

COMMUNICATIONS LAB. Experiment #1: Adaptation Experiment

OBJECTIVES

Getting familiar with Communication Laboratory equipment, oscilloscopes and basic operations.

INFORMATION

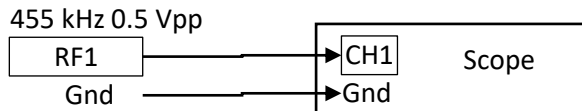
Read "*Oscilloscope Beginner's Guide*" which is also available on <https://web.ogu.edu.tr/eseke/>.

Important: Make connections while Experiment Set Power Switch is **OFF**.

EXPERIMENT

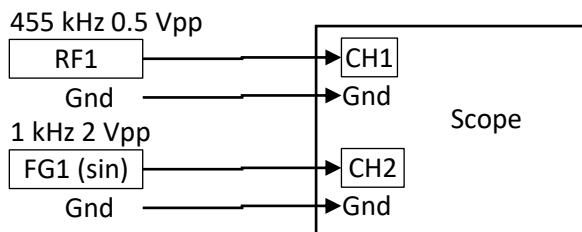
- a) Generate a 455kHz and 0.5Vpp sinusoidal signal by using "RF1" and observe this signal by "Channel 1" of the oscilloscope.

Hint: Push "Auto" button to scale the signal best-fit after making required connections.



- b) Generate a 1kHz and 2Vpp sinusoidal signal by using "FG1" and observe this signal by "Channel 2" of the oscilloscope while "Channel 1" is still connected to "RF1".

Hint: Use "Scale" knob on "Horizontal" part of the oscilloscope to scale the signal after making required connections.



- c) Observe both channels at the same time. Do you experience any difficulty while observing the signals at the same time? If any, why do you think this difficulty occurs? Draw the result observed on the screen to your report and note down your comments.

- d) Adjust trigger level of the signal which is available on "Channel 2".

Hint: 1. Push "Menu" button on the "Trigger" section of the oscilloscope.

2. Make "Source" selection as "CH2".

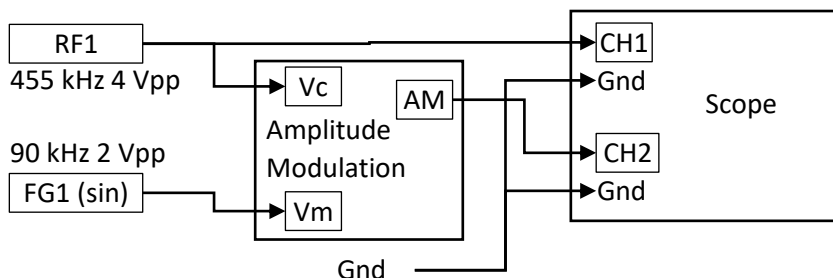
3. Use "Level" knob to adjust trigger level if the signal is still not stable.

- e) Observe both channels individually. First, connect only "Channel 2" to the training set and measure frequency and amplitude of the signal. Then connect only "Channel 1" to the training set, press "Auto" and measure frequency and amplitude of the signal.

- f) Change the amplitude of the signal on "RF1" as 4Vpp and change the frequency of the signal on "FG1" as 90kHz.

*Hint: Use "Scale" knob on "Vertical" or "Horizontal" part of the oscilloscope to scale the signal when measured value of the signal is seen as "****".*

- g) Make required connections on the training set to construct the AM modulator. AM modulator is an analog multiplier that multiplies V_c and V_m signal inputs.



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- h) Observe the signal available at “AM” output. Use “Channel 1” of the oscilloscope for this operation. Draw the result observed on the screen to your report.
Hint: Push “Auto” button and then use “Scale” knob on “Horizontal” section of the oscilloscope to observe a proper AM signal on the screen after making required connections.
- i) Observe the frequency spectrum of the output using the “FFT” function on the oscilloscope. Draw the result observed on the screen to your report and note down your comments.
- j) Change the frequency and the amplitude of the message signal while using the “FFT” to see the effects of the changes. Draw the result observed on the screen to your report for different results and note down your comments.
- k) Generate a 10kHz and 2Vpp sinusoidal signal by using “FG1” and observe this signal by “Channel 1” of the oscilloscope. Then observe the output frequency spectrum using the “FFT” function on the oscilloscope. Change the frequency and the amplitude of the signal while using the “FFT” to see the effects of the changes. Draw the result observed on the screen to your report and note down your comments.
- l) Generate a 10kHz and 2Vpp square wave signal by using “Square Wave” output of “FG1” and observe this signal by “Channel 1” of the oscilloscope. Then observe the output frequency spectrum using the “FFT” function on the oscilloscope. Change the frequency and the amplitude of the signal while using the “FFT” to see the effects of the changes. Draw the result observed on the screen to your report and note down your comments.

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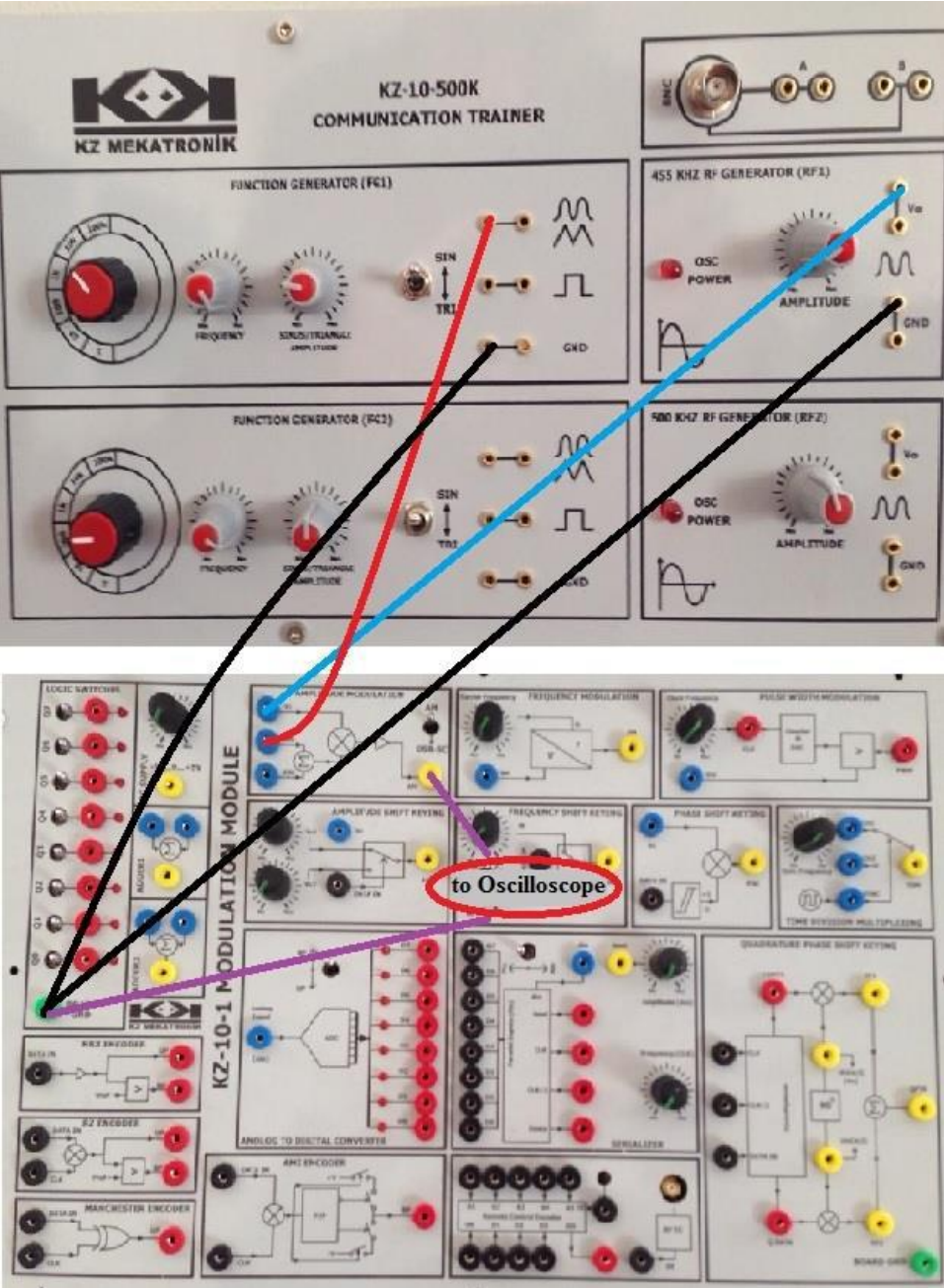


Figure 1 Required Connections for the AM Modulator