

Scientech TechBooks are compact and user friendly learning platforms to provide a modern, portable, comprehensive and practical way to learn Technology. Each TechBook is provided with detailed Multimedia learning material which covers basic theory, step by step procedure to conduct the experiment and other useful information.

**Scientech TechBook 2803** provides an extensive hands on learning on Delta, Adaptive Delta, Sigma Delta Modulator & Demodulator.

### Features

- Modulator and Demodulator on same board
- On-board DDS Signal Generator for standard and Arbitrary signals
- Selectable Sampling Frequencies
- On board Transmission effect
- Selectable step size for Integrator
- Detailed study of granular noise and slope overloading
- On board 2nd order Butterworth Low Pass filter
- SMD LED Indicators
- Can be issued just like a book for hands-on learning

### Scope of Learning (Experimentation)

#### Delta Modulator & Demodulator

##### Study and analysis of:

- Delta Modulation and Demodulation.
- Sample & Hold output by varying the Sampling as well as Signal frequency.
- Integrator output at the Modulator by varying the Sampling frequency.
- Improved Integrator output by varying the gain control frequency.
- Slope Overload distortion problem.
- Granular Noise problem.
- Single bit Delta modulated PCM output.
- Integrator output at the Demodulator.
- Analyze the final Delta demodulated output with Second order Low Pass Butterworth filter .

#### Adaptive Delta Modulator & Demodulator

- Adaptive Delta Modulation.
- Single bit PCM output by varying the Sampling frequency.
- Variable step register at the Modulator side.
- Accumulator and Add/Subtract at the Modulator side.
- Accumulator and Add/Subtract at the Demodulator side.

- Overcoming of Slope Overload distortion occurred in Delta Modulation by the generation of variable step size.
- Analyze the final Adaptive Delta demodulated output with Second order Low Pass Butterworth filter.

## Sigma Delta First Order

- Sigma Delta Modulation of the First order.
- Sigma output after the summation of two signals.
- Integrator output by varying the Sampling frequency.
- Single bit PCM output at the Sigma Delta Modulator.
- Sigma Delta Demodulation of First order.
- Decimator filter output at the Demodulator by varying the position of the clock enable switch.
- Analyze the final Sigma Delta Demodulation output with Second order Low Pass Butterworth filter at the given test point.

## Sigma Delta Second Order

- Sigma Delta Modulation of Second order.
- First order Sigma output .
- Second order Sigma output.
- Integrator output by varying the Sampling frequency.
- Single bit PCM output at the Sigma Delta Modulator.
- Sigma Delta Demodulation of Second order.
- Decimator filter output at the Demodulator by varying the position of the clock enable switch.
- Analyze the final Sigma Delta Demodulation of Second order output with Second order Low Pass Butterworth filter.

## Transmission effects

- Attenuator effect.
- Filter effect.
- Noise effect by varying the noise level.

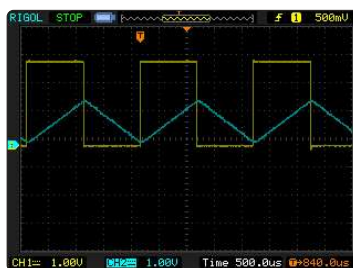
## Technical Specifications

### Modulation & Demodulation

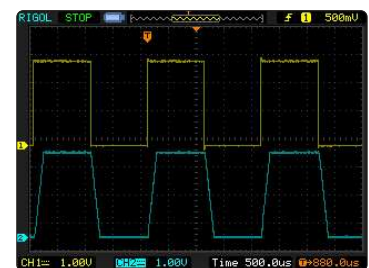
<b>Techniques</b>	:	Delta
	:	Adaptive Delta
	:	Sigma Delta First order
	:	Sigma Delta Second order
<b>Internal Signal Generator</b>	:	Direct Digital Synthesizer
Types of Signal	:	Sine, Square, Triangle, Arbitrary signals
Frequency	:	500Hz, 1KHz, 2KHz, 3KHz
<b>External Signal</b>	:	
Types of Signal	:	Sine, Square, Triangle, Arbitrary signals
Maximum Input Voltage:	:	3Vpp (Max.) +1.5V DC offset
Frequency	:	500Hz to 3.5KHz
<b>SMD LED Indicators</b>	:	48 nos for
		DDS signal selection
		DDS signal frequency selection
		Sampling selection
		Technique selection
		Interconnect path
<b>Transmission Effect</b>	:	Attenuation (7dB & 10dB)
		Noise
		Filter
<b>Crystal Frequency</b>	:	8MHz
<b>Sampling Frequencies</b>	:	16KHz, 32KHz, 64KHz, 128KHz, 256KHz
<b>Integrator step</b>	:	Normal & 3 times
<b>Selection Mode</b>	:	Push switches
<b>Number of Test Points</b>	:	46 nos (Gold plated).
<b>Low Pass Filter</b>	:	Cut-off frequency-5KHz
<b>Digital Filter</b>	:	Decimation filter (16:1)
<b>Product Tutorial</b>	:	Online on <a href="http://www.SciencetechLearning.com">www.SciencetechLearning.com</a>
<b>Dimensions (mm)</b>	:	W 326 x D 252 x H 52
<b>Power Supply</b>	:	110V - 260V AC, 50/60Hz
<b>Weight</b>	:	1.5Kg (Approximately)
<b>Operating Conditions</b>	:	0-40°C, 85% RH
<b>Included accessories</b>	:	2mm Patch cord - 2nos



Granular noise effect



Slope overload effect



Variable step size