



VIT[®]

Vellore Institute of Technology
(Deemed to be University under section 3 of UGC Act, 1956)

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Lab Assesment - 6

Multiplexing and ADC

Aim:

*To convert an analog signal **selected by the user**, into a digital signal using multiplexing techniques and display the selected input and the output analog as well as the digital graphs.*

Abstract:

Multiplexing is the concept by which, an array of signals are given as an input and only one of them is selected by the user according to the needs. There are three types of multiplexing:

- 1. Space division multiplexing*
- 2. Time division multiplexing*
- 3. Frequency division multiplexing.*

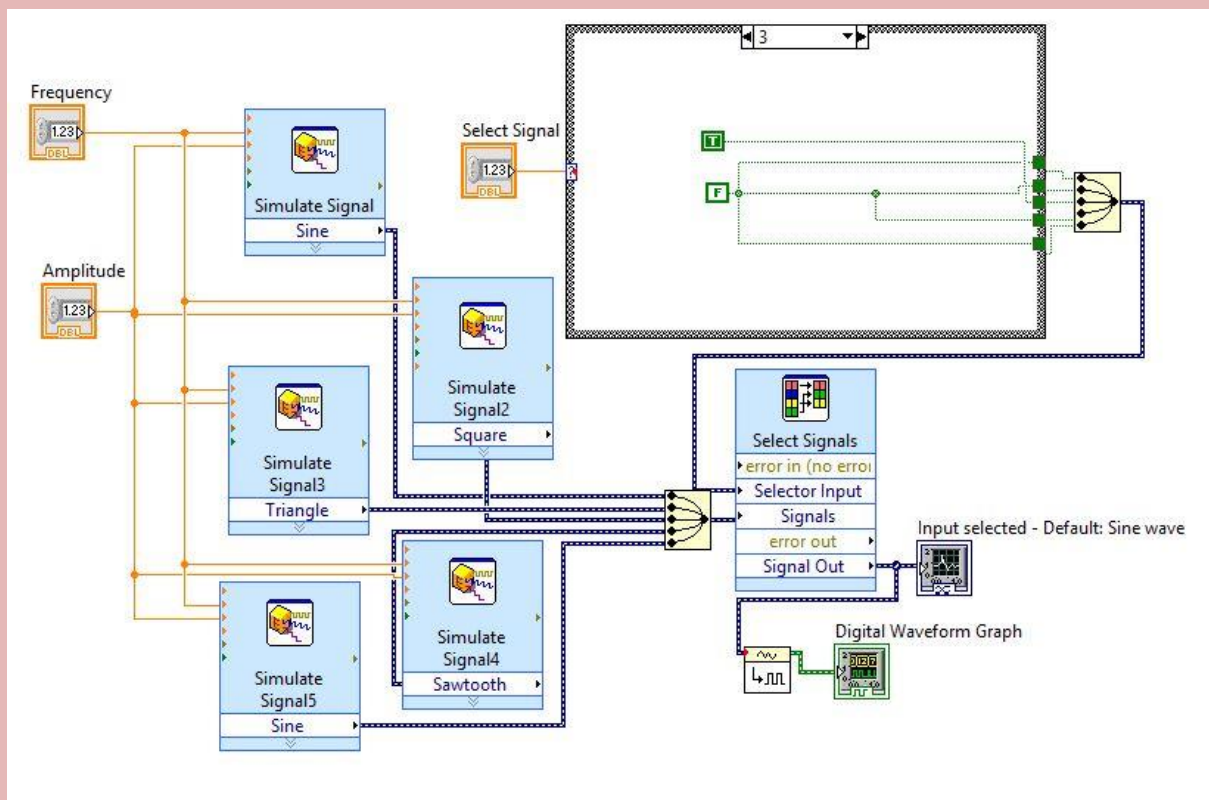
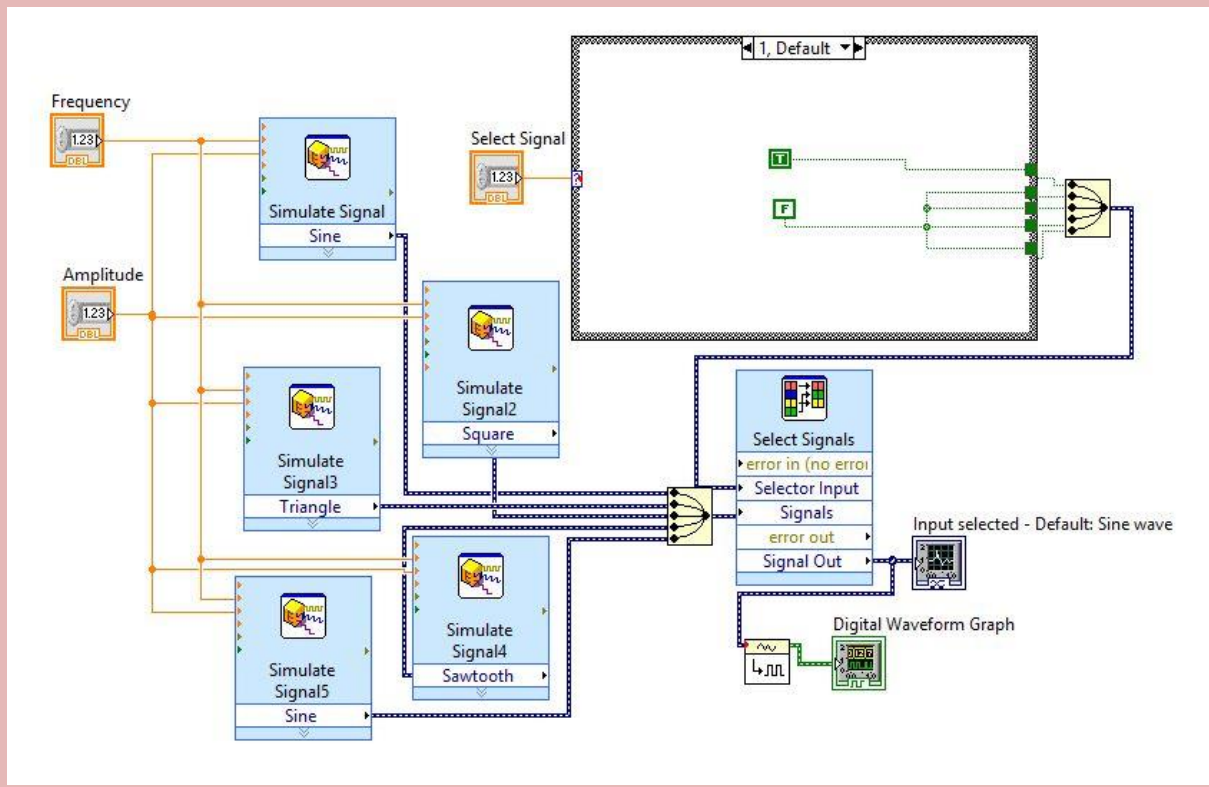
Frequency multiplexing is preferred the most due to its huge range of expandability and reusability. It can be done in LabVIEW in 2 ways.

- 1. Filtering using Band-pass filters: Five signals of different frequencies are transmitted and using the in-built band-pass filter in LabVIEW, the unnecessary signals are filtered out and the required signal by the user is passed through. This method can be greatly expanded.*
- 2. Using Select signals function*

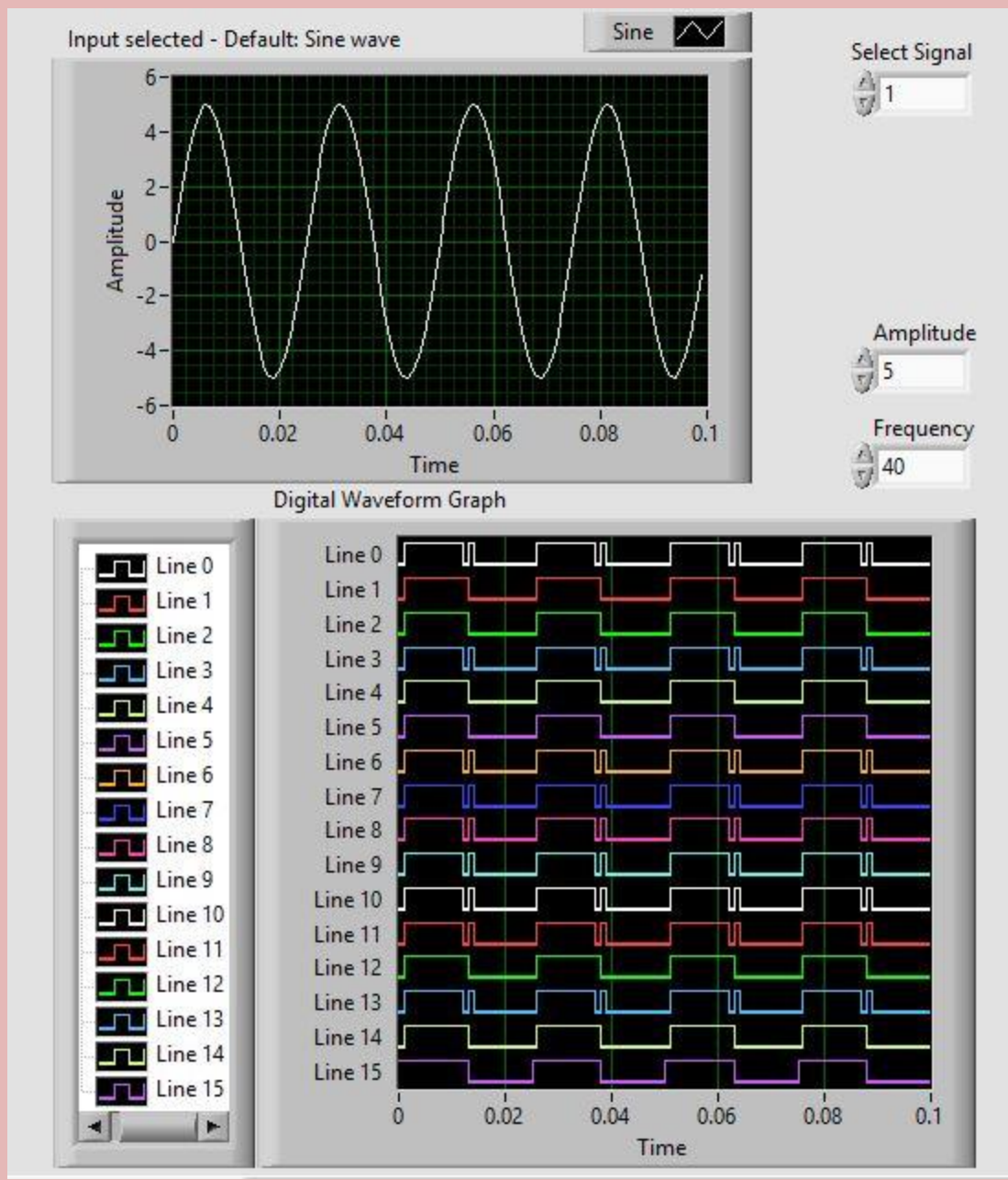
The second one is demonstrated in this document.

Digital signals are easier to condition, easier for processing and safer for transmission to reduce the data loss. Signals are being converted to digital using a simple ADC (Analog to Digital Converter) from LabVIEW.

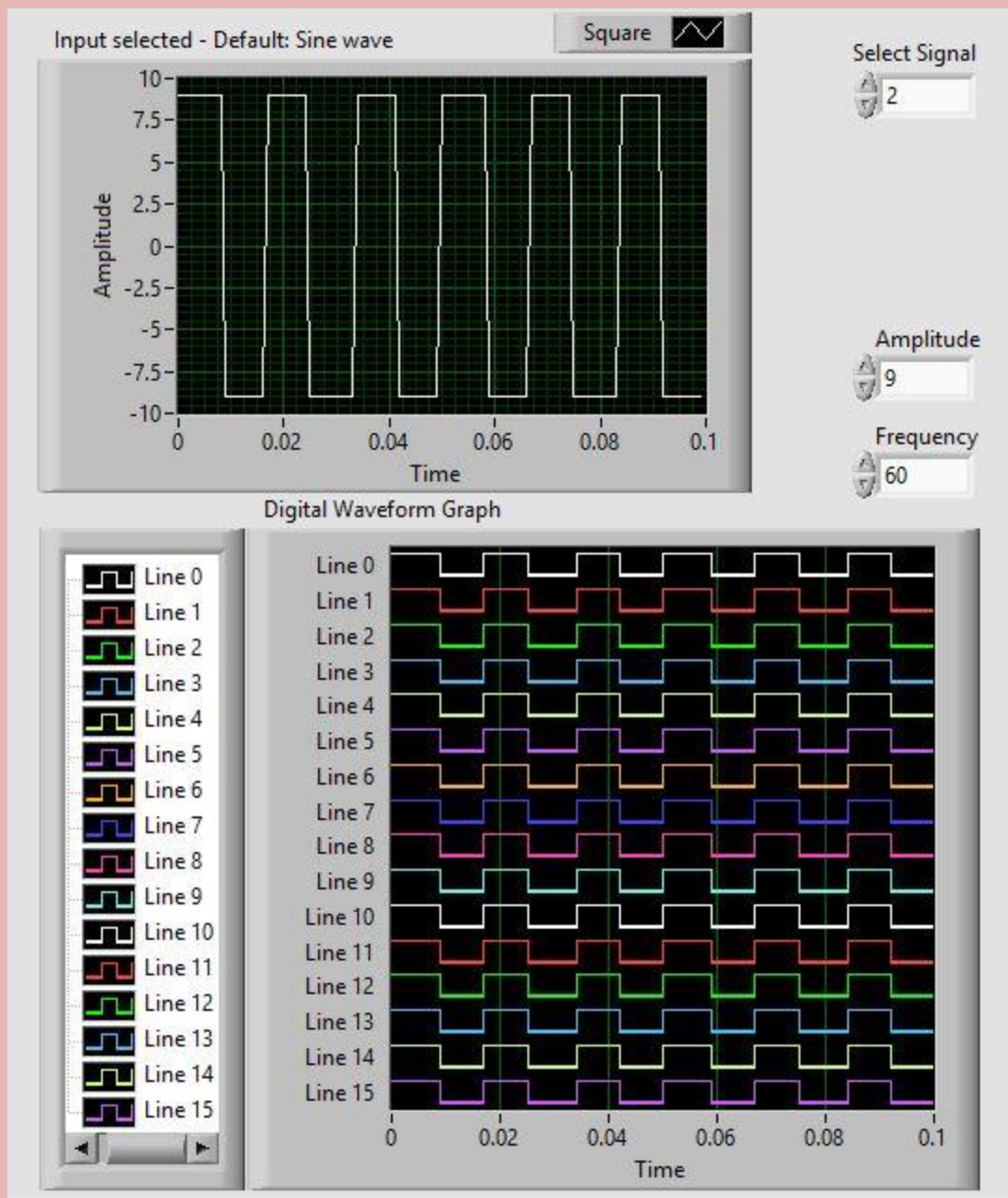
Circuit Diagram:



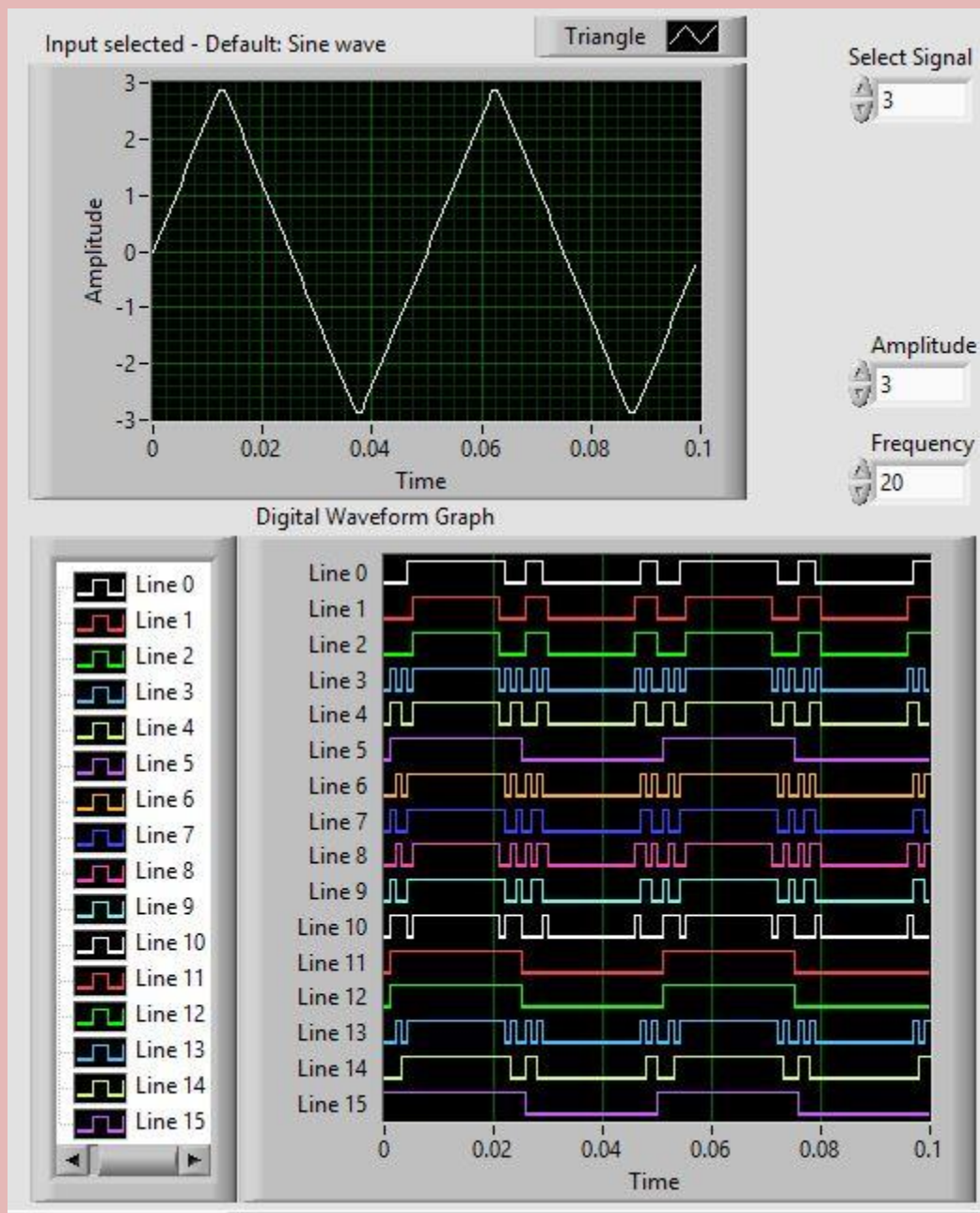
Outputs:



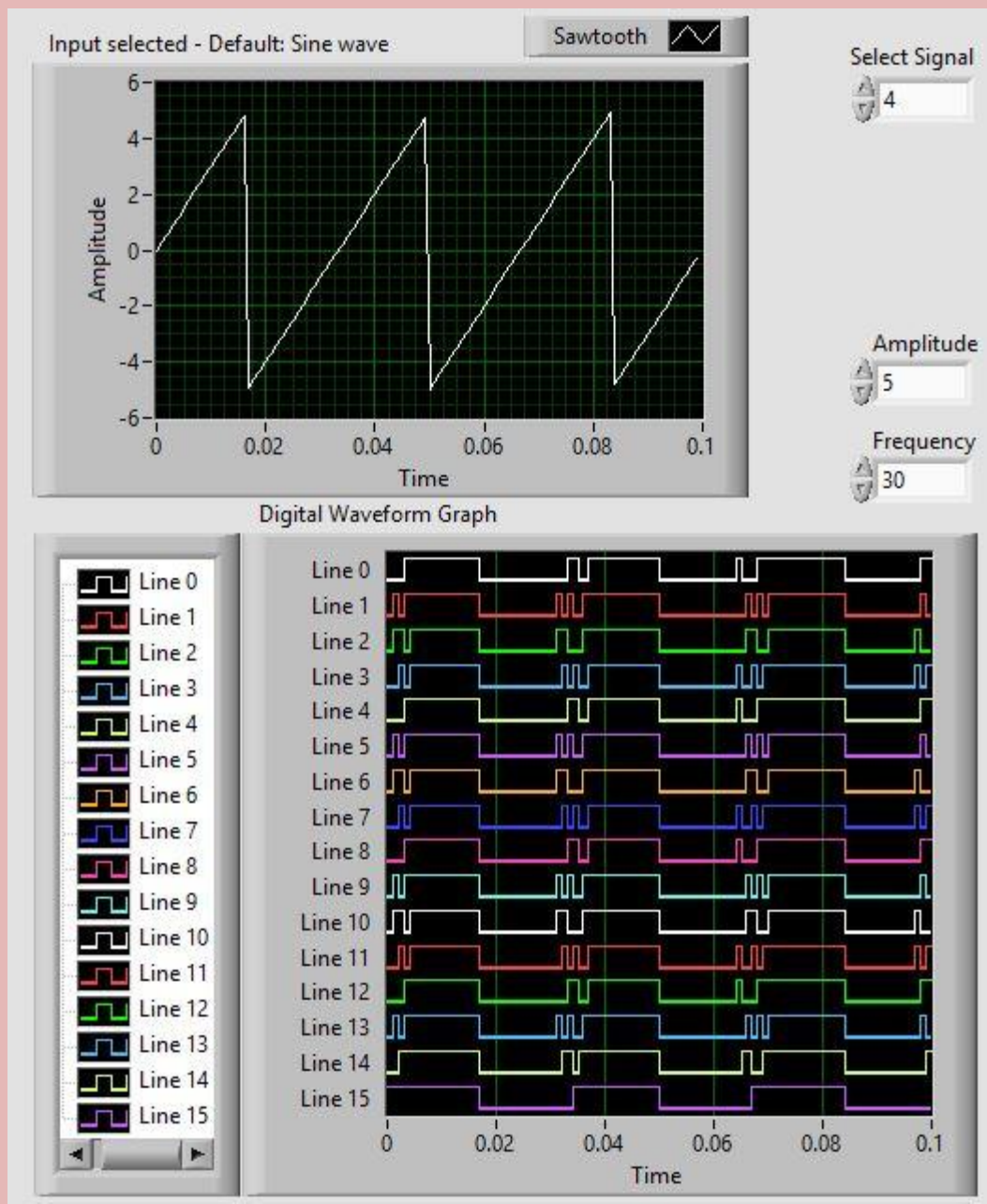
*Sine wave with a user adjustable frequency and amplitude. This is the **default case** selected when the user selects an option which does not have a signal assigned to it. Eg. Signal no. 7 when there are only 4 signals available. One signal should be used as a default condition in the switch case.*



Square wave.



Triangular wave.



Sawtooth wave.

All these waves are assigned to a switch case and the user can select the signal that is required. Also for additional expandability, the program also offers the user the choice to adjust the amplitude and the frequency of the waves.