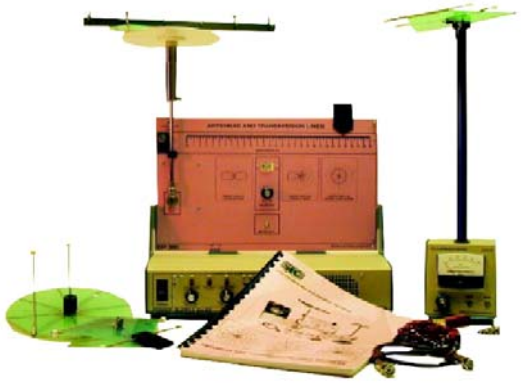
Consulab
HELPING YOU TEACH TECHNOLOGY

ANTENNAS AND TRANSMISSION LINES



DESCRIPTION

The CL-SIP360 trainer helps the student understand antennas and transmission lines as an integral part of any telecommunications course. This course includes a microwave transmitter, field-strength meter, Lecher line and detector panel; horizontal and vertical dipole and Yagi antennas, to provide both theory and hands-on experiments in antenna radiation patterns, polarization, gains and VSWR measurements. The course provides for 60 hours of instruction.

FEATURES

- Radiation pattern measurements surrounding a horizontal dipole, ground plane and yagi;
- Polarization of electromagnetic waves;
- Measuring frequency by using standing waves;
- Demonstration of the effects of reflectors and directors;
- A UHF transmitter with mW output power, operating in the 800-900 MHz range;
- Includes a field-strength meter
- Contains a printed circuit panel with Lecher line, VSWR meter, dipoles and reflecting rods;
- All solid state operation; and,
- Laboratory manual contains both theory and laboratory measurements.

EXPERIMENT TOPICS

1. **The Basic Dipole Antenna**
   - The Radio Spectrum;
   - Electric and Magnetic Fields;
   - Transmission of Radio Waves;
   - Sky and Ground Waves;
   - Antenna Resistance;
   - Antenna Reciprocity; and,
   - Lecher Lines.
2. **Vertical and Folded Dipoles**
   - Isotropic Antenna Characteristics;
   - Antenna Directivity and Gain;
   - Beam width and Radiation Patterns;
   - Antenna Bandwidth and Q;
   - Vertical Ground Plane Antennas;
   - Folded Dipole Antennas; and,
   - Long Wire Antennas.
3. **Driven (Yagi) Antennas**
   - Element Length Calculations;
   - Feed Impedance;
   - Beam width; and,
   - Gain.
4. **Directional Antennas**
   - Co-linear Beam Antennas;
   - Driven Tower Arrays;
   - The Rhombic Antenna;
   - Log-Periodic Antennas;
   - Corner Reflectors;
   - Helical Antennas; and,
   - The Parabolic Dish Antenna.
5. **Transmission Lines**
   - Propagation Velocity;
   - Standing Waves and VSWR;
   - Open and Shorted Lines;
   - Lecher Lines;
   - Impedance Matching;
   - Transmission Line Spacing;
   - Coaxial Lines;
   - Tuning Stubs; and,
   - The BALUN.
6. **Propagation of RF Energy in the Atmosphere**
   - Atmospheric Propagation;
   - Radio Waves;
   - The Ionosphere;
   - Critical Frequency; and,
   - Angle of Incidence.

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ANTENNAS AND TRANSMISSION LINES

BASIC EQUIPMENT INCLUDED:

- One (1) CL-SIP360a-1P, Antennas and transmission lines panel;
- One (1) CL-SIP360AM, Laboratory manual;
- One (1) CL-S360-2, Transmitting dipole antenna;
- One (1) CL-S360-3, Ground plane and reflector;
- One (1) CL-S360-4, Yagi antenna;
- One (1) CL-S360-5, Reflector rod;
- One (1) CL-S360-6, Field-strength meter;
- One (1) CL-S360-8, Components kit (Resistors); and,
- CL-S360-10, Cloth tape.

CL-S300PSB

POWER BASE REQUIRED:

- One (1) CL-S300PSB, Power Supply Base.

OPTIONAL EQUIPMENT:

- One (1) CL-S00-18, Overhead Demonstration Meter.

SPECIFICATIONS

Each of the following major items is supplied with this course.

1. **Antenna Panel with Lecher Line, RF Detector and RF Transmitter**
   - ✔ Transmitter 860-900 MHz, strip-line (factory set to 880 MHz); and
   - ✔ Power input 100 mW nominal.
2. **RF Detector/Field-Strength Meter**
   - ✔ Dual diode, with 50 mA meter; and,
   - ✔ Jacks for DMM & overhead demonstration meter (opt.).
3. **Antennas**
   - ✔ Transmitter yagi - One reflector and four director elements (two removable);
   - ✔ Receiver yagi – One director and one reflector;
   - ✔ Horizontal dipole;
   - ✔ Vertical ground plane antenna with removable reflector; and,
   - ✔ BALUN, ¼ wave, adjustable.
4. **Other Supplied Items**
   - ✔ Reflector rod, cables, matching resistors, polar plotting paper, tape measure and BNC T-connectors (2).

✔ T 60-hour course is supplied with a comprehensive lab manual
✔ All equipment operates on 120/240 VAC, 50/60 Hz: and,
✔ Total weight: 5 lbs (2.27 kg).

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