PAM, PPM, PWM and Line Coding Techniques

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 2801 provides an extensive hands on learning on PAM, PPM, PWM and Line Coding Techniques.

Features

▸ **Modulator and Demodulator on same board**

▸ **Different type of sampling, Natural, Flat top, sampled and hold**

▸ **On-board DDS Signal Generator for standard and arbitrary signals**

▸ **Selectable sampling frequencies for PAM**

▸ **Selectable Ramp frequencies for PWM and PPM**

▸ **On board 2nd order Butterworth low pass filter**

▸ **SMD LED Indicators**

▸ **Can be issued just like a book for hands-on learnings**

Scope of Learning (Experimentation)
PAM Modulator & Demodulator

➢ Study and analysis of Pulse Amplitude Modulation.

➢ Study and analysis of Nyquist sampling rate.

➢ Study and analysis of Natural sampling with different types of message signals at different frequencies.

➢ Study and analysis of Flat top sampling with different types of message signals at different frequencies.

➢ Study and analysis of Sample & Hold output with different types of message signals at different frequencies.

➢ Study and analysis of under sampling by varying the message frequency and sampling rate.

➢ Study and analysis of Second order Low Pass Butterworth filter.

➢ Study and analysis of Pulse Amplitude Demodulation of Sample & Hold output with Second Order Low Pass Butterworth filter.

➢ Analyze all these Natural sampling, Flat top sampling and Sample & Hold output simultaneously and observe the difference.

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Line Coding Techniques

➢ Study and analysis of Different Line Coding techniques.

➢ Study and analysis of different 8-Bit, 16-Bit and 32-Bit Pattern Generator by changing Pattern selection.

➢ Study and analysis of NRZ Unipolar coding.

➢ Study and analysis of NRZ Polar coding.

➢ Study and analysis of RZ Bipolar coding.

➢ Study and analysis of RZ Unipolar coding.

➢ Study and analysis of Manchester coding.

➢ Analyze all types of Line coding outputs simultaneously and observe differences.

## PWM Modulator & De-modulator

➢ Study and analysis of Pulse Width Modulation.

➢ Study and analysis of single bit PWM output by varying the Ramp frequency and signal type.

➢ Study and analysis of Pulse Width Demodulation.

➢ Study and analysis of PWM demodulated output by varying the Ramp frequency.

➢ Study and analysis of Sample & Hold output of demodulated PWM signal.

➢ Study and analysis of Second order Low Pass Butterworth filter.

➢ Analyze the final PWM demodulated output with Second order Low Pass Butterworth filter.

PPM Modulator & De-modulator

➢ Study and analysis of Pulse Position Modulation.

➢ Study and analysis of single bit PPM output by varying the Ramp frequency and signal type.

➢ Study and analysis of Pulse Position Demodulation.

➢ Study and analysis of Sample & Hold output of demodulated PPM signal.

➢ Study and analysis of Second order Low Pass Butterworth filter.

➢ Analyze the final PPM demodulated output with Second order Low Pass Butterworth filter.

Technical Specifications

Modulation & Demodulation Techniques	:	PAM
		PWM
		PPM
		Line Coding Techniques
Internal Signal Generator	:	Direct Digital Synthesizer
Types of Signal	:	Sine, Square, Triangle, Arbitrary signals.
Frequency	:	500Hz, 1KHz, 2KHz, 3KHz
External Signal	:	
Types of Signal	:	Sine, Square, Triangle, Arbitrary signals
Maximum Input Voltage	:	3Vpp (Max.) +1.5V DC offset
Frequency	:	500Hz to 3.5KHz
Sampling/Ramp Frequencies	:	1.25KHz, 2.50KHz, 5KHz, 9.80KHz, 19.53KHz, 39.06KHz, 78.13KHz
SMD LED Indicators	:	46 nos for
		DDS signal selection
		DDS signal frequency selection
		Sampling selection
		Technique Selection
		Interconnect path
Crystal Frequency	:	20MHz
Selection Mode	:	Push switches
Random Data (For line Coding)	:	8 Bit/ 16 Bit/ 32 Bit
Test Points	:	29 nos. (Gold Plated)
Low Pass Filter	:	Cut-off frequency-5KHz
Learning Material	:	CD (Theory, procedure, reference results, etc), Online (optional)
Dimensions (mm)	:	W 326 x D 252 x H 52
Power Supply	:	110V - 260V AC, 50/60Hz
Weight	:	1.5Kg (Approximately)
Operating Condition	:	0-40°C, 85% RH
Included Contents	:	2mm Patch cord - 2nos
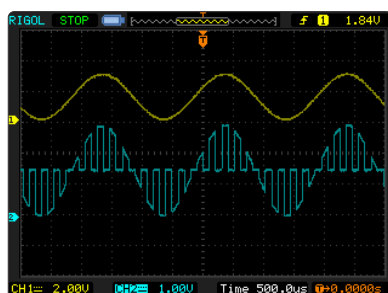
Natural Sampled Output
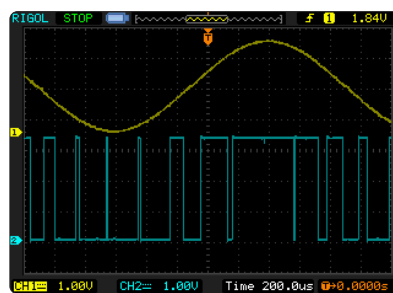
PWM Output
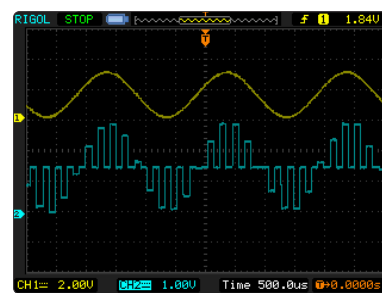
Flat Top Sampled Output

Subject to change

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