# SampleandHoldsignal -- Overview

## Sample and Hold Circuit

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## OBJECTIVES:

At the end of performing this experiment, learners would be able to:
• Understand the working of LF398 IC (sample-and-hold circuit)
• Describe the concept of sampling a time varying signal
• Obtain the sampled and hold otuput signal from given input

## EQUIPMENT:

• IC LF398
• Signal generator
• Capacitor – 0.01 µF
• +/- 15V DC Power Supply
• Digital Storage Oscilloscope & probes
• Connecting wires  & Bread Board

## THEORY:

• In sample and hold circuit, it converts continuously varying analog signal to discrete flat top samples and holds its value at a constant level for a specified minimum period of time.
• 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.

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.

# SampleandHoldsignal -- Procedures

## Step 1

### Circuit setup:
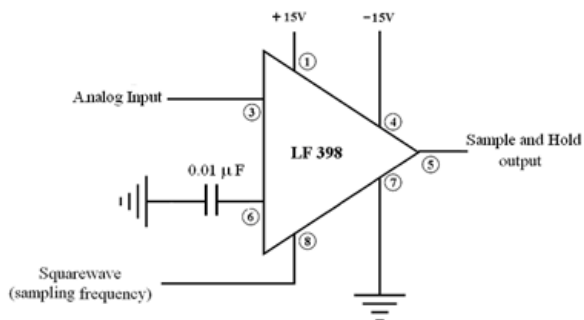Build the following circuit with given component values



**Figure 1:** The circuit used to generate Sample-and-hold output

## Step 2

• Use a signal generator to generate analog input and sampling (square wave signal). The analog input will be set to 1 kHz Sine wave(or triangular wave) and sampling signal will be 15-20 kHz Square-wave of 80% duty cycle.

• 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 analog input (pin # 3 of LF398 IC), CH2 at sampling signal input (pin # 8 of LF398 IC) and CH3 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.

• Record the measurement and Observe – input, output on DSO

# Step 5

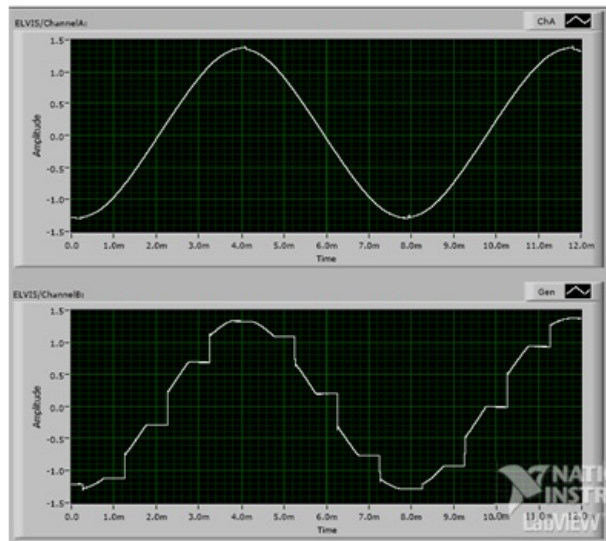The Figure shows the message signal with its corresponding Sample-and-hold output



**Figure 2:** The message signal with its corresponding Sample-and-hold output

# Step 6

## Open-ended Question / Can you answer this?
What will be the effect on output waveform if:
1) Duty cycle of the square pulse is increased to 50%?
2) Capacitor value is changed from 0.01 µF to 1 µF?