How to start and proceed ?

1. Adjustment of step-size

First calibrate the Step-size by connecting 0-V DC to '+' terminal of Comparator and adjusting the "Level Changer Preset" located in the U-B converter (Transmitter section) till the Integrator's output (t_p17) is a triangle wave centered about 0-V line. Its peak-to-peak amplitude will be = 0.5 Volt (minimum) corresponding to integrator's switches position A = 0 & B = 0; this amplitude is known as the step-size of the integrator

Now onwards, the step-size can be increased by changing the switches positions, e.g., when A = 0 & B = 1, Step-size will be double (1.0 V), for A = 1, B = 0, step-size = 1.5 V and for A =1, B =1, it will be 2.0 V

2. Adjustment of Sampling rate is done by setting the clock frequency selector switches A & B, e.g., Setting A=1 B=0 gives sampling rate of 128 KHz, and so on..

Perform the experiment in the following order:-

Firstly generate a balanced DM signal, selecting message of say $1V_{p-p}$ and frequency = 1 KHz, after making connections according to "Schematic Diagram" of Delta Modulation Transmitter (as shown earlier) and by adjusting the proper values of sampling rate and step-size. Observe that the integrator's output (at tp17) is following the message wave-form.

To determine the conditions of slope-overloading, increase :-

(i) the message amplitude, till integrator's o/p ceases to follow the message wave-form

(ii) msg freq till integrator's o/p ceases to follow the message wave-form.

The slope-overloading caused by increasing the message amplitude, or msg frequency, can be eliminated by increasing the step-size, or increasing the sampling frequency. Verify it experimentally & report your observations in a form shown in the next slide ==➔ ==➔

Refer to the experiment sheet and/or Work-book of ST-2105

Record the observations in the following way:-

For balanced Delta modulation:-

1. Message signal amplitude = …… Volt p-p
2. Message signal frequency = …… KHz
3. Sampling frequency = …… KHz
4. Step size = …… Volt

Observations for slope-overloading and its elimination:-

Maximum amplitude of msg (at f = …. KHz) at which Slope-overloading occurred = …. Vp-p

Above slope overloading was eliminated by increasing the step size to ….. V

Maximum frequency of msg (at A = …. Vp-p) at which Slope-overloading occurred = …. KHz

Above slope overloading was eliminated by increasing the sampling frequency to …..KHz

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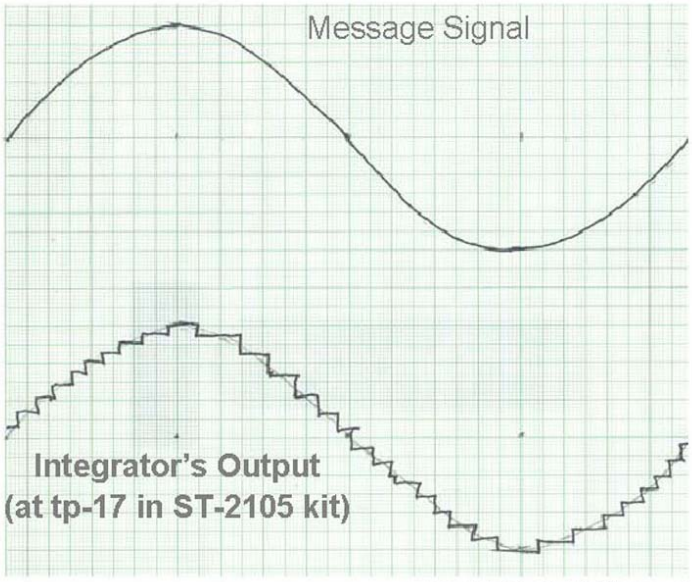
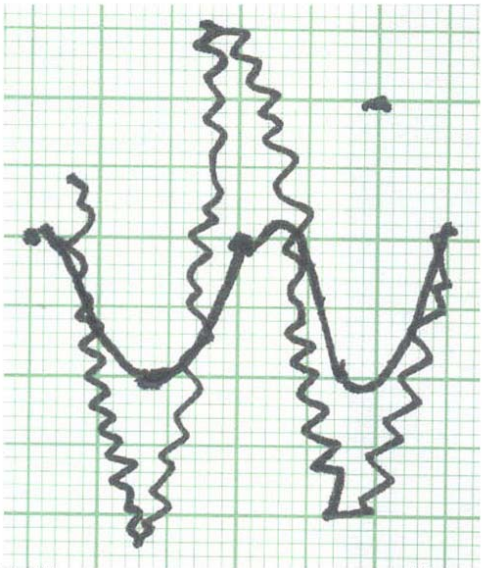
The Delta Modulation Signal and Slope over loading

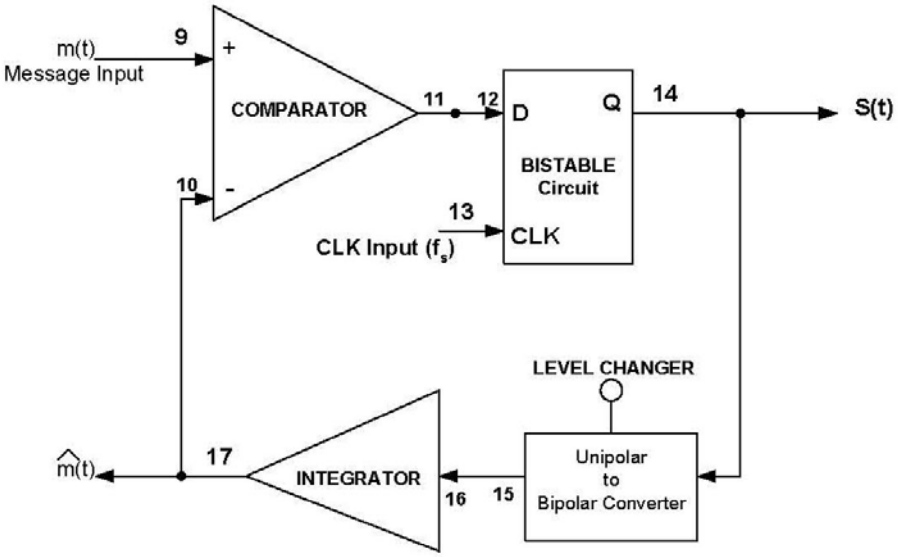
Balanced / Proper Delta Modulation



Occurrence of Slope-overloading



To generate the DM signal make the connections in the transmitter section of the kit according to the following schematic diagram:-



Schematic Diagram of DM