

*PSI 2327- Laboratório de Eletrônica II*

*ELVIS*

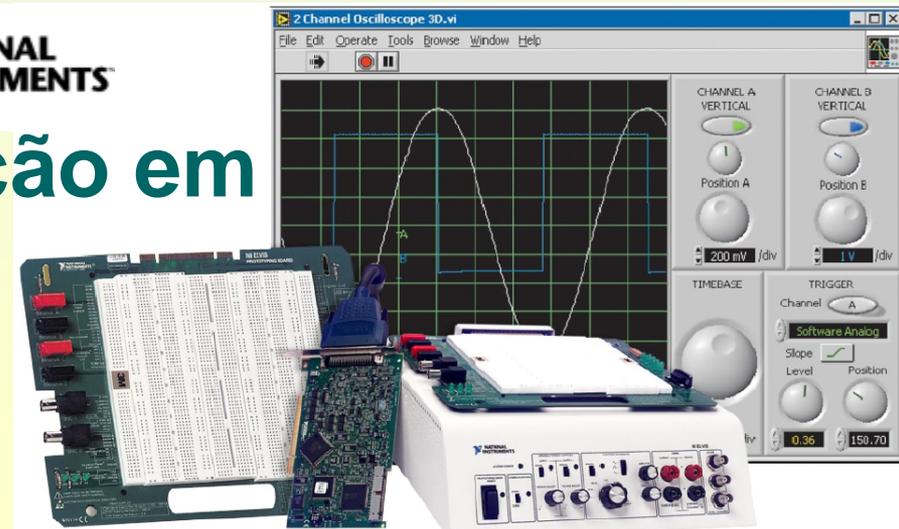
**Escola Politécnica da Universidade de São Paulo**

**Departamento de Engenharia de Sistemas Eletrônicos**

# ELVIS

## *Electronic Laboratory Virtual Instrument System*

- Equipamento didático
- Compatível com LabVIEW
- Produzido pela
- Recebido como doação em 2005
- Vocês vão testá-lo





ELVIS

COMPUTADOR

Escola Politécnica - USP  
PSI - Departamento de Eng. de Sistemas Eletrônicos

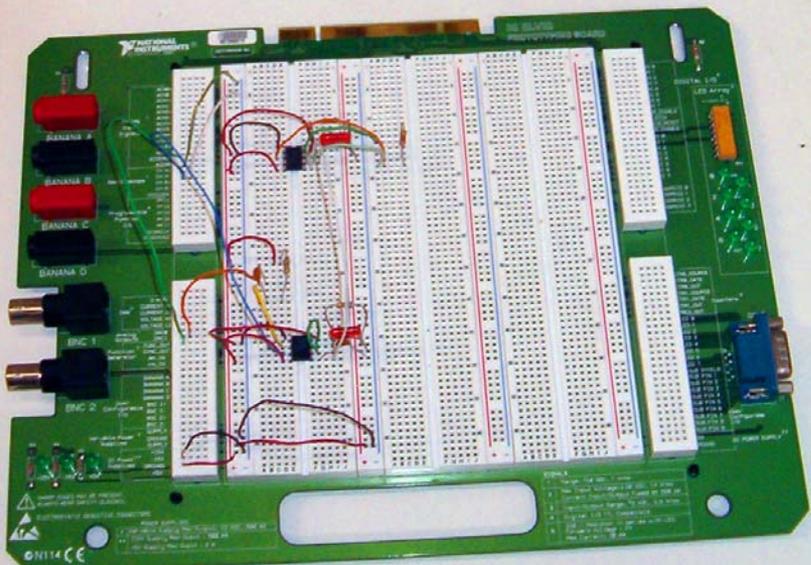


PSI2327 Laboratório de Eletrônica II  
Exp. 5: Multivibradores Astável e Monostável

Aluno: \_\_\_\_\_  
Turma: \_\_\_\_\_  
Prof. \_\_\_\_\_  
Data: \_\_\_\_\_

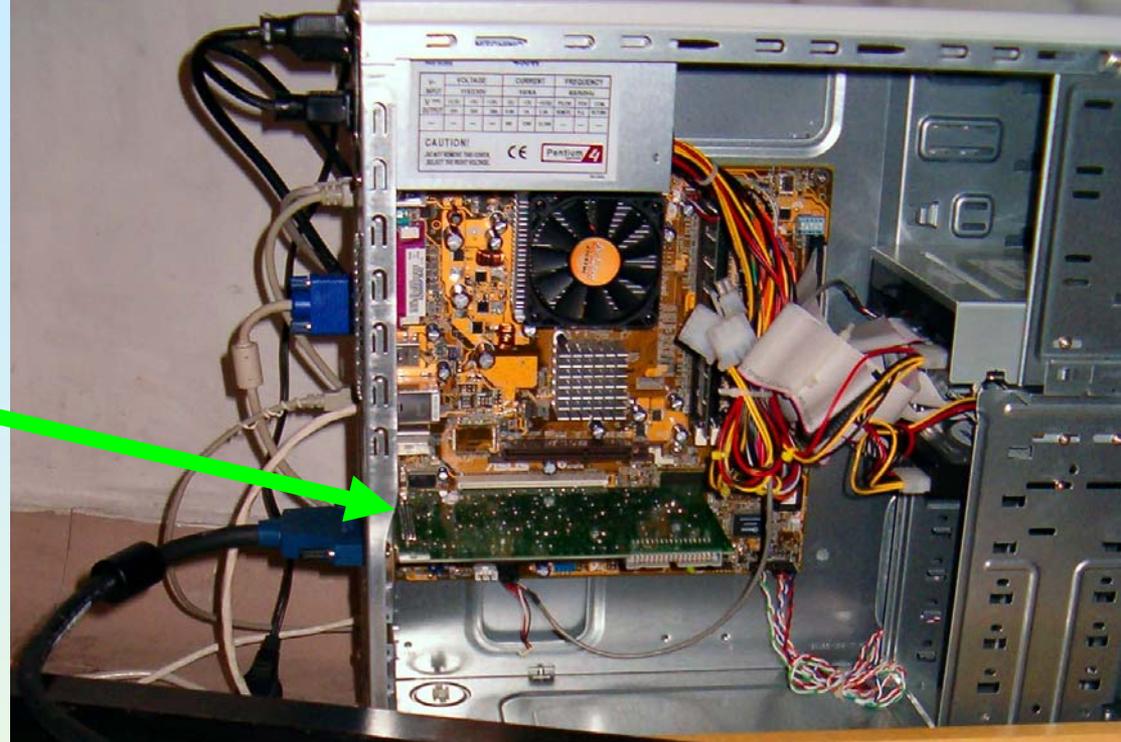
2006

ELVIS



PLACA  
NI-DAQ

**PLACA  
NI-DAQ**



**COMPUTADOR**





NI ELVIS

SYSTEM POWER

PROTOTYPING BOARD POWER

COMMUNICATIONS

BYPASS

NORMAL

VARIABLE POWER SUPPLIES

SUPPLY - SUPPLY +

MANUAL

MANUAL

VOLTAGE

VOLTAGE

-12 0

0 +12

FUNCTION GENERATOR

MANUAL



AMPLITUDE

FINE FREQUENCY

5 kHz 50 kHz 250 kHz  
500 Hz 50 Hz

COARSE FREQUENCY

DMM CURRENT VOLTAGE

HI HI  
LO LO

FUSED AT 500 mA 20 VDC MAX 14 Vrms MAX

SCOPE CH A

CH B

TRIGGER

10 VDC, 7 Vrms MAX



# NI ELVIS

## FUNCTION GENERATOR

FUNCTION GENERATOR controls:

- Waveform selector: Sine, Square, Triangle
- COARSE FREQUENCY: 50 kHz, 250 kHz
- FINE FREQUENCY
- AMPLITUDE
- STATUS LED: Green

## DMM

DMM (Digital Multimeter) terminals:

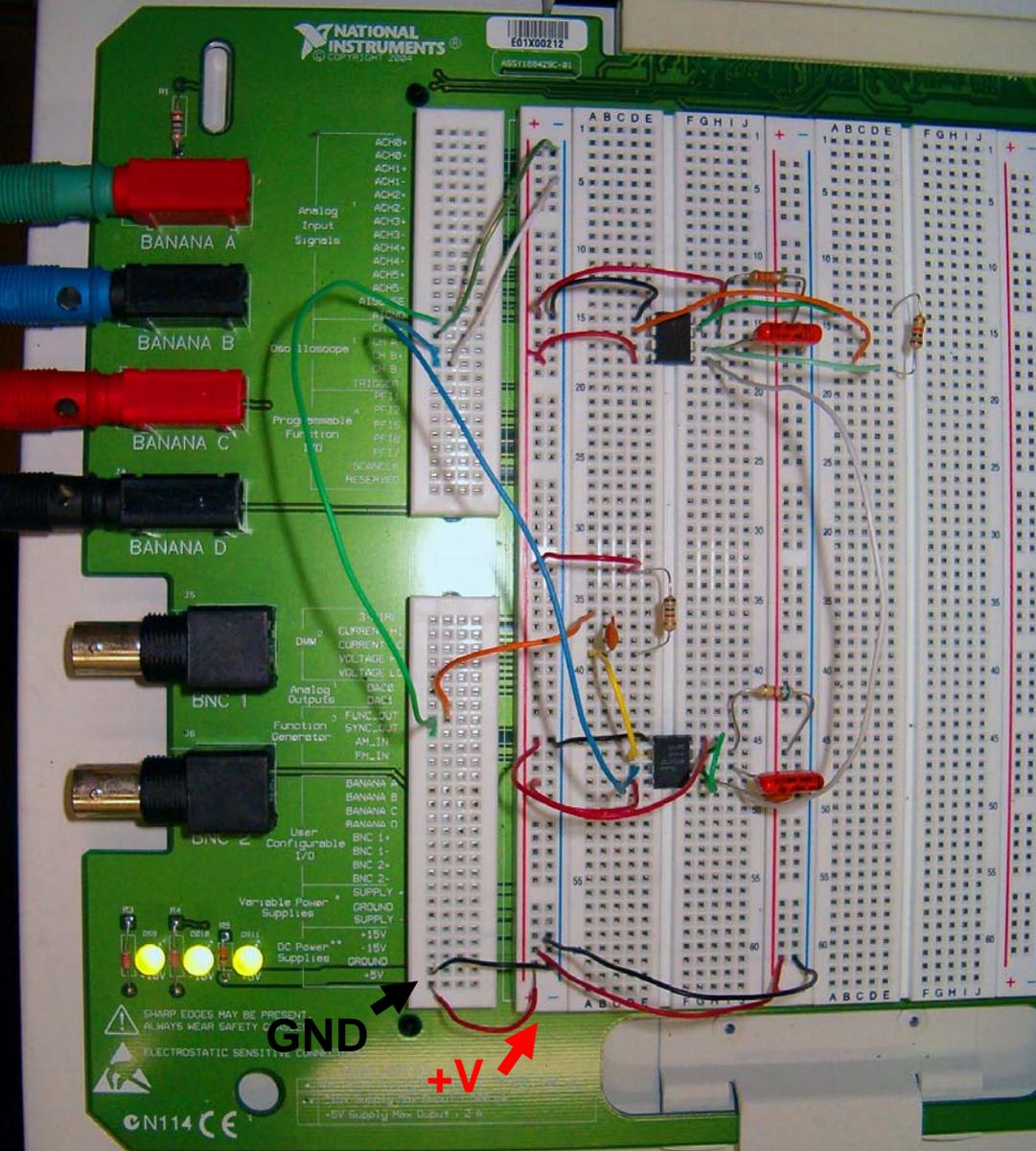
- CURRENT: HI (Red), LO (Black)
- VOLTAGE: HI (Red), LO (Black)
- Labels:  $\Omega$ ,  $\rightarrow$ ,  $\mu$ , mA, A, 20V
- Warning: FUSED AT 500 mA

## SCOPE

SCOPE (Oscilloscope) connectors:

- Two BNC connectors with probes
- One SMA connector
- Label: 10 VDC, 7 Vrms MAX

ELECTROSTATIC SENSITIVE CONNECTORS



CIRCUITO  
MULTIVIBRADOR  
ASTÁVEL

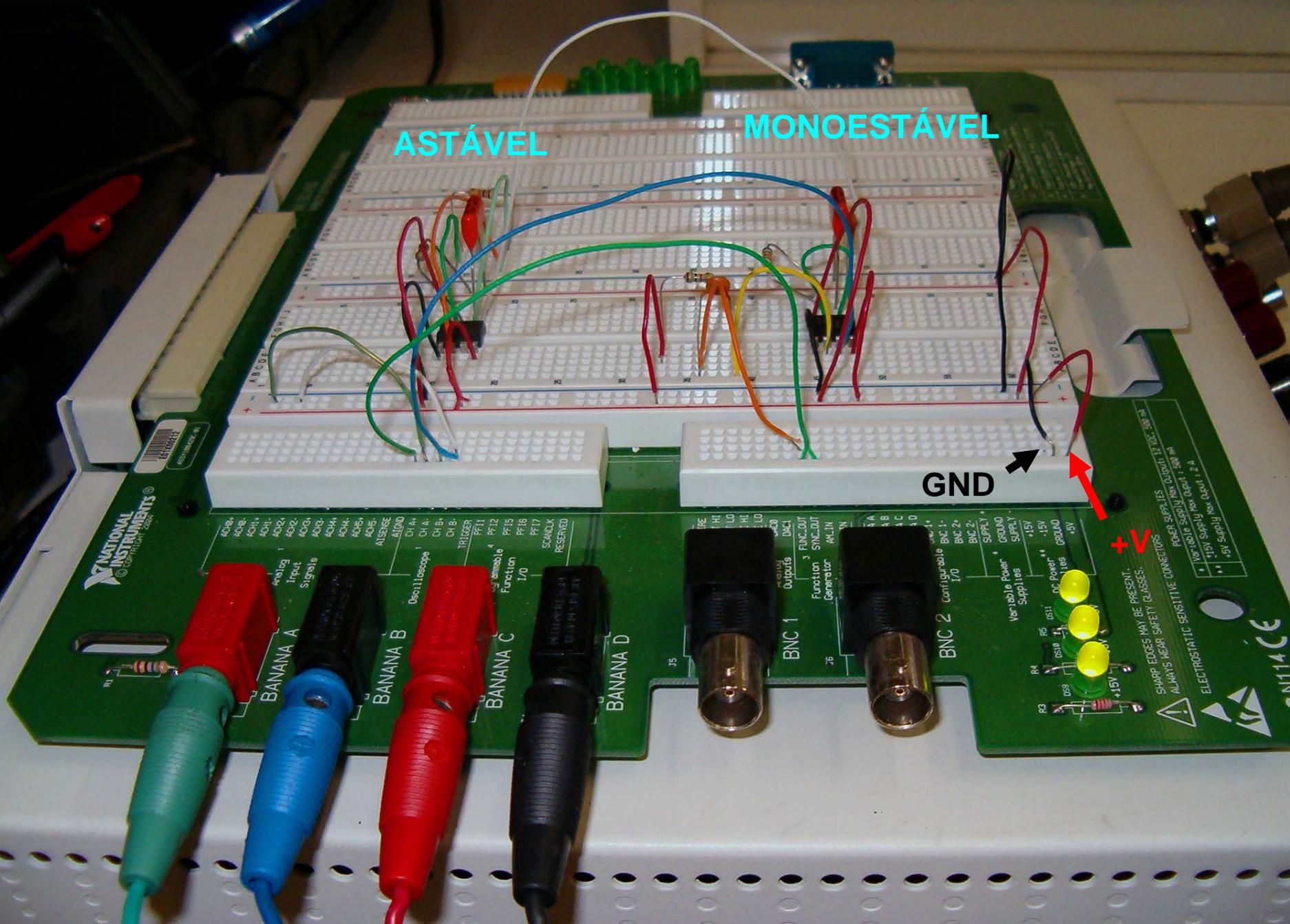
CIRCUITO  
MULTIVIBRADOR  
MONOESTÁVEL

ASTÁVEL

MONOESTÁVEL

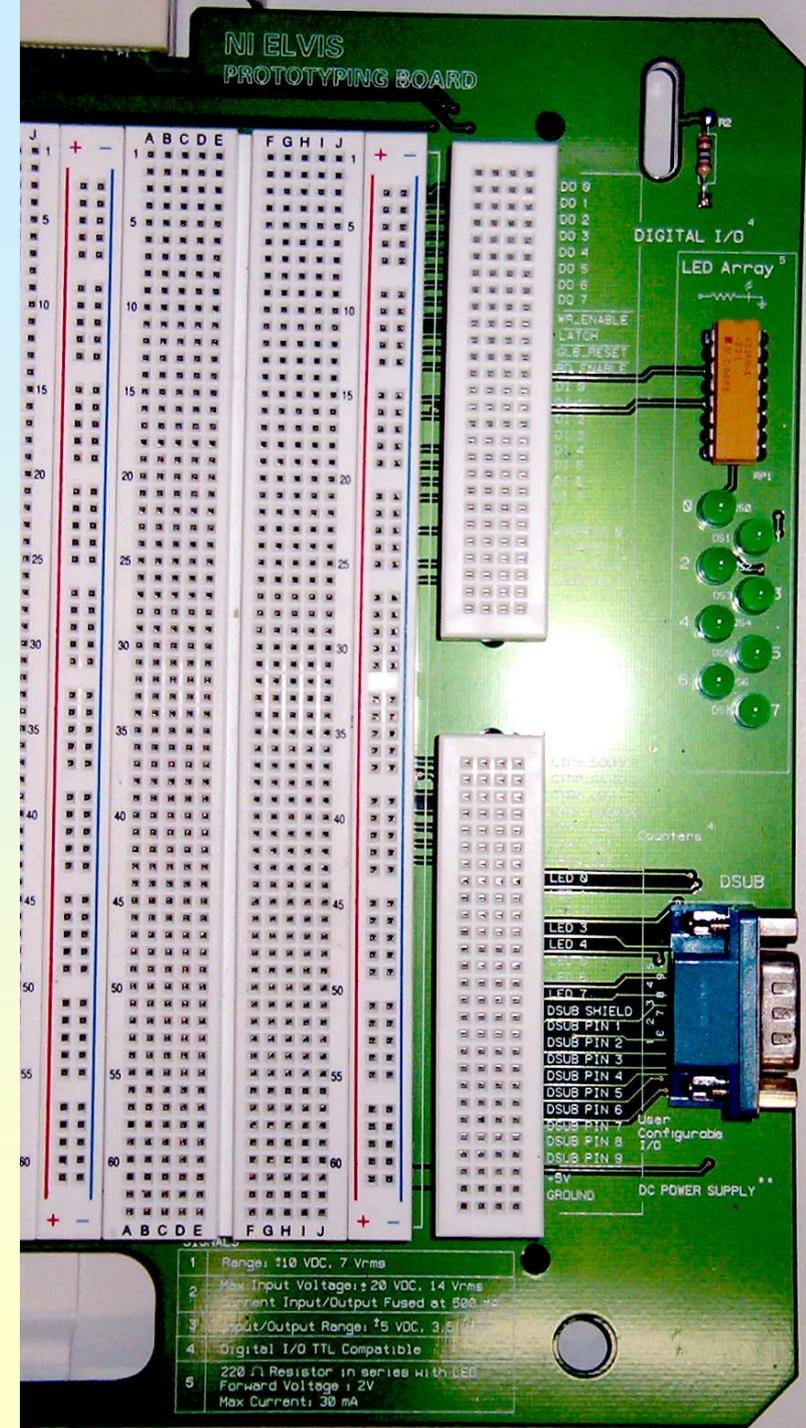
GND

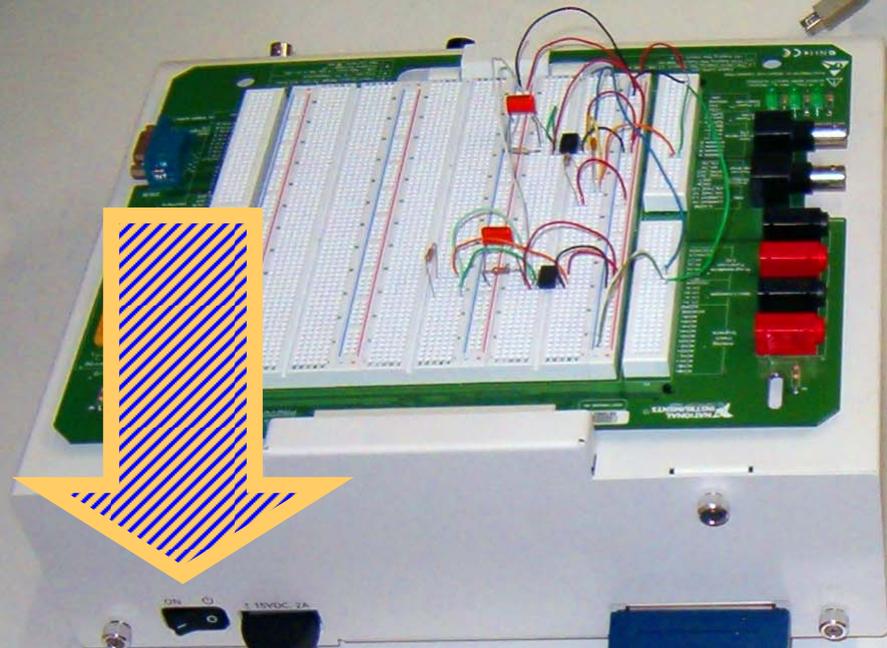
+V



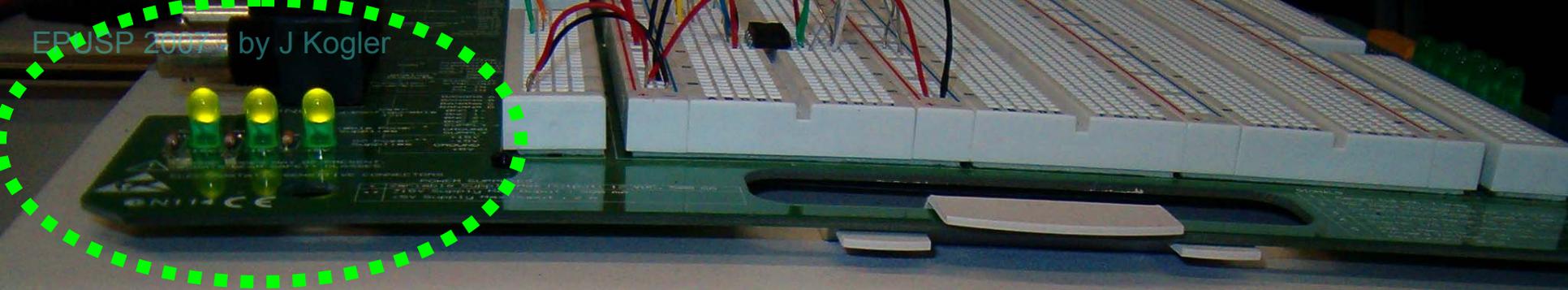
# Outros recursos

- LEDs para monitoração de níveis lógicos
- Conector para diversos sinais enviados por um mesmo cabo





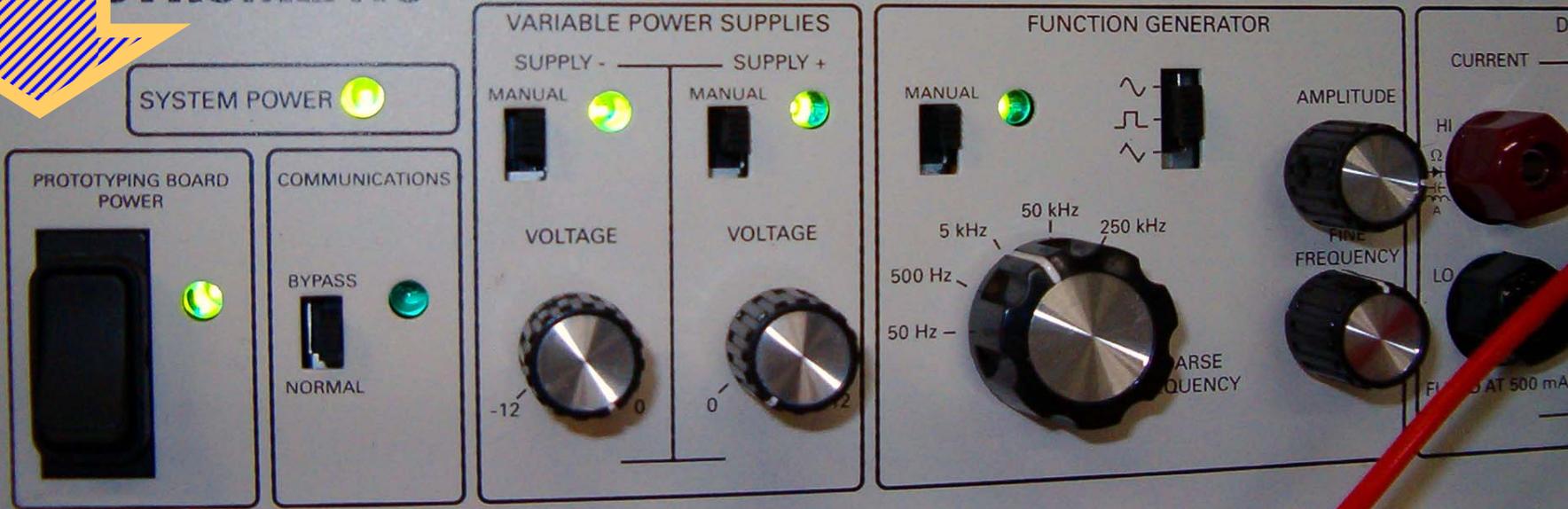
- Primeiro passo:
- Ligar o ELVIS



Energizar a placa de desenvolvimento apenas quando for realizar alguma medida



ATIONAL  
STRUMENTS



ELVIS - Instrument Launcher  
EPUSP 2007 - by J Kogler

**NATIONAL INSTRUMENTS** **NI ELVIS**

NI Educational Laboratory Virtual Instrumentation Suite

Configure

Digital Multimeter

Oscilloscope

Function Generator

Variable Power Supplies

Bode Analyzer

Dynamic Signal Analyzer

Arbitrary Waveform Generator

Digital Reader

Digital Writer

Impedance Analyzer

Two-Wire Current-Voltage Analyzer

Three-Wire Current-Voltage Analyzer

Launch LabVIEW

**LabVIEW** v 3.0



**NI ELVIS - Configure Hardware**

DAQ Device

Dev1: PCI-MIO-16E-1

Communications

Status

Communication established successfully.

Check

NI ELVIS Benchtop Workstation

Reset

OK Cancel



ELVIS - Instrument Launcher  
EPUSP 2007 - by J Kogler

**NATIONAL INSTRUMENTS** **NI ELVIS**

NI Educational Laboratory Virtual Instrumentation Suite

Configure

Digital Multimeter

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Launch LabVIEW

**LabVIEW** v 3.0

**LIGAR → BOTÃO TRASEIRO**



**NI ELVIS - Configure Hardware**

DAQ Device

Dev1: PCI-MIO-16E-1

Communications

Status

Communication established successfully.

Check

NI ELVIS Benchtop Workstation

Reset

OK Cancel

**Esqueceu o primeiro passo:**

- **Ligar o ELVIS**

NI ELVIS

LabVIEW

Measurement & Automation

Waveform Editor

ELVIS stuff

NI ELVIS 3

LAB

papers

RAMAIS LSI.doc

start

ELVIS - Instrument L...

EN

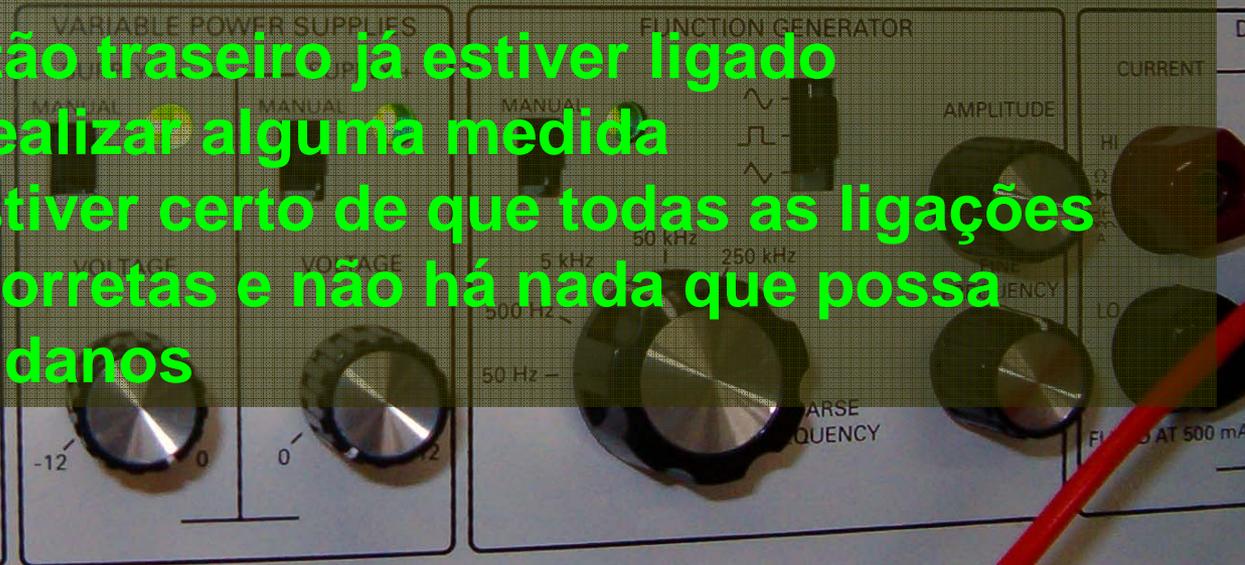
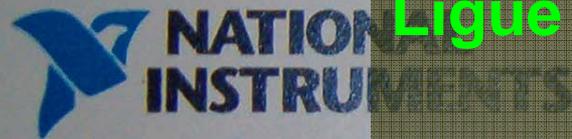
08:14 quarta-feira

## LIGAR → BOTÃO DIANTEIRO

Se o botão traseiro não estava ligado,  
O dianteiro também não deveria estar.

Ligue o botão dianteiro somente quando:

- 1-O botão traseiro já estiver ligado
- 2-For realizar alguma medida
- 3-Se estiver certo de que todas as ligações estão corretas e não há nada que possa causar danos



ELVIS - Instrument Launcher

NATIONAL INSTRUMENTS NI ELVIS

NI Educational Laboratory Virtual Instrumentation Suite

- Configure
- Digital Multimeter
- Oscilloscope
- Function Generator
- Variable Power Supplies
- Bode Analyzer
- Dynamic Signal Analyzer
- Arbitrary Waveform Generator
- Digital Reader
- Digital Writer
- Impedance Analyzer
- Two-Wire Current-Voltage Analyzer
- Three-Wire Current-Voltage Analyzer

Launch LabVIEW

LabVIEW v 3.0

Launch LabVIEW/ELVIS Source code/Examples

NI ELVIS - Digital Multimeter

NATIONAL INSTRUMENTS FGEN in MANUAL mode

**-1,260 mV DC**

% FS

Function: **V=** (DC Voltage)

Range: VDC 20 10 1 **100m**

Run Single

HELP ?

### NI ELVIS - Digital Multimeter

NATIONAL INSTRUMENTS FGEN in MANUAL mode

# 5,135 V DC

% FS

V= V~ A= A~ Ω ±|± Ω|Ω| ▶ ⌋

Function

VDC 20 10 1 100m

Auto ■ ■ ■ ■

Range

Null Run Single HELP ?

NATIONAL INSTRUMENTS

SYSTEM POWER

PROTOTYPING BOARD POWER

COMMUNICATIONS BYPASS NORMAL

VARIABLE POWER SUPPLY

SUPPLY - SUPPLY +

MANUAL MANUAL

VOLTAGE VOLTAGE

FUNCTION GENERATOR

MANUAL

50 kHz 250 kHz

500 Hz

COARSE FREQUENCY

AMPLITUDE

FREQUENCY

DMM

CURRENT VOLTAGE

HI HI

LO LO

FUSED AT 500 mA

20 VDC MAX 14 Vrms MAX

10 VDC 7 Vrms MAX

SCOPE CHA

ELECTROSTATIC SENSITIVE CONNECTORS

# Medida de Resistência

ELVIS - Instrument Launcher

NATIONAL INSTRUMENTS NI ELVIS

NI Educational Laboratory Virtual Instrumentation Suite

- Configure
- Digital Multimeter
- Oscilloscope
- Function Generator
- Variable Power Supplies
- Bode Analyzer
- Dynamic Signal Analyzer
- Arbitrary Waveform Generator
- Digital Reader
- Digital Writer
- Impedance Analyzer
- Two-Wire Current-Voltage Analyzer
- Three-Wire Current-Voltage Analyzer

Launch LabVIEW

LabVIEW v 3.0

Launch LabVIEW/ELVIS Source code/Examples

NI ELVIS - Digital Multimeter

NATIONAL INSTRUMENTS

FGEN in MANUAL mode

**-1,260 mV DC**

% FS

Function: **V=** **V~** **A=** **A~** **Ω** **+****+** **∞Ω** **▶** **)))**

DC Voltage

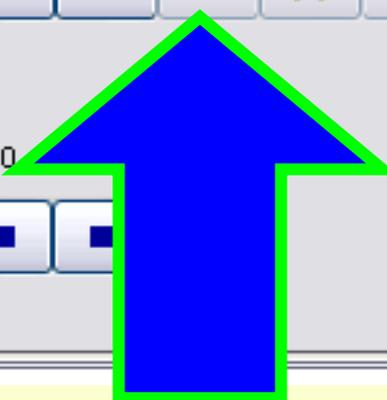
VDC 20 10

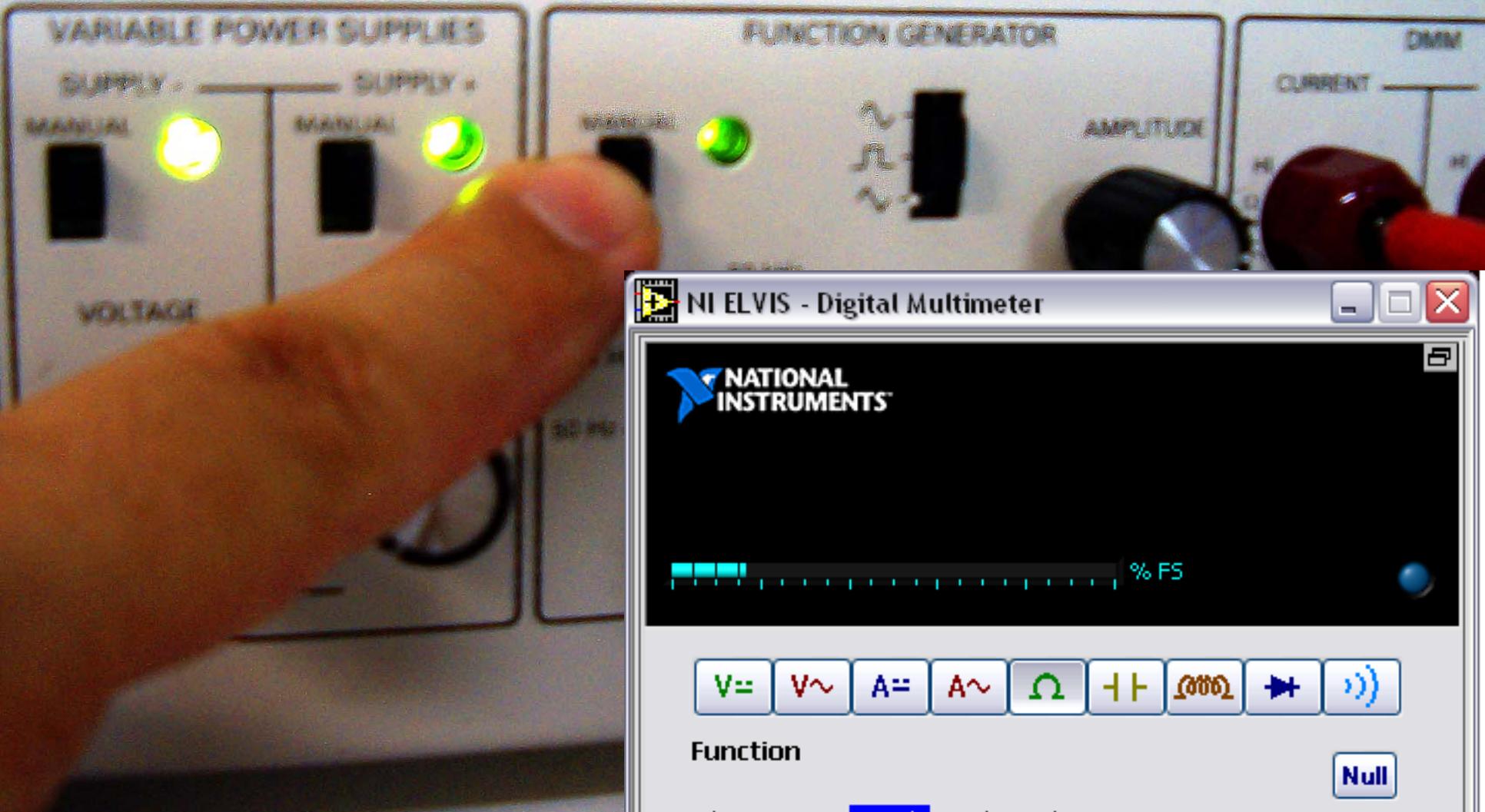
Range: **Auto** **■** **■** **■**

Run Single

Null

HELP ?





**NI ELVIS - Digital Multimeter**

NATIONAL INSTRUMENTS

% FS

V= V~ A= A~ Ω  $\frac{1}{f}$   $\frac{1}{f}$   $\frac{1}{f}$   $\frac{1}{f}$

Function

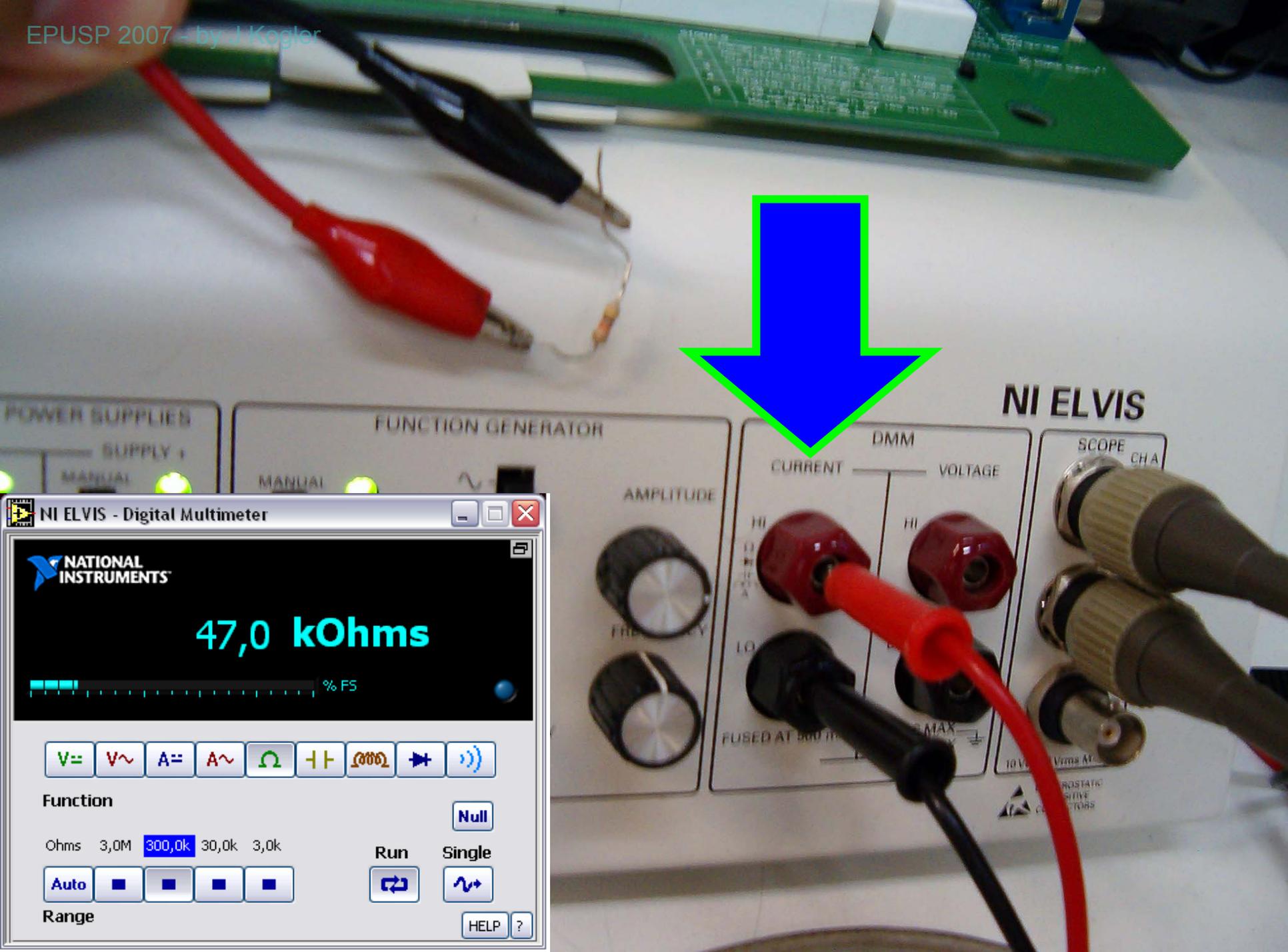
Ohms 3,0M 300,0k 30,0k 3,0k

Auto

Range

Null Run Single

HELP ?



NI ELVIS - Digital Multimeter

NATIONAL INSTRUMENTS

47,0 kOhms

% FS

V= V~ A= A~ Ω + -

Function

Ohms 3,0M 300,0k 30,0k 3,0k

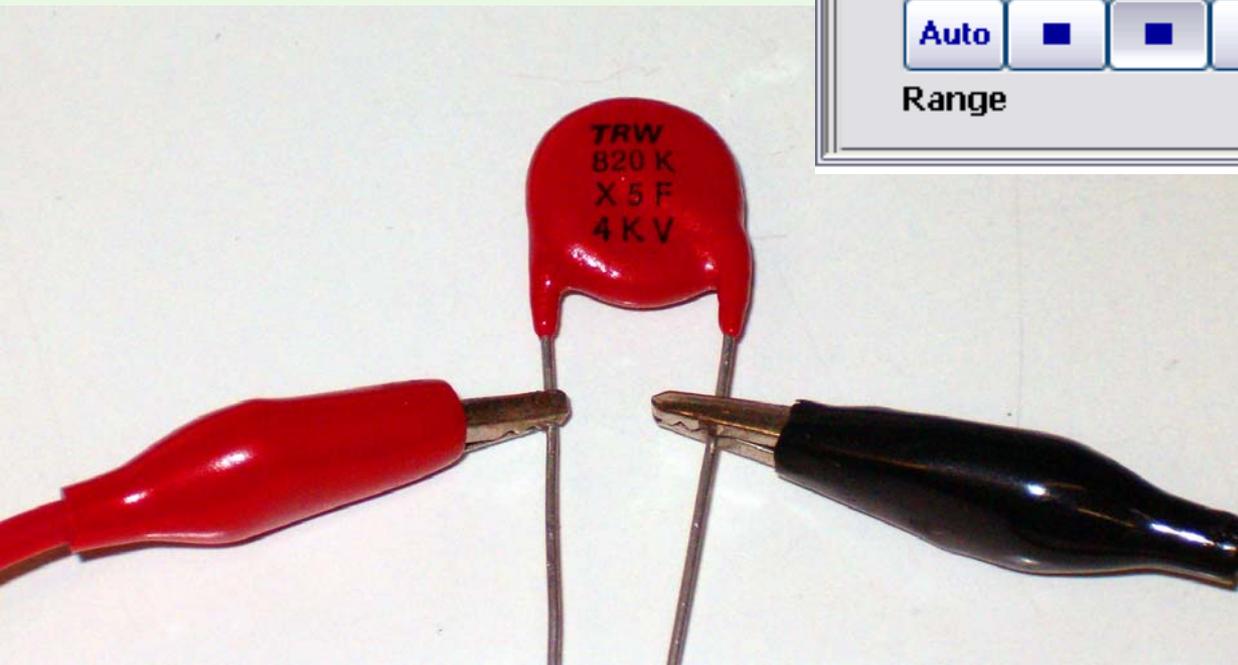
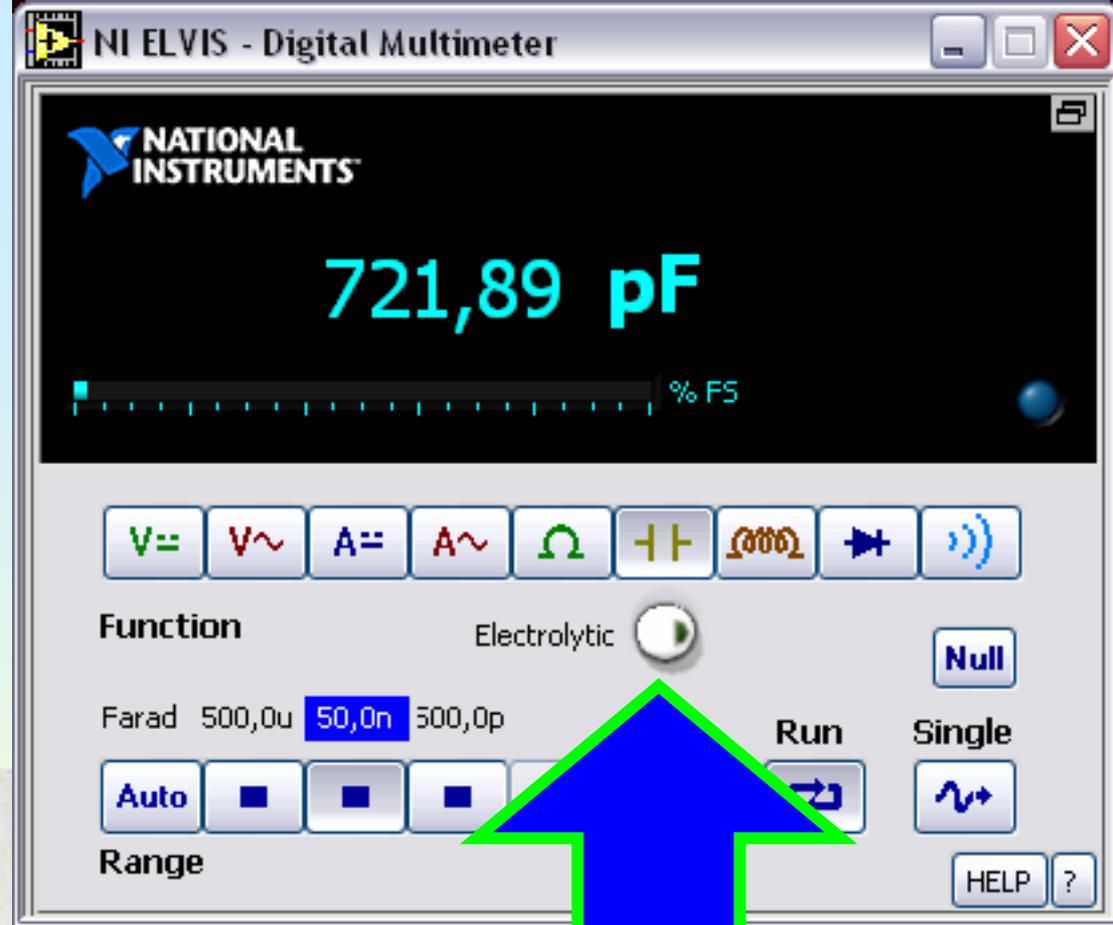
Auto

Range

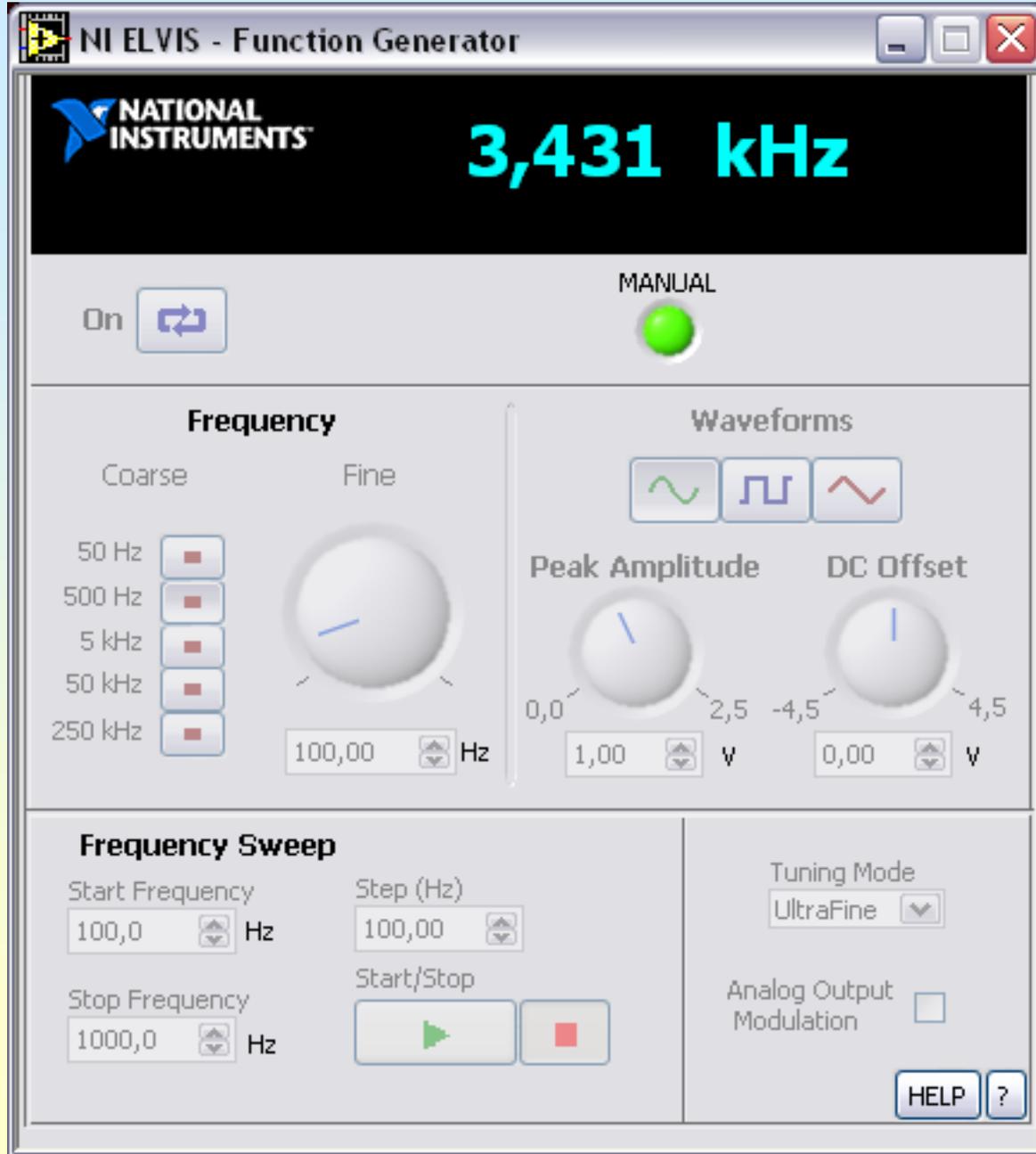
Run Single

HELP ?

# Medida de Capacitância



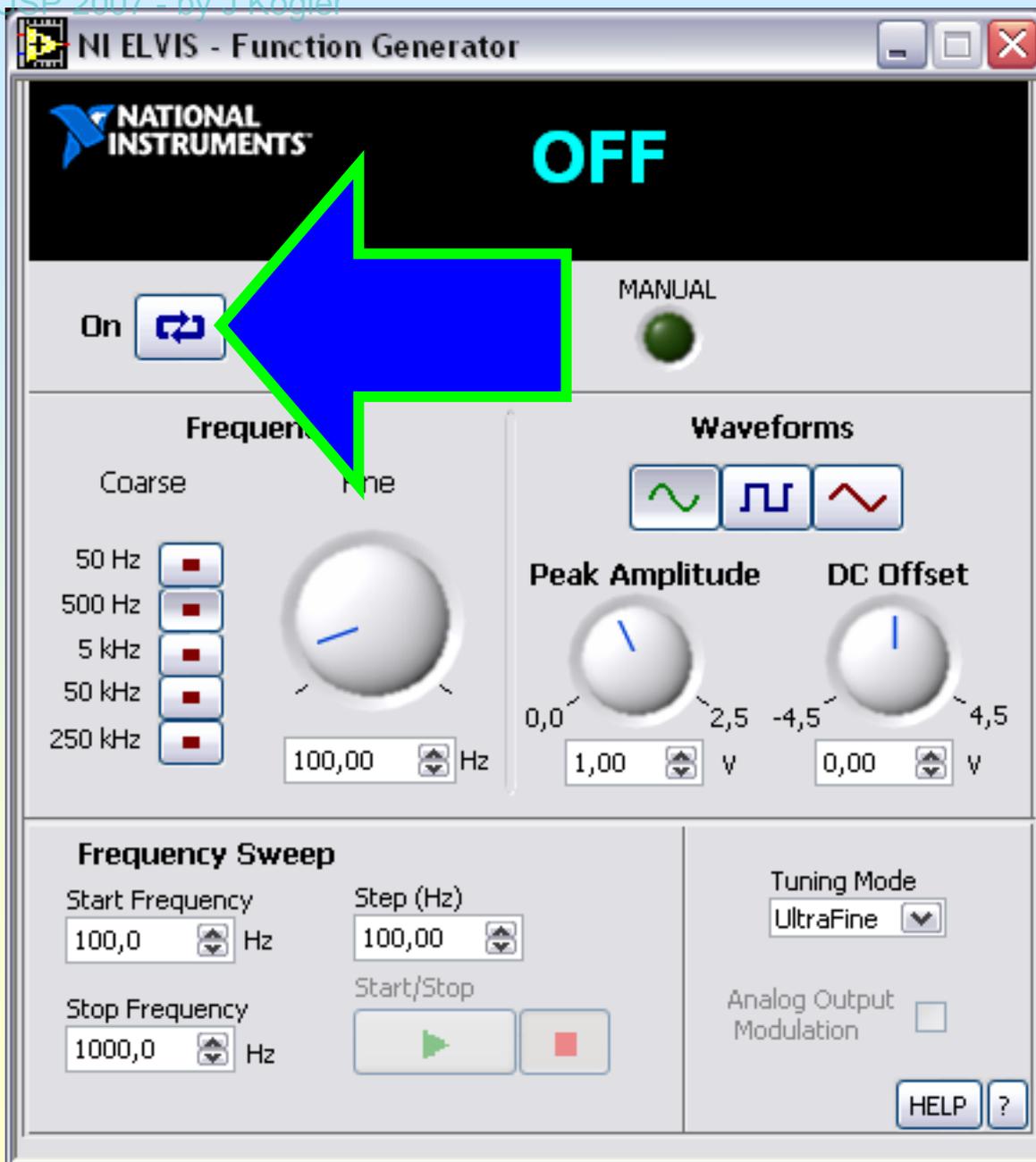
para  
eletrolíticos



**Gerador  
de  
Funções**

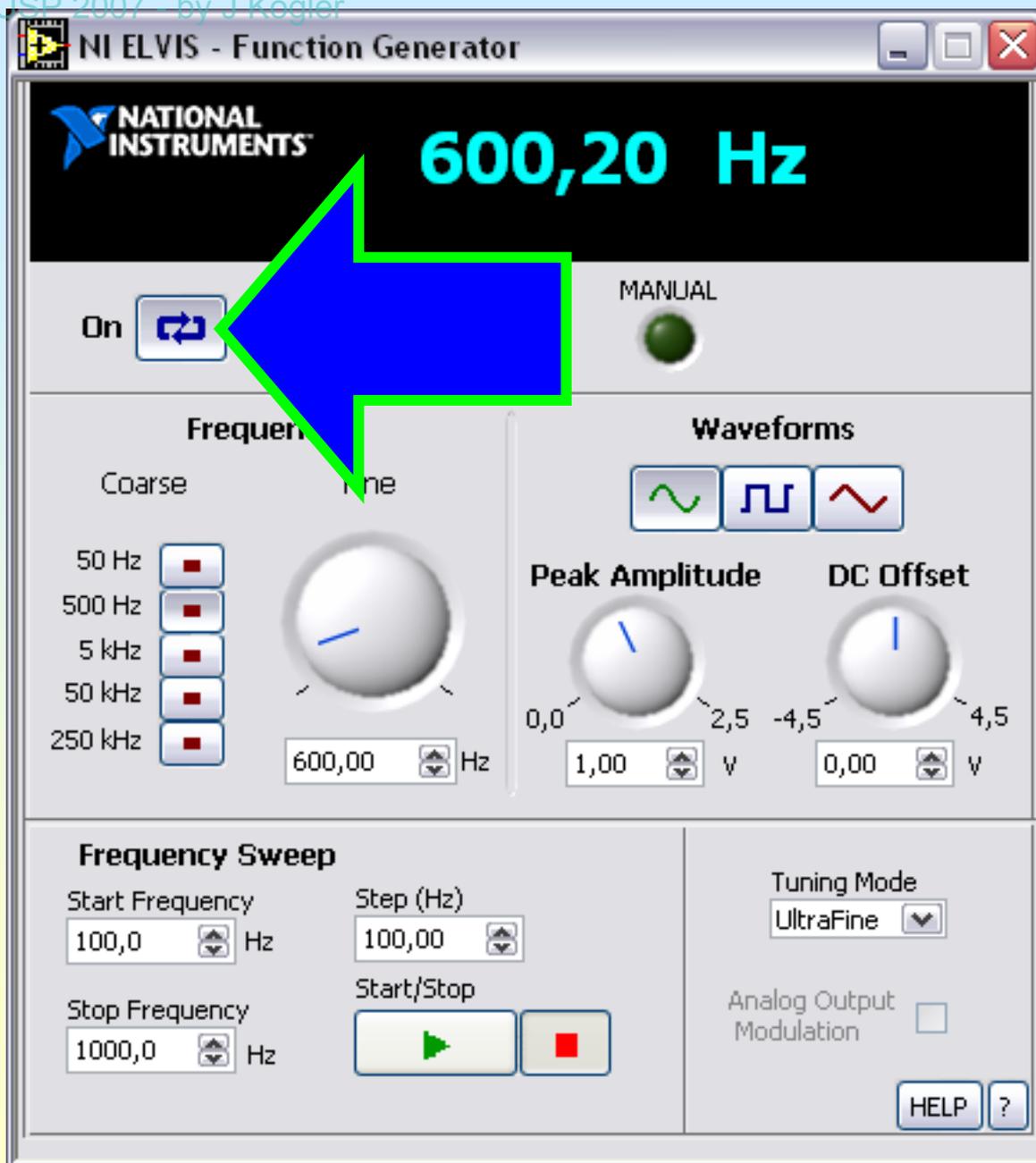
**Modo  
manual**





Gerador  
de  
Funções

Modo  
virtual



**Gerador  
de  
Funções**

**Modo  
virtual**



# NI ELVIS

NI Educational Lab Instrument

- Configure
- Digital Multimeter
- Oscilloscope
- Function Generator
- Variable Power Supply
- Bode Analyzer
- Dynamic Signal Analyzer
- Arbitrary Waveform Generator
- Digital Storage Oscilloscope
- Digital Storage Oscilloscope
- Impedance Analyzer
- Two-Wire Current Source
- Three-Wire Current Source

### NI ELVIS - Oscilloscope

Sample Rate: 40 kS/s

Cursors: C1: C2: dT:  
CH A Meas: RMS: 112,01 mV Freq: 207,952 Hz Vp-p: 176,08 mV

#### CHANNEL A

Display:

Source: BNC/Board CH A

VERTICAL Position:

Scale: 2 V /div

Coupling: DC

#### CHANNEL B

Display:

Source: BNC/Board CH B

VERTICAL Position:

Scale: 2 V /div

Coupling: DC

#### TIMEBASE

/div

#### TRIGGER

Source: Immediate

Type: Digital

Level (V): 0,00

Slope:

Run  Single

Log

Timeout

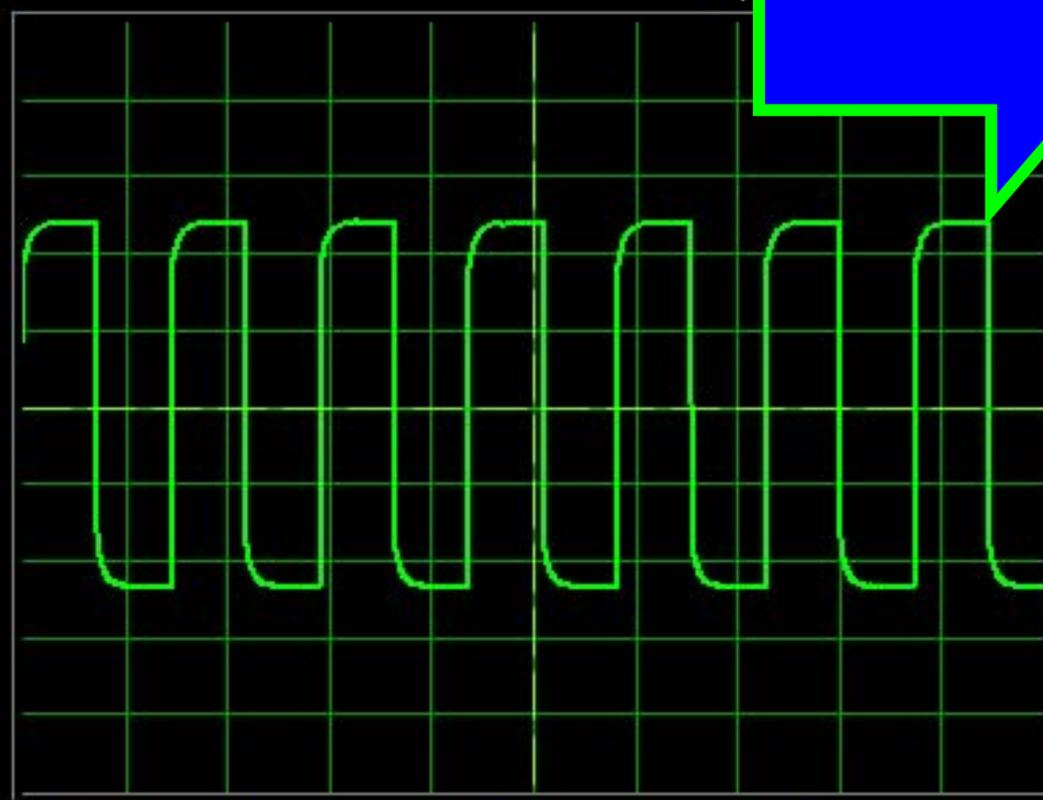
Acquired

C1 CH A C2 CH A

Launch LabVIEW



v 3.0



Cursors: C1: C2: dT:  
 CH A Meas: RMS: 2,315 V Freq: 3,432 kHz Vp-p: 4,736 V

**CHANNEL A**

Display  ON  MEAS

**CHANNEL B**

Display  OFF  MEAS

Source BNC/Board CH A

Source CH B

**VERTICAL**

Position  ZERO

Scale 1 V /div

Coupling DC  Autoscale

**VERTICAL**

Position  ZERO

Scale 2 V /div

Coupling DC  Autoscale

**TIMEBASE**

200  $\mu$ s /div

**TRIGGER**

Source CH A

Level (V)  0,00

Type Analog

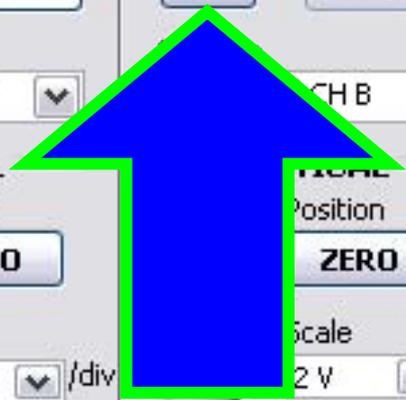
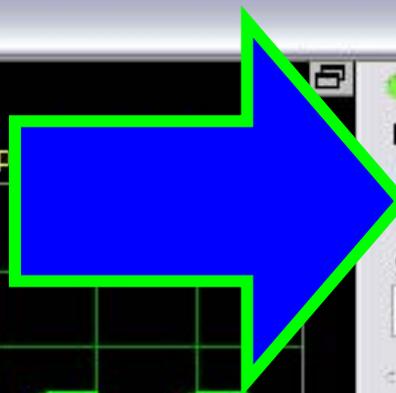
Slope

**Cursors**

OFF C1 CH A C2 CH A

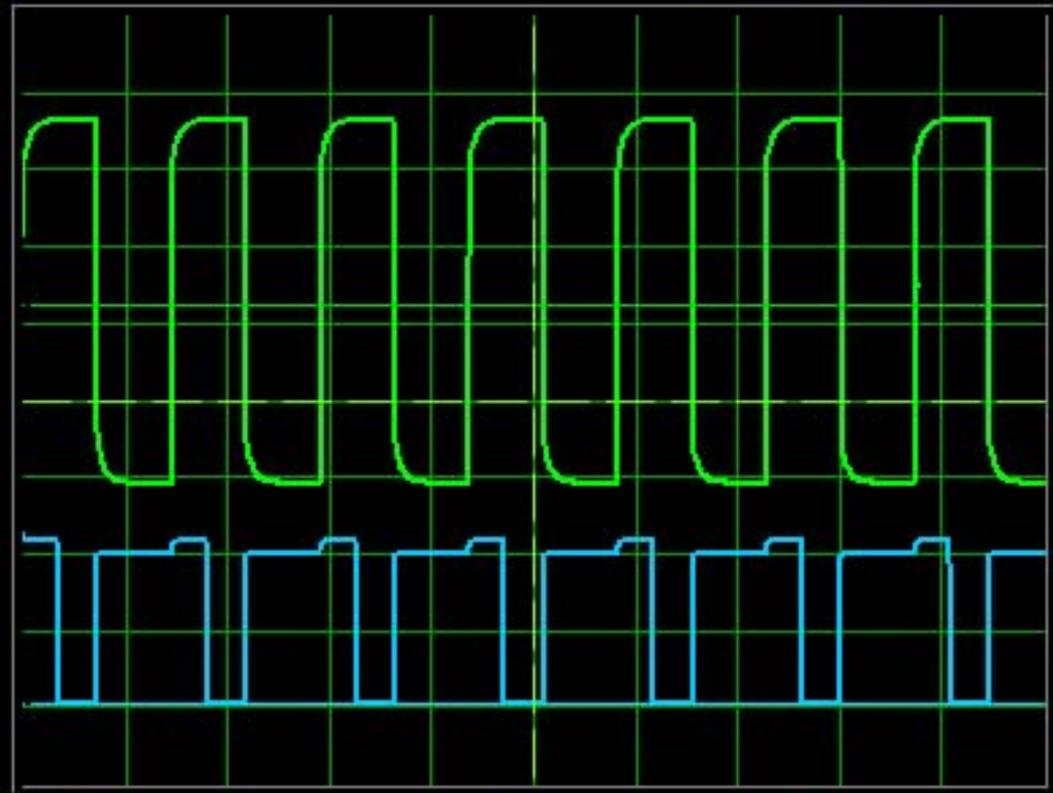
HELP ?

Run  Single  Log   Timeout  Acquired





Sample Rate: 1 MS/s



Cursors:	C1:	C2:	dT:
CH A Meas:	RMS: 2,307 V	Freq: 3,432 kHz	Vp-p: 4,724 V
CH B Meas:	RMS: 3,450 V	Freq: 3,432 kHz	Vp-p: 3,914 V

### CHANNEL A

Display

Source  
 BNC/Board CH A

#### VERTICAL

Position

Scale  
 1 V /div

Coupling  
 DC

### CHANNEL B

Display

Source  
 BNC/Board CH B

#### VERTICAL

Position

Scale  
 2 V /div

Coupling  
 DC

#### TIMEBASE

200 μs /div

#### TRIGGER

Source  
 CH A

Level (V)  
 1

Type  
 Analog

Slope

#### CURSORS

C1 CH A C2 CH A

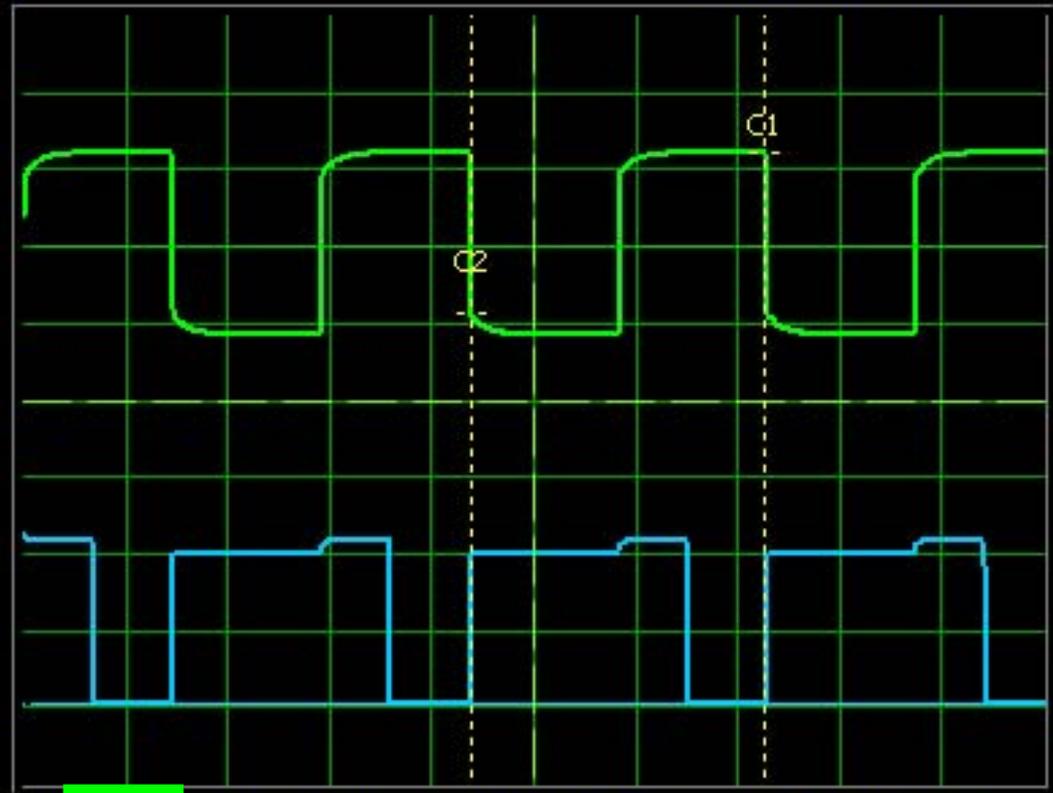
Run  Single

Log

Timeout  
 Acquired



Sample Rate: 1 MS/s



Cursor	C1: 2,39 V	C2: -1,77 V	dT: 288,00 $\mu$ s
CH A	RMS: 2,309 V	Freq: 3,429	Vp-p: 4,706 V
CH B	RMS: 3,420 V	Freq: 3,437	Vp-p: 3,905 V



Run  Single 

Log 

 Timeout  
 Acquired

### CHANNEL A

Display

Source  
 BNC/Board CH A

#### VERTICAL

Position

Scale  
 2 V /div

Coupling  
 DC

### CHANNEL B

Display

Source  
 BNC/Board CH B

#### VERTICAL

Position

Scale  
 2 V /div

Coupling  
 DC

#### TIMEBASE

100  $\mu$ s /div

#### TRIGGER

Source  
 CH A

Type  
 Analog

Slope 

#### CURSORS

C1 CH A C2 CH A

Save As  
EPUSP 2007 - by J Kogler

NAT INST  
NI Edu

Save in: LAB

File name: monoestavel  
Save as type: Custom Pattern (\*.txt)

OK Cancel

Rate: 1 MS/s

CHANNEL A  
Display: ON MEAS  
Source: BNC/Board CH A  
VERTICAL: Position ZERO, Scale 2 V/div, Coupling DC, Autoscale

CHANNEL B  
Display: ON MEAS  
Source: BNC/Board CH B  
VERTICAL: Position ZERO, Scale 2 V/div, Coupling DC, Autoscale

TIMEBASE: 100  $\mu$ s/div

TRIGGER: Source CH A, Level 0,00, Type Analog, Slope

Cursors: C1 2,39 V, C2 -1,77 V, dT: 288,00  $\mu$ s  
CH A Meas: RMS: 2,310 V, Freq: 3,429 kHz, Vp-p: 4,706 V  
CH B Meas: RMS: 3,419 V, Freq: 3,436 kHz, Vp-p: 3,910 V

Run Single Log Timeout Acquired

Impedance Analyzer

Two-Wire Current-Voltage Analyzer

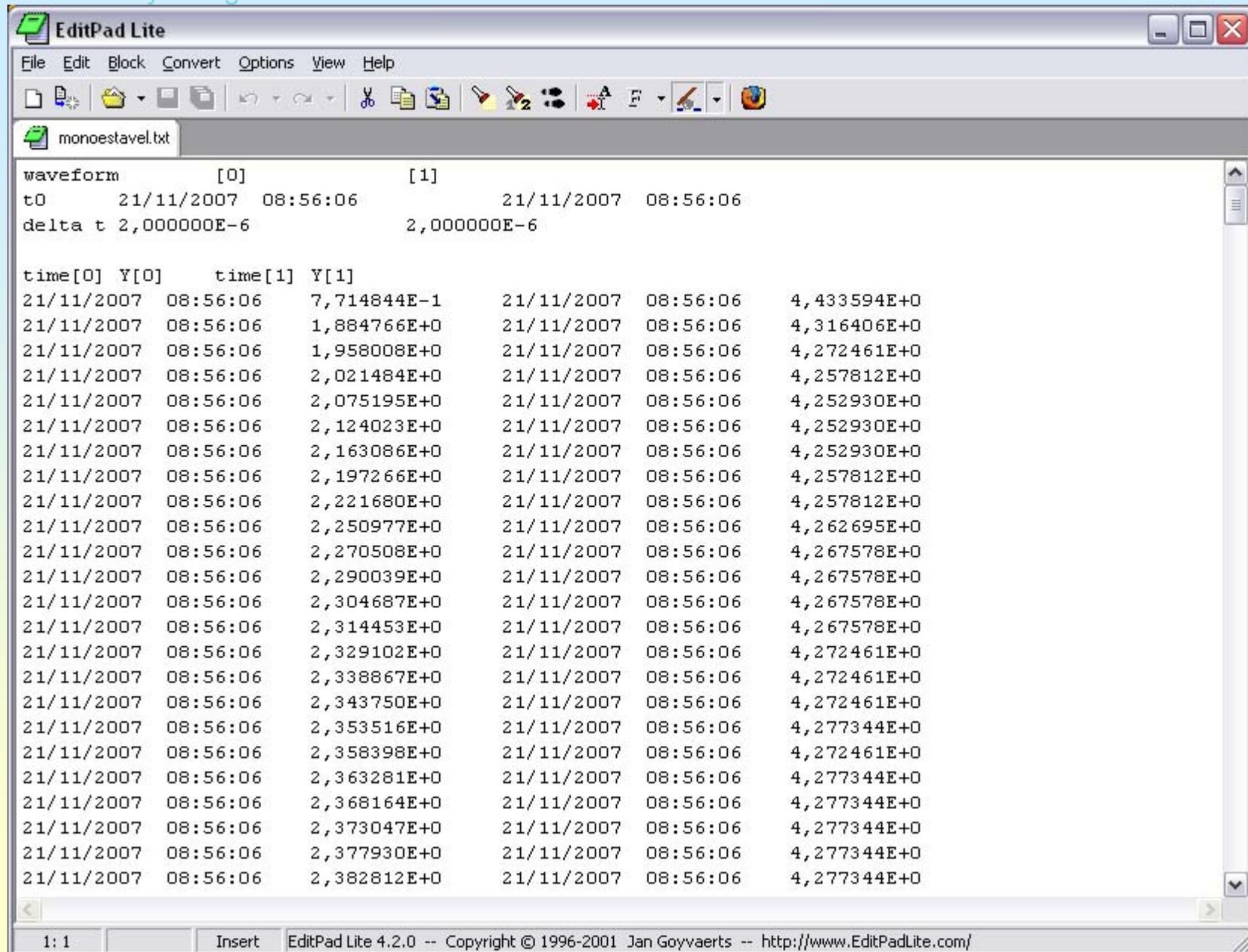
Three-Wire Current-Voltage Analyzer

Launch LabVIEW v 3.0

start

Taskbar: ELVIS - Instrument L..., NI ELVIS - Oscilloscope, AALAB, untitled - Paint

System tray: EN, 08:57, quarta-feira



```
File Edit Block Convert Options View Help
monoestavel.txt
waveform      [0]                [1]
t0            21/11/2007 08:56:06          21/11/2007 08:56:06
delta t 2,000000E-6          2,000000E-6

time[0] Y[0]      time[1] Y[1]
21/11/2007 08:56:06 7,714844E-1    21/11/2007 08:56:06 4,433594E+0
21/11/2007 08:56:06 1,884766E+0    21/11/2007 08:56:06 4,316406E+0
21/11/2007 08:56:06 1,958008E+0    21/11/2007 08:56:06 4,272461E+0
21/11/2007 08:56:06 2,021484E+0    21/11/2007 08:56:06 4,257812E+0
21/11/2007 08:56:06 2,075195E+0    21/11/2007 08:56:06 4,252930E+0
21/11/2007 08:56:06 2,124023E+0    21/11/2007 08:56:06 4,252930E+0
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21/11/2007 08:56:06 2,250977E+0    21/11/2007 08:56:06 4,262695E+0
21/11/2007 08:56:06 2,270508E+0    21/11/2007 08:56:06 4,267578E+0
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21/11/2007 08:56:06 2,329102E+0    21/11/2007 08:56:06 4,272461E+0
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21/11/2007 08:56:06 2,373047E+0    21/11/2007 08:56:06 4,277344E+0
21/11/2007 08:56:06 2,377930E+0    21/11/2007 08:56:06 4,277344E+0
21/11/2007 08:56:06 2,382812E+0    21/11/2007 08:56:06 4,277344E+0

1:1 Insert EditPad Lite 4.2.0 -- Copyright © 1996-2001 Jan Goyvaerts -- http://www.EditPadLite.com/
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