

**OMEGA TYPE ETB-84** Experimental Training Board has been designed specifically for the study of Discrete Electronic Components. It contains a wide selection of discrete components and A.C. & D.C. Power Supplies. The capabilities of this trainer extend far beyond the experiments described. Although only a finite number of experiments have been described yet other circuits as per individuals requirements can also be designed using the available components and power supplies.

Practical experience on this board carries great educative value for Science and Engineering Students.

### OBJECT

#### 01 RC & LC CIRCUITS :

- 1.1 Study of RC High Pass Filter
- 1.2 Study of RC Low Pass Filter
- 1.3 Study of RL Differentiating Circuits
- 1.4 Study of Series RC Circuit
- 1.5 Study of Series LC Circuit
- 1.6 Study of Parallel RC Circuit
- 1.7 Study of Parallel LC Circuit

#### 02 SERIES & PARALLEL RESONANCE CIRCUIT :

- 2.1 Study of Series LCR Resonance Circuit and determination of 'Q'
- 2.2 Study of Parallel LCR Resonance Circuit
- 2.3 Determination of impedance & reactance of reactive elements and plotting of reactive curves

#### 03 GERMANIUM & SILICON DIODES :

- 3.1 Characteristics of a germanium/ silicon diode reverse
- 3.2 Characteristics of a germanium/ silicon diode forward
- 3.3 Application of a diode as a half wave rectifier
- 3.4 Application of four diodes as full wave bridge rectifier

#### 04 ZENER DIODE :

- 4.1 Characteristics of a Zener Diode
- 4.2 Application of a Zener Diode as a voltage regulator
- 4.3 Determination of line regulation of a zener diode regulator circuit
- 4.4 Determination of load regulation of a zener diode regulator circuit

#### 05 CLIPPING & CLAMPING CIRCUITS :

- 5.1 Study of single level clipping circuits
- 5.2 Study of two level clipping circuits
- 5.3 Study of clamping circuits

#### 06 COMMON EMITTER CONFIGURATION OF A TRANSISTOR:

- 6.1 Input characteristics of common emitter configuration
- 6.2 Output characteristics of common emitter configuration
- 6.3 Study of common emitter amplifier

#### 07 COMMON BASE CONFIGURATION OF A TRANSISTOR:

- 7.1 Input characteristics of common base configuration
- 7.2 Output characteristics of common base configuration
- 7.3 Study of common base amplifier



#### 08 COMMON COLLECTOR CONFIGURATION OF A TRANSISTOR :

- 8.1 Transfer characteristics of common collector configuration

#### 09 EMITTER FOLLOWER ( TRANSISTOR) :

- 9.1 Study of emitter follower configuration

#### 10 CASCADED AMPLIFIER :

- 10.1 Study of two stage cascaded amplifier

#### 11 POWER AMPLIFIER

- 11.1 Study of class-A power amplifier.

#### 12 DIFFERENTIAL AMPLIFIER :

- 12.1 Study of a differential amplifier and determination of its CMRR

#### 13 FEED BACK AMPLIFIER

- 13.1. Study of current series feedback
- 13.2. Study of current shunt feedback

#### 14 SELECTIVE AMPLIFIER :

- 14.1. Study of frequency selective amplifier

#### 15 FET CHARACTERISTICS & SOURCE FOLLOWER :

- 15.1. Study of static characteristics of an FET
- 15.2. Application as source follower

#### 16 FET CHOPPER & V.V.R. (Voltage Variable Resistor)

- 16.1. Application as a Chopper
- 16.2. Application as Voltage Variable Resistor (VVR)

#### 17 R.C. PHASE SHIFT OSCILLATOR :

- 17.1. Study of R.C. Phase Shift Oscillator

#### 18 U.J.T. CHARACTERISTICS & RELAXATION OSCILLATOR:

- 18.1. Study of UJT Characteristics
- 18.2. Application of UJT as relaxation oscillator

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#### 19 TRIAC CHARACTERISTICS :

- 19.1. Terminal Characteristics in Mode I\*
- 19.2. Terminal Characteristics in Mode III\*
- 19.3. Measurement of Holding Current  $I_H$
- 19.4. Gate characteristics in Mode I\*
- 19.5. Gate characteristics in Mode I'
- 19.6. Gate characteristics in Mode III'
- 19.7. Gate characteristics in Mode III'
- 19.8. Application in power control using D.C. control voltage
- 19.9. Application in power control using A.C. control voltage

#### 20 BISTABLE MULTIVIBRATOR :

- 20.1. Study of bistable multivibrator circuit

#### 21 MONOSTABLE MULTIVIBRATOR :

- 21.1. Study of monostable multivibrator circuit

#### 22 ASTABLE MULTIVIBRATOR :

- 22.1. Study of astable multivibrator circuit

#### 23 SCHMITT TRIGGER :

- 23.1. Study of Schmitt Trigger circuit

#### 24 BASIC LOGIC GATES :

- 24.1. Study of AND gate
- 24.2. Study of OR gate
- 24.3. Study of NAND gate
- 24.4. Study of NOR gate

#### 25 LED CHARACTERISTICS & APPLICATIONS :

- 25.1. Study of Characteristics of LED
- 25.2. Application of LED in constant current sources

#### 26 SCR CHARACTERISTICS :

- 26.1. D.C. gate control characteristics
- 26.2. Anode current characteristics

#### 27 DIAC CHARACTERISTICS & APPLICATIONS :

- 27.1. Study of Characteristics of a Diac
- 27.2. Application as sawtooth wave & pulse generator
- 27.3. Application in Diac Triac Power control circuit

#### FEATURES

The board consists of the following built in parts :

- 01 4V5-0-4V5 A.C. at 500 mA, Power Supply.
- 02 0-55V A.C. at 50mA, Power Supply.
- 03 0-70V D.C. at 50 mA, continuously variable Power Supply.
- 04  $\pm 12V$  D.C. at 250 mA, IC regulated and short circuit protected Power Supply.
- 05 0-20V D.C. at 50 mA, IC Regulated Power Supply.
- 06 5V D.C. at 100mA, IC Regulated Power Supply.
- 07 A.C. / D.C. Voltmeter, 65mm rectangular dial, with switch selectable ranges of 1V, 10V and 100V.

- 08 Two D.C. Ammeters, 65mm rectangular dial, with switch selectable ranges of 50 mA/500mA/5mA/50mA/500mA.
- 09 Pulser with Dual Polarity, selectable output.
- 10 1 KHz Sine wave source with variable output level.
- 11 LEDs two each for visual indication of Input & Output status.
- 12 Speaker, LED, 8 diodes, 3 Zener diodes, Diac, SCR, Triac, FET, UJT, 5 Transistors, 36 resistors, 18 capacitors, 5 potentiometers, Electronic Load, inductor, Audio Output Transformer.
- 13 12V, OEN Relay with one change over contacts rated at 6 Amp. for resistive and 3Amp. for inductive Load at 230V
- 14 Mains ON/OFF switch, fuse and Jewel Light are provided.
- 15 The unit is operative on 230VAC  $\pm 10\%$  at 50Hz.
- 16 Adequate no. of patch cords stackable from rear both ends 2mm spring loaded plug length 50cm.
- 17 Good Quality, reliable terminal/sockets are provided at appropriate places on panel for connections & observation of waveforms.
- 18 Strongly supported by detailed Operating Instructions, giving details of Object, Theory, Design procedures, Report Suggestions and Book References.
- 19 Weight : 10.400 Kg. (Approx.)
- 20 Dimension : W 445 x H 260 x D470

#### OTHER APPARATUS REQUIRED:

- 01 Sine Square Wave Oscillator OMEGA TYPE SS-305
- 02 Dual trace CRO 20MHz OMEGA TYPE CRO-20

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