VERITAS Engineering

Catalog
Of

Industrial Electronics Trainer

Brand: VERITAS

Model: VIENT-001

Features

- Various types of industrial electronic devices, such as , UJT, PUT, SCR, SCS, DIAC, TRIAC, MOSFET, IGBT are introduced in this system. For each
- device, students are able to learn its characteristic, trigger circuit, and practical application circuit those provide students an comprehensive
- understanding of related knowledge in this technology field.

Experiment Modules:

Generally use 2mm or 4mm plugs and sockets connected by 2mm or 4mm test leads Circuits, blocks and components symbols printed on the surface of each module. Module secured in plastic housing, modules to standard DIN A4 equivalent height Cabinet provides easy to store facilities for all Modules comprehensive experiment Manuals

Industrial Electronics Trainer

Technical Specification

Power Supply Unit

(1) ACV Output voltage :18V-0V-18V,0.5A
(2) ACV Output voltage :12V-0V-12V,0.5A
(3) DCV Output voltage :+12V,0.5A
(4) DCV Output voltage :+5V,0.5A

Meter/Motor Unit

(1) Dual –scale ACV : 0-110V-220V. class 2.5
(2) Dual –scale ACA : 0-100mA-1A, class 2.5
(3) Dual –scale DCV : 0-10V-20V class 2.5
(4) Dual –scale DCA : 0-100mA-1A, class 2.5
(5) AC110V/220 motor

Isolation Transformer : AC 110V/220V

List of Modules:

A. Power Supply Unit Experiments
  (1) AC voltage measurement
  (2) DC voltage measurement
B. UJT Experiments
  UJT Characteristic
    (1) UJT introduction
    (2) UJT Characteristic
    (3) UJT equivalent circuit
    (4) CDS trigger, RTH trigger
  UJT Oscillator Circuit & Timer Switch
    (1) UJT relaxation oscillator
    (2) JUT timer switch
C. PUT Experiments
  PUT Characteristic & Equivalent Circuit
    (1) PUT introduction
    (2) PUT Characteristic
    (3) PUT equivalent Circuit
    (4) CDS trigger
    (5) RTH trigger
  PUT Oscillator Circuit & Timer Switch
    (1) PUT Circuit oscillator
    (2) PUT timer switch
D. PUT & SCR Experiments
  PUT Staircase Generator & Voltage Control Ramp Circuit
    (1) PUT staircase generator circuit
    (2) PUT voltage control ramp circuit
  SCR Characteristic & RC Shift Control Circuit
    (1) SCR Principle
    (2) SCR characteristic curve
    (3) SCR Construction
    (4) SCR trigger mode
    (5) SCR RC phase control circuit

E. SCS Experiments
- SCS Characteristic Experiment
  - (1) SCS construction and operation mode
  - (2) Use VOM meter measuring SCS
  - (3) SCS Schmitt circuit
  - (4) SCS simulate PUT Circuit
- SCS Trigger Circuit Experiment
  - (1) CDS trigger
  - (2) RTH trigger

F. UJT & PUT Trigger SCR Experiment
- UJT Trigger SCR Phase Control Circuit
  - (1) Phase control basic circuit
  - (2) Phase control analysis
  - (3) AC phase control circuit analysis
  - (4) UJT trigger SCR Phase control circuit
- PUT Trigger SCR Phase Control Circuit

G. SCR Control DC Motor & DIAC, TRIAC SCR Characteristic Experiments
- SCR Control DC Motor Forward/Reverse Experiment
  - (1) SCR Cut-off principle
  - (2) SCR control DC motor Forward / reverse control experiment
- DIAC, TRIAC Characteristic Experiment
  - (1) DIAC construction and characteristic
  - (2) DIAC operation mode and measurement
  - (3) TRIAC construction and characteristic
  - (4) TRIAC trigger mode
  - (5) TRIAC static measurement

H. Automatic Control Lamp, TRIAC Control Speed Experiments
- Automatic Control Lamp Experiment
  - (1) TRIAC shift control
  - (2) TRIAC automatic control lamp experiment
- TRIAC Control Motor Speed Experiment
  - (1) Different motor introduction
  - (2) TRIAC control motor speed experiment

I. Temperature Ratio, Photo-Couple and Touch Control Experiments
- Bridge Temperature Ratio Control Experiment
  - (1) Electronic component of thermal resistor
  - (2) SCR bridge temperature ratio control experiment
- Photo-Couple and Touch Control Experiment
  - (1) Photo – couple control circuit
  - (2) FET construction and characteristic
  - (3) Touch alarm circuit

J. Over / Under Voltage Breaker and Flasher Control Experiments
- Over /Under Voltage Breaker Experiment
  - (1) OPA characteristic with reverse & non-reverse circuit
  - (2) Voltage comparison circuit
- Flasher Control Experiment
  - (1) Application of TRIAC power control
  - (2) AC circuit control

(3) Multi vibrator

K. TRIAC Liquid Level & IC Timer Switch Experiments

TRIAC Liquid Level Control Experiment

(1) Digital circuit introduction

(2) TRIAC liquid level control experiment

IC Timer Switch Experiment

(1) NE 555 IC circuit introduction

(2) IC timer switch experiment

L. Digital Signal Drive & Zero-Voltage Switch Experiments

Digital Signal Driver Control Experiment

Zero-Voltage Switch Experiments (I)

Ideal half – wave zero-voltage switch experiments

M. Zero-Voltage Switch Experiments

Zero-Voltage Switch Experiments(II)

(1) TRIAC zero-voltage switch experiments

(2) IC mode zero-voltage switch experiments

N. SCR Converter Experiments

(1) Parallel converter introduction

(2) Series converter introduction

(3) Converter voltage adjustment

(4) Converter output- wave form improvement

O. SCR Rectifier Circuit Experiments

(1) Single – phase half –wave rectifier

(2) Single – phase full –wave rectifier

(3) Single- phase bridge rectifier

(4) Three-phase half –wave rectifier

(5) Three – phase full-wave rectifier

P. JFET / MOSFET Characteristic & MOSFET Speed Control Experiments

(1) JFET characteristic experiment

(2) MOSFET characteristic experiment

(3) MOSFET speed control experiment

Q. IGBT Characteristic & IGBT Speed Control Experiments

(1) IGBT characteristic experiment

(2) IGBT speed control experiment

Accessories

- Experiment Manual,
- Tank-2 pcs.
- Connection Plugs- 1 set,
- Storage Cabinet – 2 Sets
- Rack – 1 pcs

Experiment Modules

1. All 13 modules are equipped with an 8-bit DIP switch for fault simulation. Users learn how to solve various Problems by setting the DIP switch to different positions.
2. Solutions for all fault test are listed in the experiment manual for user's reference.
3. 2mm plugs and sockets are used throughout the main unit and all modules.
4. Comprehensive experiment manual and instructor's manual.
5. Module dimension: (255 x 165 x 30) mm.
6. Connection plugs are used on the modules to prevent accidental damages.
7. Individual keeping case for each module.

List of Modules

1. Basic Logic Gates Experiments
2. Combinational Logic Circuit Experiments(1)
3. Combinational Logic Circuit Experiments(2)
4. Combinational Logic Circuit Experiments(3)
5. Combinational Logic Circuit Experiments(4)
6. Combinational Logic Circuit Experiments(5)
7. Clock Generator Circuit Experiments
8. Sequential Logic Circuit Experiments(1)
9. Sequential Logic Circuit Experiments(2)
10. Memory Circuit Experiments(1)
11. Memory Circuit Experiments(2)
12. Converter Circuit Experiments(1)
13. Converter Circuit Experiments(2)

List of Experiments

1. Basic Logic Gates Experiments
   - (1) Introduction to logic gates and switches
   - (2) Logic gates circuits
     - a. Diode Logic (DL) circuit
     - b. Resistor-Transistor Logic (RTL) circuit
     - c. Diode-Transistor Logic (DTL) circuit
     - d. Transistor-Transistor Logic (TTL) circuit
     - e. CMOS logic circuit
   - (3) Threshold voltage measurement
     - a. TTL threshold voltage measurement
     - b. CMOS threshold voltage measurement
   - (4) Voltage/current measurement
     - a. TTL I/O voltage/current measurement
     - b. CMOS voltage/current measurement
   - (5) Basic logic gate transmission delay measurement
     - a. TTL gate delay time measurement
     - b. CMOS gate delay time measurement

(6) Measurement of basic logic gates characteristics
- a. AND gate characteristics measurement
- b. OR gate characteristics measurement
- c. INVERTER gate characteristics measurement
- d. NAND gate characteristics measurement
- e. NOR gate characteristics measurement
- f. XOR gate characteristics measurement

(7) Interface between logic gates
- a. TTL to CMOS interface
- b. CMOS to TTL interface

2. Combinational Logic Circuits Experiments

(1) NOR gate circuits

(2) NAND gate circuit

(3) XOR gate circuit
- a. Constructing XOR gate with NAND gate
- b. Constructing XOR gate with basic gate

(4) AND-OR-INVERT (AOI) gate circuit

(5) Comparator circuits
- a. Comparator constructed with basic logic gates
- b. Comparator constructed with TTL IC

(6) Schmitt gate circuit

(7) Open-collector gate circuits
- a. High voltage/current circuit
- b. Constructing an AND gate with open-collector gate

(8) Tristate gate circuits
- a. Truth table measurements
- b. Constructing an AND gate with tristate gate
- c. Bidirectional transmission circuit

(9) Half-adder and full-adder circuits
- a. Constructing HA with basic logic gates
- b. Full adder circuit
- c. High-speed adder carry generator circuit
- d. BCD code adder circuit

(10) Half-subtractor and full-subtractor circuit
- a. Subtractor circuit constructed with basic logic gates
- b. Full adder and inverter circuit

(11) Arithmetic Logic Unit (ALU) circuit

(12) Bit parity generator circuit
- a. Bit parity generator constructed with XOR gates
- b. Bit parity generator IC

(13) Encoder circuit
- a. Constructing a 4-to-2 encoder with basic gates
- b. Constructing a 10-to-4 encoder with TTL IC

(14) Decoder circuit
- a. Constructing a 2-to-4 decoder with basic gates
- b. Constructing a 4-to-10 decoder with TTL IC
- c. BCD to 7-segment decoder

(15) Multiplexer circuit
   a. Constructing a 2-to-1 multiplexer
   b. Using multiplexers to create functions
   c. Constructing a 8-to-1 multiplexer with TTL IC

(16) Demultiplexer circuit
a. Constructing a 2-output demultiplexer
b. Constructing a 8-output demultiplexer
(17) Digitally controlled analog multiplexer/demultiplexer circuit
a. Analog switch characteristics
b. Bidirectional transmission with CMOS IC analog switches

3. Clock Generator Circuit Experiments
(1) Constructing oscillator circuit with basic logic gates
(2) Constructing oscillator circuit with schmitt gate
(3) Voltage controlled oscillator (VCO) circuit
(4) 555 IC oscillator circuit
a. 555 oscillator circuit
b. VCO circuit
(5) Mono-stable multi vibrator circuits
a. Low-speed mono-stable multi vibrator circuits
b. High-speed mono-stable multi vibrator circuits
c. Constructing mono-stable multi vibrator circuits
d. Constructing non-retriggerable circuit with TTL-IC
e. Constructing retriggerable circuit with TTL-IC
f. Constructing a variable duty cycle oscillator circuit with mono stable multi vibrator

4. Sequential Logic Circuit Experiments
(1) Flip-flop circuits
a. Constructing a R-S flip-flop with a basic logic gates
b. Constructing a D flip-flop with a R-S flip-flop
c. Constructing a J-K flip-flop with a D flip-flop
d. Constructing a J-K flip-flop with a R-S flip-flop
e. Constructing a shift register with a D flip-flop
f. Preset left/right shift register
g. Constructing a noise elimination circuit with R-S flip-flop
(2) J-K flip-flop circuits
a. Asynchronous binary up-counter
b. Asynchronous decade up-counter
c. Asynchronous divide-by-N up-counter
d. Asynchronous binary down-counter
e. Synchronous binary up-counter
f. Synchronous binary up/down counter
g. Presetable synchronous binary up/down counter
h. Presetable synchronous decimal up/down counter
i. Ring counter
j. Johnson's counter

5. Memory Circuit Experiments
   (1) Constructing Read Only Memory (ROM) with diodes
   (2) Constructing Random Access Memory (RAM) with D flip-flop
   (3) 64-bit RAM circuit
   (4) Erasable Programmable Read Only Memory (EPROM) circuit
   (5) Electronic EPROM (EEPROM) circuit
   (6) Constructing dynamic scanning counter with single-chip microprocessor
6. Converter Circuit Experiment
   (1) Digital/Analog Converter (DAC) circuit
      a. Unipolar DAC circuit
      b. Bipolar DAC circuit
   (2) Analog/Digital Converter (ADC) circuit
      a. 8-bit converter circuit
      b. 3 1/2 digit converter circuit

Interfacing Software:

- Built-in circuit simulation of experiment modules.
- Fault simulation is allowed.
- Users can flexibly compare the simulation analysis result with hardware signal output.
- Support virtual instrument.

Accessories

1. Experiment Manual and Instructor's Manual
2. Connection Leads and Plugs
3. Key