APPENDIX E

Digital Blocks

E1. Behavioral VERILOG code of Control block

```
// Verilog HDL for "TEZ", "Control" "behavioral"
module Control
(reset,clk,Ram_adres,Row_akt,Akt_Dac,Ram_cs,ref_time);
parameter   Row_count=64;
parameter   n=4;
parameter   Ram_adr=6;
input             reset,clk;
input [4:0]       ref_time;
output            Ram_cs,Akt_Dac;
output[63:0]      Row_akt;
output[5:0]       Ram_adres;
reg   [31:0]      sayici_zaman,ref_time1;
reg   [5:0]       Ram_adres;
reg               Akt_Dac,kontrol;
reg   [63:0]      Row_akt;
assign Ram_cs=Akt_Dac&clk;
always@(negedge reset or negedge clk)
begin
if (!reset)
      begin
            sayici_zaman=32'b00000000000000000000000000000000;
            Ram_adres=6'b111111;
            Akt_Dac=1'b0;
            kontrol=1'b0;
      end
else if ((sayici_zaman==ref_time1) | (sayici_zaman>ref_time1))
      begin
            Akt_Dac=1'b1;
            Ram_adres=Ram_adres+1;
            if (Ram_adres==Row_count-1)
                  sayici_zaman=32'b00000000000000000000000000000000;
            else
                  sayici_zaman=sayici_zaman;
      end
else
      begin
            sayici_zaman=sayici_zaman+1;
            Akt_Dac=1'b0;
            Ram_adres=6'b111111;
      end
end
```

```
always@(Akt_Dac or Ram_adres)
begin
if (!Akt_Dac)
Row_akt=64'b1111111111111111111111111111111111111111111111111111111111111111
11111111;
else
begin
Row_akt=64'b1111111111111111111111111111111111111111111111111111111111111111
11111111;
            Row_akt[Ram_adres]=1'b0;
      end
end
always@(ref_time)
begin
      ref_time1=32'b00000000000000000000000000000000;
      ref_time1[ref_time]=1'b1;
end
endmodule
```

E2. Synthesized VERILOG NETLIST of Control Block

```
module Digital1_DW01_inc_6_0 ( A, SUM);
input  [5:0] A;
output [5:0] SUM;
wire n5, n6, n7, n8, n9, n10;
NA2 U6 (.A(A[1]),.B(A[0]),.Q(n5));
NA2 U7 (.A(A[3]),.B(n6),.Q(n8));
NO2 U8 (.A(n5),.B(n7),.Q(n6));
EN1 U9 (.A(n8),.B(A[4]),.Q(SUM[4]));
EO1 U10 (.A(n6),.B(A[3]),.Q(SUM[3]));
EN1 U11 (.A(n5),.B(A[2]),.Q(SUM[2]));
EN1 U12 (.A(A[1]),.B(SUM[0]),.Q(SUM[1]));
IN1 U13 (.A(A[2]),.Q(n7));
IN1 U14 (.A(A[0]),.Q(SUM[0]));
IN2 U15 (.A(n8),.Q(n9));
NA22 U16 (.A(A[4]),.B(n9),.Q(n10));
EN1 U17 (.A(A[5]),.B(n10),.Q(SUM[5]));
endmodule

module Digital1_DW01_cmp2_32_0 ( A, B, LEQ, TC, LT_LE, GE_GT);
input  [31:0] A;
input  [31:0] B;
input  LEQ, TC;
output LT_LE, GE_GT;
wire n15, n16, n17, n18, n19, n20, n21, n22, n23, n24, n25, n26,
n27, n28, n29, n30, n31, n32, n33, n34, n35, n36, n37, n38, n39,
n40, n41, n42, n43, n44, n45, n46, n47, n48, n49, n50, n51, n52,
n53, n54, n55, n56, n57, n58, n59, n60, n61, n62, n63, n64, n65,
n66, n67, n69, n70, n71, n72, n73, n74, n75, n76, n77, n78, n79,
n80, n81, n82, n83, n84, n85, n86, n87, n88, n89, n90;
NO2 U6 (.A(n16),.B(A[0]),.Q(n15));
IN1 U7 (.A(B[27]),.Q(n17));
IN1 U8 (.A(B[19]),.Q(n18));
IN1 U9 (.A(B[11]),.Q(n19));
IN1 U10 (.A(B[0]),.Q(n16));
IN1 U11 (.A(A[3]),.Q(n20));
IN1 U12 (.A(A[4]),.Q(n21));
IN1 U13 (.A(A[7]),.Q(n22));
```

```
IN1 U14 (.A(A[8]),.Q(n23));
IN1 U15 (.A(A[15]),.Q(n24));
IN1 U16 (.A(A[16]),.Q(n25));
IN1 U17 (.A(A[23]),.Q(n26));
IN1 U18 (.A(A[24]),.Q(n27));
IN1 U19 (.A(B[28]),.Q(n28));
IN1 U20 (.A(B[20]),.Q(n29));
IN1 U21 (.A(B[12]),.Q(n30));
IN1 U22 (.A(B[13]),.Q(n31));
IN1 U23 (.A(B[21]),.Q(n32));
IN1 U24 (.A(B[29]),.Q(n33));
IN1 U25 (.A(A[31]),.Q(n34));
IN1 U26 (.A(A[30]),.Q(n35));
IN1 U27 (.A(A[26]),.Q(n36));
IN1 U28 (.A(A[25]),.Q(n37));
IN1 U29 (.A(A[22]),.Q(n38));
IN1 U30 (.A(A[18]),.Q(n39));
IN1 U31 (.A(A[17]),.Q(n40));
IN1 U32 (.A(A[14]),.Q(n41));
IN1 U33 (.A(A[10]),.Q(n42));
IN1 U34 (.A(A[9]),.Q(n43));
IN1 U35 (.A(A[6]),.Q(n44));
IN1 U36 (.A(A[5]),.Q(n45));
IN1 U37 (.A(A[2]),.Q(n46));
NA22 U38 (.A(n33),.B(A[29]),.Q(n47));
AN22 U39 (.A(B[22]),.B(n38),.C(B[23]),.D(n26),.Q(n48));
ON22 U40 (.A(A[21]),.B(n32),.C(A[20]),.D(n29),.Q(n49));
NA22 U41 (.A(B[18]),.B(n39),.Q(n50));
AO22 U42 (.A(n40),.B(B[17]),.C(n25),.D(B[16]),.Q(n51));
AN22 U43 (.A(B[14]),.B(n41),.C(B[15]),.D(n24),.Q(n52));
ON22 U44 (.A(A[13]),.B(n31),.C(A[12]),.D(n30),.Q(n53));
NA22 U45 (.A(B[10]),.B(n42),.Q(n54));
AO22 U46 (.A(n43),.B(B[9]),.C(n23),.D(B[8]),.Q(n55));
AN22 U47 (.A(B[6]),.B(n44),.C(B[7]),.D(n22),.Q(n56));
AO22 U48 (.A(n45),.B(B[5]),.C(n21),.D(B[4]),.Q(n57));
AN22 U49 (.A(B[2]),.B(n46),.C(B[3]),.D(n20),.Q(n58));
IN2 U50 (.A(A[1]),.Q(n59));
AND23 U51 (.A(B[1]),.B(n15),.Q(n60));
ON222
U52(.A(B[2]),.B(n46),.C(n59),.D(n60),.E(B[1]),.F(n15),.Q(n61));
ON22 U53 (.A(B[3]),.B(n20),.C(B[4]),.D(n21),.Q(n62));
AN21 U54 (.A(n58),.B(n61),.C(n62),.Q(n63));
ON222
U55(.A(B[6]),.B(n44),.C(n57),.D(n63),.E(B[5]),.F(n45),.Q(n64));
ON22 U56 (.A(B[8]),.B(n23),.C(B[7]),.D(n22),.Q(n65));
AN21 U57 (.A(n56),.B(n64),.C(n65),.Q(n66));
ON222U58(.A(B[9]),.B(n43),.C(B[10]),.D(n42),.E(n55),.F(n66),.Q(n67));
OR23 U59 (.A(A[11]),.B(n19),.Q(n69));
AN322U60(.A(n54),.B(n67),.C(n69),.D(A[11]),.E(n19),.F(A[12]),.G(n30)
,.Q(n70));
NA22 U61 (.A(n31),.B(A[13]),.Q(n71));
ON221 U62 (.A(n53),.B(n70),.C(B[14]),.D(n41),.E(n71),.Q(n72));
ON22 U63 (.A(B[16]),.B(n25),.C(B[15]),.D(n24),.Q(n73));
AN21 U64 (.A(n52),.B(n72),.C(n73),.Q(n74));
ON222 U65 (.A(B[17]),.B(n40),.C(B[18]),.D(n39),.E(n51),
.F(n74),.Q(n75));
OR23 U66 (.A(A[19]),.B(n18),.Q(n76));
AN322 U67 (.A(n50),.B(n75),.C(n76),.D(A[19]),.E(n18),
.F(A[20]),.G(n29),.Q(n77));
NA22 U68 (.A(n32),.B(A[21]),.Q(n78));
```

```
ON221 U69 (.A(n49),.B(n77),.C(B[22]),.D(n38),.E(n78),.Q(n79));
ON22 U70 (.A(B[24]),.B(n27),.C(B[23]),.D(n26),.Q(n80));
AN21 U71 (.A(n48),.B(n79),.C(n80),.Q(n81));
AN221 U72 (.A(n27),.B(B[24]),.C(n37),.D(B[25]),.E(n81),.Q(n82));
ON22 U73 (.A(B[25]),.B(n37),.C(B[26]),.D(n36),.Q(n83));
IN2 U74 (.A(B[26]),.Q(n84));
OA222 U75 (.A(A[27]),.B(n17),.C(n82),.D(n83),.E(A[26]),
.F(n84),.Q(n85));
AO22 U76 (.A(A[28]),.B(n28),.C(A[27]),.D(n17),.Q(n86));
ON222 U77 (.A(A[29]),.B(n33),.C(A[28]),.D(n28),.E(n85),
.F(n86),.Q(n87));
OR23 U78 (.A(B[30]),.B(n35),.Q(n88));
AO32 U79(.A(n47),.B(n87),.C(n88),.D(B[30]),.E(n35),.Q(n89));
OR2 U80 (.A(n34),.B(n89),.Q(n90));
AO22 U81 (.A(n89),.B(n34),.C(B[31]),.D(n90),.Q(LT_LE));
endmodule

module Digital1_DW01_inc_32_0 ( A, SUM);
input  [31:0] A;
output [31:0] SUM;
wire n11, n12, n13, n14, n91, n92, n93, n94, n95, n96, n97, n98,
n99, n100, n101, n102, n103, n104, n105, n106, n107, n108, n109,
n110, n111, n112, n113, n114, n115, n116, n117, n118, n119, n120,
n121, n122, n123, n124,n125, n126, n127;
NA2 U6 (.A(A[22]),.B(n109),.Q(n111));
NA22 U7 (.A(A[1]),.B(A[0]),.Q(n11));
NO2 U8 (.A(n11),.B(n13),.Q(n12));
NA3 U9 (.A(A[4]),.B(A[3]),.C(n12),.Q(n14));
NO2 U10 (.A(n14),.B(n92),.Q(n91));
NA22 U11 (.A(A[6]),.B(n91),.Q(n93));
NO3 U12 (.A(n95),.B(n96),.C(n93),.Q(n94));
AND2 U13 (.A(n94),.B(A[9]),.Q(n97));
AND2 U14 (.A(A[10]),.B(n97),.Q(n98));
NA3 U15 (.A(A[12]),.B(A[11]),.C(n98),.Q(n99));
NO2 U16 (.A(n99),.B(n101),.Q(n100));
NA22 U17 (.A(A[14]),.B(n100),.Q(n102));
NO3 U18 (.A(n104),.B(n105),.C(n102),.Q(n103));
AND2 U19 (.A(n103),.B(A[17]),.Q(n106));
AND2 U20 (.A(A[18]),.B(n106),.Q(n107));
NA3 U21 (.A(A[20]),.B(A[19]),.C(n107),.Q(n108));
NO2 U22 (.A(n108),.B(n110),.Q(n109));
NO3 U23 (.A(n113),.B(n114),.C(n111),.Q(n112));
AND2 U24 (.A(n112),.B(A[25]),.Q(n115));
AND2 U25 (.A(A[26]),.B(n115),.Q(n116));
NA3 U26 (.A(A[28]),.B(A[27]),.C(n116),.Q(n117));
NO2 U27 (.A(n117),.B(n119),.Q(n118));
EO1 U28 (.A(n94),.B(A[9]),.Q(SUM[9]));
EN1 U29 (.A(n93),.B(A[7]),.Q(SUM[7]));
EO1 U30 (.A(n91),.B(A[6]),.Q(SUM[6]));
EN1 U31 (.A(A[5]),.B(n14),.Q(SUM[5]));
EO1 U32 (.A(n12),.B(A[3]),.Q(SUM[3]));
EO1 U33 (.A(n118),.B(A[30]),.Q(SUM[30]));
EN1 U34 (.A(n11),.B(A[2]),.Q(SUM[2]));
EN1 U35 (.A(n117),.B(A[29]),.Q(SUM[29]));
EO1 U36 (.A(n116),.B(A[27]),.Q(SUM[27]));
EO1 U37 (.A(n115),.B(A[26]),.Q(SUM[26]));
EO1 U38 (.A(n112),.B(A[25]),.Q(SUM[25]));
EN1 U39 (.A(n111),.B(A[23]),.Q(SUM[23]));
EO1 U40 (.A(n109),.B(A[22]),.Q(SUM[22]));
EN1 U41 (.A(A[21]),.B(n108),.Q(SUM[21]));
```

```
EN1 U42 (.A(A[1]),.B(SUM[0]),.Q(SUM[1]));
EO1 U43 (.A(n107),.B(A[19]),.Q(SUM[19]));
EO1 U44 (.A(n106),.B(A[18]),.Q(SUM[18]));
EO1 U45 (.A(n103),.B(A[17]),.Q(SUM[17]));
EN1 U46 (.A(n102),.B(A[15]),.Q(SUM[15]));
EO1 U47 (.A(n100),.B(A[14]),.Q(SUM[14]));
EN1 U48 (.A(A[13]),.B(n99),.Q(SUM[13]));
EO1 U49 (.A(n98),.B(A[11]),.Q(SUM[11]));
EO1 U50 (.A(n97),.B(A[10]),.Q(SUM[10]));
IN1 U51 (.A(A[2]),.Q(n13));
IN1 U52 (.A(A[5]),.Q(n92));
IN1 U53 (.A(A[13]),.Q(n101));
IN1 U54 (.A(A[21]),.Q(n110));
IN1 U55 (.A(A[29]),.Q(n119));
IN1 U56 (.A(A[15]),.Q(n105));
IN1 U57 (.A(A[16]),.Q(n104));
IN1 U58 (.A(A[23]),.Q(n114));
IN1 U59 (.A(A[24]),.Q(n113));
IN1 U60 (.A(A[0]),.Q(SUM[0]));
IN1 U61 (.A(A[7]),.Q(n96));
IN1 U62 (.A(A[8]),.Q(n95));
NO2 U63 (.A(n93),.B(n96),.Q(n120));
EN1 U64 (.A(n120),.B(n95),.Q(SUM[8]));
NA22 U65 (.A(A[3]),.B(n12),.Q(n121));
EN1 U66 (.A(n121),.B(A[4]),.Q(SUM[4]));
NA22 U67 (.A(A[30]),.B(n118),.Q(n122));
EN1 U68 (.A(n122),.B(A[31]),.Q(SUM[31]));
NA22 U69 (.A(A[27]),.B(n116),.Q(n123));
EN1 U70 (.A(n123),.B(A[28]),.Q(SUM[28]));
NO2 U71 (.A(n111),.B(n114),.Q(n124));
EN1 U72 (.A(n124),.B(n113),.Q(SUM[24]));
NA22 U73 (.A(A[19]),.B(n107),.Q(n125));
EN1 U74 (.A(n125),.B(A[20]),.Q(SUM[20]));
NO2 U75 (.A(n102),.B(n105),.Q(n126));
EN1 U76 (.A(n126),.B(n104),.Q(SUM[16]));
NA22 U77 (.A(A[11]),.B(n98),.Q(n127));
EN1 U78 (.A(n127),.B(A[12]),.Q(SUM[12]));
endmodule

module Control( reset, clk, Ram_adres, Row_akt, Akt_Dac, Ram_cs,
ref_time);
output [5:0] Ram_adres;
output [63:0] Row_akt;
input  [4:0] ref_time;
input  reset, clk;
output Akt_Dac, Ram_cs;
wire \sayici_zaman[26] , \ref_time1[7] , \sayici_zaman146[30] ,
\sayici_zaman146[29] , \sayici_zaman[15] , \sayici_zaman146[13] ,
\sayici_zaman146[20] , \sayici_zaman[22] , \sayici_zaman[11] ,
\ref_time1[3] , \sayici_zaman[30] , \sayici_zaman[18] ,
\sayici_zaman146[17] , \sayici_zaman146[24] , \sayici_zaman[29] ,
\sayici_zaman146[15] , \sayici_zaman146[26] , \ref_time1[8] ,
\ref_time1[1] , \sayici_zaman[20] , \sayici_zaman[13] ,
\sayici_zaman146[11] , \sayici_zaman146[22] , \sayici_zaman[24] ,
\sayici_zaman146[18] , \sayici_zaman[17] , \ref_time1[5] ,
\sayici_zaman[3] ,\ref_time1[24] ,\Ram_adres140[5], \ref_time1[17] ,
\sayici_zaman146[7] , \ref_time1[30] , \ref_time1[29] ,
\ref_time1[20] , \Ram_adres140[1] , \sayici_zaman146[3] ,
\sayici_zaman[7] , \ref_time1[13] , \sayici_zaman[5] , n68,
\ref_time1[22] , \Ram_adres140[3] , \ref_time1[11] ,
```

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\sayici_zaman146[1] , \ref_time1[18] , \sayici_zaman146[8] ,
\ref_time1[26] , \sayici_zaman146[5] , \ref_time1[15] ,
\sayici_zaman[1] , \sayici_zaman[8] ,\ref_time1[27] ,
\ref_time1[14],
\sayici_zaman146[4] , \sayici_zaman[9] , \sayici_zaman[0] ,
\sayici_zaman[4] , \sayici_zaman146[0] , \ref_time1[23] ,
\Ram_adres140[2] , \ref_time1[10] , \sayici_zaman146[9] ,
\ref_time1[19] , \ref_time1[31] , \ref_time1[28] , \ref_time1[21] ,
\Ram_adres140[0] , \ref_time1[12] , \sayici_zaman[6] ,
\sayici_zaman146[2] , \sayici_zaman[2] , \ref_time1[25] ,
\Ram_adres140[4] , \sayici_zaman146[6] , \ref_time1[16] ,
\sayici_zaman146[23] , \sayici_zaman146[10] , \sayici_zaman[31] ,
\sayici_zaman[28] , \sayici_zaman[25] , \sayici_zaman146[19] ,
\sayici_zaman[16] , \ref_time1[4] , \sayici_zaman146[14] ,
\sayici_zaman146[27] , \ref_time1[9] , \ref_time1[0] ,
\sayici_zaman[23] , \sayici_zaman[21] , \sayici_zaman[12] ,
\sayici_zaman[10] , \ref_time1[2] , \sayici_zaman[19] ,
\sayici_zaman146[25] , \sayici_zaman146[16] , \ref_time1[6] ,
\sayici_zaman[27] , \sayici_zaman146[31] , \sayici_zaman146[28] ,
\sayici_zaman[14] , \sayici_zaman146[12] , \sayici_zaman146[21] ,
n1412, n1413, n1414, n1415, n1416, n1417, n1418,n1419, n1420, n1421,
n1422, n1423, n1424, n1425, n1426, n1427, n1428,n1429, n1430, n1431,
n1432, n1433, n1434, n1435, n1436, n1437, n1438,n1439, n1440, n1441,
n1442, n1443, n1444, n1445, n1446, n1447, n1448,n1449, n1450, n1451,
n1452, n1453, n1454, n1455, n1456, n1457, n1458,n1459, n1460, n1461,
n1462, n1463, n1464, n1465, n1466, n1467, n1468,n1469, n1470, n1471,
n1472, n1473, n1474, n1475, n1476, n1477, n1478,n1479, n1480, n1481,
n1482, n1483, n1484, n1485, n1486, n1487, n1488,n1489, n1490, n1491,
n1492, n1493, n1494, n1495, n1496, n1497, n1498,n1499, n1500, n1501,
n1502, n1503, n1504, n1505, n1506, n1507, n1508,n1509, n1510, n1511,
n1512, n1513, n1514, n1515, n1516, n1517, n1518,n1519, n1520, n1521,
n1522, n1523, n1524, n1525, n1526, n1527, n1528,n1529, n1530, n1531,
n1532, n1533, n1534, n1535, n1536, n1537, n1538,n1539, n1540, n1541,
n1542, n1543, n1544, n1545, n1546, n1547, n1548,n1549, n1550, n1551,
n1552, n1553, n1554, n1555, n1556, n1557, n1558,n1559, n1560, n1561,
n1562, n1563, n1564, n1565, n1566, n1567, n1568,n1569, n1570, n1571,
n1572, n1573, n1574, n1575, n1576, n1577, n1578,n1579, n1580, n1581,
n1582, n1583, n1584, n1585, n1586, n1587, n1588,n1589, n1590, n1591,
n1592, n1593, n1594, n1595, n1596, n1597, n1598,n1599, n1600, n1601,
n1602, n1603, n1604, n1605, n1606, n1607, n1608,n1609, n1610, n1611,
n1612, n1613, n1614, n1615, n1616, n1617, n1618,n1619, n1620, n1621,
n1622, n1623, n1624, n1625, n1626, n1627, n1628,n1629, n1630, n1631,
n1632, n1633, n1634, n1635, n1636, n1637, n1638;
LOGIC0 U229 (.Q(n1418));
LOGIC1 U230 (.Q(n1417));
DFA \sayici_zaman_reg[0]  (.D(n1635),.C(n1625),.RN(reset),
.Q(\sayici_zaman[0]),.QN(n1601));
AND22 U231 (.A(ref_time[2]),.B(ref_time[3]),.Q(n1450));
NO22 U232 (.A(ref_time[3]),.B(ref_time[2]),.Q(n1447));
NA2 U233 (.A(n1426),.B(n1430),.Q(Row_akt[27]));
NA2 U234 (.A(n1427),.B(n1430),.Q(Row_akt[29]));
NA2 U235 (.A(n1428),.B(n1430),.Q(Row_akt[31]));
NA2 U236 (.A(n1431),.B(n1430),.Q(Row_akt[49]));
NA2 U237 (.A(n1432),.B(n1430),.Q(Row_akt[51]));
NA2 U238 (.A(n1433),.B(n1430),.Q(Row_akt[53]));
NA2 U239 (.A(n1434),.B(n1430),.Q(Row_akt[55]));
NA2 U240 (.A(n1435),.B(n1430),.Q(Row_akt[57]));
NA2 U241 (.A(n1436),.B(n1430),.Q(Row_akt[59]));
NA2 U242 (.A(n1437),.B(n1430),.Q(Row_akt[61]));
AND22 U243 (.A(n1449),.B(ref_time[3]),.Q(n1448));
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NO22 U244 (.A(ref_time[3]),.B(n1449),.Q(n1451));
IN4 U245 (.A(n1412),.Q(n1421));
NA3 U246 (.A(Ram_adres[0]),.B(n1446),.C(Akt_Dac),.Q(n1412));
BU4 U247 (.A(n1420),.Q(n1413));
BU4 U248 (.A(n1429),.Q(n1414));
IN4 U249 (.A(clk),.Q(n1625));
IN8 U250 (.A(n1415),.Q(n1546));
OR6 U251(.A(n1544),.B(n1441),.C(n1442),.D(n1545),
.E(n1443),.F(n1444),.Q(n1415));
IN8 U252 (.A(n1416),.Q(n1440));
AO31 U253 (.A(n1515),.B(n1534),.C(n1543),.D(n68),.Q(n1416));
DFA \sayici_zaman_reg[31](.D(n1603),.C(n1625),.RN(reset),
.Q(\sayici_zaman[31]),.QN(n1497));
DFA \sayici_zaman_reg[30](.D(n1604),.C(n1625),.RN(reset),
.Q(\sayici_zaman[30]),.QN(n1498));
DFA \sayici_zaman_reg[29](.D(n1605),.C(n1625),.RN(reset),
.Q(\sayici_zaman[29]),.QN(n1499));
DFA \sayici_zaman_reg[28]
(.D(n1606),.C(n1625),.RN(reset),.Q(\sayici_zaman[28]),.QN(n1566));
DFA \sayici_zaman_reg[27]
(.D(n1607),.C(n1625),.RN(reset),.Q(\sayici_zaman[27]),.QN(n1500));
DFA \sayici_zaman_reg[26]
(.D(n1608),.C(n1625),.RN(reset),.Q(\sayici_zaman[26]),.QN(n1569));
DFA \sayici_zaman_reg[25]
(.D(n1609),.C(n1625),.RN(reset),.Q(\sayici_zaman[25]),.QN(n1571));
DFA \sayici_zaman_reg[24]
(.D(n1610),.C(n1625),.RN(reset),.Q(\sayici_zaman[24]),.QN(n1573));
DFA \sayici_zaman_reg[23]
(.D(n1611),.C(n1625),.RN(reset),.Q(\sayici_zaman[23]),.QN(n1495));
DFA \sayici_zaman_reg[22]
(.D(n1612),.C(n1625),.RN(reset),.Q(\sayici_zaman[22]),.QN(n1576));
DFA \sayici_zaman_reg[21]
(.D(n1613),.C(n1625),.RN(reset),.Q(\sayici_zaman[21]),.QN(n1578));
DFA \sayici_zaman_reg[20]
(.D(n1614),.C(n1625),.RN(reset),.Q(\sayici_zaman[20]),.QN(n1580));
DFA \sayici_zaman_reg[19]
(.D(n1615),.C(n1625),.RN(reset),.Q(\sayici_zaman[19]),.QN(n1496));
DFA \sayici_zaman_reg[18]
(.D(n1616),.C(n1625),.RN(reset),.Q(\sayici_zaman[18]),.QN(n1585));
DFA \sayici_zaman_reg[17]
(.D(n1617),.C(n1625),.RN(reset),.Q(\sayici_zaman[17]),.QN(n1587));
DFA \sayici_zaman_reg[16]
(.D(n1618),.C(n1625),.RN(reset),.Q(\sayici_zaman[16]),.QN(n1589));
DFA \sayici_zaman_reg[15]
(.D(n1619),.C(n1625),.RN(reset),.Q(\sayici_zaman[15]),.QN(n1591));
DFA \sayici_zaman_reg[14]
(.D(n1620),.C(n1625),.RN(reset),.Q(\sayici_zaman[14]),.QN(n1494));
DFA \sayici_zaman_reg[13]
(.D(n1621),.C(n1625),.RN(reset),.Q(\sayici_zaman[13]),.QN(n1594));
DFA \sayici_zaman_reg[12]
(.D(n1622),.C(n1625),.RN(reset),.Q(\sayici_zaman[12]),.QN(n1493));
DFA \sayici_zaman_reg[11]
(.D(n1623),.C(n1625),.RN(reset),.Q(\sayici_zaman[11]),.QN(n1597));
DFA \sayici_zaman_reg[10]
(.D(n1624),.C(n1625),.RN(reset),.Q(\sayici_zaman[10]),.QN(n1599));
DFA \sayici_zaman_reg[9]  (.D(n1626),.C(n1625),.RN(reset),.Q(
\sayici_zaman[9]),.QN(n1547));
DFA \sayici_zaman_reg[8]  (.D(n1627),.C(n1625),.RN(reset),.Q(
\sayici_zaman[8]),.QN(n1549));
DFA \sayici_zaman_reg[7]  (.D(n1628),.C(n1625),.RN(reset),.Q(
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\sayici_zaman[7]),.QN(n1551));
DFA \sayici_zaman_reg[6]  (.D(n1629),.C(n1625),.RN(reset),.Q(
\sayici_zaman[6]),.QN(n1553));
DFA \sayici_zaman_reg[5]  (.D(n1630),.C(n1625),.RN(reset),.Q(
\sayici_zaman[5]),.QN(n1555));
DFA \sayici_zaman_reg[4]  (.D(n1631),.C(n1625),.RN(reset),.Q(
\sayici_zaman[4]),.QN(n1557));
DFA2 \sayici_zaman_reg[3]
(.D(n1632),.C(n1625),.RN(reset),.Q(\sayici_zaman[3]),.QN(n1559));
DFA \sayici_zaman_reg[2]  (.D(n1633),.C(n1625),.RN(reset),.Q(
\sayici_zaman[2]),.QN(n1563));
DFA2 \sayici_zaman_reg[1]
(.D(n1634),.C(n1625),.RN(reset),.Q(\sayici_zaman[1]),.QN(n1582));
DFA Akt_Dac_reg
(.D(n1638),.C(n1625),.RN(reset),.Q(Akt_Dac),.QN(n1439));
DFS9 \Ram_adres_reg[0](.D(n1417),.SD(n1418),
.SE(n1441),.C(n1625),.SN(reset),.Q(Ram_adres[0]));
DFS9 \Ram_adres_reg[1](.D(n1417),.SD(n1418),.SE(n1442),
.C(n1625),.SN(reset),.Q(Ram_adres[1]));
DF9 \Ram_adres_reg[2]
(.D(n1637),.C(n1625),.SN(reset),.Q(Ram_adres[2]),.QN(n1455));
DFS9 \Ram_adres_reg[3](.D(n1417),.SD(n1418),.SE(n1443),
.C(n1625),.SN(reset),.Q(Ram_adres[3]));
DFS9 \Ram_adres_reg[4](.D(n1417),.SD(n1418),.SE(n1444),
.C(n1625),.SN(reset),.Q(Ram_adres[4]),.QN(n1446));
DF9 \Ram_adres_reg[5]
(.D(n1636),.C(n1625),.SN(reset),.Q(Ram_adres[5]),.QN(n1457));
NA22 U254 (.A(n1419),.B(n1413),.Q(Row_akt[0]));
NA22 U255 (.A(n1419),.B(n1421),.Q(Row_akt[1]));
NA22 U256 (.A(n1422),.B(n1413),.Q(Row_akt[2]));
NA22 U257 (.A(n1422),.B(n1421),.Q(Row_akt[3]));
NA22 U258 (.A(n1423),.B(n1413),.Q(Row_akt[4]));
NA22 U259 (.A(n1423),.B(n1421),.Q(Row_akt[5]));
NA22 U260 (.A(n1424),.B(n1413),.Q(Row_akt[6]));
NA22 U261 (.A(n1424),.B(n1421),.Q(Row_akt[7]));
NA22 U262 (.A(n1413),.B(n1425),.Q(Row_akt[8]));
NA22 U263 (.A(n1425),.B(n1421),.Q(Row_akt[9]));
NA22 U264 (.A(n1426),.B(n1413),.Q(Row_akt[10]));
NA22 U265 (.A(n1426),.B(n1421),.Q(Row_akt[11]));
NA22 U266 (.A(n1427),.B(n1413),.Q(Row_akt[12]));
NA22 U267 (.A(n1427),.B(n1421),.Q(Row_akt[13]));
NA22 U268 (.A(n1428),.B(n1413),.Q(Row_akt[14]));
NA22 U269 (.A(n1428),.B(n1421),.Q(Row_akt[15]));
NA22 U270 (.A(n1419),.B(n1414),.Q(Row_akt[16]));
NA22 U271 (.A(n1419),.B(n1430),.Q(Row_akt[17]));
NA22 U272 (.A(n1422),.B(n1414),.Q(Row_akt[18]));
NA22 U273 (.A(n1422),.B(n1430),.Q(Row_akt[19]));
NA22 U274 (.A(n1423),.B(n1414),.Q(Row_akt[20]));
NA22 U275 (.A(n1423),.B(n1430),.Q(Row_akt[21]));
NA22 U276 (.A(n1414),.B(n1424),.Q(Row_akt[22]));
NA22 U277 (.A(n1430),.B(n1424),.Q(Row_akt[23]));
NA22 U278 (.A(n1414),.B(n1425),.Q(Row_akt[24]));
NA22 U279 (.A(n1430),.B(n1425),.Q(Row_akt[25]));
NA22 U280 (.A(n1426),.B(n1414),.Q(Row_akt[26]));
NA22 U281 (.A(n1427),.B(n1414),.Q(Row_akt[28]));
NA22 U282 (.A(n1428),.B(n1414),.Q(Row_akt[30]));
NA22 U283 (.A(n1431),.B(n1413),.Q(Row_akt[32]));
NA22 U284 (.A(n1431),.B(n1421),.Q(Row_akt[33]));
NA22 U285 (.A(n1432),.B(n1413),.Q(Row_akt[34]));
NA22 U286 (.A(n1432),.B(n1421),.Q(Row_akt[35]));
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NA22 U287 (.A(n1433),.B(n1413),.Q(Row_akt[36]));
NA22 U288 (.A(n1433),.B(n1421),.Q(Row_akt[37]));
NA22 U289 (.A(n1434),.B(n1413),.Q(Row_akt[38]));
NA22 U290 (.A(n1434),.B(n1421),.Q(Row_akt[39]));
NA22 U291 (.A(n1435),.B(n1413),.Q(Row_akt[40]));
NA22 U292 (.A(n1435),.B(n1421),.Q(Row_akt[41]));
NA22 U293 (.A(n1436),.B(n1413),.Q(Row_akt[42]));
NA22 U294 (.A(n1436),.B(n1421),.Q(Row_akt[43]));
NA22 U295 (.A(n1437),.B(n1413),.Q(Row_akt[44]));
NA22 U296 (.A(n1437),.B(n1421),.Q(Row_akt[45]));
NA22 U297 (.A(n1438),.B(n1413),.Q(Row_akt[46]));
NA22 U298 (.A(n1438),.B(n1421),.Q(Row_akt[47]));
NA22 U299 (.A(n1431),.B(n1414),.Q(Row_akt[48]));
NA22 U300 (.A(n1432),.B(n1414),.Q(Row_akt[50]));
NA22 U301 (.A(n1433),.B(n1414),.Q(Row_akt[52]));
NA22 U302 (.A(n1434),.B(n1414),.Q(Row_akt[54]));
NA22 U303 (.A(n1435),.B(n1414),.Q(Row_akt[56]));
NA22 U304 (.A(n1436),.B(n1414),.Q(Row_akt[58]));
NA22 U305 (.A(n1437),.B(n1414),.Q(Row_akt[60]));
NA22 U306 (.A(n1414),.B(n1438),.Q(Row_akt[62]));
NA22 U307 (.A(n1430),.B(n1438),.Q(Row_akt[63]));
NO2 U308 (.A(n1625),.B(n1439),.Q(Ram_cs));
IN1 U309 (.A(n1440),.Q(n1638));
NO2 U310 (.A(\Ram_adres140[0]),.B(n1440),.Q(n1441));
NO2 U311 (.A(\Ram_adres140[1]),.B(n1440),.Q(n1442));
OR23 U312 (.A(\Ram_adres140[2]),.B(n1440),.Q(n1637));
NO2 U313 (.A(\Ram_adres140[3]),.B(n1440),.Q(n1443));
NO2 U314 (.A(\Ram_adres140[4]),.B(n1440),.Q(n1444));
OR23 U315 (.A(\Ram_adres140[5]),.B(n1440),.Q(n1636));
NO3 U316
(.A(ref_time[4]),.B(ref_time[1]),.C(ref_time[0]),.Q(n1445));
NO3 U317 (.A(n1439),.B(Ram_adres[0]),.C(Ram_adres[4]),.Q(n1420));
NO3 U318 (.A(n1446),.B(Ram_adres[0]),.C(n1439),.Q(n1429));
AND3
U319(.A(ref_time[0]),.B(ref_time[1]),.C(ref_time[4]),.Q(n1452));
NO2 U320 (.A(Ram_adres[5]),.B(Ram_adres[1]),.Q(n1453));
AND2 U321 (.A(n1455),.B(Ram_adres[3]),.Q(n1454));
AND2 U322 (.A(n1454),.B(n1453),.Q(n1425));
AND2 U323 (.A(n1457),.B(Ram_adres[1]),.Q(n1456));
NO2 U324 (.A(Ram_adres[3]),.B(n1455),.Q(n1458));
AND2 U325 (.A(n1458),.B(n1456),.Q(n1424));
AND2 U326 (.A(Ram_adres[5]),.B(Ram_adres[1]),.Q(n1459));
AND2 U327 (.A(Ram_adres[2]),.B(Ram_adres[3]),.Q(n1460));
AND2 U328 (.A(n1460),.B(n1459),.Q(n1438));
NO2 U329 (.A(Ram_adres[1]),.B(n1457),.Q(n1461));
AND2 U330 (.A(n1461),.B(n1460),.Q(n1437));
AND2 U331 (.A(n1458),.B(n1453),.Q(n1423));
AND2 U332 (.A(n1459),.B(n1454),.Q(n1436));
AND2 U333 (.A(n1461),.B(n1454),.Q(n1435));
AND2 U334 (.A(n1459),.B(n1458),.Q(n1434));
AND2 U335 (.A(n1461),.B(n1458),.Q(n1433));
NO2 U336 (.A(Ram_adres[2]),.B(Ram_adres[3]),.Q(n1462));
AND2 U337 (.A(n1462),.B(n1459),.Q(n1432));
AND2 U338 (.A(n1462),.B(n1461),.Q(n1431));
AND2 U339 (.A(n1462),.B(n1456),.Q(n1422));
AND2 U340 (.A(n1460),.B(n1456),.Q(n1428));
AND2 U341 (.A(n1460),.B(n1453),.Q(n1427));
AND2 U342 (.A(n1456),.B(n1454),.Q(n1426));
AND2 U343 (.A(n1462),.B(n1453),.Q(n1419));
NA22 U344 (.A(n1464),.B(n1447),.Q(n1463));
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NA22 U345 (.A(n1466),.B(n1447),.Q(n1465));
NA22 U346 (.A(n1468),.B(n1447),.Q(n1467));
AND2 U347 (.A(n1452),.B(n1447),.Q(\ref_time1[19]));
NA22 U348 (.A(n1464),.B(n1451),.Q(n1469));
NA22 U349 (.A(n1466),.B(n1451),.Q(n1470));
NA22 U350 (.A(n1468),.B(n1451),.Q(n1471));
AND2 U351 (.A(n1452),.B(n1451),.Q(\ref_time1[23]));
NA22 U352 (.A(n1464),.B(n1448),.Q(n1472));
NA22 U353 (.A(n1466),.B(n1448),.Q(n1473));
NA22 U354 (.A(n1468),.B(n1448),.Q(n1474));
AND2 U355 (.A(n1452),.B(n1448),.Q(\ref_time1[27]));
NA22 U356 (.A(n1464),.B(n1450),.Q(n1475));
AND2 U357 (.A(n1466),.B(n1450),.Q(\ref_time1[29]));
AND2 U358 (.A(n1468),.B(n1450),.Q(\ref_time1[30]));
AND2 U359 (.A(n1452),.B(n1450),.Q(\ref_time1[31]));
NA22 U360 (.A(n1450),.B(n1477),.Q(n1476));
AND2 U361 (.A(n1450),.B(n1478),.Q(\ref_time1[14]));
NA22 U362 (.A(n1480),.B(n1450),.Q(n1479));
AND2 U363 (.A(n1450),.B(n1445),.Q(\ref_time1[12]));
NA22 U364 (.A(n1477),.B(n1448),.Q(n1481));
NA22 U365 (.A(n1478),.B(n1448),.Q(n1482));
NA22 U366 (.A(n1480),.B(n1448),.Q(n1483));
NA22 U367 (.A(n1448),.B(n1445),.Q(n1484));
NA22 U368 (.A(n1451),.B(n1477),.Q(n1485));
NA22 U369 (.A(n1451),.B(n1478),.Q(n1486));
NA22 U370 (.A(n1451),.B(n1480),.Q(n1487));
NA22 U371 (.A(n1451),.B(n1445),.Q(n1488));
NA22 U372 (.A(n1477),.B(n1447),.Q(n1489));
NA22 U373 (.A(n1478),.B(n1447),.Q(n1490));
NA22 U374 (.A(n1480),.B(n1447),.Q(n1491));
NA22 U375 (.A(n1445),.B(n1447),.Q(n1492));
IN1 U376 (.A(n1483),.Q(\ref_time1[9]));
IN1 U377 (.A(n1484),.Q(\ref_time1[8]));
IN1 U378 (.A(n1486),.Q(\ref_time1[6]));
IN1 U379 (.A(n1485),.Q(\ref_time1[7]));
IN1 U380 (.A(n1487),.Q(\ref_time1[5]));
IN1 U381 (.A(n1488),.Q(\ref_time1[4]));
IN1 U382 (.A(n1490),.Q(\ref_time1[2]));
IN1 U383 (.A(n1489),.Q(\ref_time1[3]));
IN1 U384 (.A(n1482),.Q(\ref_time1[10]));
IN1 U385 (.A(n1492),.Q(\ref_time1[0]));
IN1 U386 (.A(n1481),.Q(\ref_time1[11]));
IN1 U387 (.A(n1479),.Q(\ref_time1[13]));
IN1 U388 (.A(n1491),.Q(\ref_time1[1]));
IN1 U389 (.A(n1476),.Q(\ref_time1[15]));
IN1 U390 (.A(n1471),.Q(\ref_time1[22]));
IN1 U391 (.A(n1470),.Q(\ref_time1[21]));
IN1 U392 (.A(n1469),.Q(\ref_time1[20]));
IN1 U393 (.A(n1467),.Q(\ref_time1[18]));
IN1 U394 (.A(n1465),.Q(\ref_time1[17]));
IN1 U395 (.A(n1463),.Q(\ref_time1[16]));
IN1 U396 (.A(n1475),.Q(\ref_time1[28]));
IN1 U397 (.A(n1474),.Q(\ref_time1[26]));
IN1 U398 (.A(n1473),.Q(\ref_time1[25]));
IN1 U399 (.A(n1472),.Q(\ref_time1[24]));
IN1 U400 (.A(ref_time[2]),.Q(n1449));
IN1 U401 (.A(ref_time[1]),.Q(n1501));
NO2 U402 (.A(ref_time[1]),.B(ref_time[0]),.Q(n1502));
AND2 U403 (.A(n1502),.B(ref_time[4]),.Q(n1464));
AND33 U404 (.A(ref_time[4]),.B(ref_time[0]),.C(n1501),.Q(n1466));
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NO2 U405 (.A(ref_time[0]),.B(n1501),.Q(n1503));
AND2 U406 (.A(n1503),.B(ref_time[4]),.Q(n1468));
NO2 U407 (.A(ref_time[4]),.B(n1501),.Q(n1504));
AND2 U408 (.A(n1504),.B(ref_time[0]),.Q(n1477));
NO2 U409 (.A(ref_time[1]),.B(ref_time[4]),.Q(n1505));
AND2 U410 (.A(n1505),.B(ref_time[0]),.Q(n1480));
NO2 U411 (.A(ref_time[0]),.B(ref_time[4]),.Q(n1506));
AND2 U412 (.A(n1506),.B(ref_time[1]),.Q(n1478));
EN1 U413 (.A(\sayici_zaman[16]),.B(n1463),.Q(n1507));
EN1 U414 (.A(\sayici_zaman[17]),.B(n1465),.Q(n1508));
EN1 U415 (.A(\sayici_zaman[18]),.B(n1467),.Q(n1509));
EN1 U416 (.A(\ref_time1[19]),.B(n1496),.Q(n1510));
EN1 U417 (.A(\sayici_zaman[20]),.B(n1469),.Q(n1511));
EN1 U418 (.A(\sayici_zaman[21]),.B(n1470),.Q(n1512));
EN1 U419 (.A(\sayici_zaman[22]),.B(n1471),.Q(n1513));
EN1 U420 (.A(\ref_time1[23]),.B(n1495),.Q(n1514));
NO83 U421(.A(n1507),.B(n1508),.C(n1509),.D(n1510),
.E(n1511),.F(n1512),.G(n1513),.H(n1514),.Q(n1515));
EN1 U422 (.A(n1485),.B(\sayici_zaman[7]),.Q(n1516));
EN1 U423 (.A(n1486),.B(\sayici_zaman[6]),.Q(n1517));
EN1 U424 (.A(\sayici_zaman[8]),.B(n1484),.Q(n1518));
EN1 U425 (.A(\sayici_zaman[9]),.B(n1483),.Q(n1519));
EN1 U426 (.A(\sayici_zaman[1]),.B(n1491),.Q(n1520));
EN1 U427 (.A(\sayici_zaman[15]),.B(n1476),.Q(n1521));
EN1 U428 (.A(\ref_time1[14]),.B(n1494),.Q(n1522));
EN1 U429 (.A(\sayici_zaman[13]),.B(n1479),.Q(n1523));
EN1 U430 (.A(\ref_time1[12]),.B(n1493),.Q(n1524));
EN1 U431 (.A(\sayici_zaman[11]),.B(n1481),.Q(n1525));
EN1 U432 (.A(\sayici_zaman[10]),.B(n1482),.Q(n1526));
EN1 U433 (.A(\sayici_zaman[0]),.B(n1492),.Q(n1527));
OR8 U434(.A(n1520),.B(n1521),.C(n1522),.D(n1523),
.E(n1524),.F(n1525),.G(n1526),.H(n1527),.Q(n1528));
EN1 U435 (.A(n1489),.B(\sayici_zaman[3]),.Q(n1529));
EN1 U436 (.A(\sayici_zaman[4]),.B(n1488),.Q(n1530));
EN1 U437 (.A(\sayici_zaman[5]),.B(n1487),.Q(n1531));
OR23 U438 (.A(n1530),.B(n1531),.Q(n1532));
EN1 U439 (.A(n1490),.B(\sayici_zaman[2]),.Q(n1533));
NO83 U440(.A(n1516),.B(n1517),.C(n1518),.D(n1519),
.E(n1528),.F(n1529),.G(n1532),.H(n1533),.Q(n1534));
EN1 U441 (.A(\sayici_zaman[24]),.B(n1472),.Q(n1535));
EN1 U442 (.A(\sayici_zaman[25]),.B(n1473),.Q(n1536));
EN1 U443 (.A(\sayici_zaman[26]),.B(n1474),.Q(n1537));
EN1 U444 (.A(\ref_time1[27]),.B(n1500),.Q(n1538));
EN1 U445 (.A(\sayici_zaman[28]),.B(n1475),.Q(n1539));
EN1 U446 (.A(\ref_time1[29]),.B(n1499),.Q(n1540));
EN1 U447 (.A(\ref_time1[30]),.B(n1498),.Q(n1541));
EN1 U448 (.A(\ref_time1[31]),.B(n1497),.Q(n1542));
NO83 U449(.A(n1535),.B(n1536),.C(n1537),.D(n1538),
.E(n1539),.F(n1540),.G(n1541),.H(n1542),.Q(n1543));
IN2 U450 (.A(n1637),.Q(n1544));
IN2 U451 (.A(n1636),.Q(n1545));
NA22 U452 (.A(\sayici_zaman146[9]),.B(n1440),.Q(n1548));
ON21 U453 (.A(n1546),.B(n1547),.C(n1548),.Q(n1626));
NA22 U454 (.A(\sayici_zaman146[8]),.B(n1440),.Q(n1550));
ON21 U455 (.A(n1546),.B(n1549),.C(n1550),.Q(n1627));
NA22 U456 (.A(\sayici_zaman146[7]),.B(n1440),.Q(n1552));
ON21 U457 (.A(n1546),.B(n1551),.C(n1552),.Q(n1628));
NA22 U458 (.A(\sayici_zaman146[6]),.B(n1440),.Q(n1554));
ON21 U459 (.A(n1546),.B(n1553),.C(n1554),.Q(n1629));
NA22 U460 (.A(\sayici_zaman146[5]),.B(n1440),.Q(n1556));
```

```
ON21 U461 (.A(n1546),.B(n1555),.C(n1556),.Q(n1630));
NA22 U462 (.A(\sayici_zaman146[4]),.B(n1440),.Q(n1558));
ON21 U463 (.A(n1546),.B(n1557),.C(n1558),.Q(n1631));
NA22 U464 (.A(\sayici_zaman146[3]),.B(n1440),.Q(n1560));
ON21 U465 (.A(n1546),.B(n1559),.C(n1560),.Q(n1632));
NA22 U466 (.A(\sayici_zaman146[31]),.B(n1440),.Q(n1561));
ON21 U467 (.A(n1546),.B(n1497),.C(n1561),.Q(n1603));
NA22 U468 (.A(\sayici_zaman146[30]),.B(n1440),.Q(n1562));
ON21 U469 (.A(n1546),.B(n1498),.C(n1562),.Q(n1604));
NA22 U470 (.A(\sayici_zaman146[2]),.B(n1440),.Q(n1564));
ON21 U471 (.A(n1546),.B(n1563),.C(n1564),.Q(n1633));
NA22 U472 (.A(\sayici_zaman146[29]),.B(n1440),.Q(n1565));
ON21 U473 (.A(n1546),.B(n1499),.C(n1565),.Q(n1605));
NA22 U474 (.A(\sayici_zaman146[28]),.B(n1440),.Q(n1567));
ON21 U475 (.A(n1546),.B(n1566),.C(n1567),.Q(n1606));
NA22 U476 (.A(\sayici_zaman146[27]),.B(n1440),.Q(n1568));
ON21 U477 (.A(n1546),.B(n1500),.C(n1568),.Q(n1607));
NA22 U478 (.A(\sayici_zaman146[26]),.B(n1440),.Q(n1570));
ON21 U479 (.A(n1546),.B(n1569),.C(n1570),.Q(n1608));
NA22 U480 (.A(\sayici_zaman146[25]),.B(n1440),.Q(n1572));
ON21 U481 (.A(n1546),.B(n1571),.C(n1572),.Q(n1609));
NA22 U482 (.A(\sayici_zaman146[24]),.B(n1440),.Q(n1574));
ON21 U483 (.A(n1546),.B(n1573),.C(n1574),.Q(n1610));
NA22 U484 (.A(\sayici_zaman146[23]),.B(n1440),.Q(n1575));
ON21 U485 (.A(n1546),.B(n1495),.C(n1575),.Q(n1611));
NA22 U486 (.A(\sayici_zaman146[22]),.B(n1440),.Q(n1577));
ON21 U487 (.A(n1546),.B(n1576),.C(n1577),.Q(n1612));
NA22 U488 (.A(\sayici_zaman146[21]),.B(n1440),.Q(n1579));
ON21 U489 (.A(n1546),.B(n1578),.C(n1579),.Q(n1613));
NA22 U490 (.A(\sayici_zaman146[20]),.B(n1440),.Q(n1581));
ON21 U491 (.A(n1546),.B(n1580),.C(n1581),.Q(n1614));
NA22 U492 (.A(\sayici_zaman146[1]),.B(n1440),.Q(n1583));
ON21 U493 (.A(n1546),.B(n1582),.C(n1583),.Q(n1634));
NA22 U494 (.A(\sayici_zaman146[19]),.B(n1440),.Q(n1584));
ON21 U495 (.A(n1546),.B(n1496),.C(n1584),.Q(n1615));
NA22 U496 (.A(\sayici_zaman146[18]),.B(n1440),.Q(n1586));
ON21 U497 (.A(n1546),.B(n1585),.C(n1586),.Q(n1616));
NA22 U498 (.A(\sayici_zaman146[17]),.B(n1440),.Q(n1588));
ON21 U499 (.A(n1546),.B(n1587),.C(n1588),.Q(n1617));
NA22 U500 (.A(\sayici_zaman146[16]),.B(n1440),.Q(n1590));
ON21 U501 (.A(n1546),.B(n1589),.C(n1590),.Q(n1618));
NA22 U502 (.A(\sayici_zaman146[15]),.B(n1440),.Q(n1592));
ON21 U503 (.A(n1546),.B(n1591),.C(n1592),.Q(n1619));
NA22 U504 (.A(\sayici_zaman146[14]),.B(n1440),.Q(n1593));
ON21 U505 (.A(n1546),.B(n1494),.C(n1593),.Q(n1620));
NA22 U506 (.A(\sayici_zaman146[13]),.B(n1440),.Q(n1595));
ON21 U507 (.A(n1546),.B(n1594),.C(n1595),.Q(n1621));
NA22 U508 (.A(\sayici_zaman146[12]),.B(n1440),.Q(n1596));
ON21 U509 (.A(n1546),.B(n1493),.C(n1596),.Q(n1622));
NA22 U510 (.A(\sayici_zaman146[11]),.B(n1440),.Q(n1598));
ON21 U511 (.A(n1546),.B(n1597),.C(n1598),.Q(n1623));
NA22 U512 (.A(\sayici_zaman146[10]),.B(n1440),.Q(n1600));
ON21 U513 (.A(n1546),.B(n1599),.C(n1600),.Q(n1624));
NA22 U514 (.A(\sayici_zaman146[0]),.B(n1440),.Q(n1602));
ON21 U515 (.A(n1546),.B(n1601),.C(n1602),.Q(n1635));
AND33 U516
(.A(Ram_adres[0]),.B(Akt_Dac),.C(Ram_adres[4]),.Q(n1430));
Digital1_DW01_inc_6_0 add_42(.A(Ram_adres),.SUM({\Ram_adres140[5] ,
\Ram_adres140[4] , \Ram_adres140[3] , \Ram_adres140[2] ,
\Ram_adres140[1] , \Ram_adres140[0] }));
```

```
Digital1_DW01_cmp2_32_0 gt_39 (.A({\ref_time1[31] , \ref_time1[30] ,
\ref_time1[29] , \ref_time1[28] , \ref_time1[27] , \ref_time1[26] ,
\ref_time1[25] , \ref_time1[24] , \ref_time1[23] , \ref_time1[22] ,
\ref_time1[21] , \ref_time1[20] , \ref_time1[19] , \ref_time1[18] ,
\ref_time1[17] , \ref_time1[16] , \ref_time1[15] , \ref_time1[14] ,
\ref_time1[13] , \ref_time1[12] , \ref_time1[11] , \ref_time1[10] ,
\ref_time1[9] , \ref_time1[8] , \ref_time1[7] , \ref_time1[6] ,
\ref_time1[5] , \ref_time1[4] , \ref_time1[3] , \ref_time1[2] ,
\ref_time1[1] , \ref_time1[0] }),.B({\sayici_zaman[31] ,
\sayici_zaman[30] , \sayici_zaman[29] , \sayici_zaman[28] ,
\sayici_zaman[27] , \sayici_zaman[26] , \sayici_zaman[25] ,
\sayici_zaman[24] , \sayici_zaman[23] , \sayici_zaman[22] ,
\sayici_zaman[21] , \sayici_zaman[20] , \sayici_zaman[19] ,
\sayici_zaman[18] , \sayici_zaman[17] , \sayici_zaman[16] ,
\sayici_zaman[15] , \sayici_zaman[14] , \sayici_zaman[13] ,
\sayici_zaman[12] , \sayici_zaman[11] , \sayici_zaman[10] ,
\sayici_zaman[9] , \sayici_zaman[8] , \sayici_zaman[7] ,
\sayici_zaman[6] , \sayici_zaman[5] , \sayici_zaman[4] ,
\sayici_zaman[3] , \sayici_zaman[2] , \sayici_zaman[1] ,
\sayici_zaman[0] }),.LEQ(n1418),.TC(n1418),.LT_LE(n68));
Digital1_DW01_inc_32_0add_50(.A({\sayici_zaman[31],\sayici_zaman[30],
\sayici_zaman[29] , \sayici_zaman[28] , \sayici_zaman[27] ,
\sayici_zaman[26] , \sayici_zaman[25] , \sayici_zaman[24] ,
\sayici_zaman[23] , \sayici_zaman[22] , \sayici_zaman[21] ,
\sayici_zaman[20] , \sayici_zaman[19] , \sayici_zaman[18] ,
\sayici_zaman[17] , \sayici_zaman[16] , \sayici_zaman[15] ,
\sayici_zaman[14] , \sayici_zaman[13] , \sayici_zaman[12] ,
\sayici_zaman[11] , \sayici_zaman[10] , \sayici_zaman[9] ,
\sayici_zaman[8] , \sayici_zaman[7] , \sayici_zaman[6] ,
\sayici_zaman[5] , \sayici_zaman[4] , \sayici_zaman[3] ,
\sayici_zaman[2] , \sayici_zaman[1] , \sayici_zaman[0] }),.SUM({
\sayici_zaman146[31] , \sayici_zaman146[30] , \sayici_zaman146[29] ,
\sayici_zaman146[28] , \sayici_zaman146[27] , \sayici_zaman146[26] ,
\sayici_zaman146[25] , \sayici_zaman146[24] , \sayici_zaman146[23] ,
\sayici_zaman146[22] , \sayici_zaman146[21] , \sayici_zaman146[20] ,
\sayici_zaman146[19] , \sayici_zaman146[18] , \sayici_zaman146[17] ,
\sayici_zaman146[16] , \sayici_zaman146[15] , \sayici_zaman146[14] ,
\sayici_zaman146[13] , \sayici_zaman146[12] , \sayici_zaman146[11] ,
\sayici_zaman146[10] , \sayici_zaman146[9] , \sayici_zaman146[8] ,
\sayici_zaman146[7] , \sayici_zaman146[6] , \sayici_zaman146[5] ,
\sayici_zaman146[4] , \sayici_zaman146[3] , \sayici_zaman146[2] ,
\sayici_zaman146[1] , \sayici_zaman146[0] }));
endmodule
```

E3. Behavioral VERILOG code of Interface block

```
// Verilog HDL for "TEZ", "uP_inter" "behavioral"
module uP_inter
(uP_cs,uP_write,clk,reset,prg1_do,prg2_do,prg3_do,prg4_do,prg5_do,pr
g6_do,prg7_do,prg8_do,prg9_do,prg10_do,prg11_do,prg12_do,uP_adres,CS
OUT,uP_dataout,write_out,read_out,write_data,uP_datain,uP_adresd,ref
_time,uP_read,uP_dataHz);
input             uP_cs,uP_read,uP_write,clk,reset;
input [7:0]
prg1_do,prg2_do,prg3_do,prg4_do,prg5_do,prg6_do,prg7_do,prg8_do,
prg9_do, prg10_do, prg11_do, prg12_do;
input [9:0] uP_adres;
output      [4:0] ref_time;
output      [11:0]   CSOUT;
```

```
output      [7:0] uP_dataout;
output            write_out,read_out,uP_dataHz;
output      [7:0] write_data;
input [7:0] uP_datain;
output      [5:0] uP_adresd;
reg   [4:0] ref_time;
reg         first;
wire        CSOUT1;
reg   [9:0] uP_adresic1;
reg   [7:0] write_data;
reg         write_out;
wire  [9:0] uP_adresic;
wire  uP_dataHz;
assign uP_dataHz=uP_cs|uP_read;
assign read_out=(!write_out);
assign uP_adresd=uP_adresic[5:0];
assign uP_adresic=adresec(write_out,uP_adresic1,uP_adres);
assign CSOUT=CS_funck(uP_adresic,CSOUT1);
assign CSOUT1=  (!clk) & (!uP_cs);
assign uP_dataout=uP_dat_funck(uP_adresic,prg1_do,prg2_do,prg3_do,
prg4_do,prg5_do, prg6_do, prg7_do,prg8_do,prg9_do,prg10_do,prg11_do,
prg12_do);
function [9:0] adresec;
input       a;
input [9:0] b,c;
case(a)
      1'b0:
            adresec=c;
      1'b1:
            adresec=b;
endcase
endfunction
function [11:0] CS_funck;
input [9:0] a;
input       b;
      case (a[9:6])
            4'b0000:
                  CS_funck = { 11'b00000000000,b};
            4'b0001:
                  CS_funck = { 10'b0000000000,b,1'b0};
            4'b0010:
                  CS_funck = { 9'b000000000,b,2'b00};
            4'b0011:
                  CS_funck = { 8'b00000000,b,3'b000};
            4'b0100:
                  CS_funck = { 7'b0000000,b,4'b0000};
            4'b0101:
                  CS_funck = { 6'b000000,b,5'b00000};
            4'b0110:
                  CS_funck = { 5'b00000,b,6'b000000};
            4'b0111:
                  CS_funck = { 4'b0000,b,7'b0000000};
            4'b1000:
                  CS_funck = { 3'b000,b,8'b00000000};
            4'b1001:
                  CS_funck = { 2'b00,b,9'b000000000};
            4'b1010:
                  CS_funck = { 1'b0,b,10'b0000000000};
            4'b1011:
                  CS_funck = { b,11'b00000000000};
```

```
            default:
                  CS_funck = 12'b000000000000;
      endcase
endfunction
function [7:0] uP_dat_funck;
input [9:0] a;
input [7:0] b1,b2,b3,b4,b5,b6,b7,b8,b9,b10,b11,b12;
case (a[9:6])
            4'b0000:
                  uP_dat_funck=b1;
            4'b0001:
                  uP_dat_funck=b2;
            4'b0010:
                  uP_dat_funck=b3;
            4'b0011:
                  uP_dat_funck=b4;
            4'b0100:
                  uP_dat_funck=b5;
            4'b0101:
                  uP_dat_funck=b6;
            4'b0110:
                  uP_dat_funck=b7;
            4'b0111:
                  uP_dat_funck=b8;
            4'b1000:
                  uP_dat_funck=b9;
            4'b1001:
                  uP_dat_funck=b10;
            4'b1010:
                  uP_dat_funck=b11;
            4'b1011:
                  uP_dat_funck=b12;
            default:
                  uP_dat_funck=b1;
endcase
endfunction
always@(negedge reset or negedge clk)
begin
if (!reset)
      ref_time=5'b01111;
else
      if (uP_adresic1[9:6]==4'b1100)
            ref_time=write_data[4:0];
      else
            ref_time=ref_time;
end
always@(negedge reset or posedge clk)
begin
if (!reset)
      begin
            uP_adresic1=10'b0000000000;
            write_data=8'b00000000;
            write_out=1'b0;
            first=1'b0;
      end
else
      begin
            uP_adresic1=uP_adres;
            write_data=uP_datain;
            if ((!first) & (!uP_write))
```

```
                  begin
                        write_out=1'b1;
                        first=1'b1;
                  end
            else
                  begin
                        write_out=1'b0;
                        first=1'b0;
                  end
      end
end
endmodule
```

E4.Synthesized VERILOG NETLIST of Interface Block

```
module uP_inter ( uP_cs, uP_write, clk, reset, prg1_do, prg2_do,
prg3_do,prg4_do, prg5_do, prg6_do, prg7_do,prg8_do,prg9_do,prg10_do,
prg11_do,prg12_do, uP_adres, CSOUT, uP_dataout, write_out, read_out,
write_data, uP_datain, uP_adresd, ref_time, uP_read, uP_dataHz);
input  [7:0] prg1_do;
input  [7:0] prg2_do;
input  [7:0] prg7_do;
input  [9:0] uP_adres;
input  [7:0] prg3_do;
input  [7:0] prg6_do;
input  [7:0] prg8_do;
input  [7:0] prg9_do;
input  [7:0] prg11_do;
input  [7:0] prg10_do;
input  [7:0] uP_datain;
input  [7:0] prg4_do;
input  [7:0] prg5_do;
output [7:0] write_data;
output [5:0] uP_adresd;
output [4:0] ref_time;
input  [7:0] prg12_do;
output [11:0] CSOUT;
output [7:0] uP_dataout;
input  uP_cs, uP_write, clk, reset, uP_read;
output write_out, read_out, uP_dataHz;
wire \uP_adresic1[7] , \uP_adresic1[3] , \uP_adresic1[1] ,
 \uP_adresic1[8] , \uP_adresic1[5] , \uP_adresic1[4] ,
 \uP_adresic1[0] , \uP_adresic1[9] , \uP_adresic1[2] ,
 \uP_adresic1[6] , write_out946, n1045, n1046, n1047,
 n1048, n1049, n1050, n1051, n1052, n1053, n1054,n1055,
 n1056, n1057, n1058, n1059, n1060, n1061, n1062, n1063,
 n1064, n1065, n1066, n1067, n1068, n1069, n1070, n1071,
 n1072, n1073, n1074, n1075, n1076, n1077, n1078, n1079,
 n1080, n1081, n1082, n1083, n1084, n1085, n1086, n1087,
 n1088, n1089, n1090, n1091, n1092, n1093, n1094, n1095,
 n1096, n1097, n1098, n1099, n1100, n1101, n1102, n1103,
 n1104, n1105, n1106, n1107, n1108, n1109, n1110, n1111,
 n1112, n1113, n1114, n1115, n1116;
LOGIC0 U266 (.Q(n1046));
AND23 U267 (.A(n1050),.B(n1056),.Q(n1064));
IN2 U268 (.A(n1045),.Q(n1074));
```

```
AN22 U269 (.A(n1052),.B(n1051),.C(n1049),.D(n1050),.Q(n1045));
AND23 U270 (.A(n1065),.B(n1055),.Q(n1066));
DFA2 write_out_reg
(.D(write_out946),.C(clk),.RN(reset),.Q(write_out),.QN(read_out));
AND23 U271 (.A(n1065),.B(n1050),.Q(n1069));
AND23 U272 (.A(n1059),.B(n1056),.Q(n1061));
AND23 U273 (.A(n1049),.B(n1062),.Q(n1071));
AND23 U274 (.A(n1062),.B(n1056),.Q(n1063));
AND23 U275 (.A(n1049),.B(n1055),.Q(n1047));
AND23 U276 (.A(n1065),.B(n1059),.Q(n1067));
NO23 U277 (.A(uP_cs),.B(clk),.Q(n1048));
AND23 U278 (.A(n1049),.B(n1059),.Q(n1070));
AND23 U279 (.A(n1065),.B(n1062),.Q(n1068));
AND23 U280 (.A(n1057),.B(n1051),.Q(n1065));
AND23 U281 (.A(n1056),.B(n1055),.Q(n1058));
DFA first_reg (.D(write_out946),.C(clk),.RN(reset),.Q(n1073));
DFA \write_data_reg[0]  (.D(uP_datain[0]),.C(clk),.RN(reset),.Q(
write_data[0]));
DFA \write_data_reg[1]  (.D(uP_datain[1]),.C(clk),.RN(reset),.Q(
write_data[1]));
DFA \write_data_reg[2]  (.D(uP_datain[2]),.C(clk),.RN(reset),.Q(
write_data[2]));
DFA \write_data_reg[3]  (.D(uP_datain[3]),.C(clk),.RN(reset),.Q(
write_data[3]));
DFA \write_data_reg[4]  (.D(uP_datain[4]),.C(clk),.RN(reset),.Q(
write_data[4]));
DFA \write_data_reg[5]  (.D(uP_datain[5]),.C(clk),.RN(reset),.Q(
write_data[5]));
DFA \write_data_reg[6]  (.D(uP_datain[6]),.C(clk),.RN(reset),.Q(
write_data[6]));
DFA \write_data_reg[7]  (.D(uP_datain[7]),.C(clk),.RN(reset),.Q(
write_data[7]));
DFA \uP_adresic1_reg[0]  (.D(uP_adres[0]),.C(clk),.RN(reset),.Q(
\uP_adresic1[0]));
DFA \uP_adresic1_reg[1]  (.D(uP_adres[1]),.C(clk),.RN(reset),.Q(
\uP_adresic1[1]));
DFA \uP_adresic1_reg[2]  (.D(uP_adres[2]),.C(clk),.RN(reset),.Q(
\uP_adresic1[2]));
DFA \uP_adresic1_reg[3]  (.D(uP_adres[3]),.C(clk),.RN(reset),.Q(
\uP_adresic1[3]));
DFA \uP_adresic1_reg[4]  (.D(uP_adres[4]),.C(clk),.RN(reset),.Q(
\uP_adresic1[4]));
DFA \uP_adresic1_reg[5]  (.D(uP_adres[5]),.C(clk),.RN(reset),.Q(
\uP_adresic1[5]));
DFA \uP_adresic1_reg[6]  (.D(uP_adres[6]),.C(clk),.RN(reset),.Q(
\uP_adresic1[6]));
DFA \uP_adresic1_reg[7]  (.D(uP_adres[7]),.C(clk),.RN(reset),.Q(
\uP_adresic1[7]));
DFA \uP_adresic1_reg[8]  (.D(uP_adres[8]),.C(clk),.RN(reset),.Q(
\uP_adresic1[8]));
DFA \uP_adresic1_reg[9]  (.D(uP_adres[9]),.C(clk),.RN(reset),.Q(
\uP_adresic1[9]));
JKS9 \ref_time_reg[2](.J(n1046),.K(n1046),.SD(write_data[2]),
.SE(n1072),.C(n1115),.SN(reset),.Q(ref_time[2]));
JKS9 \ref_time_reg[0]  (.J(n1046),.K(n1046),.SD(write_data[0]),
.SE(n1072),.C(n1115),.SN(reset),.Q(ref_time[0]));
JKS9 \ref_time_reg[1]  (.J(n1046),.K(n1046),.SD(write_data[1]),
.SE(n1072),.C(n1115),.SN(reset),.Q(ref_time[1]));
JKS9 \ref_time_reg[3]  (.J(n1046),.K(n1046),.SD(write_data[3]),
.SE(n1072),.C(n1115),.SN(reset),.Q(ref_time[3]));
```

```
AND2 U282 (.A(n1047),.B(n1048),.Q(CSOUT[3]));
AND3 U283 (.A(n1049),.B(n1050),.C(n1048),.Q(CSOUT[0]));
OR2 U284 (.A(uP_read),.B(uP_cs),.Q(uP_dataHz));
MU2 U285(.I0(uP_adres[8]),.I1(\uP_adresic1[8]),
.S(write_out),.Q(n1051));
MU2 U286 (.I0(uP_adres[9]),.I1(\uP_adresic1[9]),
.S(write_out),.Q(n1052));
MU2 U287 (.I0(uP_adres[7]),.I1(\uP_adresic1[7]),
.S(write_out),.Q(n1053));
MU2 U288 (.I0(uP_adres[6]),.I1(\uP_adresic1[6]),
.S(write_out),.Q(n1054));
AND2 U289 (.A(n1054),.B(n1053),.Q(n1055));
NO2 U290 (.A(n1051),.B(n1057),.Q(n1056));
NO2 U291 (.A(n1054),.B(n1060),.Q(n1059));
AND2 U292 (.A(n1060),.B(n1054),.Q(n1062));
NO2 U293 (.A(n1054),.B(n1053),.Q(n1050));
NO2 U294 (.A(n1051),.B(n1052),.Q(n1049));
MU2 U295 (.I0(uP_adres[5]),.I1(\uP_adresic1[5]),
.S(write_out),.Q(uP_adresd[5]));
MU2 U296 (.I0(uP_adres[4]),.I1(\uP_adresic1[4]),
.S(write_out),.Q(uP_adresd[4]));
MU2 U297 (.I0(uP_adres[3]),.I1(\uP_adresic1[3]),
.S(write_out),.Q(uP_adresd[3]));
MU2 U298 (.I0(uP_adres[2]),.I1(\uP_adresic1[2]),
.S(write_out),.Q(uP_adresd[2]));
MU2 U299 (.I0(uP_adres[1]),.I1(\uP_adresic1[1]),
.S(write_out),.Q(uP_adresd[1]));
MU2 U300 (.I0(uP_adres[0]),.I1(\uP_adresic1[0]),
.S(write_out),.Q(uP_adresd[0]));
MU2 U301 (.I0(ref_time[4]),.I1(write_data[4]),.S(n1072),.Q(n1116));
NO2 U302 (.A(uP_write),.B(n1073),.Q(write_out946));
AND2 U303 (.A(n1048),.B(n1058),.Q(CSOUT[11]));
AND2 U304 (.A(n1048),.B(n1061),.Q(CSOUT[10]));
AND2 U305 (.A(n1048),.B(n1063),.Q(CSOUT[9]));
AND2 U306 (.A(n1048),.B(n1064),.Q(CSOUT[8]));
AND2 U307 (.A(n1048),.B(n1066),.Q(CSOUT[7]));
AND2 U308 (.A(n1048),.B(n1067),.Q(CSOUT[6]));
AND2 U309 (.A(n1048),.B(n1068),.Q(CSOUT[5]));
AND2 U310 (.A(n1048),.B(n1069),.Q(CSOUT[4]));
AND2 U311 (.A(n1048),.B(n1070),.Q(CSOUT[2]));
AND2 U312 (.A(n1048),.B(n1071),.Q(CSOUT[1]));
IN1 U313 (.A(clk),.Q(n1115));
IN1 U314 (.A(n1053),.Q(n1060));
IN1 U315 (.A(n1052),.Q(n1057));
AN222 U316 (.A(n1071),.B(prg2_do[7]),.C(n1074),
.D(prg1_do[7]),.E(n1070),.F(prg3_do[7]),.Q(n1075));
AN222 U317 (.A(n1047),.B(prg4_do[7]),.C(n1069),
.D(prg5_do[7]),.E(n1068),.F(prg6_do[7]),.Q(n1076));
AN222 U318 (.A(n1067),.B(prg7_do[7]),.C(n1066),
.D(prg8_do[7]),.E(n1064),.F(prg9_do[7]),.Q(n1077));
AN222 U319 (.A(n1063),.B(prg10_do[7]),.C(n1061),
.D(prg11_do[7]),.E(n1058),.F(prg12_do[7]),.Q(n1078));
NA4 U320
(.A(n1075),.B(n1076),.C(n1077),.D(n1078),.Q(uP_dataout[7]));
NA22 U321 (.A(prg7_do[6]),.B(n1067),.Q(n1079));
AN222 U322 (.A(prg11_do[6]),.B(n1061),.C(prg10_do[6]),
.D(n1063),.E(prg12_do[6]),.F(n1058),.Q(n1080));
AN22 U323 (.A(prg9_do[6]),.B(n1064),.C(prg8_do[6]),
.D(n1066),.Q(n1081));
```

```
AN222 U324 (.A(prg2_do[6]),.B(n1071),.C(n1074),
.D(prg1_do[6]),.E(prg3_do[6]),.F(n1070),.Q(n1082));
AN222 U325 (.A(prg5_do[6]),.B(n1069),.C(prg4_do[6]),
.D(n1047),.E(prg6_do[6]),.F(n1068),.Q(n1083));
NA5 U326 (.A(n1079),.B(n1080),.C(n1081),.D(n1082),.E(n1083),.Q(
uP_dataout[6]));
NA22 U327 (.A(prg7_do[5]),.B(n1067),.Q(n1084));
AN222 U328 (.A(prg11_do[5]),.B(n1061),.C(prg10_do[5]),
.D(n1063),.E(prg12_do[5]),.F(n1058),.Q(n1085));
AN22 U329 (.A(prg9_do[5]),.B(n1064),.C(prg8_do[5]),
.D(n1066),.Q(n1086));
AN222 U330 (.A(prg2_do[5]),.B(n1071),.C(n1074),
.D(prg1_do[5]),.E(prg3_do[5]),.F(n1070),.Q(n1087));
AN222 U331 (.A(prg5_do[5]),.B(n1069),.C(prg4_do[5]),
.D(n1047),.E(prg6_do[5]),.F(n1068),.Q(n1088));
NA5 U332 (.A(n1084),.B(n1085),.C(n1086),.D(n1087),.E(n1088),.Q(
uP_dataout[5]));
NA22 U333 (.A(prg7_do[4]),.B(n1067),.Q(n1089));
AN222 U334 (.A(prg11_do[4]),.B(n1061),.C(prg10_do[4]),
.D(n1063),.E(prg12_do[4]),.F(n1058),.Q(n1090));
AN22 U335 (.A(prg9_do[4]),.B(n1064),.C(prg8_do[4]),
.D(n1066),.Q(n1091));
AN222 U336 (.A(prg2_do[4]),.B(n1071),.C(n1074),
.D(prg1_do[4]),.E(prg3_do[4]),.F(n1070),.Q(n1092));
AN222 U337 (.A(prg5_do[4]),.B(n1069),.C(prg4_do[4]),
.D(n1047),.E(prg6_do[4]),.F(n1068),.Q(n1093));
NA5 U338 (.A(n1089),.B(n1090),.C(n1091),.D(n1092),.E(n1093),.Q(
uP_dataout[4]));
NA22 U339 (.A(prg7_do[3]),.B(n1067),.Q(n1094));
AN222 U340 (.A(prg11_do[3]),.B(n1061),.C(prg10_do[3]),
.D(n1063),.E(prg12_do[3]),.F(n1058),.Q(n1095));
AN22 U341 (.A(prg9_do[3]),.B(n1064),.C(prg8_do[3]),
.D(n1066),.Q(n1096));
AN222 U342 (.A(prg2_do[3]),.B(n1071),.C(n1074),
.D(prg1_do[3]),.E(prg3_do[3]),.F(n1070),.Q(n1097));
AN222 U343 (.A(prg5_do[3]),.B(n1069),.C(prg4_do[3]),
.D(n1047),.E(prg6_do[3]),.F(n1068),.Q(n1098));
NA5 U344 (.A(n1094),.B(n1095),.C(n1096),.D(n1097),.E(n1098),.Q(
uP_dataout[3]));
NA22 U345 (.A(prg7_do[2]),.B(n1067),.Q(n1099));
AN222 U346 (.A(prg11_do[2]),.B(n1061),.C(prg10_do[2]),
.D(n1063),.E(prg12_do[2]),.F(n1058),.Q(n1100));
AN22 U347 (.A(prg9_do[2]),.B(n1064),.C(prg8_do[2]),
.D(n1066),.Q(n1101));
AN222 U348 (.A(prg2_do[2]),.B(n1071),.C(n1074),
.D(prg1_do[2]),.E(prg3_do[2]),.F(n1070),.Q(n1102));
AN222 U349 (.A(prg5_do[2]),.B(n1069),.C(prg4_do[2]),
.D(n1047),.E(prg6_do[2]),.F(n1068),.Q(n1103));
NA5 U350 (.A(n1099),.B(n1100),.C(n1101),.D(n1102),.E(n1103),.Q(
uP_dataout[2]));
NA22 U351 (.A(prg7_do[1]),.B(n1067),.Q(n1104));
AN222 U352 (.A(prg11_do[1]),.B(n1061),.C(prg10_do[1]),
.D(n1063),.E(prg12_do[1]),.F(n1058),.Q(n1105));
AN22 U353 (.A(prg9_do[1]),.B(n1064),.C(prg8_do[1]),
.D(n1066),.Q(n1106));
AN222 U354 (.A(prg2_do[1]),.B(n1071),.C(n1074),
.D(prg1_do[1]),.E(prg3_do[1]),.F(n1070),.Q(n1107));
AN222 U355 (.A(prg5_do[1]),.B(n1069),.C(prg4_do[1]),
.D(n1047),.E(prg6_do[1]),.F(n1068),.Q(n1108));
NA5 U356 (.A(n1104),.B(n1105),.C(n1106),.D(n1107),.E(n1108),.Q(
```

```
uP_dataout[1]));
NA22 U357 (.A(prg7_do[0]),.B(n1067),.Q(n1109));
AN222 U358 (.A(prg11_do[0]),.B(n1061),.C(prg10_do[0]),
.D(n1063),.E(prg12_do[0]),.F(n1058),.Q(n1110));
AN22 U359 (.A(prg9_do[0]),.B(n1064),.C(prg8_do[0]),
.D(n1066),.Q(n1111));
AN222 U360 (.A(prg2_do[0]),.B(n1071),.C(n1074),
.D(prg1_do[0]),.E(prg3_do[0]),.F(n1070),.Q(n1112));
AN222 U361 (.A(prg5_do[0]),.B(n1069),.C(prg4_do[0]),
.D(n1047),.E(prg6_do[0]),.F(n1068),.Q(n1113));
NA5 U362 (.A(n1109),.B(n1110),.C(n1111),.D(n1112),.E(n1113),.Q(
uP_dataout[0]));
NO2 U363 (.A(\uP_adresic1[7]),.B(\uP_adresic1[6]),.Q(n1114));
AND3 U364 (.A(\uP_adresic1[9]),.B(\uP_adresic1[8]),
.C(n1114),.Q(n1072));
DFA
\ref_time_reg[4](.D(n1116),.C(n1115),.RN(reset),.Q(ref_time[4]));
Endmodule
```

E5. Behavioral VERILOG code of Encoder block

```
// Verilog HDL for "TEZ", "encoder" "behavioral"
module encoder(in,out);
parameter   Row_count=64;
parameter   code_b=6;
integer           i;
input [63:0]      in;
output[5:0] out;
reg   [5:0] out1,out2;
assign out=cikis(out1,out2);
function [5:0] cikis;
input [5:0] a,b;
if (a==b)
      cikis=a;
else
      cikis=cikis;
endfunction
always@(in)
begin
for (i=0;i<64;i=i+1)
      begin
            if(!in[i])
                  out1=i;
            else
                  out1=out1;
end
for (i=64;i>0;i=i-1)
      begin
            if(!in[i-1])
                  out2=i-1;
            else
                  out2=out2;
      end
end
endmodule
```

E6.Synthesized VERILOG NETLIST of Encoder Block

```
module Encoder ( in, out);
input  [63:0] in;
output [5:0] out;
wire n1552, n1553, n1554, n1555, n1556, n1557, n1558, n1559, n1560,
n1561, n1562, n1563, n1564, n1565, n1566, n1567, n1568, n1569,
n1570, n1571, n1572, n1573, n1574, n1575, n1576, n1577, n1578,
n1579, n1580, n1581, n1582, n1583, n1584, n1585, n1586, n1587,
n1588, n1589, n1590, n1591, n1592, n1593, n1594, n1595, n1596,
n1597, n1598, n1599, n1600, n1601, n1602, n1603, n1604, n1605,
n1606, n1607, n1608, n1609, n1610, n1611, n1612, n1613, n1614,
n1615, n1616, n1617, n1618, n1619, n1620, n1621, n1622, n1623,
n1624, n1625, n1626, n1627, n1628, n1629, n1630, n1631, n1632,
n1633, n1634, n1635, n1636, n1637, n1638, n1639, n1640, n1641,
n1642, n1643, n1644, n1645, n1646, n1647, n1648, n1649, n1650,
n1651, n1652, n1653, n1654, n1655, n1656, n1657, n1658, n1659,
n1660, n1661, n1662, n1663, n1664, n1665, n1666, n1667, n1668,
n1669, n1670, n1671, n1672, n1673, n1674, n1675, n1676, n1677,
n1678, n1679, n1680, n1681, n1682, n1683, n1684, n1685, n1686,
n1687, n1688, n1689, n1690, n1691;
NA5 U518 (.A(n1552),.B(n1553),.C(n1554),
.D(n1555),.E(n1556),.Q(out[5]));
AO31 U519 (.A(n1555),.B(n1556),.C(n1557),.D(n1558),.Q(out[4]));
ON21 U520 (.A(n1559),.B(n1558),.C(n1560),.Q(out[3]));
ON21 U521 (.A(n1561),.B(n1562),.C(n1563),.Q(out[2]));
ON211 U522(.A(n1564),.B(n1565),.C(in[63]),.D(in[62]),.Q(out[1]));
ON21 U523 (.A(n1566),.B(n1567),.C(in[63]),.Q(out[0]));
AN211 U524 (.A(out[3]),.B(n1569),.C(n1570),.D(n1571),.Q(n1568));
AN211 U525 (.A(n1555),.B(n1572),.C(n1573),.D(n1574),.Q(n1559));
AN211 U526 (.A(n1576),.B(n1577),.C(n1578),.D(n1571),.Q(n1575));
AN211 U527 (.A(n1580),.B(n1581),.C(n1582),.D(n1583),.Q(n1579));
AN211 U528 (.A(n1552),.B(n1585),.C(n1573),.D(n1586),.Q(n1584));
OA21 U529 (.A(n1584),.B(n1587),.C(n1588),.Q(n1561));
AN211 U530 (.A(out[1]),.B(n1590),.C(n1591),.D(n1592),.Q(n1589));
AN211 U531 (.A(n1576),.B(n1594),.C(n1595),.D(n1596),.Q(n1593));
AN211 U532 (.A(n1598),.B(n1599),.C(n1600),.D(n1601),.Q(n1597));
AN211 U533 (.A(n1580),.B(n1603),.C(n1604),.D(n1605),.Q(n1602));
AN211 U534 (.A(n1607),.B(n1608),.C(n1609),.D(n1610),.Q(n1606));
AN211 U535 (.A(n1552),.B(n1612),.C(n1613),.D(n1614),.Q(n1611));
AN211 U536 (.A(n1554),.B(n1616),.C(n1617),.D(n1618),.Q(n1615));
AN211 U537 (.A(n1560),.B(n1619),.C(n1620),.D(n1621),.Q(n1564));
AN21 U538 (.A(out[0]),.B(in[0]),.C(n1623),.Q(n1622));
AN21 U539 (.A(in[4]),.B(n1625),.C(n1626),.Q(n1624));
AN21 U540 (.A(in[8]),.B(n1628),.C(n1629),.Q(n1627));
AN21 U541 (.A(in[12]),.B(n1631),.C(n1632),.Q(n1630));
AN21 U542 (.A(in[16]),.B(n1634),.C(n1635),.Q(n1633));
AN21 U543 (.A(in[20]),.B(n1637),.C(n1638),.Q(n1636));
AN21 U544 (.A(in[24]),.B(n1640),.C(n1641),.Q(n1639));
AN21 U545 (.A(in[28]),.B(n1643),.C(n1644),.Q(n1642));
AN21 U546 (.A(in[32]),.B(n1646),.C(n1647),.Q(n1645));
AN21 U547 (.A(in[36]),.B(n1649),.C(n1650),.Q(n1648));
AN21 U548 (.A(in[40]),.B(n1652),.C(n1653),.Q(n1651));
AN21 U549 (.A(in[44]),.B(n1655),.C(n1656),.Q(n1654));
AN21 U550 (.A(in[48]),.B(n1658),.C(n1659),.Q(n1657));
AN21 U551 (.A(in[52]),.B(n1661),.C(n1662),.Q(n1660));
AN21 U552 (.A(in[56]),.B(n1664),.C(n1665),.Q(n1663));
AN21 U553 (.A(in[60]),.B(n1666),.C(n1667),.Q(n1566));
IN1 U554 (.A(in[33]),.Q(n1647));
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IN1 U555 (.A(in[34]),.Q(n1610));
IN1 U556 (.A(in[35]),.Q(n1609));
IN1 U557 (.A(in[38]),.Q(n1668));
IN1 U558 (.A(in[36]),.Q(n1669));
IN1 U559 (.A(in[37]),.Q(n1650));
AND4 U560 (.A(in[37]),.B(in[36]),.C(in[38]),.D(in[39]),.Q(n1670));
NA4 U561 (.A(in[35]),.B(in[34]),.C(in[33]),.D(in[32]),.Q(n1671));
IN1 U562 (.A(in[45]),.Q(n1656));
IN1 U563 (.A(in[46]),.Q(n1672));
IN1 U564 (.A(in[51]),.Q(n1618));
IN1 U565 (.A(in[49]),.Q(n1659));
IN1 U566 (.A(in[50]),.Q(n1617));
IN1 U567 (.A(in[61]),.Q(n1667));
IN1 U568 (.A(in[62]),.Q(n1567));
NA4 U569 (.A(in[62]),.B(in[63]),.C(in[61]),.D(in[60]),.Q(n1565));
IN1 U570 (.A(in[59]),.Q(n1621));
IN1 U571 (.A(in[58]),.Q(n1620));
IN1 U572 (.A(in[57]),.Q(n1665));
IN1 U573 (.A(in[53]),.Q(n1662));
IN1 U574 (.A(in[54]),.Q(n1673));
NA4 U575 (.A(in[55]),.B(in[54]),.C(in[52]),.D(in[53]),.Q(n1674));
NA5 U576 (.A(in[59]),.B(n1563),.C(in[56]),
.D(in[57]),.E(in[58]),.Q(n1562));
NA4 U577 (.A(in[50]),.B(in[49]),.C(in[48]),.D(in[51]),.Q(n1587));
IN1 U578 (.A(in[44]),.Q(n1586));
IN1 U579 (.A(in[41]),.Q(n1653));
IN1 U580 (.A(in[42]),.Q(n1614));
IN1 U581 (.A(in[43]),.Q(n1613));
IN1 U582 (.A(in[3]),.Q(n1592));
IN1 U583 (.A(in[2]),.Q(n1591));
IN1 U584 (.A(in[1]),.Q(n1623));
IN1 U585 (.A(in[5]),.Q(n1626));
IN1 U586 (.A(in[6]),.Q(n1675));
IN1 U587 (.A(in[4]),.Q(n1676));
 NA4 U588 (.A(in[4]),.B(in[6]),.C(in[5]),.D(in[7]),.Q(n1677));
 AND4 U589 (.A(in[0]),.B(in[1]),.C(in[2]),.D(in[3]),.Q(n1678));
IN1 U590 (.A(in[11]),.Q(n1596));
IN1 U591 (.A(in[10]),.Q(n1595));
IN1 U592 (.A(in[9]),.Q(n1629));
IN1 U593 (.A(in[13]),.Q(n1632));
IN1 U594 (.A(in[14]),.Q(n1679));
NA3 U595 (.A(in[12]),.B(in[13]),.C(in[14]),.Q(n1571));
AND4 U596 (.A(in[9]),.B(in[10]),.C(in[8]),.D(in[11]),.Q(n1576));
NO2 U597 (.A(n1680),.B(n1677),.Q(n1569));
IN1 U598 (.A(in[15]),.Q(n1578));
IN1 U599 (.A(in[19]),.Q(n1601));
IN1 U600 (.A(in[18]),.Q(n1600));
IN1 U601 (.A(in[17]),.Q(n1635));
IN1 U602 (.A(in[20]),.Q(n1681));
IN1 U603 (.A(in[21]),.Q(n1638));
IN1 U604 (.A(in[22]),.Q(n1682));
AND4 U605 (.A(in[22]),.B(in[23]),.C(in[21]),.D(in[20]),.Q(n1683));
NA4 U606 (.A(in[17]),.B(in[18]),.C(in[16]),.D(in[19]),.Q(n1684));
IN1 U607 (.A(in[30]),.Q(n1685));
IN1 U608 (.A(in[27]),.Q(n1605));
IN1 U609 (.A(in[25]),.Q(n1641));
IN1 U610 (.A(in[26]),.Q(n1604));
IN1 U611 (.A(in[28]),.Q(n1583));
IN1 U612 (.A(in[29]),.Q(n1644));
```

```
AND6 U613 (.A(in[28]),.B(in[29]),.C(in[24]),
.D(in[27]),.E(in[25]),.F(in[26]),.Q(n1580));
AND2 U614 (.A(in[30]),.B(in[31]),.Q(n1686));
NA2 U615 (.A(n1598),.B(n1683),.Q(n1687));
AND4 U616 (.A(in[15]),.B(n1569),.C(n1576),.D(n1688),.Q(n1590));
NA5 U617 (.A(in[44]),.B(in[40]),.C(in[41]),
.D(in[43]),.E(in[42]),.Q(n1574));
NO3 U618 (.A(n1562),.B(n1674),.C(n1587),.Q(n1554));
NA3 U619 (.A(in[47]),.B(in[45]),.C(in[46]),.Q(n1573));
AND2 U620 (.A(n1607),.B(n1670),.Q(n1555));
AN21 U621 (.A(out[4]),.B(n1590),.C(n1690),.Q(n1689));
AN31 U622 (.A(n1691),.B(n1686),.C(n1689),.D(n1574),.Q(n1557));
NA2 U623 (.A(in[15]),.B(n1576),.Q(n1570));
NA2 U624 (.A(n1686),.B(in[29]),.Q(n1582));
IN1 U625 (.A(n1687),.Q(n1691));
IN1 U626 (.A(n1684),.Q(n1598));
IN1 U627 (.A(n1671),.Q(n1607));
IN1 U628 (.A(n1573),.Q(n1556));
IN1 U629 (.A(n1565),.Q(n1563));
IN1 U630 (.A(n1562),.Q(n1560));
IN1 U631 (.A(n1674),.Q(n1588));
IN1 U632 (.A(n1554),.Q(n1558));
IN1 U633 (.A(n1571),.Q(n1688));
IN1 U634 (.A(n1580),.Q(n1690));
IN1 U635 (.A(n1574),.Q(n1552));
NA5 U636 (.A(n1686),.B(n1580),.C(n1691),
.D(out[5]),.E(n1590),.Q(n1553));
ON211 U637 (.A(n1568),.B(n1687),.C(n1580),.D(n1686),.Q(n1572));
AO21 U638 (.A(out[2]),.B(n1678),.C(n1677),.Q(n1577));
ON21 U639 (.A(n1575),.B(n1684),.C(n1683),.Q(n1581));
ON21 U640 (.A(n1579),.B(n1671),.C(n1670),.Q(n1585));
ON311 U641 (.A(n1676),.B(n1589),.C(n1626),
.D(in[7]),.E(in[6]),.Q(n1594));
ON211 U642 (.A(n1593),.B(n1571),.C(in[14]),.D(in[15]),.Q(n1599));
ON311 U643 (.A(n1638),.B(n1597),.C(n1681),
.D(in[23]),.E(in[22]),.Q(n1603));
ON31 U644 (.A(n1644),.B(n1602),.C(n1583),.D(n1686),.Q(n1608));
ON311 U645 (.A(n1650),.B(n1606),.C(n1669),
.D(in[39]),.E(in[38]),.Q(n1612));
ON311 U646 (.A(n1586),.B(n1611),.C(n1656),
.D(in[47]),.E(in[46]),.Q(n1616));
ON211 U647 (.A(n1615),.B(n1674),.C(in[54]),.D(in[55]),.Q(n1619));
ON21 U648 (.A(n1622),.B(n1591),.C(in[3]),.Q(n1625));
ON21 U649 (.A(n1624),.B(n1675),.C(in[7]),.Q(n1628));
ON21 U650 (.A(n1627),.B(n1595),.C(in[11]),.Q(n1631));
ON21 U651 (.A(n1630),.B(n1679),.C(in[15]),.Q(n1634));
ON21 U652 (.A(n1633),.B(n1600),.C(in[19]),.Q(n1637));
ON21 U653 (.A(n1636),.B(n1682),.C(in[23]),.Q(n1640));
ON21 U654 (.A(n1639),.B(n1604),.C(in[27]),.Q(n1643));
ON21 U655 (.A(n1642),.B(n1685),.C(in[31]),.Q(n1646));
ON21 U656 (.A(n1645),.B(n1610),.C(in[35]),.Q(n1649));
ON21 U657 (.A(n1648),.B(n1668),.C(in[39]),.Q(n1652));
ON21 U658 (.A(n1651),.B(n1614),.C(in[43]),.Q(n1655));
ON21 U659 (.A(n1654),.B(n1672),.C(in[47]),.Q(n1658));
ON21 U660 (.A(n1657),.B(n1617),.C(in[51]),.Q(n1661));
ON21 U661 (.A(n1660),.B(n1673),.C(in[55]),.Q(n1664));
ON21 U662 (.A(n1663),.B(n1620),.C(in[59]),.Q(n1666));
IN1 U663 (.A(n1678),.Q(n1680));
endmodule
```

E8. RAM block's (dpram64x8) general information

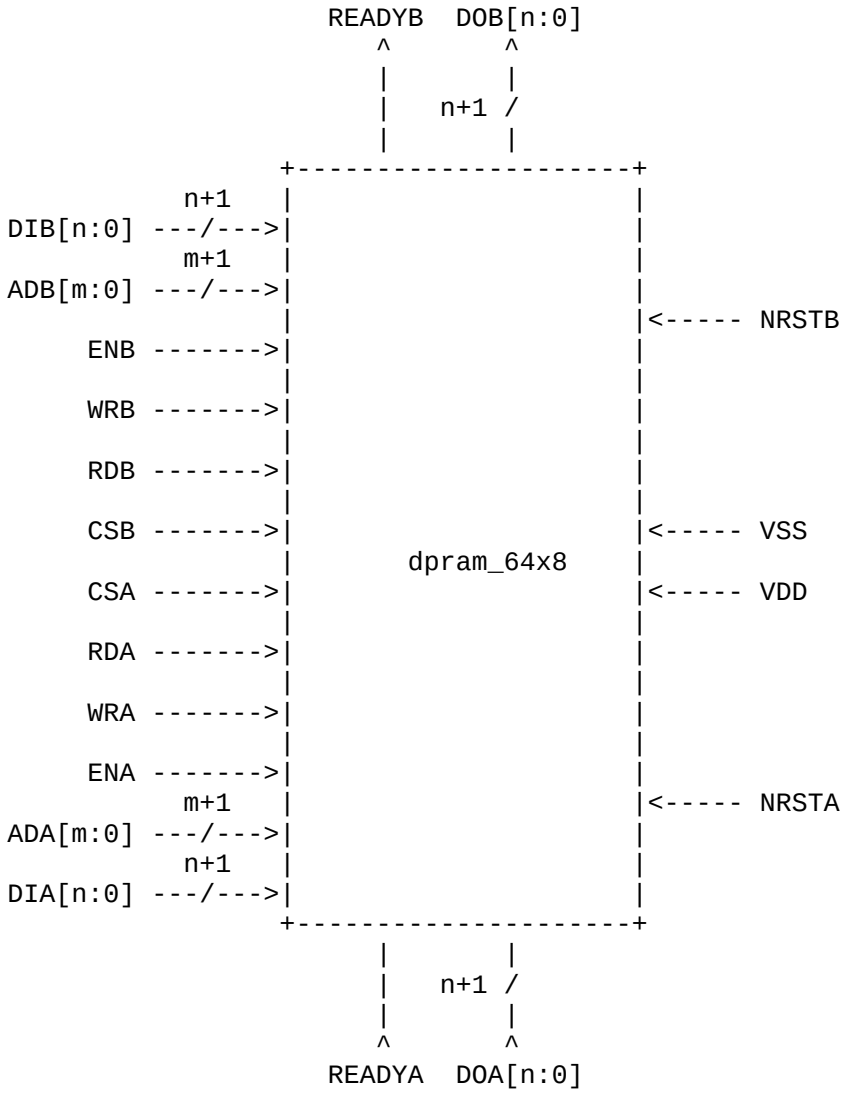
```
SECTION 1.  FEATURES

* Up to 64 kbits capacity
* Word length from 1 to 128 bits
* 2 metal layers cub 0.6 micron technology
* two input data busses and two output data busses


SECTION 2.  SYMBOL

Cell Name              = DualPortRAM
Unit Name              = dpram_64x8
Number of words        = 64
Number of data bits    = 8
Number of address bits = 6


SUBSECTION 2.1 Unidirectional DPRAM symbol
```



SECTION 3. SIGNAL DESCRIPTION

n = number of bits
w = number of words
m = number of address bits

Signal Name	I/O	Function
NRSTA NRSTB	IN	Reset an operation on port A or B. This signal does not affect memory or busses
CSA CSB	IN	The rising edge on CS set a request operation cycle depending on RDx and WRx. (port A and B)
RDA, RDB	IN	Read enable (port A and B)
WRA, WRB	IN	Write enable (port A and B)
ADA, ADAB [m:0]	IN	Address busses (port A and B)
ENA, ENB	IN	Command of DOx[n:0] and READYx outputs high level impedance settings-Active At 1
DIA, DIB [n:0]	IN	Input data bus unidirectional.
DOA, DOB [n:0]	OUT	Output data bus unidirectional.
READYA READYB	OUT	For reading, this signal indicates that data are available on outputs. For write, indicates that write is achieved (falling edge)
VDD	SUP	High Level Supply Voltage
VSS	SUP	Low Level Supply Voltage

SECTION 4. DIMENSIONS AVAILABLE

Parameters	MIN. Limit	Max. Limit	Step	Value
Words	16	655536	words = words + 1	64
bits	1	128	bits = bits + 1	8
col	16	256	column = column + 2	16
row	8	256	row = row + 2	32
capacity	128	65536	capacity = row * column	512

note: words * bits <= 65536

SECTION 5.

AC/DC CHARACTERISTICS, TYP MODELS,
TEMPERATURE= 25.0C, VDD = 5.0V, Cload = 0pF
SUBSECTION 5.1 TIMING TABLE

Spec	symbol	min	max	unit
Access time	ACCESS_TIME_LEC		7.73	ns
Address setup time for read Address setup time for write	AD_SETUP_TIME_LEC AD_SETUP_TIME_ECR	1.93 2.89		ns
Address hold time for read Address hold time for write	AD_HOLD_TIME_LEC AD_HOLD_TIME_ECR	9.59 9.59		ns
Data setup time for write	DATA_SETUP_TIME_ECR	1.83		ns
Data hold time for write	DATA_HOLD_TIME_ECR	2.18		ns
Read setup time	RD_SETUP_TIME	1.88		ns
Write setup time	WR_SETUP_TIME	1.88		ns
CSN low pulse width	CS_LOW_TIME	2.23		ns
CSN high pulse width	CS_HIGH_TIME	1.78		ns
Cycle time	CYCLE_TIME_MIN	12.49		ns
NRST setup time	NRST_SETUP_TIME	1.45		ns
NRST hold time	CSTONRT_SETUP_TIME	0.20		ns
NRST pulse width	NRST_LOW_PULSE	1.70		ns
HIGH impedance time	HIGH_Z_TIME		2.14	ns
LOW impedance time	LOW_Z_TIME		2.19	ns
READY HIGH propagation time	CS_READY_TIME		2.65	ns
READY LOW propagation time for read for write	 READY_TIME_LEC READY_TIME_ECR	 	 9.64 6.92	 ns ns

Note: 1. All timings are measured for 2ns rise/fall timings of input stimuli.

SUBSECTION 5.2 SENSITIVITY

output load sensitivity: add (Ks_q * CL) to intrinsic value

Time	Ks_q(ns/pF)
ACCESS_TİME	0.22
CS_READY_TIME	0.27
READY_TIME_LEC	0.32
READY_TIME_ECR	0.32
LOW_Z_TIME	0.29

SUBSECTION 5.3

CONSUMPTION, TYP MODELS,

TEMPERATURE= 25.0C, VDD = 5.0V, Cload = 1pF

dynamic consumption (ICC) = 0.116 mA/MHz

SUBSECTION 5.4 INPUT/OUTPUT LOAD

Pin Name	I/O	Load (fF)
DO	OUT	51
DI	IN	66
AD	IN	64
READY	OUT	56
NRST	IN	168
CS	IN	67
EN	IN	17
RD	IN	50
WR	IN	47

SUBSECTION 5.5 CELL AREA

Parameter	Value	Unit
Height	735	um
Length	337	um
Aspect Ratio	2.181	
Perimeter	2144	um
Area	0.248	mm^2
density	2067.058	mm^2

* DPRAM timings at 25.0 deg., 5.0V, Typical process
* Units : Time in ns, capacity in pF

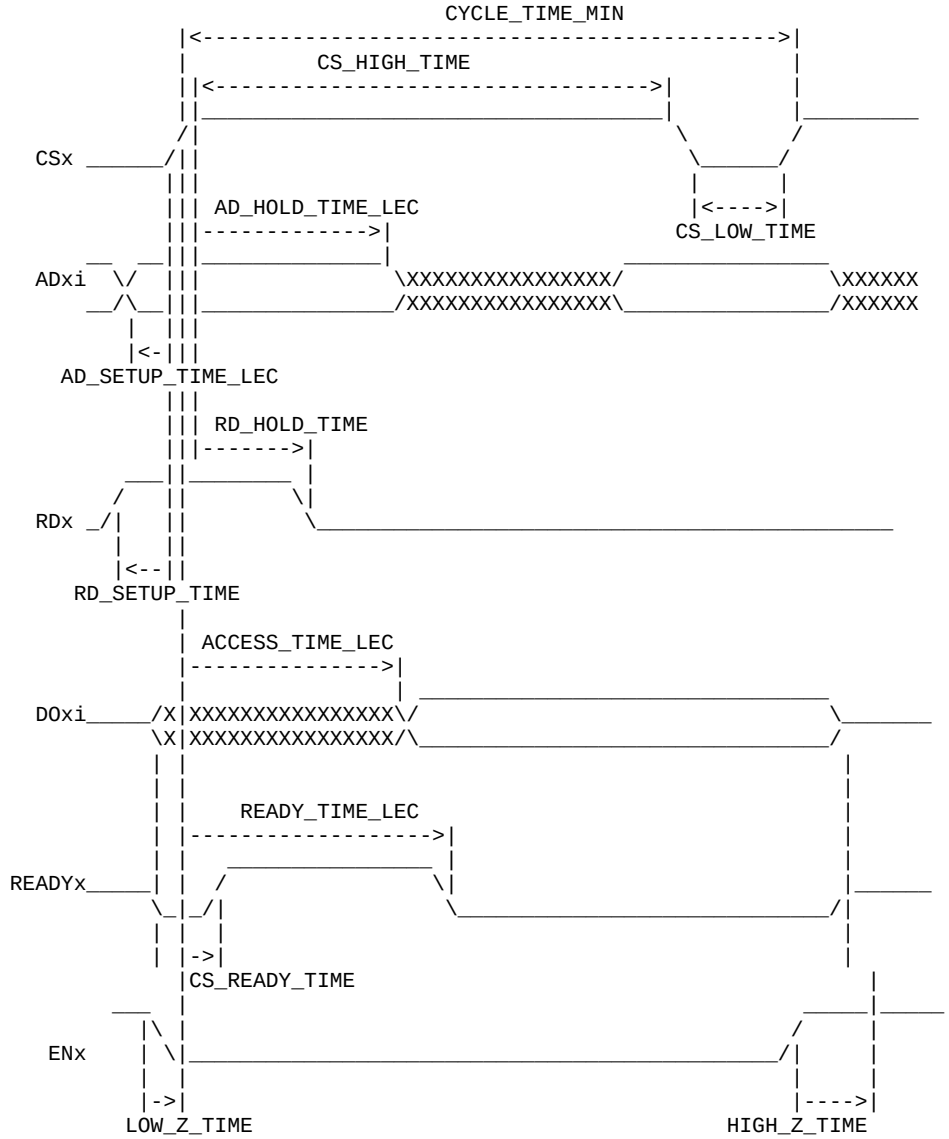
AD_SETUP_TIME_LEC 1.93
AD_SETUP_TIME_ECR 2.89
AD_HOLD_TIME_LEC 9.59
AD_HOLD_TIME_ECR 9.59
DATA_SETUP_TIME_ECR 1.83
DATA_HOLD_TIME_ECR 2.18
RD_SETUP_TIME 1.88
RD_HOLD_TIME 1.49
WR_SETUP_TIME 1.88
WR_HOLD_TIME 1.49
NRST_SETUP_TIME 1.45
ST_LOW_TIME 1.70
CSTONRST_SETUP_TIME 0.20
CYCLE_TIME 12.49
CS_HIGH_TIME 1.78
CS_LOW_TIME 2.23
HIGH_Z_TIME 2.14
LOW_Z_TIME 2.19 + 0.29 *CDOUT
ACCESS_TIME_LEC 7.73+0.22*CDOUT
READY_TIME_LEC 9.64+0.32*CREADY
READY_TIME_ECR 6.92+0.32*CREADY
CS_READY_TIME 2.65+0.27*CREADY
TP_NR_READY 3.01 + 0.29*CREADY

* Rise and Fall times

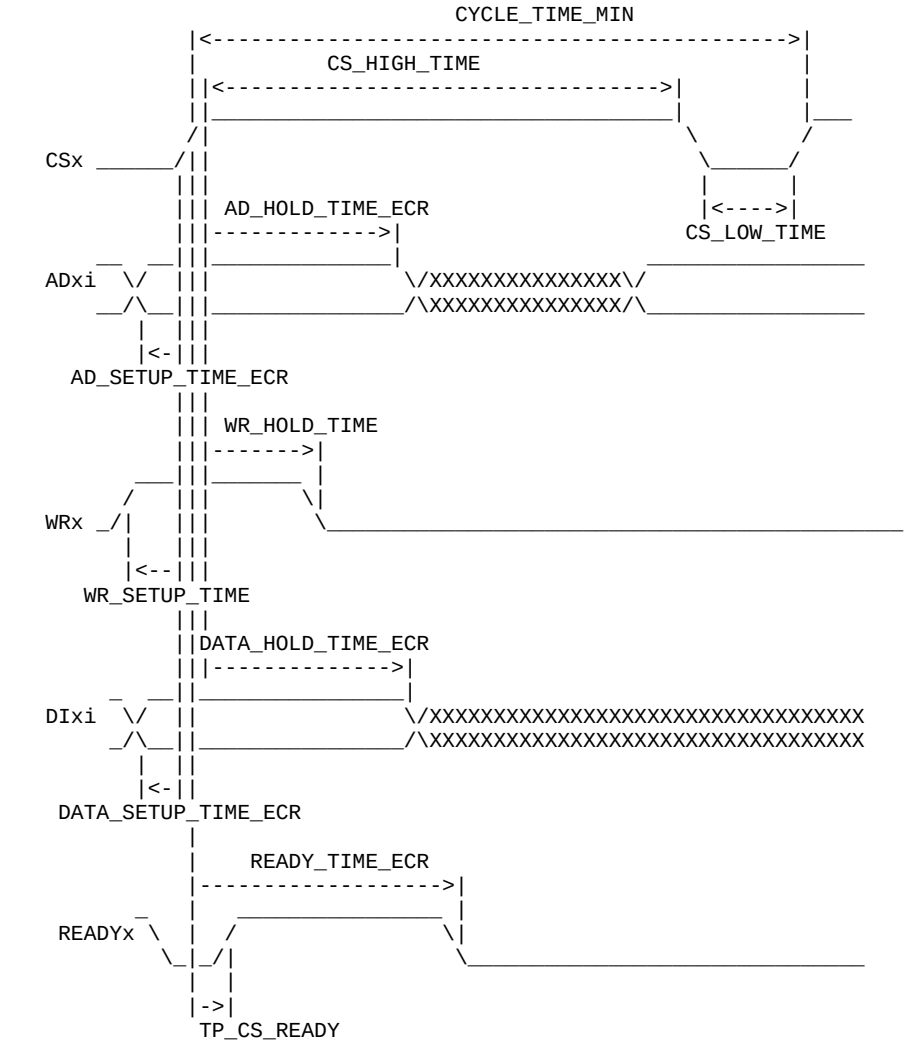
RISE_DOUT 0.44 + 0.75 * CDOUT FALL_DOUT 0.18 + 0.54 * CDOUT
RISE_READY 0.36 + 0.75 * CREADY FALL_READY 0.12 + 0.53 * CREADY

SECTION 6. WAVEFORMS

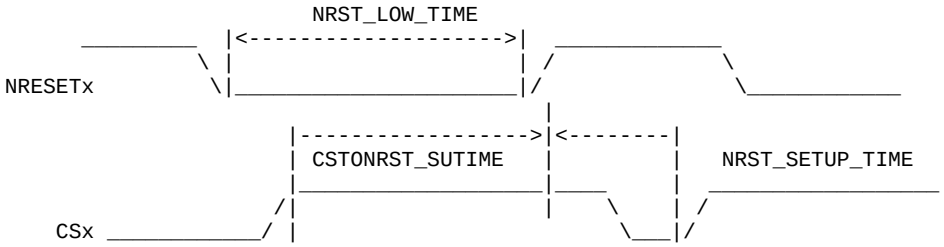
SUBSECTION 6.1 READ CYCLE TIMING (x = port A or B) (@ different address)



SUBSECTION 6.2 WRITE CYCLE TIMING (x = port A or B) (@ different address)



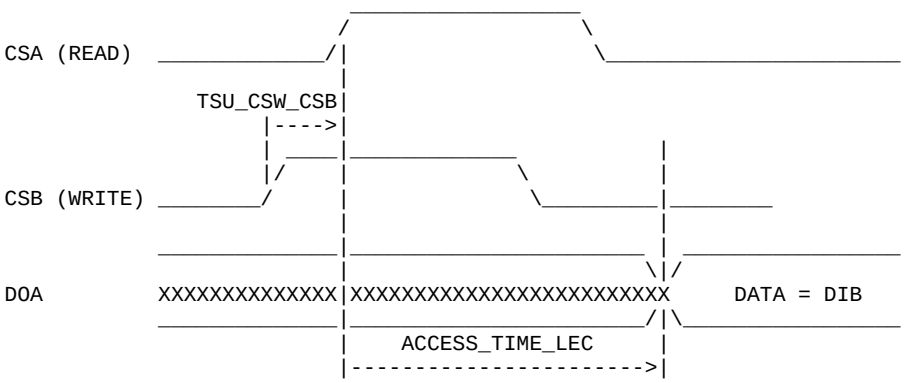
SUBSECTION 6.3 NRESET CYCLE



SUBSECTION 6.4 OPERATIONS AT THE SAME ADDRESS

6.4.1 WRITE THROUGH (WRITE port B and READ port A)

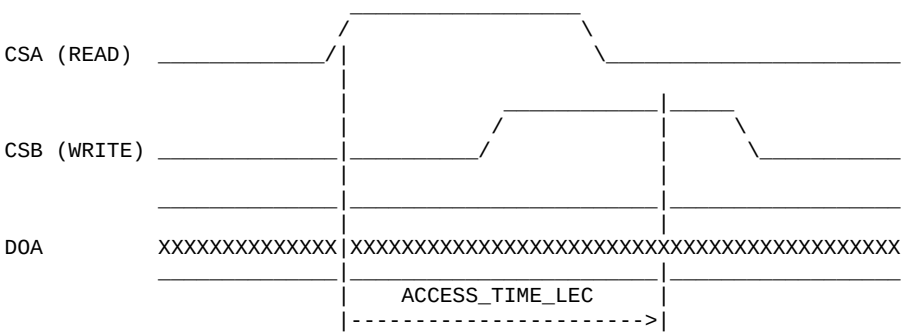
Remark: READ and WRITE operation can be inverted between port A and port B. CSB rising edge arrives before CSA rising edge.



Remark: TSU_CSW_CSR must be greater or equal to zero. If CSA and CSB have a simultaneous rising edge, write through works.

6.4.2 WRITE THROUGH conflict(WRITE port B and READ port A at the same address)

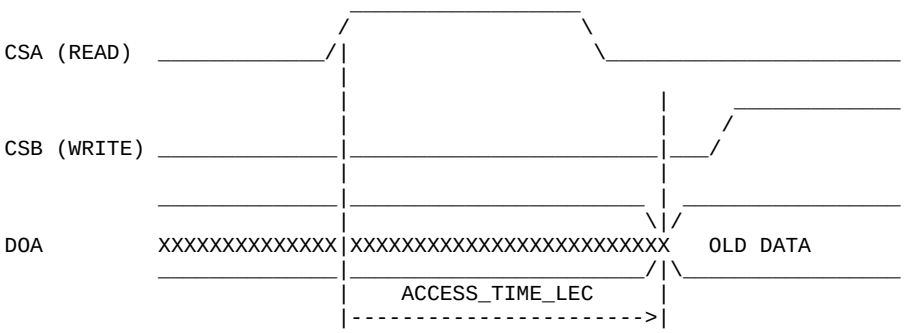
CSB rising edge arrives after CSA one and before READ access time.



DOA is unknown because READ and WRITE are really simultaneous.

6.4.3 READ and WRITE sequentially (WRITE port B and READ port A at the same address)

CSB rising edge arrives after READ access time.



DOA = the data memorized before into the memory. WRITE operation is done
after READ operation. No conflict.