

Experiment 8

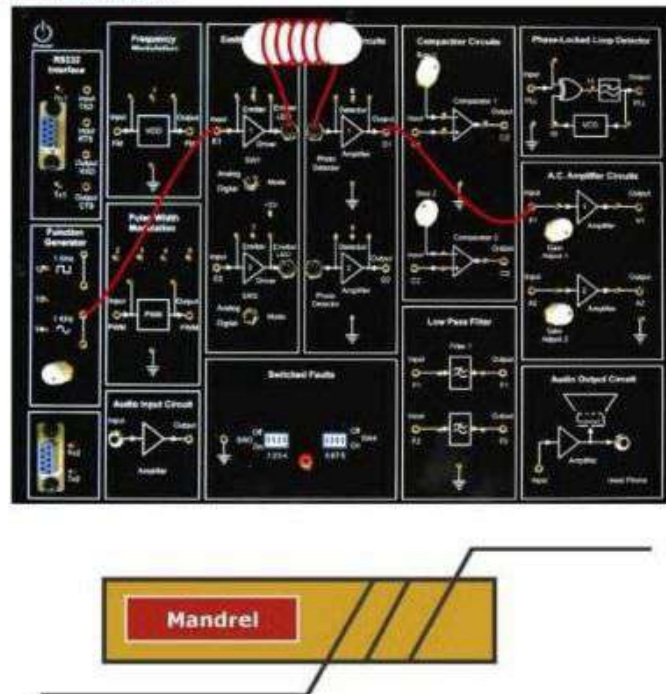
Objective: Study of Bending Loss

The object of this experiment into study bending loss

Equipments Required:

- Sciencetech 2502 TechBook with Power Supply cord
- Optical Fiber cable
- Cathode ray Oscilloscope with necessary connecting probe
- Mandrel

Connection Diagram:



Optical Fiber Communication Sciencetech 2502

Procedure:

- Connect Power Supply cord to the main power plug & to TechBook Sciencetech 2502.
- Make the connections as shown in next figure.
 - Function Generator 1 KHz sine wave output to input socket of emitter Circuit via 4 mm lead.
 - Connect 0.5 m optic fiber between emitter output and detectors input.
 - Connect Detector output to amplifier input socket via 4mm lead.
- Switch 'On' the Power Supply of the TechBook and Oscilloscope.
- Set the Oscilloscope channel 1 to 0.5 V/ Div and adjust 4-6 div amplitude by using X 1 probe with the help of variable pot in Function Generator Block at input of Emitter.
- Observe the output signal from detector (TP8) on CRO.
- Adjust the amplitude of the received signal as that of transmitted one with the help of gain adjusts potentiometer in AC amplifier block. Note this amplitude and name it V_1 .
- Wind the fiber optic cable on the mandrel and observe the corresponding AC amplifier output on CRO, it will be gradually reducing, showing loss due to bends.

Questions:

- What is the reason of bending losses?
- What is core and cladding?
- What is the function of cladding?

Experiment 7

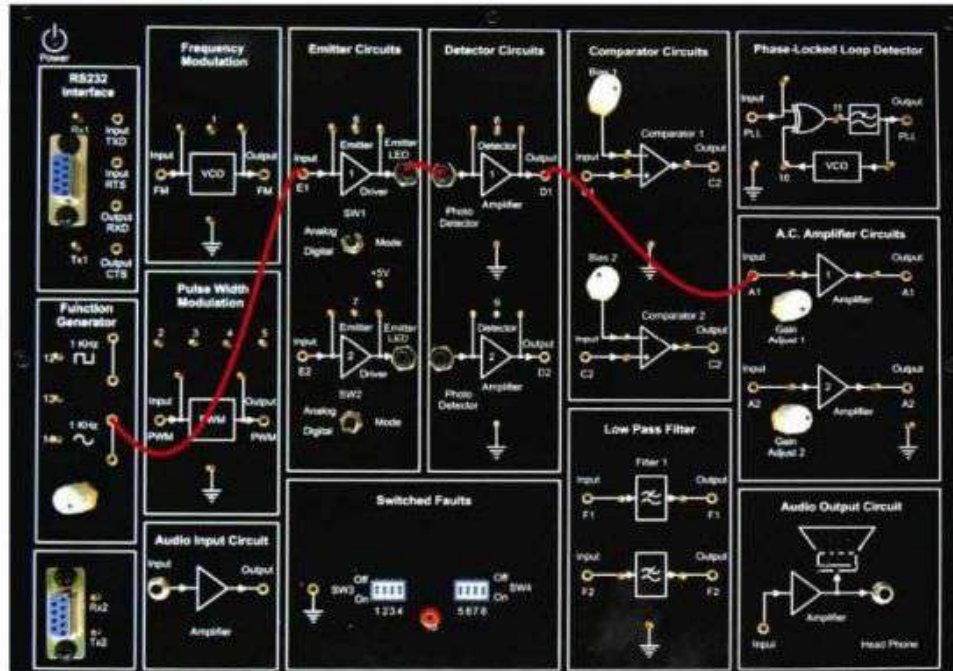
Objective: Study of Propagation Loss in Optical Fiber

To measure propagation or attenuation loss in optical fiber

Equipments Required:

- Sciencetech 2502 TechBook with Power Supply cord
- Optical Fiber cable
- Cathode ray Oscilloscope with necessary connecting probe

Connection Diagram:



Procedure:

Procedure:

- Connect Power Supply cord to the main power plug & to TechBook Sciencetech 2502.
- Make the following connections as shown in next figure.
 - Function Generator's 1 KHz sine wave output to Input 1 socket of emitter 1 circuit via 4 mm lead.
 - Connect 0.5 m optic fiber between emitter 1 output and detector 1's input.
 - Connect detector 1 output to amplifier 1 input socket via 4mm lead.
- Switch ON the Power Supply of the TechBook and Oscilloscope.
- Set the Oscilloscope channel 1 to 0.5 V / Div and adjust 4 - 6 div amplitude by using X 1 probe with the help of variable pot in Function Generator block at input 1 of Emitter 1.
- Observe the output signal from detector TP10 on CRO.
- Adjust the amplitude of the received signal same as that of transmitted one with the help of gain adjust potentiometer in AC amplifier block. Note this amplitude and name it V1.
- Now replace the previous FG cable with 1 m cable without disturbing any previous setting.
- Measure the amplitude at the receiver side again at output of amplifier 1 socket TP 28. Note this value and name it V2.

Calculate the propagation (attenuation) loss with the help of following formula.

$$V1 / V2 = e^{-\alpha (L1 + L2)}$$

Where α is loss in nepers / meter

1 neper = 8.686 dB

L 1 = length of shorter cable (0.5 m)

L 2 = Length of longer cable (1 m)

Questions:

- How to measure propagation losses?
- By what optical cable is made up of?
- What is step index Fiber?