

## • Communication

# PC BASED DIGITAL COMMUNICATION TRAINER

New  
ED-1440



## > FEATURE

- The PC Based Digital Communication Trainer ED-1440 is a complete training system of total 16 experimental modules for identifying digital communication theories and principles. The learning objective is to acquire general theories of digital pulse modulation and demodulation and form a foundation applicable to real communication Systems.
- Basically, ED-1440 is designed for use by connecting to DS-1410 Docking Station. PC connection through the Docking Station enables contact control on MMI(HMI) based software. It is also

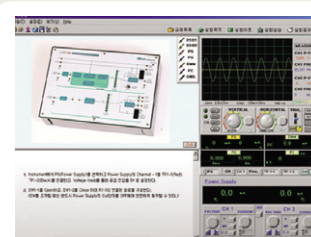
used together with CBIS-1400 for real-time measurements on the computer screen.

- The Electronic Manual operable on PC comes with ED-1440 and e-learning is optimized by remote control of student's operating program and evaluation of student's online report in real time.
- Through DS-1410, it provides Variable Power Supply(VPS), Function Generator(FG), Analog Output, Digital Output needed for experiments.

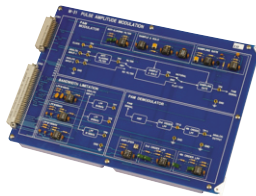
## > CONFIGURATION

- **ED-1440 : PC Based Digital Communication Trainer**
  - » Number of Modules : 16ea
  - » Size of modules(each) : 290(W) x 210(H) x 26(D)mm
  - » Module Storage Box(2ea) : 596(W) x 318(H) x 255(D)mm
- **Required System**
  - » DS-1410 : Docking Station(Optional)
    - › Please refer to page 24 on DS-1410 specifications
  - » CBIS-1400 : Computer Based Instrument System(Optional)
    - › Please refer to page 22 on CBIS-1400 specifications
  - » Computer(Optional)

## Operating Software

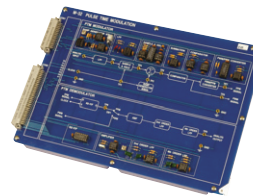


## Experiments Module



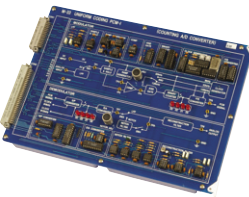
### M-31 PAM

- To understand sampling PAM (Natural, Flat-top) signal generation
- To explain an effect of sampling signal frequency at the time domain upon PAM signal



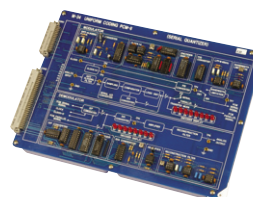
### M-32 PTM

- To identify PTM(Pulse Time Modulation) signal generation
- To understand PTM signal characteristics at the time domain
- To grasp relationship between PWM and PPM Signals



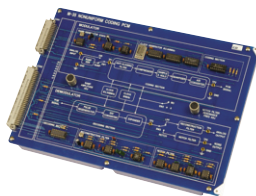
### M-33 UNIFORM CODING PCM-I (COUNTING A/D CONVERSION)

- To understand A/D and D/A conversion
- To learn methods of counter-type A/D conversion and parallel-type D/A conversion
- To illustrate an effect of quantizing intervals at the time domain upon the quantization noise



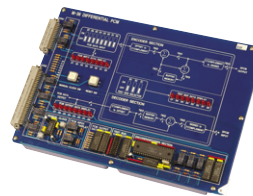
### M-34 UNIFORM CODING PCM-II (SERIAL A/D CONVERSION)

- To learn the principles of Parallel A/D Conversion and the transmission methods of PCM signal
- To illustrate the effect of interference among adjacent symbols caused by the bandwidth limitation in the PCM signal transmission



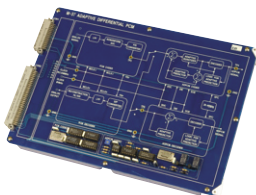
### M-35 NONUNIFORM CODING PCM

- To differentiate the companding characteristics curve of  $\mu$ - and A-law
- To understand the companding effect upon the Demodulation signal
- To grasp quantization noise's effect associated with amplitude variation of an analog input signal



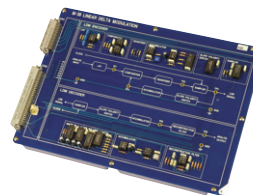
### M-36 DPCM

- To familiarize the DPCM signal generation and message signal's demodulation methods
- To understand offset binary, two's complement, encoding binary code and their relationship
- To demonstrate the sequence of DPCM Encoder and Decoder



### M-37 ADPCM

- To be acquainted with PCM Codec operation and timing
- To demonstrate ADPCM operation principles and its merit
- To understand the timing of ADPCM Transcoder
- To identify an effect of the message signal's amplitude upon the quantization noise

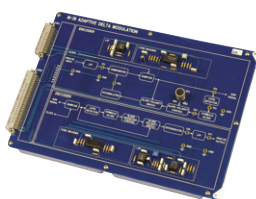


### M-38 LDM

- To familiarize the LDM signal generation and message signal's demodulation methods
- To understand Slope Overload Noise generated in the  $\Delta M$  system and the form of Granular Noise

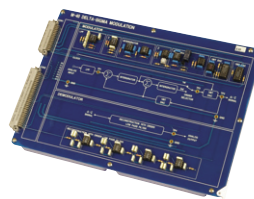
# PC BASED DIGITAL COMMUNICATION TRAINER

## ED-1440



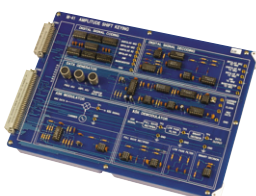
### M-39 ADM

- To illustrate the ADM signal generation and message signal's demodulation methods
- To learn methods of Slope Overload Noise prevention in the CVSD modulation system



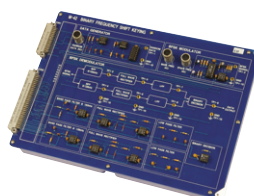
### M-40 $\Delta$ - $\Sigma$

- To learn the principles of  $\Delta$ - $\Sigma$  modulation and the methods of S/N ratio improvement
- To illustrate the effect of oversampling and noise formation upon the S/N ratio at the state of  $\Delta$ - $\Sigma$  modulation



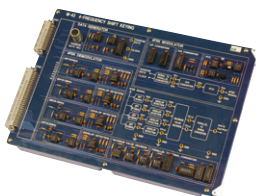
### M-41 ASK

- To learn the basic principle and elements of amplitude-shift keying
- To understand the characteristics of ASK and required bandwidth at the frequency domain and time domain



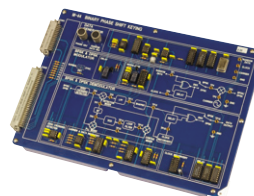
### M-42 BFSK

- To learn basic principle and elements of frequency-shift keying
- To understand characteristics of BFSK and required bandwidth at the frequency domain and time domain



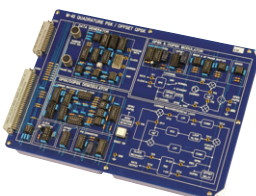
### M-43 4-FSK

- To learn the category of multiple modulation methods and the basic principles and elements of 4-FSK
- To illustrate the characteristics of 4-FSK and required bandwidth at the frequency domain and time domain



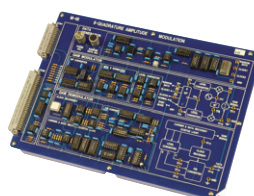
### M-44 BPSK/DPSK

- To learn basic principles and elements of Binary Phase-shift keying
- To understand the frequency domain and time domain characteristics of BPSK signal
- To be acquainted with the carrier needed for synchronous demodulators and clock recovery action
- To learn differential phase-shift keying
- To differentiate between BPSK and DPSK and grasp their strength and weakness



### M-45 QPSK/OQPSK

- To familiarize the basic principles and elements of QPSK and OQPSK
- To grasp the difference between QPSK and OQPSK



### M-46 8-QAM

- To familiarize basic principles and elements of QAM
- To explain 8-QAM modulation and demodulation elements and principles of operation
- To understand characteristics of QAM and its application cases

#### OS ENVIRONMENT

- Pentium IV above 1.7GHz, RAM 512M or higher
- Hard Disk Min. 500Mbyte Free Space
- USB 2.0 Compatible
- Windows NT4.0/2000/XP  
(Recommended OS : Windows XP)

#### ACCESSORIES

- Connection Cord : 1set
- User's Manual : 1ea
- Program CD : 1set
- AC Power Cord : 1ea