Experiment 3(a)

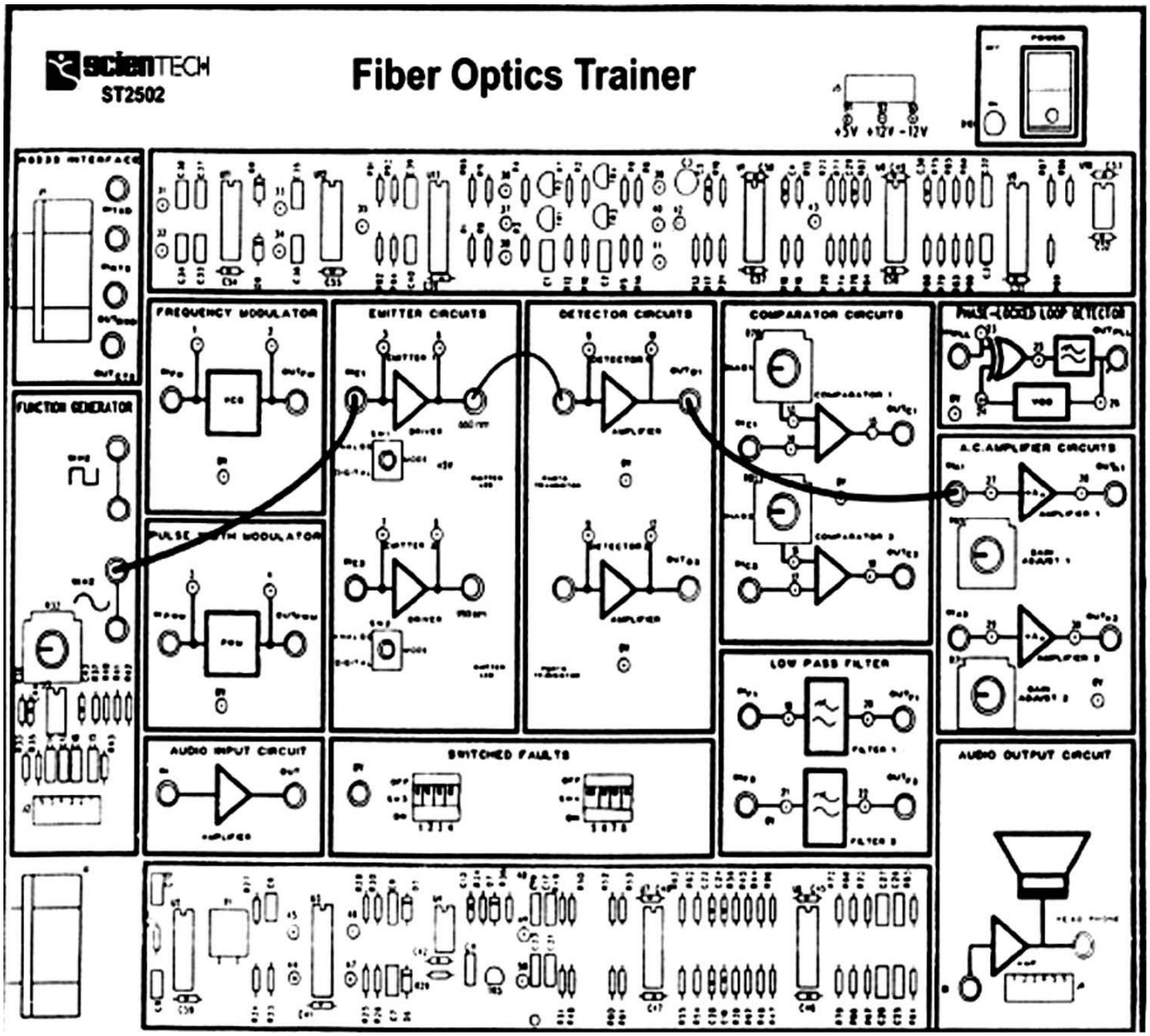
Objective: Setting up Fiber Optic Analog Link

Study of a 650nm fiber optic analog link in this experiment you will study the relationship between the input signal and received signal.

Equipments Required:

1. ST2502 trainer with power supply cord
2. Optical Fibre cable
3. Cathode ray oscilloscope with necessary connecting probe

Connection diagram:-



Procedure:

1. Connect the power supply cord to the main power plug & to trainer ST2502.
2. Ensure that all switched faults are ‘Off’.
3. Make the following connections as shown in figure 1.1

a. Connect the 1 KHz sine wave output to emitter l's input.
b. Connect the Fiber Optics cable between emitter output and detectors input.
c. Detector l's output to AC amplifier 1 input.

4. On the board, switch emitter l's driver to analog mode.
5. Switch ON the power supply of trainer and oscilloscope.
6. Observe the input to emitter 1 (TP5) with the output from AC amplifier 1 (TP28) and note that the two signals are same.

Questions:

1. What is meant by index profile?
2. What is the drawback of multimode fibres?
3. What is fibre optics?

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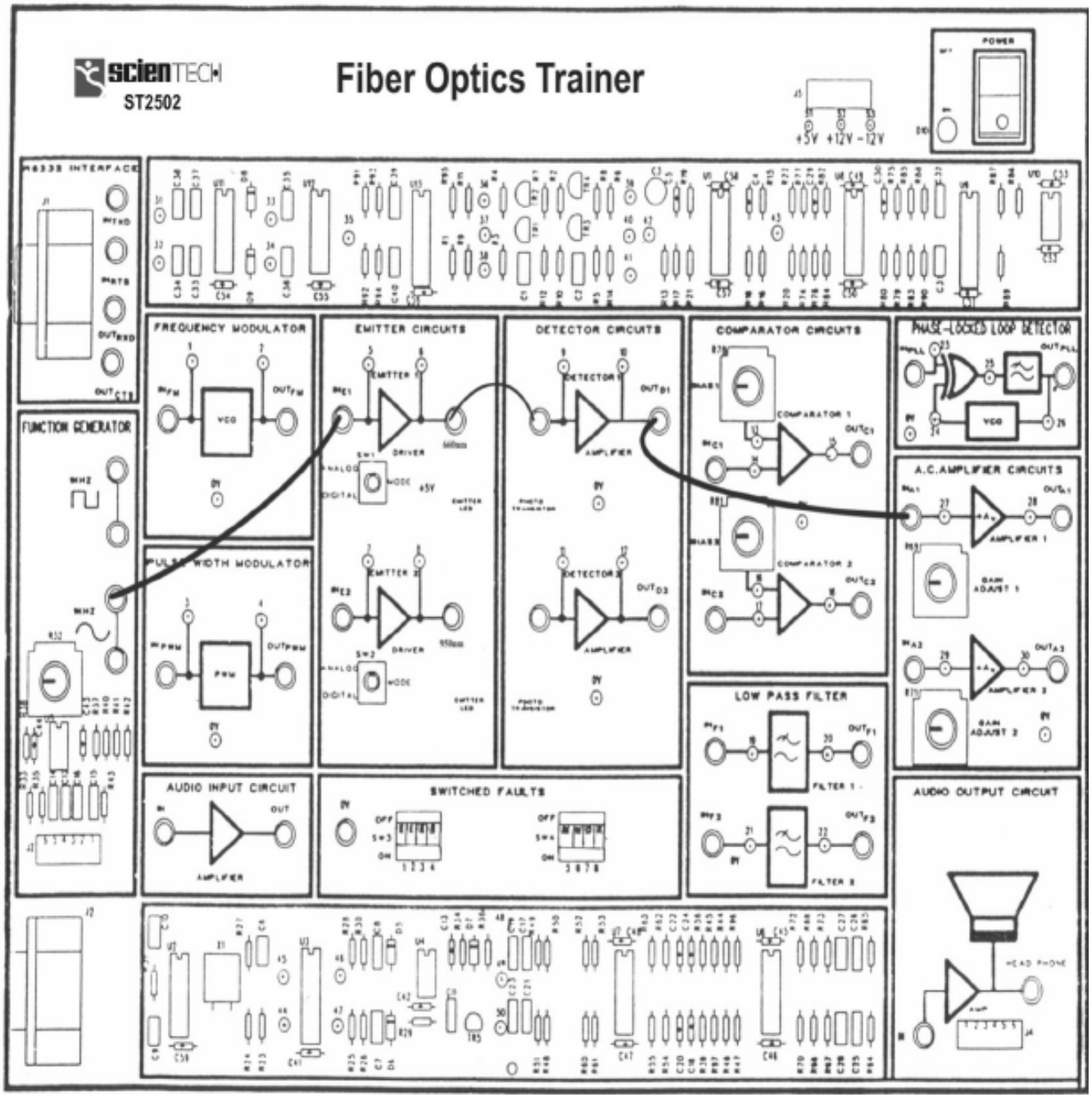
Experiment 3(b)

Object:- To measure propagation or attenuation loss in optical fiber

Equipments Required:

1. ST2502 trainer with power supply cord
2. Optical Fibre cable
3. Cathode ray oscilloscope with necessary connecting probe

Connection Diagram:



Procedure:-

1. Connect power supply cord to the main power plug & to trainer ST2502.
2. Make the following connections as shown in the above connection diagram (on page-3).
a. Function generator's 1 KHz sine wave output to Input 1 socket of emitter 1 circuit via 4 mm lead.
b. Connect 0.5 m optic fiber between emitter 1 output and detector l's input.
c. Connect detector 1 output to amplifier 1 input socket via 4mm lead.
3. Switch ON the Power Supply of the trainer and oscilloscope.
4. 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.
5. Observe the output signal from detector TP10 on CRO.
6. 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 V_1.
7. Now replace the previous FG cable with 1 m cable without disturbing any previous setting.
8. Measure the amplitude at the receiver side again at output of amplifier 1 socket TP 28. Note this value end name it V_2.

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

$$V_1 / V_2 = e^{-\alpha (L_1 + L_2)}$$ Where α is the attenuation loss in nepers / meter

Note that, 1 neper = 8. 686 dB
L_1 = length of shorter cable (0.5 m)
L_2 = Length of longer cable (1 m)

Questions:
1. How to measure propagation losses?
2. By what optical cable is made up of?
3. What is step index fibre?

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