DICENTRA SCHEMATICS

Central Processor

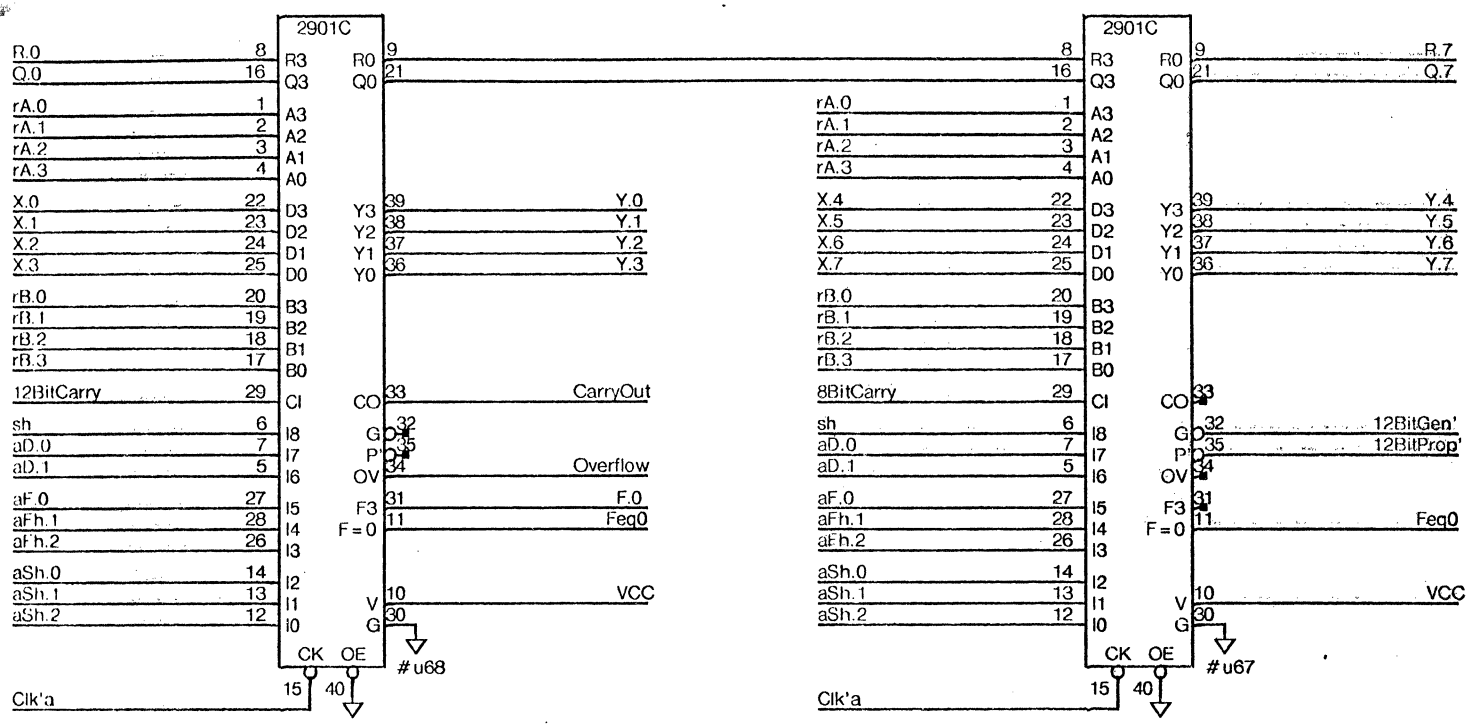
Table of contents

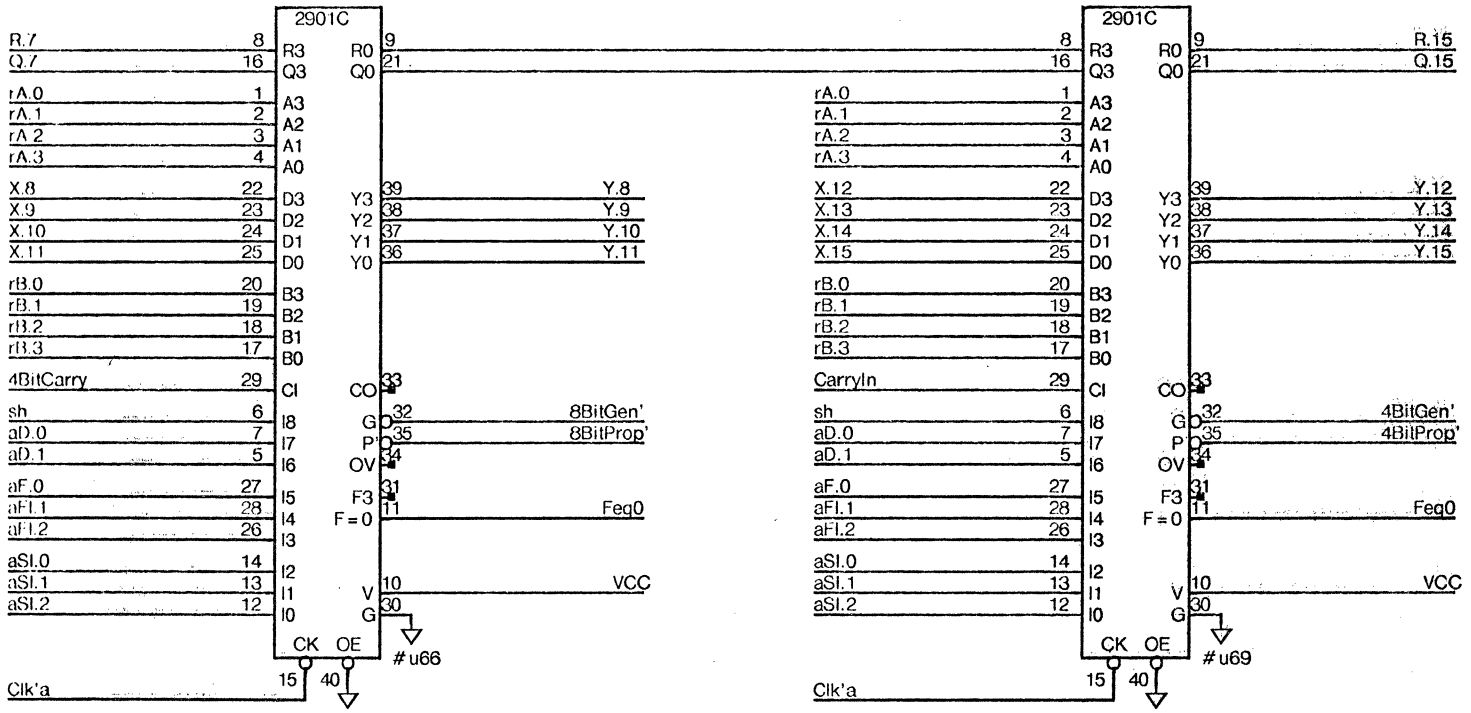
Butler Lampson designed this Mesa processor and named it WILDFLOWER.
Robert Garner implemented a version for Star and named it DANDELION.
David Boggs repackaged it minus tasking plus a Multibus and named it DICENTRA.

These drawings use the following [SIL] User.cm parameters:

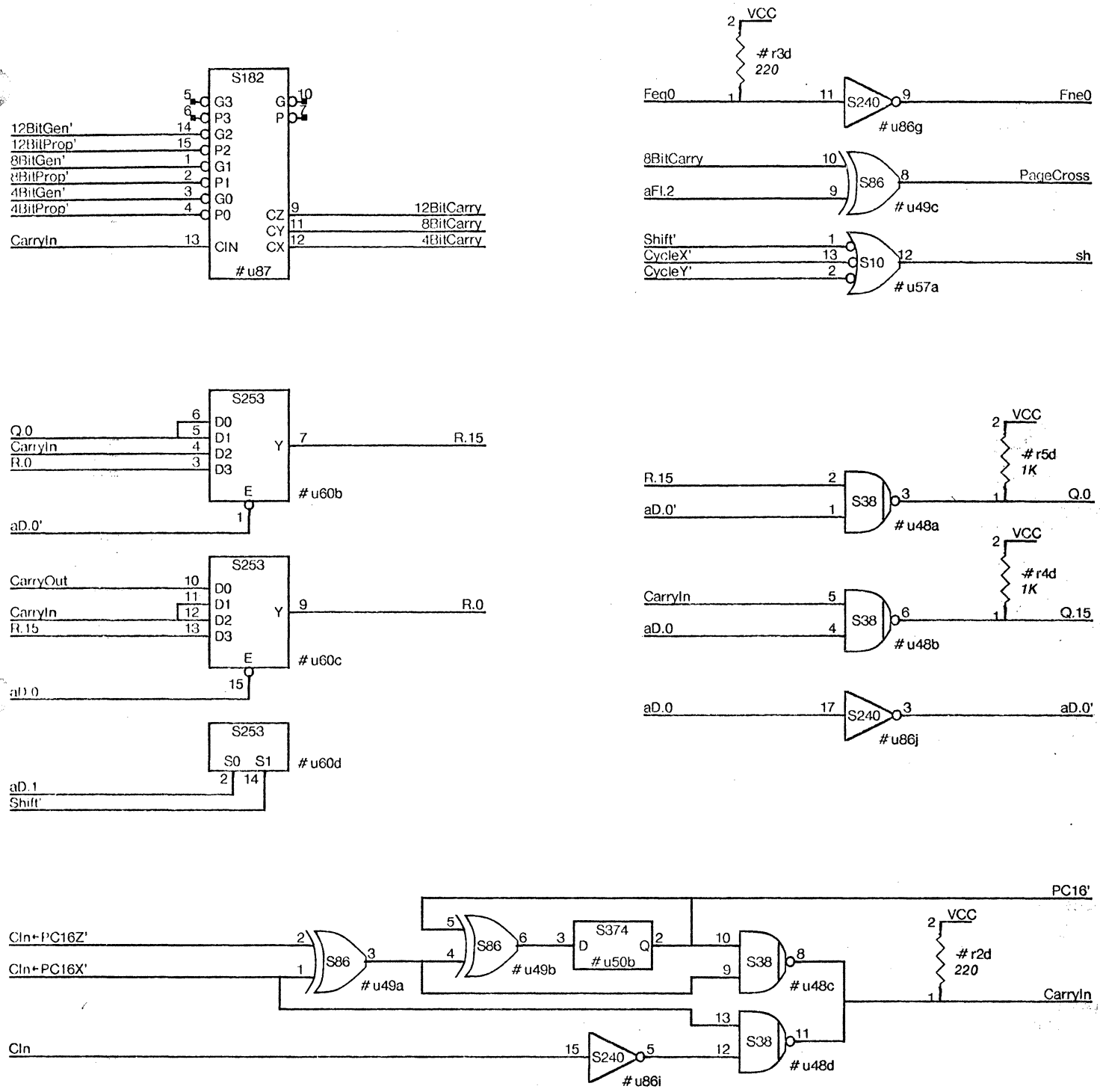
0: Helvetica10
1: Helvetica7
2: Template64
3: Gates32
5: Dicentra.lb5
6: Dicentra.lb6
7: Dicentra.lb7
8: Dicentra.lb8
A: Dicentra.Analyze
Y: 712

All files are kept on [Indigo]<Dicentra>

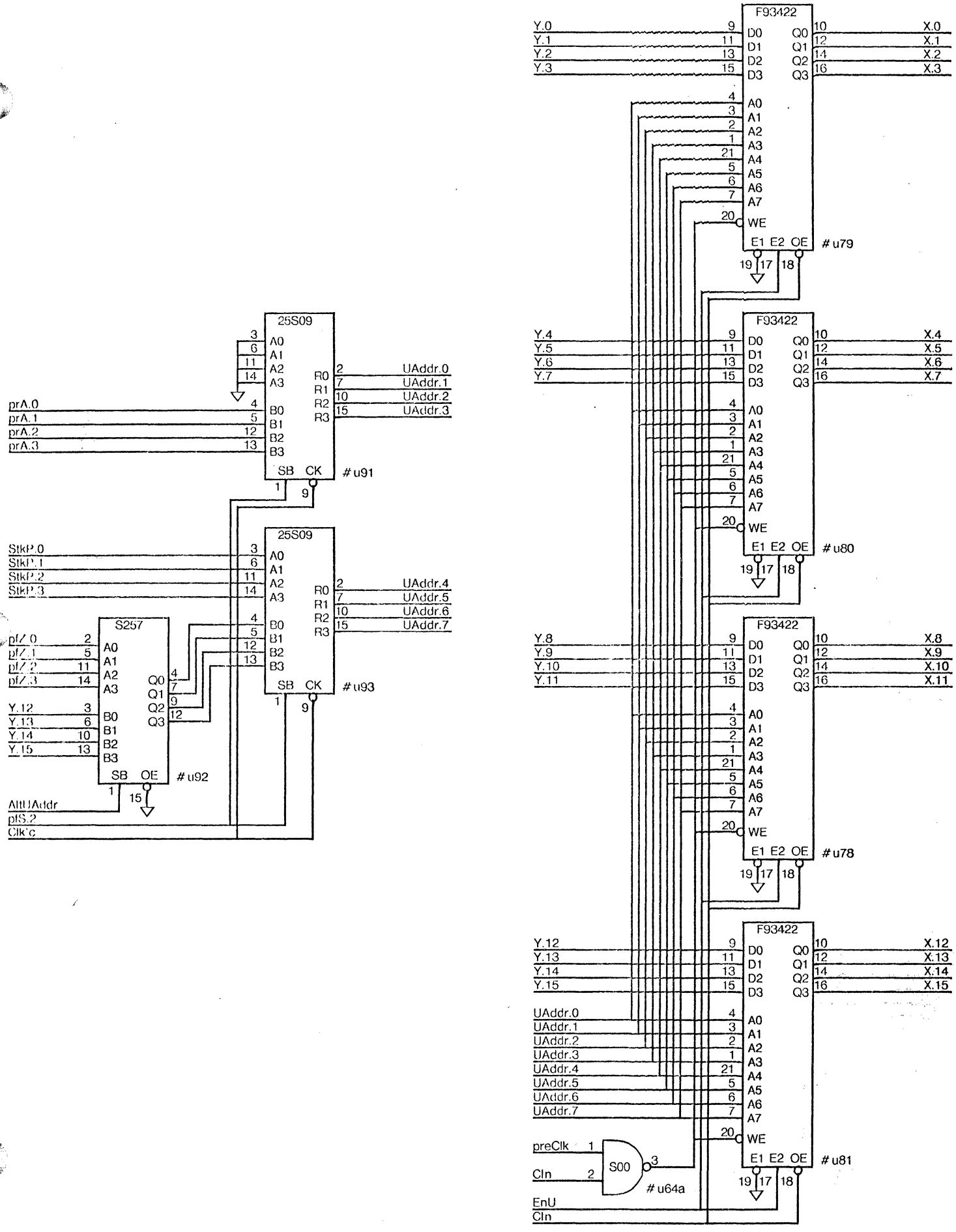




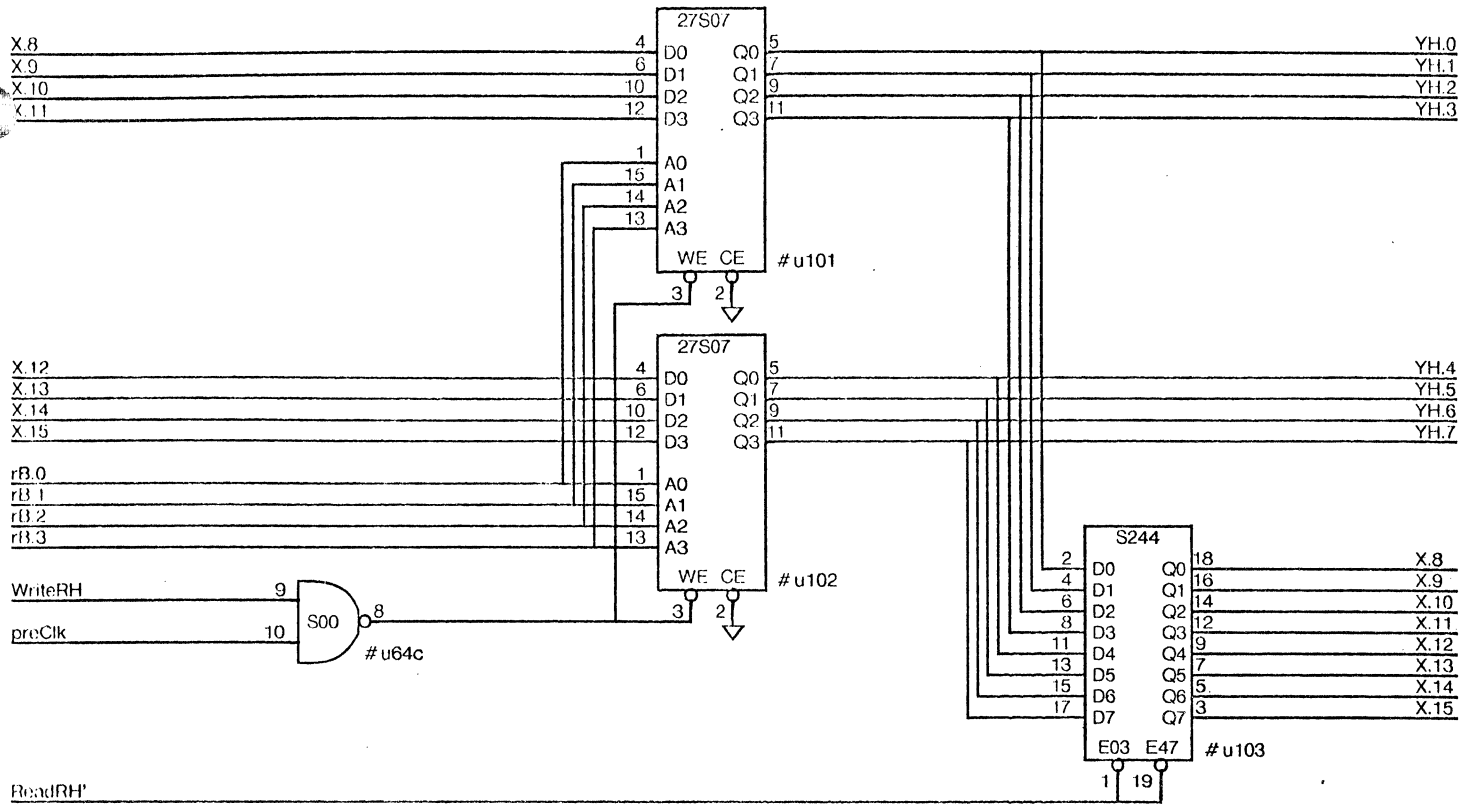
XEROX PARC	Project	Title	File	Designer	Rev	Date	Page
	Dicentra	Arithmetic Logic Units	DCP01.sil	David Boggs	I	4/22/84	01

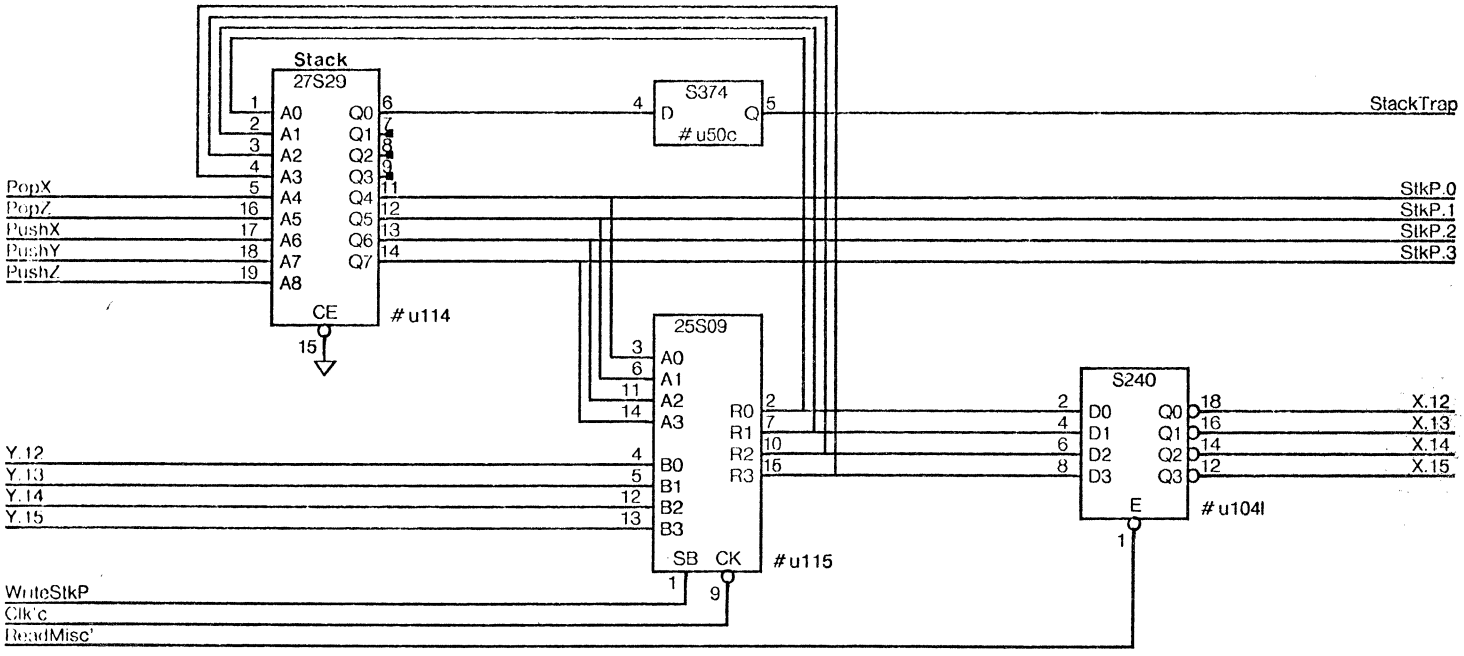


XEROX PARC	Project	Title	File	Designer	Rev	Date	Page
	Dicentra	ALU Carry & Shift Ends	DCP02.sil	David Boggs	I	4/22/84	02

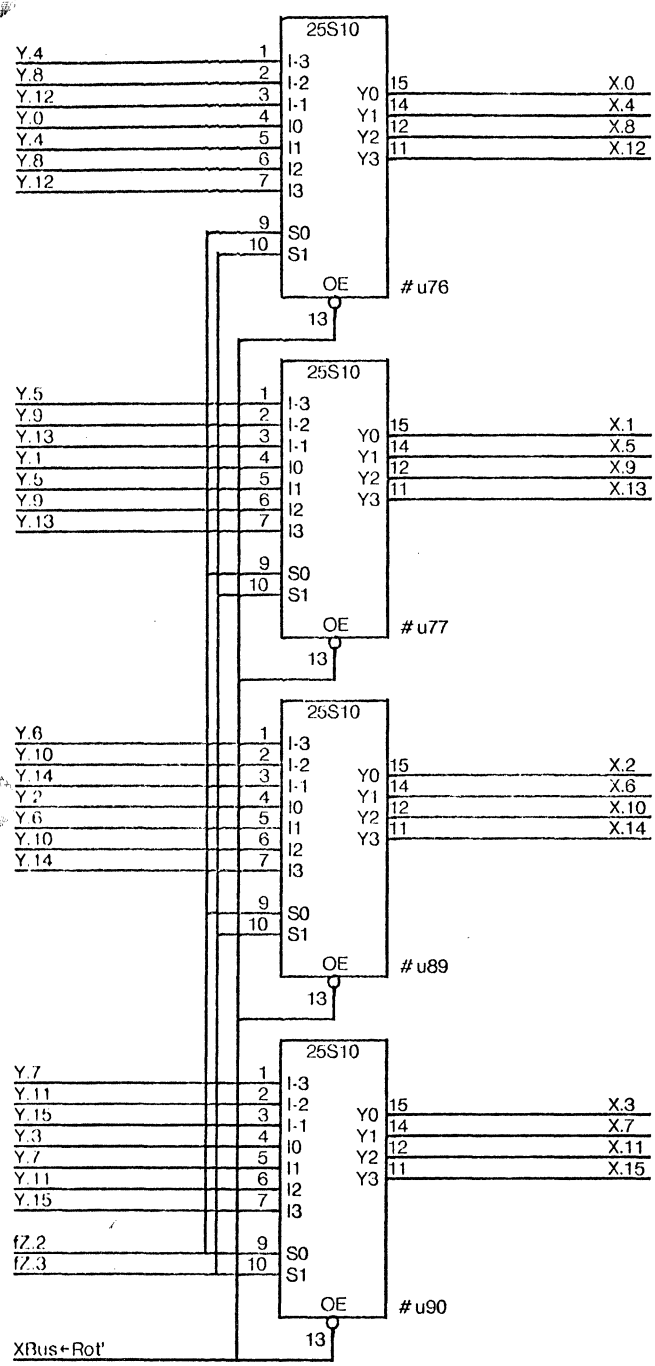


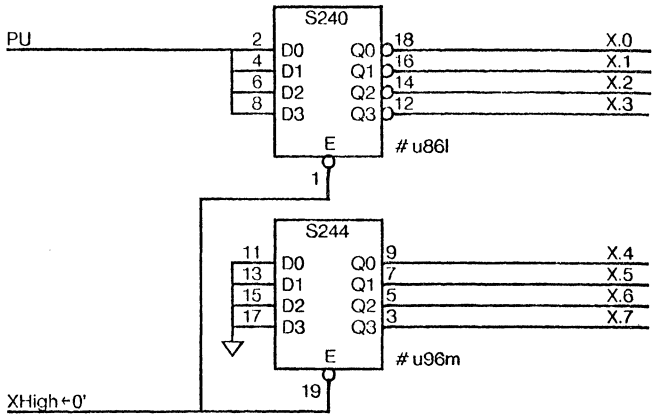
XEROX PARC	Project	Title	File	Designer	Rev	Date	Page
	Dicentra	U Registers	DCP03.sil	David Boggs	I	6/20/83	03

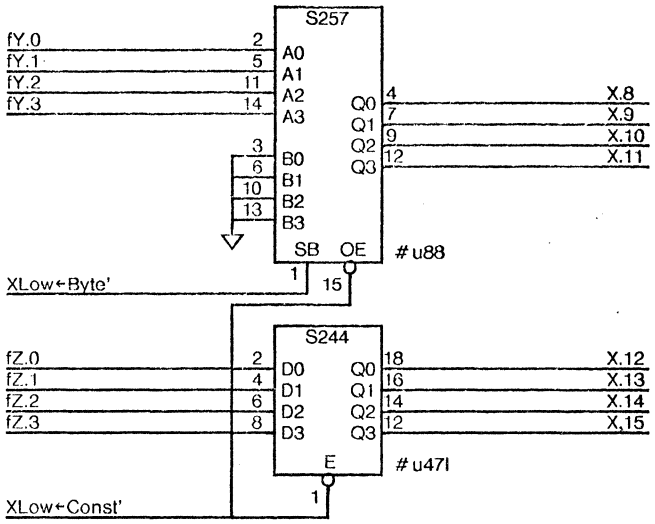




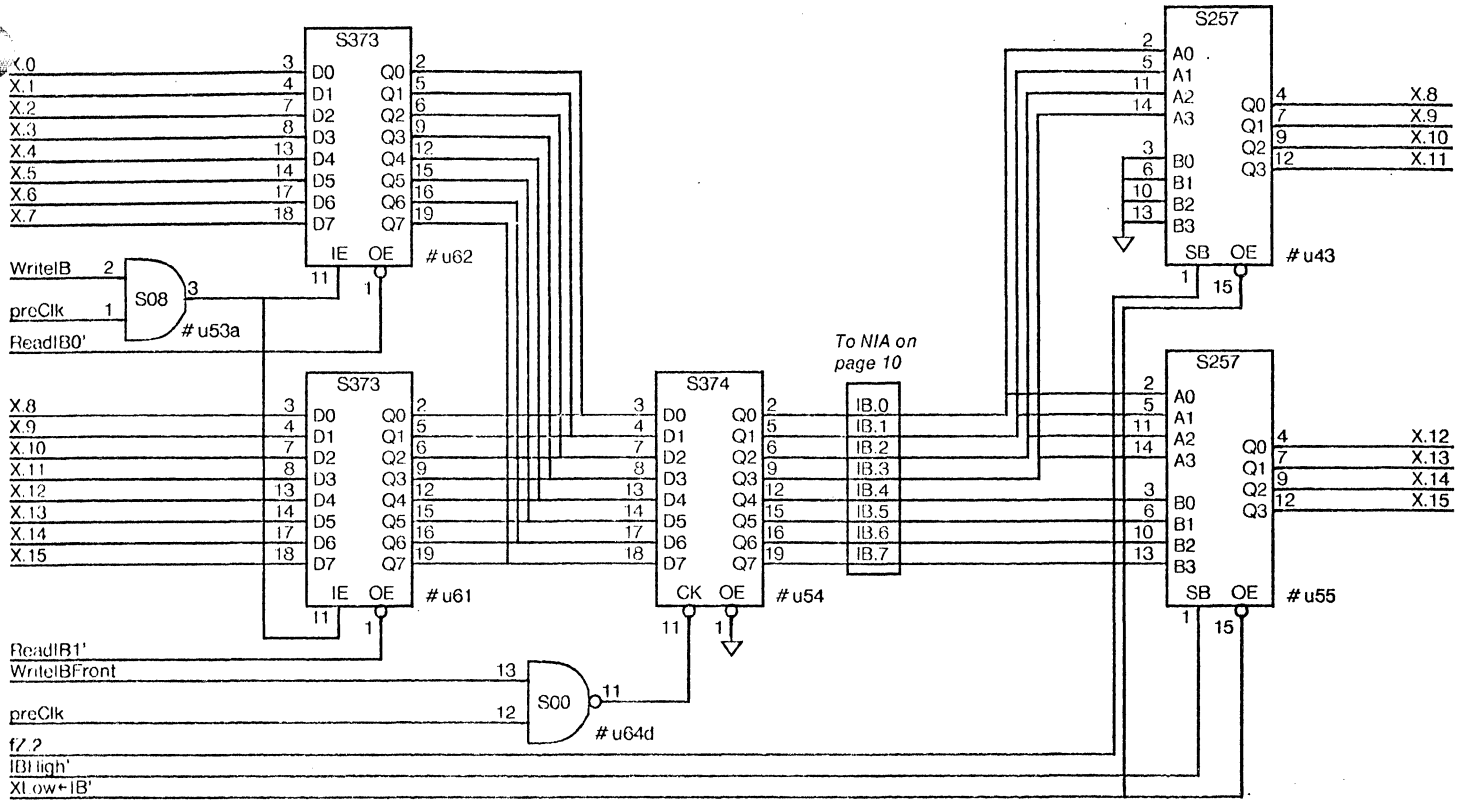
XEROX PARC	Project	Title	File	Designer	Rev	Date	Page
	Dicentra	RH Registers & StackP	DCP04.sil	David Boggs	I	6/29/83	04

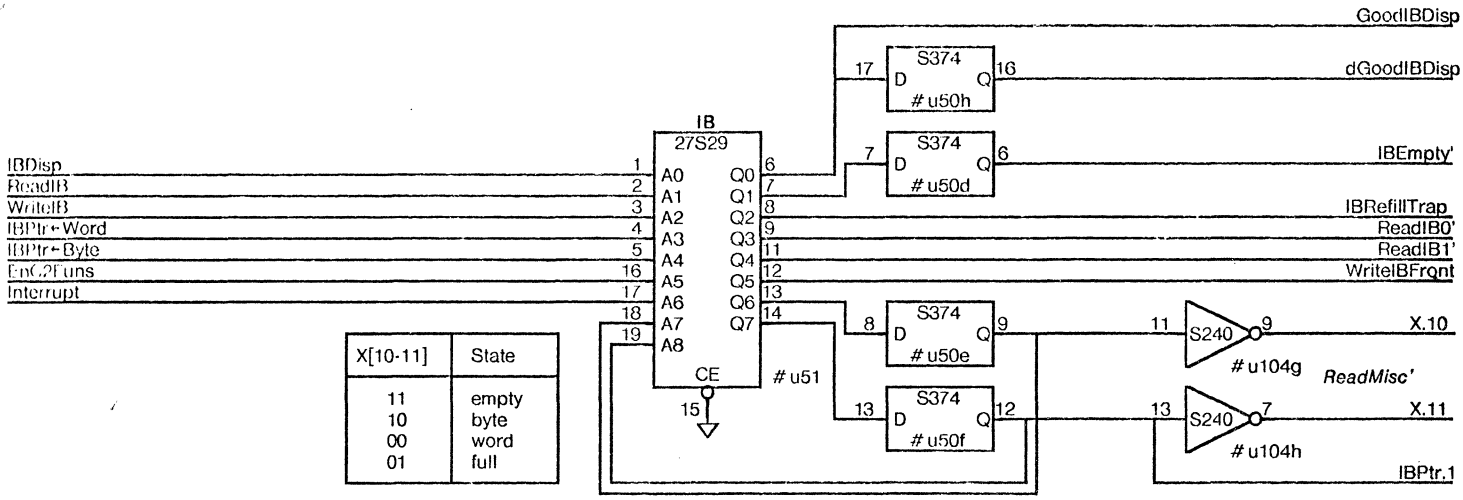


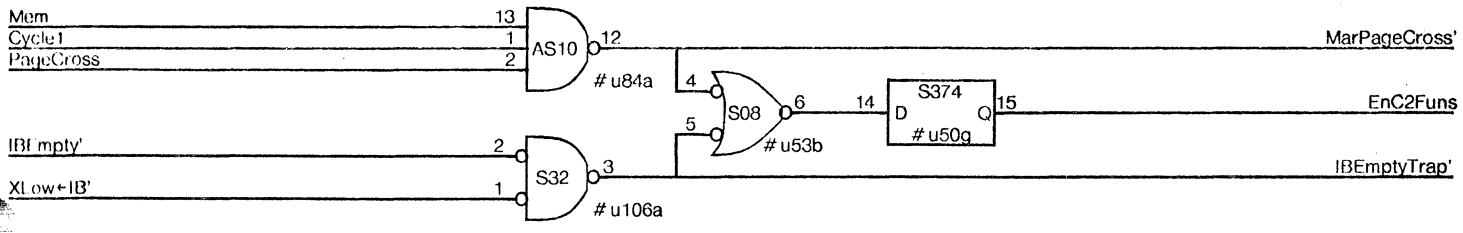




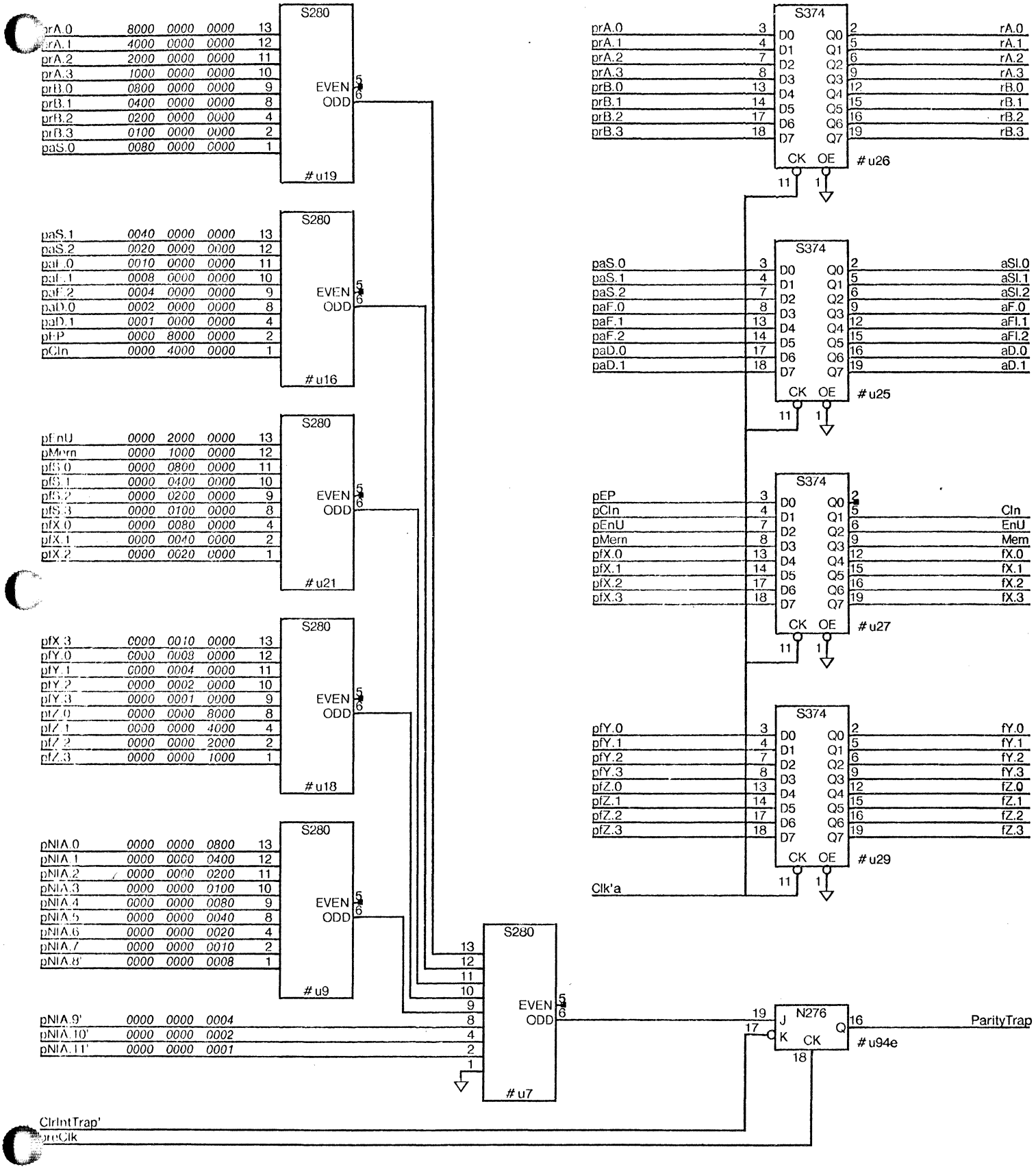
XEROX PARC	Project: Dicentra	Title: Rotator & Constants	File: DCP05.sil	Designer: David Boggs	Rev: I	Date: 6/20/83	Page: 05



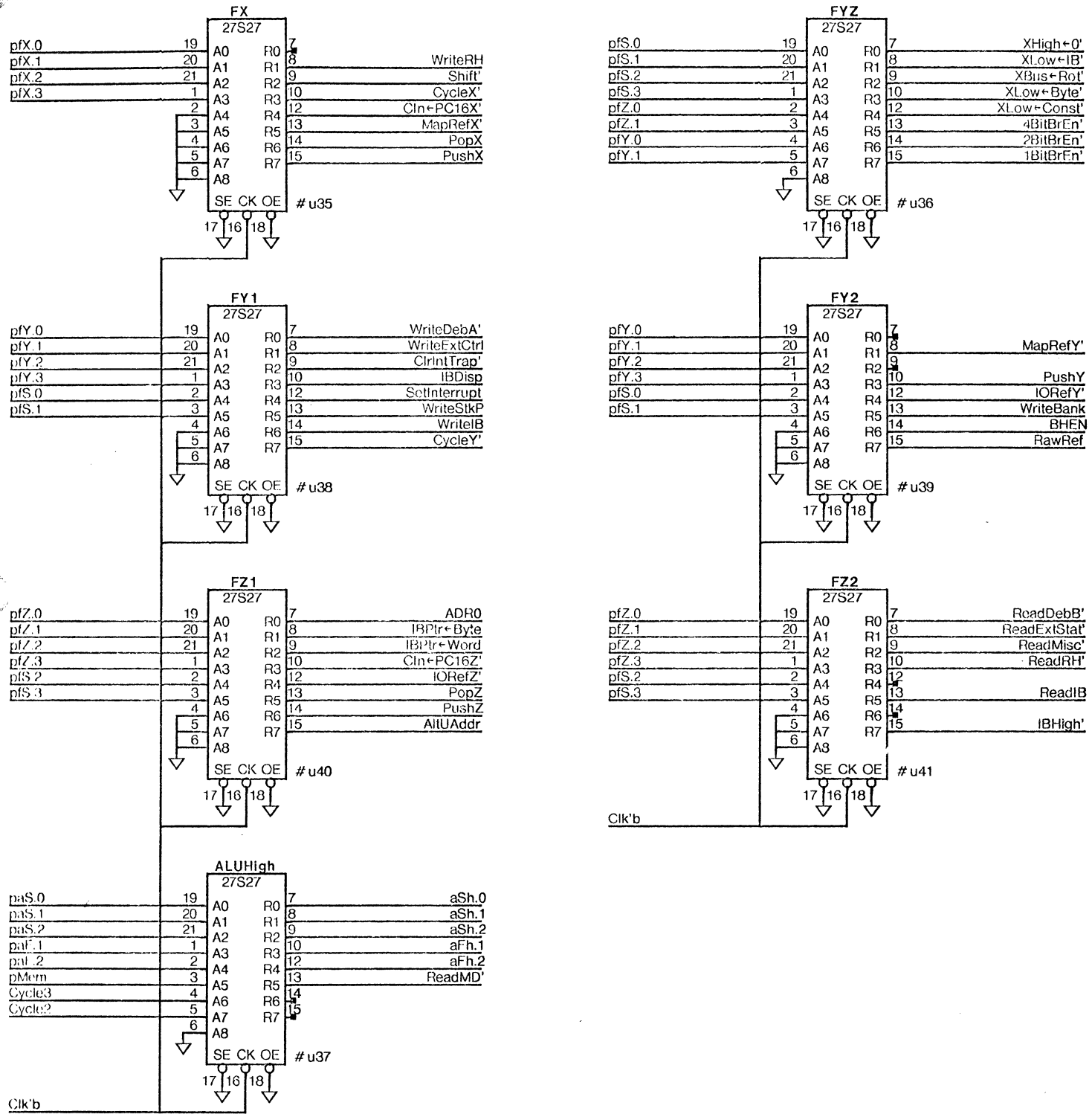




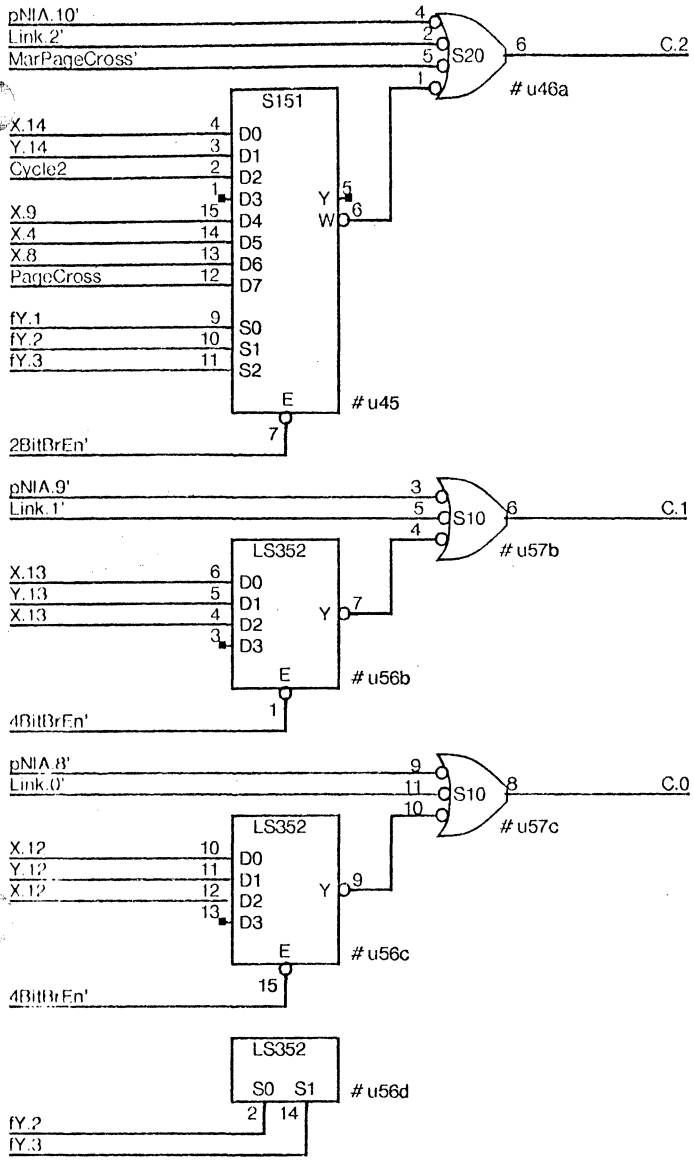
XEROX PARC	Project	Title	File	Designer	Rev	Date	Page
	Dicentra	Instruction Buffer	DCP06.sil	Boggs/Murray	I	3/16/85	06

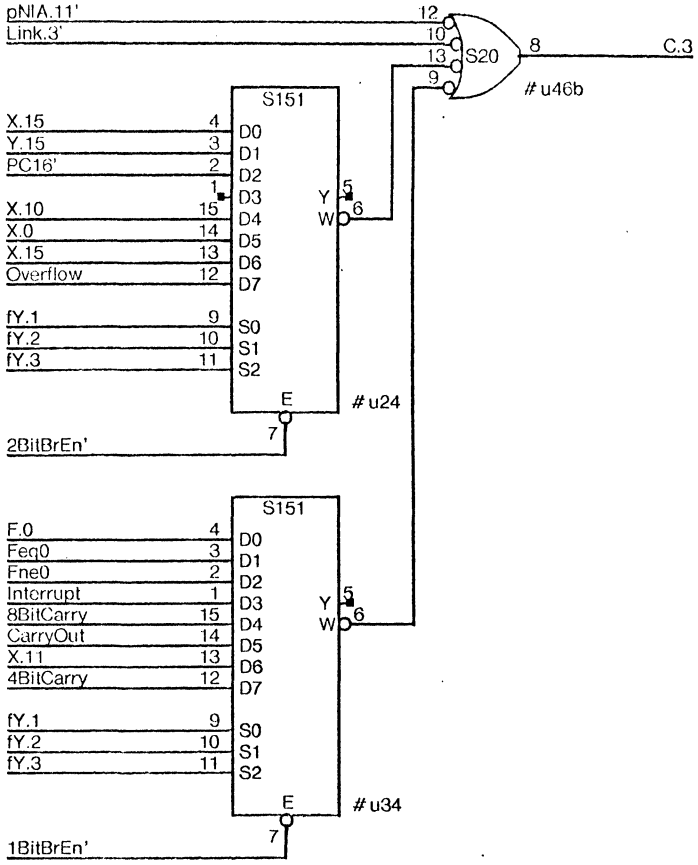


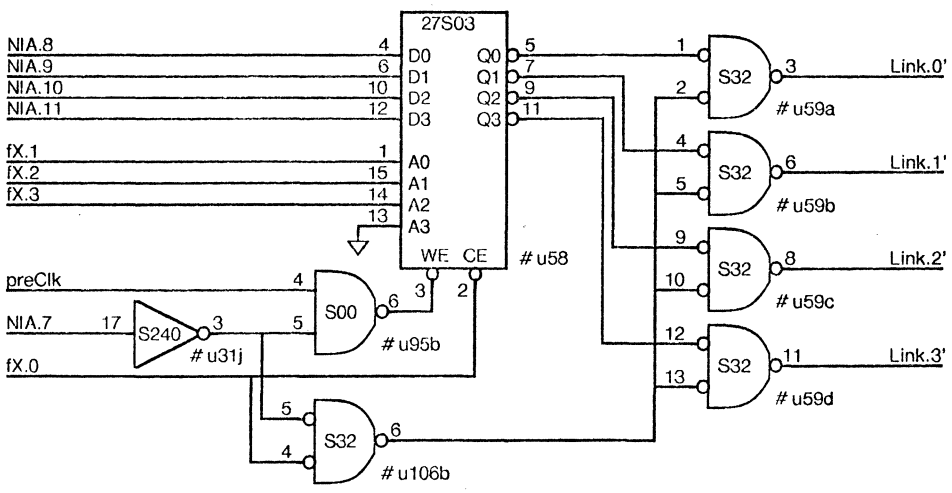
XEROX PARC	Project	Title	File	Designer	Rev	Date	Page
	Dicentra	Raw MIR	DCP07.sil	Boggs/Murray	I	3/16/85	07



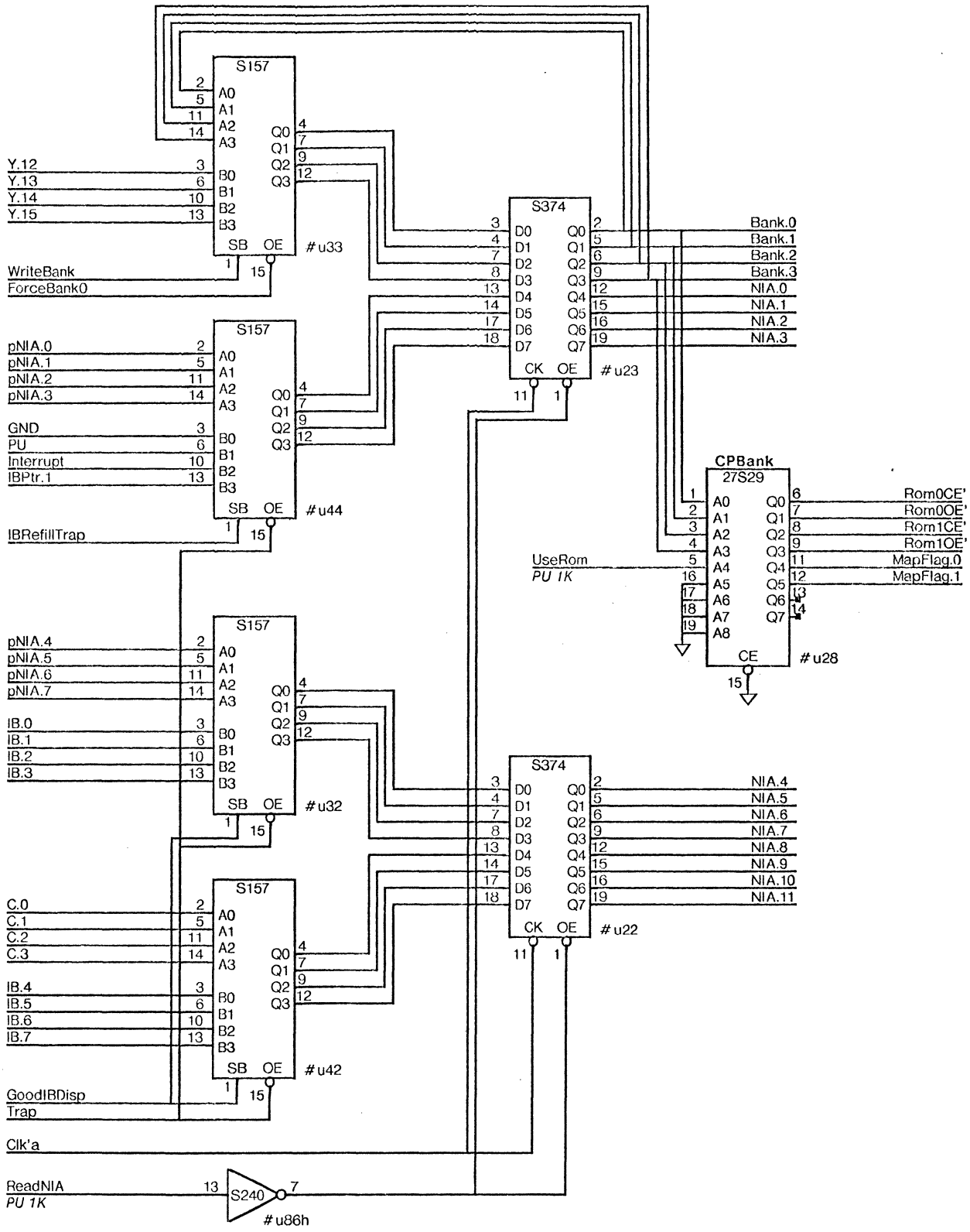
XEROX PARC	Project	Title	File	Designer	Rev	Date	Page
	Dicentra	Decoded MIR	DCP08.sil	David Boggs	I	6/29/83	08



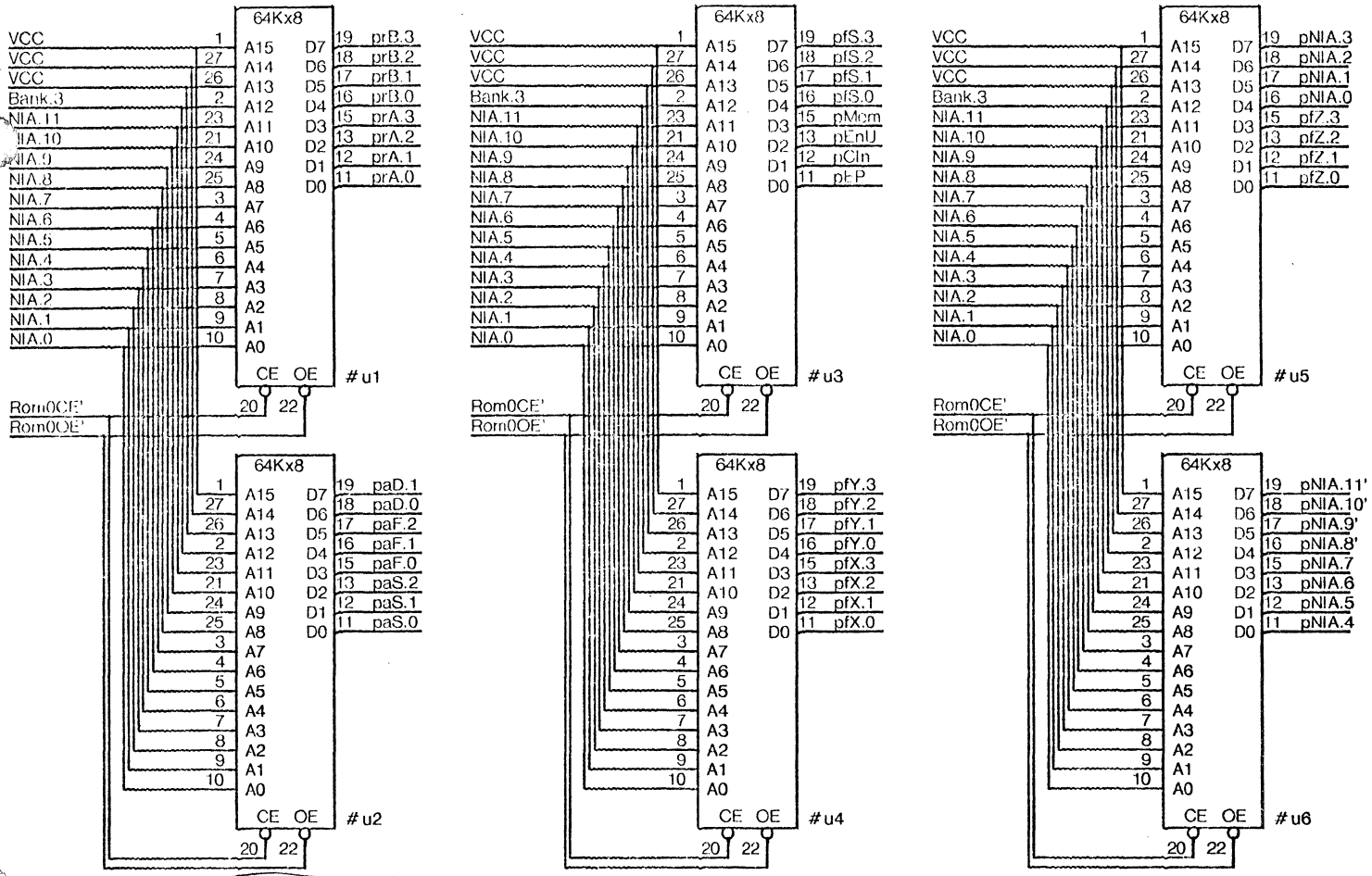




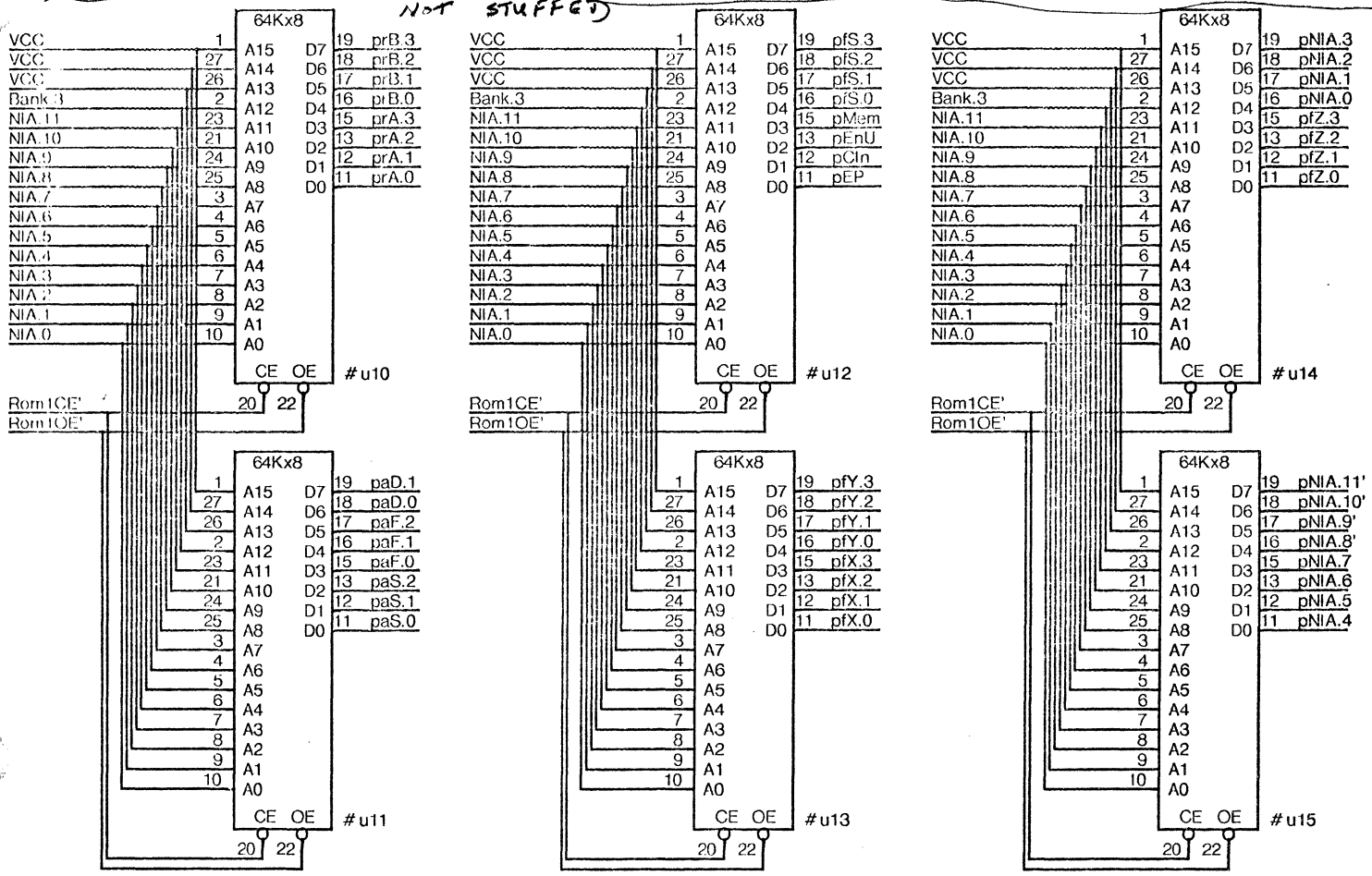
XEROX PARC	Project	Title	File	Designer	Rev	Date	Page
	Dicentra	Branching & Link Register	DCP09.sil	David Boggs	I	4/22/84	09



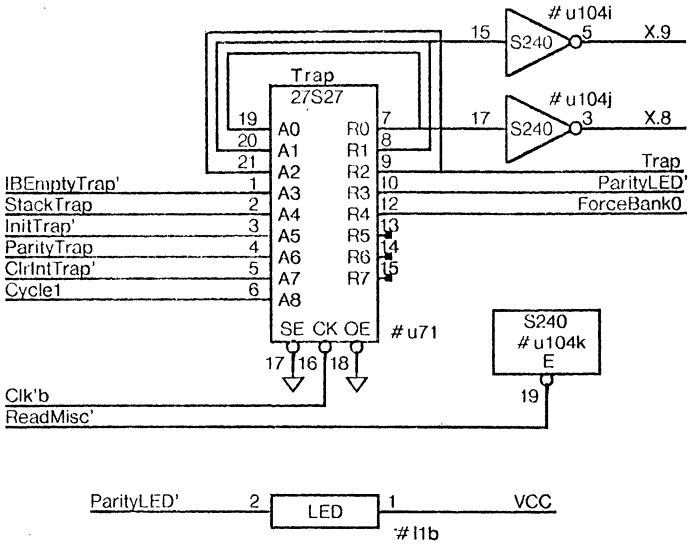
XEROX PARC	Project	Drawing	File	Designer	Rev	Date	Page
	Dicentra	Next Address Register	DCP10.sil	Boggs/Murray	I	3/16/85	10



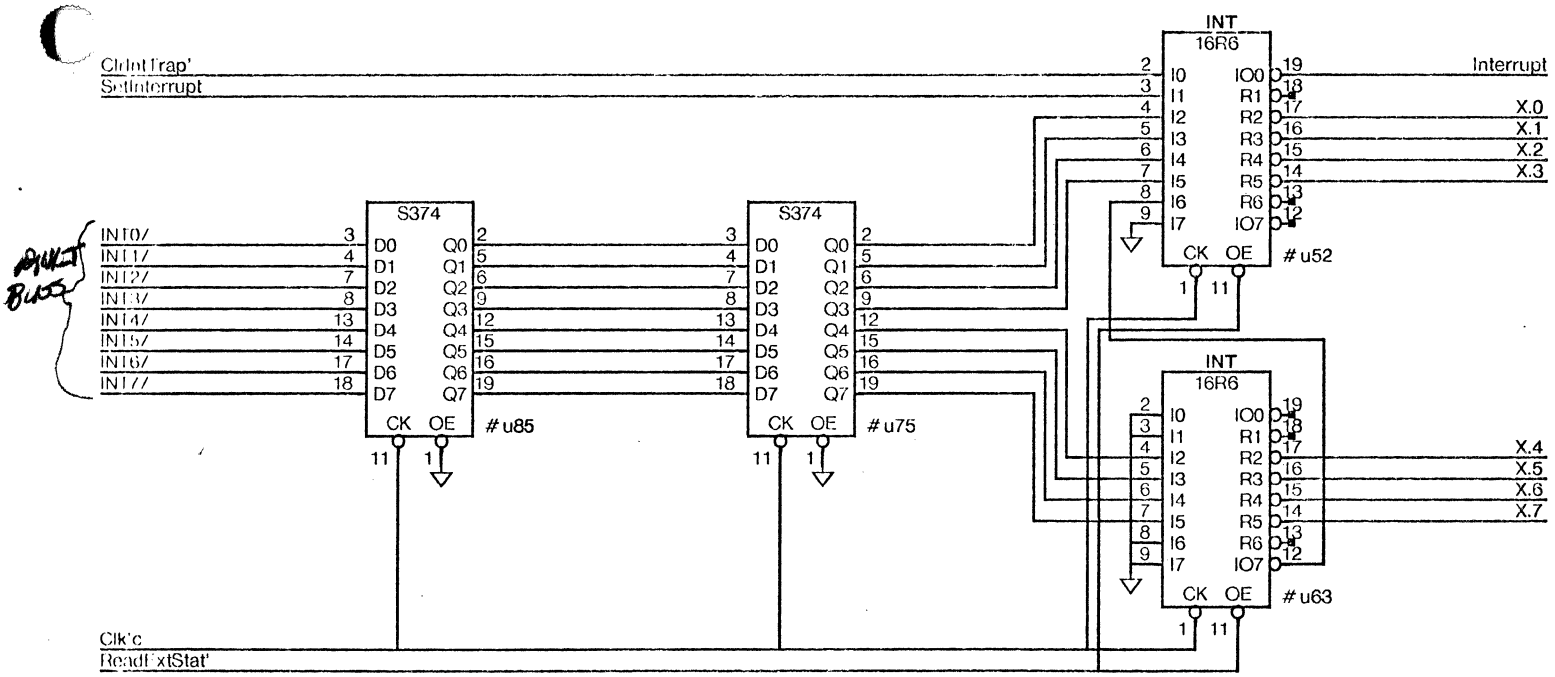
NOT STUFFED



XEROX PARC	Project	Title	File	Designer	Rev	Date	Page
	Dicentra	Prom Control Store	DCP11.sil	David Boggs	I	4/22/84	11



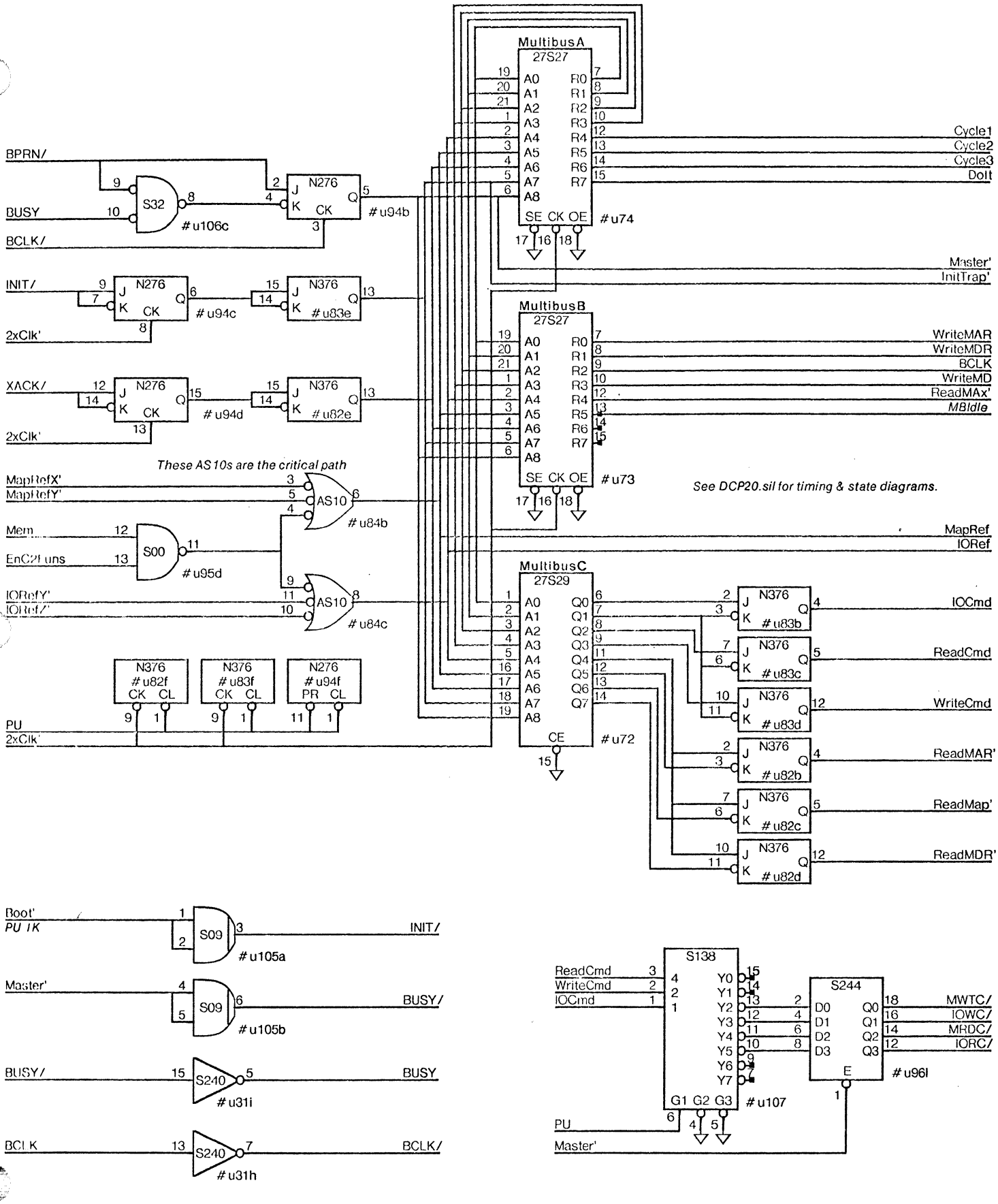
X[8:9]	Trap
0	CSParity
1	Init
2	Stack
3	IBEmpty



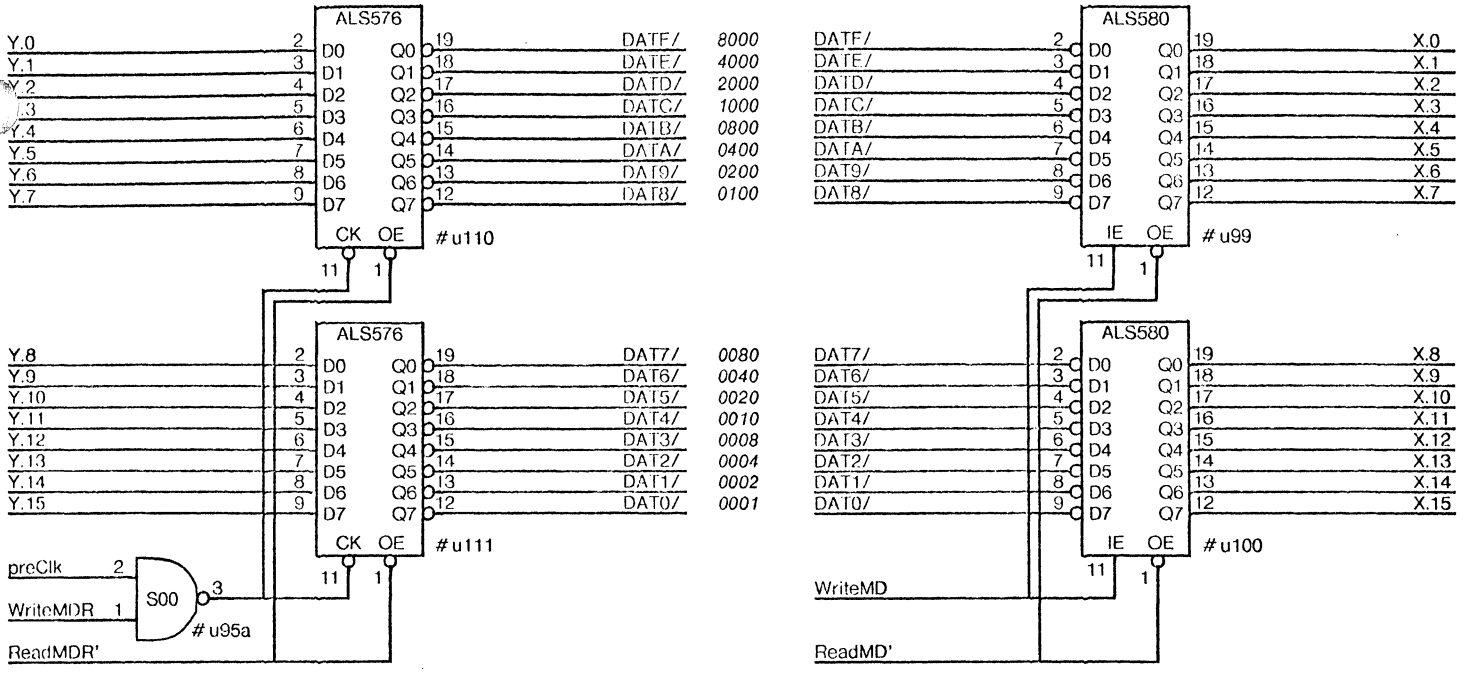
See DCP19.sil for PAL contents

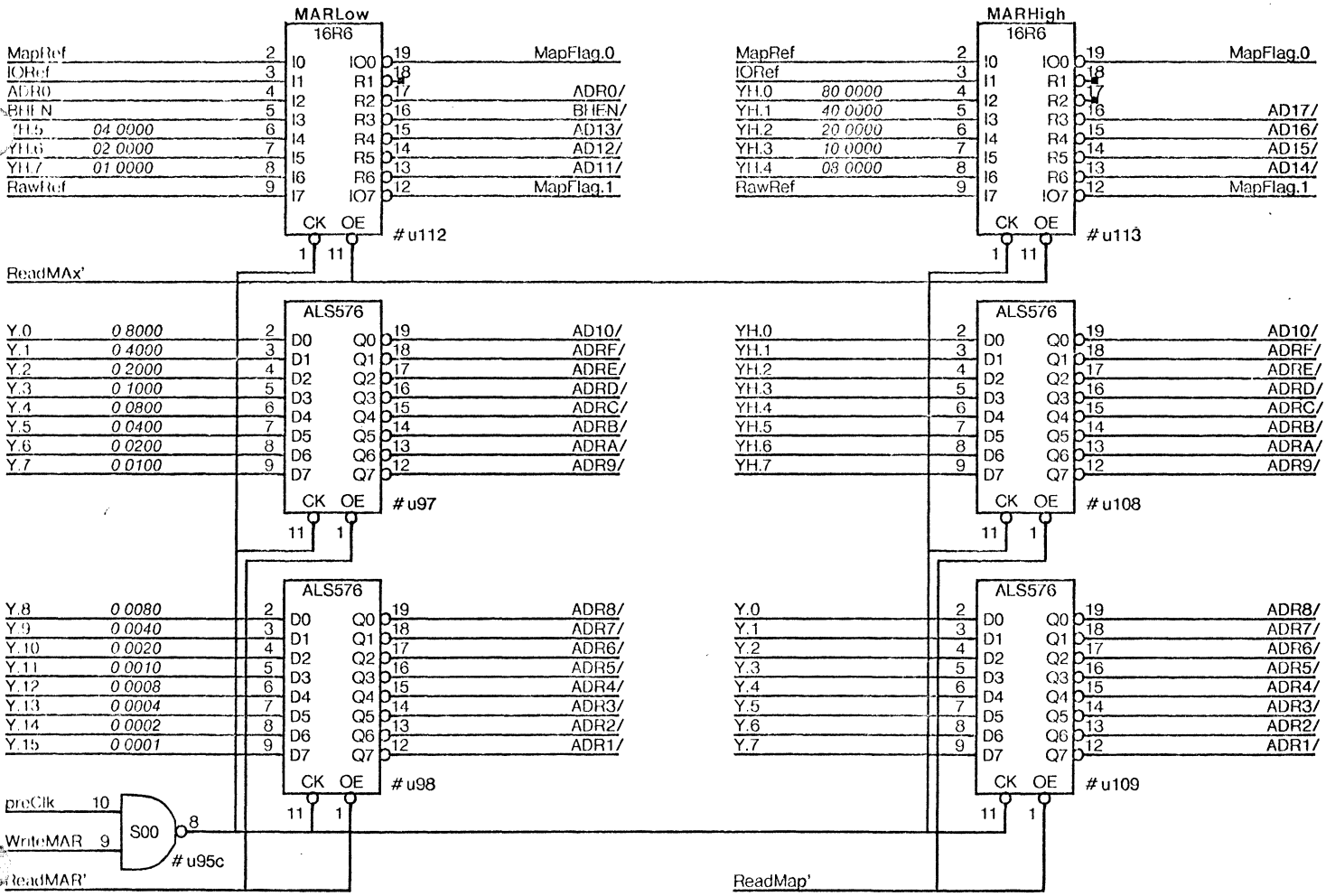
XEROX PARC	Project	Drawing	File	Designer	Rev	Date	Page
	Dicentra	Traps & Interrupts	DCP12.sil	Hal Murray	I	3/16/85	12

Beware: These PROMs are running way over specs

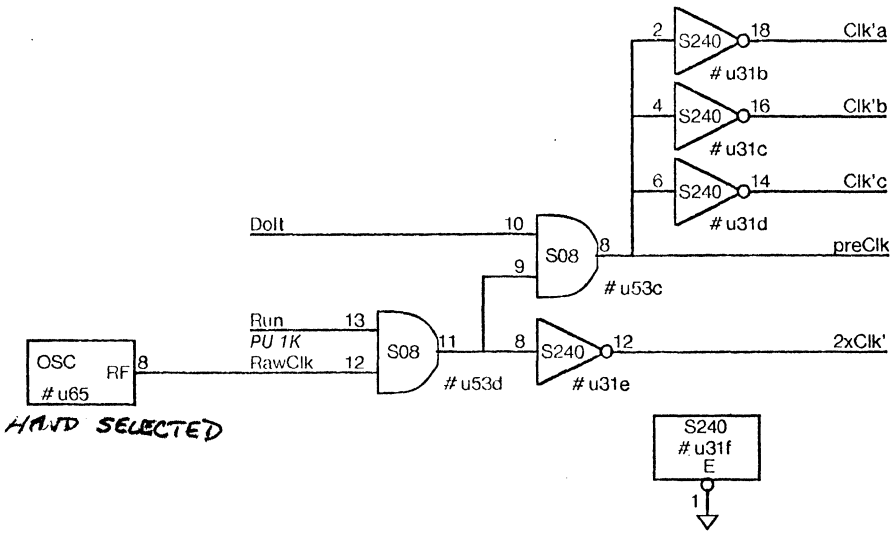


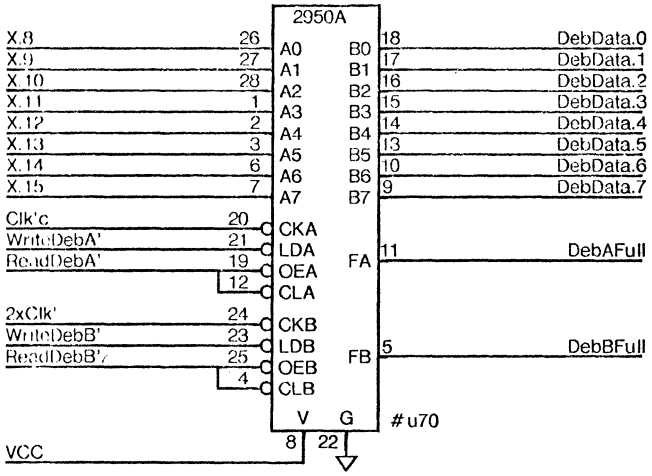
XEROX PARC	Project	Title	File	Designer	Rev	Date	Page
	Dicentra	Multibus Control	DCP13.sil	Hal Murray	I	3/16/85	13



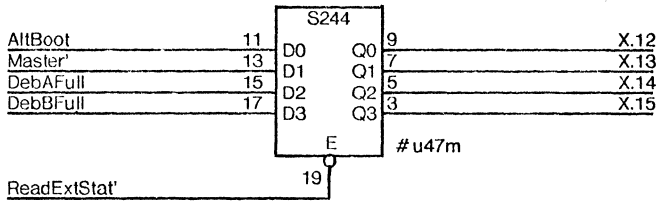


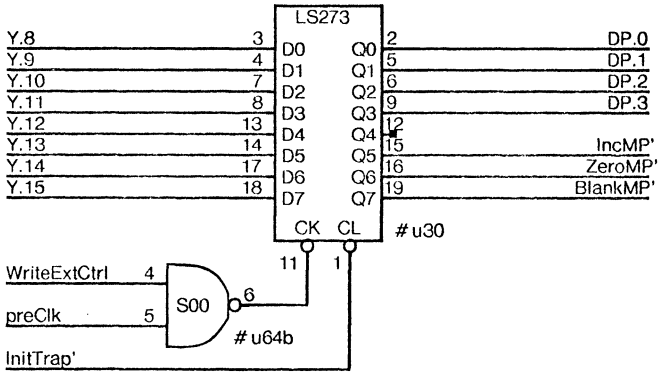
XEROX PARC	Project	Title	File	Designer	Rev	Date	Page
	Dicentra	Multibus Data & Address	DCP14.sil	Boggs/Murray	I	3/16/85	14



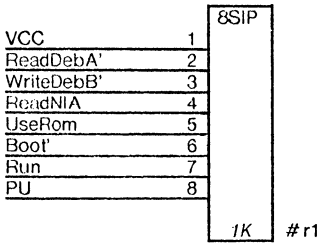


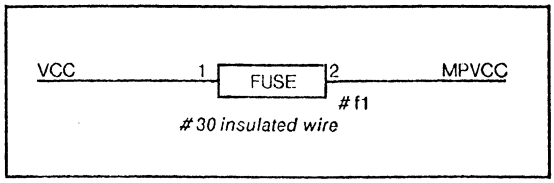
CP writes A and reads B



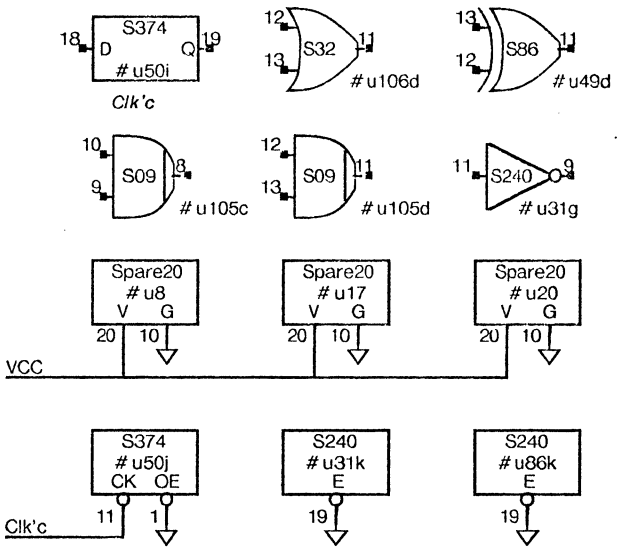


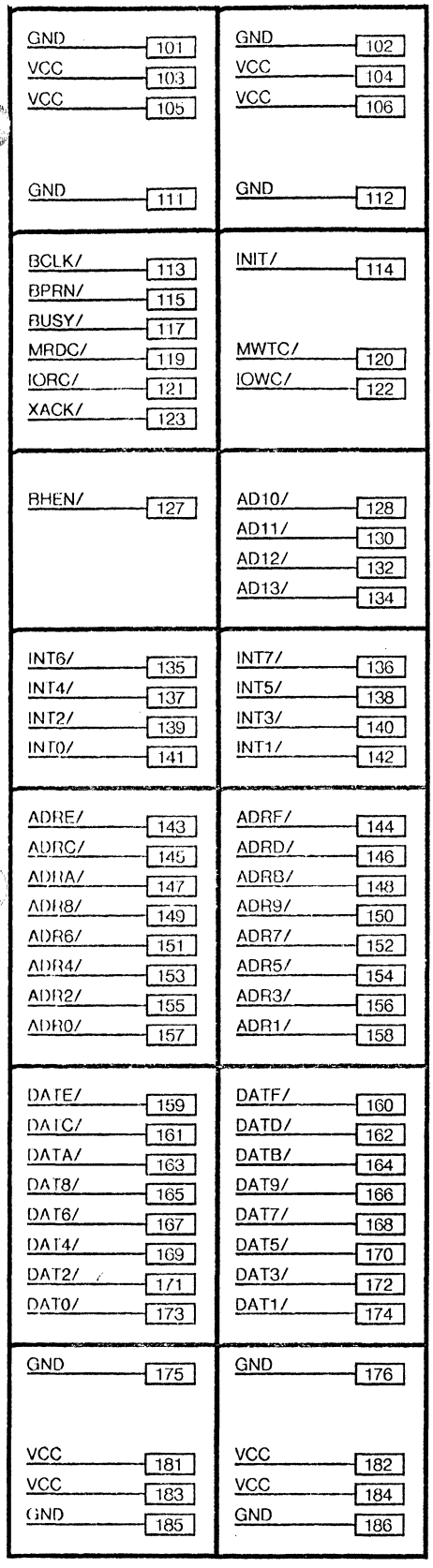
XEROX PARC	Project	Title	File	Designer	Rev	Date	Page
	Dicentra	Clocks & Debugger	DCP15.sil	David Boggs	I	4/22/84	15



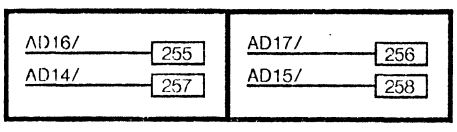


Add this in Rev J

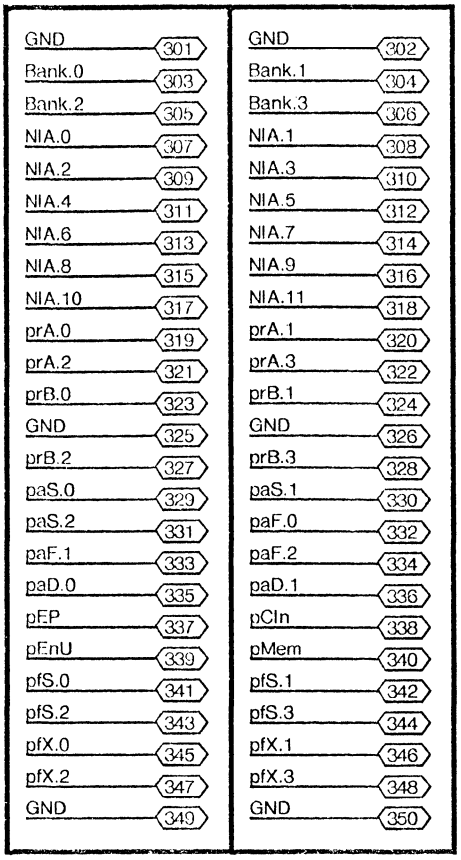




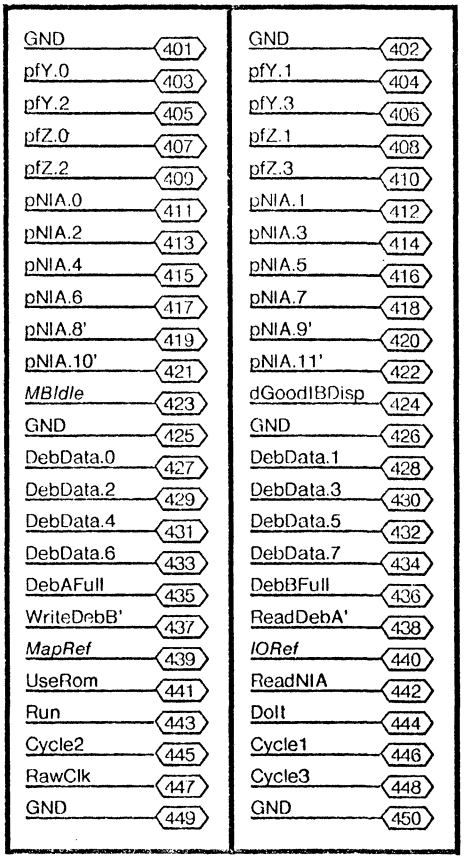
P1



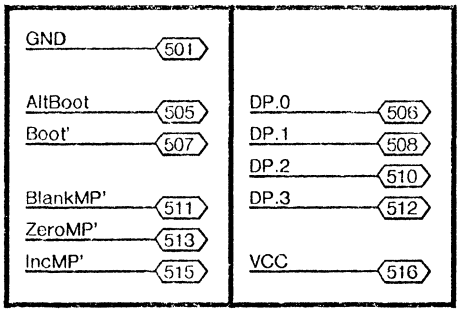
Component side **P2** *Solder Side*



Component side **J1** *Solder Side*



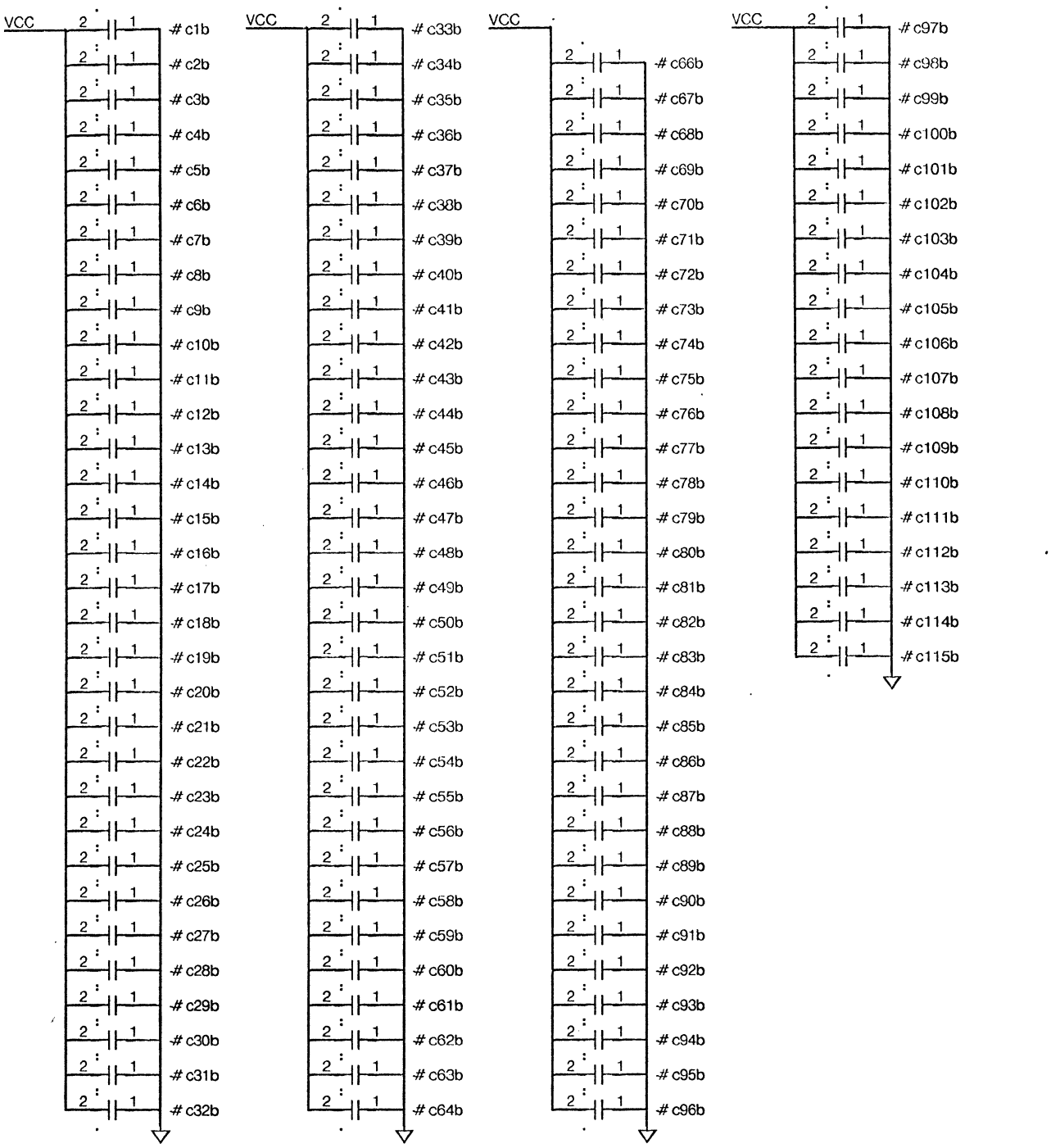
Component side **J2** *Solder Side*



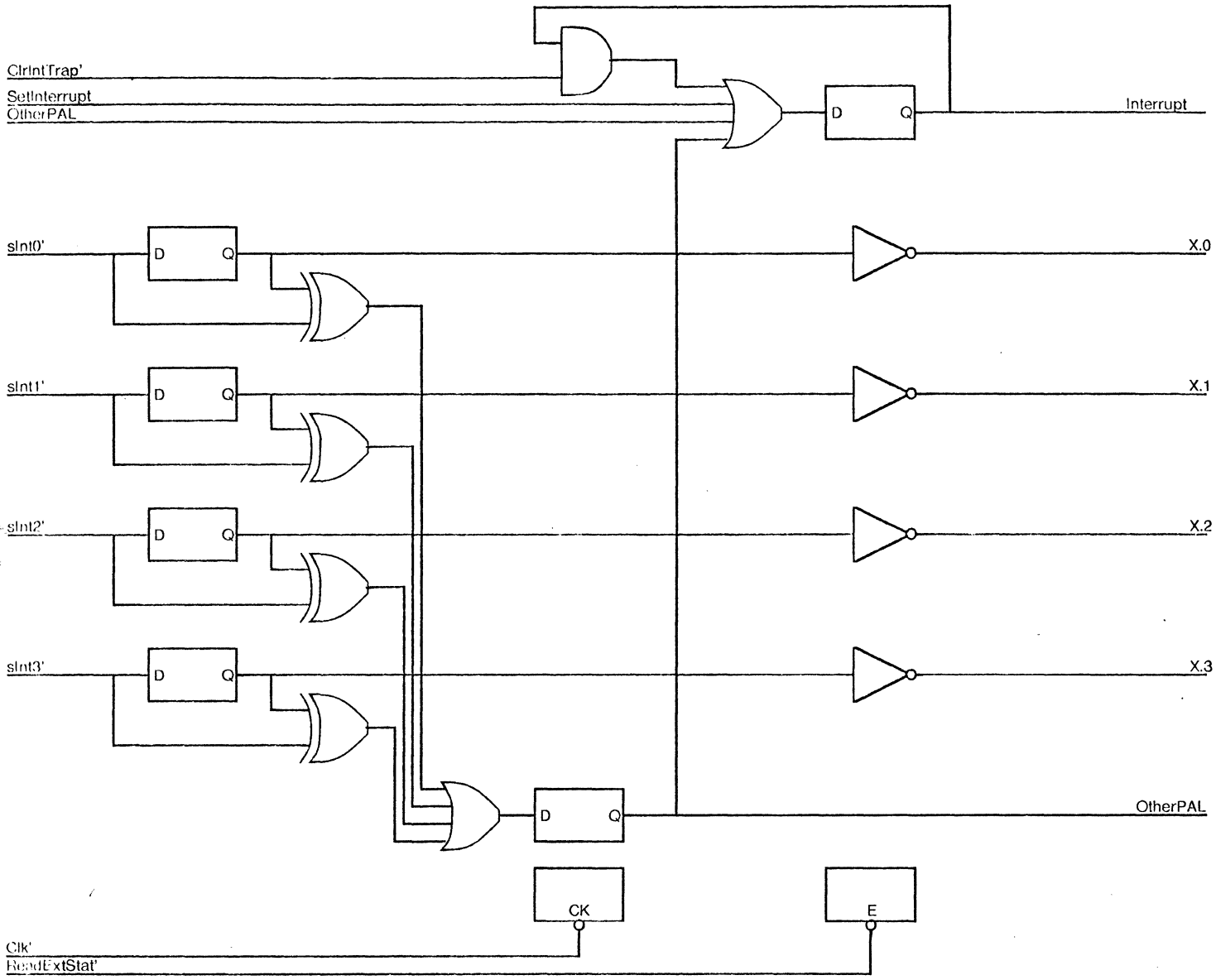
Component side **J3** *Solder Side*

NB: The pin numbers on J1, J2, and J3 correspond to the Multibus specs.
The numbers on the 3M connectors are top/bottom reversed.
The numbers on the StitchWeld boards are top/bottom reversed.

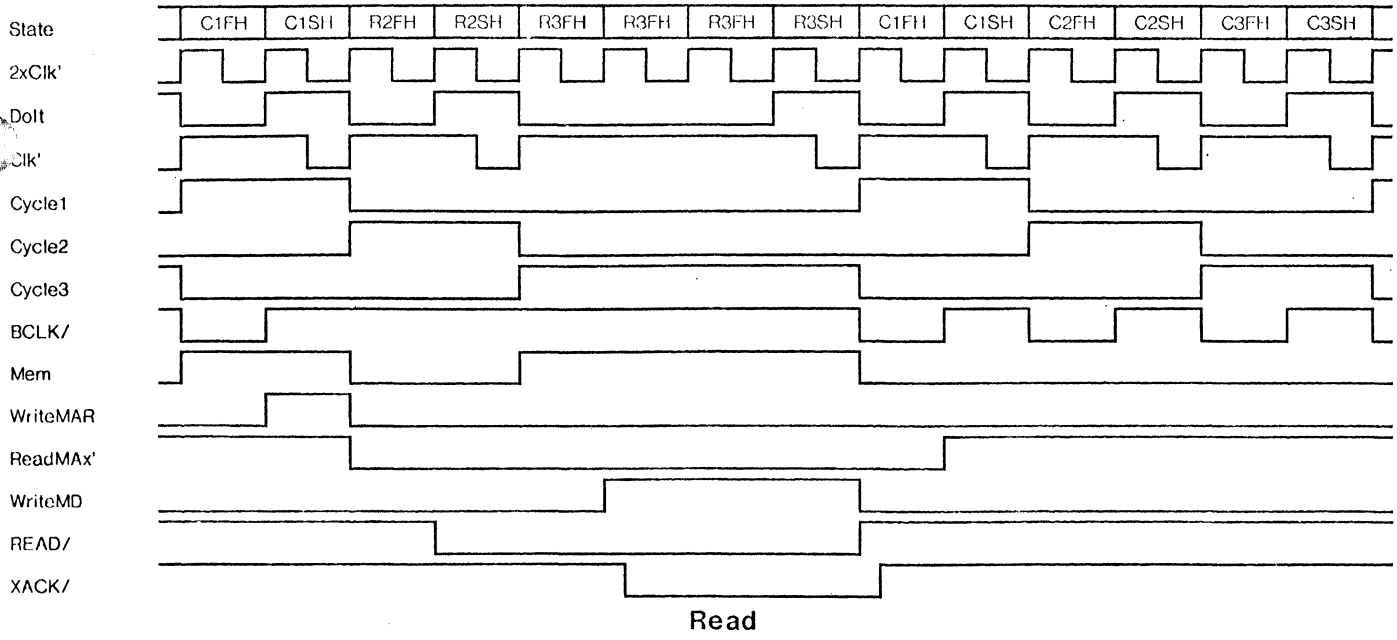
XEROX PARC	Project: Dicentra	Title: Connectors	File: DCP17.sil	Designer: Hal Murray	Rev: I	Date: 10/15/84	Page: 17



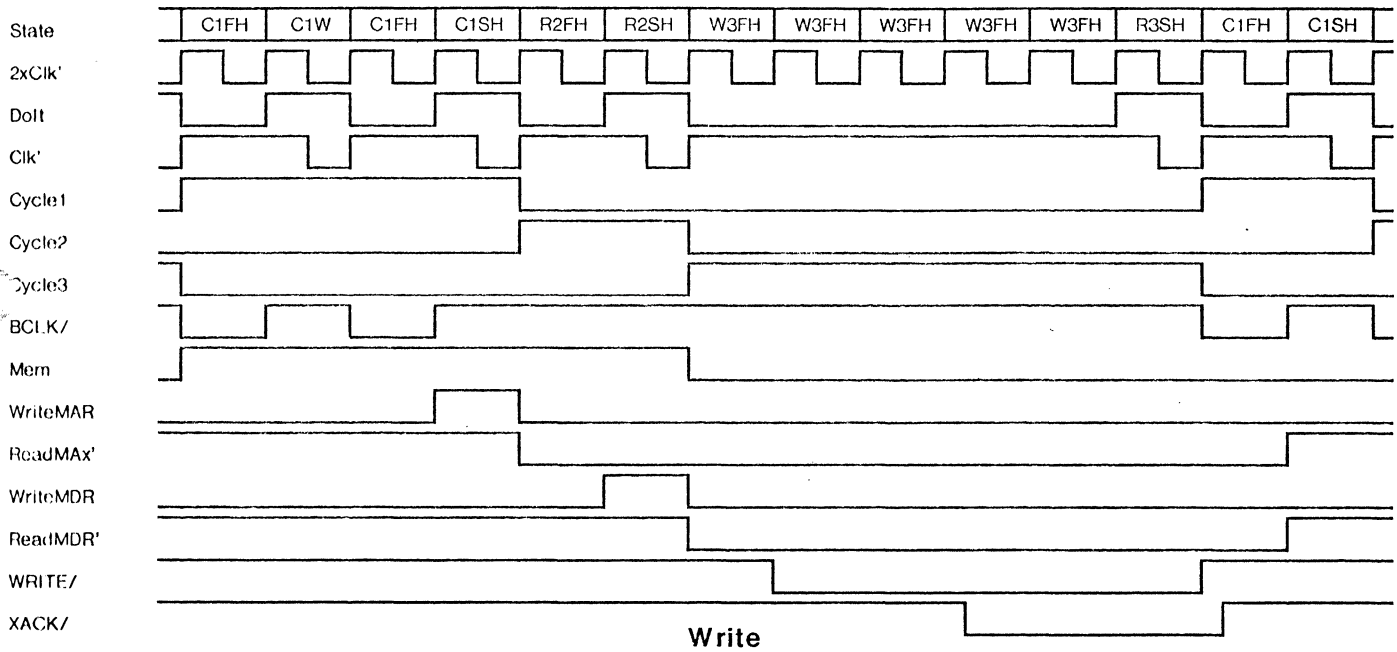
XEROX PARC	Project	Title	File	Designer	Rev	Date	Page
	Dicentra	Bypass Capacitors	DCP18.sil	David Boggs	I	4/22/84	18



XEROX PARC	Project	Reference	File	Designer	Rev	Date	Page
	Dicentra	Interrupt PAL	DCP19.sil	David Boggs	I	6/29/83	19



Read



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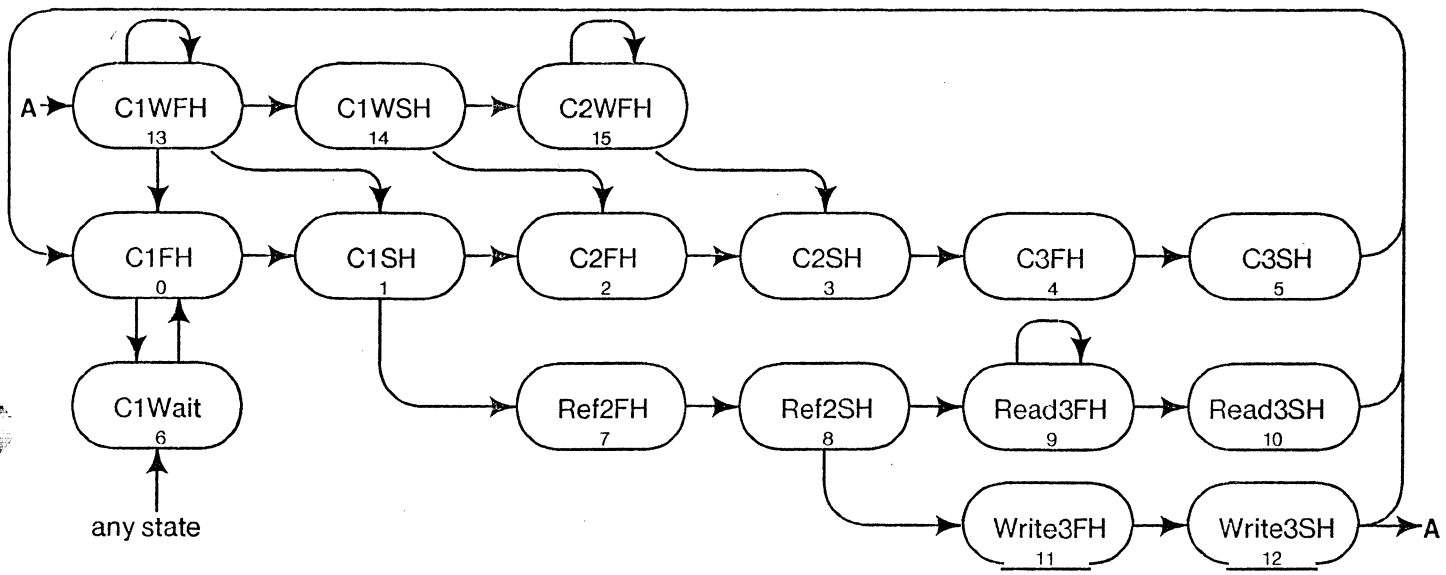
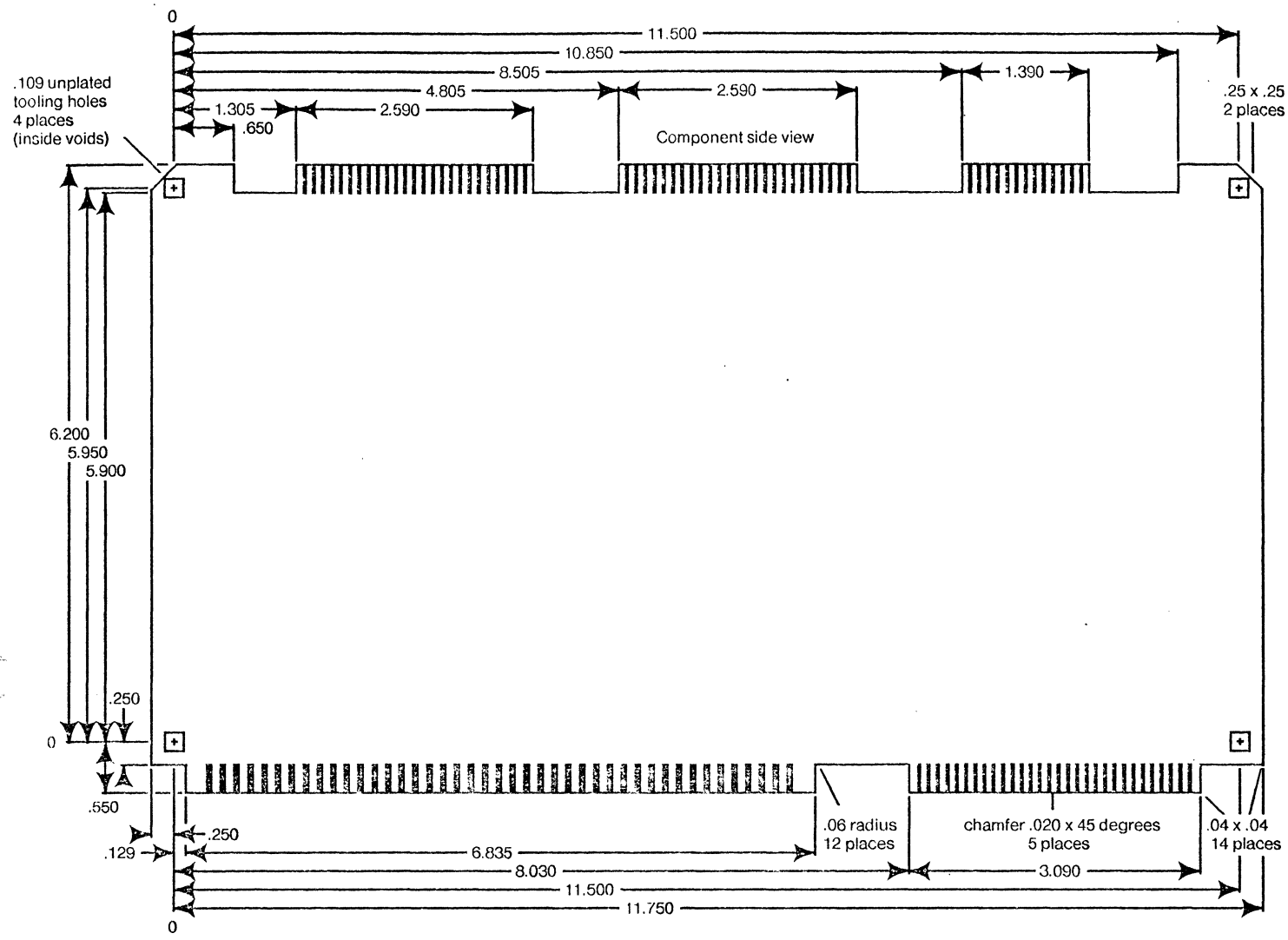


XEROX PARC	Project	Reference	File	Designer	Rev	Date	Page
	Dicentra	Multibus Timing & States	DCP20.sil	David Boggs	1	4/22/84	20

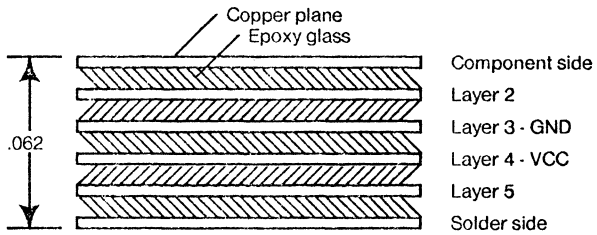
Qty	Manufacturer	Part Number	Description	Location
4	MMI	16R6	PAL	U52, U63, U112, U113 We can't blow AMD PALs.
3	AMD	25S09	IC	U91, U93, U115
4	AMD	25S10	IC	U76, U77, U89, U90
1	AMD	27S03	IC	U58
2	AMD	27S07	IC	U101, U102
10	AMD	27S27	Prom 512*8	U35-U41, U71, U73, U74
4	AMD	27S29	Prom 512*8	U28, U51, U72, U114
6	AMD	27S43	Prom 2K*8 Taa < 70ns	U1-U6, U10-U15 Intel 3632
4	AMD	2901C	IC	U66-U69
1	AMD	2950	IC	U70
2	TI	74S00	IC	U64, U95
1	TI	74S08	IC	U53
1	TI	7409	IC	U105
1	TI	74S10	IC	U57
1	TI	74AS10	IC	U84
1	TI	74S20	IC	U46
2	TI	74S32	IC	U59, U106
1	TI	74S38	IC	U48
1	TI	74S86	IC	U49
1	TI	74S138	IC	U107
3	TI	74S151	IC	U24, U34, U45
4	TI	74S157	IC	U32, U33, U42, U44
1	TI	74S182	IC	U87
3	TI	74S240	IC	U31, U86, U104
3	TI	74S244	IC	U47, U96, U103
1	TI	74S253	IC	U60
4	TI	74S257	IC	U43, U55, U88, U92
1	TI	74LS273	IC	U30
1	TI	74276	IC	U94
6	TI	74S280	IC	U7, U9, U16, U18, U19, U21
2	TI	74S373	IC	U61, U62
1	TI	74LS352	IC	U56
10	TI	74S374	IC	U22, U23, U25-U27, U29, U50, U54, U75, U85
2	TI	74376	IC	U82, U83
6	TI	74ALS576	IC	U97, U98, U108-U111
2	TI	74ALS580	IC	U99, U100
4	Fairchild	93422	Ram 256*4 Tw < 31ns	U78-U81

Qty	Manufacturer	Part Number	Description	Location
1	AB	108A102	7x1K SIP resistor	R1
2	AB	BB2215	220ohm 1/8W 5%	R2, R3
2	AB	BB1025	1Kohm 1/8W 5%	R4, R5
1	Dialite	547-2004	LED	L1
114	AVX	MD015E104ZAA	.1uf DIP capacitor	C1-C115
1	Motorola	K1115A	16 MHz oscillator	U65
1	EMC	10314-01-445	14-pin DIP socket	U65 Socket must take round pins
8	EMC	10320-01-445	20-pin DIP socket	U28, U51, U52, U63, U72, U112-U114
10	EMC	10422-01-445	22-pin DIP socket	U35-U41, U71, U73, U74
13	EMC	10628-01-445	28-pin DIP socket	U1-U6, U10-U15, U70
4			40-pin DIP scoket	U66-U69
2	Scanbe	S-203	Ejector & roll pin	
1	Xerox	DCP-Rev-I	PC Board	

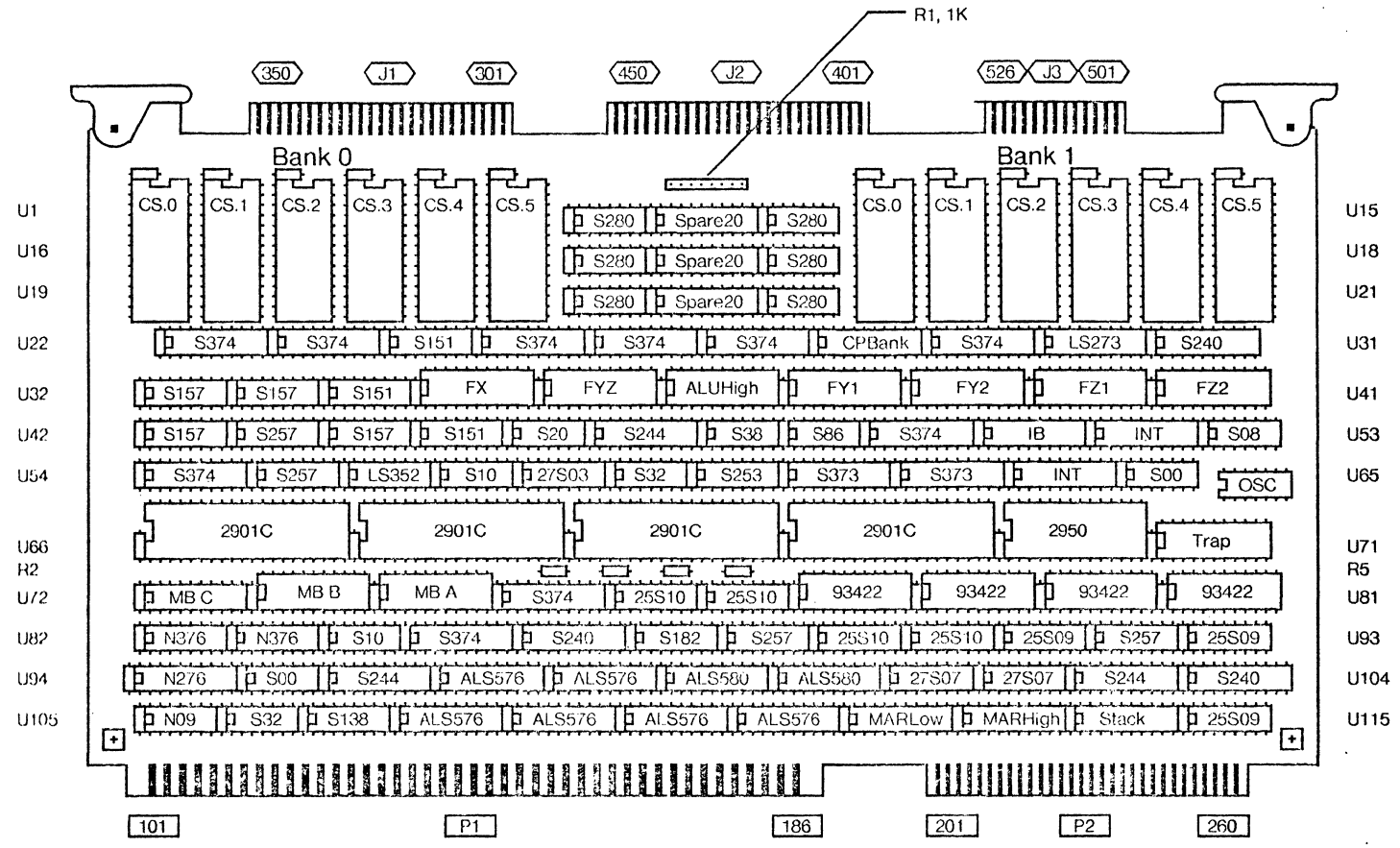


NOTES

1. All dimensions are in inches; drawing is not to scale.
   X.XXX is +-.005; X.XX is +-.01.
2. Except as noted, this printed board shall be made in accordance with IPC-ML-910 Class II.
3. Acceptability of the finished board will be judged in accordance with IPC-A-600.
4. Base material: 1 oz Cu on FR4 in accordance with IPC-L-130.
5. Bonding agent: prepreg B-stage in accordance with IPC-L-110.
6. Solder mask: green epoxy in accordance with IPC-SM-840.
7. Silk screen: none
8. Plating: .000050 Au over .000200 Ni on contact fingers.
   .0003 Sn-Pb over .0010 Cu in holes and on traces.
9. Holes: tooling holes finished diameter .109.
   component & connector holes finished diameter .031.
   feedthru holes finished diameter .018.
10. Pads: components & connectors .050, feedthrus .030.
11. Conductors: .010 wide, .010 spacing.



XEROX PARC	Project	Reference	File	Drawn by	Rev	Date	Page
	Dicentra	Fabrication Drawing	DCP23.sil	David Boggs	I	4/22/84	23



R2, R3: 220
R4, R5: 1K

Proms, pals, and oscillator are socketed.
Odd numbered edge pins are on the component side
Even numbered edge pins are on the solder side
NB: The pin numbers on J1, J2, and J3 correspond to the Multibus specs.
The numbers on the 3M connectors are top/bottom reversed.
The numbers on the StitchWeld boards are top/bottom reversed.

Rework:
Add MBIdle from J2.23 to U73.13

Proms & Pals					
Position	Type	Name	Position	Type	Name
U28	27S29	CPBank	U52	16R6	INT
U35	27S27	FX	U63	16R6	INT
U36	27S27	FYZ	U71	27S27	Trap
U37	27S27	ALUHigh	U72	27S29	MultibusC
U38	27S27	FY1	U73	27S27	MultibusB
U39	27S27	FY2	U74	27S27	MultibusA
U40	27S27	FZ1	U112	16R6	MARLow
U41	27S27	FZ2	U113	16R6	MARHigh
U51	27S29	IB	U114	27S29	Stack

```
// DCP-Multibus.bcpl -- Multibus FSM Roms for Dicentra Central Processor
// Loaded with DCP-Proms.bcpl
// Last modified October 28, 1983  1:22 AM by Boggs

external Multibus

manifest [ high = 1; low = 0 ]

//-------------------------------------------------------------------------------------
let Multibus(addr, data) be
//-------------------------------------------------------------------------------------
[
manifest
   [
   // FSM states
   C1FH = 0
   C1SH = 1
   C2FH = 2
   C2SH = 3
   C3FH = 4
   C3SH = 5
   C1Wait = 6
   Ref2FH = 7
   Ref2SH = 8
   Read3FH = 9
   Read3SH = 10
   Write3FH = 11
   Write3SH = 12
   C1WFH = 13
   C1WSH = 14
   C2WFH = 15
   ]

structure Addr:
   [
   blank bit 7
   CurState bit 4
   IORef bit
   MapRef bit
   XACK bit             //low true
   InitTrap bit         //low true
   Master bit           //low true
   ]

structure Data:
   [
   NextState bit 4
   Cycle1 bit
   Cycle2 bit
   Cycle3 bit
   DoIt bit
   WriteMar bit
   WriteMDR bit
   BCLK bit
   WriteMD bit
   ReadMAx bit          //low true
   MBIdle bit
   blank bit 2
   IOCmd bit
   ClearCmd bit         //low true
   ReadCmd bit
   WriteCmd bit
   ClearAD bit
   ReadMar bit          //low true
   ReadMap bit          //low true
   ReadMDR bit          //low true
   blank bit 8
   ]
```

```
let CurrentState = addr<<Addr.CurState
let IORef = addr<<Addr.IORef eq high
let MapRef = addr<<Addr.MapRef eq high
let XACK = addr<<Addr.XACK eq low
let InitTrap = addr<<Addr.InitTrap eq low
let Master = addr<<Addr.Master eq low

let NextState = nil
let Cycle1, Cycle2, Cycle3, DoIt = false, false, false, false
let WriteMar, WriteMDR, BCLK, WriteMD = false, false, nil, false
let ReadMAx, MBIdle = false, false
let IOCmd, ReadCmd, WriteCmd, ClearCmd = false, false, false, false
let ReadMar, ReadMap, ReadMDR, ClearAD = false, false, false, false

if InitTrap & CurrentState ne C1FH then CurrentState = C1Wait

switchon CurrentState into
   [
   case C1FH:
      [
      Cycle1 = true
      ClearAD = true
      BCLK = low
      test InitTrap
         ifso
            [
            DoIt = true
            NextState = C1Wait
            ]
         ifnot test IORef % MapRef
            ifnot
               [
               DoIt = true
               NextState = C1SH
               ]
            ifso test Master
               ifso
                  [
                  WriteMar = true
                  DoIt = true
                  NextState = C1SH
                  ]
               ifnot NextState = C1Wait
      endcase
      ]
   case C1Wait:
      [
      Cycle1 = true
      BCLK = high
      ClearCmd = true
      NextState = C1FH
      endcase
      ]
   case C1SH:
      [
      Cycle2 = true
      test IORef % MapRef
         ifnot
            [
            ClearAD = true
            BCLK = high
            NextState = C2FH
            ]
         ifso
            [
            BCLK = low
            IOCmd = IORef & not MapRef
            test MapRef & not IORef
               ifso ReadMap = true
               ifnot ReadMar = true
            ReadMAx = true
            NextState = Ref2FH
            ]
      endcase
      ]
```

```
case Ref2FH:
   [
   Cycle2 = true
   BCLK = low
   test IORef & MapRef
      ifnot ReadCmd = true
      ifso WriteMDR = true
   ReadMAx = true
   DoIt = true
   NextState = Ref2SH
   endcase
   ]
case Ref2SH:
   [
   Cycle3 = true
   BCLK = low
   ReadMAx = true
   test IORef & MapRef
      ifnot NextState = Read3FH
      ifso
         [
         ReadMDR = true
         NextState = Write3FH
         ]
   endcase
   ]

case Read3FH:
   [
   Cycle3 = true
   BCLK = low
   WriteMD = true
   ReadMAx = true
   test XACK
      ifnot NextState = Read3FH
      ifso
         [
         DoIt = true
         NextState = Read3SH
         ]
   endcase
   ]
case Read3SH:
   [
   Cycle1 = true
   BCLK = high
   ReadMAx = true
   ClearCmd = true
   NextState = C1FH
   endcase
   ]
```

```
case Write3FH:
   [
   Cycle3 = true
   BCLK = low
   WriteMD = true
   ReadMAx = true
   unless IORef & MapRef do WriteCmd = true
   DoIt = true
   NextState = Write3SH
   endcase
   ]
case Write3SH:
   [
   Cycle1 = true
   ReadMAx = true
   if IORef & MapRef then XACK = true
   test XACK
      ifnot
         [
         BCLK = low
         NextState = C1WFH
         ]
      ifso
         [
         ClearCmd = true
         BCLK = high
         NextState = C1FH
         ]
   endcase
   ]
```

```
case C1WFH:
   [
   Cycle1 = true
   ReadMAx = true
   BCLK = low
   test XACK
      ifnot test IORef % MapRef
         ifnot
            [
            DoIt = true
            NextState = C1WSH
            ]
         ifso NextState = C1WFH
      ifso
         [
         ClearCmd = true
         test IORef % MapRef
            ifso
               [
               BCLK = high
               NextState = C1FH
               ]
            ifnot
               [
               DoIt = true
               NextState = C1SH
               ]
         ]
   endcase
   ]
case C1WSH:
   [
   Cycle2 = true
   ReadMAx = true
   test XACK
      ifso
         [
         BCLK = high
         ClearCmd = true
         NextState = C2FH
         ]
      ifnot
         [
         BCLK = low
         NextState = C2WFH
         ]
   endcase
   ]
case C2WFH:
   [
   Cycle2 = true
   ReadMAx = true
   BCLK = low
   test XACK
      ifso
         [
         DoIt = true
         ClearCmd = true
         NextState = C2SH
         ]
      ifnot NextState = C2WFH
   endcase
   ]
```

```
   case C2FH:
      [
      DoIt = true
      Cycle2 = true
      ClearAD = true
      BCLK = low
      NextState = C2SH
      endcase
      ]
   case C2SH:
      [
      Cycle3 = true
      MBIdle = true
      ClearAD = true
      BCLK = high
      NextState = C3FH
      endcase
      ]
   case C3FH:
      [
      DoIt = true
      Cycle3 = true
      BCLK = low
      NextState = C3SH
      endcase
      ]
   case C3SH:
      [
      Cycle1 = true
      BCLK = high
      NextState = C1FH
      endcase
      ]
   ]

data>>Data.NextState = high? NextState, not NextState
data>>Data.Cycle1 = Cycle1? high, low
data>>Data.Cycle2 = Cycle2? high, low
data>>Data.Cycle3 = Cycle3? high, low
data>>Data.DoIt = DoIt? high, low
data>>Data.WriteMar = WriteMar? high, low
data>>Data.WriteMDR = WriteMDR? high, low
data>>Data.BCLK = BCLK
data>>Data.WriteMD = WriteMD? high, low
data>>Data.ReadMAx = ReadMAx? low, high
data>>Data.MBIdle = MBIdle? high, low
data>>Data.IOCmd = IOCmd? high, low
data>>Data.ClearCmd = ClearCmd? low, high
data>>Data.ReadCmd = ReadCmd? high, low
data>>Data.WriteCmd = WriteCmd? high, low
data>>Data.ClearAD = ClearAD? high, low
data>>Data.ReadMar = ReadMar? low, high
data>>Data.ReadMap = ReadMap? low, high
data>>Data.ReadMDR = ReadMDR? low, high
]
```

```
// DCP-Proms.bcpl -- Dicentra Central Processor Proms
// Loaded with DCP-Multibus.bcpl
// Last modified October 23, 1983  7:40 PM by Boggs

external [ Ws; OpenFile; Puts; Closes; Allocate; Free; sysZone; Multibus ]

static [ memory; mbFile ]

structure String [ length byte; chart1,1 byte ]

manifest [ high = 1; low = 0 ]

//---------------------------------------------------------------------------------------
let DCPProms() be
//---------------------------------------------------------------------------------------
[
mbFile = OpenFile("DCP-Proms.mb")

DoMemory("Stack", 512, 8, Stack)
DoMemory("IB", 512, 8, IB)
DoMemory("ALUHigh", 512, 8, ALUHigh)
DoMemory("FX", 512, 8, FX)
DoMemory("FYZ", 512, 8, FYZ)
DoMemory("FY1", 512, 8, FY1)
DoMemory("FY2", 512, 8, FY2)
DoMemory("FZ1", 512, 8, FZ1)
DoMemory("FZ2", 512, 8, FZ2)
DoMemory("CPBank3632", 512, 8, CPBank3632)
DoMemory("CPBank2732", 512, 8, CPBank2732)
DoMemory("Trap", 512, 8, Trap)
DoMemory("Multibus", 512, 24, Multibus)

Puts(mbFile, 0)  //0 = end of file
Closes(mbFile)
]

//---------------------------------------------------------------------------------------
and DoMemory(name, nAddr, nData, Proc) be
//---------------------------------------------------------------------------------------
// nAddr is number of addresses
// nData is number of output bits
[
Ws("*N"); Ws(name)

Puts(mbFile, 4)  //4 = define memory
memory = memory +1
Puts(mbFile, memory)
Puts(mbFile, nData)
if name>>String.length gr 1 then
   for i = 1 to name>>String.length-1 by 2 do
      Puts(mbFile, name>>String.chart i lshift 8 + name>>String.chart(i+1))
Puts(mbFile, (name>>String.length & 1) eq 0? 0,
 name>>String.chart(name>>String.length) lshift 8)

Puts(mbFile, 2)  //2 = set current memory
Puts(mbFile, memory)
Puts(mbFile, 0)  //location counter (not used)

let data = Allocate(sysZone, (nData+15)/16)
for addr = 0 to nAddr-1 do
   [
   Puts(mbFile, 1)  //1 = memory contents
   Puts(mbFile, 0)  //source line number (not used)
   Proc(addr, data)
   for i = 0 to (nData+15)/16 -1 do Puts(mbFile, data!i)
   ]
Free(sysZone, data)
]
```

```
//-------------------------------------------------------------------------------------
and Stack(addr, data) be
//-------------------------------------------------------------------------------------
[
structure Addr:
   [
   blank bit 7
   StackP bit 4
   PopX bit
   PopZ bit
   PushX bit
   PushY bit
   PushZ bit
   ]

structure Data:
   [
   StackTrap bit
   blank bit 3
   StackP bit 4
   blank bit 8
   ]

let PopX = addr<<Addr.PopX eq high
let PopZ = addr<<Addr.PopZ eq high
let PushX = addr<<Addr.PushX eq high
let PushY = addr<<Addr.PushY eq high
let PushZ = addr<<Addr.PushZ eq high
let StackP = addr<<Addr.StackP

let Pop = PopX % PopZ
let Push = PushX % PushY % PushZ

let StackTrap = Pop & StackP eq 0 %
   Push & StackP eq 15 %
   PopX & Push & StackP eq 0 %
   Push & PopZ & StackP eq 15 %
   PopX & PopZ & (StackP eq 0 % StackP eq 1) %
   PopX & PopZ & Push & (StackP eq 0 % StackP eq 1)

if Pop then StackP = StackP -1
if Push then StackP = StackP +1

data>>Data.StackP = StackP
data>>Data.StackTrap = StackTrap? high, low
]
```

```
//-------------------------------------------------------------------------------------
and IB(addr, data) be
//-------------------------------------------------------------------------------------
[
manifest
   [
   // instruction buffer states
   ibEmpty = 0
   ibByte = 1
   ibFull = 2
   ibWord = 3
   ]

structure Addr:
   [
   blank bit 7
   IBDisp bit
   ReadIB bit
   WriteIB bit
   IBPtrGetsWord bit
   IBPtrGetsByte bit
   EnC2Funs bit
   Interrupt bit
   InIBPtr bit 2
   unused bit
   ]

structure Data:
   [
   GoodIBDisp bit
   IBEmpty bit          //low true
   IBRefillTrap bit
   ReadIB0 bit          //low true
   ReadIB1 bit          //low true
   WriteIBFront bit
   OutIBPtr bit 2
   blank bit 8
   ]

let IBDisp = addr<<Addr.IBDisp eq high
let ReadIB = addr<<Addr.ReadIB eq high
let WriteIB = addr<<Addr.WriteIB eq high
let IBPtrGetsWord = addr<<Addr.IBPtrGetsWord eq high
let IBPtrGetsByte = addr<<Addr.IBPtrGetsByte eq high
let EnC2Funs = addr<<Addr.EnC2Funs eq high
let Interrupt = addr<<Addr.Interrupt eq high
let InIBPtr = addr<<Addr.InIBPtr

let IBEmpty = false
let IBRefillTrap = false
let GoodIBDisp = false
let ReadIB0 = false
let ReadIB1 = false
let WriteIBFront = false
let OutIBPtr = InIBPtr

let advance = false
```

```
// IBRefillTrap causes a trap to one of four locations executed in Cycle 1:
//      3400b or 3000b  Interrupt
//      2400b           IB refill; IB not empty
//      2000b           IB refill; IB is empty
if IBDisp & EnC2Funs & not ReadIB & not WriteIB & not IBPtrGetsWord then
   test (Interrupt % InIBPtr ne ibFull) & not IBPtrGetsByte
      ifso IBRefillTrap = true
      ifnot [ GoodIBDisp = true; advance = true ]

// ReadIB puts IBFront onto the X bus and advances IBPtr.
// Since there are always at least 2 bytes in the buffer when we begin
//  executing a Mesa instruction, ReadIB can't trap.
// Note that "ReadIB, IBDisp" is not legal (its a Noop).
if ReadIB & not IBDisp & not WriteIB & not IBPtrGetsWord & not IBPtrGetsByte then
   advance = true

if advance then
   [
   WriteIBFront = true
   ReadIB0 = (InIBPtr & 1) eq 0  //ReadIB0 is the inverse of IBPtr.1
   ReadIB1 = not ReadIB0
   OutIBPtr = selecton InIBPtr into
      [
      case ibFull: ibWord
      case ibWord: ibByte
      case ibByte: ibEmpty
      case ibEmpty: ibEmpty
      ]
   ]

// Unless we are refilling due to a jump instruction, IBPtr will be ibByte or ibEmpty.
//  If it's ibEmpty then we need to write IBFront from IB0.
//  If it's ibByte then we shouldn't write IBFront.
// If we are refilling due to a jump instruction, IBPtr value is unknown.
//  It will be specified by a IBPtr← in this cycle or the next.
// Note that "WriteIB, ReadIB" is not legal (it's a Noop).
if WriteIB & not IBDisp & not ReadIB test InIBPtr eq ibEmpty
   ifso
      [
      WriteIBFront = true
      test IBPtrGetsByte
         ifso [ ReadIB1 = true; OutIBPtr = ibByte ]
         ifnot [ ReadIB0 = true; OutIBPtr = ibWord ]
      ]
   ifnot OutIBPtr = ibFull

// IBPtr←byte or IBPtr←word always come in cycle 1 immediately after a WriteIB.
// They load IBFront with the even or odd dest byte and set up IBPtr.
if IBPtrGetsWord & not IBDisp & not ReadIB & not WriteIB & not IBPtrGetsByte then
   [
   WriteIBFront = true
   ReadIB0 = true
   OutIBPtr = ibWord
   ]
if IBPtrGetsByte & not IBDisp & not ReadIB & not WriteIB & not IBPtrGetsWord then
   [
   WriteIBFront = true
   ReadIB1 = true
   OutIBPtr = ibByte
   ]

data>>Data.IBEmpty = OutIBPtr eq ibEmpty? low, high
data>>Data.IBRefillTrap = IBRefillTrap? high, low
data>>Data.GoodIBDisp = GoodIBDisp? high, low
data>>Data.ReadIB0 = ReadIB0? low, high
data>>Data.ReadIB1 = ReadIB1? low, high
data>>Data.WriteIBFront = WriteIBFront? high, low
data>>Data.OutIBPtr = OutIBPtr
]
```

```
//-------------------------------------------------------------------------------------
and ALUHigh(addr, data) be
//-------------------------------------------------------------------------------------
[
structure Addr:
   [
   blank bit 7
   paS0 bit
   paS1 bit
   paS2 bit
   paF1 bit
   paF2 bit
   pMem bit
   Cycle3 bit
   Cycle2 bit
   blank bit
   ]

structure Data:
   [
   aSh0 bit
   aSh1 bit
   aSh2 bit
   aFh1 bit
   aFh2 bit
   ReadMD bit           //low true
   blank bit 2
   blank bit 8
   ]

let paS0 = addr<<Addr.paS0 eq high
let paS1 = addr<<Addr.paS1 eq high
let paS2 = addr<<Addr.paS2 eq high
let paF1 = addr<<Addr.paF1 eq high
let paF2 = addr<<Addr.paF2 eq high
let pMem = addr<<Addr.pMem eq high
let Cycle3 = addr<<Addr.Cycle3 eq high
let Cycle2 = addr<<Addr.Cycle2 eq high

data>>Data.aSh0 = (pMem & Cycle3? false, paS0)? high, low
data>>Data.aSh1 = (pMem & Cycle3? true, paS1)? high, low
data>>Data.aSh2 = (pMem & Cycle3? true, paS2)? high, low
data>>Data.aFh1 =(pMem & Cycle3? true, paF1)? high, low
data>>Data.aFh2 =(pMem & Cycle3? true, paF2)? high, low
data>>Data.ReadMD = pMem & Cycle2? low, high
]
```

```
//-------------------------------------------------------------------------------------------
and FX(addr, data) be
//-------------------------------------------------------------------------------------------
[
structure Addr:
   [
   blank bit 7
   pfX bit 4
   blank bit 5
   ]

structure Data:
   [
   blank bit
   WriteRH bit
   Shift bit            //low true
   CycleX bit           //low true
   CInGetsPC16X bit     //low true
   MapRefX bit          //low true
   PopX bit
   PushX bit
   blank bit 8
   ]

let FX = addr<<Addr.pfX

data>>Data.WriteRH = FX eq 9? high, low
data>>Data.Shift = FX eq 10? low, high
data>>Data.CycleX = FX eq 11? low, high
data>>Data.CInGetsPC16X = FX eq 12? low, high
data>>Data.MapRefX = FX eq 13? low, high
data>>Data.PopX = FX eq 14? high, low
data>>Data.PushX = FX eq 15? high, low
]
```

```
//-------------------------------------------------------------------------------------
and FYZ(addr, data) be
//-------------------------------------------------------------------------------------
[
structure Addr:
   [
   blank bit 7
   pfS01 bit 2
   pfS23 bit 2
   pfZ01 bit 2 =
      [
      pfZ0 bit
      pfZ1 bit
      ]
   pfY0 bit
   pfY1 bit
   blank bit
   ]

structure Data:
   [
   Zero bit              //low true
   IB bit                //low true
   Rot bit               //low true
   Byte bit              //low true
   Const bit             //low true
   FourBitBr bit         //low true
   TwoBitBr bit          //low true
   OneBitBr bit          //low true
   blank bit 8
   ]

let pfS01 = addr<<Addr.pfS01
let pfS23 = addr<<Addr.pfS23
let pfZ01 = addr<<Addr.pfZ01
let pfZ0 = addr<<Addr.pfZ0 eq high
let pfY0 = addr<<Addr.pfY0 eq high
let pfY1 = addr<<Addr.pfY1 eq high

data>>Data.Zero = (pfS23 eq 1 % (pfS23 eq 3 & pfZ0))? low, high
data>>Data.IB = (pfS23 eq 3 & pfZ01 eq 3)? low, high
data>>Data.Rot = (pfS23 eq 0 & pfZ01 eq 3)? low, high
data>>Data.Byte = pfS01 eq 3? low, high
data>>Data.Const = pfS23 eq 1? low, high
data>>Data.FourBitBr = (pfS01 eq 0 & pfY0 & not pfY1)? low, high
data>>Data.TwoBitBr = (pfS01 eq 0 & pfY0)? low, high
data>>Data.OneBitBr = (pfS01 eq 0 & not pfY0)? low, high
]
```

```
//-------------------------------------------------------------------------------------------
and FY1(addr, data) be
//-------------------------------------------------------------------------------------------
[
structure Addr:
   [
   blank bit 7
   pfY bit 4
   pfS01 bit 2
   blank bit 3
   ]

structure Data:
   [
   WriteDebA bit        //low true
   WriteExtCtrl bit
   ClrIntTrap bit       //low true
   IBDisp bit
   SetInterrupt bit
   WriteStkP bit
   WriteIB bit
   CycleY bit           //low true
   blank bit 8
   ]

let pfY = addr<<Addr.pfY
let pfS01 = addr<<Addr.pfS01

data>>Data.WriteDebA = (pfS01 eq 2 & pfY eq 0)? low, high
data>>Data.WriteExtCtrl = (pfS01 eq 2 & pfY eq 1)? high, low
data>>Data.ClrIntTrap = (pfS01 eq 1 & pfY eq 2)? low, high
data>>Data.IBDisp = (pfS01 eq 1 & pfY eq 3)? high, low
data>>Data.SetInterrupt = (pfS01 eq 1 & pfY eq 4)? high, low
data>>Data.WriteStkP = (pfS01 eq 1 & pfY eq 5)? high, low
data>>Data.WriteIB = (pfS01 eq 1 & pfY eq 6)? high, low
data>>Data.CycleY = (pfS01 eq 1 & pfY eq 7)? low, high
]
```

```
//-------------------------------------------------------------------------------
and FY2(addr, data) be
//-------------------------------------------------------------------------------
[
structure Addr:
   [
   blank bit 7
   pfY bit 4
   pfS01 bit 2
   blank bit 3
   ]

structure Data:
   [
   blank bit
   MapRefY bit          //low true
   blank bit
   PushY bit
   IORefY bit           //low true
   WriteBank bit
   BHEN bit
   RawRef bit
   blank bit 8
   ]

let pfY = addr<<Addr.pfY
let pfS01 = addr<<Addr.pfS01

data>>Data.MapRefY = (pfS01 eq 1 & pfY eq 9)? low, high
data>>Data.PushY = (pfS01 eq 1 & pfY eq 11)? high, low
data>>Data.IORefY = ((pfS01 eq 1 % pfS01 eq 2) & pfY eq 12)? low, high
data>>Data.WriteBank = (pfS01 eq 1 & pfY eq 13)? high, low
data>>Data.BHEN = (pfS01 eq 2 & (pfY eq 12 % pfY eq 14 % pfY eq 15))? low, high
data>>Data.RawRef = ((pfS01 eq 1 % pfS01 eq 2) & pfY eq 14)? high, low
]
```

```
//-------------------------------------------------------------------------------------
and FZ1(addr, data) be
//-------------------------------------------------------------------------------------
[
structure Addr:
   [
   blank bit 7
   pfZ bit 4
   pfS23 bit 2
   blank bit 3
   ]

structure Data:
   [
   ADR0 bit
   IBPtrGetsByte bit
   IBPtrGetsWord bit
   CInGetsPC16Z bit      //low true
   IORefZ bit            //low true
   PopZ bit
   PushZ bit
   AltUAddr bit
   blank bit 8
   ]

let pfZ = addr<<Addr.pfZ
let pfS23 = addr<<Addr.pfS23

data>>Data.ADR0 = (pfS23 eq 3 & pfZ eq 0)? high, low
data>>Data.IBPtrGetsByte = (pfS23 eq 0 & pfZ eq 1)? high, low
data>>Data.IBPtrGetsWord = (pfS23 eq 0 & pfZ eq 2)? high, low
data>>Data.CInGetsPC16Z = (pfS23 eq 0 & pfZ eq 3)? low, high
data>>Data.IORefZ = (pfS23 eq 3 & pfZ eq 7)? low, high
data>>Data.PopZ = (pfS23 eq 0 & pfZ eq 5)? high, low
data>>Data.PushZ = (pfS23 eq 0 & pfZ eq 6)? high, low
data>>Data.AltUAddr = (pfS23 eq 0 & pfZ eq 7)? high, low
]
```

```
//-------------------------------------------------------------------------------------
and FZ2(addr, data) be
//-------------------------------------------------------------------------------------
[
structure Addr:
   [
   blank bit 7
   pfZ bit 4
   pfS23 bit 2
   blank bit 3
   ]

structure Data:
   [
   ReadDebB bit          //low true
   ReadExtStat bit       //low true
   ReadMisc bit          //low true
   ReadRH bit            //low true
   blank bit
   ReadIB bit
   blank bit
   IBHigh bit            //low true
   blank bit 8
   ]

let pfZ = addr<<Addr.pfZ
let pfS23 = addr<<Addr.pfS23

data>>Data.ReadDebB = (pfS23 eq 3 & pfZ eq 8)? low, high
data>>Data.ReadExtStat = (pfS23 eq 3 & pfZ eq 6)? low, high
data>>Data.ReadMisc = (pfS23 eq 3 & pfZ eq 10)? low, high
data>>Data.ReadRH = (pfS23 eq 3 & pfZ eq 11)? low, high
data>>Data.ReadIB = (pfS23 eq 3 & pfZ eq 13)? high, low
data>>Data.IBHigh = (pfS23 eq 3 & pfZ eq 15)? low, high
]
```

```
//-------------------------------------------------------------------------------------
and CPBank3632(addr, data) be
//-------------------------------------------------------------------------------------
[
structure Addr:
   [
   blank bit 7
   Bank bit 4
   UseRom bit
   blank bit 4
   ]

structure Data:
   [
   Rom0CE bit           //high true, aka CS2
   Rom0OE bit           //low true, aka CS1
   Rom1CE bit           //high true, aka CS2
   Rom1OE bit           //low true, aka CS1
   MapFlags bit 2
   blank bit 2
   blank bit 8
   ]

let Bank = addr<<Addr.Bank
let UseRom = addr<<Addr.UseRom

let Rom0CE, Rom0OE = false, false
let Rom1CE, Rom1OE = false, false
let MapFlags = 0

if UseRom then
   [
   if Bank eq 0 then Rom0CE, Rom0OE = true, true
   if Bank eq 1 then Rom1CE, Rom1OE = true, true
   ]

data>>Data.Rom0CE = Rom0CE? high, low
data>>Data.Rom0OE = Rom0OE? low, high
data>>Data.Rom1CE = Rom1CE? high, low
data>>Data.Rom1OE = Rom1OE? low, high
data>>Data.MapFlags = MapFlags
]
```

```
//-------------------------------------------------------------------------------------
and CPBank2732(addr, data) be
//-------------------------------------------------------------------------------------
[
structure Addr:
   [
   blank bit 7
   Bank bit 4
   UseRom bit
   blank bit 4
   ]

structure Data:
   [
   Rom0CE bit           //low true
   Rom0OE bit           //low true
   Rom1CE bit           //low true
   Rom1OE bit           //low true
   MapFlags bit 2
   blank bit 2
   blank bit 8
   ]

let Bank = addr<<Addr.Bank
let UseRom = addr<<Addr.UseRom

let Rom0CE, Rom0OE = false, false
let Rom1CE, Rom1OE = false, false
let MapFlags = 0

if UseRom then
   [
   if Bank eq 0 then Rom0CE, Rom0OE = true, true
   if Bank eq 1 then Rom1CE, Rom1OE = true, true
   ]

data>>Data.Rom0CE = Rom0CE? low, high
data>>Data.Rom0OE = Rom0OE? low, high
data>>Data.Rom1CE = Rom1CE? low, high
data>>Data.Rom1OE = Rom1OE? low, high
data>>Data.MapFlags = MapFlags
]
```

```
//-------------------------------------------------------------------------------------
and Trap(addr, data) be
//-------------------------------------------------------------------------------------
[
manifest
   [
   // These bits appear inverted on X[8-9] when fZ = XLow←Misc.
   // If X[8-9] = zero then a control store parity error occured.
   stateIBEmpty = 0
   stateStack = 1
   stateInit = 2
   stateNoTrap = 3
   stateParity = 3
   ]

structure Addr:
   [
   blank bit 7
   CurrentState bit 2
   TrapIn bit
   IBEmptyTrap bit      //low true
   StackTrap bit
   InitTrap bit         //low true
   ParityTrap bit
   ClrIntTrap bit       //low true
   Cycle1 bit
   ]

structure Data:
   [
   NextState bit 2
   Trap bit
   ParityLED bit        //low true
   ForceBank0 bit
   blank bit 3
   blank bit 8
   ]

let CurrentState = addr<<Addr.CurrentState
let IBEmptyTrap = addr<<Addr.IBEmptyTrap eq low
let StackTrap = addr<<Addr.StackTrap eq high
let InitTrap = addr<<Addr.InitTrap eq low
let ParityTrap = addr<<Addr.ParityTrap eq high
let ClrIntTrap = addr<<Addr.ClrIntTrap eq low
let Cycle1 = addr<<Addr.Cycle1 eq high
let TrapIn = addr<<Addr.TrapIn eq high

let NextState = CurrentState
let Trap = false
```

```
// The Trap machine only remembers one trap.  If multiple traps occur,
//  only one of them is reported.  The priority of reporting is:
//      InitTrap - highest priority
//      ParityTrap
//      StackTrap
//      IBEmptyTrap - lowest priority
// If a trap occurs in an instruction which clears traps, the new trap still takes.
// The instruction at location 0 must read the trap type (XBus+Misc) and
//  clear the trap (ClrIntTrap), or else another trap will occur.

// InitTrap causes a continuous Trap regardless of the cycle.
// The CP repeatedly executes the instruction at location 0.
// The Multibus FSM loops in Cycle 1.
// The control store bank is forced to 0.
// When InitTrap goes away, the processor takes off from location 0 in cycle 1.

// The instruction at location 0, which the CP repeatedly executes while
//  Init is asserted, contains fY = ClrIntTrap.  Unless inhibited, this will
//  cause the trap machine to forget its mission 3 cycles before the processor
//  is finally released from its chains.  TrapIn detects this peculiar
//  combination and remembers it long enough to inhibit ClrIntTrap until the last
//  time that that magic instruction at location 0 is executed.

if ClrIntTrap & CurrentState eq stateInit & (TrapIn % not Cycle1) then ClrIntTrap = false

if ClrIntTrap then NextState = stateNoTrap
if IBEmptyTrap & CurrentState eq stateNoTrap then NextState = stateIBEmpty
if StackTrap & (CurrentState eq stateNoTrap % CurrentState eq stateIBEmpty) then
   NextState = stateStack
if ParityTrap & CurrentState ne stateInit then NextState = stateParity
if InitTrap then NextState = stateInit

// Trap must be asserted during Cycle 2, so we must decide to assert it during Cycle 1.
// A Trap causes the address loaded into NIA at the end of cycle 2 to be zero.
// The instruction at location 0 is fetched in cycle 3 and executed in cycle 1.

if Cycle1 & (NextState ne stateNoTrap % ParityTrap) then Trap = true

// ParityTrap is a level (JK-FF) rather than a 1-cycle pulse like the rest of the traps.
// This is fortunate since the trap mechanism has only 2 state bits but has 5 states:
//      NoTrap, IBEmpty, Stack, Parity, Init.

// InitTraps and ParityTraps go to location 0 in bank 0.
// All other traps go to location 0 in the current bank.
// This trap handler might just pass control to the trap handler in bank 0.

data>>Data.NextState = NextState
data>>Data.ParityLED = ParityTrap? low, high
data>>Data.ForceBank0 = (Trap & ParityTrap) % InitTrap? high, low
data>>Data.Trap = Trap? high, low
]
```

```
DCP-Ints.pal
Last modified October 14, 1982  3:54 PM by Boggs

PALType 16R6

PinDefs

CK
/ClrIntTrap SetInterrupt In0 In1 In2 In3 OtherIn Low
GND /ReadInts
OtherOut /Trans /Out3 /Out2 /Out1 /Out0 /IFF Interrupt
PWR

BEGIN

Out0 := In0;
Out1 := In1;
Out2 := In2;
Out3 := In3;

Trans := In0 /Out0 + /In0 Out0 +
         In1 /Out1 + /In1 Out1 +
         In2 /Out2 + /In2 Out2 +
         In3 /Out3 + /In3 Out3;

IF /Low THEN /OtherOut := /Trans;

IFF := /ClrIntTrap IFF + SetInterrupt + OtherIn + Trans;

IF /Low THEN /Interrupt := /IFF;

END
```

```
DCP-MarHigh.pal
Last modified February 21, 1983  6:45 PM by Boggs

PALType 16R6

PinDefs

CK
MapRef IORef YH0 YH1 YH2 YH3 YH4 RawRef
GND /ReadMAx
MapFlag1 /AD14 /AD15 /AD16 /AD17 SpareOut1 SpareOut2 MapFlag0
PWR

BEGIN

AD14 = IORef YH4;
AD15 = RawRef YH3 + IORef /MapRef YH3;
AD16 = RawRef YH2 + IORef /MapRef YH2;
AD17 = RawRef YH1 + IORef /MapRef YH1;

END
```

```
DCP-MarLow.pal
Last modified February 21, 1983  6:45 PM by Boggs

PALType 16R6

PinDefs

CK
MapRef IORef ADR0in BHENin YH5 YH6 YH7 RawRef
GND /ReadMAx
MapFlag1 /AD11 /AD12 /AD13 /BHEN /ADR0 SpareOut MapFlag0
PWR

BEGIN

AD11 = IORef YH7 + /IORef MapRef;
AD12 = IORef YH6;
AD13 = IORef YH5;
BHEN = BHENin;
ADR0 = ADR0in;

END
```

Page Numbers: Yes First Page: 1
Columns: 2 Edge Margin: .8" Between Columns: .0"
Heading:
DCP-Rev-I.ps
COMPONENTS:

-:	2	12	18			
16R6:	12	14				
25S09:	3	4				
25S10:	5					
27S03:	9					
27S07:	4					
27S27:	8	12	13			
27S29:	4	6	10	13		
2901C:	1					
2950A:	15					
64Kx8:	11					
8SIP:	16					
ALS576:	14					
ALS580:	14					
F93422:	3					
LS273:	15					
LS352:	9					
N276:	7	13				
N376:	13					
OSC:	15					
S00:	3	4	6	9	13	14
	15					
S08:	6	15				
S09:	13	16				
S10:	2	6	9	13		
S138:	13					
S151:	9					
S157:	10					
S182:	2					
S20:	9					
S240:	2	4	5	6	9	10
	12	13	15	16		
S244:	4	5	13	15		
S253:	2					
S257:	3	5	6			
S280:	7					
S32:	6	9	13	16		
S373:	6					
S374:	2	4	6	7	10	12
	16					
S38:	2					
S86:	2	16				
Spare20:	16					

SIGNAL NAMES:

+:	1(1)	2(1)	3(1)	4(1)	5(1)	6(1)
	7(1)	8(1)	9(1)	10(1)	11(1)	12(1)
	13(1)	14(1)	15(1)	16(1)	17(1)	18(1)
12BitCarry:	1(1)	2(1)				
12BitGen':	1(1)	2(1)				
12BitProp':	1(1)	2(1)				
1BitBrEn':	8(1)	9(1)				
2BitBrEn':	8(1)	9(2)				
2xClk':	13(3)	15(2)				
4BitBrEn':	8(1)	9(2)				
4BitCarry:	1(1)	2(1)	9(1)			
4BitGen':	1(1)	2(1)				
4BitProp':	1(1)	2(1)				
8BitCarry:	1(1)	2(2)	9(1)			
8BitGen':	1(1)	2(1)				
8BitProp':	1(1)	2(1)				
aD.0:	1(4)	2(3)	7(1)			
aD.0':	2(3)					
aD.1:	1(4)	2(1)	7(1)			
AD10/:	14(2)	17(1)				
AD11/:	14(1)	17(1)				
AD12/:	14(1)	17(1)				
AD13/:	14(1)	17(1)				
AD14/:	14(1)	17(1)				
AD15/:	14(1)	17(1)				
AD16/:	14(1)	17(1)				
AD17/:	14(1)	17(1)				
ADR0:	8(1)	14(1)				
ADR0/:	14(1)	17(1)				
ADR1/:	14(2)	17(1)				
ADR2/:	14(2)	17(1)				
ADR3/:	14(2)	17(1)				
ADR4/:	14(2)	17(1)				
ADR5/:	14(2)	17(1)				
ADR6/:	14(2)	17(1)				
ADR7/:	14(2)	17(1)				
ADR8/:	14(2)	17(1)				
ADR9/:	14(2)	17(1)				
ADRA/:	14(2)	17(1)				
ADRB/:	14(2)	17(1)				
ADRC/:	14(2)	17(1)				
ADRD/:	14(2)	17(1)				
ADRE/:	14(2)	17(1)				
ADRF/:	14(2)	17(1)				
aF.0:	1(4)	7(1)				
aFh.1:	1(2)	8(1)				
aFh.2:	1(2)	8(1)				
aFl.1:	1(2)	7(1)				

```
IB.6:              6(1)   10(1)
IB.7:              6(1)   10(1)
IBDisp:            6(1)    8(1)
IBEmpty':          6(2)
IBEmptyTrap':      6(1)   12(1)
IBHigh':           6(1)    8(1)
IBPtr.1:           6(1)   10(1)
IBPtr←Byte:        6(1)    8(1)
IBPtr←Word:        6(1)    8(1)
IBRefillTrap:      6(1)   10(1)
IncMP':           15(1)   17(1)
INIT/:            13(2)   17(1)
InitTrap':        12(1)   13(1)   15(1)
INT0/:            12(1)   17(1)
INT1/:            12(1)   17(1)
INT2/:            12(1)   17(1)
INT3/:            12(1)   17(1)
INT4/:            12(1)   17(1)
INT5/:            12(1)   17(1)
INT6/:            12(1)   17(1)
INT7/:            12(1)   17(1)
Interrupt:         6(1)    9(1)   10(1)   12(1)
IOCmd:            13(2)
IORC/:            13(1)   17(1)
IORef:            13(1)   14(2)
IORefY':           8(1)   13(1)
IORefZ':           8(1)   13(1)
IOWC/:            13(1)   17(1)
Link.0':           9(2)
Link.1':           9(2)
Link.2':           9(2)
Link.3':           9(2)
MapFlag.0:        10(1)   14(2)
MapFlag.1:        10(1)   14(2)
MapRef:           13(1)   14(2)
MapRefX':          8(1)   13(1)
MapRefY':          8(1)   13(1)
MarPageCross':     6(1)    9(1)
Master':          13(3)   15(1)
Mem:               6(1)    7(1)   13(1)
MRDC/:            13(1)   17(1)
MWTC/:            13(1)   17(1)
NIA.0:            10(1)   11(6)   17(1)
NIA.1:            10(1)   11(6)   17(1)
NIA.10:            9(1)   10(1)   11(6)   17(1)
NIA.11:            9(1)   10(1)   11(6)   17(1)
NIA.2:            10(1)   11(6)   17(1)
NIA.3:            10(1)   11(6)   17(1)
NIA.4:            10(1)   11(6)   17(1)
NIA.5:            10(1)   11(6)   17(1)
NIA.6:            10(1)   11(6)   17(1)
NIA.7:             9(1)   10(1)   11(6)   17(1)
NIA.8:             9(1)   10(1)   11(6)   17(1)
NIA.9:             9(1)   10(1)   11(6)   17(1)
Overflow:          1(1)    9(1)
paD.0:             7(2)   11(2)   17(1)
paD.1:             7(2)   11(2)   17(1)
paF.0:             7(2)   11(2)   17(1)
paF.1:             7(2)    8(1)   11(2)   17(1)
paF.2:             7(2)    8(1)   11(2)   17(1)
PageCross:         2(1)    6(1)    9(1)
ParityLED':       12(2)
ParityTrap:        7(1)   12(1)
paS.0:             7(2)    8(1)   11(2)   17(1)
paS.1:             7(2)    8(1)   11(2)   17(1)
paS.2:             7(2)    8(1)   11(2)   17(1)
PC16':             2(1)    9(1)
pCIn:              7(2)   11(2)   17(1)
pEnU:              7(2)   11(2)   17(1)
pEP:               7(2)   11(2)   17(1)
pfS.0:             7(1)    8(3)   11(2)   17(1)
pfS.1:             7(1)    8(3)   11(2)   17(1)
pfS.2:             3(1)    7(1)    8(3)   11(2)   17(1)
pfS.3:             7(1)    8(3)   11(2)   17(1)
pfX.0:             7(2)    8(1)   11(2)   17(1)
pfX.1:             7(2)    8(1)   11(2)   17(1)
pfX.2:             7(2)    8(1)   11(2)   17(1)
pfX.3:             7(2)    8(1)   11(2)   17(1)
pfY.0:             7(2)    8(3)   11(2)   17(1)
pfY.1:             7(2)    8(3)   11(2)   17(1)
pfY.2:             7(2)    8(2)   11(2)   17(1)
pfY.3:             7(2)    8(2)   11(2)   17(1)
pfZ.0:             3(1)    7(2)    8(3)   11(2)   17(1)
pfZ.1:             3(1)    7(2)    8(3)   11(2)   17(1)
pfZ.2:             3(1)    7(2)    8(2)   11(2)   17(1)
pfZ.3:             3(1)    7(2)    8(2)   11(2)   17(1)
pMem:              7(2)    8(1)   11(2)   17(1)
pNIA.0:            7(1)   10(1)   11(2)   17(1)
pNIA.1:            7(1)   10(1)   11(2)   17(1)
pNIA.10':          7(1)    9(1)   11(2)   17(1)
pNIA.11':          7(1)    9(1)   11(2)   17(1)
pNIA.2:            7(1)   10(1)   11(2)   17(1)
pNIA.3:            7(1)   10(1)   11(2)   17(1)
pNIA.4:            7(1)   10(1)   11(2)   17(1)
pNIA.5:            7(1)   10(1)   11(2)   17(1)
pNIA.6:            7(1)   10(1)   11(2)   17(1)
pNIA.7:            7(1)   10(1)   11(2)   17(1)
pNIA.8':           7(1)    9(1)   11(2)   17(1)
pNIA.9':           7(1)    9(1)   11(2)   17(1)
PopX:              4(1)    8(1)
PopZ:              4(1)    8(1)
```

```
prA.0:          3(1)    7(2)   11(2)   17(1)
prA.1:          3(1)    7(2)   11(2)   17(1)
prA.2:          3(1)    7(2)   11(2)   17(1)
prA.3:          3(1)    7(2)   11(2)   17(1)
prB.0:          7(2)   11(2)   17(1)
prB.1:          7(2)   11(2)   17(1)
prB.2:          7(2)   11(2)   17(1)
prB.3:          7(2)   11(2)   17(1)
preClk:         3(1)    4(1)    6(2)    7(1)    9(1)   14(2)
               15(2)
PU:             5(1)   10(1)   13(2)   16(1)
PushX:          4(1)    8(1)
PushY:          4(1)    8(1)
PushZ:          4(1)    8(1)
Q.0:            1(1)    2(2)
Q.15:           1(1)    2(1)
Q.7:            1(2)
R.0:            1(1)    2(2)
R.15:           1(1)    2(3)
R.7:            1(2)
rA.0:           1(4)    7(1)
rA.1:           1(4)    7(1)
rA.2:           1(4)    7(1)
rA.3:           1(4)    7(1)
RawClk:        15(1)   17(1)
RawRef:         8(1)   14(2)
rB.0:           1(4)    4(1)    7(1)
rB.1:           1(4)    4(1)    7(1)
rB.2:           1(4)    4(1)    7(1)
rB.3:           1(4)    4(1)    7(1)
ReadCmd:       13(2)
ReadDebA':     15(1)   16(1)   17(1)
ReadDebB':      8(1)   15(1)
ReadExtStat':   8(1)   12(1)   15(1)
ReadIB:         6(1)    8(1)
ReadIB0':       6(2)
ReadIB1':       6(2)
ReadMap':      13(1)   14(1)
ReadMAR':      13(1)   14(1)
ReadMAx':      13(1)   14(1)
ReadMD':        8(1)   14(1)
ReadMDR':      13(1)   14(1)
ReadMisc':      4(1)    8(1)   12(1)
ReadNIA:       10(1)   16(1)   17(1)
ReadRH':        4(1)    8(1)
Rom0CE':       10(1)   11(3)
Rom0OE':       10(1)   11(3)
Rom1CE':       10(1)   11(3)
Rom1OE':       10(1)   11(3)
Run:           15(1)   16(1)   17(1)
SetInterrupt:   8(1)   12(1)
sh:             1(4)    2(1)
Shift':         2(2)    8(1)
StackTrap:      4(1)   12(1)
StkP.0:         3(1)    4(1)
StkP.1:         3(1)    4(1)
StkP.2:         3(1)    4(1)
StkP.3:         3(1)    4(1)
Trap:          10(1)   12(1)
UAddr.0:        3(2)
UAddr.1:        3(2)
UAddr.2:        3(2)
UAddr.3:        3(2)
UAddr.4:        3(2)
UAddr.5:        3(2)
UAddr.6:        3(2)
UAddr.7:        3(2)
UseRom:        10(1)   16(1)   17(1)
VCC:            1(4)    2(4)   11(18)  12(1)   15(1)   16(2)
               17(9)   18(4)
WriteBank:      8(1)   10(1)
WriteCmd:      13(2)
WriteDebA':     8(1)   15(1)
WriteDebB':    15(1)   16(1)   17(1)
WriteExtCtrl:   8(1)   15(1)
WriteIB:        6(2)    8(1)
WriteIBFront:   6(2)
WriteMAR:      13(1)   14(1)
WriteMD:       13(1)   14(1)
WriteMDR:      13(1)   14(1)
WriteRH:        4(1)    8(1)
WriteStkP:      4(1)    8(1)
X.0:            1(1)    3(1)    5(2)    6(1)    9(1)   12(1)
               14(1)
X.1:            1(1)    3(1)    5(2)    6(1)   12(1)   14(1)
X.10:           1(1)    3(1)    4(2)    5(2)    6(3)    9(1)
               14(1)   15(1)
X.11:           1(1)    3(1)    4(2)    5(2)    6(3)    9(1)
               14(1)   15(1)
X.12:           1(1)    3(1)    4(3)    5(2)    6(2)    9(2)
               14(1)   15(2)
X.13:           1(1)    3(1)    4(3)    5(2)    6(2)    9(2)
               14(1)   15(2)
X.14:           1(1)    3(1)    4(3)    5(2)    6(2)    9(1)
               14(1)   15(2)
X.15:           1(1)    3(1)    4(3)    5(2)    6(2)    9(2)
               14(1)   15(2)
X.2:            1(1)    3(1)    5(2)    6(1)   12(1)   14(1)
X.3:            1(1)    3(1)    5(2)    6(1)   12(1)   14(1)
X.4:            1(1)    3(1)    5(2)    6(1)    9(1)   12(1)
               14(1)
```

X.5:	1(1)	3(1)	5(2)	6(1)	12(1)	14(1)
X.6:	1(1)	3(1)	5(2)	6(1)	12(1)	14(1)
X.7:	1(1)	3(1)	5(2)	6(1)	12(1)	14(1)
X.8:	1(1)	3(1)	4(2)	5(2)	6(2)	9(1)
	12(1)	14(1)	15(1)			
X.9:	1(1)	3(1)	4(2)	5(2)	6(2)	9(1)
	12(1)	14(1)	15(1)			
XACK/:	13(1)	17(1)				
XBus←Rot':	5(1)	8(1)				
XHigh←0':	5(1)	8(1)				
XLow←Byte':	5(1)	8(1)				
XLow←Const':	5(1)	8(1)				
XLow←IB':	6(2)	8(1)				
Y.0:	1(1)	3(1)	5(1)	14(3)		
Y.1:	1(1)	3(1)	5(1)	14(3)		
Y.10:	1(1)	3(1)	5(2)	14(2)	15(1)	
Y.11:	1(1)	3(1)	5(2)	14(2)	15(1)	
Y.12:	1(1)	3(2)	4(1)	5(2)	9(1)	10(1)
	14(2)	15(1)				
Y.13:	1(1)	3(2)	4(1)	5(2)	9(1)	10(1)
	14(2)	15(1)				
Y.14:	1(1)	3(2)	4(1)	5(2)	9(1)	10(1)
	14(2)	15(1)				
Y.15:	1(1)	3(2)	4(1)	5(2)	9(1)	10(1)
	14(2)	15(1)				
Y.2:	1(1)	3(1)	5(1)	14(3)		
Y.3:	1(1)	3(1)	5(1)	14(3)		
Y.4:	1(1)	3(1)	5(2)	14(3)		
Y.5:	1(1)	3(1)	5(2)	14(3)		
Y.6:	1(1)	3(1)	5(2)	14(3)		
Y.7:	1(1)	3(1)	5(2)	14(3)		
Y.8:	1(1)	3(1)	5(2)	14(2)	15(1)	
Y.9:	1(1)	3(1)	5(2)	14(2)	15(1)	
YH.0:	4(1)	14(2)				
YH.1:	4(1)	14(2)				
YH.2:	4(1)	14(2)				
YH.3:	4(1)	14(2)				
YH.4:	4(1)	14(2)				
YH.5:	4(1)	14(2)				
YH.6:	4(1)	14(2)				
YH.7:	4(1)	14(2)				
ZeroMP':	15(1)	17(1)				

-/2/J:

#c1	#c10	#c100	#c101	#c102	#c103	#c104	#c105
#c106	#c107	#c108	#c109	#c11	#c110	#c111	#c112
#c113	#c114	#c115	#c12	#c13	#c14	#c15	#c16
#c17	#c18	#c19	#c2	#c20	#c21	#c22	#c23
#c24	#c25	#c26	#c27	#c28	#c29	#c3	#c30
#c31	#c32	#c33	#c34	#c35	#c36	#c37	#c38
#c39	#c4	#c40	#c41	#c42	#c43	#c44	#c45
#c46	#c47	#c48	#c49	#c5	#c50	#c51	#c52
#c53	#c54	#c55	#c56	#c57	#c58	#c59	#c6
#c60	#c61	#c62	#c63	#c64	#c66	#c67	#c68
#c69	#c7	#c70	#c71	#c72	#c73	#c74	#c75
#c76	#c77	#c78	#c79	#c8	#c80	#c81	#c82
#c83	#c84	#c85	#c86	#c87	#c88	#c89	#c9
#c90	#c91	#c92	#c93	#c94	#c95	#c96	#c97
#c98	#c99	#l1	#r2	#r3	#r4	#r5	

16R6/20/N:

#u112	#u113	#u52	#u63

64Kx8/28/N6W:

#u1	#u10	#u11	#u12	#u13	#u14	#u15	#u2
#u3	#u4	#u5	#u6				

74276/20/N:

#u94

74376/16/N:

#u82	#u83

74ALS576/20/N:

#u108	#u109	#u110	#u111	#u97	#u98

74ALS580/20/N:

#u100	#u99

74LS273/20/N:

#u30

74LS352/16/N:

#u56

74S00/14/N:

#u64	#u95

74S08/14/N:

#u53

74S09/14/N:

#u105

74S10/14/N:

#u57	#u84

74S138/16/N:

#u107

74S151/16/N:

#u24	#u34	#u45

74S157/16/N:

#u32	#u33	#u42	#u44

74S182/16/N:

#u87

74S20/14/N:

#u46

74S240/20/N:

#u104	#u31	#u86

74S244/20/N:

#u103	#u47	#u96

74S253/16/N:

#u60

74S257/16/N:

```
    #u43        #u55        #u88        #u92

74S280/14/N:

    #u16        #u18        #u19        #u21        #u7         #u9

74S32/14/N:

    #u106       #u59

74S373/20/N:

    #u61        #u62

74S374/20/N:

    #u22        #u23        #u25        #u26        #u27        #u29        #u50        #u54
    #u75        #u85

74S38/14/N:

    #u48

74S86/14/N:

    #u49

8SIP/8/J1W:

    #r1

93422/22/F4W:

    #u78        #u79        #u80        #u81

AMD25S09/16/N:

    #u115       #u91        #u93

AMD25S10/16/N:

    #u76        #u77        #u89        #u90

AMD27S03/16/N:

    #u58

AMD27S07/16/N:

    #u101       #u102

AMD27S27/22/N4W:

    #u35        #u36        #u37        #u38        #u39        #u40        #u41        #u71
    #u73        #u74

AMD27S29/20/N:

    #u114       #u28        #u51        #u72

AMD2901C/40/J6W:

    #u66        #u67        #u68        #u69

AMD2950/28/J6W:

    #u70

OSCILLATOR/14/N:

    #u65

Spare20/20/J:

    #u17        #u20        #u8
```

```
Universal
;File=DCP-Rev-I.sil Rev=I Date=10/15/84 Page=00 Reference  -MARKED BUILT-
;File=DCP01.sil Rev=I Date=4/22/84 Page=01  -MARKED BUILT-
;File=DCP02.sil Rev=I Date=4/22/84 Page=02  -MARKED BUILT-
;File=DCP03.sil Rev=I Date=6/20/83 Page=03  -MARKED BUILT-
;File=DCP04.sil Rev=I Date=6/29/83 Page=04  -MARKED BUILT-
;File=DCP05.sil Rev=I Date=6/20/83 Page=05  -MARKED BUILT-
;File=DCP06.sil Rev=I Date=6/20/83 Page=06  -MARKED BUILT-
;File=DCP07.sil Rev=I Date=4/22/84 Page=07  -MARKED BUILT-
;File=DCP08.sil Rev=I Date=6/29/83 Page=08  -MARKED BUILT-
;File=DCP09.sil Rev=I Date=4/22/84 Page=09  -MARKED BUILT-
;File=DCP10.sil Rev=I Date=4/22/84 Page=10  -MARKED BUILT-
;File=DCP11.sil Rev=I Date=4/22/84 Page=11  -MARKED BUILT-
;File=DCP12.sil Rev=I Date=10/15/84 Page=12  -MARKED BUILT-
;File=DCP13.sil Rev=I Date=10/15/84 Page=13  -MARKED BUILT-
;File=DCP14.sil Rev=I Date=4/22/84 Page=14  -MARKED BUILT-
;File=DCP15.sil Rev=I Date=4/22/84 Page=15  -MARKED BUILT-
;File=DCP16.sil Rev=I Date=10/15/84 Page=16  MARKED BUILT
;File=DCP17.sil Rev=I Date=10/15/84 Page=17  -MARKED BUILT-
;File=DCP18.sil Rev=I Date=4/22/84 Page=18  -MARKED BUILT-
;File=DCP19.sil Rev=I Date=6/29/83 Page=19 Reference  -MARKED BUILT-
;File=DCP20.sil Rev=I Date=4/22/84 Page=20 Reference  -MARKED BUILT-
;File=DCP21.sil Rev=I Date=10/15/84 Page=21 Reference  -MARKED BUILT-
;File=DCP22.sil Rev=I Date=10/15/84 Page=22 Reference  -MARKED BUILT-
;File=DCP23.sil Rev=I Date=4/22/84 Page=23 Reference  -MARKED BUILT-
; Implicitly generated wiring ...

#c1: (-/2/J) ;
#c10: (-/2/J) ;
#c100: (-/2/J) ;
#c101: (-/2/J) ;
#c102: (-/2/J) ;
#c103: (-/2/J) ;
#c104: (-/2/J) ;
#c105: (-/2/J) ;
#c106: (-/2/J) ;
#c107: (-/2/J) ;
#c108: (-/2/J) ;
#c109: (-/2/J) ;
#c11: (-/2/J) ;
#c110: (-/2/J) ;
#c111: (-/2/J) ;
#c112: (-/2/J) ;
#c113: (-/2/J) ;
#c114: (-/2/J) ;
#c115: (-/2/J) ;
#c12: (-/2/J) ;
#c13: (-/2/J) ;
#c14: (-/2/J) ;
#c15: (-/2/J) ;
#c16: (-/2/J) ;
#c17: (-/2/J) ;
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#c40: (-/2/J) ;
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#c44: (-/2/J) ;
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#c57: (-/2/J) ;
#c58: (-/2/J) ;
#c59: (-/2/J) ;
#c6: (-/2/J) ;
#c60: (-/2/J) ;
#c61: (-/2/J) ;
```

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#c62: (-/2/J) ;
#c63: (-/2/J) ;
#c64: (-/2/J) ;
#c66: (-/2/J) ;
#c67: (-/2/J) ;
#c68: (-/2/J) ;
#c69: (-/2/J) ;
#c7: (-/2/J) ;
#c70: (-/2/J) ;
#c71: (-/2/J) ;
#c72: (-/2/J) ;
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#c94: (-/2/J) ;
#c95: (-/2/J) ;
#c96: (-/2/J) ;
#c97: (-/2/J) ;
#c98: (-/2/J) ;
#c99: (-/2/J) ;
#l1: (-/2/J) ;
#r1: (8SIP/8/J1W) ;
#r2: (-/2/J) ;
#r3: (-/2/J) ;
#r4: (-/2/J) ;
#r5: (-/2/J) ;
#u1: (64Kx8/28/N6W) ;
#u10: (64Kx8/28/N6W) ;
#u100: (74ALS580/20/N) ;
#u101: (AMD27S07/16/N) ;
#u102: (AMD27S07/16/N) ;
#u103: (74S244/20/N) ;
#u104: (74S240/20/N) ;
#u105: (74S09/14/N) ; 8,9,10,11,12,13
#u106: (74S32/14/N) ; 11,12,13
#u107: (74S138/16/N) ; 7,9,14,15
#u108: (74ALS576/20/N) ;
#u109: (74ALS576/20/N) ;
#u11: (64Kx8/28/N6W) ;
#u110: (74ALS576/20/N) ;
#u111: (74ALS576/20/N) ;
#u112: (16R6/20/N) ; 18
#u113: (16R6/20/N) ; 17,18
#u114: (AMD27S29/20/N) ; 7,8,9
#u115: (AMD25S09/16/N) ;
#u12: (64Kx8/28/N6W) ;
#u13: (64Kx8/28/N6W) ;
#u14: (64Kx8/28/N6W) ;
#u15: (64Kx8/28/N6W) ;
#u16: (74S280/14/N) ; 3,5
#u17: (Spare20/20/J) ; 1,2,3,4,5,6,7,8,9,11,12,13,14,15,16,17,18,19
#u18: (74S280/14/N) ; 3,5
#u19: (74S280/14/N) ; 3,5
#u2: (64Kx8/28/N6W) ;
#u20: (Spare20/20/J) ; 1,2,3,4,5,6,7,8,9,11,12,13,14,15,16,17,18,19
#u21: (74S280/14/N) ; 3,5
#u22: (74S374/20/N) ;
#u23: (74S374/20/N) ;
#u24: (74S151/16/N) ; 1,5
#u25: (74S374/20/N) ;
#u26: (74S374/20/N) ;
#u27: (74S374/20/N) ; 2
#u28: (AMD27S29/20/N) ; 13,14
#u29: (74S374/20/N) ;
#u3: (64Kx8/28/N6W) ;
#u30: (74LS273/20/N) ; 12
#u31: (74S240/20/N) ; 9,11
#u32: (74S157/16/N) ;
#u33: (74S157/16/N) ;
#u34: (74S151/16/N) ; 5
#u35: (AMD27S27/22/N4W) ; 7
#u36: (AMD27S27/22/N4W) ;
#u37: (AMD27S27/22/N4W) ; 14,15
#u38: (AMD27S27/22/N4W) ;
#u39: (AMD27S27/22/N4W) ; 7,9
#u4: (64Kx8/28/N6W) ;
#u40: (AMD27S27/22/N4W) ;
#u41: (AMD27S27/22/N4W) ; 12,14
#u42: (74S157/16/N) ;
#u43: (74S257/16/N) ;
#u44: (74S157/16/N) ;
```

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#u45: (74S151/16/N) ; 1,5
#u46: (74S20/14/N) ; 3,11
#u47: (74S244/20/N) ;
#u48: (74S38/14/N) ;
#u49: (74S86/14/N) ; 11,12,13
#u5: (64Kx8/28/N6W) ;
#u50: (74S374/20/N) ; 18,19
#u51: (AMD27S29/20/N) ;
#u52: (16R6/20/N) ; 12,13,18
#u53: (74S08/14/N) ;
#u54: (74S374/20/N) ;
#u55: (74S257/16/N) ;
#u56: (74LS352/16/N) ; 3,13
#u57: (74S10/14/N) ;
#u58: (AMD27S03/16/N) ;
#u59: (74S32/14/N) ;
#u6: (64Kx8/28/N6W) ;
#u60: (74S253/16/N) ;
#u61: (74S373/20/N) ;
#u62: (74S373/20/N) ;
#u63: (16R6/20/N) ; 13,18,19
#u64: (74S00/14/N) ;
#u65: (OSCILLATOR/14/N) ; 1,2,3,4,5,6,9,10,11,12,13
#u66: (AMD2901C/40/J6W) ; 31,33,34
#u67: (AMD2901C/40/J6W) ; 31,33,34
#u68: (AMD2901C/40/J6W) ; 32,35
#u69: (AMD2901C/40/J6W) ; 31,33,34
#u7: (74S280/14/N) ; 3,5
#u70: (AMD2950/28/J6W) ;
#u71: (AMD27S27/22/N4W) ; 13,14,15
#u72: (AMD27S29/20/N) ;
#u73: (AMD27S27/22/N4W) ; 13,14,15
#u74: (AMD27S27/22/N4W) ;
#u75: (74S374/20/N) ;
#u76: (AMD25S10/16/N) ;
#u77: (AMD25S10/16/N) ;
#u78: (93422/22/F4W) ;
#u79: (93422/22/F4W) ;
#u8: (Spare20/20/J) ; 1,2,3,4,5,6,7,8,9,11,12,13,14,15,16,17,18,19
#u80: (93422/22/F4W) ;
#u81: (93422/22/F4W) ;
#u82: (74376/16/N) ;
#u83: (74376/16/N) ;
#u84: (74S10/14/N) ;
#u85: (74S374/20/N) ;
#u86: (74S240/20/N) ;
#u87: (74S182/16/N) ; 5,6,7,10
#u88: (74S257/16/N) ;
#u89: (AMD25S10/16/N) ;
#u9: (74S280/14/N) ; 3,5
#u90: (AMD25S10/16/N) ;
#u91: (AMD25S09/16/N) ;
#u92: (74S257/16/N) ;
#u93: (AMD25S09/16/N) ;
#u94: (74276/20/N) ;
#u95: (74S00/14/N) ;
#u96: (74S244/20/N) ;
#u97: (74ALS576/20/N) ;
#u98: (74ALS576/20/N) ;
#u99: (74ALS580/20/N) ;
@

CALIBRATE: <1>   ; INSTALL welder nose, board wiring side up ...
    #TopRight {0,0}       #TopLeft {0,0}       #? {0,0}             #? {0,0}

12BitCarry: <382> (196)
    #u87.9o {204,92}      #u68.29i {24,108}

12BitGen': <364> (148)
    #u87.14i {204,72}     #u67.32o {80,96}

12BitProp': <337> (140)
    #u87.15i {204,68}     #u67.35o {80,84}

1BitBrEn': <324> (100)
    #u34.7i {220,168}     #u36.15o {124,172}

2BitBrEn': <44> (88)
    #u36.14o {124,176}    #u45.7i {188,168}     #u24.7i {204,168}

2xClk': <31> (1052)
    #u73.16i {916,168}    #u74.16i {896,168}    #u31.12o {280,176}    #u70.24i {296,216}
    #u82.9i {44,228}      #u83.9i {28,228}      #u94.8i {32,172}      #u94.13i {44,172}

4BitBrEn': <53> (228)
    #u56.15i {312,148}    #u56.1i {300,144}     #u36.13o {124,180}

4BitCarry: <328> (288)
    #u66.29i {52,108}     #u87.12o {204,80}     #u34.12i {232,160}

4BitGen': <326> (108)
    #u87.3i {192,72}      #u69.32o {108,96}

4BitProp': <318> (92)
    #u87.4i {192,76}      #u69.35o {108,84}

8BitCarry: <299> (248)
    #u67.29i {80,108}     #u49.10i {124,80}     #u87.11o {204,84}     #u34.15i {232,148}

8BitGen': <371> (172)
    #u87.1i {192,64}      #u66.32o {52,96}
```

```
8BitProp': <366> (156)
    #u87.2i {192,68}      #u66.35o {52,84}

aD.0: <165> (844)
    #u68.7i {0,88}        #u66.7i {28,88}       #u67.7i {56,88}       #u69.7i {84,88}
    #u86.17i {140,76}     #u48.4i {176,76}      #u60.15i {220,68}     #u25.16o {812,80}

aD.0': <179> (88)
    #u86.3o {128,72}      #u48.1i {176,64}      #u60.1i {208,64}

aD.1: <164> (824)
    #u68.5i {0,80}        #u66.5i {28,80}       #u67.5i {56,80}       #u69.5i {84,80}
    #u60.2i {208,68}      #u25.19o {812,68}

AD10/: <198> (388)
    #u108.19o {188,204}   #u97.19o {156,204}    E128 {0,4}

AD11/: <418> (340)
    E130 {8,4}            #u112.13o {124,228}

AD12/: <417> (328)
    E132 {16,4}           #u112.14o {124,224}

AD13/: <410> (316)
    E134 {24,4}           #u112.15o {124,220}

AD14/: <422> (356)
    E257 {4,8}            #u113.13o {140,228}

AD15/: <420> (348)
    E258 {8,8}            #u113.14o {140,224}

AD16/: <450> (584)
    E255 {508,4}          #u113.15o {140,220}

AD17/: <421> (348)
    E256 {0,8}            #u113.16o {140,216}

ADR0: <327> (108)
    #u112.4i {112,212}    #u40.7o {48,168}

ADR0/: <387> (216)
    E157 {116,4}          #u112.17o {124,212}

ADR1/: <183> (312)
    #u109.12o {204,232}   #u98.12o {172,232}    E158 {120,4}

ADR2/: <187> (320)
    #u109.13o {204,228}   #u98.13o {172,228}    E155 {108,4}

ADR3/: <184> (312)
    #u109.14o {204,224}   #u98.14o {172,224}    E156 {112,4}

ADR4/: <188> (320)
    #u109.15o {204,220}   #u98.15o {172,220}    E153 {100,4}

ADR5/: <185> (312)
    #u109.16o {204,216}   #u98.16o {172,216}    E154 {104,4}

ADR6/: <189> (320)
    #u109.17o {204,212}   #u98.17o {172,212}    E151 {92,4}

ADR7/: <186> (312)
    #u109.18o {204,208}   #u98.18o {172,208}    E152 {96,4}

ADR8/: <190> (320)
    #u109.19o {204,204}   #u98.19o {172,204}    E149 {84,4}

ADR9/: <193> (328)
    #u108.12o {188,232}   #u97.12o {156,232}    E150 {88,4}

ADRA/: <196> (336)
    #u108.13o {188,228}   #u97.13o {156,228}    E147 {76,4}

ADRB/: <194> (328)
    #u108.14o {188,224}   #u97.14o {156,224}    E148 {80,4}

ADRC/: <197> (336)
    #u108.15o {188,220}   #u97.15o {156,220}    E145 {68,4}

ADRD/: <191> (328)
    #u108.16o {188,216}   #u97.16o {156,216}    E146 {72,4}

ADRE/: <195> (336)
    #u108.17o {188,212}   #u97.17o {156,212}    E143 {60,4}

ADRF/: <192> (328)
    #u108.18o {188,208}   #u97.18o {156,208}    E144 {64,4}

aF.0: <160> (796)
    #u68.27i {24,116}     #u66.27i {52,116}     #u67.27i {80,116}     #u69.27i {108,116}
    #u25.9o {800,96}

aFh.1: <258> (212)
    #u68.28i {24,112}     #u67.28i {80,112}     #u37.10o {168,180}

aFh.2: <260> (224)
    #u68.26i {24,120}     #u67.26i {80,120}     #u37.12o {184,184}

aFl.1: <264> (776)
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    #u66.28i {52,112}     #u69.28i {108,112}    #u25.12o {812,96}

aFl.2: <248> (796)
    #u66.26i {52,120}     #u69.26i {108,120}    #u49.9i {124,84}      #u25.15o {812,84}

AltBoot: <332> (128)
    C505 {484,44}         #u47.11i {556,100}

AltUAddr: <419> (348)
    #u40.15o {64,172}     #u92.1i {304,64}

aSh.0: <259> (220)
    #u68.14i {0,116}      #u67.14i {56,116}     #u37.7o {168,168}

aSh.1: <261> (228)
    #u68.13i {0,112}      #u67.13i {56,112}     #u37.8o {168,172}

aSh.2: <262> (236)
    #u68.12i {0,108}      #u67.12i {56,108}     #u37.9o {168,176}

aSl.0: <269> (820)
    #u66.14i {28,116}     #u69.14i {84,116}     #u25.2o {800,68}

aSl.1: <267> (804)
    #u66.13i {28,112}     #u69.13i {84,112}     #u25.5o {800,80}

aSl.2: <265> (796)
    #u66.12i {28,108}     #u69.12i {84,108}     #u25.6o {800,84}

Bank.0: <210> (352)
    #u28.1i {428,144}     #u23.2o {396,148}     #u33.2i {332,148}     C303 {188,40}

Bank.1: <233> (368)
    #u28.2i {428,148}     #u23.5o {396,160}     #u33.5i {332,160}     C304 {192,40}

Bank.2: <232> (368)
    #u28.3i {428,152}     #u23.6o {396,164}     #u33.11i {344,164}    C305 {196,40}

Bank.3: <133> (716)
    #u10.2i {752,148}     #u11.2i {724,148}     #u12.2i {696,148}     #u14.2i {668,148}
    #u13.2i {640,148}     #u15.2i {612,148}     #u6.2i {584,148}      #u4.2i {556,148}
    #u5.2i {528,148}      #u3.2i {500,148}      #u2.2i {472,148}      #u1.2i {444,148}
    #u28.4i {428,156}     #u23.9o {396,176}     #u33.14i {344,152}    C306 {200,40}

BCLK: <456> (624)
    #u31.13i {280,172}    #u73.9o {900,176}

BCLK/: <394> (604)
    #u94.3i {32,152}      #u31.7o {268,168}     E113 {452,0}

BHEN: <297> (72)
    #u112.5i {112,216}    #u39.14o {144,176}

BHEN/: <452> (600)
    E127 {508,0}          #u112.16o {124,216}

BlankMP': <428> (416)
    C511 {508,44}         #u30.19o {252,204}

Boot': <7> (624)
    #u105.1i {64,200}     #u105.2i {64,204}     #r1.6i {300,220}      C507 {492,44}

BPRN/: <423> (932)
    #u94.2i {32,148}      E115 {460,0}          #u106.9i {732,84}

BUSY: <446> (544)
    #u31.5o {268,160}     #u106.10i {732,80}

BUSY/: <400> (624)
    #u105.6o {64,220}     #u31.15i {280,164}    E117 {468,0}

C.0: <398> (268)
    #u42.2i {380,148}     #u57.8o {172,88}

C.1: <404> (296)
    #u42.5i {380,160}     #u57.6o {160,84}

C.2: <338> (140)
    #u42.11i {392,164}    #u46.6o {252,164}

C.3: <361> (144)
    #u42.14i {392,152}    #u46.8o {264,168}

CarryIn: <5> (208)
    #u60.11i {220,84}     #u60.12i {220,80}     #r2.1o {224,64}       #u60.4i {208,76}
    #u87.13i {204,76}     #u48.8o {188,88}      #u48.11o {188,76}     #u48.5i {176,80}
    #u69.29i {108,108}

CarryOut: <305> (276)
    #u68.33o {24,92}      #u60.10i {220,88}     #u34.14i {232,152}

CIn: <120> (704)
    #u86.15i {140,84}     #u64.2i {288,68}      #u79.18i {368,80}     #u80.18i {388,80}
    #u78.18i {408,80}     #u81.18i {428,80}     #u27.5o {816,80}

CIn←PC16X': <309> (208)
    #u48.13i {188,68}     #u49.1i {112,64}      #u35.12o {104,184}

CIn←PC16Z': <372> (176)
    #u40.10o {48,180}     #u49.2i {112,68}
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Clk'a: <89> (984)
    #u29.11i {844,100}    #u27.11i {828,100}    #u25.11i {812,100}    #u26.11i {796,100}
    #u22.11i {424,180}    #u23.11i {408,180}    #u31.18o {280,152}    #u69.15i {84,120}
    #u67.15i {56,120}     #u66.15i {28,120}     #u68.15i {0,120}

Clk'b: <121> (748)
    #u71.16i {796,168}    #u31.16o {280,160}    #u37.16i {184,168}    #u41.16i {164,168}
    #u39.16i {144,168}    #u36.16i {124,168}    #u35.16i {104,168}    #u38.16i {84,168}
    #u40.16i {64,168}

Clk'c: <91> (1088)
    #u70.20i {296,232}    #u31.14o {280,168}    #u50.11i {156,100}    #u93.9i {332,92}
    #u91.9i {348,92}      #u115.9i {444,92}     #u52.1i {800,144}     #u63.1i {816,144}
    #u75.11i {860,180}    #u85.11i {876,180}

ClrIntTrap': <199> (804)
    #u94.17i {44,156}     #u38.9o {68,176}      #u71.5i {780,160}     #u52.2i {800,148}

Cycle1: <334> (788)
    #u74.12o {896,184}    #u71.6i {780,164}     #u84.1i {640,64}      C446 {248,44}

Cycle2: <204> (940)
    #u74.13o {896,180}    #u37.5i {168,160}     #u45.2i {188,148}     C445 {244,44}

Cycle3: <385> (948)
    #u74.14o {896,176}    #u37.4i {168,156}     C448 {256,44}

CycleX': <383> (196)
    #u35.10o {88,180}     #u57.13i {172,68}

CycleY': <373> (180)
    #u38.15o {84,172}     #u57.2i {160,68}

DAT0/: <350> (408)
    #u100.9i {80,232}     #u111.12o {220,232}   E173 {180,4}

DAT1/: <344> (400)
    #u100.8i {80,228}     #u111.13o {220,228}   E174 {184,4}

DAT2/: <351> (408)
    #u100.7i {80,224}     #u111.14o {220,224}   E171 {172,4}

DAT3/: <345> (400)
    #u100.6i {80,220}     #u111.15o {220,220}   E172 {176,4}

DAT4/: <352> (408)
    #u100.5i {80,216}     #u111.16o {220,216}   E169 {164,4}

DAT5/: <346> (400)
    #u100.4i {80,212}     #u111.17o {220,212}   E170 {168,4}

DAT6/: <353> (408)
    #u100.3i {80,208}     #u111.18o {220,208}   E167 {156,4}

DAT7/: <347> (400)
    #u100.2i {80,204}     #u111.19o {220,204}   E168 {160,4}

DAT8/: <354> (420)
    #u110.12o {236,232}   #u99.9i {96,232}      E165 {148,4}

DAT9/: <355> (420)
    #u110.13o {236,228}   #u99.8i {96,228}      E166 {152,4}

DATA/: <348> (404)
    #u110.14o {236,224}   #u99.7i {96,224}      E163 {140,4}

DATB/: <349> (404)
    #u110.15o {236,220}   #u99.6i {96,220}      E164 {144,4}

DATC/: <342> (388)
    #u110.16o {236,216}   #u99.5i {96,216}      E161 {132,4}

DATD/: <343> (388)
    #u110.17o {236,212}   #u99.4i {96,212}      E162 {136,4}

DATE/: <339> (372)
    #u110.18o {236,208}   #u99.3i {96,208}      E159 {124,4}

DATF/: <340> (372)
    #u110.19o {236,204}   #u99.2i {96,204}      E160 {128,4}

DCP01.sil+1: <236> (48)
    #u67.16i {56,124}     #u68.21o {24,140}

DCP01.sil+2: <272> (60)
    #u67.8i {56,92}       #u68.9o {0,96}

DCP01.sil+3: <271> (60)
    #u69.8i {84,92}       #u66.9o {28,96}

DCP01.sil+4: <237> (48)
    #u69.16i {84,124}     #u66.21o {52,140}

DCP02.sil+1: <4> (88)
    #u49.3o {112,72}      #u49.4i {112,76}      #u48.9i {188,84}

DCP02.sil+2: <223> (44)
    #u50.3i {144,72}      #u49.6o {112,84}

DCP02.sil+3: <290> (68)
    #u48.12i {188,72}     #u86.5o {128,80}
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DCP03.sil+1: <35> (16)
#u92.4o {304,76} #u93.4i {320,76}

DCP03.sil+2: <129> (24)
#u92.7o {304,88} #u93.5i {320,80}

DCP03.sil+3: <135> (28)
#u92.9o {316,92} #u93.12i {332,80}

DCP03.sil+4: <97> (20)
#u92.12o {316,80} #u93.13i {332,76}

DCP03.sil+5: <116> (140)
#u81.20i {428,72} #u78.20i {408,72} #u80.20i {388,72} #u79.20i {368,72}
#u64.3o {288,72}

DCP04.sil+1: <51> (196)
#u101.3i {480,72} #u102.3i {464,72} #u64.8o {300,88}

DCP04.sil+2: <110> (88)
#u104.2i {512,68} #u114.1i {448,64} #u115.2o {432,68}

DCP04.sil+3: <209> (108)
#u104.4i {512,76} #u114.2i {448,68} #u115.7o {432,88}

DCP04.sil+4: <112> (92)
#u104.6i {512,84} #u115.10o {444,88} #u114.3i {448,72}

DCP04.sil+5: <27> (92)
#u104.8i {512,92} #u114.4i {448,76} #u115.15o {444,68}

DCP04.sil+6: <408> (312)
#u50.4i {144,76} #u114.6o {448,84}

DCP06.sil+1: <39> (36)
#u54.3i {736,72} #u62.2o {752,68} #u61.2o {768,68}

DCP06.sil+10: <437> (472)
#u64.11o {300,76} #u54.11i {748,100}

DCP06.sil+11: <443> (532)
#u50.13i {156,92} #u51.14o {684,88}

DCP06.sil+12: <445> (540)
#u50.8i {144,92} #u51.13o {684,92}

DCP06.sil+13: <380> (572)
#u51.18i {684,72} #u104.11i {524,100} #u50.9o {144,96}

DCP06.sil+14: <442> (528)
#u51.7o {672,88} #u50.7i {144,88}

DCP06.sil+15: <441> (504)
#u50.14i {156,88} #u53.6o {656,84}

DCP06.sil+2: <38> (36)
#u54.4i {736,76} #u62.5o {752,80} #u61.5o {768,80}

DCP06.sil+3: <37> (36)
#u54.7i {736,88} #u62.6o {752,84} #u61.6o {768,84}

DCP06.sil+4: <36> (36)
#u54.8i {736,92} #u62.9o {752,96} #u61.9o {768,96}

DCP06.sil+5: <43> (36)
#u54.13i {748,92} #u62.12o {764,96} #u61.12o {780,96}

DCP06.sil+6: <42> (36)
#u54.14i {748,88} #u62.15o {764,84} #u61.15o {780,84}

DCP06.sil+7: <41> (36)
#u54.17i {748,76} #u62.16o {764,80} #u61.16o {780,80}

DCP06.sil+8: <40> (36)
#u54.18i {748,72} #u62.19o {764,68} #u61.19o {780,68}

DCP06.sil+9: <49> (152)
#u61.11i {780,100} #u62.11i {764,100} #u53.3o {656,72}

DCP07.sil+1: <473> (884)
#u7.13i {28,148} #u19.6o {848,84}

DCP07.sil+2: <474> (904)
#u7.12i {28,152} #u16.6o {864,84}

DCP07.sil+3: <475> (924)
#u7.11i {28,156} #u21.6o {880,84}

DCP07.sil+4: <476> (944)
#u7.10i {28,160} #u18.6o {896,84}

DCP07.sil+5: <136> (28)
#u7.9i {28,164} #u9.6o {0,164}

DCP07.sil+6: <224> (44)
#u94.19i {44,148} #u7.6o {16,164}

DCP09.sil+1: <312> (84)
#u45.6o {188,164} #u46.1i {252,144}

DCP09.sil+10: <389> (232)
#u56.7o {300,168} #u57.4i {160,76}

DCP09.sil+11: <390> (232)
#u56.9o {312,172} #u57.10i {172,80}

DCP09.sil+12: <239> (48)
#u59.1i {284,144} #u58.5o {316,160}

DCP09.sil+2: <302> (76)
#u24.6o {204,164} #u46.13i {264,148}

DCP09.sil+3: <227> (44)
#u34.6o {220,164} #u46.9i {264,164}

DCP09.sil+4: <319> (92)
#u95.6o {236,164} #u58.3i {316,152}

DCP09.sil+5: <30> (536)
#u59.5i {284,160} #u59.2i {284,148} #u59.13i {296,148} #u59.10i {296,160}
#u106.6o {720,84}

DCP09.sil+6: <226> (44)
#u59.4i {284,156} #u58.7o {316,168}

DCP09.sil+7: <213> (40)
#u59.9i {296,164} #u58.9o {328,172}

DCP09.sil+8: <225> (44)
#u59.12i {296,152} #u58.11o {328,164}

DCP09.sil+9: <222> (564)
#u95.5i {236,160} #u31.3o {268,152} #u106.5i {720,80}

DCP10.sil+1: <238> (48)
#u22.8i {412,172} #u32.12o {376,160}

DCP10.sil+10: <253> (56)
#u23.7i {396,168} #u33.9o {344,172}

DCP10.sil+11: <303> (76)
#u23.4i {396,156} #u33.7o {332,168}

DCP10.sil+12: <291> (68)
#u23.3i {396,152} #u33.4o {332,156}

DCP10.sil+13: <274> (60)
#u42.4o {380,156} #u22.13i {424,172}

DCP10.sil+14: <228> (44)
#u42.7o {380,168} #u22.14i {424,168}

DCP10.sil+15: <240> (48)
#u42.9o {392,172} #u22.17i {424,156}

DCP10.sil+16: <215> (40)
#u42.12o {392,160} #u22.18i {424,152}

DCP10.sil+17: <58> (340)
#u22.1i {412,144} #u23.1i {396,144} #u86.7o {128,88}

DCP10.sil+2: <214> (40)
#u22.7i {412,168} #u32.9o {376,172}

DCP10.sil+3: <273> (60)
#u22.4i {412,156} #u32.7o {364,168}

DCP10.sil+4: <247> (52)
#u22.3i {412,152} #u32.4o {364,156}

DCP10.sil+5: <254> (56)
#u44.12o {360,160} #u23.18i {408,152}

DCP10.sil+6: <284> (64)
#u44.9o {360,172} #u23.17i {408,156}

DCP10.sil+7: <275> (60)
#u44.7o {348,168} #u23.14i {408,168}

DCP10.sil+8: <304> (76)
#u44.4o {348,156} #u23.13i {408,172}

DCP10.sil+9: <283> (64)
#u23.8i {396,172} #u33.12o {344,160}

DCP12.sil+1: <143> (376)
#u104.17i {524,76} #u71.7o {780,168} #u71.19i {796,156}

DCP12.sil+10: <285> (64)
#u63.7i {816,168} #u75.19o {860,148}

DCP12.sil+11: <177> (32)
#u63.12o {828,176} #u52.8i {800,172}

DCP12.sil+12: <105> (20)
#u75.3i {848,152} #u85.2o {864,148}

DCP12.sil+13: <104> (20)
#u75.4i {848,156} #u85.5o {864,160}

DCP12.sil+14: <103> (20)

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    #u75.7i {848,168}     #u85.6o {864,164}

DCP12.sil+15: <102> (20)
    #u75.8i {848,172}     #u85.9o {864,176}

DCP12.sil+16: <101> (20)
    #u75.13i {860,172}    #u85.12o {876,176}

DCP12.sil+17: <100> (20)
    #u75.14i {860,168}    #u85.15o {876,164}

DCP12.sil+18: <99> (20)
    #u75.17i {860,156}    #u85.16o {876,160}

DCP12.sil+19: <98> (20)
    #u75.18i {860,152}    #u85.19o {876,148}

DCP12.sil+2: <211> (376)
    #u104.15i {524,84}    #u71.20i {796,152}    #u71.8o {780,172}

DCP12.sil+3: <256> (56)
    #u75.9o {848,176}     #u52.7i {800,168}

DCP12.sil+4: <242> (48)
    #u75.6o {848,164}     #u52.6i {800,164}

DCP12.sil+5: <241> (48)
    #u75.5o {848,160}     #u52.5i {800,160}

DCP12.sil+6: <255> (56)
    #u75.2o {848,148}     #u52.4i {800,156}

DCP12.sil+7: <286> (64)
    #u63.4i {816,156}     #u75.12o {860,176}

DCP12.sil+8: <244> (48)
    #u63.5i {816,160}     #u75.15o {860,164}

DCP12.sil+9: <243> (48)
    #u63.6i {816,164}     #u75.16o {860,160}

DCP13.sil+1: <127> (976)
    #u73.21i {916,148}    #u74.21i {896,148}    #u74.9o {880,176}     #u72.3i {0,208}

DCP13.sil+10: <207> (36)
    #u83.10i {28,224}     #u72.9o {0,232}

DCP13.sil+11: <125> (968)
    #u72.4i {0,212}       #u74.10o {880,180}    #u74.1i {880,144}     #u73.1i {900,144}

DCP13.sil+12: <3> (48)
    #u94.6o {32,164}      #u83.15i {28,204}     #u83.14i {28,208}

DCP13.sil+13: <118> (492)
    #u95.11o {248,156}    #u84.4i {640,76}      #u84.9i {652,84}

DCP13.sil+14: <26> (76)
    #u72.11o {12,236}     #u82.7i {32,224}      #u82.10i {44,224}     #u82.2i {32,204}

DCP13.sil+15: <25> (56)
    #u72.7o {0,224}       #u83.6i {16,220}      #u83.3i {16,208}      #u83.11i {28,220}

DCP13.sil+16: <178> (32)
    #u83.2i {16,204}      #u72.6o {0,220}

DCP13.sil+17: <472> (768)
    #u94.4i {32,156}      #u106.8o {732,88}

DCP13.sil+18: <461> (644)
    #u96.2i {560,68}      #u107.13o {60,212}

DCP13.sil+19: <459> (640)
    #u96.4i {560,76}      #u107.12o {60,216}

DCP13.sil+2: <126> (968)
    #u73.20i {916,152}    #u74.20i {896,152}    #u74.8o {880,172}     #u72.2i {0,204}

DCP13.sil+20: <458> (636)
    #u96.6i {560,84}      #u107.11o {60,220}

DCP13.sil+21: <457> (632)
    #u96.8i {560,92}      #u107.10o {60,224}

DCP13.sil+3: <124> (960)
    #u73.19i {916,156}    #u74.19i {896,156}    #u74.7o {880,168}     #u72.1i {0,200}

DCP13.sil+4: <229> (44)
    #u82.3i {32,208}      #u72.12o {12,232}

DCP13.sil+5: <137> (28)
    #u82.6i {32,220}      #u72.13o {12,228}

DCP13.sil+6: <208> (36)
    #u82.11i {44,220}     #u72.14o {12,224}

DCP13.sil+7: <2> (44)
    #u94.15o {44,164}     #u82.15i {44,204}     #u82.14i {44,208}

DCP13.sil+8: <122> (944)
    #u73.4i {900,156}     #u74.4i {880,156}     #u82.13o {44,212}     #u72.17i {12,212}
```

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DCP13.sil+9: <106> (20)
    #u83.7i {16,224}      #u72.8o {0,228}

DCP14.sil+1: <46> (100)
    #u111.11i {220,236}   #u110.11i {236,236}   #u95.3o {236,152}

DCP14.sil+2: <54> (240)
    #u95.8o {248,168}     #u109.11i {204,236}   #u108.11i {188,236}   #u98.11i {172,236}
    #u97.11i {156,236}    #u113.1i {128,200}    #u112.1i {112,200}

DCP15.sil+1: <16> (496)
    #u31.8i {268,172}     #u53.9i {668,84}      #u53.11o {668,76}

DCP15.sil+2: <379> (188)
    #u64.6o {288,84}      #u30.11i {252,236}

DebAFull: <397> (656)
    #u47.15i {556,84}     C435 {204,44}         #u70.11o {272,240}

DebBFull: <391> (616)
    #u47.17i {556,76}     C436 {208,44}         #u70.5o {272,216}

DebData.0: <414> (320)
    C427 {172,44}         #u70.18o {296,240}

DebData.1: <413> (320)
    C428 {176,44}         #u70.17o {296,244}

DebData.2: <412> (320)
    C429 {180,44}         #u70.16o {296,248}

DebData.3: <411> (320)
    C430 {184,44}         #u70.15o {296,252}

DebData.4: <403> (292)
    C431 {188,44}         #u70.14o {272,252}

DebData.5: <401> (284)
    C432 {192,44}         #u70.13o {272,248}

DebData.6: <399> (268)
    C433 {196,44}         #u70.10o {272,236}

DebData.7: <395> (260)
    C434 {200,44}         #u70.9o {272,232}

dGoodIBDisp: <212> (40)
    C424 {160,44}         #u50.16o {156,80}

DoIt: <415> (784)
    #u74.15o {896,172}    #u53.10i {668,80}     C444 {240,44}

DP.0: <425> (408)
    C506 {488,44}         #u30.2o {240,204}

DP.1: <431> (428)
    C508 {496,44}         #u30.5o {240,216}

DP.2: <434> (440)
    C510 {504,44}         #u30.6o {240,220}

DP.3: <430> (424)
    C512 {0,48}           #u30.9o {240,232}

EnC2Funs: <367> (660)
    #u51.16i {684,80}     #u95.13i {248,148}    #u50.15o {156,84}

EnU: <117> (448)
    #u79.17i {368,84}     #u80.17i {388,84}     #u78.17i {408,84}     #u81.17i {428,84}
    #u27.6o {816,84}

F.0: <393> (252)
    #u34.4i {220,156}     #u68.31o {24,100}

Feq0: <144> (416)
    #r3.1o {272,64}       #u34.3i {220,152}     #u86.11i {140,100}    #u69.11o {84,104}
    #u67.11o {56,104}     #u66.11o {28,104}     #u68.11o {0,104}

Fne0: <360> (144)
    #u34.2i {220,148}     #u86.9o {128,96}

ForceBank0: <438> (488)
    #u71.12o {796,184}    #u33.15i {344,148}

fX.0: <333> (604)
    #u27.12o {828,96}     #u106.4i {720,76}     #u58.2i {316,148}

fX.1: <448> (572)
    #u58.1i {316,144}     #u27.15o {828,84}

fX.2: <447> (568)
    #u58.15i {328,148}    #u27.16o {828,80}

fX.3: <449> (584)
    #u58.14i {328,152}    #u27.19o {828,68}

fY.0: <406> (304)
    #u29.2o {832,68}      #u88.2i {528,68}

fY.1: <71> (724)
    #u45.9i {200,172}     #u24.9i {216,172}     #u34.9i {232,172}     #u88.5i {528,80}
```

#u29.6o {832,80}

fY.2: <70> (716)
#u45.10i {200,168} #u24.10i {216,168} #u34.10i {232,168} #u56.2i {300,148}
#u88.11i {540,84} #u29.6o {832,84}

fY.3: <72> (748)
#u45.11i {200,164} #u24.11i {216,164} #u34.11i {232,164} #u56.14i {312,152}
#u88.14i {540,72} #u29.9o {832,96}

fZ.0: <416> (328)
#u29.12o {844,96} #u47.2i {544,68}

fZ.1: <407> (308)
#u29.15o {844,84} #u47.4i {544,76}

fZ.2: <59> (352)
#u47.6i {544,84} #u76.9i {588,92} #u77.9i {604,92} #u89.9i {620,92}
#u90.9i {636,92} #u43.1i {688,64} #u29.16o {844,80}

fZ.3: <56> (324)
#u47.8i {544,92} #u76.10i {588,88} #u77.10i {604,88} #u89.10i {620,88}
#u90.10i {636,88} #u29.19o {844,68}

GND: <13> (22312)
#u65.7i {256,224} #u30.10i {240,236} #u110.10i {224,236} #u111.10i {208,236}
#u109.10i {192,236} #u108.10i {176,236} #u98.10i {160,236} #u97.10i {144,236}
#u113.10i {128,236} #u112.10i {112,236} #u99.10i {96,236} #u100.10i {80,236}
#u105.7i {64,224} #u107.8i {48,228} #u82.8i {32,228} #u83.8i {16,228}
#u72.10i {0,236} #u73.11i {900,184} #u74.11i {880,184} #u85.10i {864,180}
#u75.10i {848,180} #u63.10i {816,180} #u52.10i {800,180} #u71.11i {780,184}
#u10.14i {752,196} #u11.14i {724,196} #u12.14i {696,196} #u14.14i {668,196}
#u13.14i {640,196} #u15.14i {612,196} #u6.14i {584,196} #u4.14i {556,196}
#u5.14i {528,196} #u3.14i {500,196} #u2.14i {472,196} #u1.14i {444,196}
#u28.10i {428,180} #u22.10i {412,180} #u23.10i {396,180} #u42.8i {380,172}
#u32.8i {364,172} #u44.8i {348,172} #u33.8i {332,172} #u58.8i {316,172}
#u56.8i {300,172} #u59.7i {284,168} #u31.10i {268,180} #u46.7i {252,168}
#u95.7i {236,168} #u34.8i {220,172} #u24.8i {204,172} #u45.8i {188,172}
#u37.11i {168,184} #u41.11i {148,184} #u39.11i {128,184} #u36.11i {108,184}
#u35.11i {88,184} #u38.11i {68,184} #u40.11i {48,184} #u94.10i {32,180}
#u7.7i {16,168} #u9.7i {0,168} #u18.7i {896,88} #u21.7i {880,88}
#u16.7i {864,88} #u19.7i {848,88} #u29.10i {832,100} #u27.10i {816,100}
#u25.10i {800,100} #u26.10i {784,100} #u61.10i {768,100} #u62.10i {752,100}
#u54.10i {736,100} #u106.7i {720,88} #u55.8i {704,92} #u43.8i {688,92}
#u51.10i {672,100} #u53.7i {656,88} #u84.7i {640,88} #u90.8i {624,92}
#u89.8i {608,92} #u77.8i {592,92} #u76.8i {576,92} #u96.10i {560,100}
#u47.10i {544,100} #u88.8i {528,92} #u104.10i {512,100} #u103.10i {496,100}
#u101.8i {480,92} #u102.8i {464,92} #u114.10i {448,100} #u115.8i {432,92}
#u81.8i {412,92} #u78.8i {392,92} #u80.8i {372,92} #u79.8i {352,92}
#u91.8i {336,92} #u93.8i {320,92} #u92.8i {304,92} #u64.7i {288,88}
#u60.8i {208,92} #u87.8i {192,92} #u48.7i {176,88} #u57.7i {160,88}
#u50.10i {144,100} #u86.10i {128,100} #u49.7i {112,88} #c97.1o {336,260}
#c98.1o {320,260} #c99.1o {304,260} #c100.1o {272,260} #c101.1o {288,260}
#c102.1o {256,260} #c103.1o {240,260} #c104.1o {208,260} #c105.1o {224,260}
#c106.1o {192,260} #c107.1o {176,260} #c108.1o {144,260} #c109.1o {160,260}
#c110.1o {128,260} #c111.1o {112,260} #c112.1o {96,260} #c113.1o {48,260}
#c114.1o {64,260} #c115.1o {80,260} #c66.1o {464,256} #c67.1o {480,256}
#c68.1o {512,256} #c69.1o {496,256} #c70.1o {528,256} #c71.1o {544,256}
#c72.1o {576,256} #c73.1o {560,256} #c74.1o {592,256} #c75.1o {608,256}
#c76.1o {640,256} #c77.1o {624,256} #c78.1o {656,256} #c79.1o {672,256}
#c80.1o {688,256} #c81.1o {32,260} #c82.1o {16,260} #c83.1o {0,260}
#c84.1o {880,256} #c85.1o {896,256} #c86.1o {864,256} #c87.1o {848,256}
#c88.1o {816,256} #c89.1o {832,256} #c90.1o {800,256} #c91.1o {784,256}
#c92.1o {752,256} #c93.1o {768,256} #c94.1o {736,256} #c95.1o {720,256}
#c96.1o {704,256} #c33.1o {448,256} #c34.1o {432,256} #c35.1o {416,256}
#c36.1o {384,256} #c37.1o {400,256} #c38.1o {368,256} #c39.1o {352,256}
#c40.1o {320,256} #c41.1o {336,256} #c42.1o {304,256} #c43.1o {288,256}
#c44.1o {256,256} #c45.1o {272,256} #c46.1o {240,256} #c47.1o {224,256}
#c48.1o {208,256} #c49.1o {864,200} #c50.1o {880,200} #c51.1o {896,200}
#c52.1o {16,256} #c53.1o {0,256} #c54.1o {32,256} #c55.1o {48,256}
#c56.1o {80,256} #c57.1o {64,256} #c58.1o {96,256} #c59.1o {112,256}
#c60.1o {144,256} #c61.1o {128,256} #c62.1o {160,256} #c63.1o {176,256}
#c64.1o {192,256} #c1.1o {352,200} #c2.1o {368,200} #c3.1o {384,200}
#c4.1o {416,200} #c5.1o {400,200} #c6.1o {432,200} #c7.1o {448,200}
#c8.1o {480,200} #c9.1o {464,200} #c10.1o {496,200} #c11.1o {512,200}
#c12.1o {544,200} #c13.1o {528,200} #c14.1o {560,200} #c15.1o {576,200}
#c16.1o {592,200} #c17.1o {848,200} #c18.1o {832,200} #c19.1o {816,200}
#c20.1o {784,200} #c21.1o {800,200} #c22.1o {768,200} #c23.1o {752,200}
#c24.1o {720,200} #c25.1o {736,200} #c26.1o {704,200} #c27.1o {688,200}
#c28.1o {656,200} #c29.1o {672,200} #c30.1o {640,200} #c31.1o {624,200}
#c32.1o {608,200} E185 {228,4} E186 {232,4} E176 {192,4}
E175 {188,4} E112 {448,0} E111 {444,0} E102 {408,0}
E101 {404,0} C501 {468,44} C450 {264,44} C449 {260,44}
C350 {376,40} C349 {372,40} C325 {276,40} C326 {280,40}
C425 {164,44} C426 {168,44} C402 {72,44} C401 {68,44}
C302 {184,40} C301 {180,40} #u8.10i {320,236} #u17.10i {336,236}
#u20.10i {304,236} #u86.19i {140,68} #u31.19i {280,148} #u50.1i {144,64}
#u31.1i {268,144} #u70.22i {296,224} #u107.4i {48,212} #u107.5i {48,216}
#u74.17i {896,164} #u72.15i {12,220} #u73.17i {916,164} #u73.18i {916,160}
#u74.18i {896,160} #u52.9i {800,176} #u63.2i {816,148} #u63.3i {816,152}
#u63.8i {816,172} #u63.9i {816,176} #u71.18i {796,160} #u75.1i {848,144}
#u85.1i {864,144} #u71.17i {796,164} #u28.15i {440,164} #u28.16i {440,160}
#u28.17i {440,156} #u28.18i {440,152} #u28.19i {440,148} #u44.3i {348,152}
#u58.13i {328,156} #u37.6i {168,164} #u37.18i {184,160} #u37.17i {184,164}
#u36.6i {108,164} #u41.17i {164,164} #u39.17i {144,164} #u36.17i {124,164}
#u35.17i {104,164} #u38.17i {84,164} #u40.17i {64,164} #u39.18i {144,160}
#u39.4i {128,156} #u39.5i {128,160} #u39.6i {128,164} #u40.18i {64,160}
#u40.4i {48,156} #u40.5i {48,160} #u40.6i {48,164} #u41.4i {148,156}
#u41.5i {148,160} #u41.6i {148,164} #u38.4i {68,156} #u38.5i {68,160}
#u38.6i {68,164} #u35.2i {88,148} #u35.3i {88,152} #u35.4i {88,156}
#u35.5i {88,160} #u35.6i {88,164} #u35.18i {104,160} #u36.18i {124,160}

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    #u38.18i {84,160}     #u41.18i {164,160}    #u7.1i {16,144}       #u29.1i {832,64}
    #u27.1i {816,64}      #u25.1i {800,64}      #u26.1i {784,64}      #u43.3i {688,72}
    #u43.6i {688,84}      #u43.10i {700,88}     #u43.13i {700,76}     #u51.15i {634,84}
    #u54.1i {736,64}      #u96.11i {572,100}    #u96.13i {572,92}     #u96.15i {572,84}
    #u96.17i {572,76}     #u88.3i {528,72}      #u88.6i {528,84}      #u88.10i {540,88}
    #u88.13i {540,76}     #u102.2i {464,68}     #u101.2i {480,68}     #u114.15i {460,84}
    #u81.19i {428,76}     #u78.19i {408,76}     #u80.19i {388,76}     #u79.19i {368,76}
    #u92.15i {316,68}     #u91.3i {336,72}      #u91.6i {336,84}      #u91.11i {348,84}
    #u91.14i {348,72}     #u69.30o {108,104}    #u66.40i {52,64}      #u66.30o {52,104}
    #u68.40i {24,64}      #u67.30o {80,104}     #u68.30o {24,104}     #u69.40i {108,64}
    #u67.40i {80,64}

GoodIBDisp: <69> (644)
    #u51.6o {672,84}      #u42.1i {380,144}     #u32.1i {364,144}     #u50.17i {156,76}

IB.0: <63> (456)
    #u54.2o {736,68}      #u55.2i {704,68}      #u43.2i {688,68}      #u32.3i {364,152}

IB.1: <62> (456)
    #u54.5o {736,80}      #u55.5i {704,80}      #u43.5i {688,80}      #u32.6i {364,164}

IB.2: <61> (444)
    #u54.6o {736,84}      #u55.11i {716,84}     #u43.11i {700,84}     #u32.10i {376,168}

IB.3: <64> (468)
    #u54.9o {736,96}      #u55.14i {716,72}     #u43.14i {700,72}     #u32.13i {376,156}

IB.4: <293> (472)
    #u54.12o {748,96}     #u55.3i {704,72}      #u42.3i {380,152}

IB.5: <234> (448)
    #u54.15o {748,84}     #u55.6i {704,84}      #u42.6i {380,164}

IB.6: <219> (444)
    #u54.16o {748,80}     #u55.10i {716,88}     #u42.10i {392,168}

IB.7: <218> (444)
    #u54.19o {748,68}     #u55.13i {716,76}     #u42.13i {392,156}

IBDisp: <468> (720)
    #u38.10o {68,180}     #u51.1i {672,64}

IBEmpty': <451> (592)
    #u50.6o {144,84}      #u106.2i {720,68}

IBEmptyTrap': <298> (204)
    #u53.5i {656,80}      #u106.3o {720,72}     #u71.1i {780,144}

IBHigh': <462> (648)
    #u41.15o {164,172}    #u55.1i {704,64}

IBPtr.1: <377> (676)
    #u50.12o {156,96}     #u44.13i {360,156}    #u104.13i {524,92}    #u51.19i {684,68}

IBPtr←Byte: <467> (716)
    #u40.8o {48,172}      #u51.5i {672,80}

IBPtr←Word: <469> (724)
    #u40.9o {48,176}      #u51.4i {672,76}

IBRefillTrap: <424> (376)
    #u44.1i {348,144}     #u51.8o {672,92}

IncMP': <427> (412)
    C515 {12,48}          #u30.15o {252,220}

INIT/: <19> (664)
    #u105.3o {64,208}     #u94.9i {32,176}      #u94.7i {32,168}      E114 {456,0}

InitTrap': <123> (960)
    #u72.18i {12,208}     #u83.13o {28,212}     #u30.1i {240,200}     #u71.3i {780,152}
    #u74.5i {880,160}     #u73.5i {900,160}

INT0/: <478> (960)
    E141 {52,4}           #u85.3i {864,152}

INT1/: <477> (960)
    E142 {56,4}           #u85.4i {864,156}

INT2/: <480> (984)
    E139 {44,4}           #u85.7i {864,168}

INT3/: <479> (984)
    E140 {48,4}           #u85.8i {864,172}

INT4/: <484> (1008)
    E137 {36,4}           #u85.13i {876,172}

INT5/: <483> (1000)
    E138 {40,4}           #u85.14i {876,168}

INT6/: <482> (1000)
    E135 {28,4}           #u85.17i {876,156}

INT7/: <481> (992)
    E136 {32,4}           #u85.18i {876,152}

Interrupt: <370> (780)
    #u34.1i {220,144}     #u44.10i {360,168}    #u51.17i {684,76}     #u52.19o {812,148}

IOCmd: <230> (44)
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    #u83.4o {16,212}      #u107.1i {48,200}

IORC/: <374> (184)
    E121 {484,0}          #u96.12o {572,96}

IORef: <92> (1088)
    #u72.5i {0,216}       #u112.3i {112,208}    #u113.3i {128,208}    #u84.8o {652,88}
    #u74.2i {880,148}     #u73.2i {900,148}

IORefY': <454> (616)
    #u84.11i {652,76}     #u39.12o {144,184}

IORefZ': <464> (692)
    #u84.10i {652,80}     #u40.12o {64,184}

IOWC/: <368> (164)
    E122 {488,0}          #u96.16o {572,80}

Link.0': <378> (188)
    #u59.3o {284,152}     #u57.11i {172,76}

Link.1': <386> (208)
    #u57.5i {160,80}      #u59.6o {284,164}

Link.2': <282> (64)
    #u46.2i {252,148}     #u59.8o {296,168}

Link.3': <206> (36)
    #u46.10i {264,160}    #u59.11o {296,156}

MapFlag.0: <57> (340)
    #u28.11o {440,180}    #u113.19o {140,204}   #u112.19o {124,204}

MapFlag.1: <60> (372)
    #u28.12o {440,176}    #u113.12o {140,232}   #u112.12o {124,232}

MapRef: <93> (1088)
    #u73.3i {900,152}     #u74.3i {880,152}     #u84.6o {640,84}      #u113.2i {128,204}
    #u112.2i {112,204}    #u72.16i {12,216}

MapRefX': <460> (644)
    #u84.3i {640,72}      #u35.13o {104,180}

MapRefY': <453> (604)
    #u84.5i {640,80}      #u39.8o {128,172}

MarPageCross': <15> (496)
    #u53.4i {656,76}      #u84.12o {652,72}     #u46.5i {252,160}

Master': <11> (1576)
    #u105.5i {64,216}     #u105.4i {64,212}     #u72.19i {12,204}     #u94.5o {32,160}
    #u47.13i {556,92}     #u74.6i {880,164}     #u73.6i {900,164}     #u96.1i {560,64}

Mem: <381> (680)
    #u27.9o {816,96}      #u84.13i {652,68}     #u95.12i {248,152}

MRDC/: <375> (184)
    E119 {476,0}          #u96.14o {572,88}

MWTC/: <369> (164)
    E120 {480,0}          #u96.18o {572,72}

NIA.0: <157> (688)
    #u10.10i {752,180}    #u11.10i {724,180}    #u12.10i {696,180}    #u14.10i {668,180}
    #u13.10i {640,180}    #u15.10i {612,180}    #u6.10i {584,180}     #u4.10i {556,180}
    #u5.10i {528,180}     #u3.10i {500,180}     #u2.10i {472,180}     #u1.10i {444,180}
    #u23.12o {408,176}    C307 {204,40}

NIA.1: <156> (680)
    #u10.9i {752,176}     #u11.9i {724,176}     #u12.9i {696,176}     #u14.9i {668,176}
    #u13.9i {640,176}     #u15.9i {612,176}     #u6.9i {584,176}      #u4.9i {556,176}
    #u5.9i {528,176}      #u3.9i {500,176}      #u2.9i {472,176}      #u1.9i {444,176}
    #u23.15o {408,164}    C308 {208,40}

NIA.10: <155> (680)
    #u10.21i {776,172}    #u11.21i {748,172}    #u12.21i {720,172}    #u14.21i {692,172}
    #u13.21i {664,172}    #u15.21i {636,172}    #u6.21i {608,172}     #u4.21i {580,172}
    #u5.21i {552,172}     #u3.21i {524,172}     #u2.21i {496,172}     #u1.21i {468,172}
    #u22.16o {424,160}    #u58.10i {328,168}    C317 {244,40}

NIA.11: <153> (676)
    #u10.23i {776,164}    #u11.23i {748,164}    #u12.23i {720,164}    #u14.23i {692,164}
    #u13.23i {664,164}    #u15.23i {636,164}    #u6.23i {608,164}     #u4.23i {580,164}
    #u5.23i {552,164}     #u3.23i {524,164}     #u2.23i {496,164}     #u1.23i {468,164}
    #u22.19o {424,148}    #u58.12i {328,160}    C318 {248,40}

NIA.2: <152> (672)
    #u10.8i {752,172}     #u11.8i {724,172}     #u12.8i {696,172}     #u14.8i {668,172}
    #u13.8i {640,172}     #u15.8i {612,172}     #u6.8i {584,172}      #u4.8i {556,172}
    #u5.8i {528,172}      #u3.8i {500,172}      #u2.8i {472,172}      #u1.8i {444,172}
    #u23.16o {408,160}    C309 {212,40}

NIA.3: <151> (664)
    #u10.7i {752,168}     #u11.7i {724,168}     #u12.7i {696,168}     #u14.7i {668,168}
    #u13.7i {640,168}     #u15.7i {612,168}     #u6.7i {584,168}      #u4.7i {556,168}
    #u5.7i {528,168}      #u3.7i {500,168}      #u2.7i {472,168}      #u1.7i {444,168}
    #u23.19o {408,148}    C310 {216,40}

NIA.4: <149> (656)
    #u10.6i {752,164}     #u11.6i {724,164}     #u12.6i {696,164}     #u14.6i {668,164}
    #u13.6i {640,164}     #u15.6i {612,164}     #u6.6i {584,164}      #u4.6i {556,164}
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    #u5.6i {528,164}      #u3.6i {500,164}      #u2.6i {472,164}      #u1.6i {444,164}
    #u22.2o {412,148}     C311 {220,40}

NIA.5: <147> (648)
    #u10.5i {752,160}     #u11.5i {724,160}     #u12.5i {696,160}     #u14.5i {668,160}
    #u13.5i {640,160}     #u15.5i {612,160}     #u6.5i {584,160}      #u4.5i {556,160}
    #u5.5i {528,160}      #u3.5i {500,160}      #u2.5i {472,160}      #u1.5i {444,160}
    #u22.5o {412,160}     C312 {224,40}

NIA.6: <148> (656)
    #u10.4i {752,156}     #u11.4i {724,156}     #u12.4i {696,156}     #u14.4i {668,156}
    #u13.4i {640,156}     #u15.4i {612,156}     #u6.4i {584,156}      #u4.4i {556,156}
    #u5.4i {528,156}      #u3.4i {500,156}      #u2.4i {472,156}      #u1.4i {444,156}
    #u22.6o {412,164}     C313 {228,40}

NIA.7: <154> (680)
    #u10.3i {752,152}     #u11.3i {724,152}     #u12.3i {696,152}     #u14.3i {668,152}
    #u13.3i {640,152}     #u15.3i {612,152}     #u6.3i {584,152}      #u4.3i {556,152}
    #u5.3i {528,152}      #u3.3i {500,152}      #u2.3i {472,152}      #u1.3i {444,152}
    #u22.9o {412,176}     #u31.17i {280,156}    C314 {232,40}

NIA.8: <158> (696)
    #u10.25i {776,156}    #u11.25i {748,156}    #u12.25i {720,156}    #u14.25i {692,156}
    #u13.25i {664,156}    #u15.25i {636,156}    #u6.25i {608,156}     #u4.25i {580,156}
    #u5.25i {552,156}     #u3.25i {524,156}     #u2.25i {496,156}     #u1.25i {468,156}
    #u22.12o {424,176}    #u58.4i {316,156}     C315 {236,40}

NIA.9: <150> (664)
    #u10.24i {776,160}    #u11.24i {748,160}    #u12.24i {720,160}    #u14.24i {692,160}
    #u13.24i {664,160}    #u15.24i {636,160}    #u6.24i {608,160}     #u4.24i {580,160}
    #u5.24i {552,160}     #u3.24i {524,160}     #u2.24i {496,160}     #u1.24i {468,160}
    #u22.15o {424,164}    #u58.6i {316,164}     C316 {240,40}

Overflow: <396> (264)
    #u24.12i {216,160}    #u68.34o {24,88}

paD.0: <306> (824)
    #u16.8i {876,88}      #u25.17i {812,76}     #u11.18o {748,184}    #u2.18o {496,184}
    C335 {316,40}

paD.1: <266> (796)
    #u16.4i {864,76}      #u25.18i {812,72}     #u11.19o {748,180}    #u2.19o {496,180}
    C336 {320,40}

paF.0: <320> (848)
    #u16.11i {876,76}     #u25.8i {800,92}      #u11.15o {748,196}    #u2.15o {496,196}
    C332 {304,40}

paF.1: <308> (1076)
    #u37.1i {168,144}     C333 {308,40}         #u2.16o {496,192}     #u11.16o {748,192}
    #u25.13i {812,92}     #u16.10i {876,80}

paF.2: <295> (1068)
    #u37.2i {168,148}     C334 {312,40}         #u2.17o {496,188}     #u11.17o {748,188}
    #u25.14i {812,88}     #u16.9i {876,84}

PageCross: <365> (680)
    #u84.2i {640,68}      #u45.12i {200,160}    #u49.8o {124,88}

ParityLED': <325> (100)
    #l1.2i {844,144}      #u71.10o {780,180}

ParityTrap: <470> (740)
    #u71.4i {780,156}     #u94.16o {44,160}

paS.0: <270> (1036)
    #u19.1i {848,64}      #u25.3i {800,72}      #u11.11o {724,184}    #u2.11o {472,184}
    #u37.19i {184,156}    C329 {292,40}

paS.1: <314> (1072)
    #u37.20i {184,152}    C330 {296,40}         #u2.12o {472,188}     #u11.12o {724,188}
    #u25.4i {800,76}      #u16.13i {876,68}

paS.2: <321> (1072)
    #u37.21i {184,148}    C331 {300,40}         #u2.13o {472,192}     #u11.13o {724,192}
    #u25.7i {800,88}      #u16.12i {876,72}

PC16': <231> (184)
    #u49.5i {112,80}      #u50.2o {144,68}      #u48.10i {188,80}     #u24.2i {204,148}

pCIn: <276> (808)
    #u16.1i {864,64}      #u27.4i {816,76}      #u12.12o {696,188}    #u3.12o {500,188}
    C338 {328,40}

pEnU: <322> (836)
    #u21.13i {892,68}     #u27.7i {816,88}      #u12.13o {696,192}    #u3.13o {500,192}
    C339 {332,40}

pEP: <249> (800)
    #u16.2i {864,68}      #u27.3i {816,72}      #u12.11o {696,184}    #u3.11o {500,184}
    C337 {324,40}

pfS.0: <34> (1216)
    #u38.2i {68,148}      #u36.19i {124,156}    #u39.2i {128,148}     C341 {340,40}
    #u3.16o {524,192}     #u12.16o {720,192}    #u21.11i {892,76}

pfS.1: <10> (1192)
    #u38.3i {68,152}      #u36.20i {124,152}    #u39.3i {128,152}     C342 {344,40}
    #u3.17o {524,188}     #u12.17o {720,188}    #u21.10i {892,80}

pfS.2: <96> (1352)
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    #u21.9i {892,84}      #u12.18o {720,184}    #u3.18o {524,184}     #u91.1i {336,64}
    #u93.1i {320,64}      C343 {348,40}         #u40.2i {48,148}      #u36.21i {124,148}
    #u41.2i {148,148}

pfS.3: <246> (1204)
    #u40.3i {48,152}      #u36.1i {108,144}     #u41.3i {148,152}     C344 {352,40}
    #u3.19o {524,180}     #u12.19o {720,180}    #u21.8i {892,88}

pfX.0: <296> (1144)
    #u35.19i {104,156}    C345 {356,40}         #u4.11o {556,184}     #u13.11o {640,184}
    #u27.13i {828,92}     #u21.4i {880,76}

pfX.1: <301> (1156)
    #u35.20i {104,152}    C346 {360,40}         #u4.12o {556,188}     #u13.12o {640,188}
    #u27.14i {828,88}     #u21.2i {880,68}

pfX.2: <288> (1164)
    #u35.21i {104,148}    C347 {364,40}         #u4.13o {556,192}     #u13.13o {640,192}
    #u27.17i {828,76}     #u21.1i {880,64}

pfX.3: <315> (1208)
    #u35.1i {88,144}      C348 {368,40}         #u4.15o {580,196}     #u13.15o {664,196}
    #u27.18i {828,72}     #u18.13i {908,68}

pfY.0: <134> (1100)
    #u18.12i {908,72}     #u29.3i {832,72}      #u13.16o {664,192}    #u4.16o {580,192}
    #u39.19i {144,156}    #u36.4i {108,156}     #u38.19i {84,156}     C403 {76,44}

pfY.1: <205> (1100)
    #u18.11i {908,76}     #u29.4i {832,76}      #u13.17o {664,188}    #u4.17o {580,188}
    #u39.20i {144,152}    #u36.5i {108,160}     #u38.20i {84,152}     C404 {80,44}

pfY.2: <278> (1068)
    #u18.10i {908,80}     #u29.7i {832,88}      #u13.18o {664,184}    #u4.18o {580,184}
    #u39.21i {144,148}    #u38.21i {84,148}     C405 {84,44}

pfY.3: <279> (1092)
    #u18.9i {908,84}      #u29.8i {832,92}      #u13.19o {664,180}    #u4.19o {580,180}
    #u39.1i {128,144}     #u38.1i {68,144}      C406 {88,44}

pfZ.0: <252> (1300)
    C407 {92,44}          #u40.19i {64,156}     #u36.2i {108,148}     #u41.19i {164,156}
    #u92.2i {304,68}      #u5.11o {528,184}     #u14.11o {668,184}    #u29.13i {844,92}
    #u18.8i {908,88}

pfZ.1: <235> (1264)
    C408 {96,44}          #u40.20i {64,152}     #u36.3i {108,152}     #u41.20i {164,152}
    #u92.5i {304,80}      #u5.12o {528,188}     #u14.12o {668,188}    #u29.14i {844,88}
    #u18.4i {896,76}

pfZ.2: <280> (1268)
    #u18.2i {896,68}      #u29.17i {844,76}     #u14.13o {668,192}    #u5.13o {528,192}
    #u92.11i {316,84}     #u41.21i {164,148}    #u40.21i {64,148}     C409 {100,44}

pfZ.3: <281> (1320)
    #u40.1i {48,144}      #u41.1i {148,144}     C410 {104,44}         #u92.14i {316,72}
    #u5.15o {552,196}     #u14.15o {692,196}    #u29.18i {844,72}     #u18.1i {896,64}

pMem: <323> (1116)
    #u37.3i {168,152}     C340 {336,40}         #u3.15o {524,196}     #u12.15o {720,196}
    #u27.8i {816,92}      #u21.12i {892,72}

pNIA.0: <358> (924)
    #u14.16o {692,192}    #u5.16o {552,192}     #u44.2i {348,148}     #u9.13i {12,148}
    C411 {108,44}

pNIA.1: <357> (924)
    #u14.17o {692,188}    #u5.17o {552,188}     #u44.5i {348,160}     #u9.12i {12,152}
    C412 {112,44}

pNIA.10': <169> (872)
    #u7.4i {16,156}       C421 {148,44}         #u46.4i {252,156}     #u6.18o {608,184}
    #u15.18o {636,184}

pNIA.11': <166> (860)
    #u15.19o {636,180}    #u6.19o {608,180}     #u46.12i {264,152}    C422 {152,44}
    #u7.2i {16,148}

pNIA.2: <356> (924)
    #u14.18o {692,184}    #u5.18o {552,184}     #u44.11i {360,164}    #u9.11i {12,156}
    C413 {116,44}

pNIA.3: <359> (932)
    #u14.19o {692,180}    #u5.19o {552,180}     #u44.14i {360,152}    C414 {120,44}
    #u9.10i {12,160}

pNIA.4: <167> (860)
    #u15.11o {612,184}    #u6.11o {584,184}     #u32.2i {364,148}     C415 {124,44}
    #u9.9i {12,164}

pNIA.5: <168> (868)
    #u15.12o {612,188}    #u6.12o {584,188}     #u32.5i {364,160}     C416 {128,44}
    #u9.8i {12,168}

pNIA.6: <170> (872)
    #u15.13o {612,192}    #u6.13o {584,192}     #u32.11i {376,164}    C417 {132,44}
    #u9.4i {0,156}

pNIA.7: <172> (892)
    #u15.15o {636,196}    #u6.15o {608,196}     #u32.14i {376,152}    C418 {136,44}
    #u9.2i {0,148}
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pNIA.8': <171> (884)
#u15.16o {636,192} #u6.16o {608,192} #u57.9i {172,84} C419 {140,44}
#u9.1i {0,144}

pNIA.9': <173> (900)
#u15.17o {636,188} #u6.17o {608,188} #u7.8i {28,168} #u57.3i {160,72}
C420 {144,44}

PopX: <433> (440)
#u35.14o {104,176} #u114.5i {448,80}

PopZ: <439> (496)
#u40.13o {64,180} #u114.16i {460,80}

prA.0: <311> (868)
#u19.13i {860,68} #u26.3i {784,72} #u10.11o {752,184} #u1.11o {444,184}
#u91.4i {336,76} C319 {252,40}

prA.1: <310> (868)
#u19.12i {860,72} #u26.4i {784,76} #u10.12o {752,188} #u1.12o {444,188}
#u91.5i {336,80} C320 {256,40}

prA.2: <317> (868)
#u19.11i {860,76} #u26.7i {784,88} #u10.13o {752,192} #u1.13o {444,192}
#u91.12i {348,80} C321 {260,40}

prA.3: <316> (868)
#u19.10i {860,80} #u26.8i {784,92} #u10.15o {776,196} #u1.15o {468,196}
#u91.13i {348,76} C322 {264,40}

prB.0: <300> (852)
#u19.9i {860,84} #u26.13i {796,92} #u10.16o {776,192} #u1.16o {468,192}
C323 {268,40}

prB.1: <287> (836)
#u19.8i {860,88} #u26.14i {796,88} #u10.17o {776,188} #u1.17o {468,188}
C324 {272,40}

prB.2: <250> (816)
#u19.4i {848,76} #u26.17i {796,76} #u10.18o {776,184} #u1.18o {468,184}
C327 {284,40}

prB.3: <268> (812)
#u19.2i {848,68} #u26.18i {796,72} #u10.19o {776,180} #u1.19o {468,180}
C328 {288,40}

preClk: <23> (1028)
#u53.8o {668,88} #u53.1i {656,64} #u64.12i {300,72} #u64.10i {300,80}
#u61.5i {288,80} #u64.1i {288,64} #u31.2i {268,148} #u31.4i {268,156}
#u95.10i {248,160} #u95.4i {236,156} #u94.18i {44,152} #u95.2i {236,148}
#u31.6i {268,164}

PU: <21> (888)
#u94.11i {44,180} #u94.1i {32,144} #u86.8i {128,92} #u86.6i {128,84}
#u86.4i {128,76} #u86.2i {128,68} #u83.1i {16,200} #u82.1i {32,200}
#u107.6i {48,220} #r1.8i {300,228} #u44.6i {348,164}

PushX: <435> (452)
#u35.15o {104,172} #u114.17i {460,76}

PushY: <432> (440)
#u39.10o {128,180} #u114.18i {460,72}

PushZ: <440> (504)
#u40.14o {64,176} #u114.19i {460,68}

Q.0: <6> (340)
#r5.1o {256,64} #u60.5i {208,80} #u60.6i {208,84} #u48.3o {176,72}
#u68.16i {0,124}

Q.15: <313> (208)
#r4.1o {240,64} #u48.6o {176,84} #u69.21o {108,140}

Q.7: <289> (68)
#u66.16i {28,124} #u67.21o {80,140}

R.0: <181> (252)
#u60.3i {208,72} #u60.9o {220,92} #u68.8i {0,92}

R.15: <132> (196)
#u60.13i {220,76} #u60.7o {208,88} #u48.2i {176,68} #u69.9o {84,96}

R.7: <175> (32)
#u66.8i {28,92} #u67.9o {56,96}

rA.0: <159> (788)
#u68.1i {0,64} #u66.1i {28,64} #u67.1i {56,64} #u69.1i {84,64}
#u26.2o {784,68}

rA.1: <162> (796)
#u68.2i {0,68} #u66.2i {28,68} #u67.2i {56,68} #u69.2i {84,68}
#u26.5o {784,80}

rA.2: <161> (796)
#u68.3i {0,72} #u66.3i {28,72} #u67.3i {56,72} #u69.3i {84,72}
#u26.6o {784,84}

rA.3: <163> (804)
#u68.4i {0,76} #u66.4i {28,76} #u67.4i {56,76} #u69.4i {84,76}
#u26.9o {784,96}

```
RawClk: <384> (640)
    #u53.12i {668,72}     C447 {252,44}         #u65.8o {268,224}

RawRef: <45> (92)
    #u112.9i {112,232}    #u113.9i {128,232}    #u39.15o {144,172}

rB.0: <87> (904)
    #u68.20i {0,140}      #u66.20i {28,140}     #u67.20i {56,140}     #u69.20i {84,140}
    #u102.1i {464,64}     #u101.1i {480,64}     #u26.12o {796,96}

rB.1: <84> (880)
    #u68.19i {0,136}      #u66.19i {28,136}     #u67.19i {56,136}     #u69.19i {84,136}
    #u102.15i {476,68}    #u101.15i {492,68}    #u26.15o {796,84}

rB.2: <81> (864)
    #u68.18i {0,132}      #u66.18i {28,132}     #u67.18i {56,132}     #u69.18i {84,132}
    #u102.14i {476,72}    #u101.14i {492,72}    #u26.16o {796,80}

rB.3: <79> (856)
    #u68.17i {0,128}      #u66.17i {28,128}     #u67.17i {56,128}     #u69.17i {84,128}
    #u102.13i {476,76}    #u101.13i {492,76}    #u26.19o {796,68}

ReadCmd: <216> (40)
    #u107.3i {48,208}     #u83.5o {16,216}

ReadDebA': <182> (312)
    #u70.12i {272,244}    #u70.19i {296,236}    #r1.2i {300,204}      C438 {216,44}

ReadDebB': <131> (192)
    #u41.7o {148,168}     #u70.4i {272,212}     #u70.25i {296,212}

ReadExtStat': <86> (896)
    #u63.11i {828,180}    #u52.11i {812,180}    #u47.19i {556,68}     #u41.8o {148,172}

ReadIB: <455> (620)
    #u41.13o {164,180}    #u51.2i {672,68}

ReadIB0': <329> (112)
    #u62.1i {752,64}      #u51.9o {672,96}

ReadIB1': <330> (120)
    #u61.1i {768,64}      #u51.11o {684,100}

ReadMap': <50> (176)
    #u82.5o {32,216}      #u108.1i {176,200}    #u109.1i {192,200}

ReadMAR': <48> (140)
    #u82.4o {32,212}      #u97.1i {144,200}     #u98.1i {160,200}

ReadMAx': <78> (844)
    #u112.11i {124,236}   #u113.11i {140,236}   #u73.12o {916,184}

ReadMD': <47> (124)
    #u37.13o {184,180}    #u99.1i {96,200}      #u100.1i {80,200}

ReadMDR': <52> (196)
    #u110.1i {224,200}    #u111.1i {208,200}    #u82.12o {44,216}

ReadMisc': <67> (492)
    #u41.9o {148,176}     #u104.1i {512,64}     #u104.19i {524,68}

ReadNIA: <341> (376)
    #r1.4i {300,212}      C442 {232,44}         #u86.13i {140,92}

ReadRH': <65> (480)
    #u103.19i {508,68}    #u103.1i {496,64}     #u41.10o {148,180}

Rom0CE': <140> (192)
    #u6.20i {608,176}     #u4.20i {580,176}     #u5.20i {552,176}     #u3.20i {524,176}
    #u2.20i {496,176}     #u1.20i {468,176}     #u28.6o {428,164}

Rom0OE': <138> (180)
    #u6.22i {608,168}     #u4.22i {580,168}     #u5.22i {552,168}     #u3.22i {524,168}
    #u2.22i {496,168}     #u1.22i {468,168}     #u28.7o {428,168}

Rom1CE': <141> (352)
    #u10.20i {776,176}    #u11.20i {748,176}    #u12.20i {720,176}    #u14.20i {692,176}
    #u13.20i {664,176}    #u15.20i {636,176}    #u28.8o {428,172}

Rom1OE': <142> (356)
    #u10.22i {776,168}    #u11.22i {748,168}    #u12.22i {720,168}    #u14.22i {692,168}
    #u13.22i {664,168}    #u15.22i {636,168}    #u28.9o {428,176}

Run: <392> (700)
    #r1.7i {300,224}      C443 {236,44}         #u53.13i {668,68}

SetInterrupt: <471> (748)
    #u52.3i {800,152}     #u38.12o {84,184}

sh: <139> (184)
    #u68.6i {0,84}        #u66.6i {28,84}       #u67.6i {56,84}       #u69.6i {84,84}
    #u57.12o {172,72}

Shift': <292> (252)
    #u60.14i {220,72}     #u57.1i {160,64}      #u35.9o {88,176}

StackTrap: <466> (704)
    #u71.2i {780,148}     #u50.5o {144,80}

StkP.0: <257> (168)
```

#u93.3i {320,72} #u115.3i {432,72} #u114.11o {460,100}

StkP.1: <217> (152)
#u93.6i {320,84} #u115.6i {432,84} #u114.12o {460,96}

StkP.2: <130> (136)
#u93.11i {332,84} #u115.11i {444,84} #u114.13o {460,92}

StkP.3: <180> (144)
#u93.14i {332,72} #u115.14i {444,72} #u114.14o {460,88}

Trap: <66> (480)
#u44.15i {360,148} #u32.15i {376,148} #u42.15i {392,148} #u71.21i {796,148}
#u71.9o {780,176}

UAddr.0: <109> (84)
#u91.2o {336,68} #u79.4i {352,76} #u80.4i {372,76} #u78.4i {392,76}
#u81.4i {412,76}

UAddr.1: <111> (92)
#u91.7o {336,88} #u79.3i {352,72} #u80.3i {372,72} #u78.3i {392,72}
#u81.3i {412,72}

UAddr.2: <108> (84)
#u91.10o {348,88} #u79.2i {352,68} #u80.2i {372,68} #u78.2i {392,68}
#u81.2i {412,68}

UAddr.3: <14> (68)
#u91.15o {348,68} #u79.1i {352,64} #u80.1i {372,64} #u78.1i {392,64}
#u81.1i {412,64}

UAddr.4: <115> (108)
#u93.2o {320,68} #u79.21i {368,68} #u80.21i {388,68} #u78.21i {408,68}
#u81.21i {428,68}

UAddr.5: <114> (100)
#u93.7o {320,88} #u79.5i {352,80} #u80.5i {372,80} #u78.5i {392,80}
#u81.5i {412,80}

UAddr.6: <107> (84)
#u93.10o {332,88} #u79.6i {352,84} #u80.6i {372,84} #u78.6i {392,84}
#u81.6i {412,84}

UAddr.7: <113> (100)
#u93.15o {332,68} #u79.7i {352,88} #u80.7i {372,88} #u78.7i {392,88}
#u81.7i {412,88}

UseRom: <376> (428)
#u28.5i {428,160} #r1.5i {300,216} C441 {228,44}

VCC: <12> (16640)
#u65.14i {268,200} #u30.20i {252,200} #u110.20i {236,200} #u111.20i {220,200}
#u109.20i {204,200} #u108.20i {188,200} #u98.20i {172,200} #u97.20i {156,200}
#u113.20i {140,200} #u112.20i {124,200} #u99.20i {108,200} #u100.20i {92,200}
#u105.14i {76,200} #u107.16i {60,200} #u82.16i {44,200} #u83.16i {28,200}
#u72.20i {12,200} #u73.22i {916,144} #u74.22i {896,144} #u85.20i {876,144}
#u75.20i {860,144} #u63.20i {828,144} #u52.20i {812,144} #u71.22i {796,144}
#u10.28i {776,144} #u11.28i {748,144} #u12.28i {720,144} #u14.28i {692,144}
#u13.28i {664,144} #u15.28i {636,144} #u6.28i {608,144} #u4.28i {580,144}
#u5.28i {552,144} #u3.28i {524,144} #u2.28i {496,144} #u1.28i {468,144}
#u28.20i {440,144} #u22.20i {424,144} #u23.20i {408,144} #u42.16i {392,144}
#u32.16i {376,144} #u44.16i {360,144} #u33.16i {344,144} #u58.16i {328,144}
#u56.16i {312,144} #u59.14i {296,144} #u31.20i {280,144} #u46.14i {264,144}
#u95.14i {248,144} #u34.16i {232,144} #u24.16i {216,144} #u45.16i {200,144}
#u37.22i {184,144} #u41.22i {164,144} #u39.22i {144,144} #u36.22i {124,144}
#u35.22i {104,144} #u38.22i {84,144} #u40.22i {64,144} #u94.20i {44,144}
#u7.14i {28,144} #u9.14i {12,144} #u18.14i {908,64} #u21.14i {892,64}
#u16.14i {876,64} #u19.14i {860,64} #u29.20i {844,64} #u27.20i {828,64}
#u25.20i {812,64} #u26.20i {796,64} #u61.20i {780,64} #u62.20i {764,64}
#u54.20i {748,64} #u106.14i {732,64} #u55.16i {716,64} #u43.16i {700,64}
#u51.20i {684,64} #u53.14i {668,64} #u84.14i {652,64} #u90.16i {636,64}
#u89.16i {620,64} #u77.16i {604,64} #u76.16i {588,64} #u96.20i {572,64}
#u47.20i {556,64} #u88.16i {540,64} #u104.20i {524,64} #u103.20i {508,64}
#u101.16i {492,64} #u102.16i {476,64} #u114.20i {460,64} #u115.16i {444,64}
#u81.22i {428,64} #u78.22i {408,64} #u80.22i {388,64} #u79.22i {368,64}
#u91.16i {348,64} #u93.16i {332,64} #u92.16i {316,64} #u64.14i {300,64}
#u60.16i {220,64} #u87.16i {204,64} #u48.14i {188,64} #u57.14i {172,64}
#u50.20i {156,64} #u86.20i {140,64} #u49.14i {124,64} #c97.2i {348,260}
#c115.2i {92,260} #c114.2i {76,260} #c113.2i {60,260} #c112.2i {108,260}
#c111.2i {124,260} #c110.2i {140,260} #c109.2i {172,260} #c108.2i {156,260}
#c107.2i {188,260} #c106.2i {204,260} #c105.2i {236,260} #c104.2i {220,260}
#c103.2i {252,260} #c102.2i {268,260} #c101.2i {300,260} #c100.2i {284,260}
#c99.2i {316,260} #c98.2i {332,260} #c96.2i {716,256} #c95.2i {732,256}
#c94.2i {748,256} #c93.2i {780,256} #c92.2i {764,256} #c91.2i {796,256}
#c90.2i {812,256} #c89.2i {844,256} #c88.2i {828,256} #c87.2i {860,256}
#c86.2i {876,256} #c85.2i {908,256} #c84.2i {892,256} #c83.2i {12,260}
#c82.2i {28,260} #c81.2i {44,260} #c80.2i {700,256} #c79.2i {684,256}
#c78.2i {668,256} #c77.2i {636,256} #c76.2i {652,256} #c75.2i {620,256}
#c74.2i {604,256} #c73.2i {572,256} #c72.2i {588,256} #c71.2i {556,256}
#c70.2i {540,256} #c69.2i {508,256} #c68.2i {524,256} #c67.2i {492,256}
#c66.2i {476,256} #c33.2i {460,256} #c64.2i {204,256} #c63.2i {188,256}
#c62.2i {172,256} #c61.2i {140,256} #c60.2i {156,256} #c59.2i {124,256}
#c58.2i {108,256} #c57.2i {76,256} #c56.2i {92,256} #c55.2i {60,256}
#c54.2i {44,256} #c53.2i {12,256} #c52.2i {28,256} #c51.2i {908,200}
#c50.2i {892,200} #c49.2i {876,200} #c48.2i {220,256} #c47.2i {236,256}
#c46.2i {252,256} #c45.2i {284,256} #c44.2i {268,256} #c43.2i {300,256}
#c42.2i {316,256} #c41.2i {348,256} #c40.2i {332,256} #c39.2i {364,256}
#c38.2i {380,256} #c37.2i {412,256} #c36.2i {396,256} #c35.2i {428,256}
#c34.2i {444,256} #c1.2i {364,200} #c32.2i {620,200} #c31.2i {636,200}
#c30.2i {652,200} #c29.2i {684,200} #c28.2i {668,200} #c27.2i {700,200}
#c26.2i {716,200} #c25.2i {748,200} #c24.2i {732,200} #c23.2i {764,200}

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    #c22.2i {780,200}     #c21.2i {812,200}     #c20.2i {796,200}     #c19.2i {828,200}
    #c18.2i {844,200}     #c17.2i {860,200}     #c16.2i {604,200}     #c15.2i {588,200}
    #c14.2i {572,200}     #c13.2i {540,200}     #c12.2i {556,200}     #c11.2i {524,200}
    #c10.2i {508,200}     #c9.2i {476,200}      #c8.2i {492,200}      #c7.2i {460,200}
    #c6.2i {444,200}      #c5.2i {412,200}      #c4.2i {428,200}      #c3.2i {396,200}
    #c2.2i {380,200}      C516 {16,48}          E184 {224,4}          E182 {216,4}
    E181 {212,4}          E183 {220,4}          E105 {420,0}          E106 {424,0}
    E104 {416,0}          E103 {412,0}          #u20.20i {316,200}    #u8.20i {332,200}
    #u17.20i {348,200}    #r1.1i {300,200}      #u70.8i {272,228}     #11.1o {832,144}
    #u1.26i {468,152}     #u2.26i {496,152}     #u1.27i {468,148}     #u2.27i {496,148}
    #u1.1i {444,144}      #u2.1i {472,144}      #u3.1i {500,144}      #u4.1i {556,144}
    #u3.27i {524,148}     #u4.27i {580,148}     #u3.26i {524,152}     #u4.26i {580,152}
    #u5.26i {552,152}     #u6.26i {608,152}     #u5.27i {552,148}     #u6.27i {608,148}
    #u5.1i {528,144}      #u6.1i {584,144}      #u14.1i {668,144}     #u15.1i {612,144}
    #u14.27i {692,148}    #u15.27i {636,148}    #u14.26i {692,152}    #u15.26i {636,152}
    #u12.26i {720,152}    #u13.26i {664,152}    #u12.27i {720,148}    #u13.27i {664,148}
    #u12.1i {696,144}     #u13.1i {640,144}     #u10.1i {752,144}     #u11.1i {724,144}
    #u10.27i {776,148}    #u11.27i {748,148}    #u10.26i {776,152}    #u11.26i {748,152}
    #r3.2i {284,64}       #r2.2i {236,64}       #r4.2i {252,64}       #r5.2i {268,64}
    #u69.10o {84,100}     #u68.10o {0,100}      #u66.10o {28,100}     #u67.10o {56,100}

WriteBank: <388> (224)
    #u33.1i {332,144}     #u39.13o {144,180}

WriteCmd: <176> (32)
    #u107.2i {48,204}     #u83.12o {28,216}

WriteDebA': <402> (288)
    #u70.21i {296,228}    #u38.7o {68,168}

WriteDebB': <55> (268)
    #u70.23i {296,220}    #r1.3i {300,208}      C437 {212,44}

WriteExtCtrl: <409> (316)
    #u64.4i {288,76}      #u38.8o {68,172}

WriteIB: <119> (700)
    #u51.3i {672,72}      #u53.2i {656,68}      #u38.14o {84,176}

WriteIBFront: <426> (412)
    #u51.12o {684,96}     #u64.13i {300,68}

WriteMAR: <463> (656)
    #u95.9i {248,164}     #u73.7o {900,168}

WriteMD: <83> (864)
    #u73.10o {900,180}    #u99.11i {108,236}    #u100.11i {92,236}

WriteMDR: <465> (692)
    #u95.1i {236,144}     #u73.8o {900,172}

WriteRH: <405> (300)
    #u35.8o {88,172}      #u64.9i {300,84}

WriteStkP: <436> (464)
    #u38.13o {84,180}     #u115.1i {432,64}

X.0: <363> (1240)
    #u52.17o {812,156}    #u62.3i {752,72}      #u76.15o {588,68}     #u79.10o {352,100}
    #u24.14i {216,152}    #u86.18o {140,72}     #u99.19o {108,204}    #u68.22i {24,136}

X.1: <362> (1144)
    #u52.16o {812,160}    #u62.4i {752,76}      #u77.15o {604,68}     #u79.12o {368,104}
    #u86.16o {140,80}     #u99.18o {108,208}    #u68.23i {24,132}

X.10: <32> (1064)
    #u100.17o {92,212}    #u66.24i {52,128}     #u24.15i {216,148}    #u70.28i {296,200}
    #u78.14o {408,96}     #u101.10i {492,88}    #u103.14o {508,88}    #u104.9o {512,96}
    #u88.9o {540,92}      #u89.12o {620,80}     #u43.9o {700,92}      #u61.7i {768,88}

X.11: <174> (1268)
    #u66.25i {52,124}     #u100.16o {92,216}    #u70.1i {272,200}     #u34.13i {232,156}
    #u78.16o {408,88}     #u101.12i {492,80}    #u104.7o {512,88}     #u88.12o {540,80}
    #u103.12o {508,96}    #u61.8i {768,92}      #u43.12o {700,80}     #u90.12o {636,80}

X.12: <24> (1052)
    #u61.13i {780,92}     #u55.4o {704,76}      #u76.11o {588,84}     #u47.18o {556,72}
    #u104.18o {524,72}    #u47.9o {544,96}      #u103.9o {496,96}     #u102.4i {464,76}
    #u81.10o {412,100}    #u56.12i {312,160}    #u56.10i {312,168}    #u70.2i {272,204}
    #u100.15o {92,220}    #u69.22i {108,136}

X.13: <22> (972)
    #u61.14i {780,88}     #u55.7o {704,88}      #u77.11o {604,84}     #u47.16o {556,80}
    #u47.7o {544,88}      #u104.16o {524,80}    #u103.7o {496,88}     #u102.6i {464,84}
    #u81.12o {428,104}    #u56.4i {300,156}     #u56.6i {300,164}     #u70.3i {272,208}
    #u100.14o {92,224}    #u69.23i {108,132}

X.14: <128> (1072)
    #u100.13o {92,228}    #u69.24i {108,128}    #u45.4i {188,156}     #u70.6i {272,220}
    #u81.14o {428,96}     #u102.10i {476,88}    #u103.5o {496,80}     #u104.14o {524,88}
    #u47.5o {544,80}      #u47.14o {556,88}     #u89.11o {620,84}     #u55.9o {716,92}
    #u61.17i {780,76}

X.15: <33> (1212)
    #u61.18i {780,72}     #u55.12o {716,80}     #u90.11o {636,84}     #u104.12o {524,96}
    #u47.12o {556,96}     #u47.3o {544,72}      #u103.3o {496,72}     #u102.12i {476,80}
    #u81.16o {428,88}     #u24.13i {216,156}    #u24.4i {204,156}     #u69.25i {108,124}
    #u100.12o {92,232}    #u70.7i {272,224}

X.2: <336> (1128)
    #u52.15o {812,164}    #u62.7i {752,88}      #u89.15o {620,68}     #u79.14o {368,96}
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    #u86.14o {140,88}     #u68.24i {24,128}     #u99.17o {108,212}

X.3: <335> (1120)
    #u52.14o {812,168}    #u62.8i {752,92}      #u90.15o {636,68}     #u79.16o {368,88}
    #u86.12o {140,96}     #u68.25i {24,124}     #u99.16o {108,216}

X.4: <251> (1040)
    #u63.17o {828,156}    #u62.13i {764,92}     #u76.14o {588,72}     #u96.9o {560,96}
    #u80.10o {372,100}    #u45.14i {200,152}    #u67.22i {80,136}     #u99.15o {108,220}

X.5: <277> (1016)
    #u63.16o {828,160}    #u62.14i {764,88}     #u77.14o {604,72}     #u96.7o {560,88}
    #u80.12o {388,104}    #u67.23i {80,132}     #u99.14o {108,224}

X.6: <294> (1024)
    #u63.15o {828,164}    #u62.17i {764,76}     #u89.14o {620,72}     #u96.5o {560,80}
    #u80.14o {388,96}     #u67.24i {80,128}     #u99.13o {108,228}

X.7: <307> (1032)
    #u63.14o {828,168}    #u62.18i {764,72}     #u90.14o {636,72}     #u96.3o {560,72}
    #u80.16o {388,88}     #u67.25i {80,124}     #u99.12o {108,232}

X.8: <8> (1036)
    #u61.3i {768,72}      #u43.4o {688,76}      #u76.12o {588,80}     #u88.4o {528,76}
    #u104.3o {512,72}     #u103.18o {508,72}    #u101.4i {480,76}     #u78.10o {392,100}
    #u70.26i {296,208}    #u45.13i {200,156}    #u100.19o {92,204}    #u66.22i {52,136}

X.9: <9> (1064)
    #u100.18o {92,208}    #u66.23i {52,132}     #u45.15i {200,148}    #u70.27i {296,204}
    #u78.12o {408,104}    #u101.6i {480,84}     #u103.16o {508,80}    #u104.6o {512,80}
    #u88.7o {528,88}      #u77.12o {604,80}     #u43.7o {688,88}      #u61.4i {768,76}

XACK/: <18> (624)
    #u94.12i {44,176}     #u94.14i {44,168}     E123 {492,0}

XBus←Rot': <68> (628)
    #u90.13i {636,76}     #u89.13i {620,76}     #u77.13i {604,76}     #u76.13i {588,76}
    #u36.9o {108,176}

XHigh←0': <331> (572)
    #u96.19i {572,68}     #u86.1i {128,64}      #u36.7o {108,168}

XLow←Byte': <444> (536)
    #u36.10o {108,180}    #u88.1i {528,64}

XLow←Const': <17> (540)
    #u47.1i {544,64}      #u88.15i {540,68}     #u36.12o {124,184}

XLow←IB': <20> (720)
    #u106.1i {720,64}     #u55.15i {716,68}     #u43.15i {700,68}     #u36.8o {108,172}

Y.0: <200> (816)
    #u76.4i {576,76}      #u79.9i {352,96}      #u110.2i {224,204}    #u109.2i {192,204}
    #u97.2i {144,204}     #u68.39o {24,68}

Y.1: <201> (836)
    #u77.4i {592,76}      #u79.11i {352,104}    #u110.3i {224,208}    #u109.3i {192,208}
    #u97.3i {144,208}     #u68.38o {24,72}

Y.10: <80> (860)
    #u89.2i {608,68}      #u89.6i {608,84}      #u78.13i {408,100}    #u30.7i {240,224}
    #u111.4i {208,212}    #u98.4i {160,212}     #u66.37o {52,76}

Y.11: <85> (880)
    #u90.2i {624,68}      #u90.6i {624,84}      #u78.15i {408,92}     #u30.8i {240,228}
    #u111.5i {208,216}    #u98.5i {160,216}     #u66.36o {52,80}

Y.12: <94> (1096)
    #u30.13i {252,228}    #u111.6i {208,220}    #u98.6i {160,220}     #u69.39o {108,68}
    #u92.3i {304,72}      #u33.3i {332,152}     #u56.11i {312,164}    #u115.4i {432,76}
    #u81.9i {412,96}      #u76.3i {576,72}      #u76.7i {576,88}

Y.13: <88> (908)
    #u77.3i {592,72}      #u77.7i {592,88}      #u115.5i {432,80}     #u81.11i {412,104}
    #u92.6i {304,84}      #u56.5i {300,160}     #u33.6i {332,164}     #u30.14i {252,224}
    #u111.7i {208,224}    #u98.7i {160,224}     #u69.38o {108,72}

Y.14: <90> (1060)
    #u45.3i {188,152}     #u69.37o {108,76}     #u98.8i {160,228}     #u111.8i {208,228}
    #u30.17i {252,212}    #u33.10i {344,168}    #u92.10i {316,88}     #u81.13i {428,100}
    #u115.12i {444,80}    #u89.7i {608,88}      #u89.3i {608,72}

Y.15: <95> (1168)
    #u98.9i {160,232}     #u69.36o {108,80}     #u24.3i {204,152}     #u111.9i {208,232}
    #u30.18i {252,208}    #u33.13i {344,156}    #u92.13i {316,76}     #u115.13i {444,76}
    #u81.15i {428,92}     #u90.3i {624,72}      #u90.7i {624,88}

Y.2: <202> (856)
    #u89.4i {608,76}      #u79.13i {368,100}    #u110.4i {224,212}    #u109.4i {192,212}
    #u97.4i {144,212}     #u68.37o {24,76}

Y.3: <203> (876)
    #u90.4i {624,76}      #u79.15i {368,92}     #u110.5i {224,216}    #u109.5i {192,216}
    #u97.5i {144,216}     #u68.36o {24,80}

Y.4: <73> (804)
    #u76.1i {576,64}      #u76.5i {576,80}      #u80.9i {372,96}      #u110.6i {224,220}
    #u109.6i {192,220}    #u97.6i {144,220}     #u67.39o {80,68}

Y.5: <75> (824)
    #u77.1i {592,64}      #u77.5i {592,80}      #u80.11i {372,104}    #u110.7i {224,224}
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    #u109.7i {192,224}    #u97.7i {144,224}     #u67.38o {80,72}

Y.6: <77> (844)
    #u89.1i {608,64}      #u89.5i {608,80}      #u80.13i {388,100}    #u110.8i {224,228}
    #u109.8i {192,228}    #u97.8i {144,228}     #u67.37o {80,76}

Y.7: <82> (864)
    #u90.1i {624,64}      #u90.5i {624,80}      #u80.15i {388,92}     #u110.9i {224,232}
    #u109.9i {192,232}    #u97.9i {144,232}     #u67.36o {80,80}

Y.8: <74> (804)
    #u76.2i {576,68}      #u76.6i {576,84}      #u78.9i {392,96}      #u30.3i {240,208}
    #u111.2i {208,204}    #u98.2i {160,204}     #u66.39o {52,68}

Y.9: <76> (824)
    #u77.2i {592,68}      #u77.6i {592,84}      #u78.11i {392,104}    #u30.4i {240,212}
    #u111.3i {208,208}    #u98.3i {160,208}     #u66.38o {52,72}

YH.0: <146> (512)
    #u103.2i {496,68}     #u101.5o {480,80}     #u108.2i {176,204}    #u113.4i {128,212}

YH.1: <145> (508)
    #u103.4i {496,76}     #u101.7o {480,88}     #u108.3i {176,208}    #u113.5i {128,216}

YH.2: <28> (504)
    #u103.6i {496,84}     #u101.9o {492,92}     #u108.4i {176,212}    #u113.6i {128,220}

YH.3: <29> (512)
    #u101.11o {492,84}    #u103.8i {496,92}     #u108.5i {176,216}    #u113.7i {128,224}

YH.4: <263> (548)
    #u103.11i {508,100}   #u102.5o {464,80}     #u108.6i {176,220}    #u113.8i {128,228}

YH.5: <245> (540)
    #u103.13i {508,92}    #u102.7o {464,88}     #u108.7i {176,224}    #u112.6i {112,220}

YH.6: <220> (544)
    #u103.15i {508,84}    #u102.9o {476,92}     #u108.8i {176,228}    #u112.7i {112,224}

YH.7: <221> (556)
    #u103.17i {508,76}    #u102.11o {476,84}    #u108.9i {176,232}    #u112.8i {112,228}

ZeroMP': <429> (416)
    C513 {4,48}           #u30.16o {252,216}
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