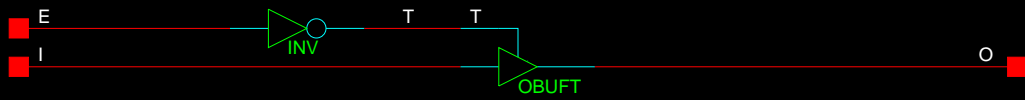
Comments: 3-State Output Buffer with Active High Enable

Date: 22nd February 1995

Ver: 1

Sheet Size: A

Rev: A



Title: XC4000E Family OBUFE Macro

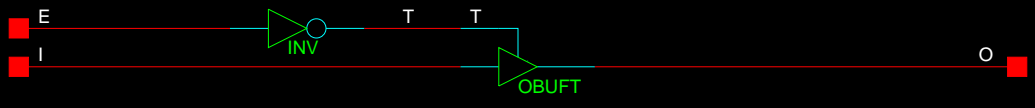
Comments: 3-State Output Buffer with Active High Enable

Date: 22nd February 1995

Ver: 1

Sheet Size: A

Rev: A



Title: XC4000E Family OBUFE Macro

Comments: 3-State Output Buffer with Active High Enable

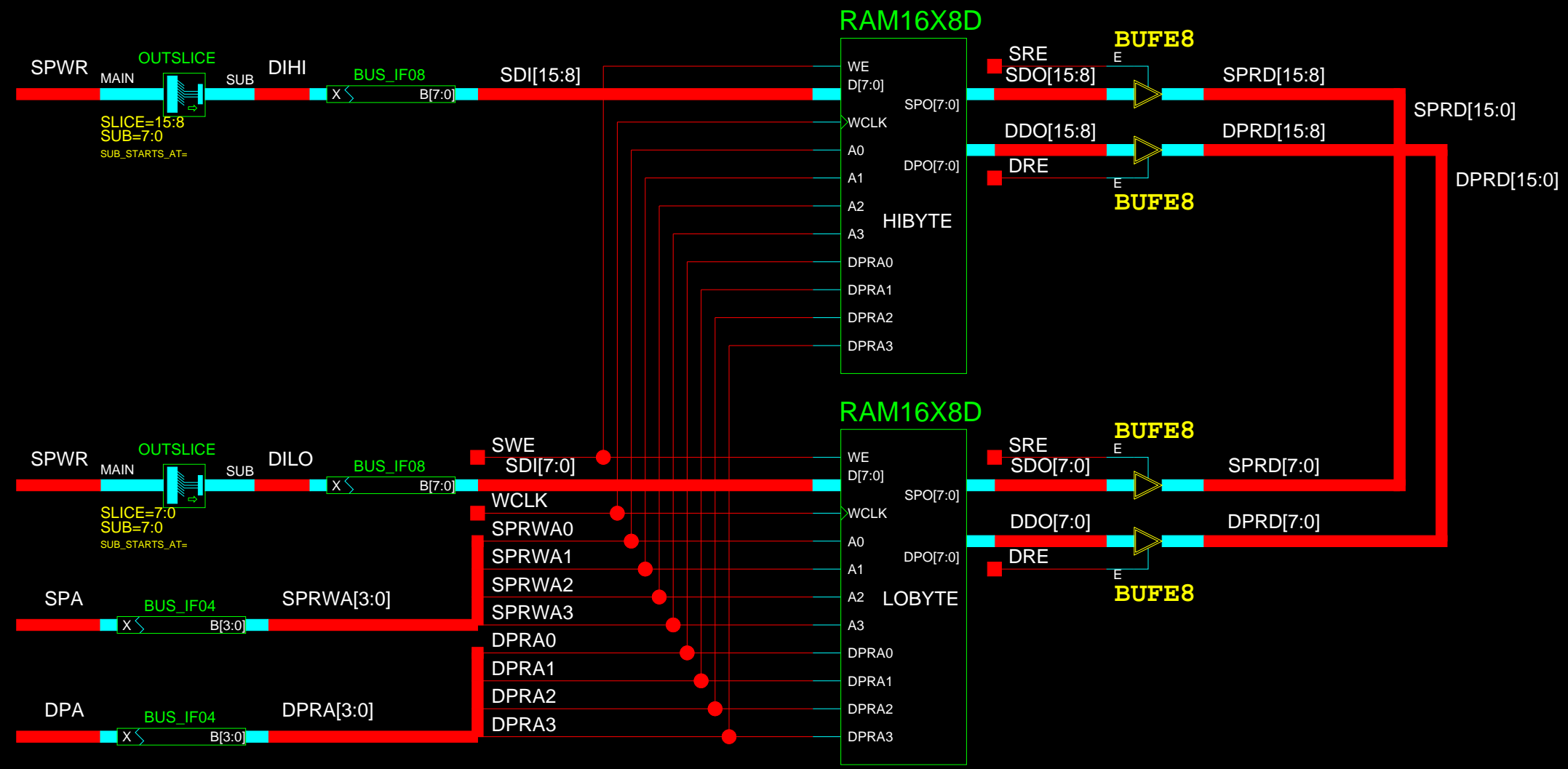
Date: 22nd February 1995

Ver: 1

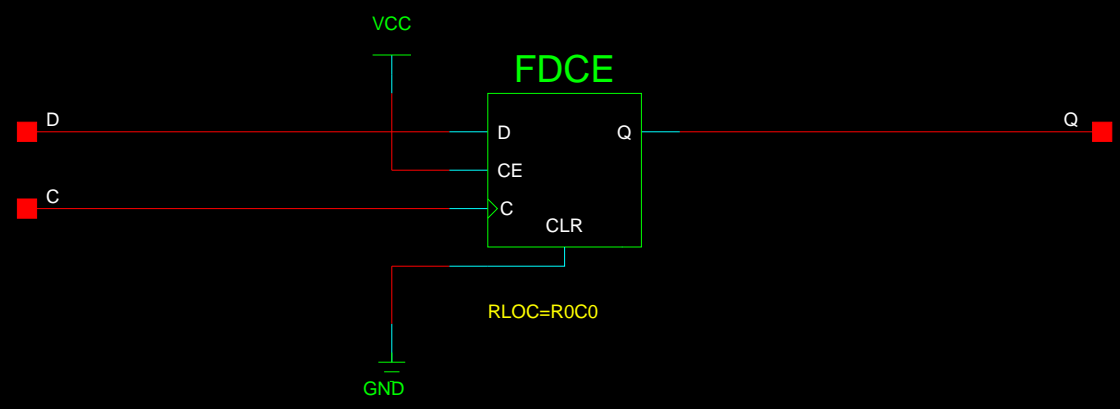
Sheet Size: A

Rev: A

Revisions				
Zone	Itr	Description	Date	Approved



HARVARD UNIVERSITY ATMOSPHERIC RESEARCH PROJECT TITLE 16-Deep by 16-Wide Dual Port Synchronous RAM - Analog I/O Board -			size	Code ID No.	Drawing No.	rev
			B		34-7002	A
PREPARED	MR		RAM16D16 BSHEET			
CHECKED			8-16-1999_15:28 10-2-2002_11:40			
ENGINEER			Scale	sheet 1 of 1		



Title: XC4000E Family FD Macro

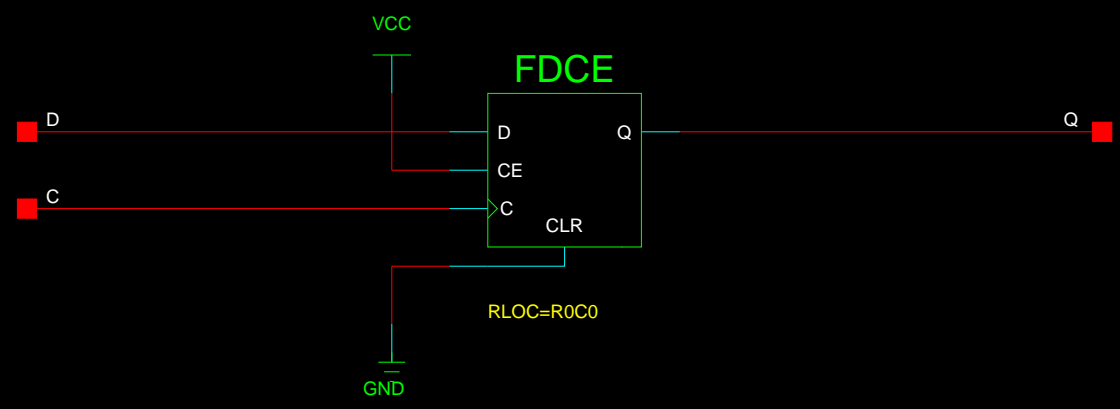
Comments: D Flip-Flop

Date: 23rd December 1992

Ver: 1

Sheet Size: A

Rev: A



Title: XC4000E Family FD Macro

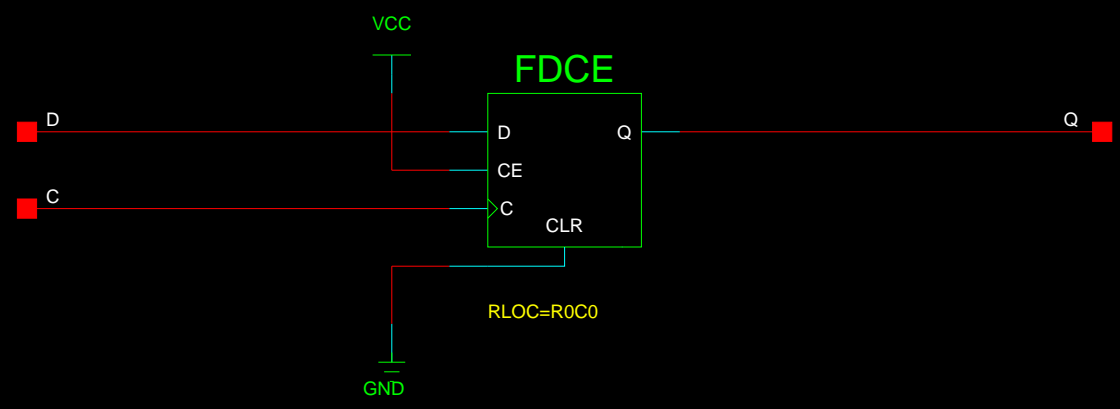
Comments: D Flip-Flop

Date: 23rd December 1992

Ver: 1

Sheet Size: A

Rev: A



Title: XC4000E Family FD Macro

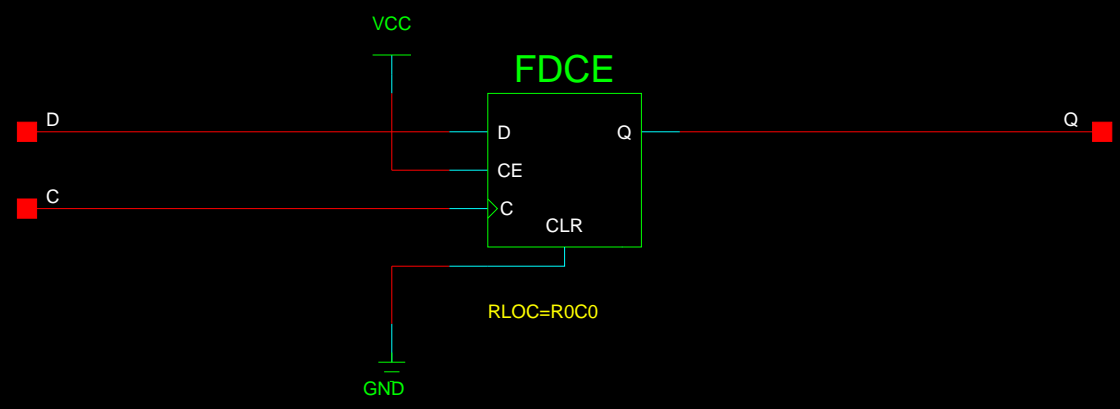
Comments: D Flip-Flop

Date: 23rd December 1992

Ver: 1

Sheet Size: A

Rev: A



Title: XC4000E Family FD Macro

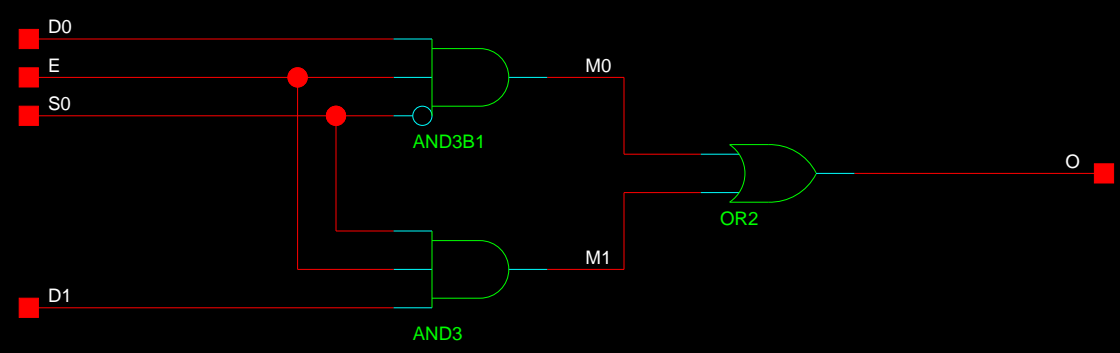
Comments: D Flip-Flop

Date: 23rd December 1992

Ver: 1

Sheet Size: A

Rev: A



Title: XC4000E Family M2_1E Macro

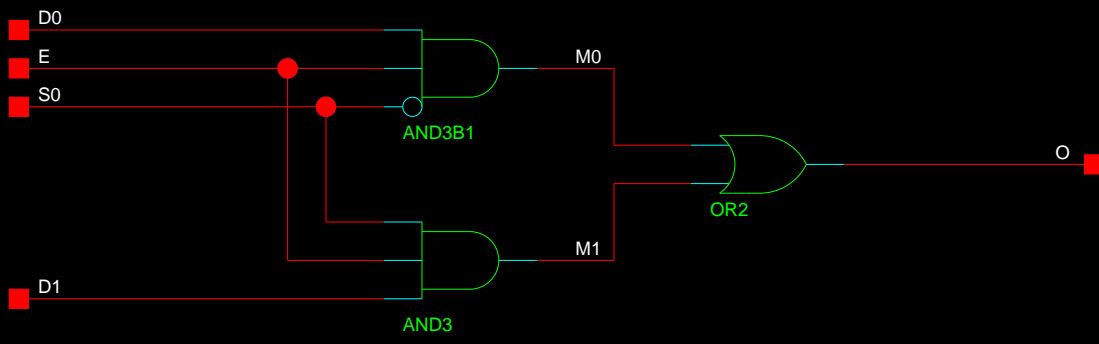
Comments: 2-to-1 Multiplexer with Enable

Date: 16th December 1992

Ver: 1

Sheet Size: A

Rev: A



Title: XC4000E Family M2_1E Macro

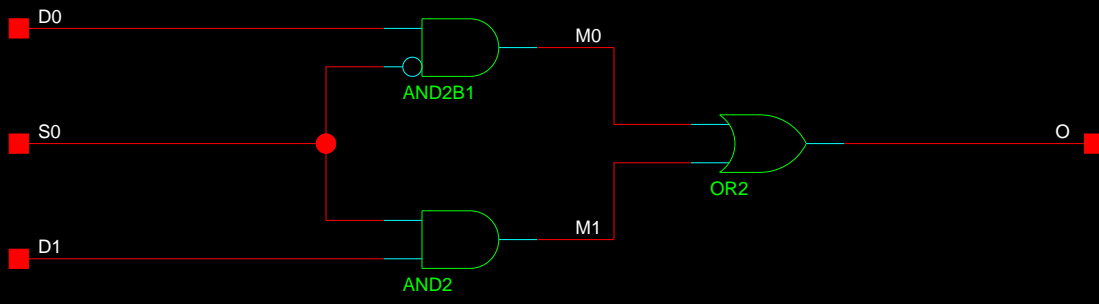
Comments: 2-to-1 Multiplexer with Enable

Date: 16th December 1992

Ver: 1

Sheet Size: A

Rev: A



Title: XC4000E Family M2_1 Macro

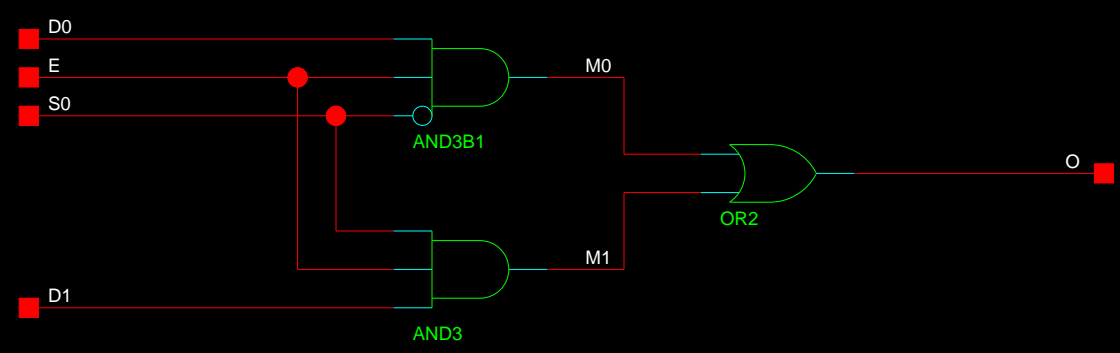
Comments: 2-to-1 Multiplexer

Date: 14th December 1992

Ver: 1

Sheet Size: A

Rev: A



Title: XC4000E Family M2_1E Macro

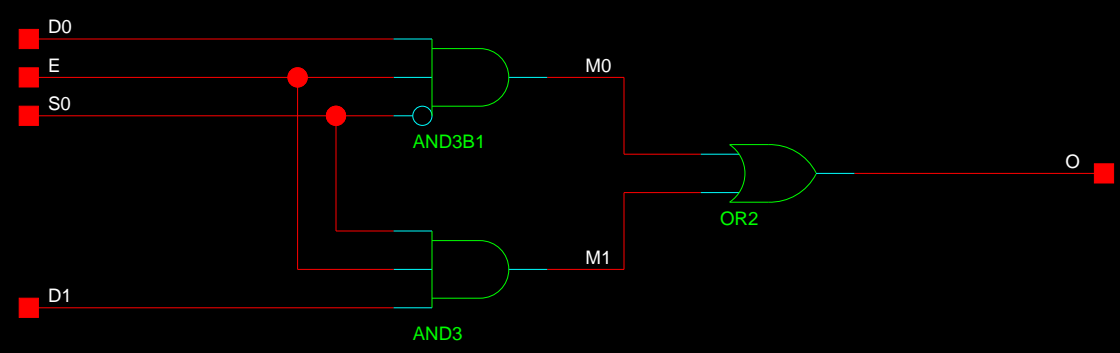
Comments: 2-to-1 Multiplexer with Enable

Date: 16th December 1992

Ver: 1

Sheet Size: A

Rev: A



Title: XC4000E Family M2_1E Macro

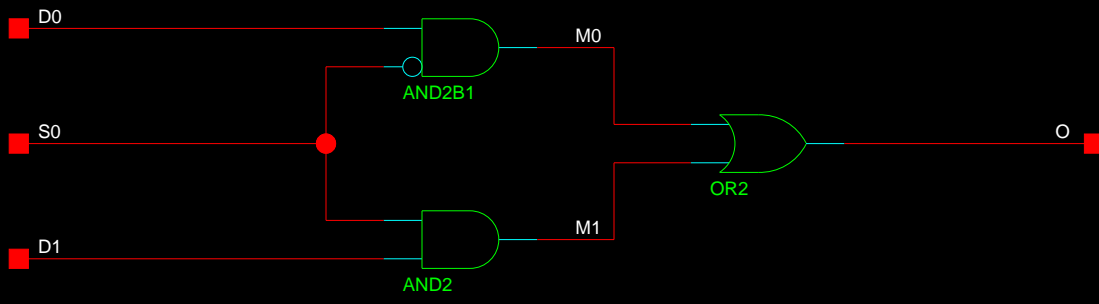
Comments: 2-to-1 Multiplexer with Enable

Date: 16th December 1992

Ver: 1

Sheet Size: A

Rev: A



Title: XC4000E Family M2_1 Macro

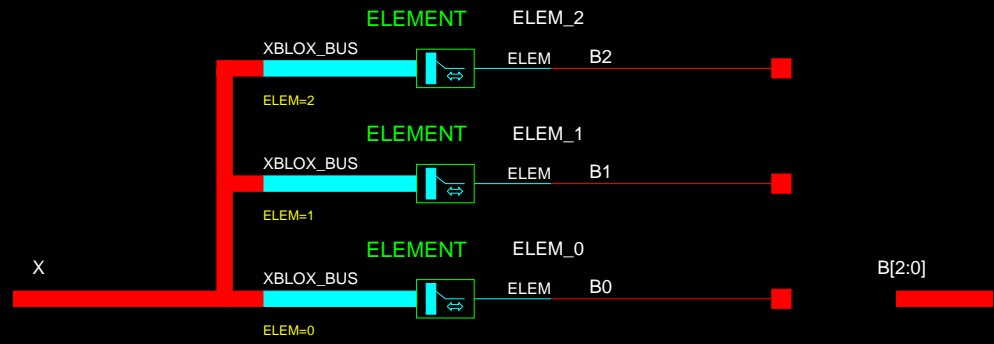
Comments: 2-to-1 Multiplexer

Date: 14th December 1992

Ver: 1

Sheet Size: A

Rev: A



Title: XBLOX Family BUS_IF03

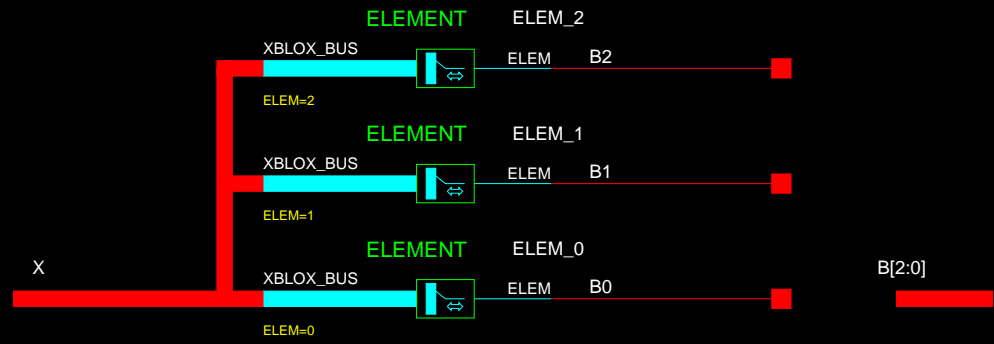
Comments:

Date: 7/21/93

Ver: 1

Sheet Size: A

Rev: A



Title: XBLOX Family BUS_IF03

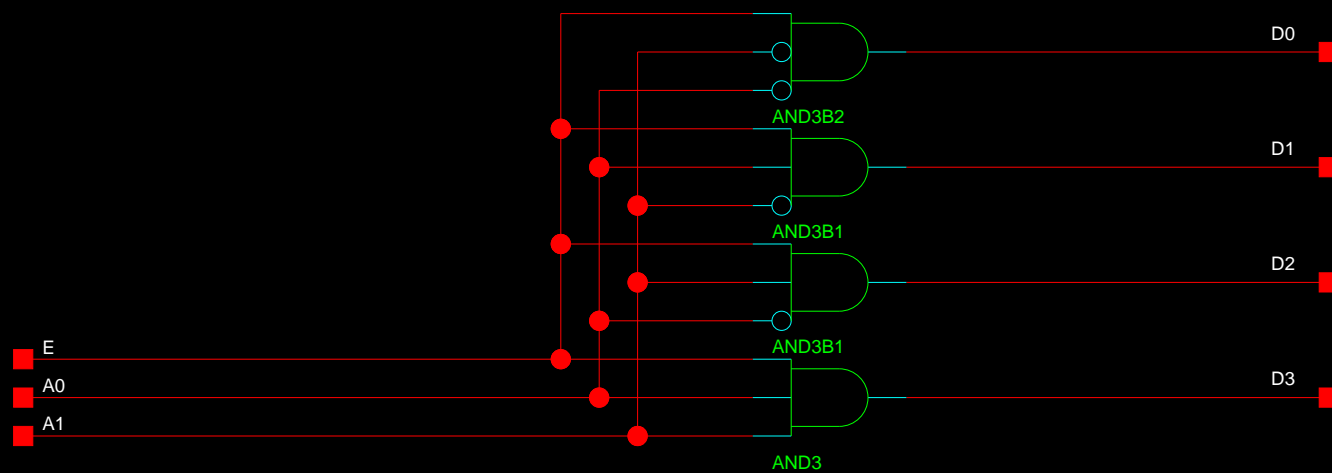
Comments:

Date: 7/21/93

Ver: 1

Sheet Size: A

Rev: A



Title: XC4000E Family D2_4E Macro

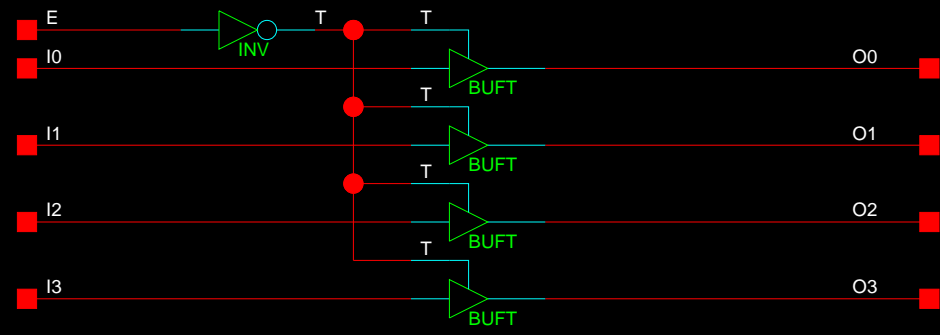
Comments: 2-Line to 4-Line Decoder/
Demultiplexer w/ Enable

Date: 19th January 1995

Ver: 1

Sheet Size: A

Rev: A



Title: XC4000E Family BUFE4 Macro

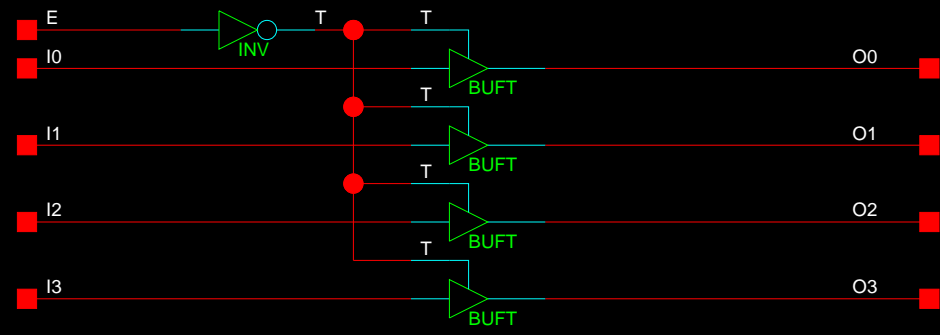
Comments: 4-Bit 3-State Buffer
w/ an Active High Enable

Date: 23rd February 1995

Ver: 1

Sheet Size: A

Rev: A



Title: XC4000E Family BUFE4 Macro

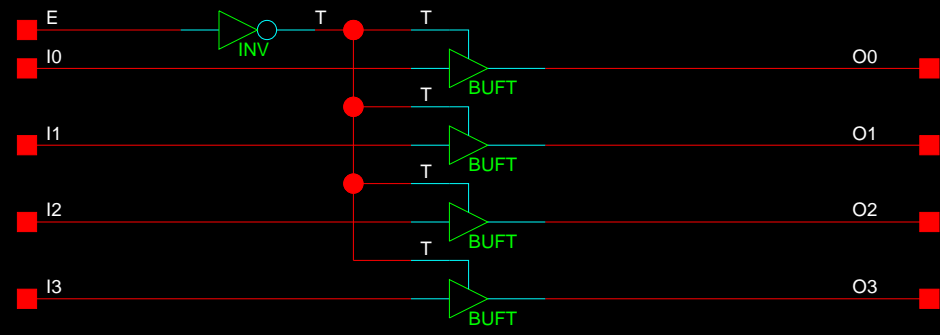
Comments: 4-Bit 3-State Buffer
w/ an Active High Enable

Date: 23rd February 1995

Ver: 1

Sheet Size: A

Rev: A



Title: XC4000E Family BUFE4 Macro

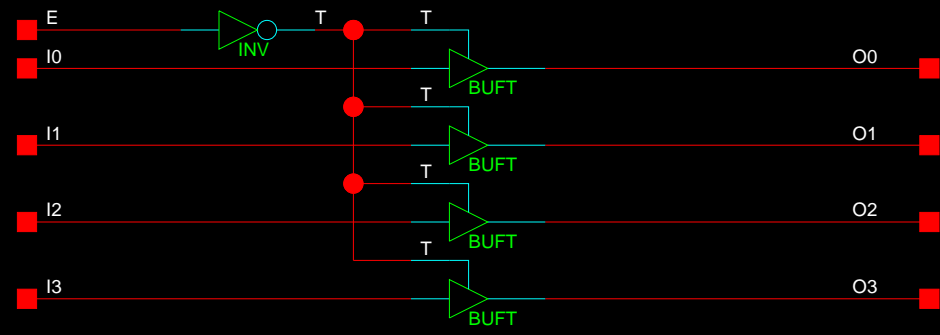
Comments: 4-Bit 3-State Buffer
w/ an Active High Enable

Date: 23rd February 1995

Ver: 1

Sheet Size: A

Rev: A



Title: XC4000E Family BUFE4 Macro

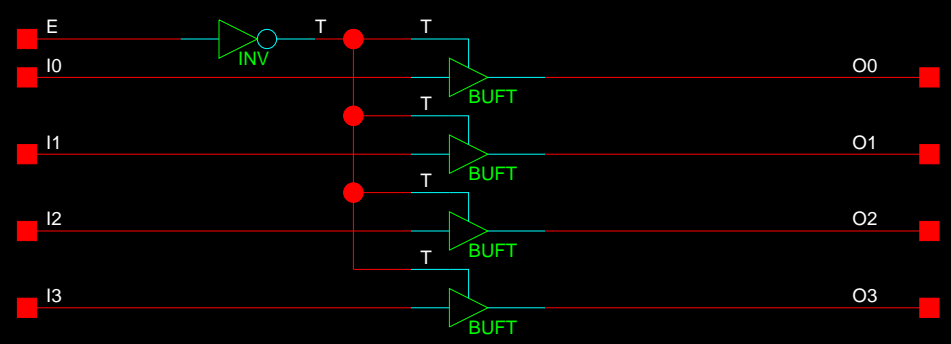
Comments: 4-Bit 3-State Buffer
w/ an Active High Enable

Date: 23rd February 1995

Ver: 1

Sheet Size: A

Rev: A



Title: XC4000E Family BUFE4 Macro

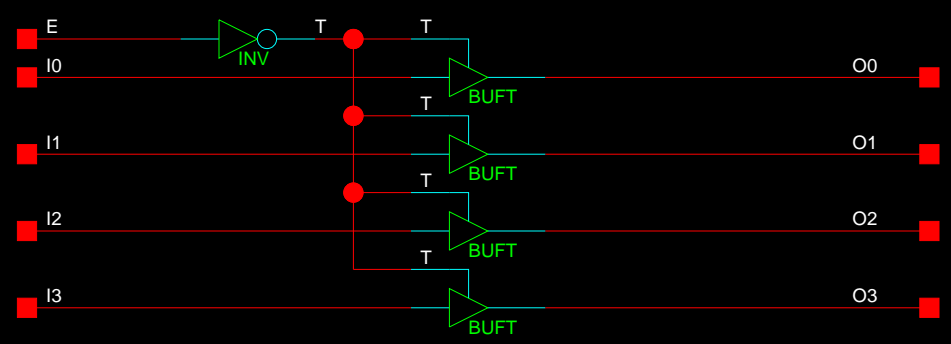
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w/ an Active High Enable

Date: 23rd February 1995

Ver: 1

Sheet Size: A

Rev: A



Title: XC4000E Family BUFE4 Macro

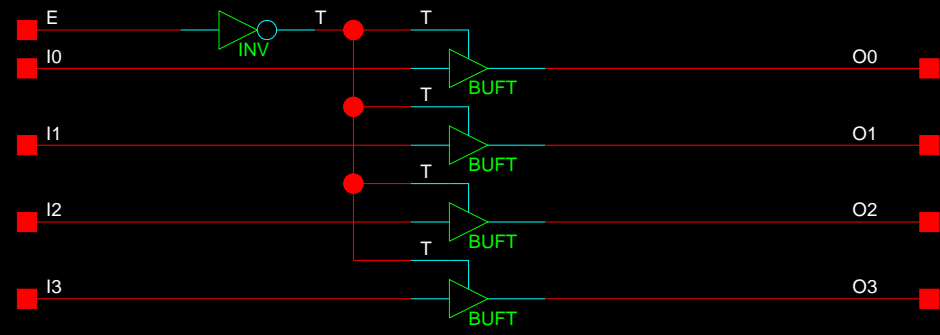
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w/ an Active High Enable

Date: 23rd February 1995

Ver: 1

Sheet Size: A

Rev: A



Title: XC4000E Family BUFE4 Macro

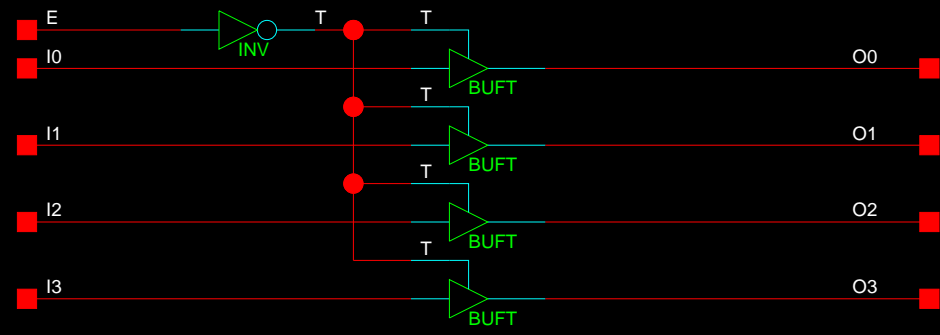
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w/ an Active High Enable

Date: 23rd February 1995

Ver: 1

Sheet Size: A

Rev: A



Title: XC4000E Family BUFE4 Macro

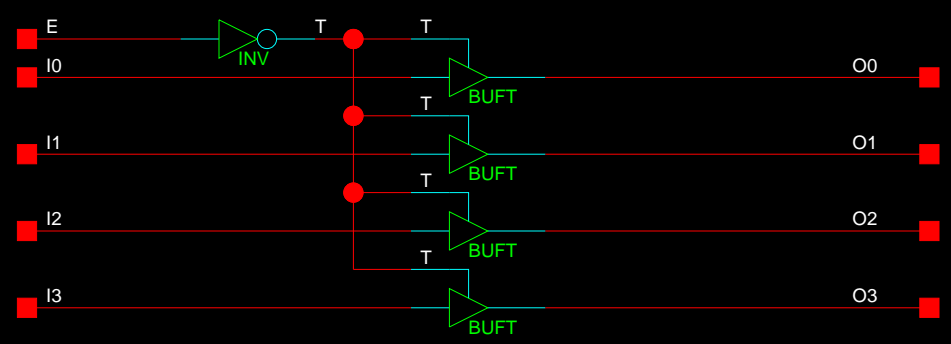
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w/ an Active High Enable

Date: 23rd February 1995

Ver: 1

Sheet Size: A

Rev: A



Title: XC4000E Family BUFE4 Macro

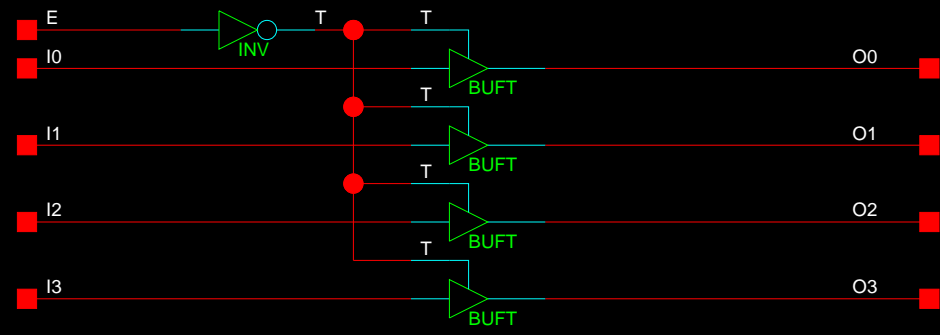
Comments: 4-Bit 3-State Buffer
w/ an Active High Enable

Date: 23rd February 1995

Ver: 1

Sheet Size: A

Rev: A



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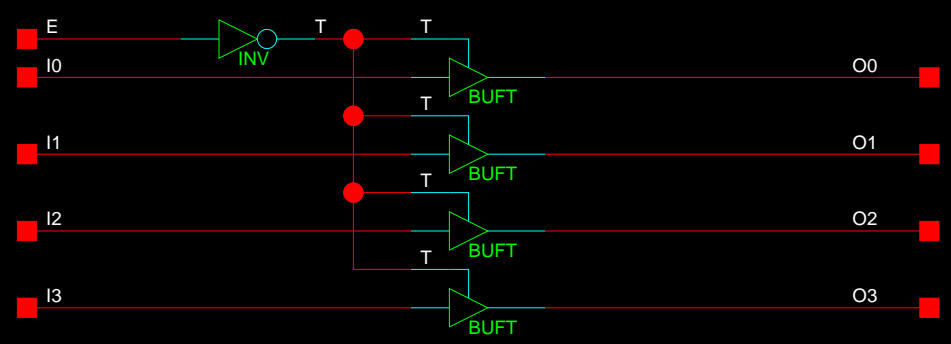
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w/ an Active High Enable

Date: 23rd February 1995

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Sheet Size: A

Rev: A



Title: XC4000E Family BUFE4 Macro

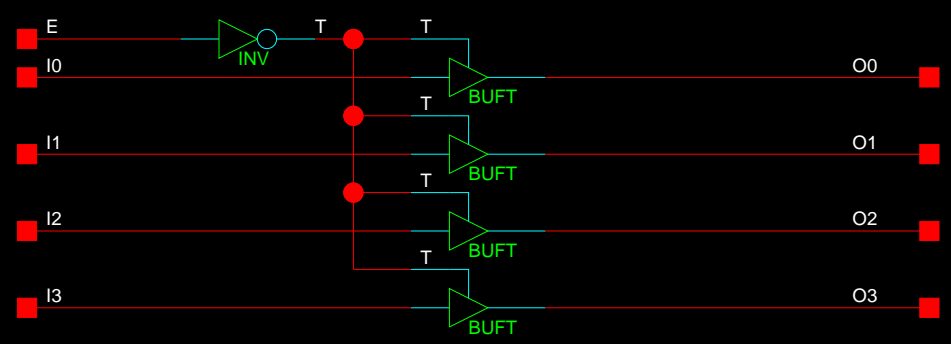
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w/ an Active High Enable

Date: 23rd February 1995

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Sheet Size: A

Rev: A



Title: XC4000E Family BUFE4 Macro

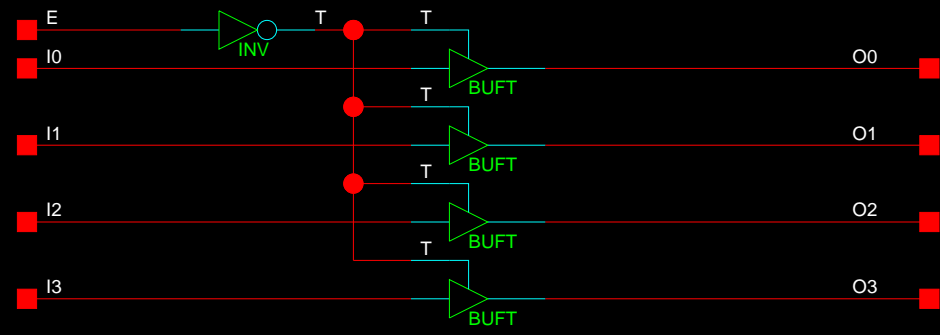
Comments: 4-Bit 3-State Buffer
w/ an Active High Enable

Date: 23rd February 1995

Ver: 1

Sheet Size: A

Rev: A



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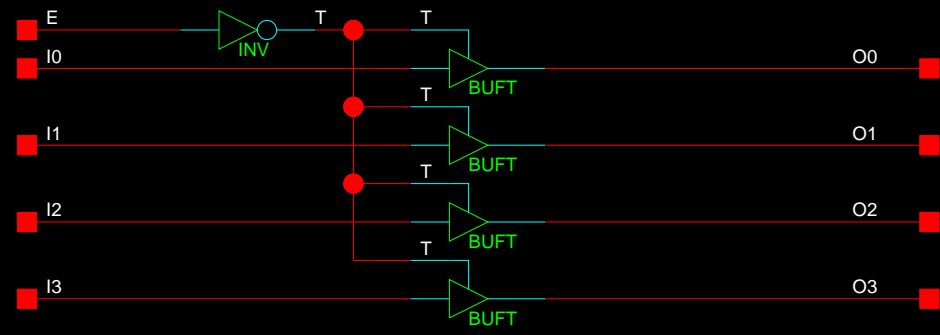
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w/ an Active High Enable

Date: 23rd February 1995

Ver: 1

Sheet Size: A

Rev: A



Title: XC4000E Family BUFE4 Macro

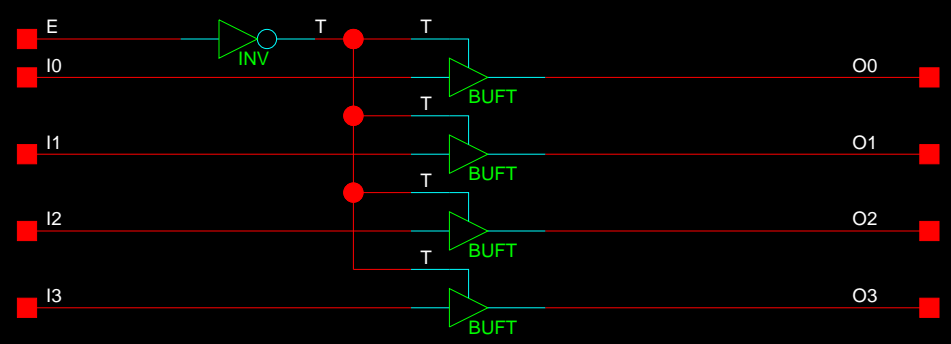
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w/ an Active High Enable

Date: 23rd February 1995

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Rev: A



Title: XC4000E Family BUFE4 Macro

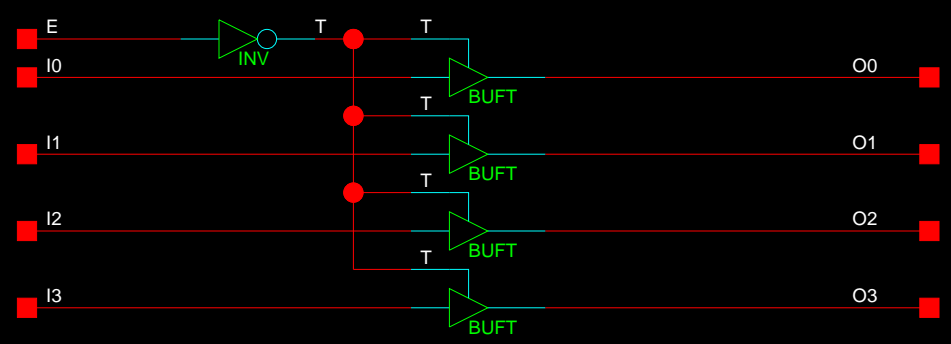
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Date: 23rd February 1995

Ver: 1

Sheet Size: A

Rev: A



Title: XC4000E Family BUFE4 Macro

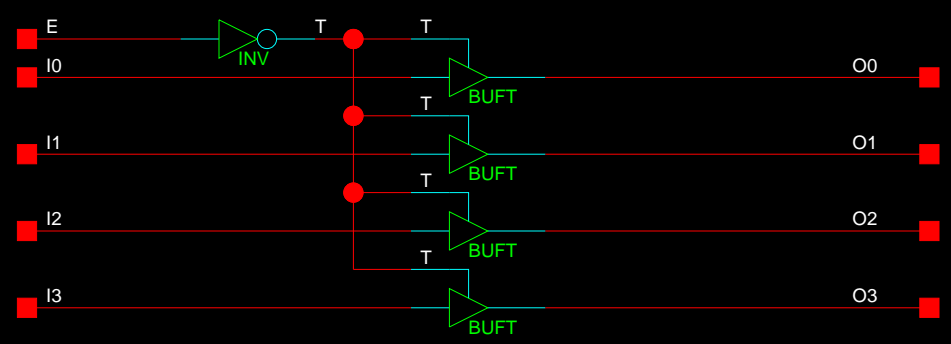
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w/ an Active High Enable

Date: 23rd February 1995

Ver: 1

Sheet Size: A

Rev: A



Title: XC4000E Family BUFE4 Macro

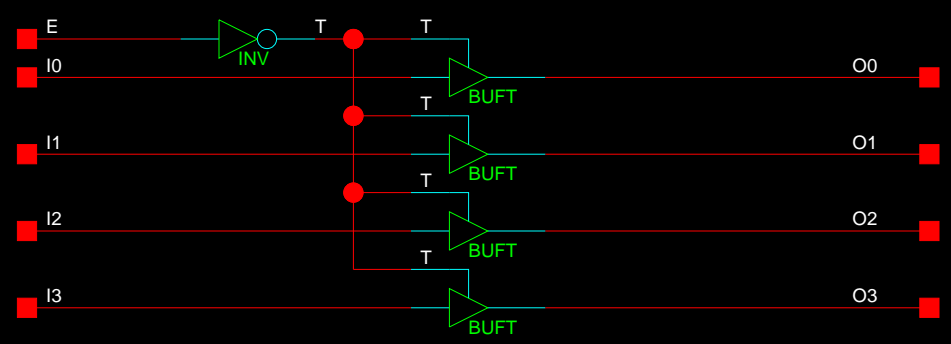
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w/ an Active High Enable

Date: 23rd February 1995

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Rev: A



Title: XC4000E Family BUFE4 Macro

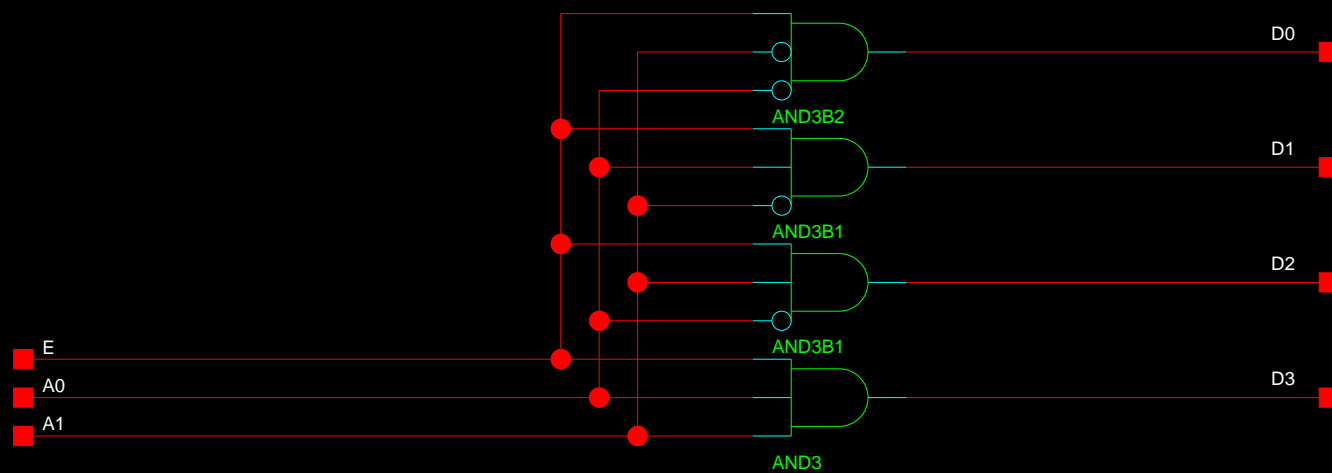
Comments: 4-Bit 3-State Buffer
w/ an Active High Enable

Date: 23rd February 1995

Ver: 1

Sheet Size: A

Rev: A



Title: XC4000E Family D2_4E Macro

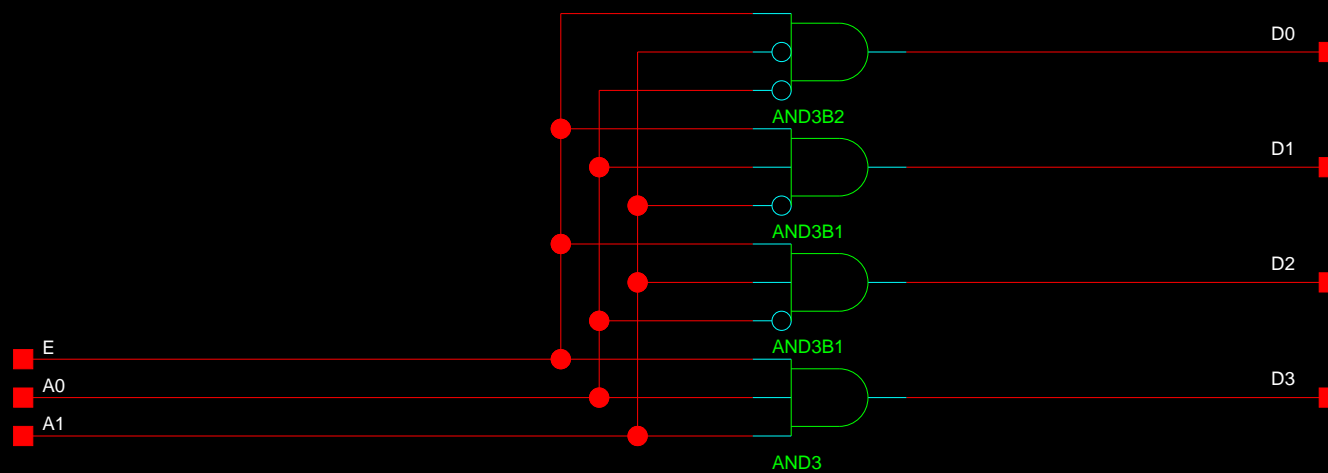
Comments: 2-Line to 4-Line Decoder/
Demultiplexer w/ Enable

Date: 19th January 1995

Ver: 1

Sheet Size: A

Rev: A



Title: XC4000E Family D2_4E Macro

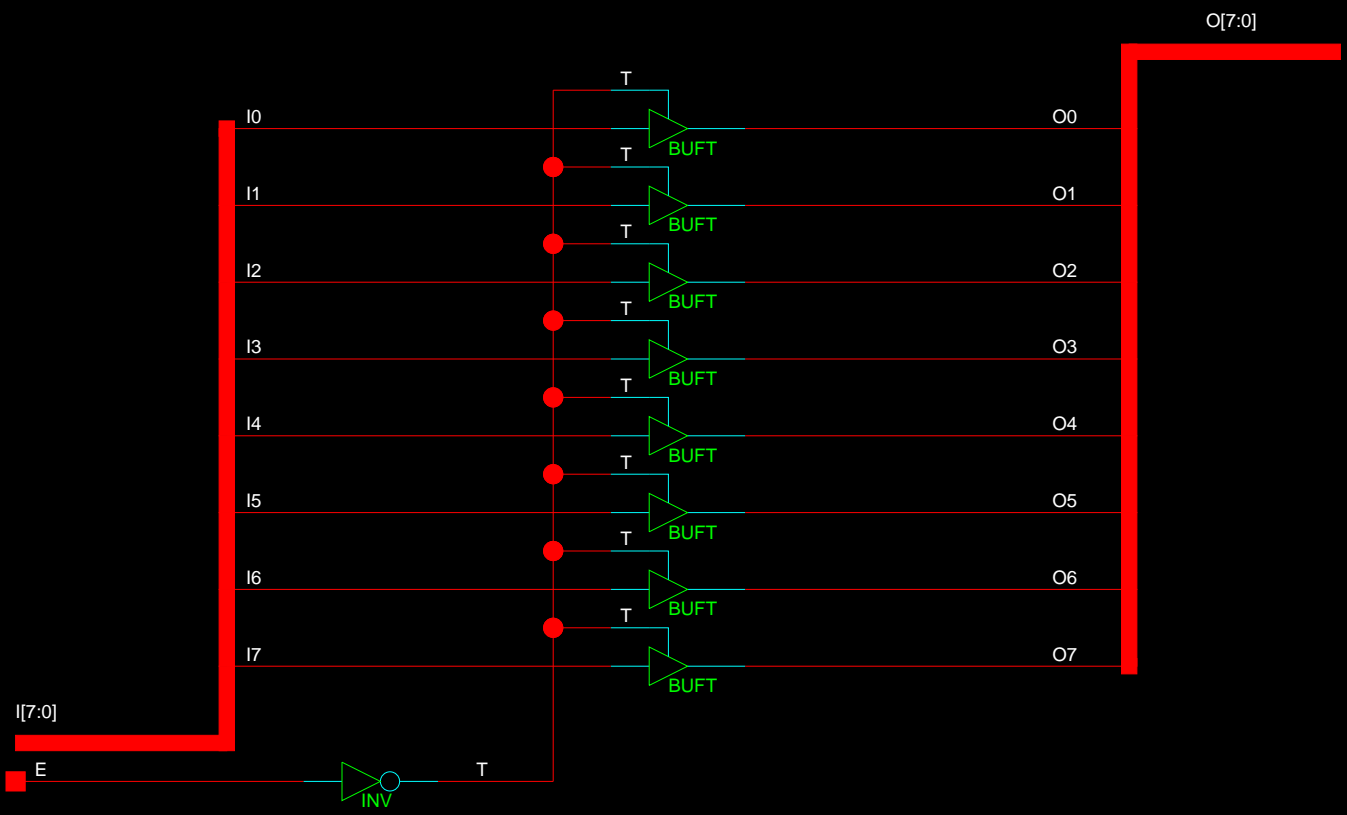
Comments: 2-Line to 4-Line Decoder/
Demultiplexer w/ Enable

Date: 19th January 1995

Ver: 1

Sheet Size: A

Rev: A



Title: XC4000E Family BUFE8 Macro

Comments: 8-Bit 3-State Buffer
w/ an Active High Enable

Date: 23rd February 1995 Ver: 1

Sheet Size: A Rev: A

D

D

C

C

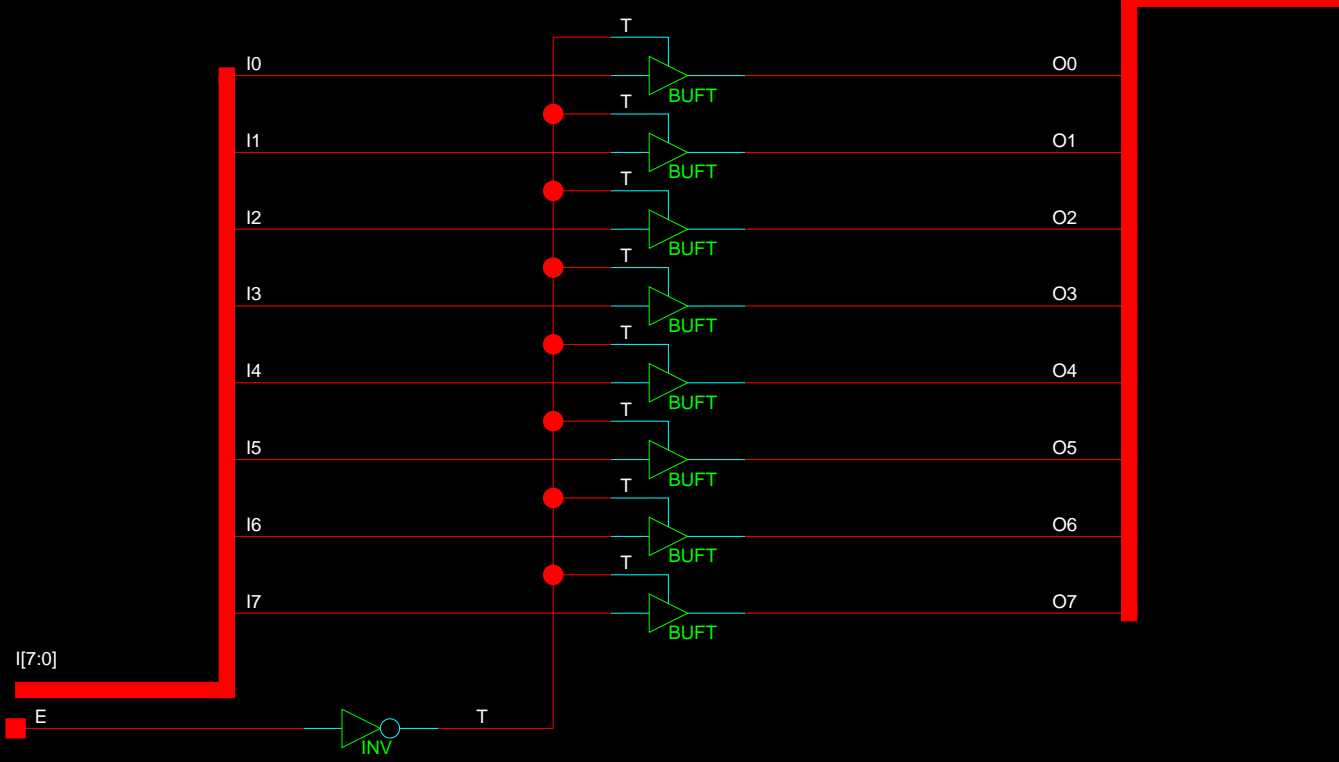
B

B

A

A

O[7:0]

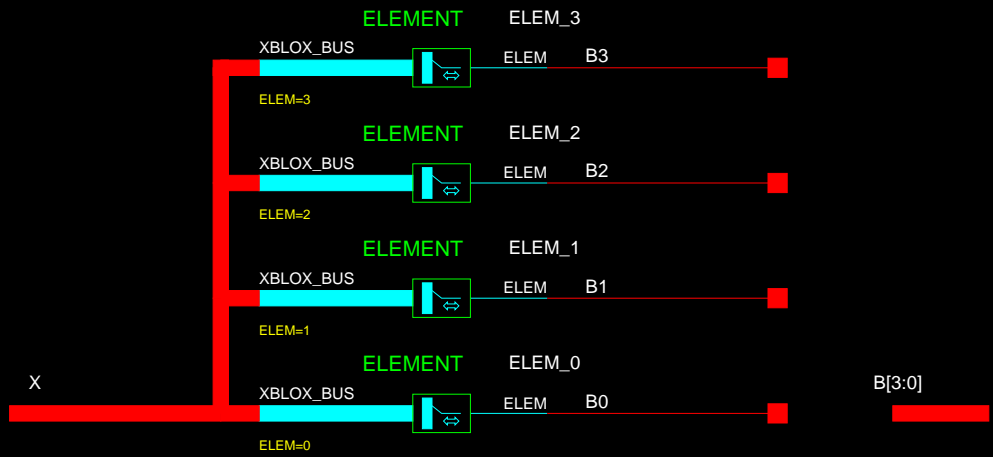


Title: XC4000E Family BUFE8 Macro

Comments: 8-Bit 3-State Buffer
w/ an Active High Enable

Date: 23rd February 1995 Ver: 1

Sheet Size: A Rev: A



Title: XBLOX Family BUS_IF04

Comments:

Date: 7/21/93

Ver: 1

Sheet Size: A

Rev: A



Title: XBLOX Family BUS_IF08

Comments:

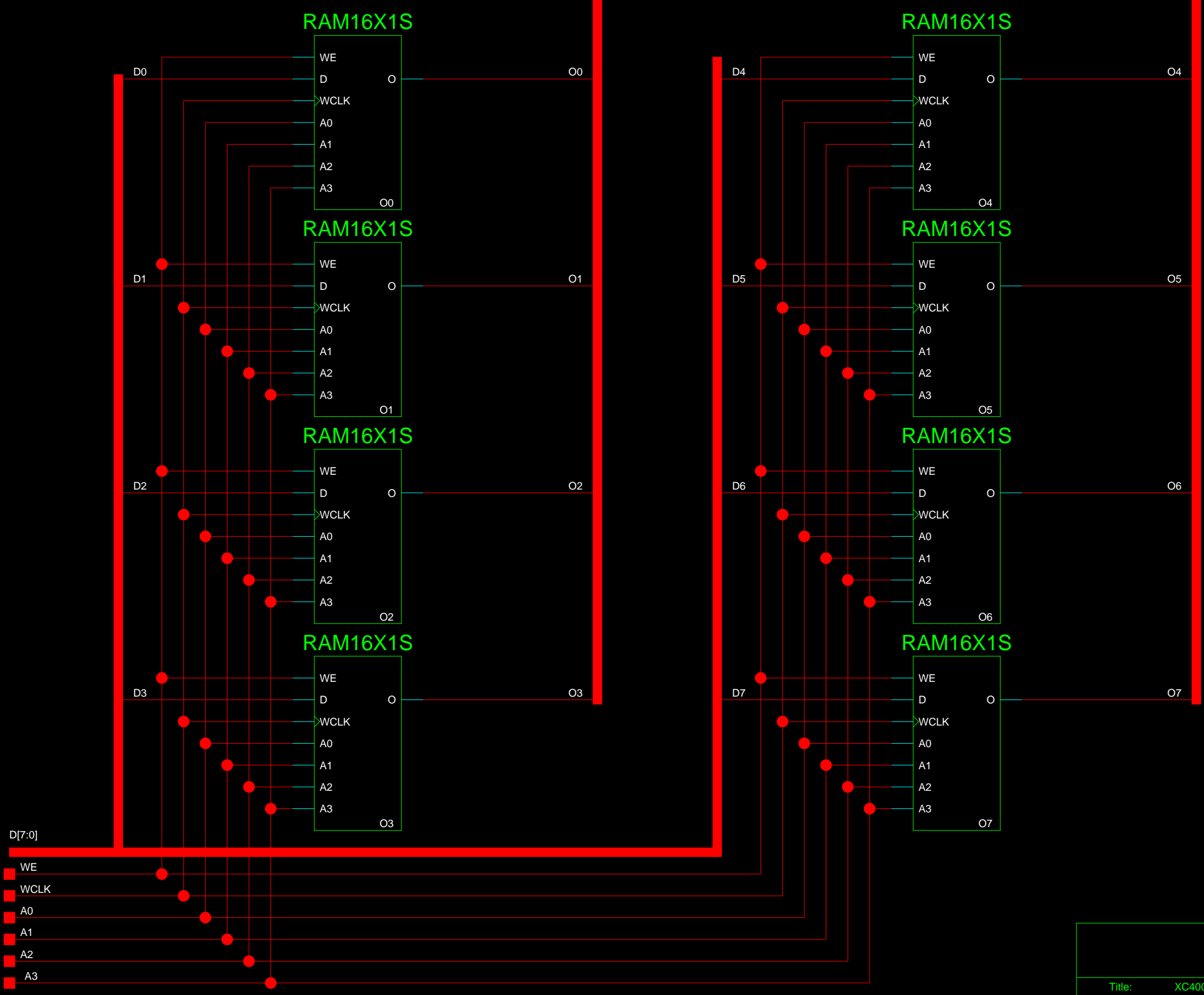
Date: 7/21/93

Ver: 1

Sheet Size: A

Rev: A

O[7:0]



D[7:0]

- WE
- WCLK
- A0
- A1
- A2
- A3



Title:	XC4000E Family RAM16x8S Macro	
Comments:	16-Deep by 8-Wide Synchronous RAM	
Date:	30th December 1994	Ver: 1
Sheet Size:	B	Rev: A



Title: XBLOX Family BUS_IF08

Comments:

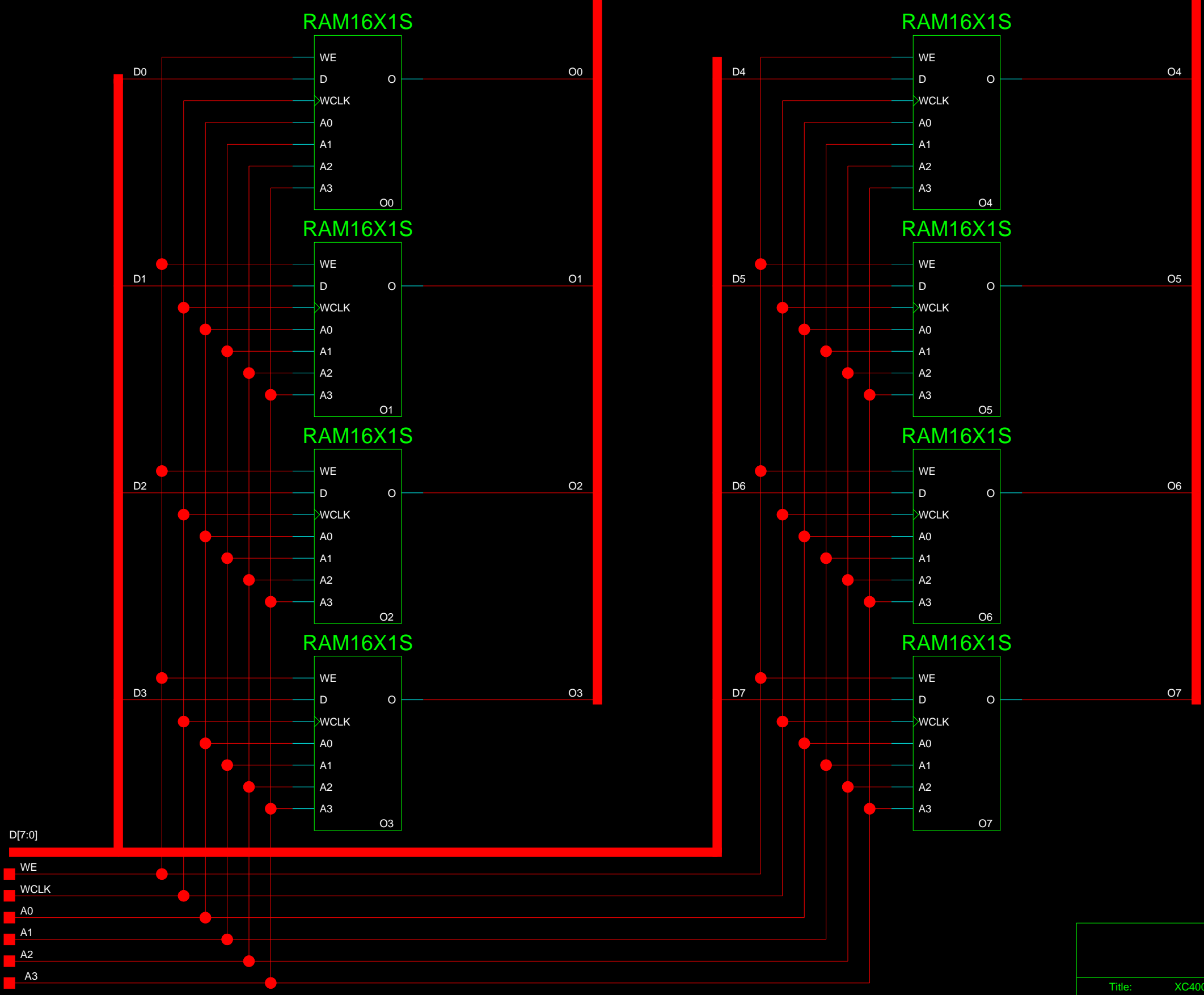
Date: 7/21/93

Ver: 1

Sheet Size: A

Rev: A

O[7:0]

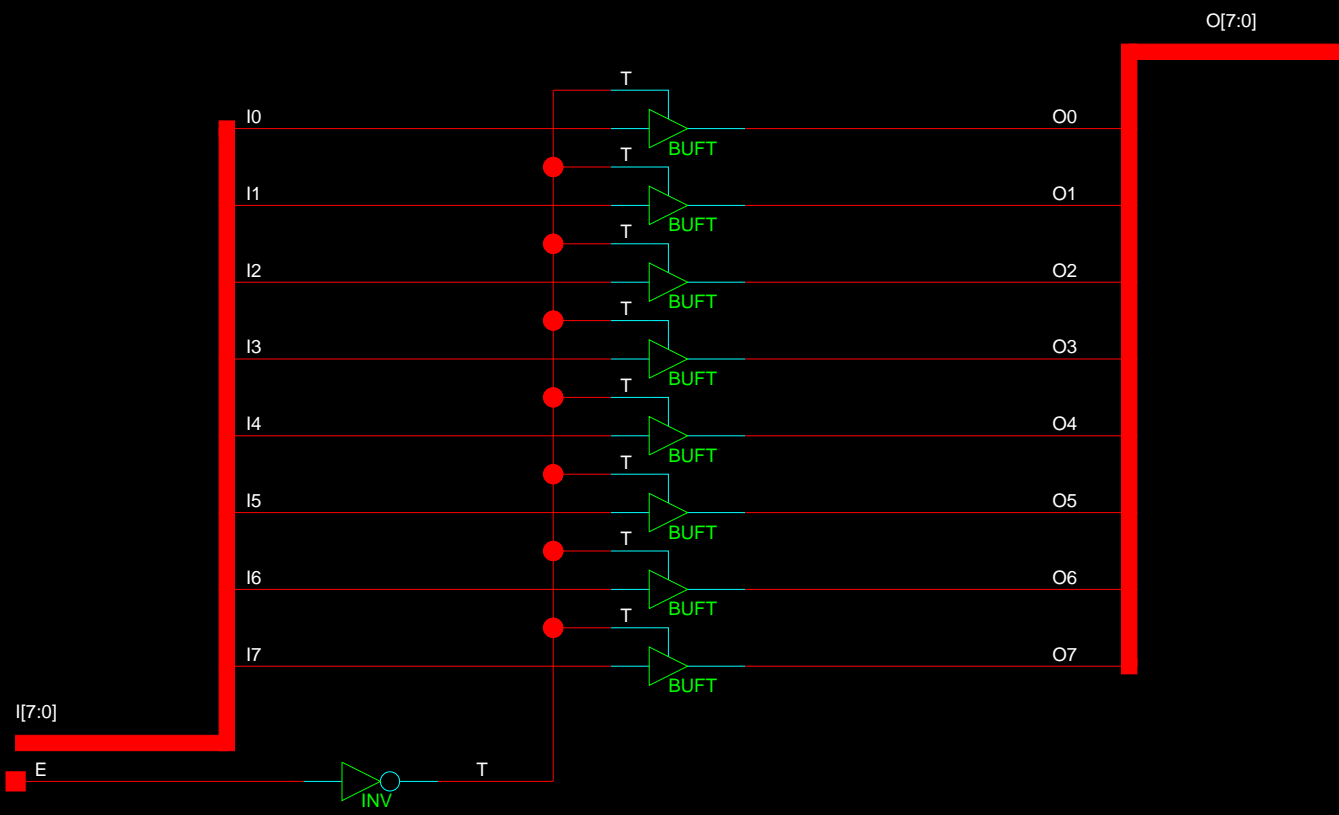


D[7:0]

- WE
- WCLK
- A0
- A1
- A2
- A3



Title:	XC4000E Family RAM16x8S Macro	
Comments:	16-Deep by 8-Wide Synchronous RAM	
Date:	30th December 1994	Ver: 1
Sheet Size:	B	Rev: A



Title: XC4000E Family BUFE8 Macro

Comments: 8-Bit 3-State Buffer
w/ an Active High Enable

Date: 23rd February 1995 Ver: 1

Sheet Size: A Rev: A

D

D

C

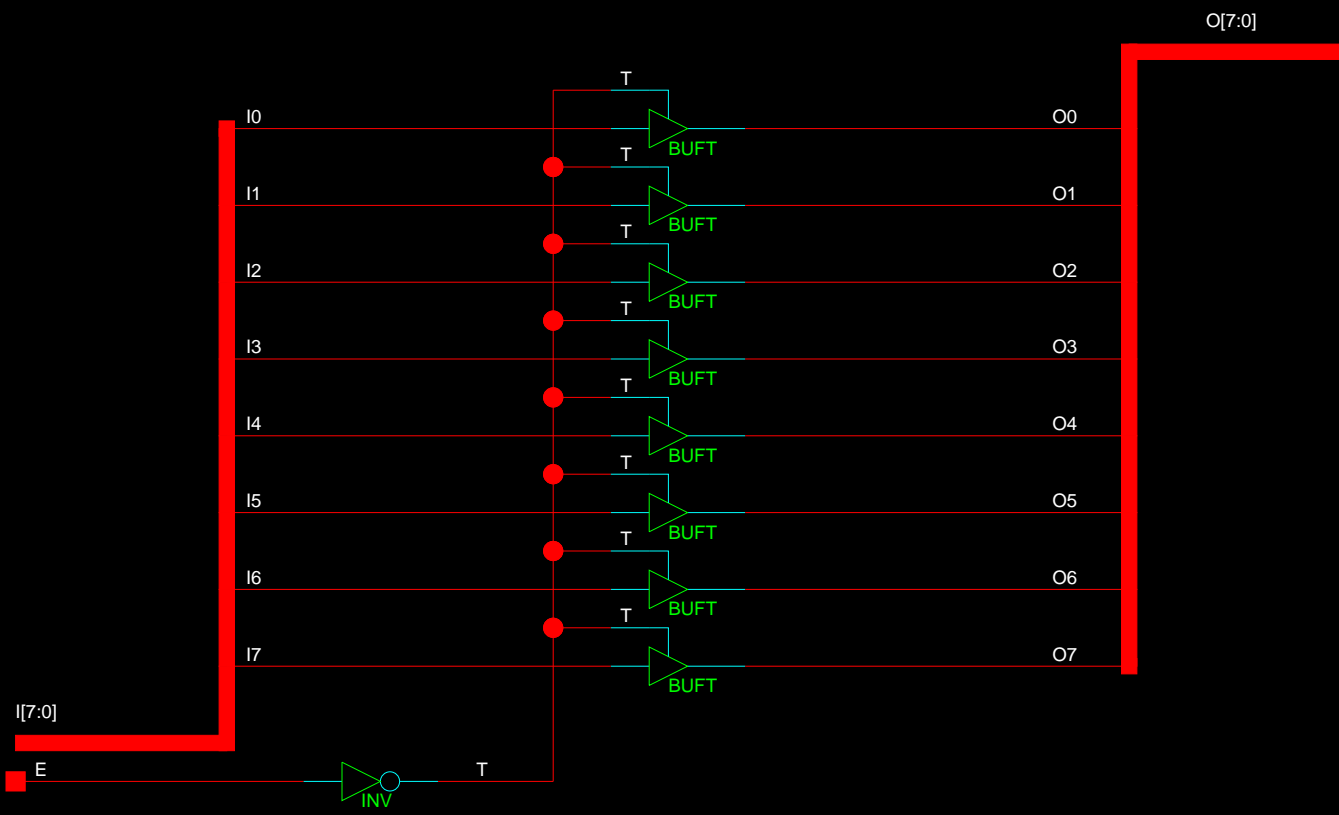
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B

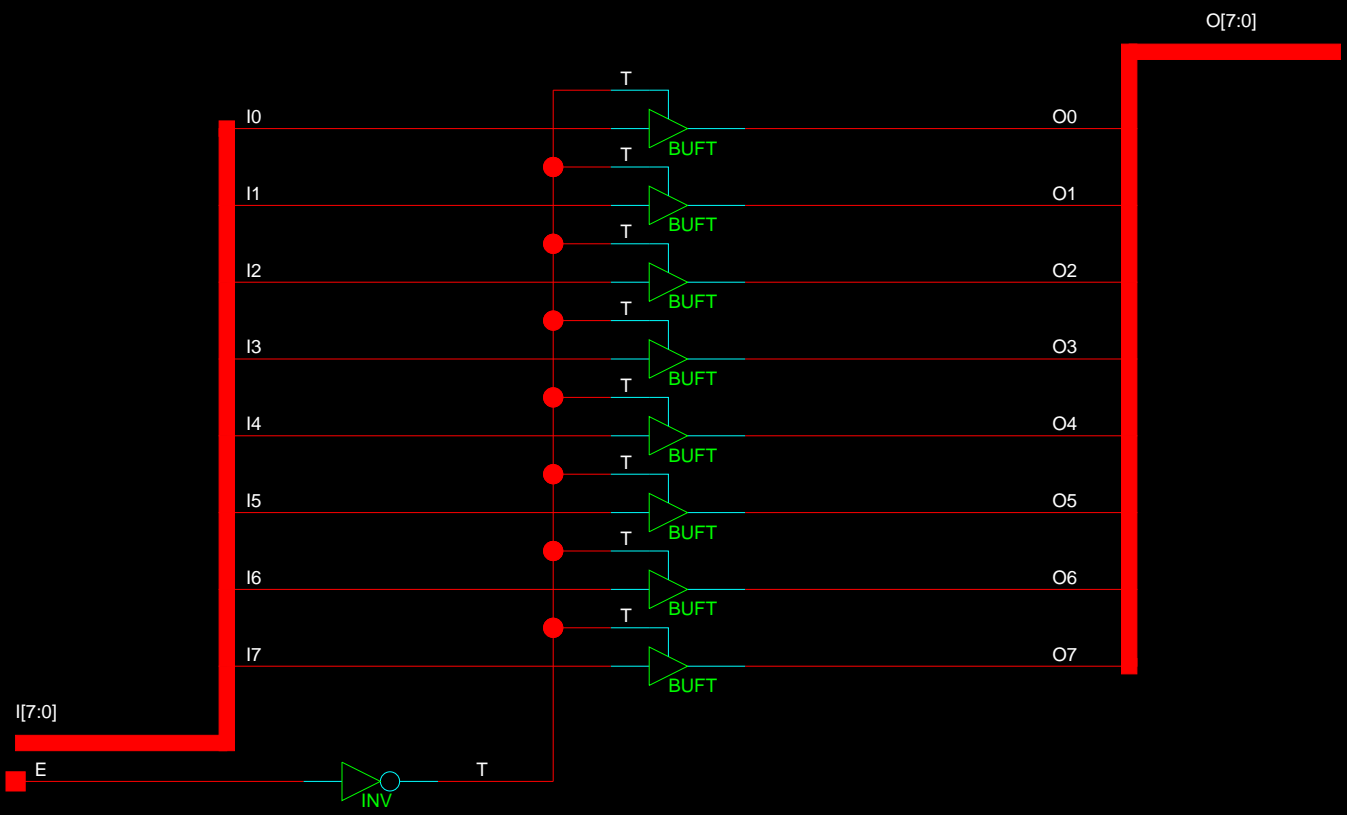
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A

A



Title:	XC4000E Family BUFE8 Macro	
Comments:	8-Bit 3-State Buffer w/ an Active High Enable	
Date:	23rd February 1995	Ver: 1
Sheet Size:	A	Rev: A

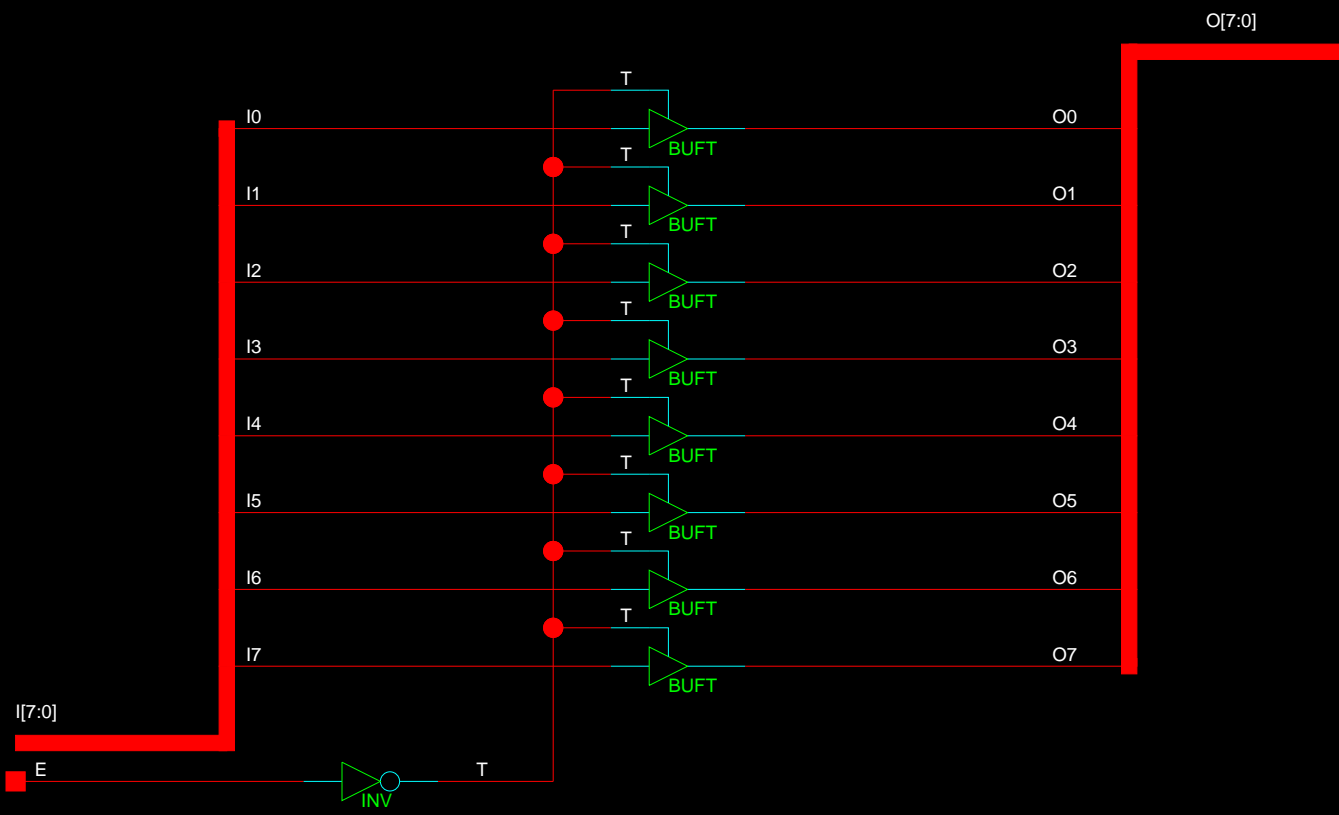


Title: XC4000E Family BUFE8 Macro

Comments: 8-Bit 3-State Buffer
w/ an Active High Enable

Date: 23rd February 1995 Ver: 1

Sheet Size: A Rev: A

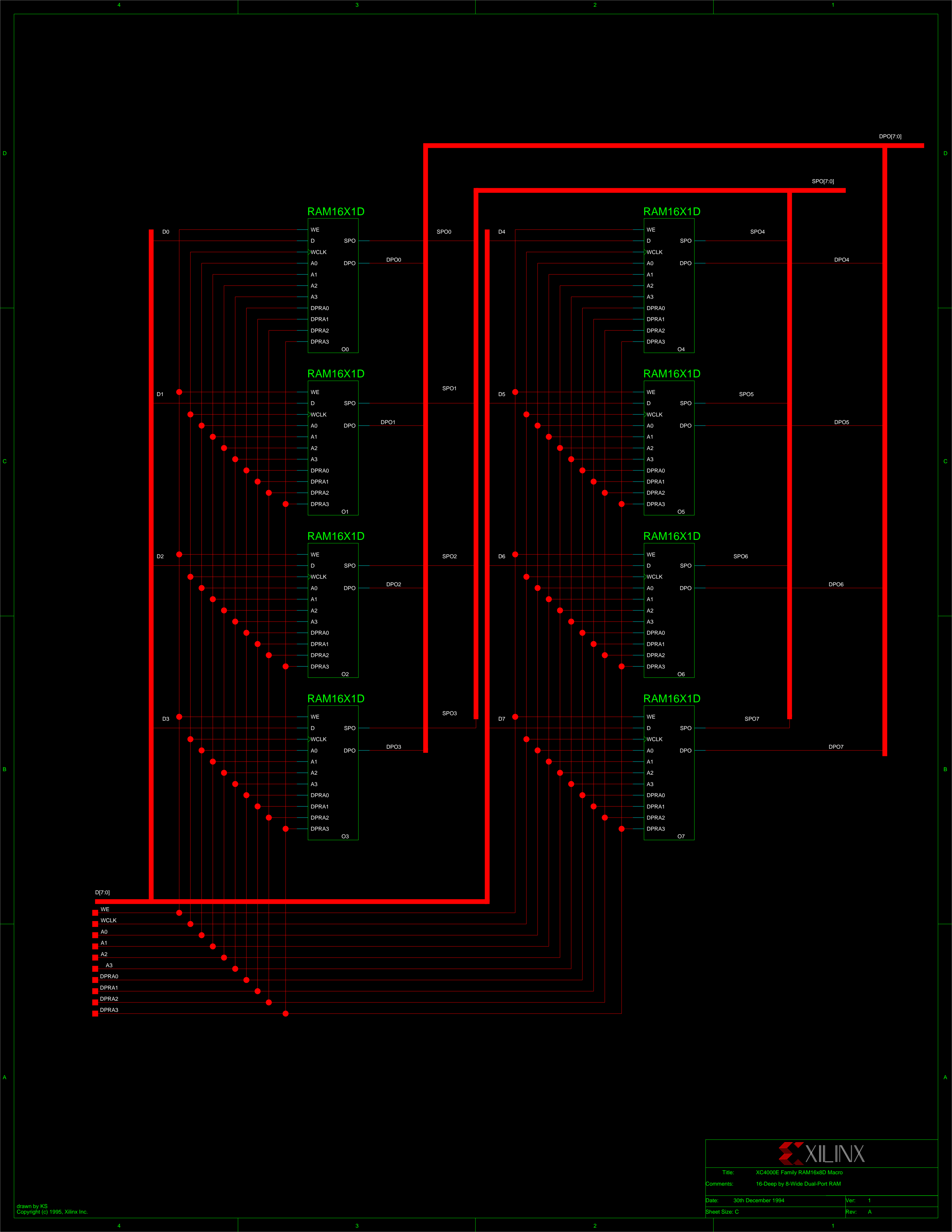


Title: XC4000E Family BUFE8 Macro

Comments: 8-Bit 3-State Buffer
w/ an Active High Enable

Date: 23rd February 1995 Ver: 1

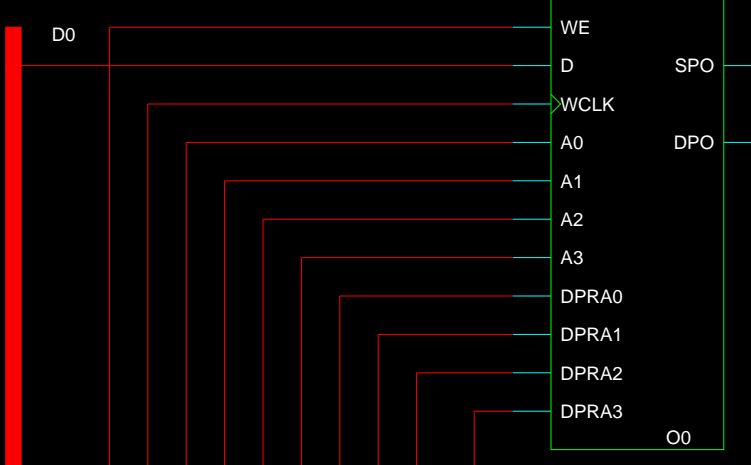
Sheet Size: A Rev: A



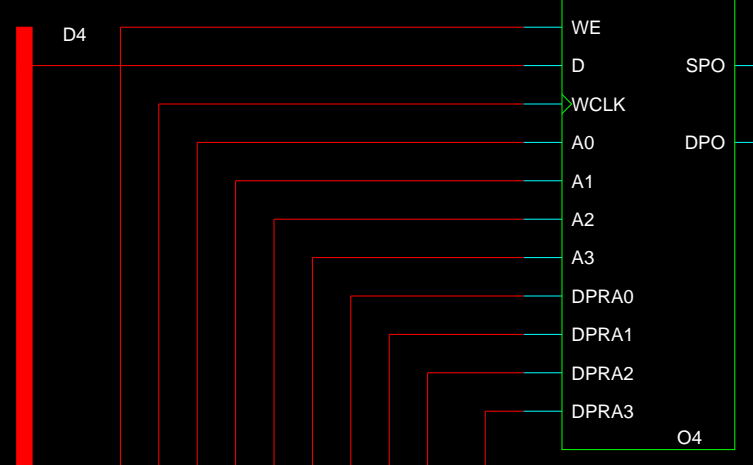
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SPO[7:0]

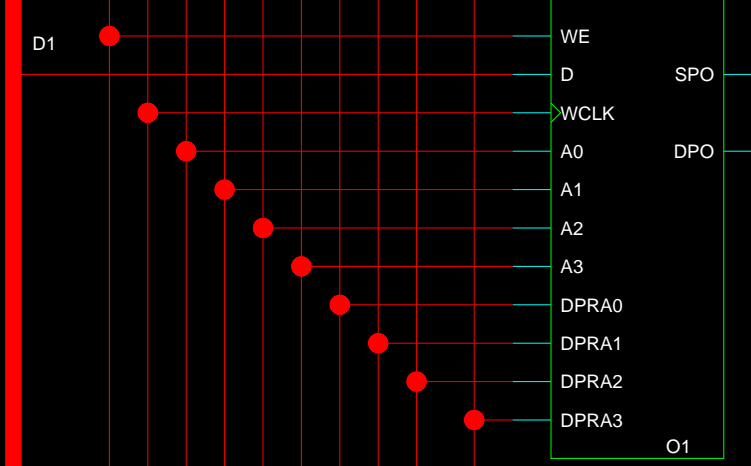
RAM16X1D



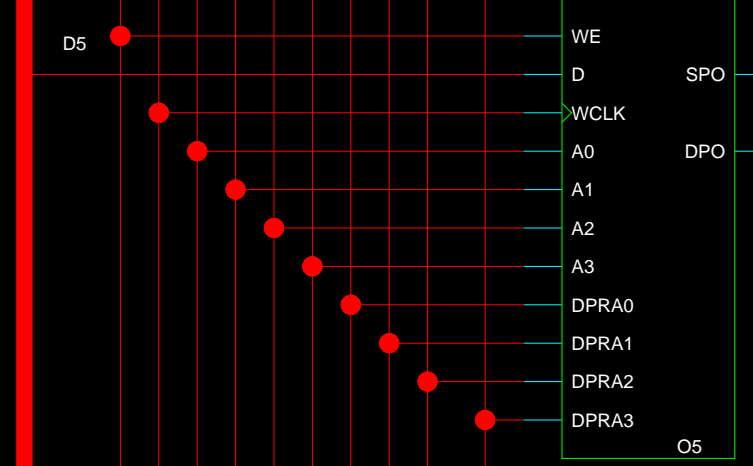
RAM16X1D



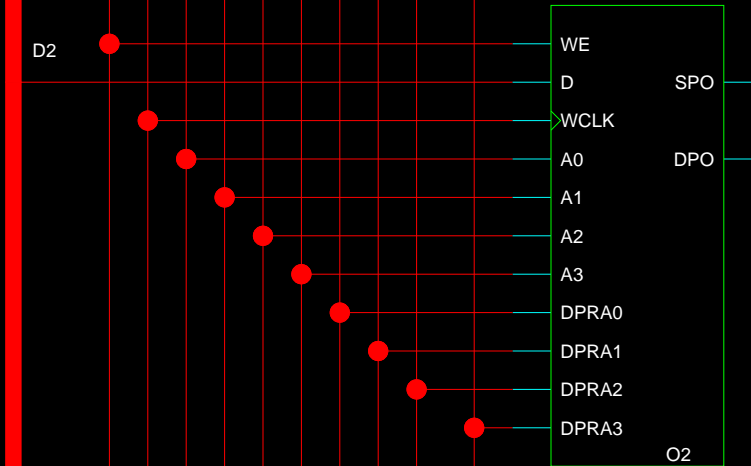
RAM16X1D



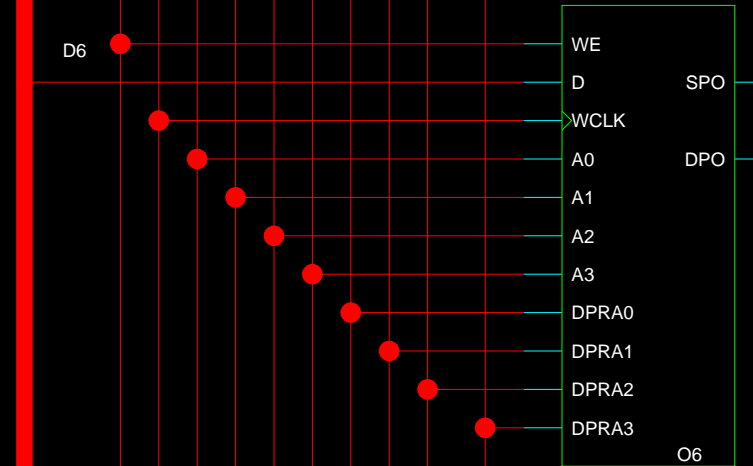
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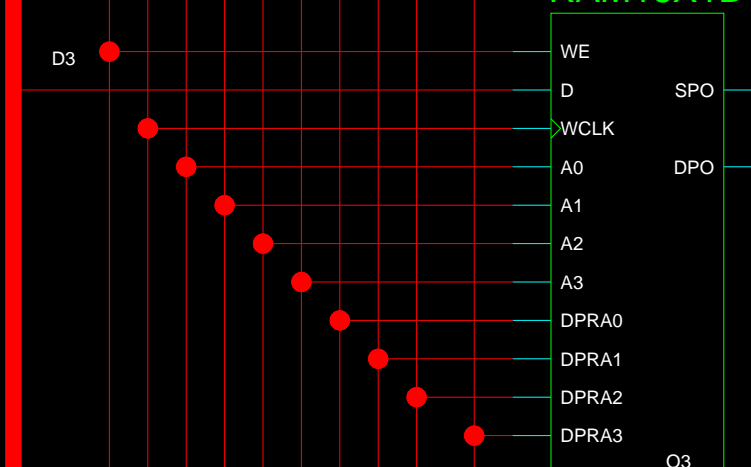
RAM16X1D



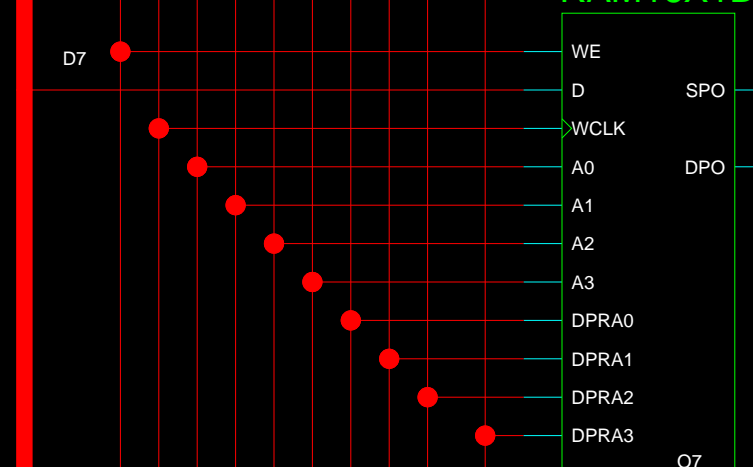
RAM16X1D



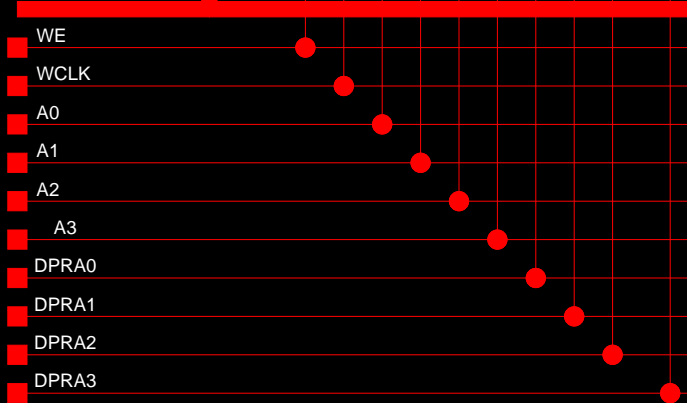
RAM16X1D



RAM16X1D



D[7:0]



Title: XC4000E Family RAM16x8D Macro	
Comments: 16-Deep by 8-Wide Dual-Port RAM	
Date: 30th December 1994	Ver: 1
Sheet Size: C	Rev: A



Title: XBLOX Family BUS_IF08

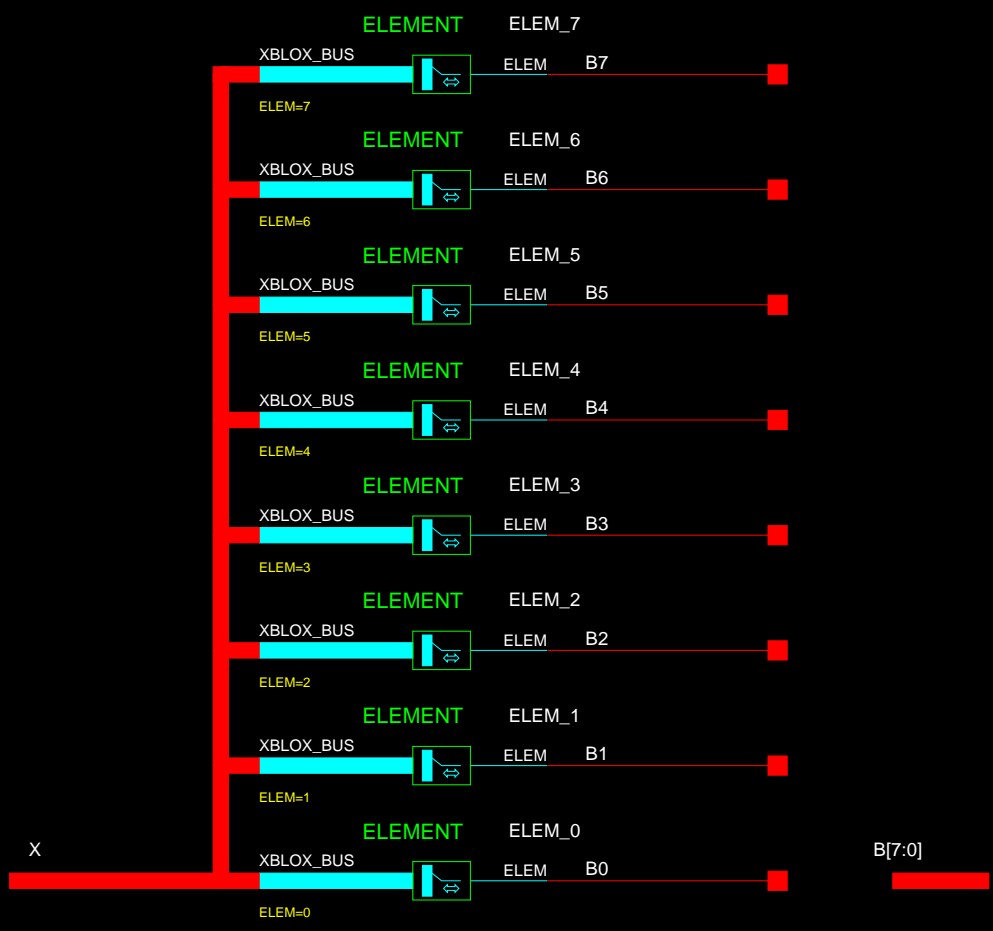
Comments:

Date: 7/21/93

Ver: 1

Sheet Size: A

Rev: A



Title: XBLOX Family BUS_IF08

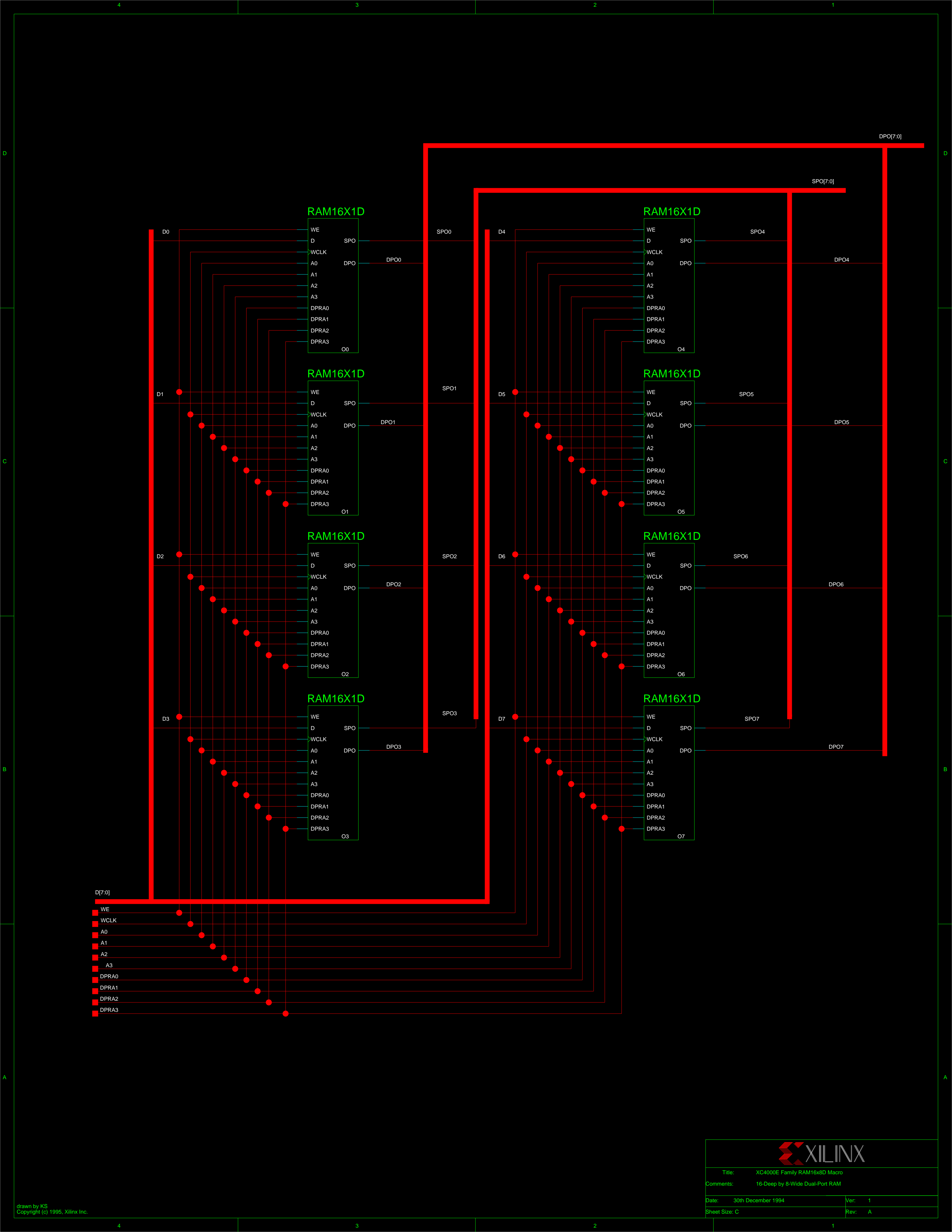
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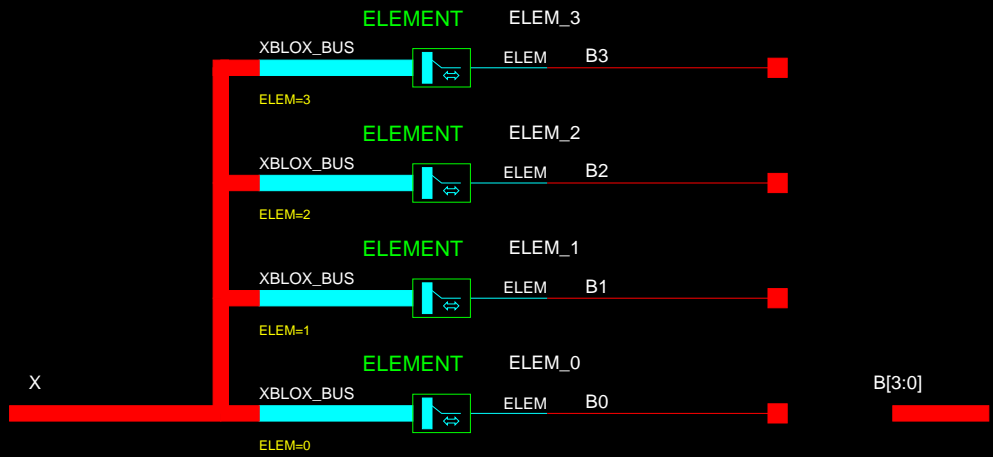
Date: 7/21/93

Ver: 1

Sheet Size: A

Rev: A





Title: XBLOX Family BUS_IF04

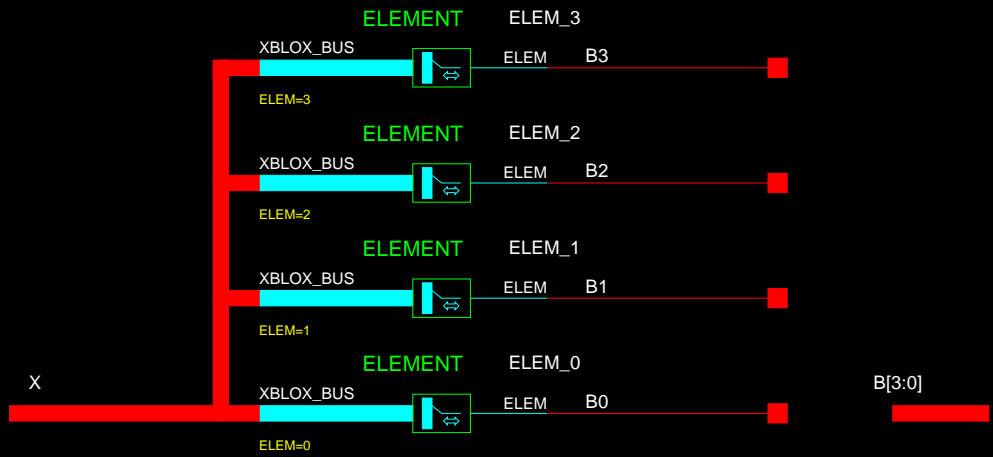
Comments:

Date: 7/21/93

Ver: 1

Sheet Size: A

Rev: A



Title: XBLOX Family BUS_IF04

Comments:

Date: 7/21/93

Ver: 1

Sheet Size: A

Rev: A