PulsePositionModula -- Overview

Pulse Position Modulation (PPM)

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OBJECTIVES:

At the end of performing this experiment, learners would be able to:
• Describe the concept of Pulse width modulation and Pulse position modulation
• Obtain the PPMsignal from given input
• Understand the working of LM555

EQUIPMENT:

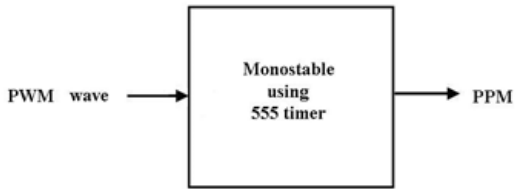
• LM 555
• Signal generator
• Resistors
• Capacitor – 0.01 µF
• +/- 15V DC Power Supply
• Digital Storage Oscilloscope & probes
• Connecting wires & Bread Board

THEORY:

• Digital modulation techniques require the analog signal to be sampled in accordance with the sampling theorem. This sampling can be accomplished using rectangular waves of very low duty cycle.

• The pulse position waveform is obtained when pulses of constant amplitude and duration change position within the sampling interval, in accordance with the magnitude of the analog signal at the instants of sampling

• The PPM waveform can be obtained PWM using a monostable multivibrator,



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.

Acknowledgement

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

PulsePositionModula -- Procedures

Step 1

Circuit setup:

Build the following circuit with given designed values

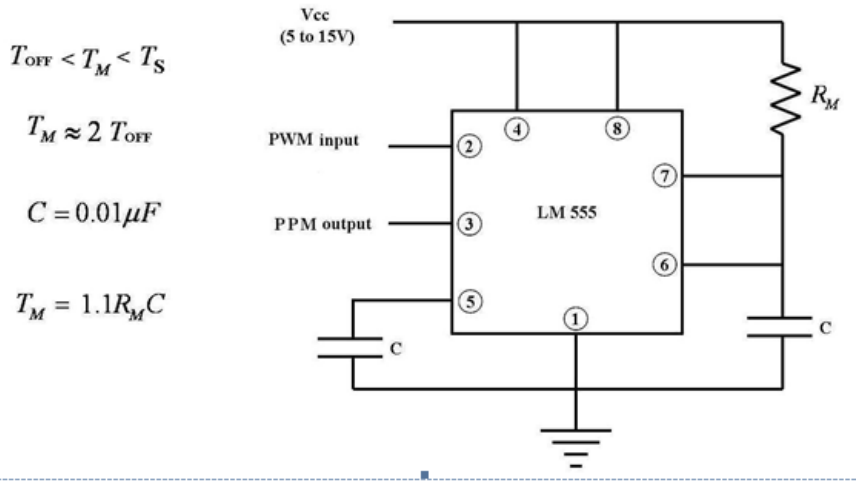


Figure 3: The PPM generation from PWM

Step 2

• Turn on the supply of the circuit

• Connect the DSO probe – CH1 at PWM input (pin # 2 of LM555 IC), CH2 at PPM output (pin # 3 of LM555 IC),

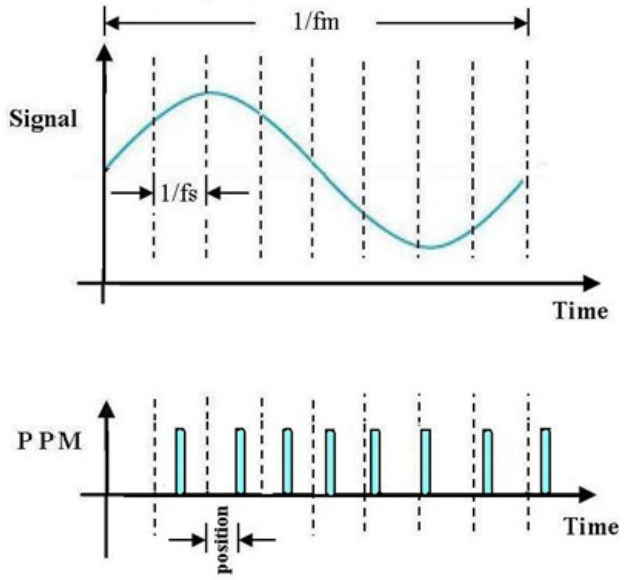
Step 3

• Perform Autoset on DSO and capture the output signal.

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

• Record the measurement and Observe – output on DSO

Step 4



Step 5

Observations:

1 Demonstrate PPM for a sinusoidal signal of frequency ……
2 Record the sinusoidal signal and the PPM waveforms on the same graph
3 Compare PAM and PPM in terms of noise immunity.
4 Compare PAM and PPM in terms of application to TDM.

Open-ended Question / Can you answer this?

What will be the effect on output waveform if:
1) Capacitor value is changed from 0.01 µF to 1 µF?
2) we change the fs value of PWM circuit?