**DIGITAL DATA COMMUNICATIONS ENGINEERING**

Data Communications is part of the telecommunications specifically relating to the transmission or transfer of data and information between computers and other devices in the digital form that is sent through a data communication medium. Data means the information presented by the digital signal.

*Data Communications Components:*

1. Sender, is a device that sends data.
2. Recipient, is any device that receives data.
3. Data, is the information to be transferred
4. Media delivery, media or channels are used to transmit data.
5. Protocol, are the rules that serve to harmonize the relationship.

A digital signal is a signal that the data in the form of pulses may change suddenly and has magnitude 0 and 1. A digital signal has only two states, namely 0 and 1, which are not easily affected by noise, but the transmission of digital signals only reach the range of data transmission is relatively close.

Usually this signal is also known as discrete signals. The signal that has two states is usually called bits. Bit is a term unique to the digital signal. A bit can be either zero (0) or one (1). Possible values ​​for a bit is 2 pieces (21). Possible values ​​for the 2 bits is 4 (22), such as 00, 01, 10, and 11. In general, the number of possible values ​​formed by the combination of n bits is equal to 2n pieces.

In digital data communications necessary to have a protocol as a rule that defines the several functions within a computer network, such as sending messages, data, information, and other functions to be fulfilled by the sending side and the receiving side so that communication can take place properly, even though the system on the network are different. This protocol deal with differences in data format on both systems to the electrical connection problem. The popular protocol standard OSI (Open System Interconnecting) defined by ISO (International Standard Organization).

*Digital Communication Advantage:*

1. Error almost always be corrected.
2. Easily display signal manipulation (encryption).
3. Greater dynamic range (the difference between the lowest value to highest) are possible.
4. Digital communication system also memilliki better data quality, as it can be checked errors in data transmission.

*Losses Digital Communication:*

1. Typically require greater bandwidth.
2. Requires synchronization

*ASYNCHRONOUS TRANSMISSION*

The strategy of this method is to prevent timing problems by not sending a long stream of bits unfailing. Instead of data transmitted per character at a time, where each character is 5 to 8 bits in length. Timing or synchronization must be maintained between each character; receiver has a chance to Synchron the beginning of each new character.

*SYNCHRONOUS TRANSMISSION*

With synchronous transmission, there is another level of synchronization that is necessary for the receiver to determine the beginning and end of a data block. To that end, each block starts with a preamble bit pattern and ends with postamble bit pattern. Pattern - the pattern is the control of information. Frame is data plus control information.