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equal to the diameter of human hair.

- The central part of the diameter is called the core.
- it is made of slica jel of greater refractive index around the core. an optical fibre has a cladding of small Refractive index the optical signal is passed through optical fiber by total internal Reflection.
- optical fibre are commonly used for telecommunicatio
- optical fibre are two types:-

i) Mono Mode.

ii) Single Mode.

i). if only one signal is passed through the fibre it is called Mono Mode.

- They are used over long distance but they are very costly, therefore they are not used for short distance diameter of the core is 5mm.

ii). MultiMode fibre :-

it severals signal passed through the fibre then it is called MultiMode fibre it core has the the diameter of 50 MM.

Advantage :-

i). In Metal wire an electrical signal is used where as in an optical fibre the lite signal is used Hence Energy lossed in optical fibre is

A plastic jacket is Molded, over the intire cline. as protective coating the outer conductor acts as grounded shield with only one inner conductor.

Advantages:-

i. ~~Conductor~~ Co-axial cable are best suited for high frequency.

ii. This type of cline doesn't radiate energy due to complete shielding.

iii. Co-axial clines are used in noisy locations.

iv. It Work upto 18 GHz.

Disadvantage:-

i). A continuous current even if small along the inperfect shield of a co-axial cable cause visible or audible interference.

ii). The gaps or holes in breaded shield allow some of the electro Magnetic field to penetrate to the other side.

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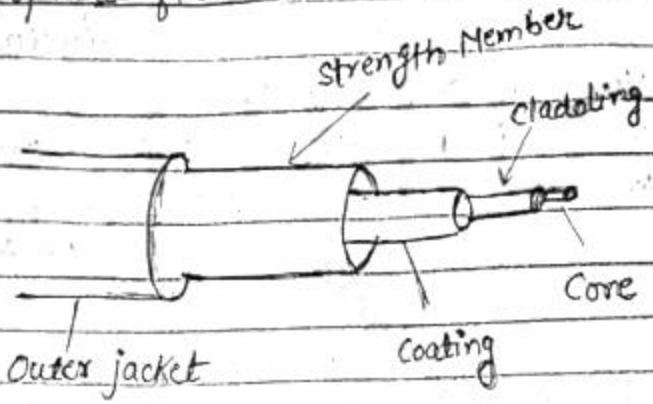
optical fibre :-



- It can transmit wide range of frequency.
- The Communication through optical fiber is not effected by electric and Magnetic field.
- in Metal wire the crosstoory is possible where as it is not possible in optical fibre.
- optical fibre is lite in weight.
- it is comparetively less affective by temperature.
- Raw Material for optical fibre is easily availble.

Disadvantage :-

i). Manufacturing cost of the fibre is very high.
ii). Optical fibre is very delicate and it breaks easly.

—: Twisted pair cable :-

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- A twisted pair transmission line is formed when two individual insulated wire conductor are twisted around one another.
- Twisted pair lines are shielded to prevent energy loss and external interference, the shielding offered is typically Metallic.

- The twisting conceles out all electromagnetic interference froms neighbouring Sources.
- it is used as both configuration (balanced and unbalanced). in balance pair, operation the 2 wire carry equal and opposite signal the destination detects difference b/w the two. This is known as differential Mode transmitted which is used in twisted pair.

→ Type of twisted pair :-

1. UTP (unshielded - Twisted pair)
2. STP (Shielded - Twisted pair)
3. FTP (foiled - Twisted pair)

1. UTP (unshielded - Twisted pair) :-

- An unshielded twisted transmission line pair consist of two copper wire that are individually insulated.
- The insulation is provided by polyvenylchloride coating.
- The wire are twisted More than two times around Each other two further Reduced External interference.

- The bandwidth of an UTP is determined by the No of twisted per segment and how the wires twisted.

2. STP :-

- It construction is same to UTP but it is often shielded it is an attempt to prevent electromagnetic interference because the shielding made of metal it may also serve as ground shielding provides an electric conductive barrier to attenuated electromagnetic waves external to the shield and provides conduction path by which induced current can be circulated and return to the source.

3. FTP :-

FTP uses foiled shielding instated of updated shielding in this transmission line when shielding is provided to collection of pairs are known as foiled twisted pair.
These type of shielding protect electromagnetic interference from entering or existing the cable.

Advantages :-

1. A pair of twisted transmission line is less expansive.
2. Due to differential signal the Noise produced is cancel at the receiver end. differential signal also reduces electromagnetic Radiation from the

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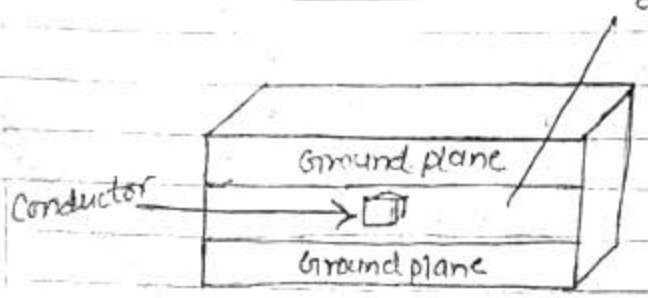
Cable flexibality and cost is of elestation.

Disadvantage:-

1. In wider application the twisted pair labeling can introduced signal in delayed.

2. increase external interference and energy loss.

-: STRIP LINE :-



A Strip line consist of flate Metallic ground plane separated by thickness of dielectric in the Middle of which a thin Metallic has been barried.

Advantage:-

1. It is used for circuit interconnection with solid state device.
2. It is also used for passive component.

Distortion:- Any change in signal that alters the basic wave form or the Relationship between various frequency component. it is usually a downgradation of the signal

Types of distortion:-

1. Amplitude distortion:-

Amplitude distortion is distortion occuring in a system, sub system or device when the output amplitude is not a linear function of the input amplitude under specific conditions.

2. Harmonic distortion:-

it adds over tones that are whole No multiples of a sound wave frequency Non-linearity that give rise to amplitude disortion in audio systems are More than often Measured in terms of the Harmonic added to a pure Sine wave fed to the system.

3. Frequency Responce distortion:-

Non flat fraquency Responce is a form of disortion that occur when different frequency are amplified by different amount in a filter. The Non-Uniform frequency Responce Curve of AC-Coupled Cacade amplifier is an example of frequency distortion.

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4. Phase distortion :-

This form of distortion Mostly occur due to electrical resistance. Here all the component of the input signal are not amplified with same phase shift Hence Making some part of the output signal out of phase with rest of the output.

5. Group delay distortion:-

Can be found only in dispersive Media. In a wave guide phase velocity varies with frequency in a filter, group delay tend to peak Near the cut off frequency, Resulting in pulse distortion. when analog distance trunks were common place.

Concept of Matching :-

- Data Matching describes effort to compare two set of collected data.
- This can be done in Many different ways, but the process is often based on algorithms or programmed loops, where processor platform Sequential analysis of Each individual piece of a data set, Matching against.
- Each individual piece of another dataset or comparing ~~piece of another~~ complex variable like strings for particular Similarity.

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• Data Matching can be done in order to discard duplicate content or for various kinds of data Mining. Many effort at data Matching are done for the purpose of identity a key link between two data set for Marketing Security or other applied uses.

* NOISE:- Noice can be defined as any unwanted form of Energy which tends to interface with proper Reception and production of wanted signals.

-: Different Kind of Noise :-

1. Normal Noise :-

• This is generated as a Result of thermal ailation of the charge carrier which are typically electrons within an Electrical Conductor. This Thermal Noise actually occur regardless of the applied voltage because the charge carrier Vibrate as a Result of the temperature. This Vibration is depend upon the temperature.
• The higher temperature the agiliation and Hence the thermal Noise level.

2. Intermodulation Noise :-

IM effect Result when two or More Single pass through a Non-linear device or Medium and interact with Each other in ways that produce additional Signal such as Harmonics and Subharmonics of input Signal frequency.

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- These Resulting IM Component May be inside or outside the frequency based of interest for a particular device it is only when they are inside the band of Interest that IM effect become IM Noise.

- IN Noise is significant Concern in Ratio Communication including Cellular telephony and data Networks.

CROSS TALK :-

- This Refer to signal interfering with Each other electromagnetically. There are essential Cause of Cross talk.

- Electrical Coupling between transmission Media like adjacent cores in a Multilance serial interface Connection.

- poor control of frequency Response.

- Non-linear performance in analog Multiplex System. High level of cross talk increase bit error rates and degrate a digital path performance.

IMPULSE NOISE:-

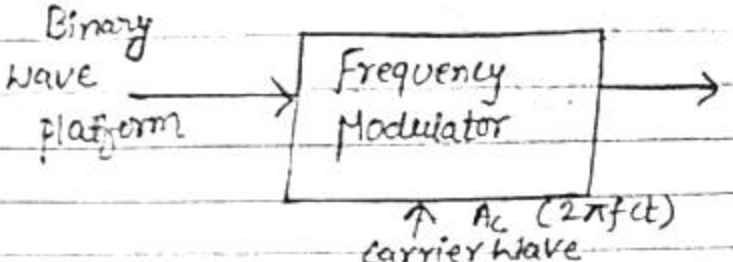
- Impulse Noise is a Non-Continuous series of irregular pulse or Noise spikes of short duration broad spectral density and of Relatively high amplitude.
- Impulse noise can caused by switching a.c. power circuit a source of intermittent but strong electromagnetic pulses such as elevator motors.
- It degrades telephony only marginally, if at all but can seriously corrupt data transmission.

SHOT NOISE:-

- Shot noise also called quantam noise is the variation is signal that is caused by the quantam nature of the light and electricity Making up the signal.
- We tends to thinks of a signal, whether a beam of light or a stream of electron as being uniforms a steady steam of particles traversing a path. The physical Reality though is not one of uniform and constant Movement but of clumpy Movement that only look smooth on average the long time flows of light or electricity as Measured by intensity or by electrical current density.

* FSK (frequency shift keying) :-

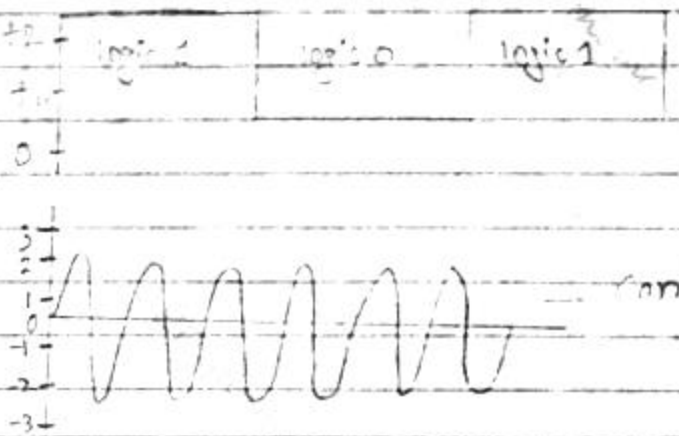
- It stand for frequency shift key. It involves Making a change to the frequency of the carrier to represent a different level.



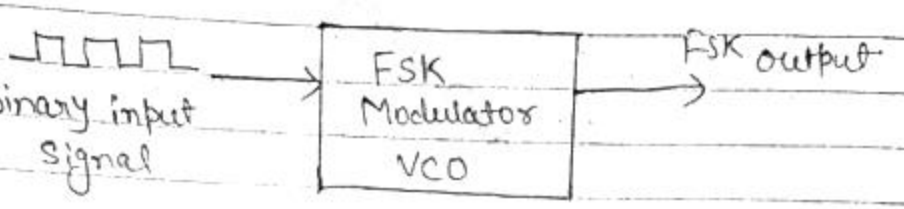
- In this Method, the frequency of carrier is changed to two different frequency depending upon the logic state of the input bit System.

- FSK Modulation is achieved using just two frequency to represent binary data.

Eg:- A frequencies of 2000Hz May Represent a binary and 1000Hz a binary 0. The Energy of the signal alternated between the Mark and Space frequencies to convey the digits (Message.).

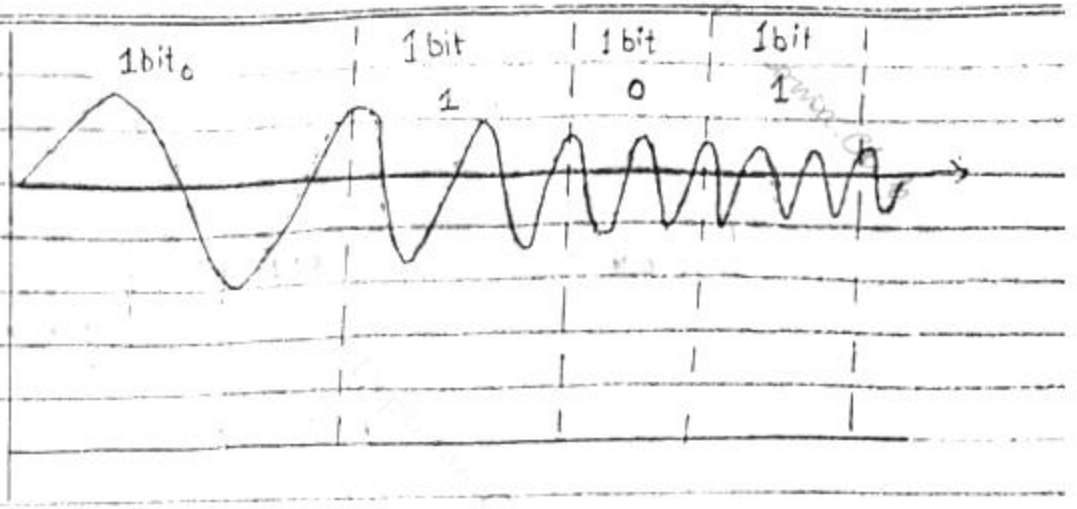


Generation of FSK :-



FSK Modulator :-

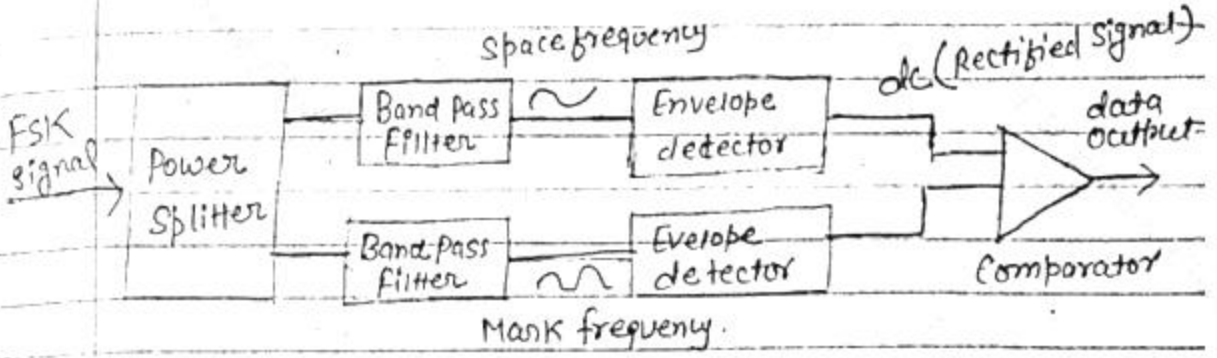
- The center frequency f.c is chosen such that it falls half way betn the Mark and Space frequency
- A logic zero (0) input shift the voltage control oscillator (VCO) output to the space frequency & a logic one input shift the VCO output to Mark frequency.
- As the binary signal changes from zero to one or 1 to 0 conditions. The VCO input shift or deviates back and forth betn the Mark & space frequency
- In binary FSK Modulator delta is the pack frequency deviation of the carrier and is equal to the differente betn the carrier rest freq and either the Space or Mark frequency.



Bit Rate:- No of bit used to represent one symbol

Baud Rate:- Rate of symbol transmission.

FSK Receiver / Demodulator :-



- In Non-Coherent FSK demodulator the input signal is simultaneously applied to both band pies filter through a power spliter the respective band Packs filter passes only the space or only the Mark frequency on to its respective envelope detector.

- The envelope detector indicates the total power in each pass band & the Comparator responds to the larger of two powers this type of FSK detection is known as Non-Coherent FSK demodulator.

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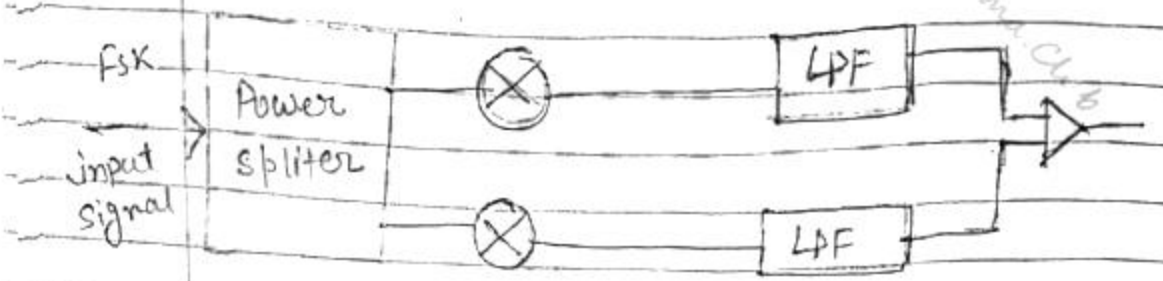
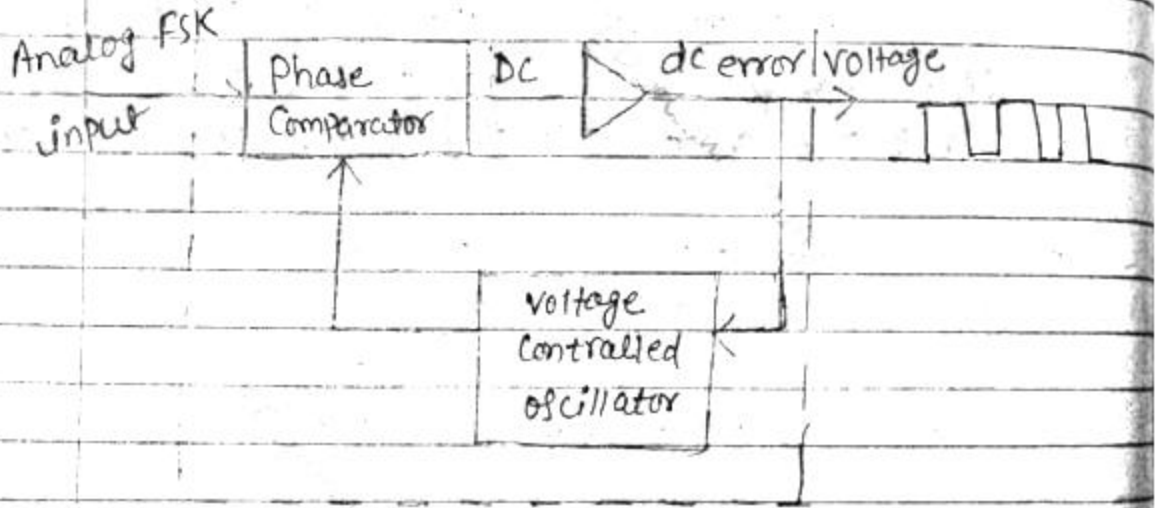
-: Coherent Fsk Demodulator :-



- In Coherent Fsk demodulator the increasing FSK Signal is Multiplied by a recovered Carrier Signal that has exact same frequency & phase as the transmitter refrains.

- The two transmitted frequency (Mark space) aren't continuous So it isn't practical to Reproduce a local refrence that is Coherent with both of them.

- So due to this problem Coherent detection Seledon used.



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- The Mostly used circuit fall demodulating FSK binary signals is a phase locked loop as the input to the PLL shifts betn the Mark & Space frequency the DLC error voltage at one output of the phase comparator follows the frequency shift as we have two input frequency i.e, Mark & Space there are also only two output error voltage for logic 0 and logic 1. The frequency of PLL is made equal to the center frequency of the FSK Modulation. So that the changes on DC error voltage follows the changed in the analog input frequency and are Semmetrical around 0 volt.

- A Communication channel May be defined by physical wire that connect Commun wire or by a Radio Laser or other Radiated Energy Source that has no abused physical presence.

→ Communication Mode :-

1. Simplex
2. Half duplex
3. full duplex
4. full / full duplex.

→ Simplex :-

This is a unidirectional Connection that is data can travel in one direction only. Simplest Connection are useful in situation where a device only