Voting Card Reader Design

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*ENCODER (8-3)*

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Y7 | Y6 | Y5 | Y4 | Y3 | Y2 | Y1 | Y0 | A0 | A1 | A2 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 |
| 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 |
| 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 |
| 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 |

A0 = Y7 + Y6 + Y5 + Y4

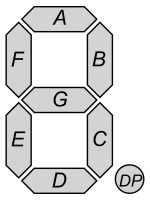
A1 = Y7 + Y6 +Y3 +Y2

A2= Y7 + Y5 + Y3 + Y1

An encoder is a digital circuit that performs the reverse operation of a decoder. It encodes multiple input lines into a smaller set of output lines. In this report, we'll discuss the design and functionality of an 8-to-3 encoder using the provided truth table and corresponding expressions.

The truth table provided for the 8-to-3 encoder lists all possible combinations of input lines (Y7 to Y0) and the corresponding output lines (A2, A1, A0). Each output line is determined based on specific combinations of input lines being active (high).

*DECODER (3-8)*

We need to find equation for every illuminated segment.

Look whether number on display contains that particular segement.

For a:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| x/yz | 00 | 01 | 11 | 10 |  |
| 0 | 1 | 0 | 1 | 1 | a = y + xz + x’z’ |
| 1 | 0 | 1 | 1 | 1 |  |

For b:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| x/yz | 00 | 01 | 11 | 10 |  |
| 0 | 1 | 1 | 1 | 1 | b = x’ + yz + y’z’ |
| 1 | 1 | 0 | 1 | 0 |  |

For c:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| x/yz | 00 | 01 | 11 | 10 |  |
| 0 | 1 | 1 | 1 | 0 | c = x + y’ + z |
| 1 | 1 | 1 | 1 | 1 |  |

For d:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| x/yz | 00 | 01 | 11 | 10 |  |
| 0 | 1 | 0 | 1 | 1 | d = xy’z + yz’ + x’y + x’z’ |
| 1 | 0 | 1 | 0 | 1 |  |

For e:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| x/yz | 00 | 01 | 11 | 10 |  |
| 0 | 1 | 0 | 0 | 1 | e = yz’ + x’z’ |
| 1 | 0 | 0 | 0 | 1 |  |

For f:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| x/yz | 00 | 01 | 11 | 10 |  |
| 0 | 1 | 0 | 0 | 0 | f = y’z’ + xy’ + xz’ |
| 1 | 1 | 1 | 0 | 1 |  |

For g:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| x/yz | 00 | 01 | 11 | 10 |  |
| 0 | 0 | 0 | 1 | 1 | g = xy’ + x’y + yz’ |
| 1 | 1 | 1 | 0 | 1 |  |

These equations represent the combinations of input signals x, y, and z that result in the illumination of each respective segment on the display. By evaluating these equations with the input signals, you can determine whether the number on the display contains the particular illuminated segment.