**Tabela verdade do somador completo**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | ENTRADAS |  | SAIDAS |  |
| A | B | Cin | S | Cout |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 1 | 1 | 0 |
| 0 | 1 | 0 | 1 | 0 |
| 0 | 1 | 1 | 0 | 1 |
| 1 | 0 | 0 | 1 | 0 |
| 1 | 0 | 1 | 0 | 1 |
| 1 | 1 | 0 | 0 | 1 |
| 1 | 1 | 1 | 1 | 1 |

**Expressão para Cout com mapa de Karnaugth**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| BCin | | | | | |
| A |  | 00 | 01 | 11 | 10 |
| 0 | 0 | 0 | 1 | 0 |
| 1 | 0 | 1 | 1 | 1 |

Cout = ACin + BCin + AB

**Expressão para S em produto de soma**

S = A’B’Cin + A’BCin’ + AB’Cin + ABCin

S = A’(B’Cin + BCin’) + A(B’Cin + BCin)

S = A’(B “ex-or” Cin ) + A(B’Cin + BCin)

**Tabela verdade das entradas por botões**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | ENTRADAS |  | SAIDAS |  |
| A | B | C | N1 | N2 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 1 | 0 | 1 |
| 0 | 1 | 0 | 1 | 0 |
| 0 | 1 | 1 | 0 | 0 |
| 1 | 0 | 0 | 1 | 1 |
| 1 | 0 | 1 | 0 | 0 |
| 1 | 1 | 0 | 0 | 0 |
| 1 | 1 | 1 | 0 | 0 |

**Expressão para N1 em produto de soma**

S = A’BC’ + AB’C’

S = C’ (A’B + AB’)

S = C’ (A “ex-or” B)

**Expressão para N2 em produto de soma**

S = S = A’B’C + AB’C’

S = B’ (A’C + AC’)

S = B’ (A “ex-or” C)

**Tabela verdade para decodificador BCD/Display 7 segmentos**

|  |  |  |
| --- | --- | --- |
| Entrada BCD | Saídas para o display de 7 segmentos | Display |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **D** | **C** | **B** | **A** | a | b | c | d | e | f | g |  |
| **0** | **0** | **0** | **0** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **0** |
| **0** | **0** | **0** | **1** | 0 | 1 | 1 | 0 | 0 | 0 | 0 | **1** |
| **0** | **0** | **1** | **0** | 1 | 1 | 0 | 1 | 1 | 0 | 1 | **2** |
| **0** | **0** | **1** | **1** | 1 | 1 | 1 | 1 | 0 | 0 | 1 | **3** |
| **0** | **1** | **0** | **0** | 0 | 1 | 1 | 0 | 0 | 1 | 1 | **4** |
| **0** | **1** | **0** | **1** | 1 | 0 | 1 | 1 | 1 | 0 | 1 | **5** |
| **0** | **1** | **1** | **0** | 1 | 0 | 1 | 1 | 1 | 1 | 1 | **6** |
| **0** | **1** | **1** | **1** | 1 | 1 | 1 | 0 | 0 | 0 | 0 | **7** |
| **1** | **0** | **0** | **0** | 1 | 1 | 1 | 1 | 1 | 1 | 1 | **8** |
| **1** | **0** | **0** | **1** | 1 | 1 | 1 | 1 | 0 | 1 | 1 | **9** |

a = d’ c’ b a’ + d’ c’ b a + d’ c b’ a + d’ c b a’ + d’ c b a + d c’ b’ a’ + d c’ b’ a

a = d’ c’ (b a’ + b a) + d’ c (b’ a + b a’ + b a) + d c’ (b’ a’ + b’ a)

b = d’ c’ b’ a + d’ c’ b a’ + d’ c’ b a + d’ c b’ a’ + d’ c b a + d c’ b’ a’ + d c’ b’ a

c = d’ c’ b’ a + d’ c’ b a + a’ c b’ a’ + d’ c b’ a + a’ c b a’ + d’ c b a + d c’ b’ a’ + d c’ b’ a

d = d' c' b a' + d' c' b a + d' c b' a + d' c b a' + d c' b' a' + d c' b' a

e = d' c' b a' + d' c b' a + d' c b a' + d c' b' a'

f = d' c b' a' + d' c b a' + d c' b' a' + d c' b' a

g = d' c' b a' + d' c' b a + d' c b' a' + d' c b' a + d' c b a' + d c' b' a' + d c' b' a

**Tabela verdade do Comparador**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Entradas** | | | | | | | | | | **Saida** |
| **X** | **B1** | **B0** | **A6** | **A5** | **A4** | **A3** | **A2** | **A1** | **A0** | **F** |
| **1** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** |
| **1** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** |
| **1** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **1** |
| **1** | **1** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** |
| **1** | **1** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **1** |
| **1** | **1** | **1** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **1** |

Soma de produtos

F = x b1’ b0 a6’ a5’ a4’ a3’ a2’ a1’ a0’ + x b1 b0’ a6’ a5’ a4’ a3’ a2’ a1’ a0’ + x b1 b0’ a6’ a5’ a4’ a3’ a2’ a1’ a0 + x b1 b0 a6’ a5’ a4’ a3’ a2’ a1’ a0’ + x b1 b0 a6’ a5’ a4’ a3’ a2’ a1’ a0 + x b1 b0 a6’ a5’ a4’ a3’ a2’ a1 a0’

F = x b1’ b0 a6’ a5’ a4’ a3’ a2’ a1’ a0’ +

x b1 b0’ a6’ a5’ a4’ a3’ a2’ a1’ (a0’ + a0) = 1 +

x b1 b0 a6’ a5’ a4’ a3’ a2’ (a1’ a0’ + a1’ a0 + a1 a0’)

a0’ (a1’ + a1) + a1’ a0

a0’ + a1’ a0’

F = x a6’ a5’ a4’ a3’ a2’ (b1’ b0 a1’ a0’ + b1 b0’ a1’ + b1 b0 (a0’ + a1’ a0))

Expressão logica para conversor de binário BCD

E0 = A B C' D E' F'  + A B C' D' E ;

N1 = A B C' E' F'  + A B C' D'  + A B' C ;

N2 = A B' C'  + A' B C  + A' B D ;

N3 = A' B C' D'  + A' C D E  + A B' C'  + A' B' C D  + A' B' C E ;

N4 = A' B D' F  + A C' D' E F  + A C' D E' F'  + A B' D E  + A' B' C D' E'  + A' B C D E'  + A' B D' E  + A B' D F  + B C' D'  + B' D E F  + B' C' D E  + B' C' D F ;

N5 = A' B' C D E F'  + A' B' C D' E' F  + A' B C D E' F  + A B' C D E' F'  + A' B C D' E' F'  + A B' C' D E F  + A' B' C' D E' F'  + B C' D' E F  + A C' D' E F'  + A B C' D E' F'  + A B C' D' F ;

N6 = A' C' D' E F'  + A' B' C' E F  + A' B C' D E  + A' C D E' F'  + A C' D' E' F'  + A' B C D' E F  + A B' C E F  + A B' C D' E  + A' B C' D' E' F  + A B' C' E' F  + A' B' C D E'  + A' B' C E' F'  + A B' C' D E F' ;

N7 = B' C' D' E' F  + A' B' D' E F  + A B' C D' F  + B C' D' E' F'  + A B' D E F'  + A B' C' D F'  + A' B C D E' F'  + A' B D E F  + A' B D' E F'  + A' B C' D F  + A' B' C D E' F  + A' B' C D' E' F'  + B' C' D E F' ;

N8 = A B C' D E' F'  + A B C' D' E  + B' G + A' G + C' D' G;