

Basic Electronics Series - 12-302 A.C. Resonant Circuits and Filters

Introduction

With over 50 years of experience in the design, manufacture and supply of high quality educational products, Feedback's 12-300 series of innovative workboards and ESPIAL software set new standards in the teaching of basic electronics.

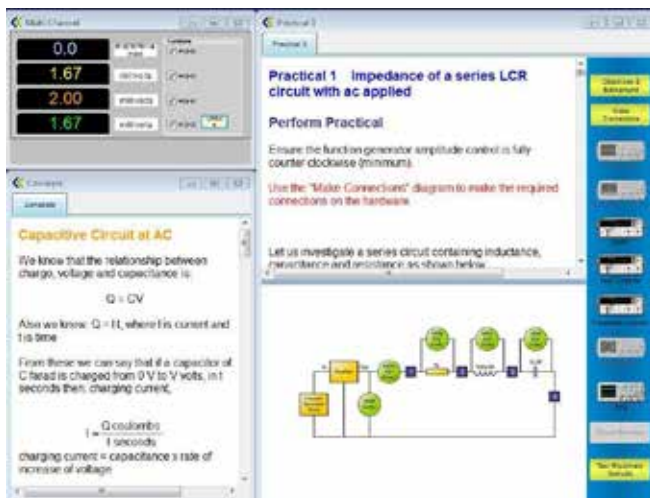
The 12-302 board introduces the concept of electrical impedance and teaches students how passive components behave under ac conditions. This is a natural progression from the 12-301 D.C. and A.C. Basics board. ESPIAL enables students to learn at their own rate by means of hands-on experimentation and measurement. Pre-constructed circuit elements may be connected in different ways

Teaching material and pc based instrumentation are which teaches the student the necessary theory in on screen instructions guide the student through the instrumentation allow results to be recorded.

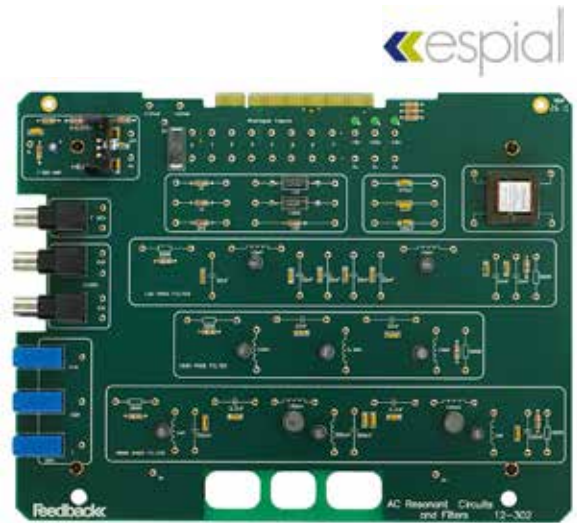
ESPIAL software provides a flexible and versatile I available resources in ways that are most suitable wide range of courses including degree foundation a

D.C. & A.C. Basics

The behaviour of resistive and reactive components associated phase lead and lag. This effect can be observed using the on-screen oscilloscope and phase-scope. The student can then measure the power which can be saved for future reference.



Screen showing the Feedback interactive ESPIAL software, the principles of the subject and then implement practical instruments .



to perform a series of assignments.

delivered by Feedback's own ESPIAL software, order to complete the practical experiments. On- set-up of the boards and the use of the

learning environment where students can use the for them. This makes the 12-300 series suitable for a nd vocational learning.

is studied under ac conditions along with the observed using the on-screen oscilloscope and dissipated in ac circuits using their results,

Resonance in ac circuits is then covered, with emphasis on the student being able to set up the experiment and to then observe its response using the on-screen instrumentation. Results can be saved for future analysis and presentation. Filters are then introduced using passive components and the method of recording the frequency response using Bode and Nyquist formats is demonstrated.

The board connects to the NI ELVIS II/II+ console which provide power and signal acquisition.

enabling the student to learn experiments using on-screen



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uits and Filters

Phase and Amplitude Shift in AC Circuits

- Study of the amplitude and phase shift in RC/LC circuits
- Concepts of phase lead and lag
- Use of virtual instrumentation to measure phase relationships

Impedance in Reactive Circuits

- Impedance of reactive circuits with a.c. applied
- Impedance of series and parallel connected components
- Power dissipated by components under a.c. conditions

Resonance

- Resonance of series and parallel LCR circuits
- Measurement and calculation of fundamental frequency

Filters

- 1st, 2nd, 3rd and 5th order low-pass filter
- 5th order high-pass filter
- 5th order band-pass filter

NI ELVIS Console

The National Instruments ELVIS II/II+ console provides the platform for the 12-300 series, also supplying power and signal acquisition. Contact your Feedback representative for more information.



Specifications for 12 - 302 board

Supply voltage: From NI ELVIS II/II+ console

Dimensions: 280 mm (w) x 20 mm (h) x 215 mm (d)

Specifications for NI ELVIS II/II+ Console

Supply voltage: 110 – 230 V a.c.

Dimensions: 343 mm (w) x 76 mm (h) x 280 mm (d)