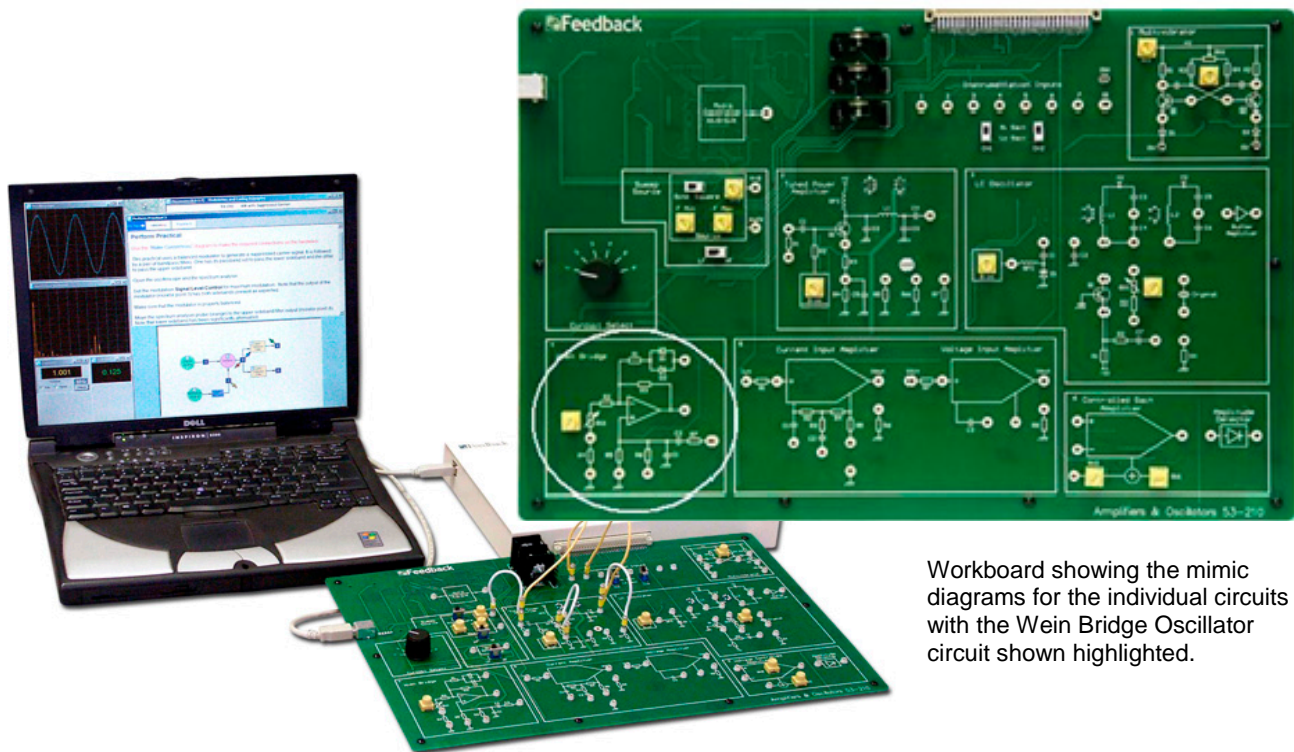


## Amplifiers and Oscillators

53-210



Workboard showing the mimic diagrams for the individual circuits with the Wein Bridge Oscillator circuit shown highlighted.

### Features

- Suitable for both technician and undergraduate teaching
- Complete trainer, requires only a PC
- Computer based assignments
- Covers an introduction to Amplifiers and Oscillators
- Integrated hardware and software environment
- On-screen background, theory and practical instructions
- Software provides embedded Instrumentation (includes Automatic Bode & Nyquist plot)
- No costly additional instrumentation required
- Stand-alone workstation

### Description

This modern training system provides a learning platform that involves the interaction between hardware, software, PC and the student. It has been specifically developed to convey the theory of a wide variety of subjects in a way that enhances the learning experience through visual presentation and interaction with the subject matter.

The Amplifier and Oscillators workboard (53-210) is one of a set of three that are related to the subject of Telecommunications. Two other workboards covering Tuned Circuits and Filters (53-220) and Modulation and Coding (53-230) are available, the complete set forming a comprehensive telecommunications course.

The Amplifiers and Oscillators workboard contains a variety of circuits that are studied individually and collectively by inter-connecting the various circuits together. These circuits consist of a Signal Source, Tuned Power Amplifier, LC Oscillator, Multivibrator, Wein Bridge Oscillator, Current and Voltage Amplifiers, Controlled Gain Amplifier, Amplitude Detector and Buffer Amplifier.

The workboard is connected to a PC via a USB Real-time Access Terminal (92-203 RAT). The RAT also provides all the necessary power supplies for the workboard to operate.

Integrated with the hardware is a comprehensive laboratory software package comprising full student instruction for performing the many assignments and practical activities, together with relevant background and theoretical information.

The software also provides the instrumentation required for the monitoring and measurement of the workboard signals.

Software for editing the course content is available, Discovery Tools (93-400) and for adding multimedia materials, Discovery Course Manager (93-410)

## Curriculum Coverage

The curriculum supplied with the 53-210 workboard is an integral part of the product installation supplied on CD. The assignments available are displayed on the screen for selection by the student, consisting of a choice of eleven main headings with up to four practical assignments under each heading.

### Familiarisation

Equipment connection and operation  
Using Discovery Software

### Voltage Amplifier

Amplifier gain and phase characteristic  
Amplifier input resistance  
Amplifier output resistance

### Current Input Amplifier

Amplitude and phase response  
Amplifier input resistance  
Amplifier output resistance

### Controlled Gain Amplifier

Gain controlled amplifier  
Automatic gain control

### LC Oscillator (Part 1)

The tuned amplifier  
Using the GPA (Gain Phase Analyser)  
Requirements for oscillation  
Oscillator stability

### LC Oscillator (Part 2)

Loading and buffering  
Varicap diode tuning

### Crystal Oscillator

Fundamental frequency operation  
Overtone operation

### Wein Bridge Oscillator

Oscillation point analysis  
Amplitude Stability

### Power Amplifier (Part 1)

Tuned power amplifier  
Amplifier input resistance  
Effect of different load resistances

### Power Amplifier (Part 2)

Variation of gain with bias voltage  
Variation of efficiency with bias voltage

### Multivibrator

The basic Multivibrator  
Multivibrator additional components (Mark/space ratio control)

## Specification

The software instruments provided are:

- 2-channel oscilloscope
- Spectrum Analyser
- Phase scope with phasor (vector) display
- Gain Phase Analyser (GPA)
- Frequency meter
- Voltmeter

### Dimensions & Weight

Dimensions: 410mm x 270mm x 60mm  
Weight: 1 kg.

### Tender Specification

- [1] A self-contained, telecommunications trainer.
- [2] To be used for teaching the principles of Amplifiers and Oscillators through the use of a work board.
- [3] The workboard to operate with a Real Time Access Terminal (RAT) enabling connection to a PC via a USB.
- [4] To be supplied with interactive software which includes teaching curricula and PC-based instrumentation.
- [5] The PC-based instruments to be allowed to be opened all at the same time in a Windows environment.
- [6] PC-based instruments to include all of the following: Oscilloscope, Spectrum Analyser, Frequency Meter, Voltmeter, Phase Meter and Gain Phase Meter.
- [7] Curriculum to cover Amplifiers and Oscillators.
- [8] Eleven assignments to be provided with up to four sub-practicals.
- [9] Standalone workstation with the option to add course manager and editing tools software packages.
- [10] Workboard to have dimensions approx. 410mm x 270mm x 60mm and weight approx. 1kg.
- [11] To be supplied with an experimental manual.
- [12] To be supplied by a company offering a 2 year parts and labour warranty.

### Ordering Information

Amplifiers and Oscillators Workboard 53-210  
USB Rapid Access Terminal (RAT) 92-203

### Discovery Development Software

Discovery Tools 93-400  
Discovery Course Manager 93-410



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