



PSI 2327- Laboratório de Eletrônica II

ELVIS

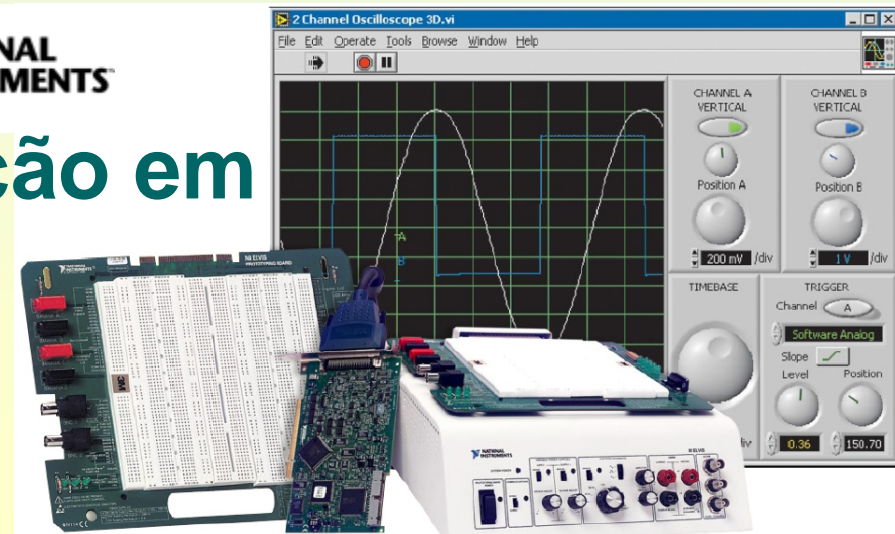
Escola Politécnica da Universidade de São Paulo

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

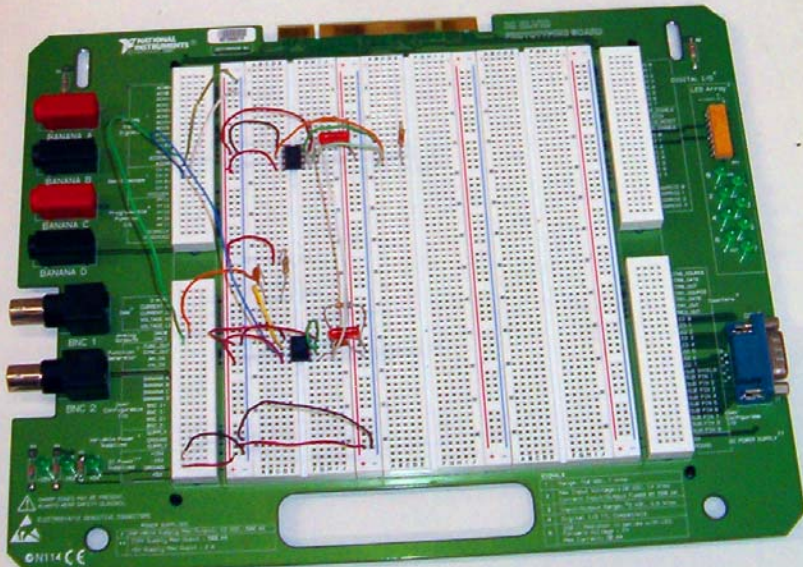
Escola Politécnica - USP
PSI - Departamento de Engenharia de Sistemas Eletrônicos



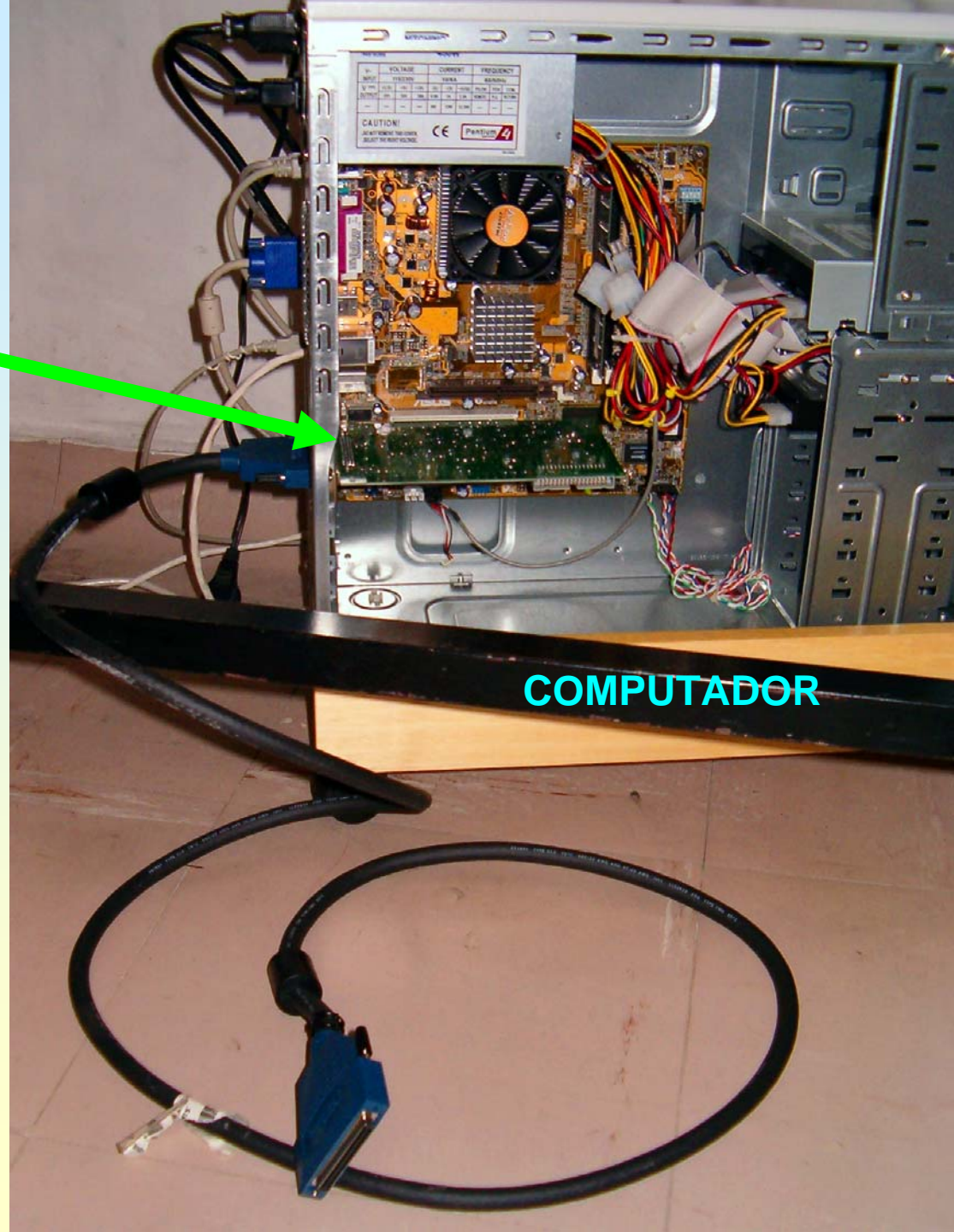
PSI2327 Laboratório de Eletrônica II
Exp. 5: Multivibradores Astável e Monostável

Equipamento: _____
Tema do Trabalho: _____
Professor: _____
Assinatura do Aluno: _____
Data: _____
2006

ELVIS



**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



5 kHz 50 kHz 250 kHz
500 Hz 50 Hz

COARSE FREQUENCY

AMPLITUDE



FINE FREQUENCY



DMM

CURRENT VOLTAGE



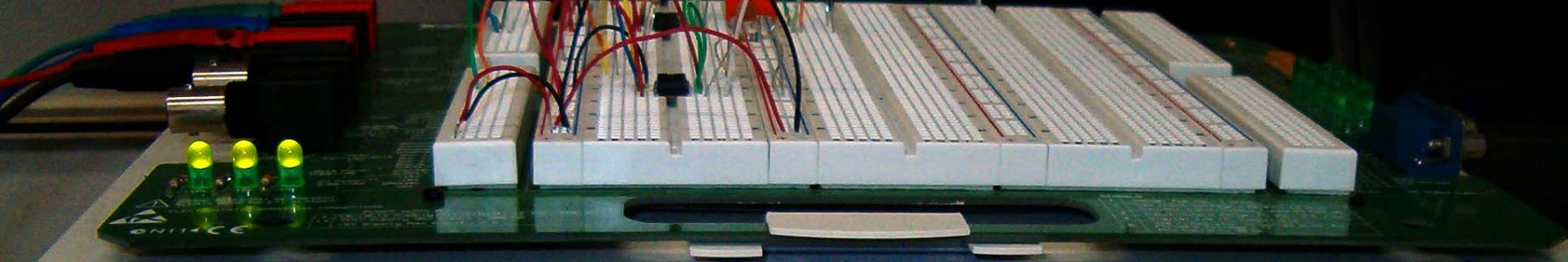
FUSED AT 500 mA

20 VDC MAX
14 Vrms MAX

SCOPE CH A



10 VDC, 7 Vrms MAX



NI ELVIS





FUNCTION GENERATOR

FUNCTION GENERATOR controls:

- Waveform selector:  (selected), , 
- COARSE FREQUENCY knob: 50 kHz, 250 kHz
- FINE FREQUENCY knob
- AMPLITUDE knob
- STATUS LED: 

DMM

DMM (Digital Multimeter) terminals:

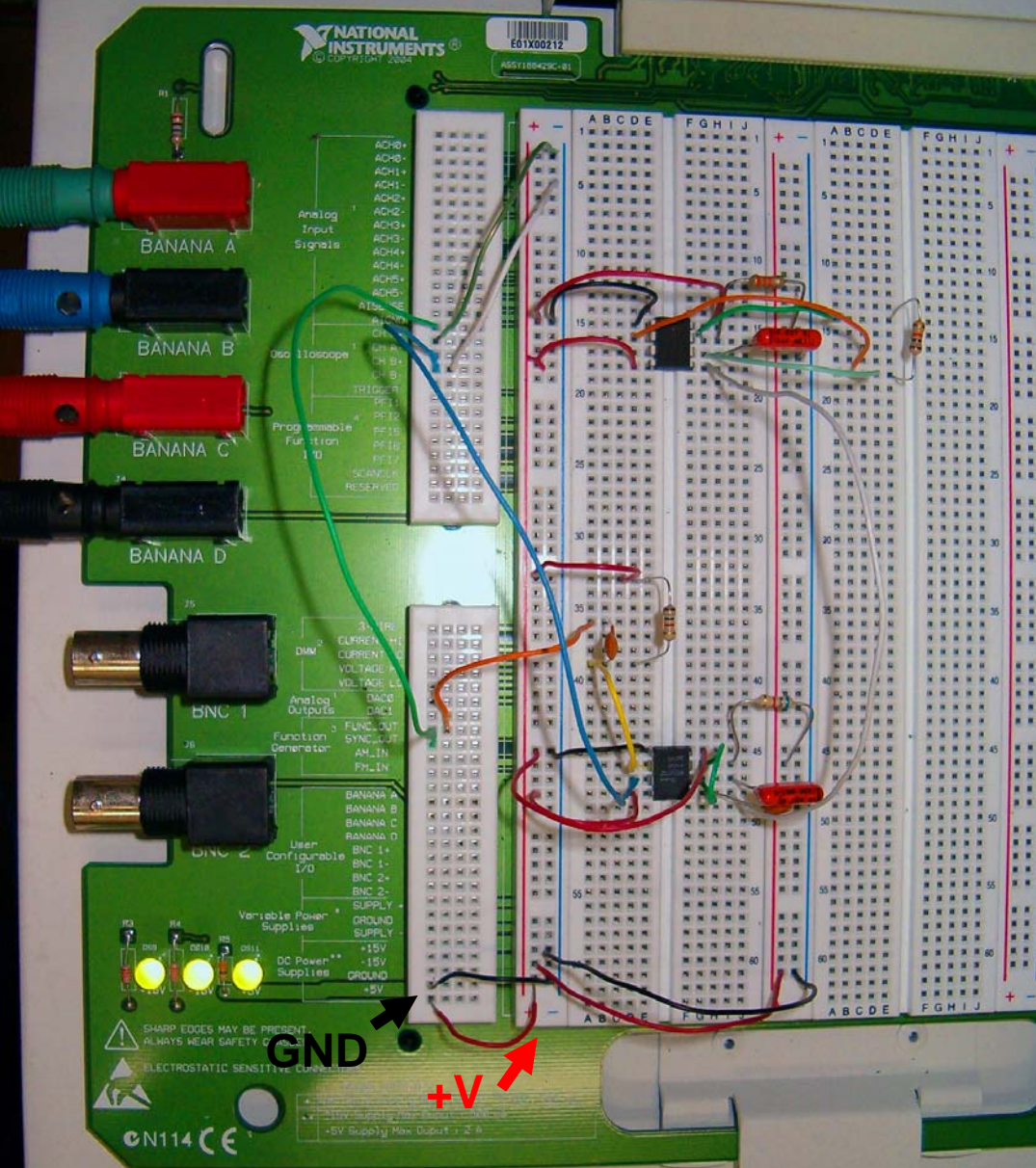
- FUNCTION selector: CURRENT (selected) | VOLTAGE
- HI terminals (red):  (labeled Ω , \rightarrow , μ , V , V_{AC} , A) | 
- LO terminals (black):  (labeled μ , V , V_{DC} , V_{AC} , A) |  (labeled 20V)
- Warning: FUSED AT 500 mA

SCOPE

SCOPE (Oscilloscope) connectors:

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

 ELECTROSTATIC SENSITIVE CONNECTORS



CIRCUITO
MULTIVIBRADOR
ASTÁVEL

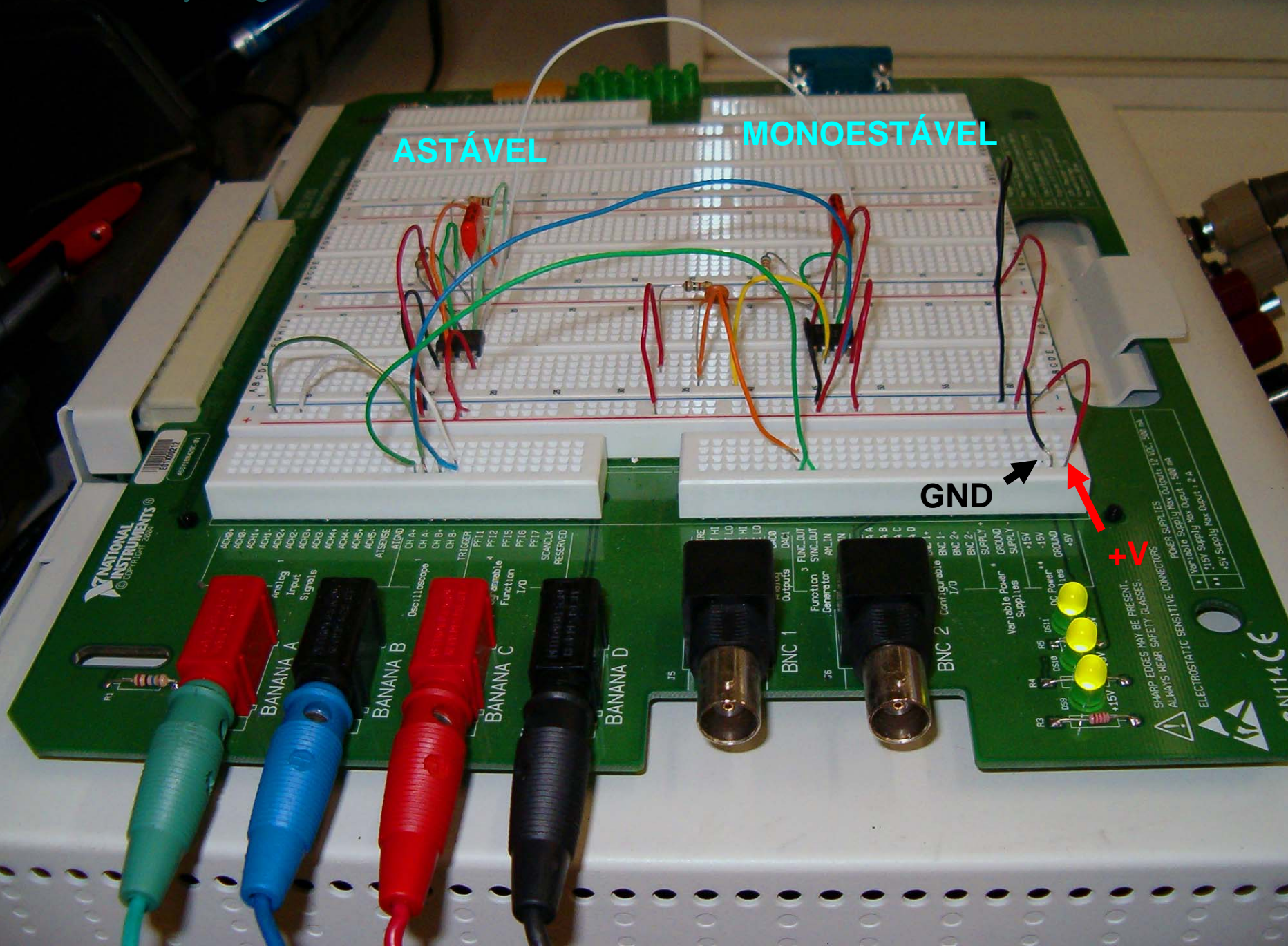
CIRCUITO
MULTIVIBRADOR
MONOESTÁVEL

ASTÁVEL

MONOESTÁVEL

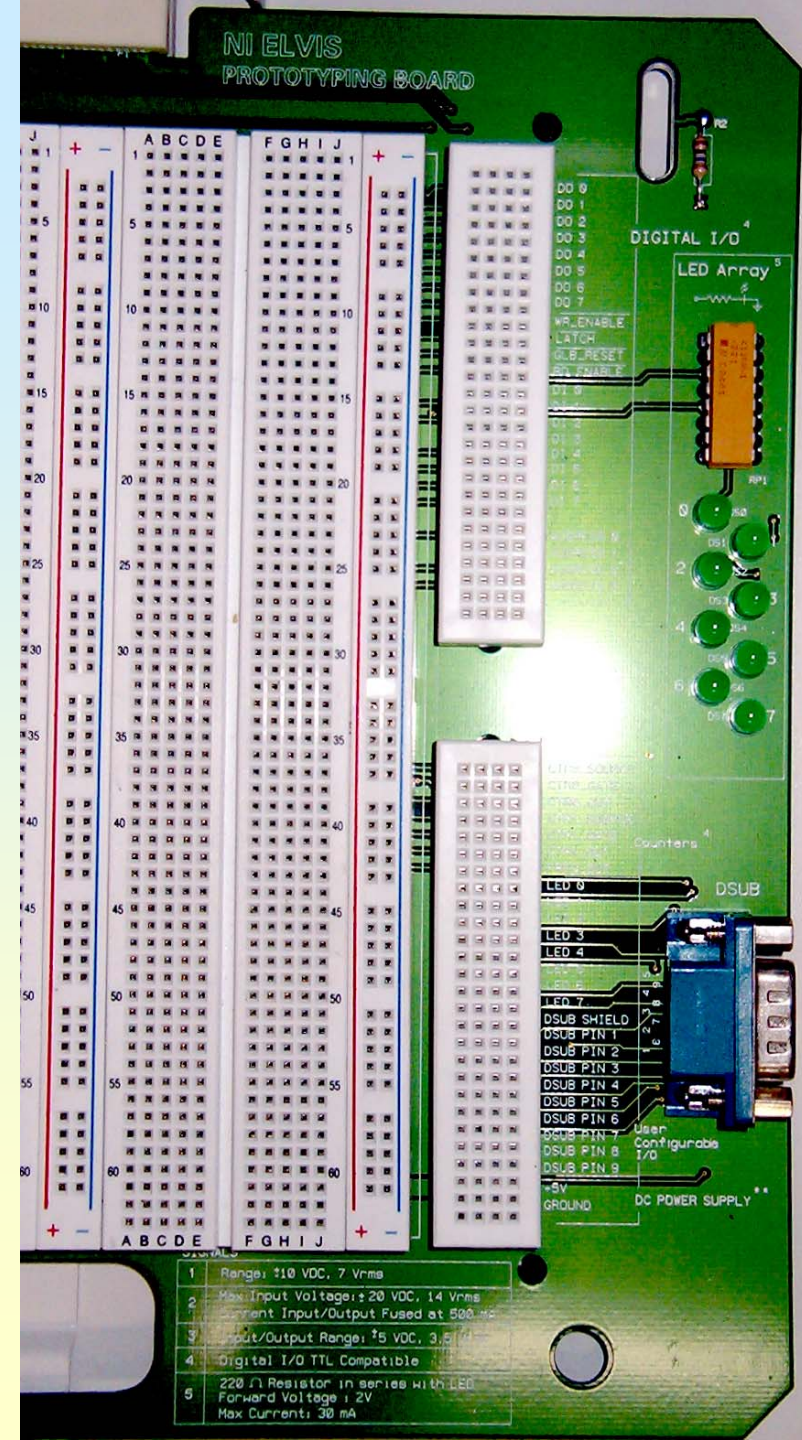
GND

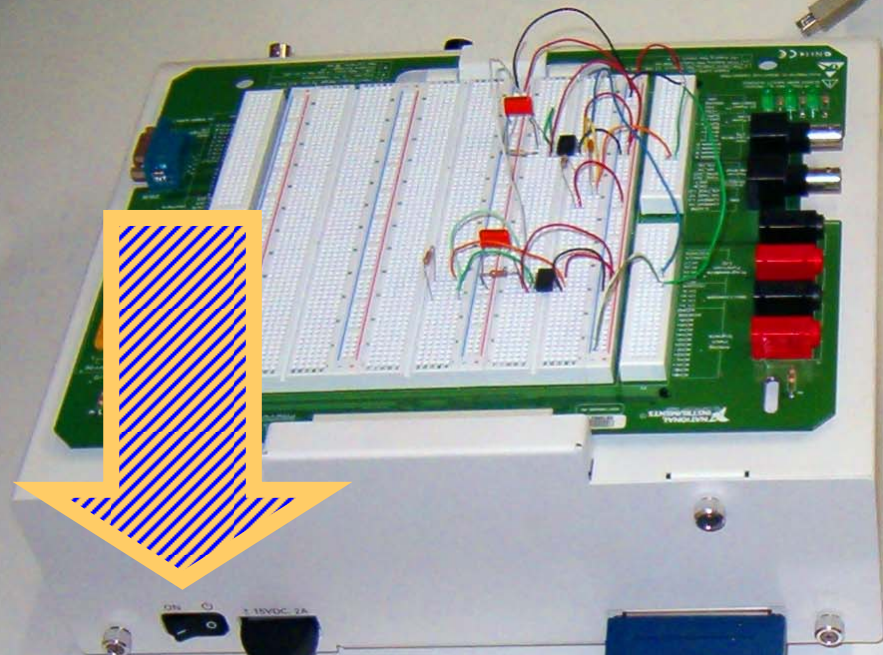
+V



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

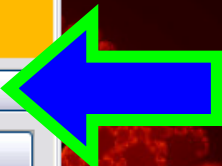
Impedance Analyzer

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

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

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:

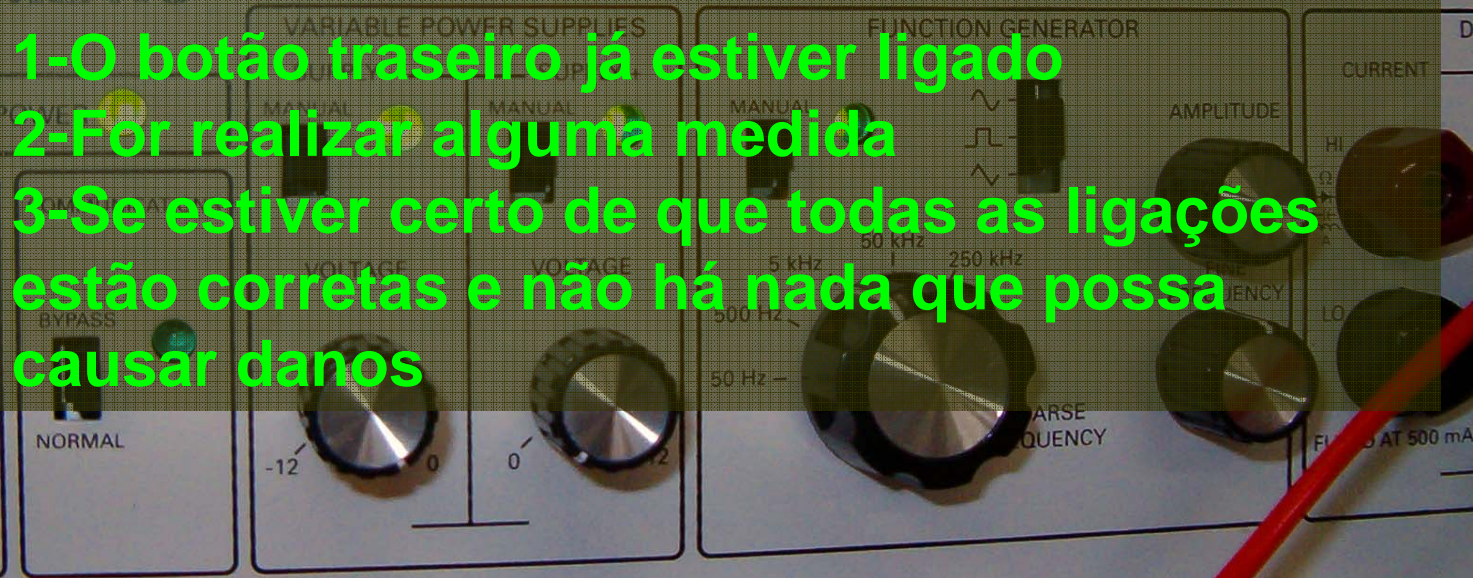
- **Ligar o ELVIS**

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




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



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

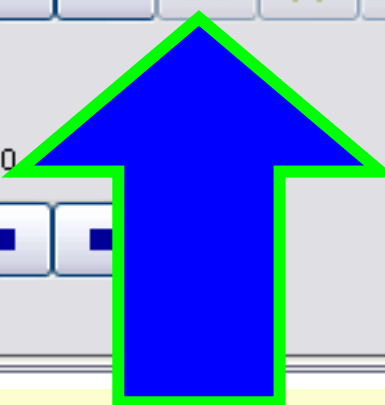
VDC 20 10

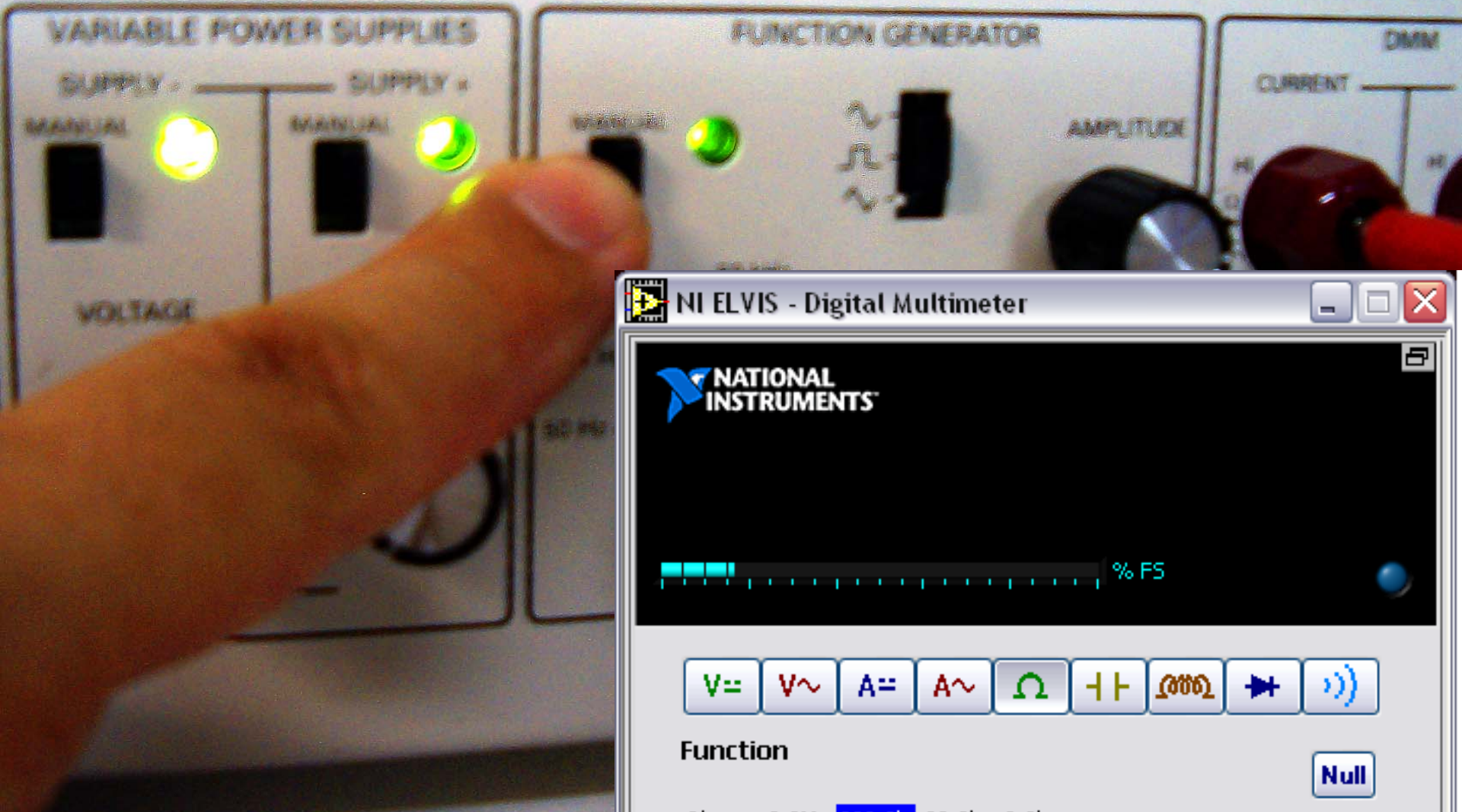
Range: **Auto** **■** **■** **■**

Run Single

Null

HELP ?





NI ELVIS - Digital Multimeter

NATIONAL INSTRUMENTS

Progress bar: % FS

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

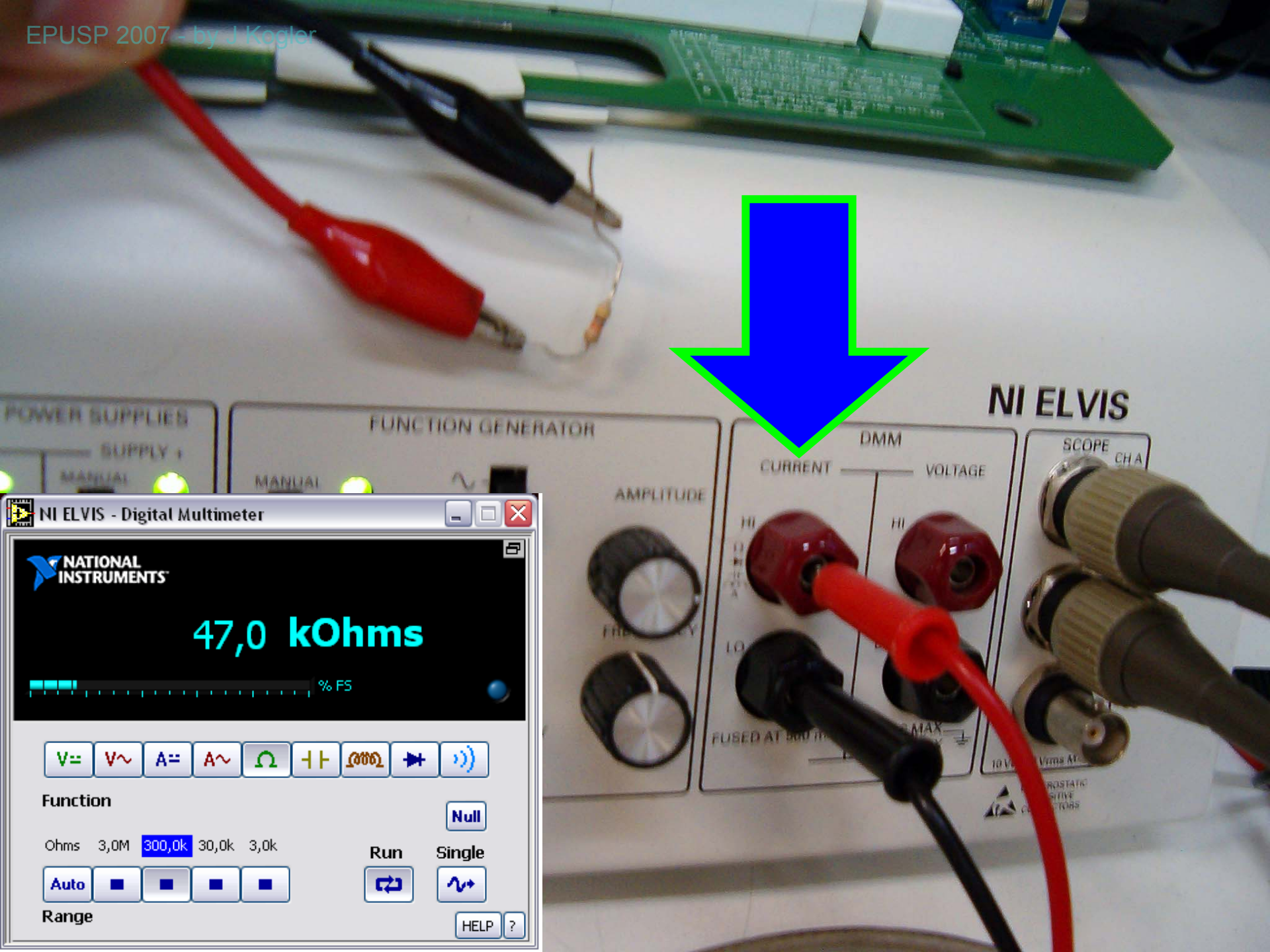
Function: Null

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

Range: Auto ■ ■ ■ ■

Run: ↻ Single: ~▶

HELP ?



NI ELVIS - Digital Multimeter

NATIONAL INSTRUMENTS

47,0 kOhms

% FS

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

Function

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

Run Single

Auto

Range

HELP ?

NI ELVIS

POWER SUPPLIES

FUNCTION GENERATOR

DMM

CURRENT

VOLTAGE

SCOPE CH A

AMPLITUDE

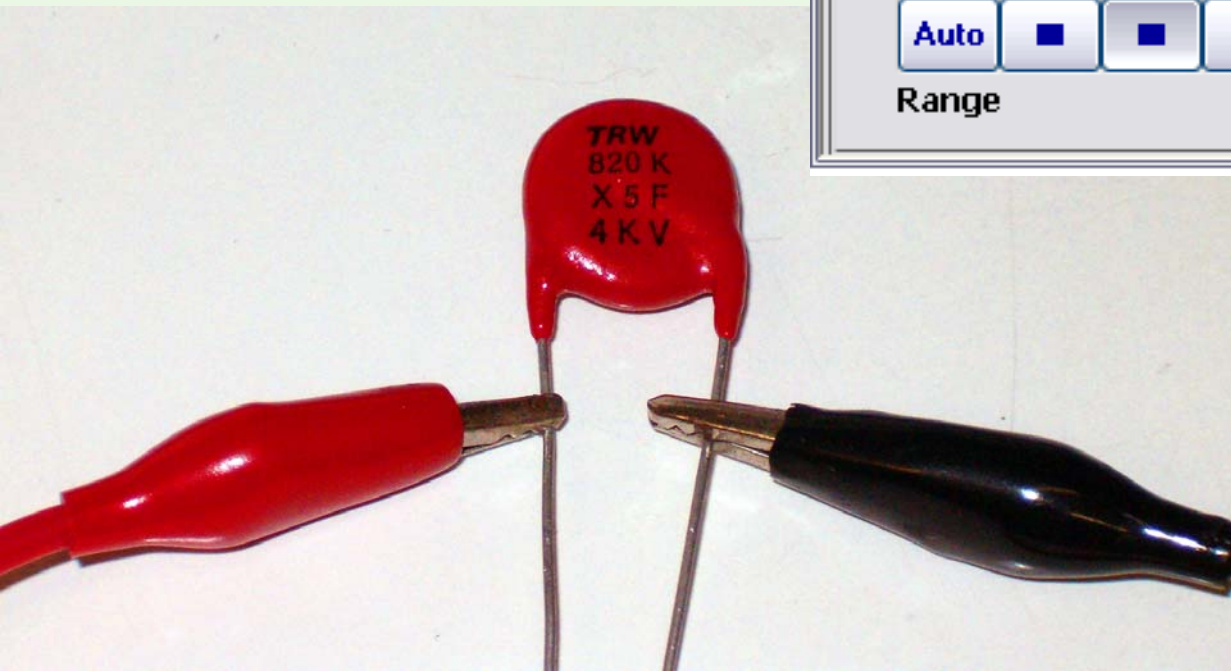
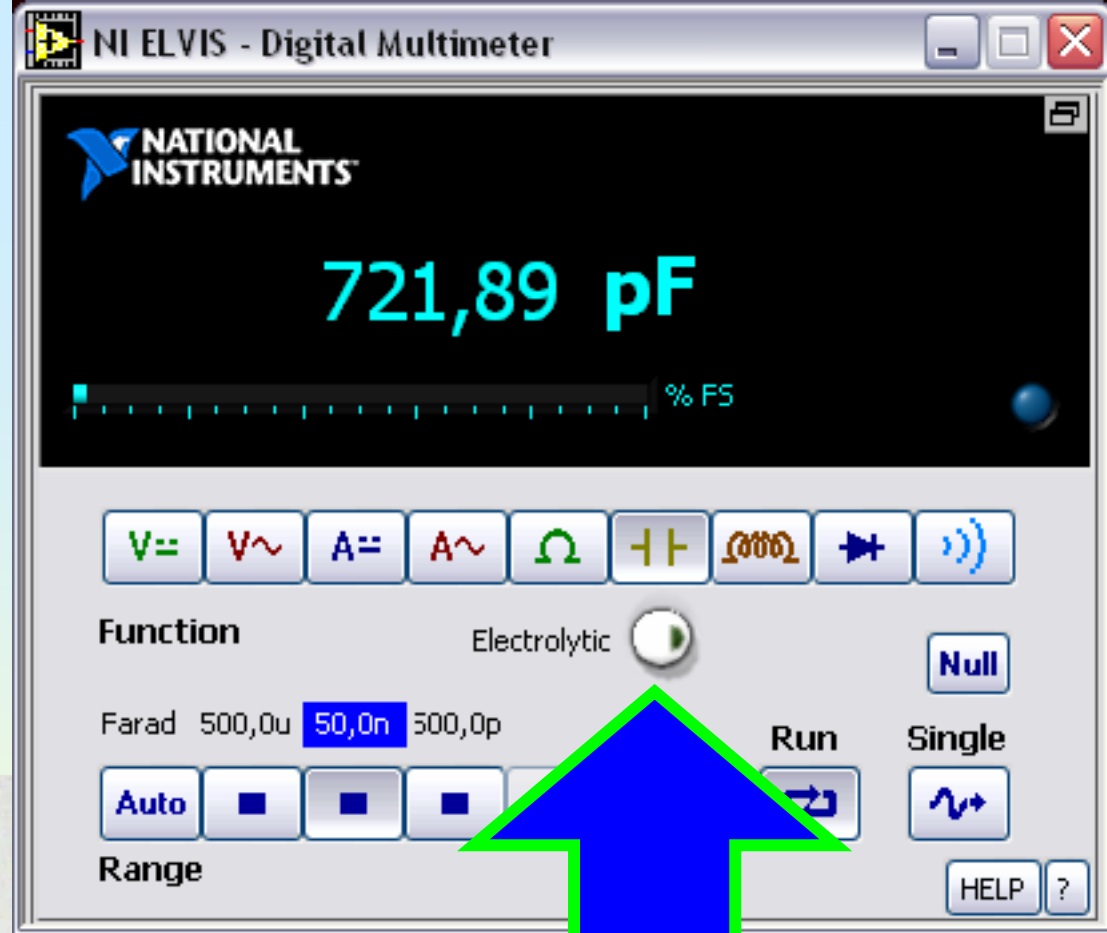
FREQUENCY

FUSED AT 500 mA

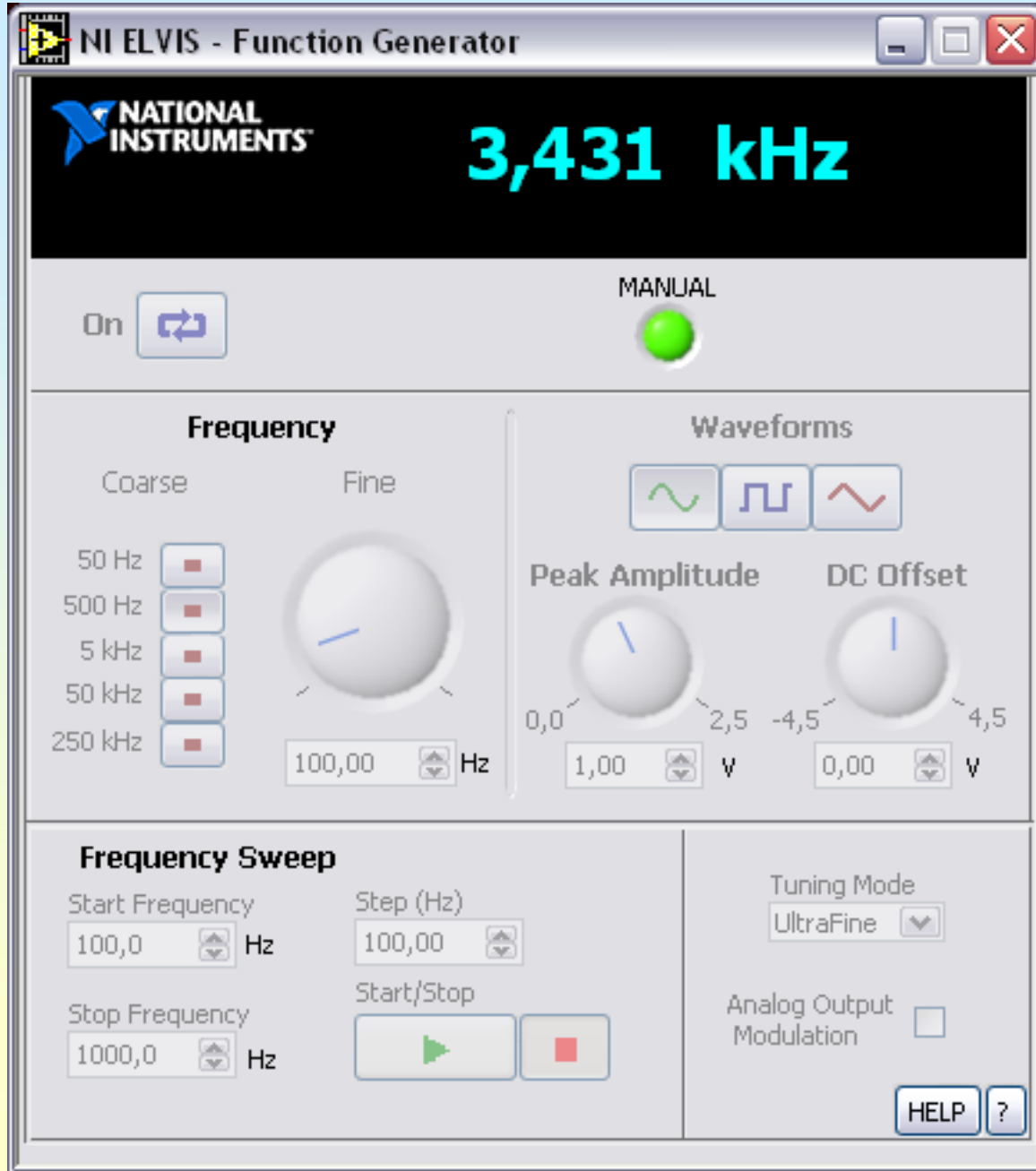
10 Vrms

PROSTATIC SENSITIVE COMPONENTS

Medida de Capacitância



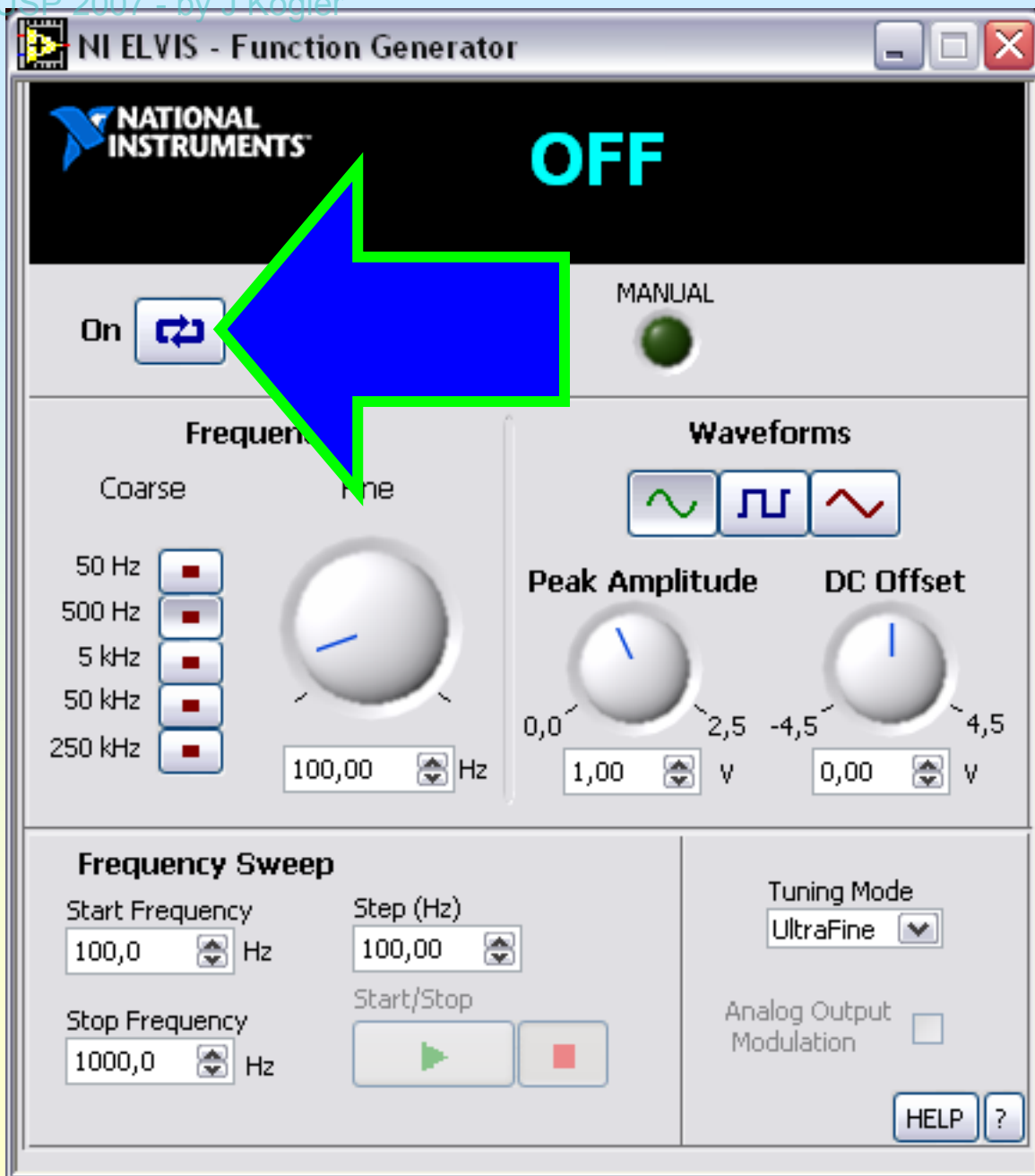
para
eletrolíticos



**Gerador
de
Funções**

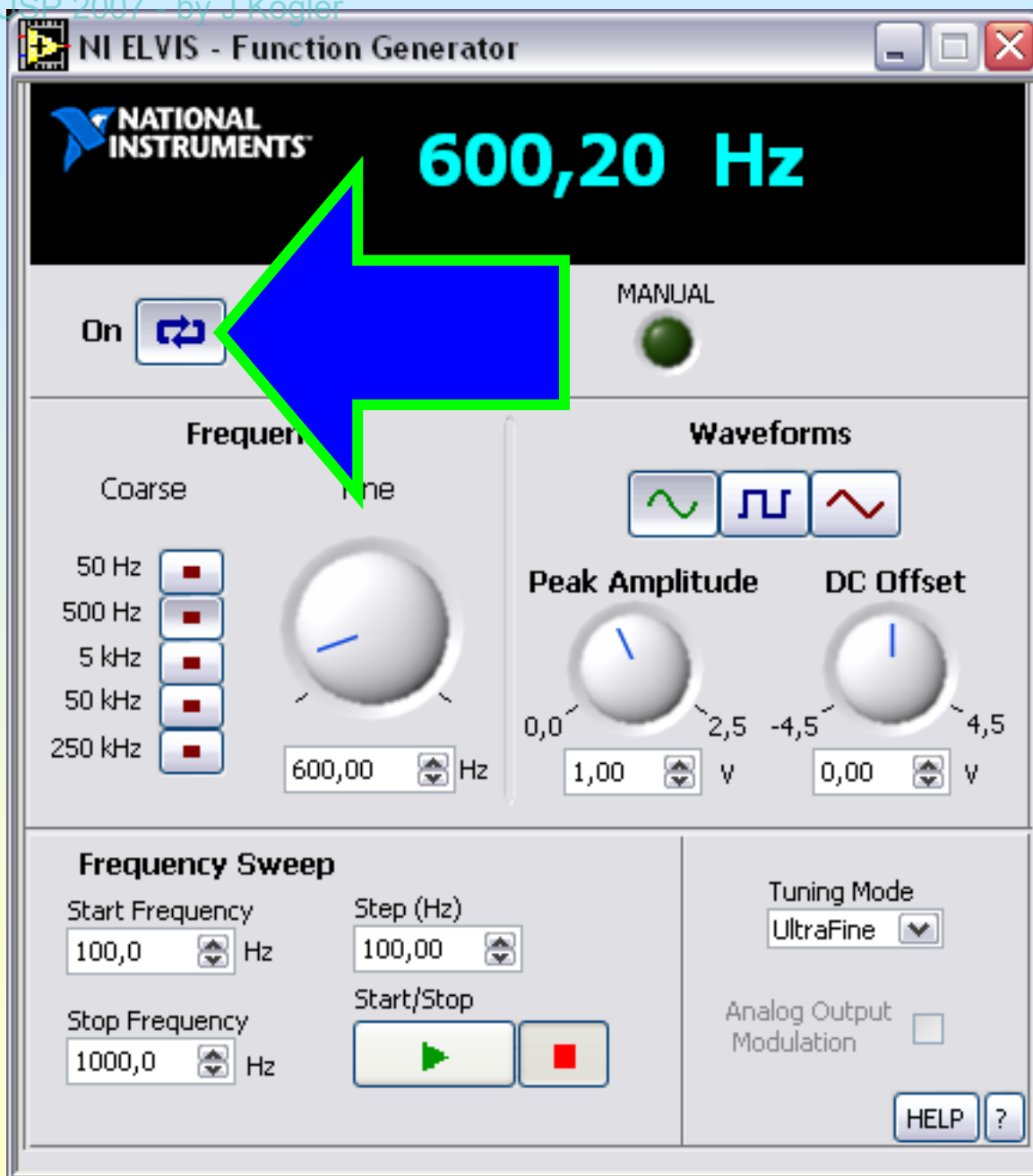
**Modo
manual**





**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

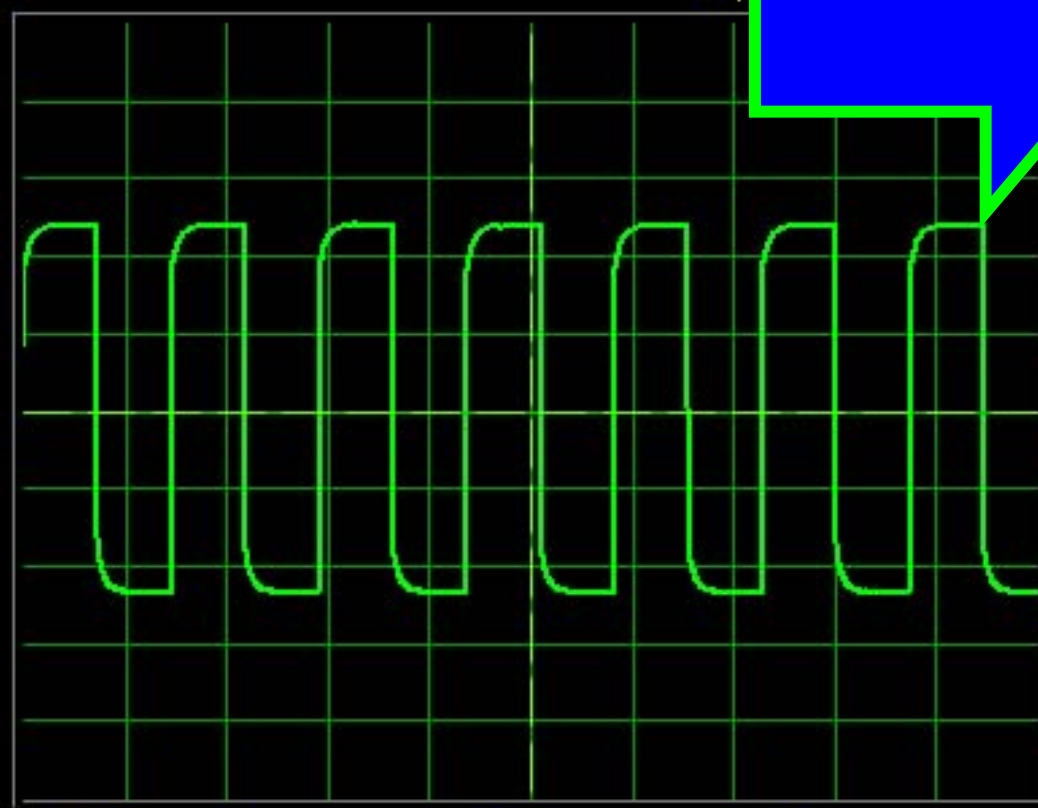
Acquired

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:

Source: BNC/Board CH A

VERTICAL

Position:

Scale: 1 V /div

Coupling: DC

CHANNEL B

Display:

Source: CH B

VERTICAL

Position:

Scale: 2 V /div

Coupling: DC

TIMEBASE

200 μ s /div

TRIGGER

Source: CH A

Level (V): 0,00

Type: Analog

Slope: Rising

Run Single Log

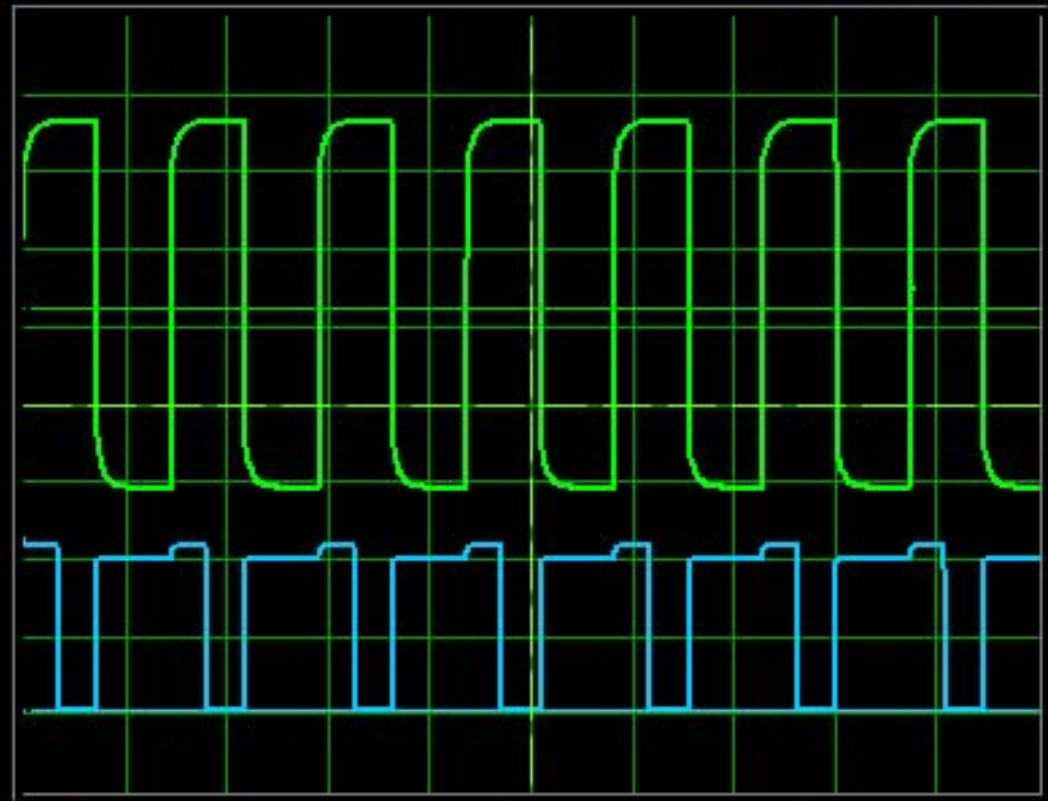
Timeout Acquired

CURSORS

C1: CH A C2: CH A



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

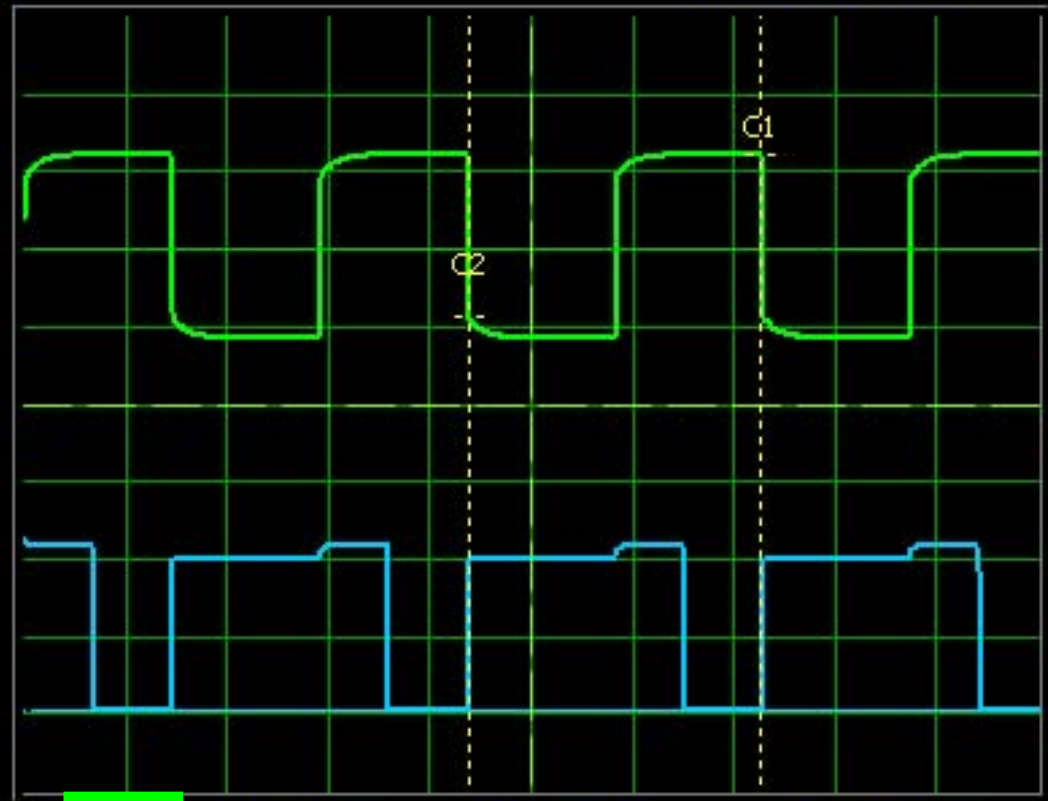
CURSORS

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 μ 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

TRIGGER

Source
 CH A

Level (V)
 1

Type
 Analog

Slope 

CURSORS

C1 CH A C2 CH A

Save As
EPUSP 2007 - by J Kogler

NAT INST

NI Edu

Art

My Recent Documents

Desktop

My Documents

My Computer

My Network

Save in: LAB

File name: monoestavel

Save as type: Custom Pattern (*.txt)

OK Cancel

Impedance Analyzer

Two-Wire Current-Voltage Analyzer

Three-Wire Current-Voltage Analyzer

Launch LabVIEW

LabVIEW v 3.0

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 μ s/div

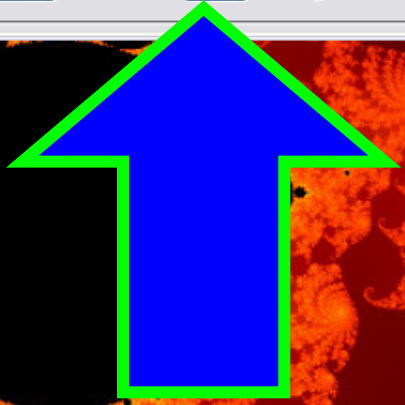
TRIGGER Source CH A Level (V) 0,00 Type Analog Slope

Cursors: C1: 2,39 V C2: -1,77 V dT: 288,00 μ 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

C1 CH A C2 CH A

HELP ?



NI ELVIS

LabVIEW

Measurement & Automation

Waveform Editor

ELVIS stuff

NI ELVIS 3

start

ELVIS - Instrument L...

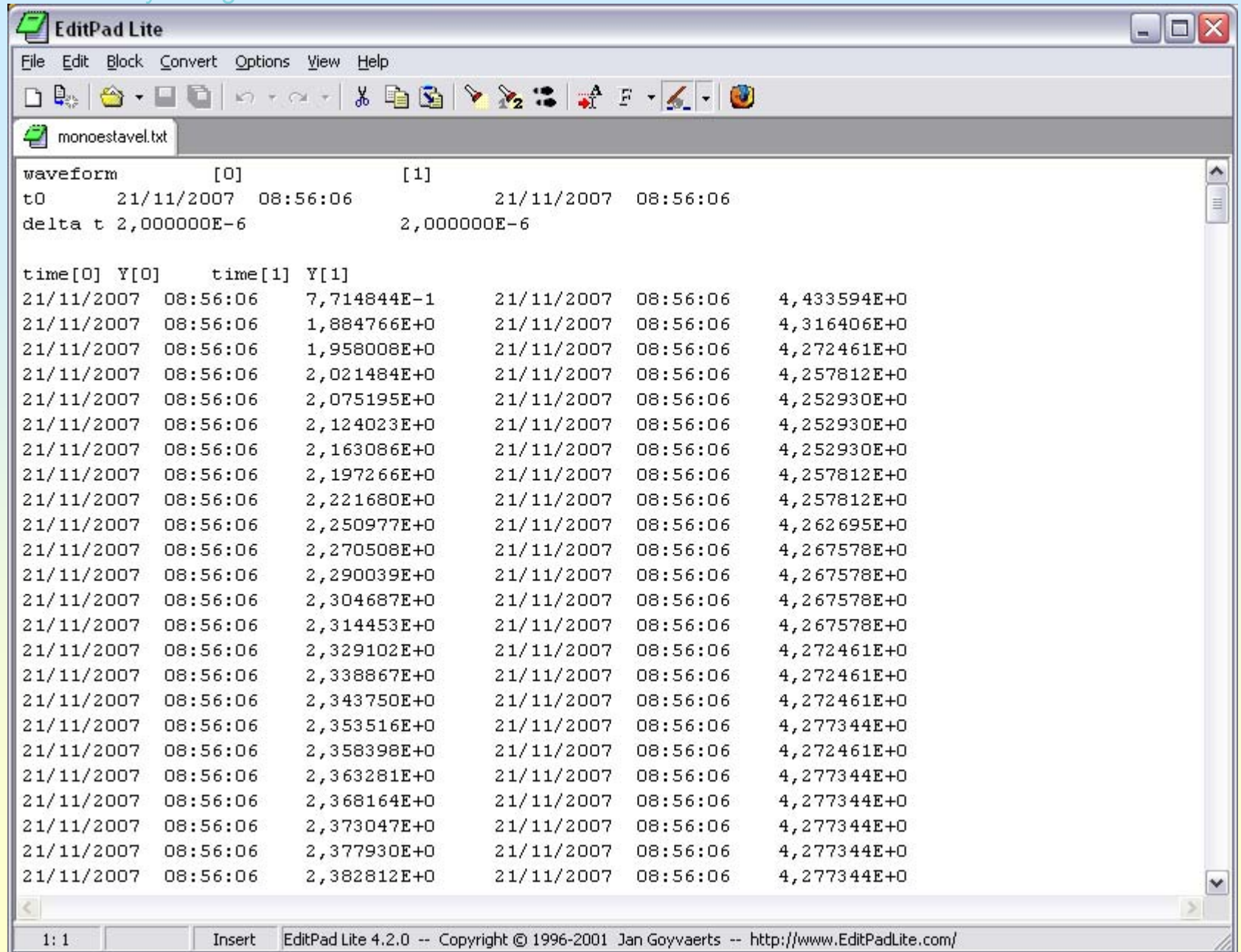
NI ELVIS - Oscilloscope

AALAB

untitled - Paint

EN

08:57 quarta-feira



```

EditPad Lite
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
21/11/2007 08:56:06 2,163086E+0 21/11/2007 08:56:06 4,252930E+0
21/11/2007 08:56:06 2,197266E+0 21/11/2007 08:56:06 4,257812E+0
21/11/2007 08:56:06 2,221680E+0 21/11/2007 08:56:06 4,257812E+0
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
21/11/2007 08:56:06 2,290039E+0 21/11/2007 08:56:06 4,267578E+0
21/11/2007 08:56:06 2,304687E+0 21/11/2007 08:56:06 4,267578E+0
21/11/2007 08:56:06 2,314453E+0 21/11/2007 08:56:06 4,267578E+0
21/11/2007 08:56:06 2,329102E+0 21/11/2007 08:56:06 4,272461E+0
21/11/2007 08:56:06 2,338867E+0 21/11/2007 08:56:06 4,272461E+0
21/11/2007 08:56:06 2,343750E+0 21/11/2007 08:56:06 4,272461E+0
21/11/2007 08:56:06 2,353516E+0 21/11/2007 08:56:06 4,277344E+0
21/11/2007 08:56:06 2,358398E+0 21/11/2007 08:56:06 4,272461E+0
21/11/2007 08:56:06 2,363281E+0 21/11/2007 08:56:06 4,277344E+0
21/11/2007 08:56:06 2,368164E+0 21/11/2007 08:56:06 4,277344E+0
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/

```