IT327
Lab 13: Fiber Optics

Objective:

To better understand optical cables and their reflective properties.

To become more familiar with an optical time domain reflectometer.

Equipment:

Optical TDR – Tektronix TFP2 Fiber Master
Motorola Fiber Optic Transmitter MFOL02T
Photodyne Model 22XL Optical Multi-meter
DC Power Supply (5V)
Fiber Optic Microscope V101 (fotec)
Step Index Single Mode
Fiber Model XYZR 100-80
Single Mode Optical Fiber
Multimode Optical fiber

Procedures:

Be sure to take plenty of pictures and include them in your write-up with an appropriate caption.

1. Look at the 2 different cables at the station through the fiber optic microscope. Note the reflective properties of each one by holding the other end up to the light and then covering it up. Draw (or include) a picture of a single mode and multimode fiber.
2. Using the optical time domain reflectometer, connect the fiber optic coil. Warning: do not look into the other end of the coil due to laser radiation. Take pictures of the results. Include the answers to the following questions in your write-up:
    a. How long is the coil?
    b. How is this similar to the TDR used for regular electrical signal cables?
    c. How is it different?
3. Turn on the light source and turn on the optical receiver. Align the 2 cables by adjusting the knobs until the receiver receives the maximum amount of light. Now record the measurements of the knobs.
    a. Record the horizontal, alignment, and angle values when the power is at a maximum. Also record the max power.
    b. Record the amount of power received as you move the 2 cables apart in the horizontal direction. Take at least 10 different readings and graph your results.
    c. Align them once again until you have maximum power. Now separate the 2 cables in the vertical direction. Take at least 10 different readings and graph your results.
    d. Align them once again until you have maximum power. Now change the angle between the two cables. Take at least 10 different readings and graph your results.
    e. Now analyze your graphs. How important is it to have good connectors using fiber optic cables? How does the angle affect the reflection between the 2 cables and internally?

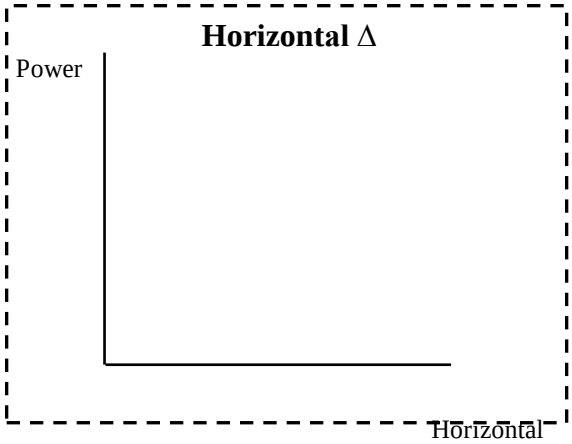
Conclusion: In addition to the follow questions, add your own conclusion as instructed in the syllabus:

What are some practical every day uses of fiber optics? (At least two)

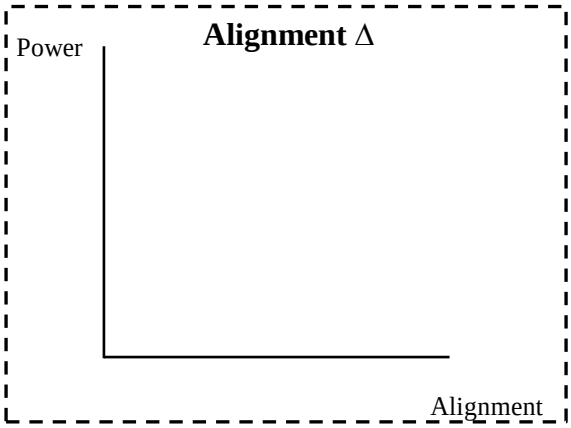
What are the advantages and disadvantages of using fiber optic cables? (At least two)

MAX Power: _____ Horizontal: _____ Alignment: _____ Angle: ___

	Horizontal Level	Power Level (dBm)
Max		
1		
2		
3		
4		
5		
6		
7		
8		
9		



	Alignment Level	Power Level (dBm)
Max		
1		
2		
3		
4		
5		
6		
7		
8		
9		



	Angle Level	Power Level (dBm)
Max		
1		
2		
3		
4		
5		
6		
7		
8		
9