

EXPERIMENT # 1

PULSE CODE MODULATION

INTRODUCTION

Pulse-code modulation (PCM) is a method used to digitally represent sampled analog signals. In a PCM stream, the amplitude of the analog signal is sampled regularly at uniform intervals, and each sample is quantized to the nearest value within a range of digital steps. PCM stream has two basic properties that determine its fidelity to the original analog signal: the sampling rate, which is the number of times per second that samples are taken, and the bit depth, which determines the number of possible digital values that can be used to represent each sample.

Laboratory Procedure

- Set up Figure 1 using the Sample and hold and Quantizer blocks. The outputs are to be fed via a MUX and the input compared with the output and the error in tracing the signal is observed using a very low frequency sine wave. The trigger signal is provided using a pulse generator.
- The effect of changes in amplitude should also be studied.
- Plot the output of the above circuit implementation as shown in the CRO's.

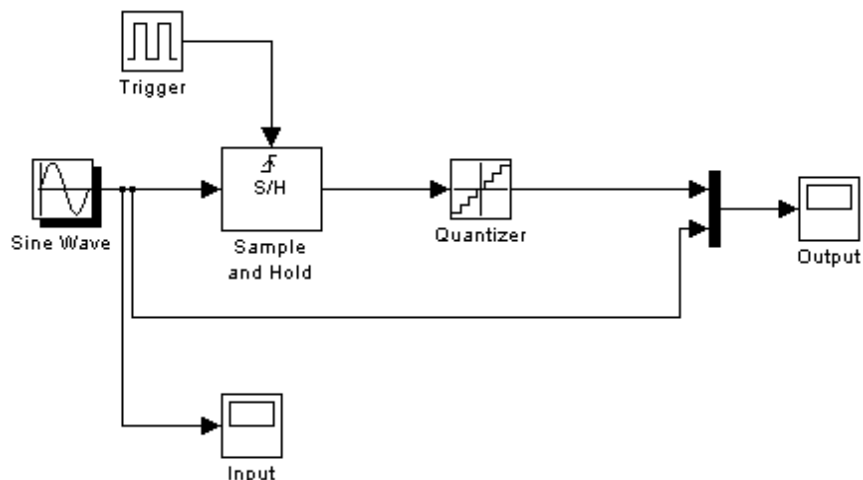


Figure1 PCM timing

- The whole PCM block implementation is achieved by adding Uniform Encoder in Fig.1.
- Later, set up the PCM transceiver in Fig.2. Observe the output of the PCM decoder. The output was also fed to a LPF to reconstruct the signal. The effect of the LPF to signal reconstruction is important since it changes the amplitude of the frequency domain signal.

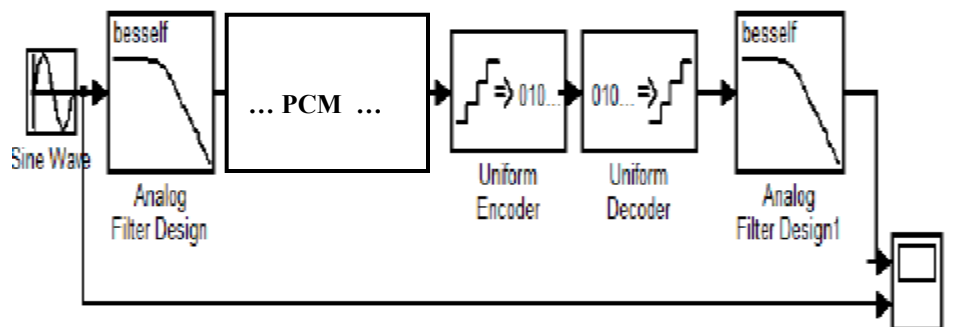


Figure 2. PCM Transceiver.

Original vs. Reconstructed Signal

Report:

- Explain the work of PCM system
- How the characteristics; sample rate and bit depth impact the system.