CODE CONVERTERS

A code converter circuit will convert coded information in one form to a different coding form.

Binary to Gray Code Converter

```
module binary_to_gray(B,G);
  input [3:0] B;
  output [3:0] G;
  assign G[3] = B[3];
  assign G[2] = B[3]^B[2];
  assign G[1] = B[2]^B[1];
  assign G[0] = B[1]^B[0];
endmodule
```

https://www.edaplayground.com/x/MKhi

Gray to Binary Code Converter

```
module gray_to_binary(G,B);
  input [3:0] G;
  output [3:0] B;
  assign B[3] = G[3];
  assign B[2] = G[3]^G[2];
  assign B[1] = G[2]^G[1];
  assign B[0] = G[1]^G[0];
endmodule
```

https://www.edaplayground.com/x/Znh3

Binary to 2’s Complement Code Converter

```
module bin_complement_2s(in,out);
  input [3:0] in;
  output unsigned [3:0] out;
  wire [3:0] temp;
  assign temp = 4'b1111-in;
  assign out = temp+4'b0001;
endmodule
```

https://www.edaplayground.com/x/KDfc

BCD to EXCESS-3 CODE Converter

```
module bcd_excess3(B,Ex_3);
  input logic [3:0] B;
  output logic [3:0] Ex_3;
  always@(*)
    begin
      case(B)
        4'b0000 : Ex_3 = 4'b0011;
        4'b0001 : Ex_3 = 4'b0100;
        4'b0010 : Ex_3 = 4'b0101;
        4'b0011 : Ex_3 = 4'b0110;
        4'b0100 : Ex_3 = 4'b0111;
        4'b0101 : Ex_3 = 4'b1000;
        4'b0110 : Ex_3 = 4'b1001;
        4'b0111 : Ex_3 = 4'b1010;
        4'b1000 : Ex_3 = 4'b1011;
        4'b1001 : Ex_3 = 4'b1100;
        default : Ex_3 = 4'bxxxx;
      endcase
    end
endmodule
```

https://www.edaplayground.com/x/Ts8n