

LINEAR CIRCUIT LAB (2) -ELECTRONIC CIRCUIT LAB **KL-200**



THE KL-200 LINEAR CIRCUIT LAB (2) — *ELECTRONIC CIRCUIT LAB* is a comprehensive and self-contained system suitable for anyone engaged in electronic circuit experiments. All necessary equipments for electronic circuit experiments such as power supply, function generator, analog and digital meters are installed on the main unit. The 17 modules covers a wide variety of essential topics in the field of electronics circuit. It is a time and cost saving device for both students and researchers interested in developing and testing circuit prototypes.

- Ideal for electronic circuit experiments and designing exercises.
- Integrated experimental circuit and trainer, with complete electronic circuit experiment curriculum
- Complete supply and testing units for easy and efficient experiments.
- With universal breadboard for circuit designing and prototypes.
- All modules equipped with an 8-bit DIP switch for fault simulations.



- Individual storage case for all modules for easy carrying and storing.



SPECIFICATIONS

MAIN UNIT(KL-21001)

① DC POWER SUPPLY

A. Fixed DC Power Supply

- (1). Voltage Range : $\pm 5V, \pm 12V$
- (2). Maximum Current Output : 0.3A
- (3). With output overload protection.

B. Dual DC Power Supply

- (1). Voltage Range : $\pm 3V - \pm 18V$, continuously adjustable
- (2). Maximum Current Output : 1A
- (3). With output overload protection.



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② AC POWER SUPPLY

- (1). Voltage Range : 0V – 9V
- (2). Maximum Current Output : 500mA
- (3). With output overload protection.

③ SIGNAL GENERATOR

A. Function Generator

- (1). Output Waveform : Sine, Square and Triangle.
- (2). Output Frequency : 10 Hz – 100 KHz, 4 settings, continuously adjustable.
- (3). Accuracy : $\pm 5\%$ of full scale value.
- (4). Output Impedance : 50 Ω
- (5). Output Voltage : $\geq 18V_{p-p}$ (open loop); $\geq 9V_{p-p}$ (with 500 load).

④ 3 1/2-DIGIT DIGITAL VOLTMETER/AMP METER

- A. DC Voltage Range : 2V, 200V
- B. DC Voltage Accuracy : $\pm 0.3\%$ of reading + 1 digit
- C. DC Current Range : 200 μA , 2000mA
- D. DC Current Accuracy : $\pm 0.5\%$ of reading + 1 digit

⑤ ANALOG METERS

- A. AC Current : 0 – 100mA – 1A
- B. AC Voltage : 0 – 15A
- C. DC Current : 0 – 100mA – 1A
- D. DC Voltage : 0 – 20V

⑥ SPEAKER

- (1). 8 Ω , 0.25W speaker with 10cm

⑨ ACCESSORIES

- A. Connect Lead: 2mm-0.65mm, 300mmL 6pcs.
- B. User's Manual
- C. Fuse
- D. AC Cord
- E. Anti-Dust Cover

EXPERIMENT MODULES

1. 17 modules each secured on to a solid-body plastic housing.
2. Each module is equipped with an 8-bit DIP switch for fault simulations. Students can practice trouble shooting by setting the DIP switch to different positions.
3. Detailed solution for the simulated faults are included in the instructor's manual.
4. All terminals on the modules accept 2mm plugs.
5. Comprehensive experiment and instructor's manual.
6. Module dimension: 255 x 165 x 30mm.

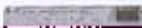
MODULES AND THE EXPERIMENTS THEY PERFORM



KL-23001 : Clipping & Clamping Circuits



KL-23002 : Rectifier, Differential & Integrator Circuits



KL-23003 : Clipping & Clamping Circuits



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KL-23005 : Multi-Stage Amplification Circuits



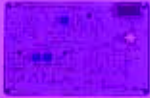
KL-23006 : OTL Amplifier Circuit



KL-23007 : OCL Amplifier



KL-23008 : Oscillator Circuits (1)



KL-23008 : Oscillator Circuits (2)



KL-23009 : RC Coupled Amplifier

LIST OF EXPERIMENTS

1. Characteristics of Diodes

1-1 Silicon Diode	KL-23001(A)
1-2 Germanium Diode	KL-23001(A)
1-3 Zener Diode	KL-23001(A)
1-4 Light Emitting Diode	KL-23001(E)
1-5 Optical Diode	KL-23001(E)

2. Clipping and Clamping Circuits with Diodes

2-1 Clipping Circuit (1)	KL-23001(B)
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KL-23001(D)



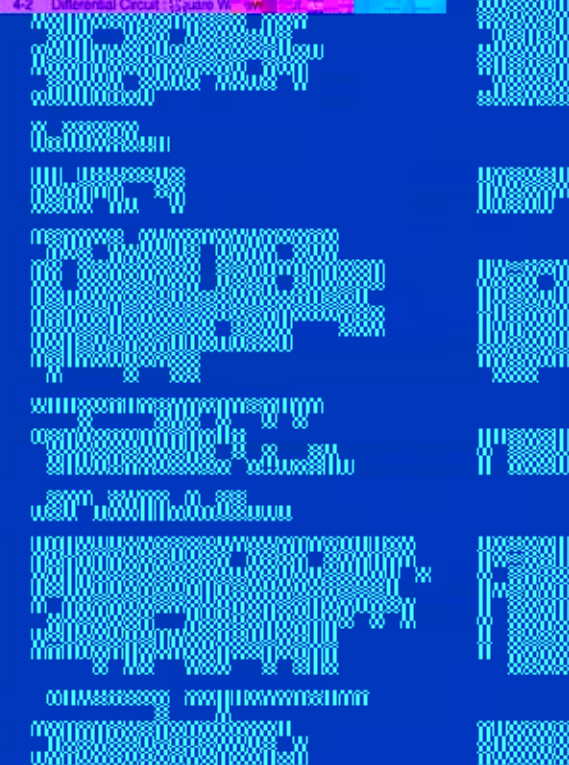
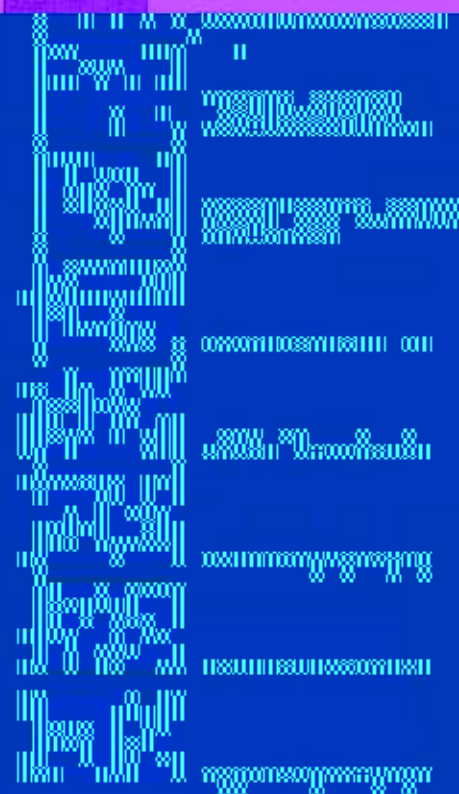
KL-23001(D)

3. Rectifier Circuits

3-1 Half Wave Rectifier Circuit	KL-23002(C)
3-2 Full Wave Rectifier Circuit	KL-23002(C)
3-3 Bridge Rectifier Circuit	KL-23002(C)
3-4 Dual Power Supply Rectifier Circuit	KL-23002(C)
3-5 Voltage Magnifying Rectifier Circuit	KL-23002(B)

4. Differential and Integration Circuits

4-1 RC Direct Current Charge/Discharge Circuit	KL-23003(D)
4-2 Differential Circuit : Square Wave	KL-23003(D)





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9-3 Transformer Coupled Amplification Circuit.....	KL-23005(B)
9-4 Push-Pull Amplification Circuit.....	KL-23005(C)
9-5 OTL Amplification Circuit.....	KL-23006(B)
9-6 OCL Amplification Circuit.....	KL-23007(A)
9-7 IC Amplification Circuit.....	KL-23006(A)

10. Transistor Negative Feedback Circuits

10-1 Serial Voltage Negative Feedback Circuit.....	KL-23007(B)
10-2 Parallel Voltage Negative Feedback Circuit.....	KL-23007(C)
10-3 Serial Current Negative Feedback Circuit.....	KL-23007(B)
10-4 Parallel Current Negative Feedback Circuit.....	KL-23007(C)

11. Transistor Positive Feedback Circuits

11-1 Low-Frequency Sine Wave Oscillating Circuit	
a. RC Phase-Shifting Oscillating Circuit.....	KL-23008(A)
b. Wine's Bridge Oscillating Circuit.....	KL-23008(B)
11-2 High-Frequency Sine Wave Oscillating Circuit	
a. Hartley's Oscillating Circuit.....	KL-23008(C)
b. Copy's Oscillating Circuit.....	KL-23009(A)
11-3 Crystal Oscillating Circuit.....	KL-23009(A)
11-4 Astable Oscillating Circuit.....	KL-23008(D)
11-5 Monostable Oscillating Circuit.....	KL-23009(B)
11-6 Bistable Oscillating Circuit.....	KL-23009(C)
11-7 Intermittent Oscillating Circuit.....	KL-23009(D)
11-8 Schmitt's Oscillating Circuit.....	KL-23010(A)
11-9 Sawtooth Oscillating Circuit.....	KL-23010(B)

12. Regulated Voltage/Constant Current Circuits

12-1 Regulated Voltage Circuit with Zener Diode.....	KL-23010(C)
12-2 Regulated Voltage Circuit with Zener Diode/Transistor.....	KL-23010(D)
12-3 Regulated Adjustable Voltage Circuit.....	KL-23010(E)
12-4 Current-Limiting Regulated Voltage Circuit.....	KL-23011(A)
12-5 Regulated Voltage Circuit with IC.....	KL-23011(B)
12-6 Constant Current Circuit.....	KL-23011(C)

13. Modulation and Demodulation

13-1 Amplitude Modulation Circuit (AM).....	KL-23011(D)
13-2 Frequency Modulation Circuit (FM).....	KL-23012(A)
13-3 Amplitude Modulation Detection Circuit.....	KL-23011(E)
13-4 Amplitude Demodulation Circuit.....	KL-23012(B)

14. OP Amplifiers

14-1 Transistor Differential Amplification Circuit.....	KL-23012(C)
14-2 Characteristics of OP Amplifiers	
a. Input Impedance Measurement.....	KL-23012(D)
b. Output Impedance Measurement.....	KL-23012(D)
c. Bandwidth Measurement.....	KL-23012(D)
d. Slew Rate Measurement.....	KL-23012(D)
e. Offset Voltage Measurement (1).....	KL-23012(D)
f. Offset Voltage Measurement (2).....	KL-23012(D)

15. Basic Characteristics of OP Amplifier

15-1 Inverse Amplification.....	KL-23013(B)
15-2 Non-Inverse Amplification.....	KL-23013(B)
15-3 Voltage-Follower Circuit.....	KL-23013(B)
15-4 Difference Amplification.....	KL-23013(B)
15-5 Sum Amplification (Adder).....	KL-23013(B)
15-6 Clipping Circuit.....	KL-23013(A)
15-7 Constant Voltage Circuit.....	KL-23013(A)

15-8 Constant Current Circuit.....	KL-23013(A)
15-9 Differentiator Circuit.....	KL-23013(A)
15-10 Integrator Circuit.....	KL-23013(A)

16. Basic Characteristics of OP Amplifier (1) - Negative Feedback

16-1 Logarithm Amplification Circuit.....	KL-23014(A)
16-2 Exponential Amplification Circuit.....	KL-23014(A)
16-3 Peak Value Detection Circuit.....	KL-23014(A)
16-4 Precision Clipping Circuit.....	KL-23014(A)
16-5 Voltage Adjustment Circuit.....	KL-23014(B)
16-6 Sampling/Hold Circuit.....	KL-23014(C)
16-7 Instrument Amplification Circuit.....	KL-23015(B)

17. Basic Characteristics of OP Amplifier (2) - Negative Feedback

17-1 High Pass Amplification Circuit.....	KL-23015(A)
17-2 Low Pass Amplification Circuit.....	KL-23015(A)
17-3 Band Pass Amplification Circuit.....	KL-23015(A)
17-4 RIAA Amplification Circuit.....	KL-23016(A)
17-5 Tone Controller Circuit.....	KL-23016(A)
17-6 Single Power Supply Inverse Amplification Circuit.....	KL-23016(B)

18. Basic Characteristics of OP Amplifier - Positive Feedback

18-1 Comparator.....	KL-23016(C)
18-2 Schmitt Trigger.....	KL-23016(C)
18-3 Window-type Comparator.....	KL-23016(D)
18-4 Monostable Multivibrator.....	KL-23017(A)
18-5 Astable Multivibrator.....	KL-23017(A)
18-6 Sine Wave Oscillation Circuit	
a. RC Oscillator.....	KL-23017(B)
b. Wine's Oscillator.....	KL-23017(B)

ACCESSORIES (KL-28002)

- A. Connect Leads: 2mm-2mm, 300mmL, 25pcs
- B. Connect Plugs: ϕ 2mm, 10mmL, 10pcs
- C. Experiment manual and Instructor's manual.
- D. Key: 1pc

GENERAL CHARACTERISTICS

- A. Individual storage case for each module (205 × 295 × 65mm).
- B. Power Source : 110V/220V±10%, 50/60Hz
- C. Operating Temperature: 0°C-50°C
- D. Humidity : <90% relative humidity
- E. Dimension : 400 × 300 × 130mm
- F. Weight : Approx. 5.8 Kg