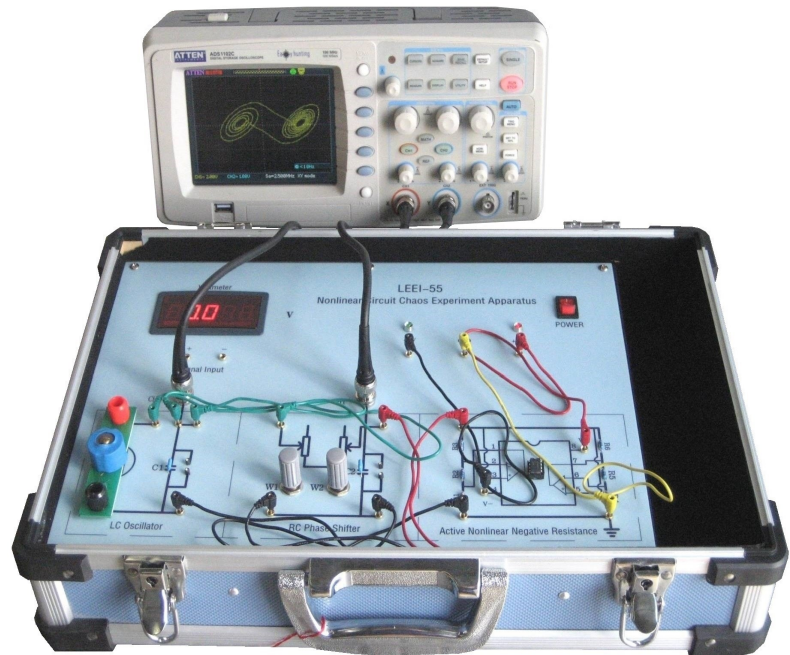


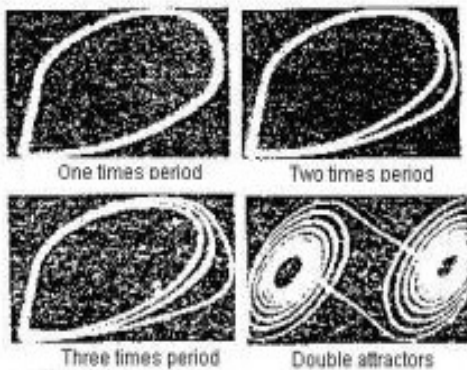
## LEEI-55 Nonlinear Circuit Chaos Experiment Apparatus

- *Simple circuit for demonstrating complicate phenomena*
- *Rich experimental contents and stable experimental results*
- *Durable and reliable with protective device, and affordable*



**Note:** oscilloscope not included

Nonlinear dynamics and associated bifurcation chaotic phenomena have received more and more attention in scientific research over the past two decades. Chaos phenomenon is related to physics, mathematics, biology, electronics, computer science, economics and other fields with widespread applications.



## Experimental Contents

1. Use RLC series resonance circuit to measure the inductance of a ferrite material at different currents;
2. Observe waveforms generated by a LC oscillator on an oscilloscope before and after RC phase-shifting;
3. Observe phase figure of the above two waveforms (i.e. Lissajous figure);
4. Observe periodic variations of the phase figure by adjusting the resistor of the RC phase shifter;
5. Draw phase figures of bifurcations, intermittency chaos, triple times period, attractor, & double attractors;
6. Measure V-I characteristics of a nonlinear negative resistance device made of a LF353 dual op-amp;
7. Explain the cause of chaos generation using the dynamics equation of nonlinear circuit.

## Specifications

Digital voltmeter	4-1/2 digit, range: 0 ~ 20 V, resolution: 1 mV
Nonlinear element	LF353 dual Op-Amp with six resistors
Power supply	$\pm 15$ VDC

## Part List

Main unit	1
Inductor	1
Magnet	1
LF353 Op-Amp	2
Jumper wire	11
BNC cable	2

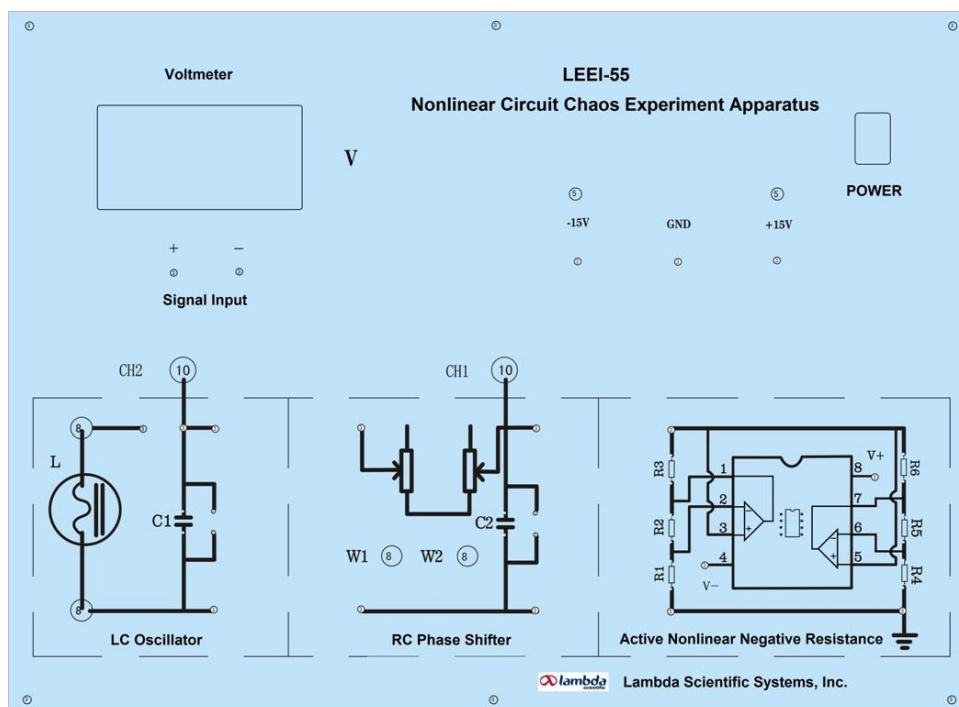


Diagram of top panel