BFSKGeneration -- Overview

Frequency Shift Keying (FSK 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 Frequency shift keying (FSK) 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.

• In Frequency shift keying (FSK) , the waveforms S1(t) = A cos W1 t and S2(t) = A cos W2 t are used to convey binary digits 0 and 1 respectively.

Reference reading:

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

Electrical and Systems science and Engineering, Rome, 28th-30thApril, Italy, 2009.Volume 52, April 2009, ISSN: 2070-3724, pages 335-340.

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Mr.Shreenivas B for converting laboratory experiment to Tektronix courseware format

BFSKGeneration -- Procedures

Step 1

Circuit setup:

Build the following circuit with given component values

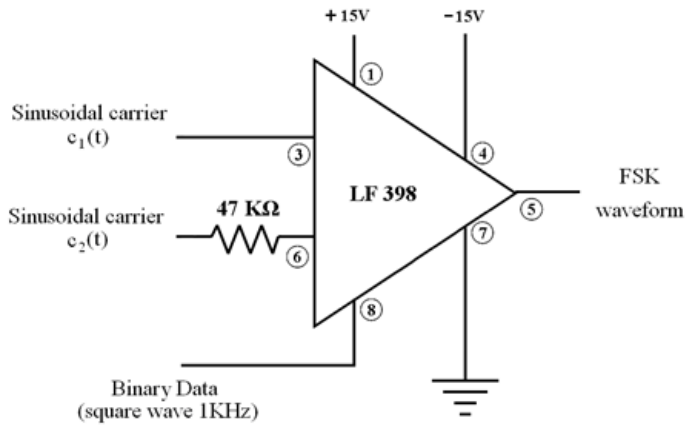

Figure 1: The circuit used to generate FSK output

Step 2

• Use a signal generator to generate Binary messge data (square wave signal) input and two carrier wave (sinusoidal signal) c1(t) and c2(t). The binary data input will be set to 1 kHz square wave and carrier signal will be TWO different sinusoidal carriers of high frequency 15-20 kHz.

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

Step 3

• Connect the DSO probe – CH1 at binary data input (pin # 8 of LF398 IC), CH2 at Sinusoidal carrier input c1(t) (pin # 3 of the LF398 IC), CH3 at Sinusoidal carrier input c2(t) (pin # 6 of the LF398 IC) and CH4 at output (pin # 5 of the LF398 IC).

• Perform Autoset on DSO and capture the output signal.

Step 4

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

• Observe and record the signal – input and output.

Step 5

The following figure has binary message signal with its corresponding BFSK output

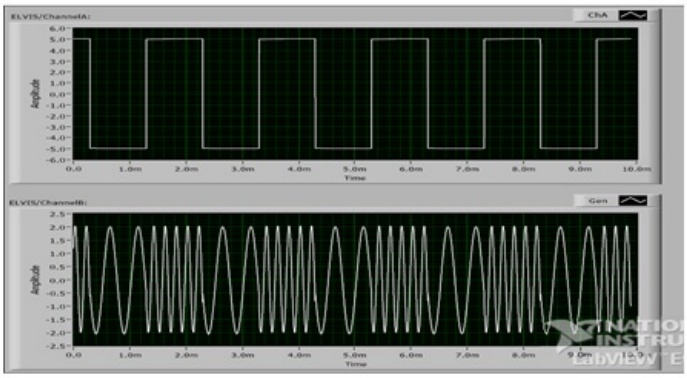

Figure 2: The binary message signal with its corresponding BFSK output

Step 6

Observation:

Symbols 1 and 0 are distinguished from each other by transmitting one of two sinusoidal waves that differ in frequency by a fixed amount

Open-ended Question / Can you answer this?

What will be the effect on output waveform if:
1) Two carrier signal have same frequency?
2) what are the voltage values for carrier and binary data signal ?