Write a description for each combinational block used in the encryption system. This includes drawing the block diagram for each block, the gate level schematic and writing a concise explanation of what each block does. This description will serve as the foundation for translating your design into VHDL during the lab activity.

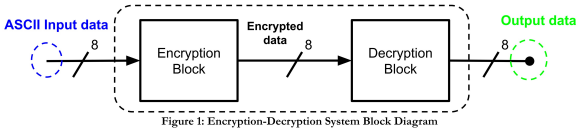


Figure 1: Encryption-Decryption System Block Diagram

E_0 - E_7 8 bits of encrypted data

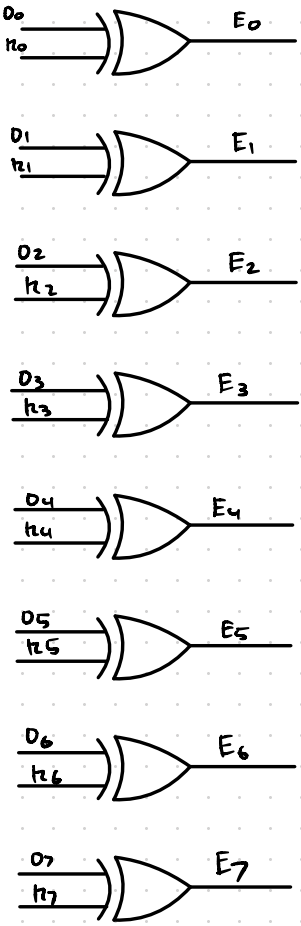
k_0 - k_7 8 bits of Encryption key

D_0 - D_7 8 bits of original ASCII Data

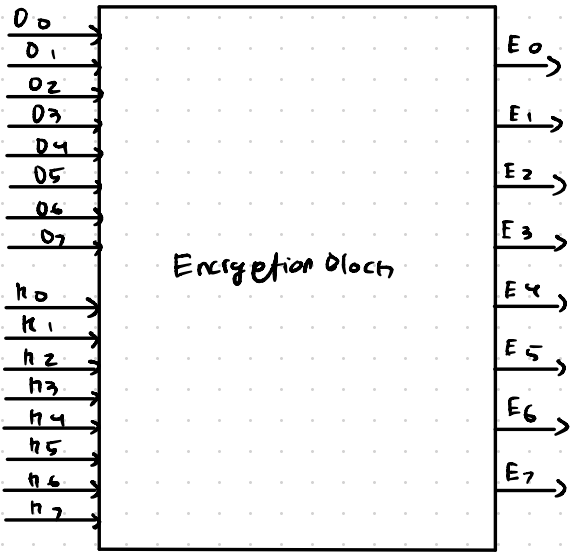
Encryption Block

The Encryption Block is responsible for encoding the 8-bit ASCII character data input using XOR gates. It takes the 8-bit input data and an 8-bit encryption key, and performs a bitwise XOR operation b/w each corresponding bit of the data & the key. This scrambles the output data, which can only be decoded by applying the same encryption key during decryption.

Gate Level Schematic



Block Diagram



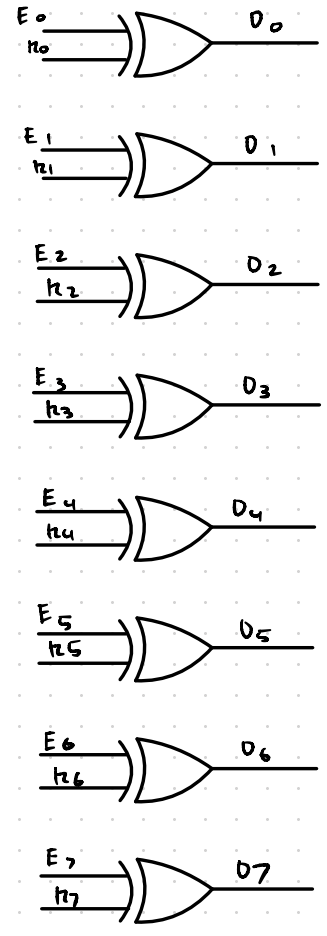
Concise Explanation

The Encryption Block takes in an 8-bit ASCII input data and an 8-bit encryption key, and performs an XOR operation on each corresponding pair of bits. The process scrambles the original data using the key, making the output unintelligible without the same key.

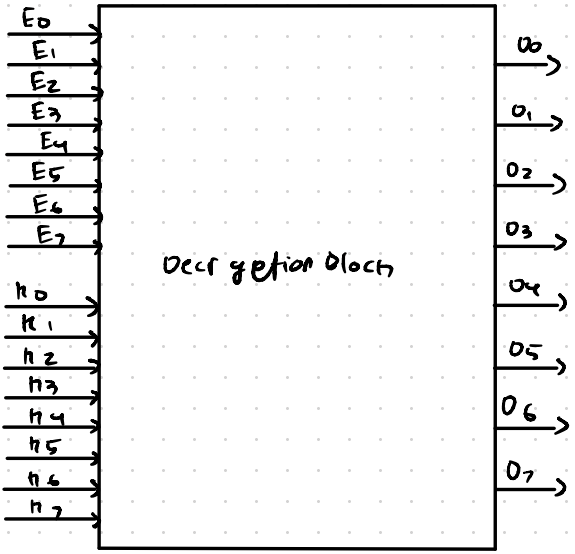
Decryption Block

This block is the reverse of the Encryption block. It takes the 8-bit encrypted and the same 8-bit encryption key as inputs, and performs a bitwise XOR operation b/w the encrypted data and the key. This reverses the encryption and retrieves the original ASCII data with the original encryption key.

Gate Level Schematic



Block Diagram



Concise Explanation

The Decription Block Reverses the encryption process. It takes the 8-bit encrypted data and the 8-bit encryption key and performs an XOR operation. This process restores the original 8-bit ASCII data if the correct key is used.

Draw the block diagram of the top level entity of the Encryption-Decryption system including all the individual blocks from the previous point.