**2x1 MUX truth table**

|  |  |  |  |
| --- | --- | --- | --- |
| **i0** | **i1** | **so** | **y** |
| **0** | **x** | **0** | **0** |
| **1** | **x** | **0** | **1** |
| **x** | **0** | **1** | **0** |
| **x** | **1** | **1** | **1** |

**2x1 MUX k-map**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  | **i1 , s0** |  |  |  |
|  |  | **0,0** | **0,1** | **1,1** | **1,0** |
| **i0** | **0** | **0** | **0** | **1** | **0** |
|  | **1** | **1** | **0** | **1** | **1** |

**4x1 MUX truth table**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **i0** | **i1** | **i2** | **i3** | **s1** | **s0** | **y** |
| **0** | **x** | **x** | **x** | **0** | **0** | **0** |
| **1** | **x** | **x** | **x** | **0** | **0** | **1** |
| **x** | **0** | **x** | **x** | **0** | **1** | **0** |
| **x** | **1** | **x** | **x** | **0** | **1** | **1** |
| **x** | **x** | **0** | **x** | **1** | **0** | **0** |
| **x** | **x** | **1** | **x** | **1** | **0** | **1** |
| **x** | **x** | **x** | **0** | **1** | **1** | **0** |
| **x** | **x** | **x** | **1** | **1** | **1** | **1** |

**4x1 MUX k-maps**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **for s1=0, s0=0** | |  |  | |  | |  | |  | | **for s1=0, s0=0** | |  |  |  |
|  |  | **i0,i1** |  | |  | |  | |  | |  |  | **i0,i1** |  |  |  |
|  |  | **0,0** | **0,1** | | **1,1** | | **1,0** | |  | |  |  | **0,0** | **0,1** | **1,1** | **1,0** |
| **i2,i3** | **0,0** | **0** | **0** | | **1** | | **1** | |  | | **i2,i3** | **0,0** | **0** | **1** | **1** | **0** |
|  | **0,1** | **0** | **0** | | **1** | | **1** | |  | |  | **0,1** | **0** | **1** | **1** | **0** |
|  | **1,0** | **0** | **0** | | **1** | | **1** | |  | |  | **1,0** | **0** | **1** | **1** | **0** |
|  | **1,1** | **0** | **0** | | **1** | | **1** | |  | |  | **1,1** | **0** | **1** | **1** | **0** |
|  |  |  |  | |  | |  | |  | |  |  |  |  |  |  |
|  |  |  |  | |  | |  | |  | |  |  |  |  |  |  |
|  | for s1=0, s0=0 | |  |  | |  | |  | |  | | for s1=0, s0=0 | |  |  |  |
|  |  | **i0,i1** |  | |  | |  | |  | |  |  | **i0,i1** |  |  |  |
|  |  | **0,0** | **0,1** | | **1,1** | | **1,0** | |  | |  |  | **0,0** | **0,1** | **1,1** | **1,0** |
| **i2,i3** | **0,0** | **0** | **0** | | **0** | | **0** | |  | | **i2,i3** | **0,0** | **0** | **0** | **0** | **0** |
|  | **0,1** | **0** | **0** | | **0** | | **0** | |  | |  | **0,1** | **1** | **1** | **1** | **1** |
|  | **1,0** | **1** | **1** | | **1** | | **1** | |  | |  | **1,0** | **1** | **1** | **1** | **1** |
|  | **1,1** | **1** | **1** | | **1** | | **1** | |  | |  | **1,1** | **0** | **0** | **0** | **0** |

**8x1 MUX truth table**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **i0** | **i1** | **i2** | **i3** | **i4** | **i5** | **i6** | **i7** | **s2** | **s1** | **s0** | **y** |
| **0** | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **0** | **0** | **0** | **0** |
| **1** | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **0** | **0** | **0** | **1** |
| **x** | **0** | **x** | **x** | **x** | **x** | **x** | **x** | **0** | **0** | **1** | **0** |
| **x** | **1** | **x** | **x** | **x** | **x** | **x** | **x** | **0** | **0** | **1** | **1** |
| **x** | **x** | **0** | **x** | **x** | **x** | **x** | **x** | **0** | **1** | **0** | **0** |
| **x** | **x** | **1** | **x** | **x** | **x** | **x** | **x** | **0** | **1** | **0** | **1** |
| **x** | **x** | **x** | **0** | **x** | **x** | **x** | **x** | **0** | **1** | **1** | **0** |
| **x** | **x** | **x** | **1** | **x** | **x** | **x** | **x** | **0** | **1** | **1** | **1** |
| **x** | **x** | **x** | **x** | **0** | **x** | **x** | **x** | **1** | **0** | **0** | **0** |
| **x** | **x** | **x** | **x** | **1** | **x** | **x** | **x** | **1** | **0** | **0** | **1** |
| **x** | **x** | **x** | **x** | **x** | **0** | **x** | **x** | **1** | **0** | **1** | **0** |
| **x** | **x** | **x** | **x** | **x** | **1** | **x** | **x** | **1** | **0** | **1** | **1** |
| **x** | **x** | **x** | **x** | **x** | **x** | **0** | **x** | **1** | **1** | **0** | **0** |
| **x** | **x** | **x** | **x** | **x** | **x** | **1** | **x** | **1** | **1** | **0** | **1** |
| **x** | **x** | **x** | **x** | **x** | **x** | **x** | **0** | **1** | **1** | **1** | **0** |
| **x** | **x** | **x** | **x** | **x** | **x** | **x** | **1** | **1** | **1** | **1** | **1** |

**1x2 DEMUX truth table**

|  |  |  |  |
| --- | --- | --- | --- |
| **s0** | **y** | **o0** | **o1** |
| **0** | **0** | **0** | **0** |
| **0** | **1** | **1** | **0** |
| **1** | **0** | **0** | **0** |
| **1** | **1** | **0** | **1** |

**1x2 DEMUX k-maps**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **for o0** |  |  |  | **for 01** |  |  |  |
|  |  |  |  |  |  |  |  |  |
|  |  | **y** |  |  |  |  | **y** |  |
|  |  | **0** | **1** |  |  |  | **0** | **1** |
| **s0** | **0** | **0** | **1** |  | **s0** | **0** | **0** | **0** |
|  | **1** | **0** | **0** |  |  | **1** | **0** | **1** |

**1x4 DEMUX truth table**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **s1** | **s0** | **y** | **o00** | **o01** | **o10** | **o11** |
| **0** | **0** | **0** | **0** | **0** | **0** | **0** |
| **0** | **0** | **1** | **1** | **0** | **0** | **0** |
| **0** | **1** | **0** | **0** | **0** | **0** | **0** |
| **0** | **1** | **1** | **0** | **1** | **0** | **0** |
| **1** | **0** | **0** | **0** | **0** | **0** | **0** |
| **1** | **0** | **1** | **0** | **0** | **1** | **0** |
| **1** | **1** | **0** | **0** | **0** | **0** | **0** |
| **1** | **1** | **1** | **0** | **0** | **0** | **1** |

**1x4 DEMUX k-maps**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **for o0** |  |  |  |  | **for o1** |  |  |
|  |  |  |  |  |  |  |  |  |
|  |  | **y** |  |  |  |  | **y** |  |
|  |  | **0** | **1** |  |  |  | **0** | **1** |
| **S1,s0** | **0,0** | **0** | **1** |  | **S1,s0** | **0,0** | **0** | **0** |
|  | **0,1** | **0** | **0** |  |  | **0,1** | **0** | **0** |
|  | **1,0** | **0** | **0** |  |  | **1,0** | **0** | **0** |
|  | **1,1** | **0** | **0** |  |  | **1,1** | **0** | **0** |
|  |  |  |  |  |  |  |  |  |
|  | **for o2** |  |  |  |  | **for o3** |  |  |
|  |  |  |  |  |  |  |  |  |
|  |  | **y** |  |  |  |  | **y** |  |
|  |  | **0** | **1** |  |  |  | **0** | **1** |
| **S1,s0** | **0,0** | **0** | **0** |  | **S1,s0** | **0,0** | **0** | **0** |
|  | **0,1** | **0** | **0** |  |  | **0,1** | **0** | **0** |
|  | **1,0** | **0** | **1** |  |  | **1,0** | **0** | **0** |
|  | **1,1** | **0** | **0** |  |  | **1,1** | **0** | **1** |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **s2** | **s1** | **s0** | **Y** | **o000** | **o001** | **o010** | **o011** | **o100** | **o101** | **o110** | **o111** |
| **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |
| **0** | **0** | **0** | **1** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |
| **0** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |
| **0** | **0** | **1** | **1** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **0** |
| **0** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |
| **0** | **1** | **0** | **1** | **0** | **0** | **1** | **0** | **0** | **0** | **0** | **0** |
| **0** | **1** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |
| **0** | **1** | **1** | **1** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **0** |
| **1** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |
| **1** | **0** | **0** | **1** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **0** |
| **1** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |
| **1** | **0** | **1** | **1** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **0** |
| **1** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |
| **1** | **1** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **0** |
| **1** | **1** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |
| **1** | **1** | **1** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** |

**1x8 DEMUX truth table**

**1x8 DEMUX k-maps**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **o0** |  |  |  |  |  |  | **o1** |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  | **y,s2** |  |  |  |  |  |  | **y,s2** |  |  |  |
|  |  | **0,0** | **0,1** | **1,1** | **1,0** |  |  |  | **0,0** | **0,1** | **1,1** | **1,0** |
| **s0,s1** | **0,0** | **0** | **1** | **0** | **0** |  | **s0,s1** | **0,0** | **0** | **0** | **0** | **0** |
|  | **0,1** | **0** | **0** | **0** | **0** |  |  | **0,1** | **0** | **0** | **0** | **0** |
|  | **1,0** | **0** | **0** | **0** | **0** |  |  | **1,0** | **0** | **1** | **0** | **0** |
|  | **1,1** | **0** | **0** | **0** | **0** |  |  | **1,1** | **0** | **0** | **0** | **0** |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | **o2** |  |  |  |  |  |  | **o3** |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  | **y,s2** |  |  |  |  |  |  | **y,s2** |  |  |  |
|  |  | **0,0** | **0,1** | **1,1** | **1,0** |  |  |  | **0,0** | **0,1** | **1,1** | **1,0** |
| **s0,s1** | **0,0** | **0** | **0** | **0** | **0** |  | **s0,s1** | **0,0** | **0** | **0** | **0** | **0** |
|  | **0,1** | **0** | **1** | **0** | **0** |  |  | **0,1** | **0** | **0** | **0** | **0** |
|  | **1,0** | **0** | **0** | **0** | **0** |  |  | **1,0** | **0** | **0** | **0** | **0** |
|  | **1,1** | **0** | **0** | **0** | **0** |  |  | **1,1** | **0** | **1** | **0** | **0** |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | **o4** |  |  |  |  |  |  | **o5** |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  | **y,s2** |  |  |  |  |  |  | **y,s2** |  |  |  |
|  |  | **0,0** | **0,1** | **1,1** | **1,0** |  |  |  | **0,0** | **0,1** | **1,1** | **1,0** |
| **s0,s1** | **0,0** | **0** | **0** | **1** | **0** |  | **s0,s1** | **0,0** | **0** | **0** | **0** | **0** |
|  | **0,1** | **0** | **0** | **0** | **0** |  |  | **0,1** | **0** | **0** | **0** | **0** |
|  | **1,0** | **0** | **0** | **0** | **0** |  |  | **1,0** | **0** | **0** | **1** | **0** |
|  | **1,1** | **0** | **0** | **0** | **0** |  |  | **1,1** | **0** | **0** | **0** | **0** |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | **o6** |  |  |  |  |  |  | **o7** |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  | **y,s2** |  |  |  |  |  |  | **y,s2** |  |  |  |
|  |  | **0,0** | **0,1** | **1,1** | **1,0** |  |  |  | **0,0** | **0,1** | **1,1** | **1,0** |
| **s0,s1** | **0,0** | **0** | **0** | **0** | **0** |  | **s0,s1** | **0,0** | **0** | **0** | **0** | **0** |
|  | **0,1** | **0** | **0** | **1** | **0** |  |  | **0,1** | **0** | **0** | **0** | **0** |
|  | **1,0** | **0** | **0** | **0** | **0** |  |  | **1,0** | **0** | **0** | **0** | **0** |
|  | **1,1** | **0** | **0** | **0** | **0** |  |  | **1,1** | **0** | **0** | **1** | **0** |

**1x2 DECODER truth table**

|  |  |  |  |
| --- | --- | --- | --- |
| **i0** | **en** | **o0** | **o1** |
| **0** | **0** | **0** | **0** |
| **0** | **1** | **1** | **0** |
| **1** | **0** | **0** | **0** |
| **1** | **1** | **0** | **1** |

**1x2 DEOCDER k-maps**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **for o0** |  |  |  | **for 01** |  |  |  |
|  |  |  |  |  |  |  |  |  |
|  |  | **en** |  |  |  |  | **en** |  |
|  |  | **0** | **1** |  |  |  | **0** | **1** |
| **i0** | **0** | **0** | **1** |  | **i0** | **0** | **0** | **0** |
|  | **1** | **0** | **0** |  |  | **1** | **0** | **1** |

**2x4 DECODER truth table**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **i1** | **i0** | **en** | **o00** | **o01** | **o10** | **o11** |
| **0** | **0** | **0** | **0** | **0** | **0** | **0** |
| **0** | **0** | **1** | **1** | **0** | **0** | **0** |
| **0** | **1** | **0** | **0** | **0** | **0** | **0** |
| **0** | **1** | **1** | **0** | **1** | **0** | **0** |
| **1** | **0** | **0** | **0** | **0** | **0** | **0** |
| **1** | **0** | **1** | **0** | **0** | **1** | **0** |
| **1** | **1** | **0** | **0** | **0** | **0** | **0** |
| **1** | **1** | **1** | **0** | **0** | **0** | **1** |

**2x4 DECODER k-maps**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **for o0** |  |  |  |  | **for o1** |  |  |
|  |  | **en** |  |  |  |  | **en** |  |
|  |  | **0** | **1** |  |  |  | **0** | **1** |
| **i1,i0** | **0,0** | **0** | **1** |  | **i1,i0** | **0,0** | **0** | **0** |
|  | **0,1** | **0** | **0** |  |  | **0,1** | **0** | **0** |
|  | **1,0** | **0** | **0** |  |  | **1,0** | **0** | **0** |
|  | **1,1** | **0** | **0** |  |  | **1,1** | **0** | **0** |
|  |  |  |  |  |  |  |  |  |
|  | **for o2** |  |  |  |  | **for o3** |  |  |
|  |  | **en** |  |  |  |  | **en** |  |
|  |  | **0** | **1** |  |  |  | **0** | **1** |
| **i1,i0** | **0,0** | **0** | **0** |  | **i1,i0** | **0,0** | **0** | **0** |
|  | **0,1** | **0** | **0** |  |  | **0,1** | **0** | **0** |
|  | **1,0** | **0** | **1** |  |  | **1,0** | **0** | **0** |
|  | **1,1** | **0** | **0** |  |  | **1,1** | **0** | **1** |

**3x8 Priority encoder truth table**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **3x8** |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |
| **i0** | **i1** | **i2** | **i3** | **i4** | **i5** | **i6** | **i7** | **o2** | **o1** | **o0** | **v** |
| **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |
| **1** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** |
| **x** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **1** |
| **x** | **x** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **1** |
| **x** | **x** | **x** | **1** | **0** | **0** | **0** | **0** | **0** | **1** | **1** | **1** |
| **x** | **x** | **x** | **x** | **1** | **0** | **0** | **0** | **1** | **0** | **0** | **1** |
| **x** | **x** | **x** | **x** | **x** | **1** | **0** | **0** | **1** | **0** | **1** | **1** |
| **x** | **x** | **x** | **x** | **x** | **x** | **1** | **0** | **1** | **1** | **0** | **1** |
| **x** | **x** | **x** | **x** | **x** | **x** | **x** | **1** | **1** | **1** | **1** | **1** |