

# model: **Basic Electronics-GTBD1002**

## Basic Electronics Trainer

### 1. Features

- 1) Comprehensive measuring instrument with multi-meter, function generator, power supply all-in-one.
- 2) It is possible to practice measuring the characteristics of each module of electronic circuit using measuring equipment.
- 3) DC + 5V,  $\pm 15V$  fixed voltage, DC variable power supply, AC variable power supply for analog and digital experiment.
- 4) For safety, overload and short circuit protection circuit is attached to the power supply of main unit module.
- 5) The main body is able to be docked or plugged and combine the training module.
- 6) It is possible to configure the circuit by using breadboard, and to be mounted on the multi-experiment module or to be detachable to the main body.

### 2. System configuration



### 3. Spec

#### 1) Basic panel

- (1) The basic panel works as the main platform where other modules will be docked or plugged.
- (2) Consists of power supply for boards.
- (3) The base panel should be computerized and can be controlled using software according to course need.

#### 2) DC circuit experiment module

- Topic coverage ;
- (1) Ohm's Law
  - (2) Serial/Parallel circuit
  - (3) Kirchhoff's Law
  - (4) Galvanometer
  - (5) Wheatstone Bridge

#### 3) AC/DC circuit experiment module

Topic coverage ;

- (1) Capacitance
- (2) Inductance
- (3) RC/RL circuit
- (4) LC resonance (Serial/Parallel)
- (5) AC/DC voltage measurement
- (6) AC/DC current measurement
- (7) Ohm's Law
- (8) Kirchhoff's Law
- (9) Series-parallel combination circuit
- (10) Thevenin's theorem
- (11) Newton's theorem
- (12) DC circuit (RC) and transient phenomenon
- (13) AC circuit (RC/RLC)
- (14) Characteristics of transformer
- (15) Resonant circuit (serial/parallel) and LC filter

#### 4) Signal conversion circuit experiment module

- Topic coverage ;
- (1) A/D converter
  - (2) D/A converter
  - (3) F/V converter
  - (4) V/F converter

#### 5) Digital logic experiment module

- Topic coverage ;
- (1) Diode logic
  - (2) AND gate
  - (3) OR/XOR gate
  - (4) Inverter
  - (5) JK flip-flop
  - (6) RS flip-flop
  - (7) Counter
  - (8) Shift register
  - (9) Decoder
  - (10) Encoder
  - (11) Half adder/Full adder
  - (12) Multiplexer/De-multiplexer

#### 6) Diode circuit with voltage regulation module

- Topic coverage ;
- (1) Bridge rectifier
  - (2) Voltage regulator
  - (3) Diode/Zener diode
  - (4) Rectifier circuits
  - (5) Filter circuits
  - (6) Characteristics of transistor
  - (7) Characteristics of LED

#### 7) Oscillator experiment module

- Topic coverage ;
- (1) Phase shift unit
  - (2) Colpitts oscillator
  - (3) Hartley oscillator
  - (4) Crystal oscillator

#### 8) Semiconductor circuit experiment

- Topic coverage ;
- (1) Diode characteristics
  - (2) Zener diode
  - (3) NPN Transistor
  - (4) PNP Transistor
  - (5) J-FET characteristics
  - (6) MOS-FET characteristics
  - (7) SCR characteristics
  - (8) TRIAC characteristics

#### 9) OP-AMP circuit basics and application experiment

- Topic coverage ;
- (1) Amplifier biasing
  - (2) Complementary amplifier
  - (3) Common emitter amplifier
  - (4) Darlington amplifier
  - (5) Inverting amplifier
  - (6) Non-inverting amplifier
  - (7) Differential amplifier
  - (8) Summing amplifier
  - (9) Push Pull amplifier

#### 10) Filter circuit

- Topic coverage ;
- (1) Low pass filter
  - (2) High pass filter
  - (3) Band pass filter

#### 11) Sensor circuit experiment

- Topic coverage ;
- (1) Temperature sensor circuit experiment
  - (2) Photoelectric sensor experiment

- (3) Hall effect sensor circuit experiment
- (4) Humidity sensor circuit experiment
- (5) Gas sensor circuit experiment

#### 12) Pulse circuit module

- Topic coverage ;
- (1) Clipper circuit
  - (2) Schmitt circuit
  - (3) Bistable multivibrator
  - (4) Monostable multivibrator

#### 13) Breadboard module

- Topic coverage ;
- (1) Voltage : DC 5V, -15V, +15V
  - (2) Variable voltage
  - (3) Variable resistor : 1k $\Omega$
  - (4) Toggle switch
  - (5) LED indicator lamp
  - (6) Digital I/O
  - (7) Relay output (A)

#### 14) Microcontroller prototyping kit module

- (1) Standalone Microcontroller ;  
ATMEGA 328p : 01 pcs  
ATMEGA 2560 : 10 pcs  
Arduino UNO : 10 pcs  
Blackpill stm32f411 : 10 pcs  
Usbtiny Avr isp Programmer : 3 pcs  
FTDI USB to TTL Serial converter adapter : 3 pcs  
ESP-32S ESP-WROOM-32 Development board  
38P NodeMCU : 5 pcs
- (2) 50X LED (red, green, yellow)
- (3) 50X Resistors (1K Ohm, 10K Ohm, 220 Ohm)
- (4) 10X 10K Potentiometer
- (5) 5X Active buzzer
- (6) 5X Passive buzzer
- (7) 5X 75HC595N
- (8) 5X Infrared receiving head
- (9) 5X LM35DZ
- (10) 10X 5mm LDR
- (11) 20X button switch with cap
- (12) 10X IR remote control
- (13) 5X seven segment 1 digit (0.56 inch)
- (14) 5X Seven segment 4 digital (0.36 inch)
- (15) 3X 8\*8 Dot matrix
- (16) 3X UNL2003 Driver board
- (17) 3X 5V Stepper motor
- (18) 3X SG90
- (19) 3X LCD1602 + 40 Pin Male header connector  
(unsoldered)
- (20) 5X DHT11 Digital temperature and humidity sensor
- (21) 2X Water sensor
- (22) 5X RFID Module
- (23) 5X RFID Key Ring
- (24) 5X RFID Card
- (25) 5X Sound module
- (26) 1 X 1 Road relay module
- (27) 5X RTC module
- (28) 5X 16 Buttons matrix keyboard
- (29) 10X 9V Battery connector

#### 15) Power Supply with function generator

- (1) Power Supply section :  
DC outputs :  $\pm 0 - 15V$ , min 1A  
5V, min 1A  
AC outputs : 2 x 24V, min 1.7A  
Function generator : sine/square/triangular waveform