

# FIBER OPTIC TRAINER

## EXPERIMENT 2 SETTING UP FIBER OPTICAL ANALOG LINK

### Objective :

The objective of this experiment is to study a 650 nm fiber optic analog link. In this experiment you will study the relationship between the input signal and received signal.

### Theory :

Fiber optic links can be used for transmission of digital as well as analog signals. Basically a fiber optic link contains three main elements, a transmitter, an optical fiber and a receiver. The transmitter module takes the input signals in electrical form and then transform it into optical (light) energy containing the same information. The optical fiber is the medium, which takes the energy to the receiver. At the receiver light is converted back into electrical form with the same pattern as originally fed to the transmitter ?

### Transmitter :

Fiber optic transmitters are typically composed of a buffer, driver and optical source. The buffer provides both an electrical connection and isolation between the transmitter & the electrical system supplying the data. The driver provides electrical power to the optical source. Finally, the optical source converts the electrical current to the light energy with the same pattern. Commonly used optical sources are light emitting diodes ( LED's ) and laser beam. Simple LED circuits, for digital and analog transmissions are shown below.

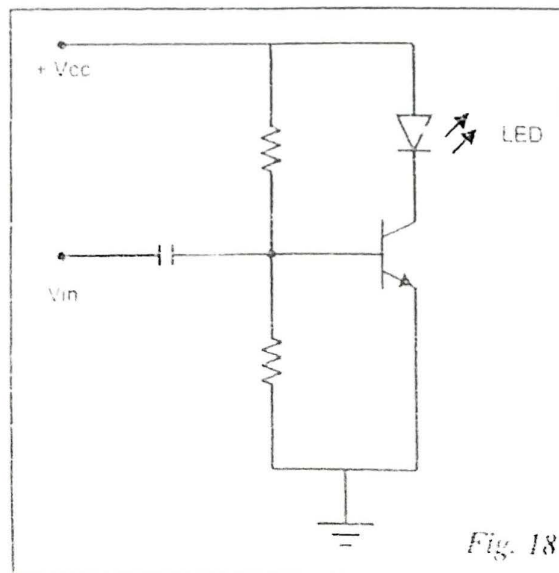


Fig. 18

Fig. 18 shows trans conductance drive circuits for analog transmission - common emitter configuration. The transmission section comprises of :

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1. Function Generator.
2. Frequency Modulator.
3. Pulse Width Modulator Block.

The function generator generates the input signals that are going to be used as information 'to transmit through the optic link'. The output voltage available is 1 KHz sinusoidal signal of adjustable amplitude, and fixed amplitude 1 KHz square wave signal. The modulator section accepts the information signals and converts it into suitable form for transmission through the fiber optic link.

## The Fiber Optic Link :

Emitter and Detector circuit on board form the fiber optic link. This section provides the light source for the optic fiber and the light detector at the far the end of the fiber optic links. The optic fiber plugs into the connectors provided in this part of the board. Two separate links are provided.

## The Receiver :

The comparator circuit, low pass filter, phase locked loop, AC amplifier circuits form receiver on the board. It is able to the undo the modulation process in order to recover the original information signal. In this experiment the trainer board is used to illustrate one - way communication between digital transmitter and receiver circuits.

## Procedure :

1. Connect the power supply to the board.
2. Ensure that all switched faults are in normal position.
3. Make the following connections ( as shown in diagram 1 ).
  - a. Connect the FG 1KHz sine wave output to emitters input.
  - b. Connect the 1 meter FO cable between emitter output and detectors input.
  - c. Detector output to AC Amplifier input.
4. On the board, switch emitter drive to analog mode.
5. Switch ON the power.
6. Observed the input to emitter ( TP5 ) with the output from AC amplifier ( TP19 ) and note that the two signals are same.

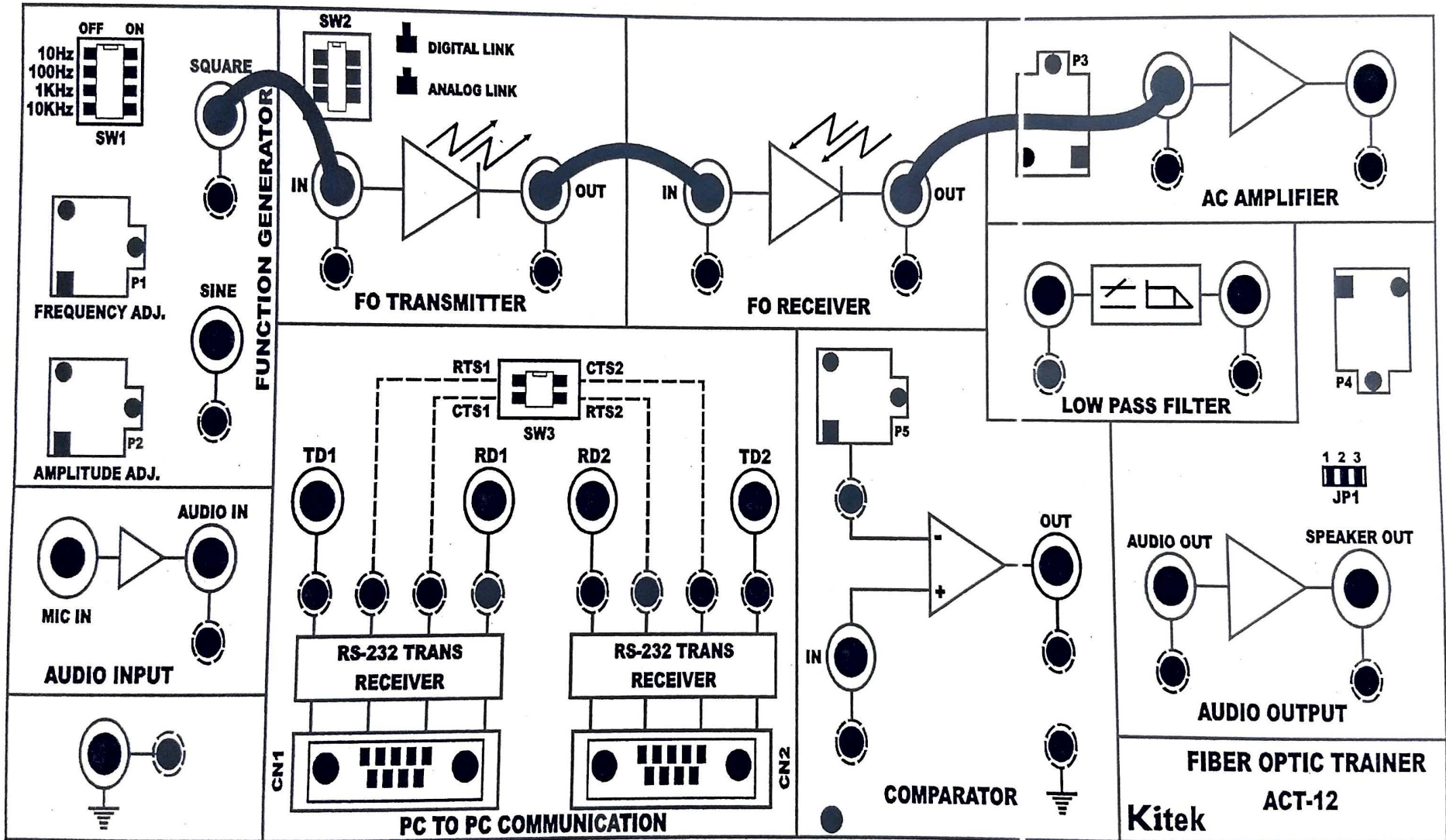


DIAGRAM-1

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