ASKwavefromGen -- Overview

Amplitude Shift Keying (ASK Modulation)

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OBJECTIVES:

At the end of performing this experiment, learners would be able to:
• Describe the concept of Modulation
• Obtain the Amplitude Shift Keying signal from given input
• Understand the working of LF398 IC (sample-and-hold circuit)

EQUIPMENT:

• IC LF398
• Signal generator
• Resistors – 47 kΩ
• +/- 15V DC Power Supply
• Digital Storage Oscilloscope & probes
• Connecting wires & Bread Board

THEORY:

• LF398 is a monolithic sample-and-hold circuit utilizing BI-FET technology for accurate fast acquisition of input signal.

• A sample and hold circuit is an analog device that samples (captures) the voltage of a continuously varying analog signal and holds (locks) its value at a constant level for a specified minimum period of time (hold time). They are typically used in analog-to-digital converters to eliminate variations in input signal that can corrupt the conversion process.

• Amplitude-shift keying (ASK) is the simplest form of digital modulation. ASK signal can be generated by product modulation that is, by multiplying the carrier with the rectangular waveform.

Reference reading:

B Kanmani, "Some applications of the combination: LM-741 and LF - 398", WASET CESSE 2009: International conference on Computer,
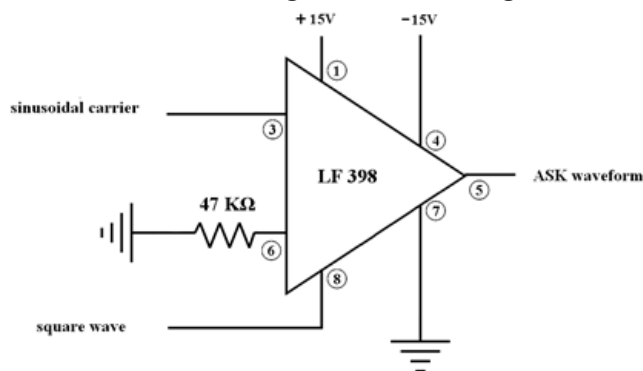
ASKwavefromGen -- Procedures

Step 1

Circuit setup:
Build the following circuit with given component values

Step 2

• Use a signal generator to generate Binary messge data (square wave signal) input and carrier wave (sinusoidal signal). The binary data input will be set to 1 kHz square wave and carrier signal will be 15-20 kHz.

• Turn on the supply of the circuit and enable signal generator that is feeding signal to the circuit.

• Connect the DSO probe – CH1 at binary data input (pin # 8 of LF398 IC), CH2 at Sinusoidal carrier input (pin # 3 of the LF398 IC) and CH3 at output (pin # 5 of the LF398 IC).

Step 3

• Perform Autoset on DSO and capture the output signal.

• Configure PEAK-to-PEAK measurement on the input and output signal.

• Observe and record the signal – input and output.

Step 4

Following figure shows the Binary message data and ASK waveform
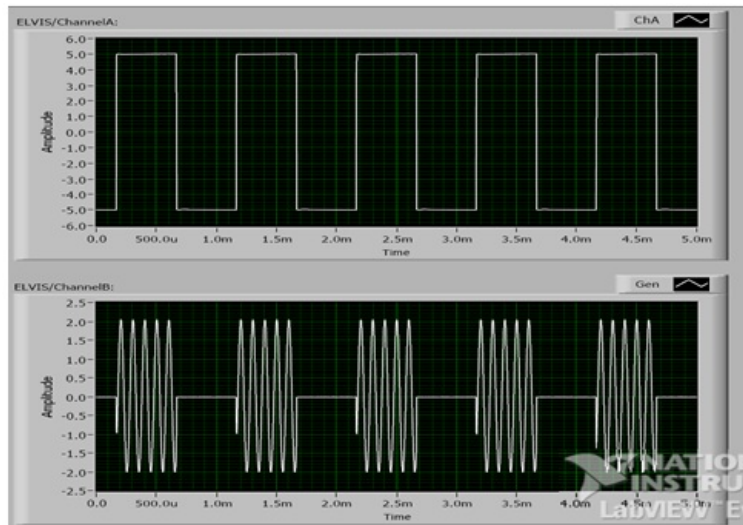
Step 5

Observation:
 The amplitude of the carrier is changed based on the input binary data being 1 or 0

Open-ended Question / Can you answer this?
 What will be the effect on output waveform if:
   1) Carrier input voltage is less than the binary data input voltage?
   2) Carrier input voltage is more than the binary data input voltage?