# Binary to Gray Code Converter and Grey to Binary Code Converter

Binary Adder   Binary Substractor   Seven Segment Display
Binary Gray Code Conversion   Binary to BCD Code Converter
Analog to Digital Converter   Binary Encoder   Binary Decoder
Basic Digital Counter   Digital Comparator
BCD to Seven Segment Decoder   Parallel Adder
Parallel Adder or Subtractor   Multiplexer   Demultiplexer   555 Timer
Look Ahead Carry Adder

The logical circuit which converts binary code to equivalent gray code is known as **binary to gray code converter**. The gray code is a non weighted code. The successive gray code differs in one bit position only that means it is a unit distance code. It is also referred as cyclic code. It is not suitable for arithmetic operations. It is the most popular of the unit distance codes. It is also a reflective code. An n-bit Gray code can be obtained by reflecting an n-1 bit code about an axis after $2^{n-1}$ rows, and putting the MSB of 0 above the axis and the MSB of 1 below the axis. Reflection of Gray codes is shown below.

The 4 bits binary to gray code conversion table is given below,

electrical4u.com

Related Articles
Binary Adder
Binary Substractor
Seven Segment Display
Binary Gray Code Conve…
Binary to BCD Code Con…
Analog to Digital Converter
Binary Encoder
Binary Decoder
Basic Digital Counter
Digital Comparator
BCD to Seven Segment …
Parallel Adder
Parallel Adder or Subtrac…
Multiplexer
Demultiplexer
555 Timer
Look Ahead Carry Adder
More Related Articles
Number
Squentional Circuit
Arithmetic
Logic Gate
New Articles

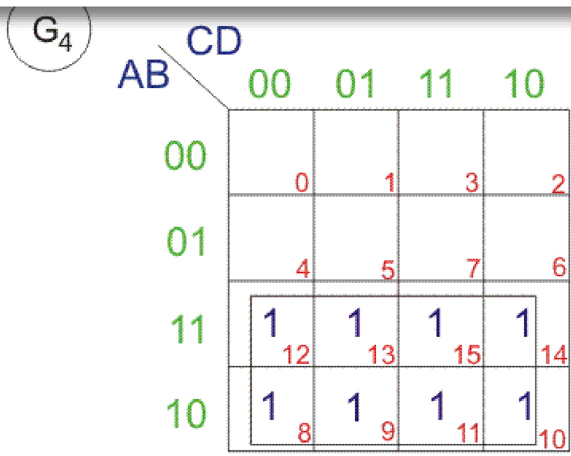
| Decimal Number | 4 bit Binary Number ABCD | 4 bit Gray Code $G_1G_2G_3G_4$ |
|---|---|---|
| 0 | 0 0 0 0 | 0 0 0 0 |
| 1 | 0 0 0 1 | 0 0 0 1 |
| 2 | 0 0 1 0 | 0 0 1 1 |
| 3 | 0 0 1 1 | 0 0 1 0 |
| 4 | 0 1 0 0 | 0 1 1 0 |
| 5 | 0 1 0 1 | 0 1 1 1 |
| 6 | 0 1 1 0 | 0 1 0 1 |
| 7 | 0 1 1 1 | 0 1 0 0 |
| 8 | 1 0 0 0 | 1 1 0 0 |
| 9 | 1 0 0 1 | 1 1 0 1 |
| 10 | 1 0 1 0 | 1 1 1 1 |
| 11 | 1 0 1 1 | 1 1 1 0 |
| 12 | 1 1 0 0 | 1 0 1 0 |
| 13 | 1 1 0 1 | 1 0 1 1 |
| 14 | 1 1 1 0 | 1 0 0 1 |
| 15 | 1 1 1 1 | 1 0 0 0 |

That means, in 4 bit gray code, (4-1) or 3 bit code is reflected against the axis drawn after $(2^{4-1})^{th}$ or $8^{th}$ row.
The bits of 4 bit gray code are considered as $G_4G_3G_2G_1$. Now from conversion table,

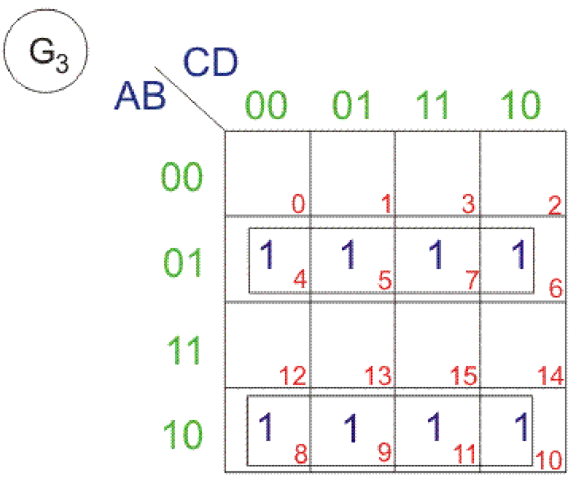
$$G_4 = \sum m(8,9,10,11,12,13,14,15),\ G_3 = \sum m(4,5,6,7,8,9,10,11)$$
$$G_2 = \sum m(2,3,4,5,10,11,12,13),\ \ G_1 = \sum m(1,2,5,6,9,10,13,14)$$

From above SOPs, let us draw K-maps for $G_4$, $G_3$, $G_2$ and $G_1$.

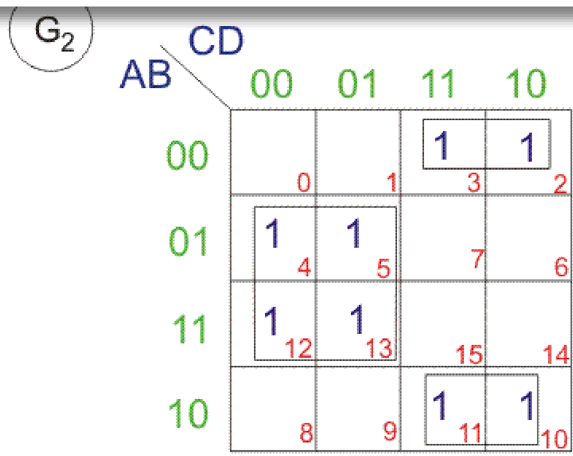
Components of ESP
History of Battery
Advantages and Disadva…
Types of Electrostatic Pr…
Articles Categories
MCQ
Contact Us
Basic Electrical
Circuit Theories
Electrical Laws
Materials
Batteries
Illumination
Generation
Transmission
Distribution
Switchgear
Protection
Measurement
Control System
Utilities
Safety
Transformer
Motor
Generator
Electrical Drives
Electronics Devices
Power Electronics
Digital Electronics
Videos



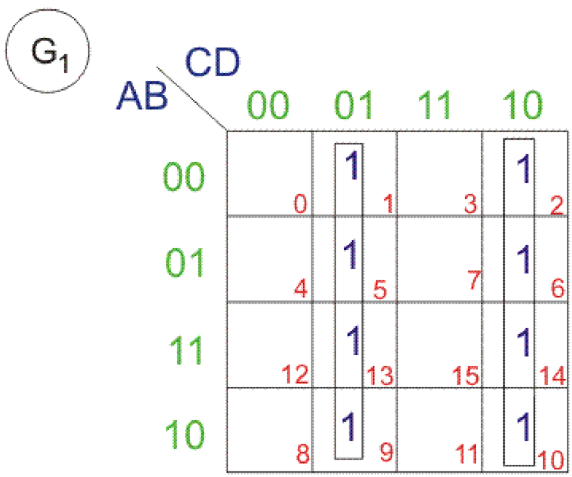

$G_4 = A$



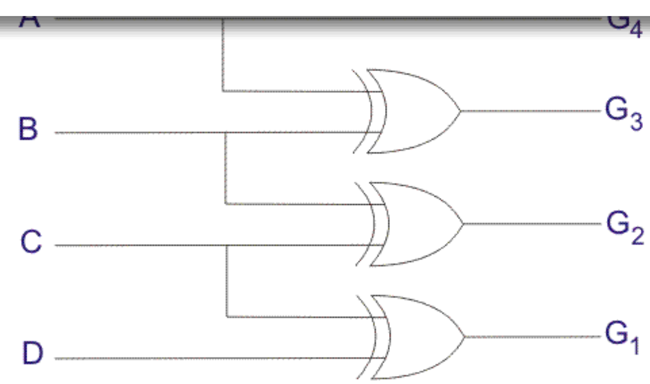

$G_3 = \overline{A}B + A\overline{B} = A \oplus B$




$$G_2 = B\overline{C} + \overline{B}C = B \oplus C$$




$$G_1 = \overline{C}D + C\overline{D} = C \oplus D$$



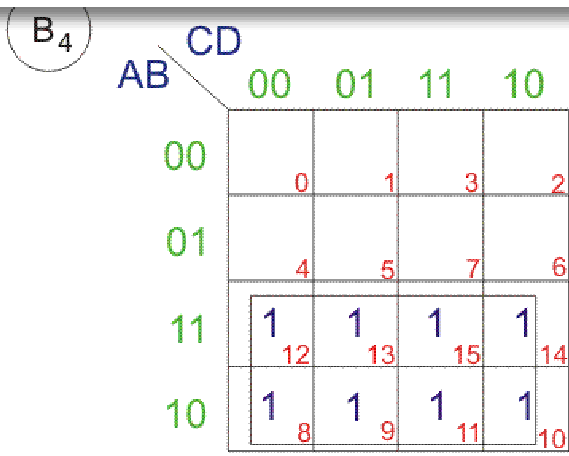

Logic Circuit for Binary to Gray Code Converter

## Grey to Binary Code Converter

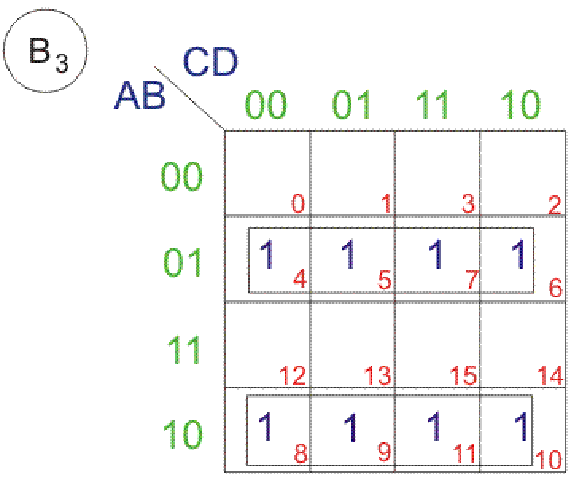
In **gray to binary code converter**, input is a multiplies gray code and output is its equivalent binary code.

Let us consider a 4 bit gray to binary code converter. To design a 4 bit gray to binary code converter, we first have to draw a conversion table.

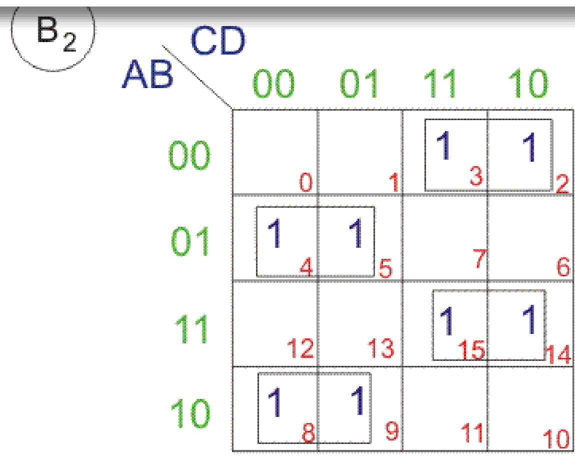
| 4 bit Gray Code<br>A B C D | 4 bit Binary Code<br>$B_4$ $B_3$ $B_2$ $B_1$ |
|---|---|
| 0 0 0 0 | 0 0 0 0 |
| 0 0 0 1 | 0 0 0 1 |
| 0 0 1 1 | 0 0 1 0 |
| 0 0 1 0 | 0 0 1 1 |
| 0 1 1 0 | 0 1 0 0 |
| 0 1 1 1 | 0 1 0 1 |
| 0 1 0 1 | 0 1 1 0 |
| 0 1 0 0 | 0 1 1 1 |
| 1 1 0 0 | 1 0 0 0 |
| 1 1 0 1 | 1 0 0 1 |
| 1 1 1 1 | 1 0 1 0 |
| 1 1 1 0 | 1 0 1 1 |
| 1 0 1 0 | 1 1 0 0 |
| 1 0 1 1 | 1 1 0 1 |
| 1 0 0 1 | 1 1 1 0 |
| 1 0 0 0 | 1 1 1 1 |



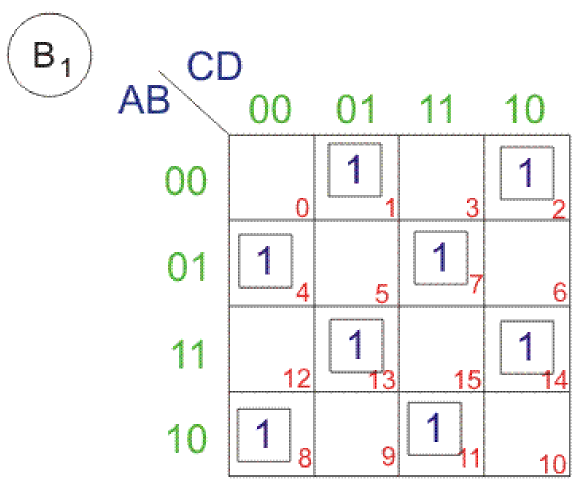

$B_4 = A$




$B_3 = \bar{A}B + A\bar{B} = A \oplus B$

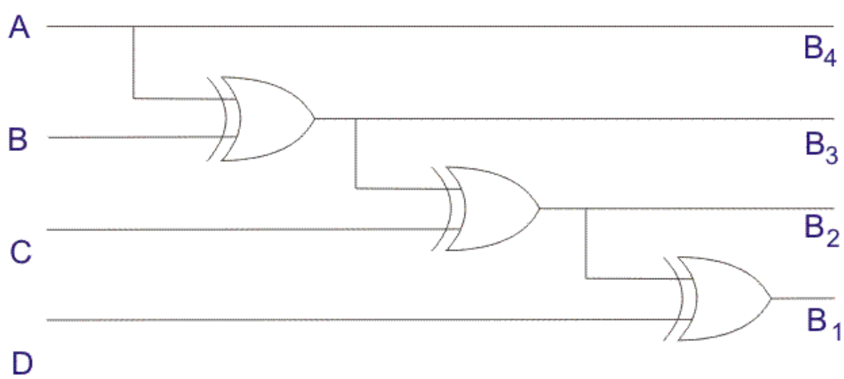



$$
\begin{aligned}
B_2 &= \overline{A}B\overline{C} + A\overline{B}\,\overline{C} + \overline{A}\,\overline{B}C + ABC \\
&= A(\overline{B}\,\overline{C} + BC) + \overline{A}(B\overline{C} + \overline{B}C) \\
&= A(\overline{B\overline{C} + \overline{B}C}) + \overline{A}(B\overline{C} + \overline{B}C) \\
&= A(\overline{B \oplus C}) + \overline{A}(\overline{B \oplus C}) = A \oplus B \oplus C
\end{aligned}
$$




$$
\begin{aligned}
B_1 = {} & \overline{A}\,\overline{B}\,\overline{C}\,D + \overline{A}\,\overline{B}\,C\,\overline{D} + \overline{A}\,B\,\overline{C}\,\overline{D} + \overline{A}\,BCD + AB\overline{C}\,D + ABC\overline{D} + A\overline{B}\,\overline{C}\,\overline{D} \\
& + A\overline{B}CD \; = \; A \oplus B \oplus C \oplus D
\end{aligned}
$$

From above Gray code we get,




Logic Circuit for Gray to Binary Code Converter

< >

**BCD** commented on 20/03/2018
Extremely poor explanation

## Comments

Your name..

Write your feelings about this page

SUBMIT

**Connects**

Facebook

Youtube

Write for us

**Contents**

Articles

MCQs

Forum

© 2011 - 2018 www.electrical4u. The content is copyrighted to www.electrical4u and may not be reproduced on other websites.