

# Digital Communication Trainer

## ETEK DCS-6000

### Curriculum Objectives

- To understand the basic theory of digital communication system.
- Design and implementation ability training of digital modulator and demodulator.
- To understand the applications of digital modulator and demodulator.

### Curriculum Outline

- Design and implementation of line code encoder and decoder.
- Design and implementation of PWM and PCM modulators and demodulators.
- Design and implementation of DM and ADM modulators and demodulators.
- Design and implementation of ASK, FSK and PSK modulators and demodulators.



Best communication and electronics tools



# Specifications of Digital Communication Trainer (ETEK DCS-6000)

## Module One: ETEK DCS-6000-01

### Chapter 1: Line Code Encoder

Experiment 1: Unipolar and Bipolar NRZ Signal Encoder

Type of Signal: TTL, Data Rate: 1 kbps ~ 4 kbps.

Experiment 2: Unipolar and Bipolar RZ Signal Encoder

Type of Signal: TTL, Data Rate: 1 kbps ~ 2.5 kbps, CLK: 2 kHz ~ 5 kHz.

Experiment 3: AMI Signal Encoder

Type of Signal: TTL, Data Rate: 50 bps ~ 250 bps, CLK: 100 Hz ~ 500 Hz.

Experiment 4: Manchester Signal Encoder

Type of Signal: TTL, Data Rate: 100 bps ~ 400 bps, CLK: 200 Hz ~ 800 Hz.

### Chapter 2: Line Code Decoder

Experiment 1: Unipolar and Bipolar NRZ Signal Decoder

Type of Signal: TTL, Data Rate: 1 kbps ~ 4 kbps.

Experiment 2: Unipolar and Bipolar RZ Signal Decoder

Type of Signal: TTL, Data Rate: 1 kbps ~ 2.5 kbps, CLK: 2 kHz ~ 5 kHz.

Experiment 3: AMI Signal Decoder

Type of Signal: TTL, Data Rate: 50 bps ~ 250 bps, CLK: 100 Hz ~ 500 Hz.

Experiment 4: Manchester Signal Decoder

Type of Signal: TTL, Data Rate: 100 bps ~ 400 bps, CLK: 200 Hz ~ 800 Hz.

## Module Two: ETEK DCS-6000-02

### Chapter 3: PWM Modulator

Experiment 1: uA741 Pulse Width Modulator

Carrier Signal: 1.5 kHz ~ 2 kHz, Audio Signal: 500 Hz.

Experiment 2: LM555 Pulse Width Modulator

Carrier Signal: 5 kHz ~ 10 kHz, Audio Signal: 1 kHz.

### Chapter 4: PWM Demodulator

Experiment 1: Pulse Width Demodulator

Carrier Signal: 5 kHz ~ 6 kHz, Audio Signal: 500 Hz ~ 700 Hz.

## Module Three: ETEK DCS-6000-03

### Chapter 5 PCM Modulator

Experiment 1: PCM Modulator

Built-in Sample Frequency: 8 kHz, Built-in Operation Frequency: 2048 kHz,  
Audio Signal: 100 Hz ~ 2 kHz.

### Chapter 6: PCM Demodulator

Experiment 1: PCM Demodulator

Built-in Sample Frequency: 8 kHz, Built-in Operation Frequency: 2048 kHz,  
Audio Signal: 100 Hz ~ 2 kHz.

## Module Four: ETEK DCS-6000-04

### Chapter 7: Delta Modulator

Experiment 1: Delta Modulator

Type of Sample Signal: TTL CLK.

Sample Frequency: 32 kHz ~ 256 kHz, Audio Signal: 1 kHz ~ 3 kHz.

### Chapter 8: Delta Demodulator

Experiment 1: Delta Demodulator

Type of Sample Signal: TTL CLK.

Sample Frequency: 32 kHz ~ 256 kHz, Audio Signal: 1 kHz ~ 3 kHz.

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## Module Five: ETEK DCS-6000-05

### Chapter 9: Adaptive Delta Modulator

Experiment 1: Adaptive Delta Modulator

Type of Sample Signal: TTL CLK.

Sample Frequency: 32 kHz ~ 128 kHz, Audio Signal: 500 Hz ~ 1 kHz.

### Chapter 10: Adaptive Delta Demodulator

Experiment 1: Adaptive Delta Demodulator

Type of Sample Signal: TTL CLK.

Sample Frequency: 64 kHz ~ 256 kHz, Audio Signal: 500 Hz ~ 1 kHz.

## Module Six: ETEK DCS-6000-06

### Chapter 11: ASK Modulator

Experiment 1: XR 2206 ASK Modulator

Carrier Signal: 20 kHz, Data Rate: 1 kbps.

Experiment 2: MC 1496 ASK Modulator

Carrier Signal: 20 kHz ~ 100 kHz, Data Rate: 2 kbps.

### Chapter 12: ASK Demodulator

Experiment 1: Asynchronous ASK Demodulator (I)

(Using XR2206 as the modulated ASK signal)

Carrier Signal: 20 kHz, Data Rate: 200 bps ~ 1 kbps.

Experiment 2: Asynchronous ASK Demodulator (II)

(Using MC1496 as the modulated ASK signal)

Carrier Signal: 20 kHz, Data Rate: 200 bps ~ 1 kbps.

Experiment 3: Synchronous ASK Demodulator

Carrier Signal: 100 kHz, Data Rate: 200 bps ~ 2 kbps.

## Module Seven: ETEK DCS-6000-07

### Chapter 13: FSK Modulator

Experiment 1: XR2206 FSK Modulator

Data Rate: 200 bps ~ 400 bps.

Experiment 2: SN74124 FSK Modulator

Data Rate: 200 bps ~ 400 bps.

### Chapter 14: FSK Demodulator

Experiment 1: FSK Demodulator (I)

(Using XR2206 as the modulated FSK signal) Data Rate: 200 bps ~ 400 bps.

Experiment 2: FSK Demodulator (II)

(Using SN74124 as the modulated FSK signal) Data Rate: 200 bps ~ 400 bps.

## Module Eight: ETEK DCS-6000-08

### Chapter 15: PSK (BPSK) Modulator

Experiment 1: PSK (BPSK) Modulator

Carrier Signal: 100 kHz, Data Rate: 200 bps.

### Chapter 16 PSK (BPSK) Demodulator

Experiment 1: PSK (BPSK) Demodulator

Carrier Signal: 100 kHz, Data Rate: 200 bps.