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## BJT, JFET and MOSFET Biasing Methods

### Model : SC-111

**SINCOM SC-111 BJT,JFET and MOSFET Biasing Methods** is a remarkable **All-In-One** simply designed trainer for the purpose to study NPN BJT Base biasing, N-Channel JFET Gate biasing and N-Channel Enhancement type MOSFET biasing methods and determine the various operational parameters with a wide range of components bank in a simple experimental way. The BJT base biasing methods includes Fixed Bias and Self Base/Voltage Divide Bias method with & without Emitter Resistor, Collector to Base Biasing methods. The N-Channel JFET Gate biasing methods includes JFET Gate Bias, Self Bias, Voltage Divider Bias, Source biasing methods. The N-Channel Enhancement type MOSFET includes Voltage Divider Bias, Drain to Gate (Feedback) biasing methods.

### Features

- ❖ User friendly Design
- ❖ Separate Modules of BJT Base, JFET Gate and MOSFET Biasing circuits
- ❖ All-In-One BJT base, JFET gate and MOSFET biasing modules
- ❖ Easy selection of Various biasing methods
- ❖ Silicon NPN BJT TO-92, JFET TO-72 Low Power, MOSFET TO-220 Transistor packages
- ❖ Combinational Resistor Bank at BJT Base, JFET Gate and MOSFET Gate
- ❖ BJT Resistor Bank at Collector to Base and Emitter
- ❖ BJT Resistive Collector Load
- ❖ JFET Resistor Bank at Drain and Source
- ❖ MOSFET Resistor Bank at Drain and Source
- ❖ In-Built Dual Fixed regulated DC Power Supply
- ❖ Easy to select the different biasing resistors
- ❖ Facility to plot DC Load Line
- ❖ Very Easy for Operation
- ❖ Multi color Circuit Diagram is screen printed on the front of the white color acrylic board
- ❖ Enclosed in an attractive, light weight, High Quality, Poly Coated Australian Pine Wooden cabinet
- ❖ Facility to connect external Digital/Analog Voltmeter and Ammeter or Digital Meters
- ❖ Interconnections by 2mm high quality banana sockets and pins
- ❖ Maximum Test points to explore all the corners of experiment
- ❖ 1 Year Warranty

### Technical Specifications

- |                          |                                                                                    |
|--------------------------|------------------------------------------------------------------------------------|
| ▪ AC Mains Power Supply  | : 230V $\pm$ 10%, 50Hz                                                             |
| ▪ DC Power Supply        | : IC Regulated Dual Fixed $\pm$ 12V/500mA                                          |
| ▪ BJT Biasing Method     | : Fixed Bias and Self Bias with & without Emitter Feedback, Collector to Base Bias |
| ▪ JFET Biasing Method    | : Gate Bias, Self Bias, Voltage Divider Bias & Source Bias                         |
| ▪ MOSFET Biasing Method  | : Drain to Gate (Feedback) Bias, Voltage Divider Bias                              |
| ▪ <b>For BJT Biasing</b> |                                                                                    |



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- Transistor Type and Package : BJT-Silicon-NPN, TO-92 Package
- Transistor Used : One SL/CL100
- Transistor  $\beta$  : @170-180
- Transistor Configuration : CE mode
- BJT Junction Voltage : 0.7V
- Max. Collector Emitter Voltage : 12 VDC
- Combinational Base Resistor Bank : Four- MFR 100K $\Omega$ , 180K $\Omega$ , 10K $\Omega$  and 100K $\Omega$ ,  $\pm 5\%$
- Collector to Base Resistor Bank : Two Fixed-MFR 10K $\Omega$  & 22K $\Omega$ ,  $\pm 5\%$  and One Variable 1M $\Omega$  Potentiometer
- Emitter Resistor Bank : Two- MFR 180 $\Omega$  and 0 $\Omega$ ,  $\pm 5\%$
- Resistive Collector Load : 470 $\Omega$  for Fixed & Self bias, 2.2K $\Omega$  Collector to Base Bias
- **For JFET Biasing**
  - Transistor Types and Package : JFET-N Channel, TO-72 Package
  - JFET Used : BFW10
  - Pin Count : 4 Gate, Drain Source and Substrate
  - Transistor Configuration : CS mode
  - Max. Drain Source Voltage : 12 VDC
  - Combinational Gate Resistor Bank : Six Gate Resistors includes Four Fixed and Two Variable
  - Fixed Gate Resistor Bank : Four Fixed-MFR 10K $\Omega$  (2 No.) & 100K $\Omega$  (2No.),  $\pm 5\%$
  - Variable Gate Resistor Bank : Two Variable 100K $\Omega$  Potentiometers
  - Drain Load Resistor Bank : One Fixed-MFR 1K $\Omega$ ,  $\pm 5\%$  & Variable 100K $\Omega$  Potentiometer
  - Source Resistor Bank : Fixed-MFR 100 $\Omega$ , 1K $\Omega$  and 0 $\Omega$ ,  $\pm 5\%$ .  
Variable 100K $\Omega$  Potentiometers
- **For MOSFET Biasing**
  - Transistor Type and Package : MOSFET, N-Channel Enhancement, TO-220 Package
  - MOSFET Used : IRF840/540
  - Pin Count : 3 Gate, Drain and Source
  - Transistor Configuration : CS mode
  - Max. Drain Source Voltage : 12 VDC
  - Combinational Gate Resistor Bank : Six Gate Resistors includes Four Fixed and Two Variable
  - Fixed Gate Resistor Bank : Four Fixed-MFR 10K $\Omega$  (2No) & 100K $\Omega$  (2No),  $\pm 5\%$
  - Variable Gate Resistor Bank : Two Variable 100K $\Omega$  Potentiometers
  - Drain Load Resistor Bank : One Fixed-MFR 1K $\Omega$ ,  $\pm 5\%$  & Variable 100K $\Omega$  Potentiometer
  - Source Resistor Bank : Fixed-MFR 100 $\Omega$ , 1K $\Omega$  and 0 $\Omega$ ,  $\pm 5\%$ .  
Variable 100K $\Omega$  Potentiometers
- Weight : 3.0 kg (approx)
- Dimensions (mm) : L 270 x W 390 x H 130
- Interconnections : 2mm Banana sockets
- Operating Temperature : 0-50 $^{\circ}$ C, 80% RH



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## Learning Scope

- To study the need of Biasing circuits.
- To study BJT Fixed Bias circuit with & without Emitter feedback Resistor.
- To study BJT Collector to Base Biasing circuit.
- To study BJT Self Bias/Voltage Divider biasing circuit. To observe & Note the change in Collector Current & Voltage w.r.t. change in biasing resistors.
- To Determine the various currents & voltages,  $I_B, I_C, V_B, V_C, V_{CE}, V_E$  and Stability factor
- To Plot DC load line & observe change w.r.t. change in base resistor & emitter feedback resistor bank
- To study the JFET Gate Bias, Self Bias, Voltage Divider Bias and Source Bias circuits.
- To study the MOSFET Gate Bias, Voltage Divider Bias and Drain to Gate (Feedback) Bias circuits.
- To Observe & Note the change in Drain Current w.r.t. change in Biasing Resistors.

## Other Instruments Required

**SINCOM Digital Multi VI meter (DMVI) : Model DMVI-03** Range  $V_1$ -20V,  $I_1$ -20mA,  $V_2$ -20V,  $I_2$ -200mA DC

**Accessories Included :** Set of Patch Cord and Details Instruction Manual