

## DCL - 07 DELTA / SIGMA DELTA / ADAPTIVE DELTA MODULATION / DEMODULATION KIT



This kit facilitates students to study concepts of Delta Modulation techniques. It facilitates students to examine Delta, Sigma Delta & Adaptive Delta & CVSD Modulation and Demodulation.

### FEATURES:

- Linear Delta Modulation and Demodulation.
- Sigma Delta Modulation and Demodulation.
- Adaptive Delta Modulation and Demodulation
- CVSD Modulation & Demodulation.
- $\mu$ -law Compauder.
- Selectable five different sampling frequencies.
- Four different on-board Sine Wave Generator, and variable D. C. Signal.
- Facility for interfacing external signals.
- 2<sup>nd</sup> & 4<sup>th</sup> order Low Pass Butterworth Filters.
- Various Test and Monitoring points provided on-board.
- Switch Faults.

### TECHNICAL SPECIFICATIONS:

#### ON-BOARD SIGNALS:

##### SINE WAVE:

**Frequency :** 250Hz, 500Hz, 1 KHz, & 2KHz

**Amplitude :** 0 - 4 Vpp

**D.C. :** 0 - 5 V.

**Sampling:** Clock : 8KHz, 16KHz, 32KHz, 64KHz and 128KHz.

**Duty cycle :** 50%.

**Modulation Techniques:** Delta Modulation, Sigma Delta Modulation, Adaptive Delta Modulation, CVSD Modulation.

**Compauder:**  $\mu$ -law Compauder and Expander.

**Voice Communication:** Voice Link for above Modulation Techniques using External Audio Input & Output kit(Optional).

**Low Pass Butterworth Filter:** 2<sup>nd</sup> Order and 4<sup>th</sup> Order Low Pass Butterworth filter with cut-off frequency of 3.4KHz.

**Switch Faults:** 8 Switch Faults are provided on board to study different effects on circuit.

**Interconnection:** 2 mm Banana Socket, Two 4-Pin Connectors for Audio Input / Output Kit.

**Test Points:** 34 Nos. Test points are provided to observe various intermediate signals.

**Power Supply:** GND, +5V, +12V, -12V.

### LIST OF EXPERIMENTS:

- Delta Modulation & Demodulation.
- Slope Overload and Increased integrator gain.
- Sigma Delta Modulation and Demodulation.
- Adaptive Delta Modulation and CVSD.
- Compression & Expansion.
- Effect of Switch Faults.
- Voice Communication (Optional).

### ACCESSORIES:

Red Short Links	: 12 Nos.
Crocodile Links	: 02 Nos.
Screw Driver	: 01 No.
Experimental Manual	: 01 No.
Circuit Description Manual	: 01 No.
Power Supply	: 01 No.

### OPTIONAL:

**A/I/O** Audio Input/Output kit

**e-Manual** Interactive Multimedia Software & Manual

