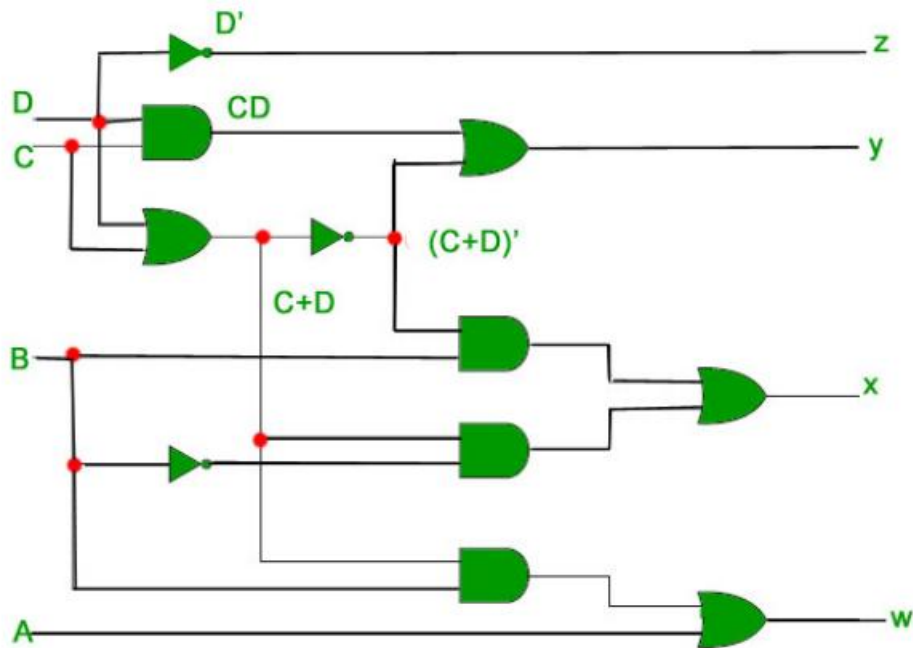
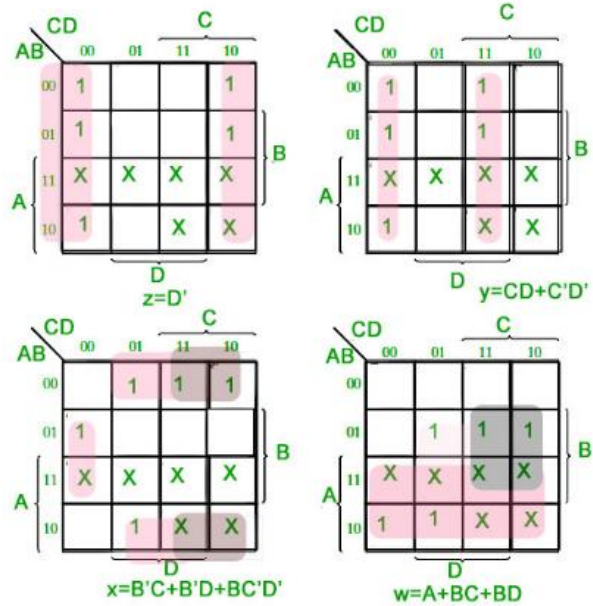


Converting BCD(8421) to Excess-3

| BCD(8421) | | | | Excess-3 | | | |
|-----------|---|---|---|----------|---|---|---|
| A | B | C | D | w | x | y | z |
| 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 |
| 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 |
| 0 | 0 | 1 | 1 | 0 | 1 | 1 | 0 |
| 0 | 1 | 0 | 0 | 0 | 1 | 1 | 1 |
| 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 |
| 0 | 1 | 1 | 0 | 1 | 0 | 0 | 1 |
| 0 | 1 | 1 | 1 | 1 | 0 | 1 | 0 |
| 1 | 0 | 0 | 0 | 1 | 0 | 1 | 1 |
| 1 | 0 | 0 | 1 | 1 | 1 | 0 | 0 |
| 1 | 0 | 1 | 0 | X | X | X | X |
| 1 | 0 | 1 | 1 | X | X | X | X |
| 1 | 1 | 0 | 0 | X | X | X | X |
| 1 | 1 | 0 | 1 | X | X | X | X |
| 1 | 1 | 1 | 0 | X | X | X | X |
| 1 | 1 | 1 | 1 | X | X | X | X |



Converting Excess-3 to BCD(8421)

| Excess-3 | | | | BCD | | | |
|----------|---|---|---|-----|---|---|---|
| w | x | y | z | A | B | C | D |
| 0 | 0 | 0 | 0 | X | X | X | X |
| 0 | 0 | 0 | 1 | X | X | X | X |
| 0 | 0 | 1 | 0 | X | X | X | X |
| 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 |
| 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| 0 | 1 | 0 | 1 | 0 | 0 | 1 | 0 |
| 0 | 1 | 1 | 0 | 0 | 0 | 1 | 1 |
| 0 | 1 | 1 | 1 | 0 | 1 | 0 | 0 |
| 1 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| 1 | 0 | 0 | 1 | 0 | 1 | 1 | 0 |
| 1 | 0 | 1 | 0 | 0 | 1 | 1 | 1 |
| 1 | 0 | 1 | 1 | 1 | 0 | 0 | 0 |
| 1 | 1 | 0 | 0 | 1 | 0 | 0 | 1 |
| 1 | 1 | 0 | 1 | X | X | X | X |
| 1 | 1 | 1 | 0 | X | X | X | X |
| 1 | 1 | 1 | 1 | X | X | X | X |

K-Map for D-

| wx \ yz | yz | | | |
|---------|----|----|----|----|
| | 00 | 01 | 11 | 10 |
| 00 | X | X | 0 | X |
| 01 | 1 | 0 | 0 | 1 |
| 11 | 1 | X | X | X |
| 10 | 1 | 0 | 0 | 1 |

K-Map for C-

| wx \ yz | yz | | | |
|---------|----|----|----|----|
| | 00 | 01 | 11 | 10 |
| 00 | X | X | 0 | X |
| 01 | 0 | 1 | 0 | 1 |
| 11 | 0 | X | X | X |
| 10 | 0 | 1 | 0 | 1 |

K-Map for B-

| wx \ yz | yz | | | |
|---------|----|----|----|----|
| | 00 | 01 | 11 | 10 |
| 00 | X | X | 0 | X |
| 01 | 0 | 0 | 1 | 0 |
| 11 | 0 | X | X | X |
| 10 | 1 | 1 | 0 | 1 |

$$A = wx + wyz$$

$$B = x'y' + x'z' + xyz$$

$$C = y'z + yz'$$

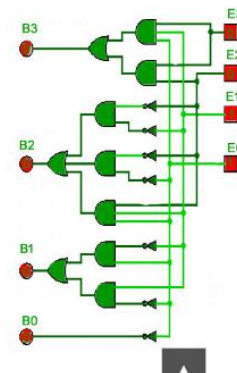
$$D = z'$$

The corresponding digital circuit -

Here E_3 , E_2 , E_1 , and E_0 correspond to w , x , y , and z and B_3 , B_2 , B_1 , and B_0 correspond to A , B , C , and D .

K-Map for A-

| wx \ yz | yz | | | |
|---------|----|----|----|----|
| | 00 | 01 | 11 | 10 |
| 00 | X | X | 0 | X |
| 01 | 0 | 0 | 0 | 0 |
| 11 | 1 | X | X | X |
| 10 | 0 | 0 | 1 | 0 |



Reference : <https://www.geeksforgeeks.org/code-converters-bcd8421-to-from-excess-3/>