

## ETS-9000 Advanced Digital Training System



### ● Feature

1. Suitable for combinational logic, sequential logic, microprocessor circuits, FPGA, etc.
2. User-friendly comprehensive power supply, function generator/ counter and testing devices.
3. Universal breadboard (1440 tie-points) for circuit design, faya-Nugget breakout boards NGT-series and prototyping.
4. Tie points fitting solid leads AWG#22~30 (0.3~0.8mm).
5. USB Interface for optional fayduino Nano board, FPGA, MCU.
6. Peripheral hardware:  
LED(3 mode), Potentiometer, Pulser switch, Rotary encoder, Data switches, Speaker, Power supply, Digital displays, Universal counter, Function generator, Logic probe.
7. All signal generators have TTL and CMOS level, controlled by CMOS/ TTL switch.
8. Options: FPGA board (with USB Blaster), MCU board, faya-Nugget Combo Pack.

### ● Specifications

#### 1. Function Generator/Counter

##### a. Universal Counter

a-1. Selector: Internal 20MHz, Ext Counter 20MHz, Internal 100MHz, Ext Counter 100MHz, Ext TH&TL, TH, TL, 20MHz, EXT TH&TL, TH, TL, 100MHz Internal 20MHz/ 100MHz, Ext Counter, TH&TL

a-2. Frequency range: 1mHz~100.00000MHz

a-3. Period range TH & TL:

0.01 $\mu$ s~999999.99 $\mu$ s; 1 $\mu$ s~99999999 $\mu$ s

a-4. Input signal:

TTL or CMOS level or any level ( $V_{min} \geq +2.3V_{p \pm 10\%}$ )

a-5. Display: 8-digit 7-segment LED display

a-6. Mode switch: FG/FC

##### b. Function Generator

b-1. Output waveform:

Sine, Square, Triangle, TTL/CMOS (Square only)

b-2. Frequency range: 1mHz~1MHz

b-3. Amplitude range: 100mVpp~18Vpp (open circuit)

b-4. DC offset: -10V~+10V

b-5. TTL/CMOS output level: +5V $\pm$ 10% for TTL mode;  
1.8V~15V for CMOS mode

#### 2. Potentiometer

2-1. Variable resistor: 1K $\Omega$ (B) ,4-pin output

2-2. Variable resistor: 100K $\Omega$ (B) ,4-pin output

#### 3. Pulser Switch

3-1. Independent output

3-2. With A,  $\bar{A}$  output, Pulse width > 5ms

3-3. TTL/CMOS level

#### 4. Rotary Encoder

4-1. PA, PB signal output

4-2. TTL/CMOS level

#### 5. Data Switches

5-1. 10 sets independently control output High or Low

5-2. TTL/CMOS level

#### 6. Logic Probe

6-1. TTL and CMOS level

6-2. MEM and Pulse switch

6-3. 5mm LED displays

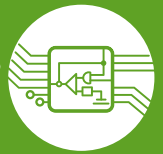
6-4. "Lo" and "Hi" LED display, low and high logic state respectively

#### 7. Speaker

8 $\Omega$ /0.5W to be used for load

#### 8. Adapter

For point tip / BNC socket exchange adapters, 2 sets



## 9. Adjustable Power Supply

- 9-1. Positive output voltage:  $0 \sim +15V \pm 10\%$ ; Pull to CMOS Level:  $1.25V \sim 16.25V \pm 10\%$ ; continuously adjustable
- 9-2. Negative output voltage:  $0 \sim -15V \pm 10\%$ , continuously adjustable
- 9-3. Maximum output current: 500mA
- 9-4. Line regulation:  $< 0.05\%$  ( $T_a = 25^\circ C$ )
- 9-5. Load regulation:  $< 30mV$  ( $T_a = 25^\circ C$ )

## 10. Fixed Power Supply

- 10-1. Fixed DC output:  $+5V \pm 10\%$ , 1A
- 10-2. Fixed DC output:  $+3.3V \pm 10\%$ , 1A
- 10-3. Fixed DC output:  $-5V \pm 10\%$ , 300mA

## 11. Digital Displays

- 11-1. 4 sets of independent 7-segment LED display
- 11-2. With BCD, 7-segment decoder/driver and DP input
- 11-3. Input with 8-4-2-1 code

## 12. Breadboards

- 12-1. Fitted on brick plate by brick posts
- 12-2. LA-60 x 4pcs: each 360 tie points, total 1440 tie points
- 12-3. Fitting solid leads AWG #22~30 (0.3~0.8mm)



## 13. Logic Indicators

12 bits LED display: TTL/CMOS Mode

## 14. USB Jack

Type A on front panel and Type B at the rear

## 15. Power Switch and Fuse

## ● Accessories

- 1. Power cord
- 2. USB Cable: A-B, A-mini

## ● General Characteristic

- 1. AC Power Input: AC 110V/220V, 50/60Hz,  $\pm 10\%$ , 1A
- 2. Weight: 4Kg
- 3. Operating temperature: ambient temperature

## ● Options

### 1. FPGA Board (ETS-33051)



USB Blaster

- a. Chip : Altera EPM 570T100C5
- b. Operating voltage: +5V
- c. Digital input pins : 20
- d. Digital output pins : 16
- e. Clock speed : 20MHz
- f. Interface : JTAG
- g. With USB Blaster
- h. User guide / Sample code

### 2. MCU Board (ETS-33052)



- a. Chip : Atmel P89V51RD2+
- b. Operating voltage : +5V
- c. Digital I/O pins : 32
- d. Clock speed : 8MHz
- e. Interface : mini USB
- f. User guide / Sample code

### 3. faya-Nugget Combo Pack (NGT-601)

Running Arduino experiments with fayalab Electronic Blocks



- Main controller : fayarduino NANO
- Modules :
 

|                                  |                       |
|----------------------------------|-----------------------|
| 1. Touch Slider                  | 7. IR Distance Sensor |
| 2. RGB LED                       | 8. DC Motor           |
| 3. Color Sticker                 | 9. Step Motor         |
| 4. Light Sensor                  | 10. IR Receiver       |
| 5. Humidity & Temperature Sensor | 11. IR Transmitter    |
| 6. 3-axis Gyroscope              | 12. Basic Logic Gates |
- Accessories :
  - 1. Brick Post Pack
  - 2. Brick Cap Pack
  - 3. Mini USB Cable
  - 4. Power Wire Pack
  - 5. Signal Wire Pack
  - 6. Tutorial CD