Feedback

AntennaLab 57-200

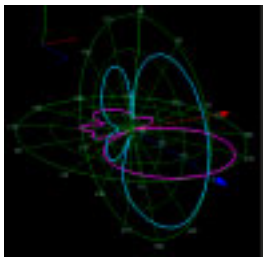
AntennaLab 57-200 is a unique, integrated package of hardware modelling and software simulation that is suitable for teaching the principles of antenna operation, through to advanced antenna design.

AntennaLab uses a combination of hardware modelling at frequencies of 1200-1800MHz and software tools, based on industry standard NEC-2 analysis, to demonstrate the theoretical principles and practical performance of a wide range of antenna types and systems.

AntennaLab is fully supported by Student and Tutor workbooks and textbooks to cover a wide range of assignment and project work.

AntennaLab is complete and requires no additional instrumentation or external power supplies. The system is PC-based, with all measurements for the hardware experimental work being performed by the PC. Signal levels, frequency response, azimuth and elevation plots, impedance, return loss and VSWR plots and 3-D visualisations are available.

Features



- **Unique integration of hardware & software**
- **Simulates, models and tests real antennas**
- **Hardware modelling between 1200MHz and 1800MHz**
- **NEC-2 based simulations**
- **PC measurement and results**
- **Rapid, graphic display of antenna characteristics**
- **Bench-top operation**
- **Low, safe power output**
- **USB interface**

BESA

Feedback

Description

AntennaLab 57-200 is an integrated package of antenna modelling hardware and antenna simulation software for teaching and demonstrating common antenna configurations at all levels of study. It can also be used as a design tool by those engaged in research and development of antenna systems.

AntennaLab is operated in conjunction with a PC and the whole system can easily be accommodated on a standard laboratory bench. The equipment comprises two towers, approximately 1 metre high, one of which contains a low-power generator controlled by a frequency synthesiser, and a motor/shaft encoder assembly to rotate the antenna under test. The antenna being investigated is mounted on a small platform on top of this tower.

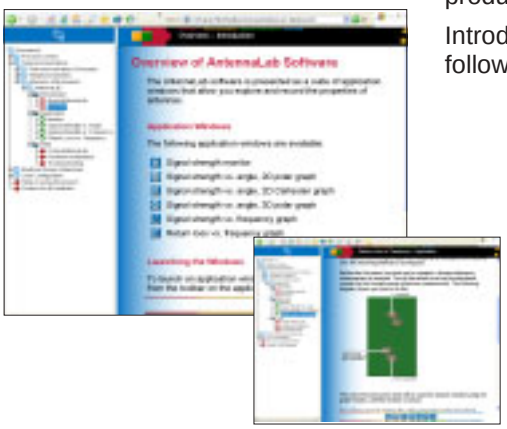
The 'receiver' tower contains a receiver controlled by a frequency synthesiser and produces a dc output representing the received signal intensity.
A broad-band array of log periodic antennas is mounted on this tower and is not changed in normal use. The receiver and generator synthesisers are synchronised, the two tower assemblies being linked by a five-metre multiway cable carrying both power and data. The 'generator' tower is linked to the microcomputer.

A selection of components is supplied with the system to enable most of the common antenna types to be constructed.

The measurements are controlled, and the results plotted by the microcomputer. The unique and powerful software provides the test interface & provides high quality graphical displays. There are no user adjustments required on the equipment itself, although it is necessary to connect up the required rf configuration for specific measurements. The results are quantitive and, within the limits of environmental factors, agree with theory.

A user-friendly, powerful antenna simulation software package is also an integral part of the AntennaLab system. This allows students to simulate theoretically those antennas that are provided in the package.
The assignments in the accompanying workbook use this unique combination of hardware modelling and software simulation to provide a powerful aid to understanding this important subject.

Discovery Software Environment



AntennaLab requires the associated Discovery Software to perform the assignments. Whether used in isolation or with other Discovery Software products, the structured content is displayed in a collapsible menu tree.

Introductory information about AntennaLab's approach to the subject is followed by details of the available application windows:

Signal strength monitor

Signal strength vs angle graph windows (2D cartesian or polar, 3D polar)

Signal strength vs frequency graph window

Return loss vs frequency graph window
(see illustrations)

Additional guidance is given on the installation of the hardware and the formatting and configuration of the graphing applications.

Other Discovery Software products offer a more interactive alternative to the traditional assignment manuals.

Simulation Software

The windows-based antenna simulation software uses the NEC-2 core and produces azimuth and elevation polar plots, surface plots, antenna impedance data, VSWR data and frequency performance tables.

Manuals Supplied

AntennaLab comes complete with all hardware, measurement software, simulation software, 57-200 Operator's Manual, Student's and Tutor's Workbooks, Simulation Software Manual and two reference textbooks.

Ancillary Equipment

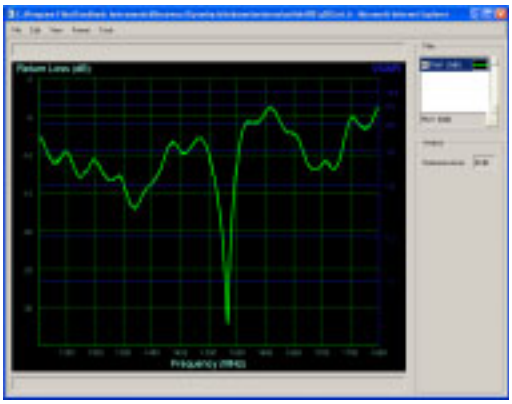
The minimum PC required to operate AntennaLab is a Pentium system with 64M RAM running Windows 98, 2000 and XP. At least 15MB hard disk space and USB interface is required.

Updating from AntennaLab 57-200 to USB version AntennaLab 57-200-USB.
The ISA-based AntennaLab 57-200 may be updated to the full USB specification with the purchase of Upgrade Pack 57-202.
This includes all of the extra hardware, Discovery software and manuals to provide the full upgrade.

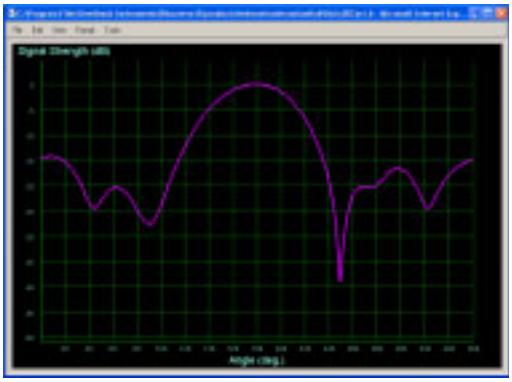
Curriculum Coverage

Assignments covered are:

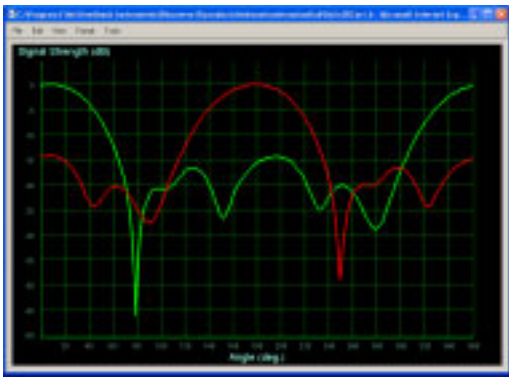
- Familiarisation
- The Dipole in Free Space
- Effects of the Surroundings
- Dual Sources
- Gain, Directivity and Aperture
- Ground Reflections
- The Monopole
- Phased Monopoles
- Resonance, Impedance and Standing Waves
- Return Loss and VSWR Measurements
- Parasitic Elements
- Multi-Element Parasitic Arrays
- Stacked and Bayed Arrays
- The Log Periodic Antenna
- The Horn Antenna
- The Dish Antenna
- Projects



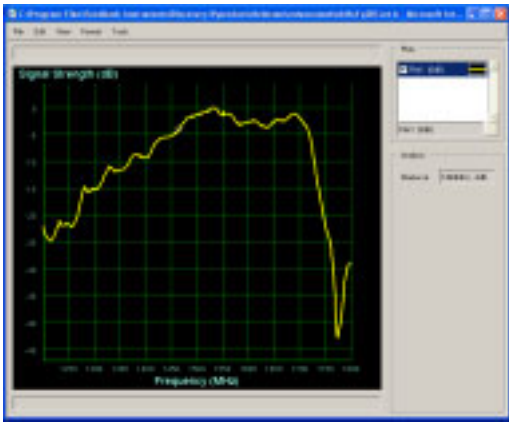
Return loss plot



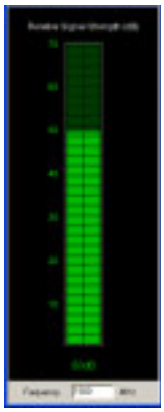
Single Cartesian plot



Multiple Cartesian plot



Yagi frequency plot

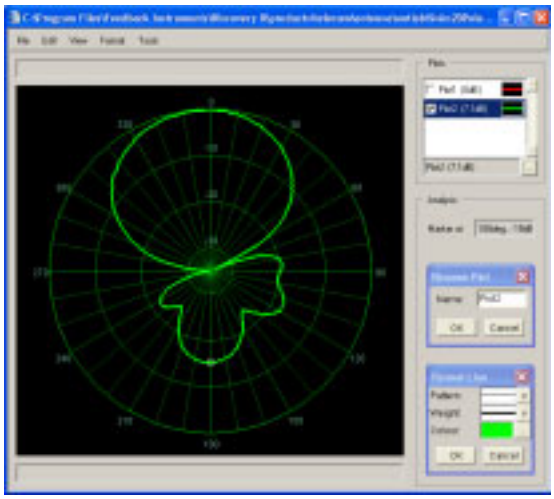


Signal amplitude bargraph

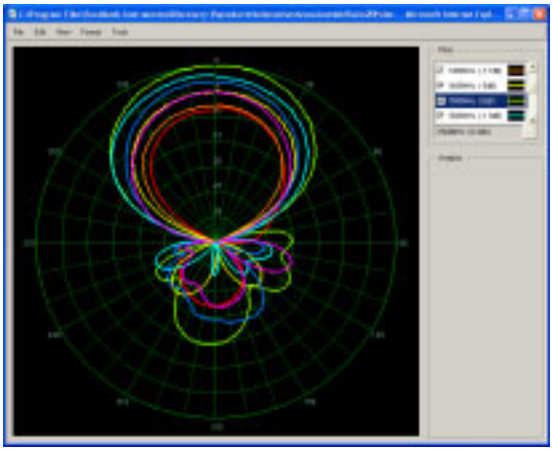
The following antennas are provided with AntennaLab:

- monopoles
- dipoles
- log-periodic arrays
- yagis
- horn
- dish

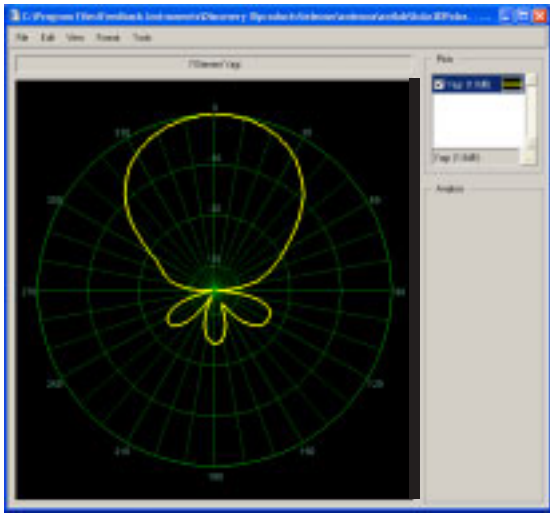
Additional antennas may be constructed and modelled by the user.



Single polar plot



Multiple polar plots



Yagi polar plot

Specification

Modelling Hardware

Operating frequency	1200 - 1800MHz.
Smallest frequency step	1MHz.
Transmitter power	10mW (max). 1mW (normally).
Receiver bandwidth	6MHz.
Receiver dynamic range	70dB.
Receiver output precision	8-bit.
Transmitter output impedance	50 ohms.
Receiver input impedance	50 ohms.
Receiver linearity	±1dB.
Maximum frequency step rate	25 per second.
Transmitter frequency accuracy	±100kHz.
Maximum antenna rotation speed	90 degrees/second.
Antenna position resolution	1 degree.
Receiver input for 1dB compression	5mW.
Transmitter output power variation over full frequency range	2dB.
Transmitter mismatch capability	Infinite.
RF connection system	SMB.
Normal receiving antenna	4 x 5 element log periodic.
Height of antenna towers	1 metre.
Distance apart	2 to 5 metres.
Computer connection	USB.
Antenna characteristics measured	● **Foward gain** ● **E & H plane polar plots** ● **3dB beamwidth** ● **Maximum side lobe** ● **Front to back ratio** ● **Polarization isolation** ● **Return loss.** *All above parameters are measured with respect to frequency.*

Accessories

Four-way power splitter/combiner	Wilkinson type fabricated on G10 microstrip with SMB terminations for use with the standard receiving antenna array.
Two-way power splitter/combiner	As above for use with transmitting array experiments.
Directional Coupler	10dB four-port coupler fabricated on G10 microstrip with a dielectric mode equaliser. Port termination SMB. Directivity 20dB. Used for measuring return loss.
Cables	Various lengths of miniature PTFE coaxial cables with SMB termination. Cable type RG316/U. Used to interconnect and provide the correct phasing to the various parts of the system.
Antenna types provided as standard	● **Dipoles** ● **Monopoles** ● **Phased arrays** ● **Parasitic array** (up to 8 element yagi) ● **Stacked and bayed yagis** ● **Log periodic** ● **Horn** ● **Dish** (0.6m dia.)
Tender Specification	A computer controlled Trainer comprising two towers, each approximately one metre high, one of which should be a low power generator, controlled by a frequency synthesizer, and a motor/shaft encoder assembly to rotate the antenna under test through at least 360°. The antenna system to be investigated should be mounted on top of this tower. The second tower should contain a receiver, controlled by a frequency synthesiser, which produces a dc output representing the received signal intensity. The system should operate in conjunction with a Pentium PC or compatible microcomputer with USB interface to display E & H plane polar diagrams and frequency responses over a range of ultra-high frequencies, and should also contain antenna simulation software. The whole system should easily be accommodated on a normal laboratory bench. An Operator's Manual, Student's and Tutor's Workbooks, Simulation Software Manual and two reference textbooks should be provided with the system.
Ordering Information	Order: 'AntennaLab 57-200-USB' Order: 'AntennaLab Upgrade kit (to full USB specification) 57-202'

Feedback
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