ETS-8000

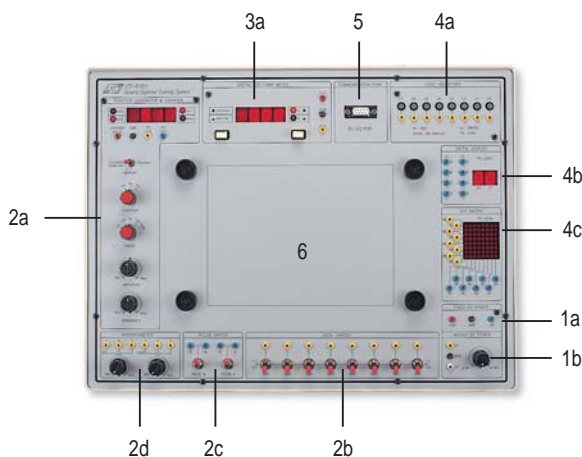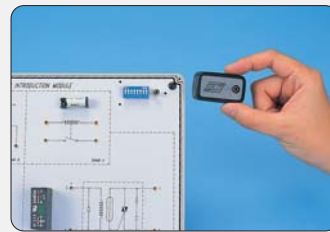## GENERAL DIGITIZED TRAINING SYSTEM

FEATURES

- Suitable for combinational logic, sequential logic experiments and designs
- Ideal tool for learning the basics of digital logic circuits
- Comprehensive power, signal supply and measurement devices for making experiments easily
- Expandability and flexibility of experiments with the combination of the universal breadboard
- All supply units are equipped with overload protection for better safety
- Computer interaction provided simulation software & emulation hardware

SPECIFICATION

1. Power supply units

a. Fixed DC power supply
- Voltage range: +5 V, -5 V
- Maximum current output: 0.3 A
- With overload protection

b. Dual adjustable DC power supply
- Voltage range : ± 3 V ~ ± 18 V, continuously adjustable
- Maximum current output: 1 A
- With overload protection

2. Signal generator units

a. Function generator
- Output waveform: sine, triangle, square, pulse
- Output frequency: 1~100 KHz; 5 settings, continuously adjustable
- Output impedance: 50 Ω
- Output amplitude: $\geqq 18$ Vpp (open loop); $\geqq 9$ Vpp (with 50 Ω load)
- Digital display: 4 sets of 7-segment LED display
- With Hz, KHz, gate, OVFL LED
- With frequency counter
  - Minimum input voltage: 300m Vpp
  - Counter range: DC ~ 100 KHz

b. Data switch
- 8 sets of independent output
- Output level: TTL
- Fanout: 10 TTL load

c. Pulse switch
- 2 sets of independent control output
- Each set with Q,$\overline{Q}$ output, pulse width $>$ 5 ms
- Output Level: TTL
- Each set of switch with debounce circuit
- Fanout: 10 TTL load

d. Potentiometer
- 1 KΩ, 0.25W, variable resistor with 3 terminals (1,2,3,), with overload protection
- 100 KΩ, 0.25W, variable resistor with 3 terminals (1,2,3,), with overload protection

3. Measurement units
a. 3 1/2-digit digital Volt/Amp meter
- DC voltage range: 2 V, 20 V
- DC voltage accuracy: ±(0.3% of reading +1 digit)
- DC current range: 2 mA, 2 A
- DC current accuracy: ±(0.5% of reading +1 digit)

4. Indicator units
a. Logic indicators
- Logic level: TTL
- Display: RED LED for logic high, GREEN LED for logic low; open status is none
- 8 sets of independent input terminal

b. Digital display
- Logic level: TTL
- 2 sets of independent 7-segment LED display
- With BCD, 7-segment decode/driver input terminal

c. 8x8 LED Dot matrix
- Logic level: TTL
- With row input terminal: R1~R8
- With column input terminal: C1~C8

5. Computer interface units
System requirements:
Hardware: CPU PIII 300 MHz, RAM 128 MB, HDD 100 MB
   free space, all better
Software: Windows 98/2000/XP
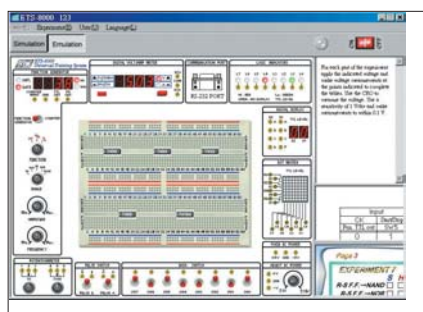
a. Software simulation
- Simulate all the active status of digital logic circuits on the platform of ETS-8000
- With simulation software of breadboard
- Simulate all digital experiments from user manual
- Hint for experiment procedure
- Automatically judging the line connection is true or false by computer
- Recording experiment result

b. Hardware emulation
- Receive signal status of ETS-8000 platform through RS-232 port (Option: USB)
- Display the entity-operation of ETS-8000 platform from screen
- Display and hint for how to connect & procede from screen
- Automatically judging the experiment result by software
- Recording experiment result

6. Experiment modules
a. Each module is equipped with an 8-bit DIP switch for fault simulations. Students can practice trouble shooting by setting the DIP switch to different positions
b. All terminals on the modules accept 2 mm plugs
c. Comprehensive experiment manual
d. Module dimension: 255 x 165 x 30 mm
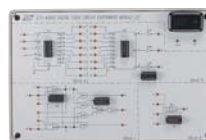e. Individual storage case for each module

LIST OF MODULES
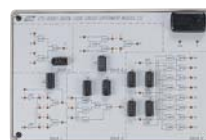
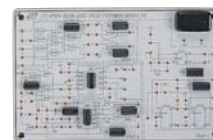

ETS-83001

ETS-83003

ETS-83002

ETS-83004

ETS-83001 Basic logic/Assembled logic gates and application
ETS-83002 Basic logic/Assembled logic gates and application; Decoder/Encoder experiments
ETS-83003 Multiplexer Experiments; Adder/Subtractor experiments
ETS-83004 Basic of Flip-Flop experiments; Counter; Digital logic application

LIST OF EXPERIMENTS

Used the ETS-8000 device
    (a) Switch & LED
Basic logic gates experiments
    (a) OR gate   (b) NOT gate   (c) OR + NOT gate
    (d) NOR gate (e) NAND gate (f) 4-inputs NAND gate
    (g) AND-NOR (h) Staircase Lamp
Assembled logic circuits experiments
    (a) X+0=X, X+1=1   (b) X・0=0, X・1=X
    (c) X+X=X, X+X'=1   (d) X・X=X, X・X'=0
    (e) (X・Y)'=X'+Y'   (f) (X+Y)'=X'・Y'
    (g) 2-bits comparator (h) Voting circuit
    (i) Karnagh map application
Adder/Subtractor experiments
    (a) Half adder   (b) Full adder (c) Half subtractor
    (d) Full subtractor   (e) 4-bits adder
    (f) 4-bits subtractor (g) BCD code adder
Decoder/Encoder experiments
    (a) 8 to 3 encoder (b) 3 to 8 decoder
Multiplexer experiments
    (a) Multiplexer
Basic of Flip-Flop experiments
    (a) Constructing a R-S Flip-Flop with NAND gates
    (b) Constructing a R-S Flip-Flop with NOR gates
    (c) J-K Flip-Flop (d) T Flip-Flop (e) D Flip-Flop
Application of Flip-Flop experiments
    (a) Constructing a D Flip-Flop with a J-K Flip-Flop;
    (b) Constructing a T Flip-Flop with a J-K Flip-Flop;
    (c) Mod-8 of ripple counter
Counter experiments
    (a) Mod-8 counter (b) Mod-4 arbitrarily sequence
Application of digital logic
    (a) 0~9 Electric roulette (b) Traffic sign control

ACCESSORIES

1. AC cord
2. Anti-Dust cover
3. Experiment manual
4. Connect plugs: φ2 mm, 10 mmL
5. Connector leads: 1 set
6. CD: Software for data acquisition
7. RS-232 cable

OTHERS

1. Power source: AC 110 V/220 V ± 10%, 50/60 Hz
2. Operating temperature: 0°C ~ 50°C
3. Relative humidity: < 90%
4. Dimension: 400 x 300 x 130 mm
5. Weight: Approx. 5.5 Kg