

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.

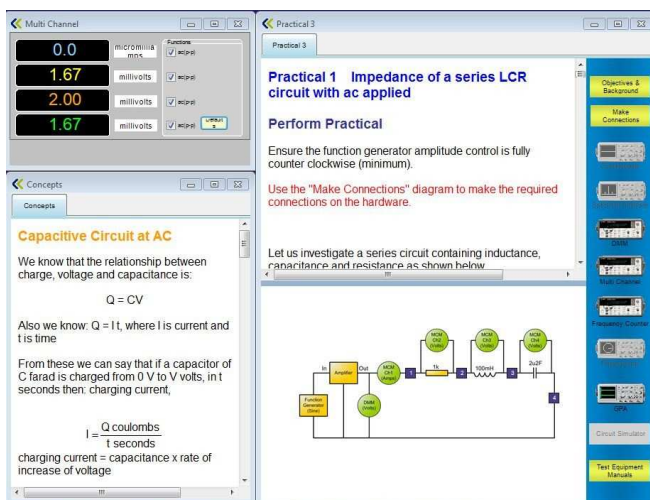
The 12-302 board introduces the concept of electrical impedance and teaches students how passive components behave under ac conditions. This is a natural progression from the 12-301 D.C. and A.C. Basics board. ESPIAL enables students to learn at their own rate by means of hands-on experimentation and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

Teaching material and pc based instrumentation are delivered by Feedback's own ESPIAL software, which teaches the student the necessary theory in order to complete the practical experiments. On-screen instructions guide the student through the set-up of the boards and the use of the instrumentation allow results to be recorded.

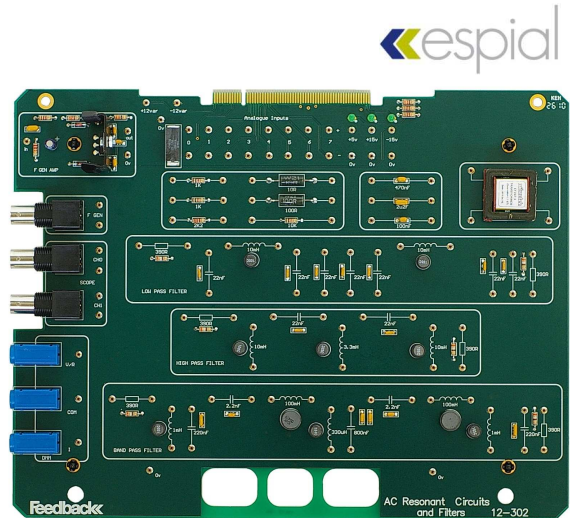
ESPIAL software provides a flexible and versatile learning environment where students can use the available resources in ways that are most suitable for them. This makes the 12-300 series suitable for a wide range of courses including degree foundation and vocational learning.

D.C. & A.C. Basics

The behaviour of resistive and reactive components is studied under ac conditions along with the 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 dissipated in ac circuits using their results, which can be saved for future reference.



Screen showing the Feedback interactive ESPIAL software, enabling the student to learn the principles of the subject and then implement practical experiments using on-screen instruments.



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.

espi

POWERED BY
NATIONAL INSTRUMENTS

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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 provide 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)



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Feedback reserves the right to change these specifications without notice