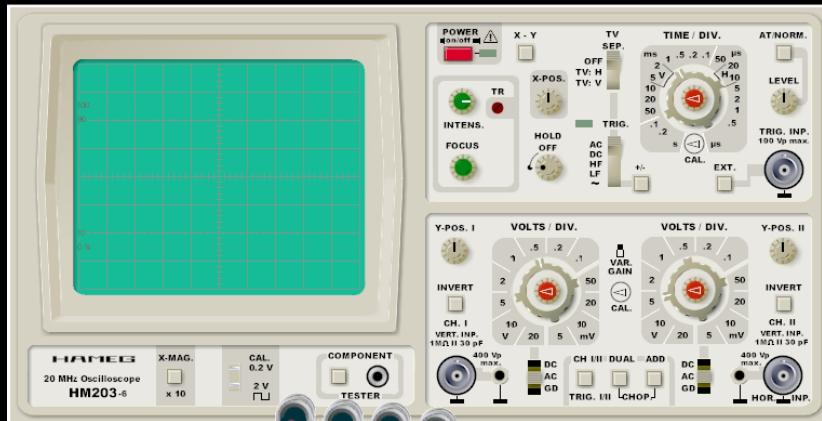


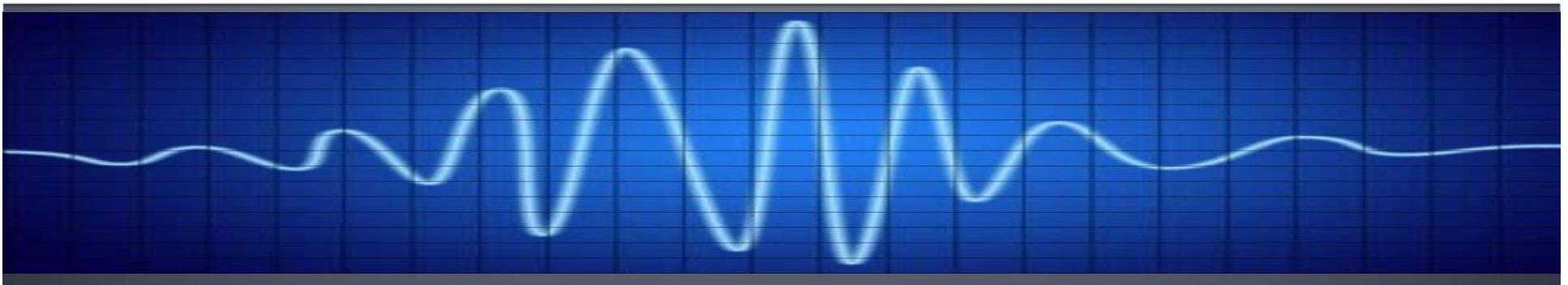


06.09.2014.

The Oscilloscope Challenge

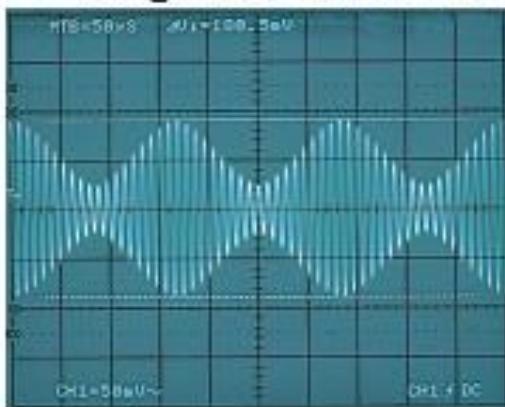


Marjan Urekar, mr
Katedra za električna merenja
FTN Novi Sad, Srbija

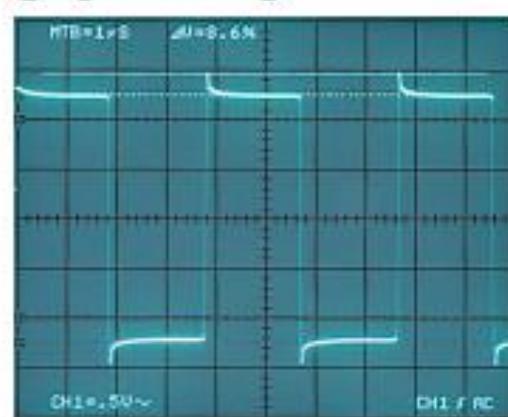


Measurements

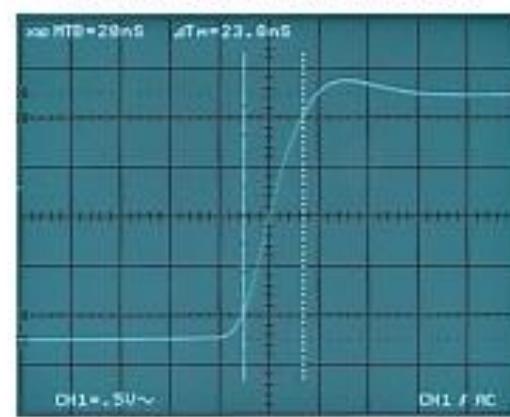
Voltage Measurement



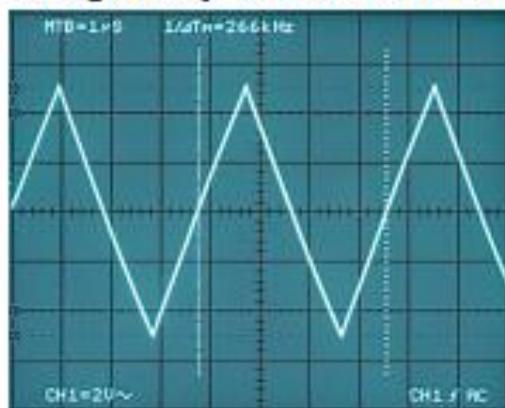
Voltage percentage Measurement



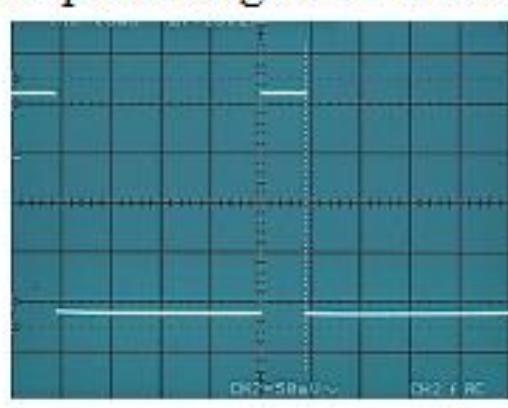
Time Measurement



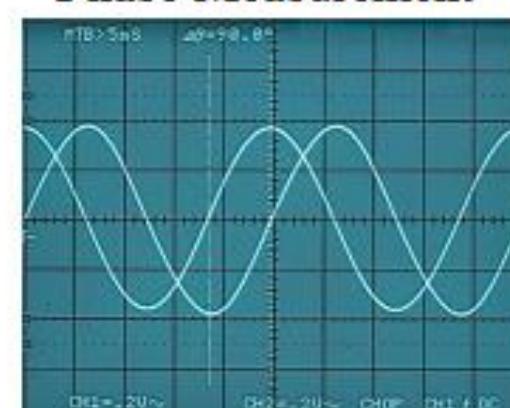
Frequency Measurement



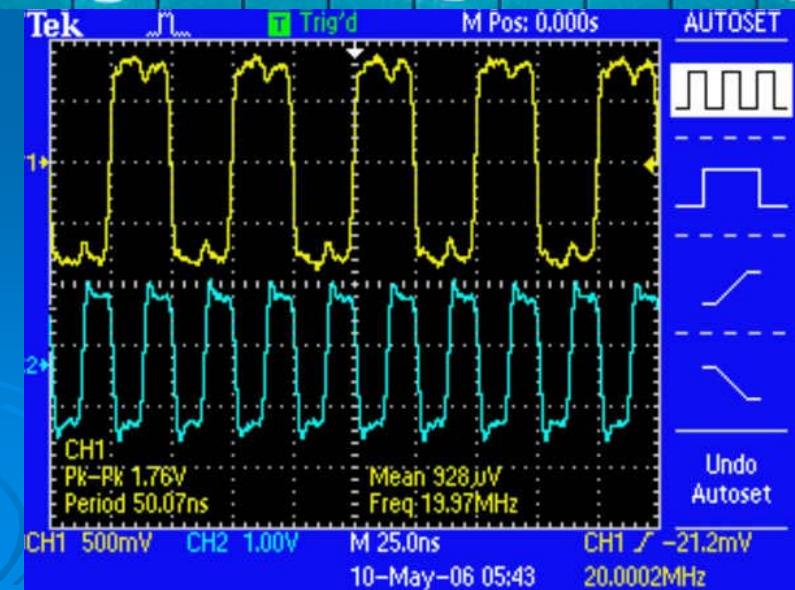
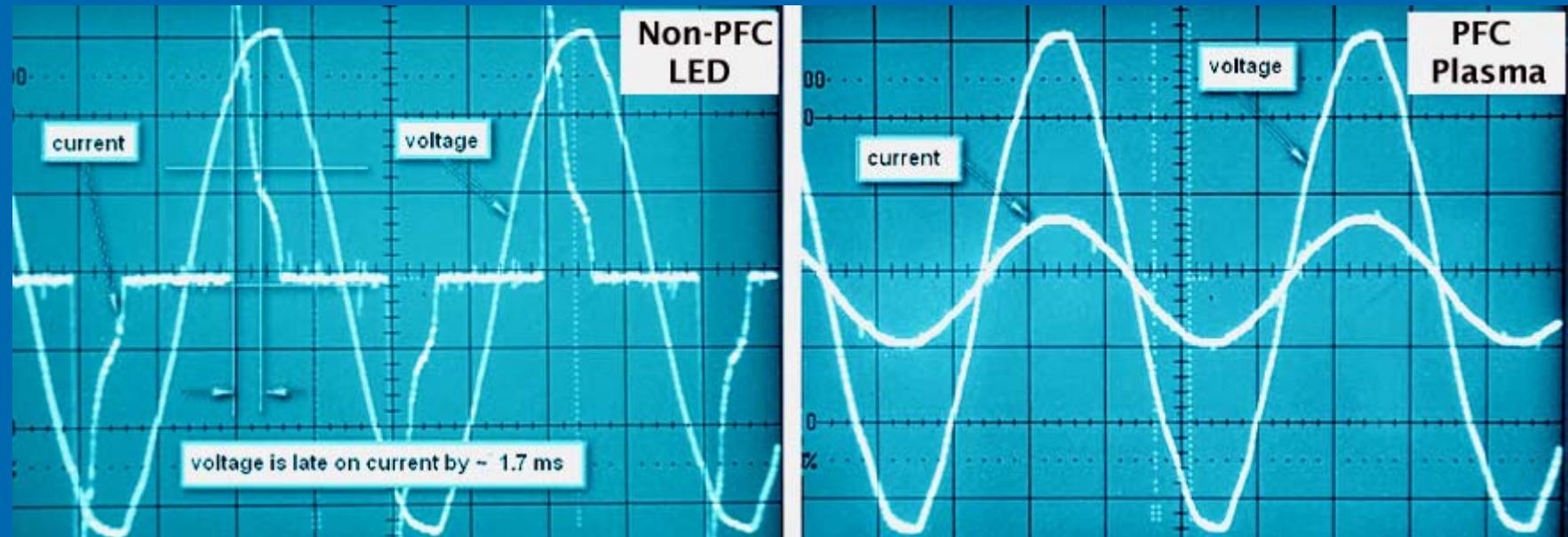
Time percentage Measurement



Phase Measurement



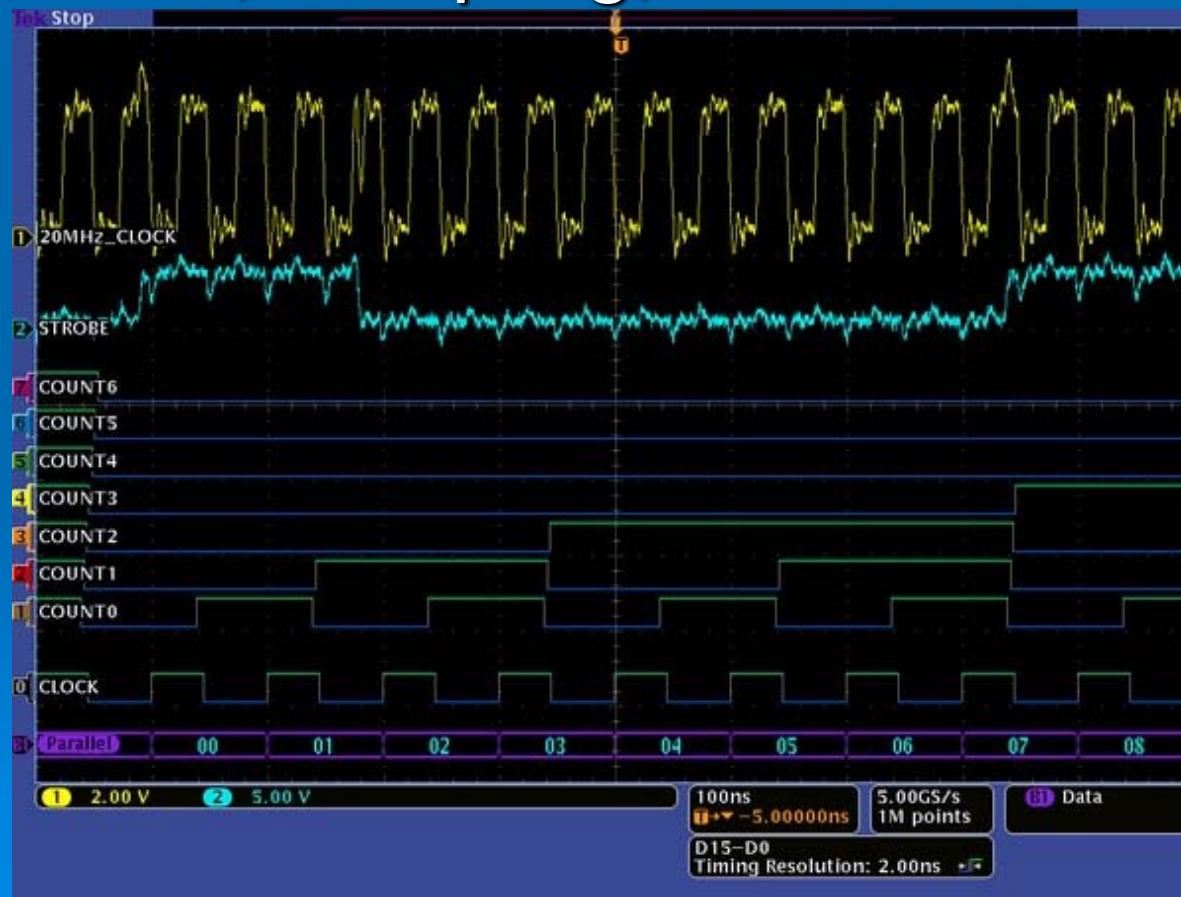
Waveforms



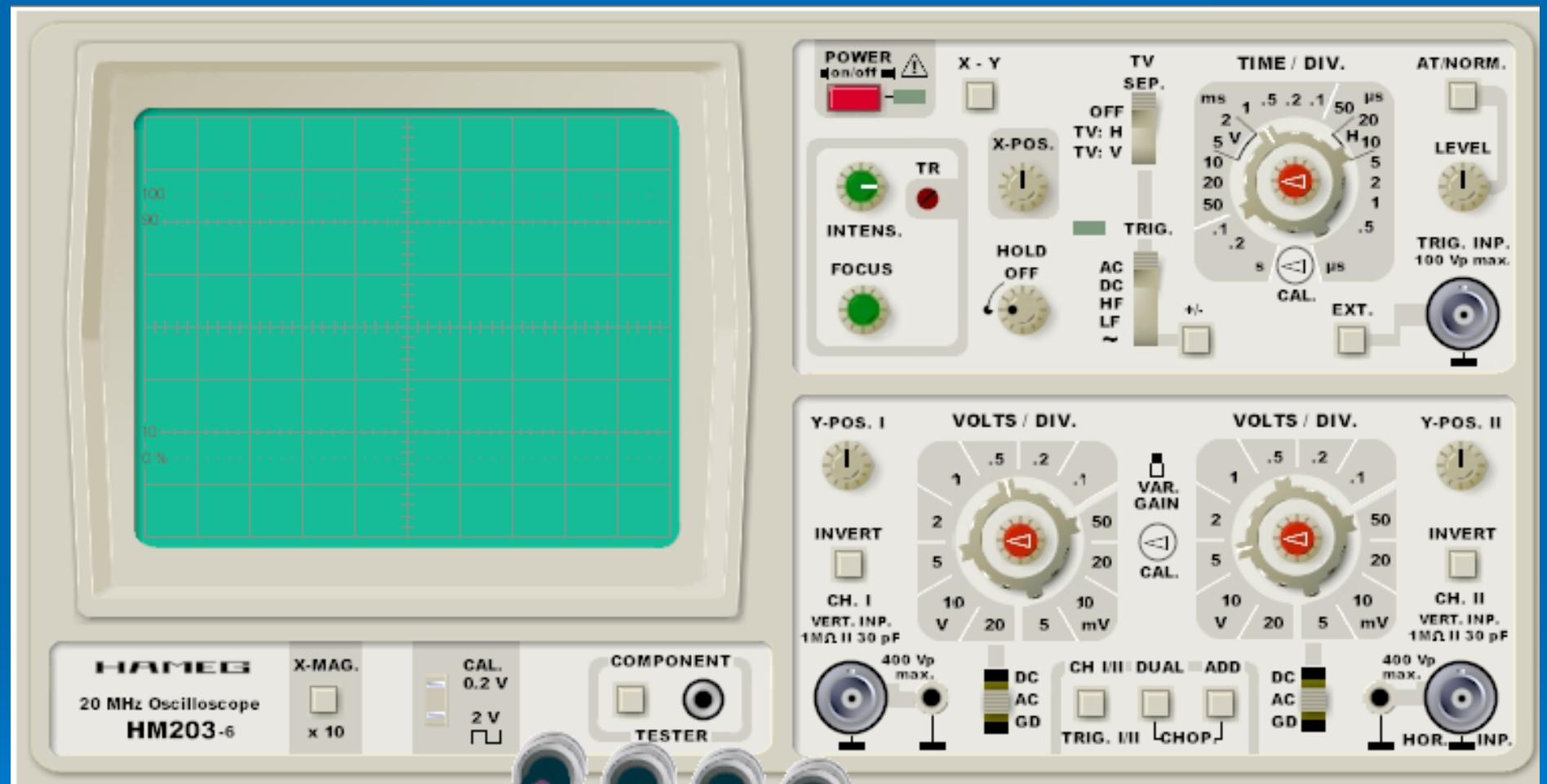
Types

Analog

Digital: DPO, Sampling, Mixed Domain...



Virtual Oscilloscope



<http://www.virtual-oscilloscope.com/>

Controls

POWER

INTENSty

FOCUS

TRace

Beam Finder

Scale Illumination



Controls

CH1 CH2 Inputs

DC/AC/GND input coupling

Channel options:

CH I/II display (Trigger source CH I/II)

DUAL

ADD

CHOP



Controls

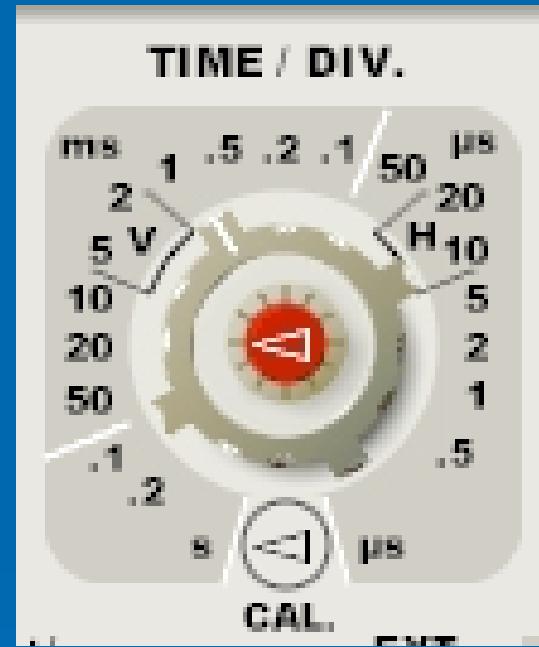
Horizontal:

TIME/DIV

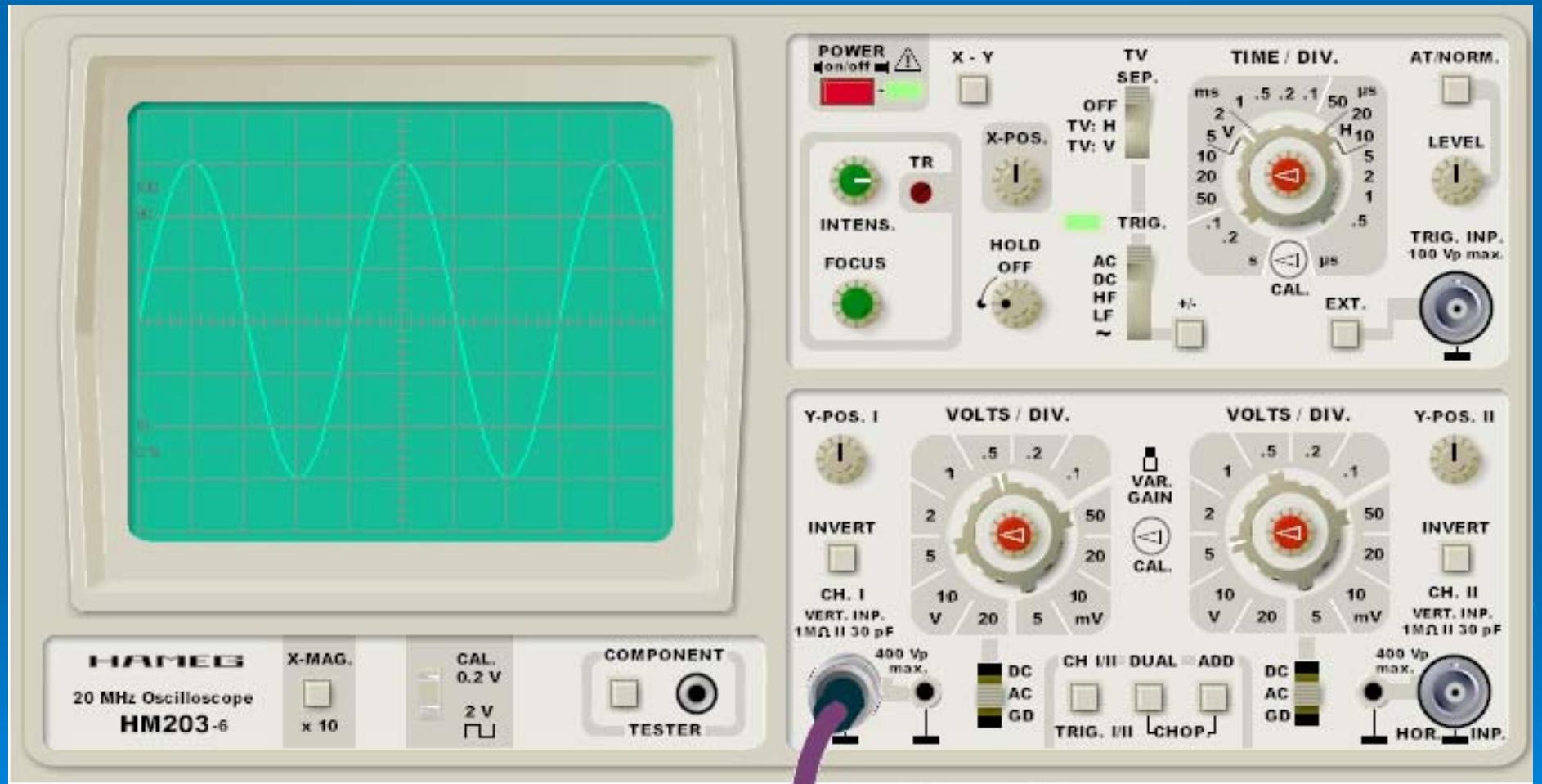
CALibration

X-POSITION

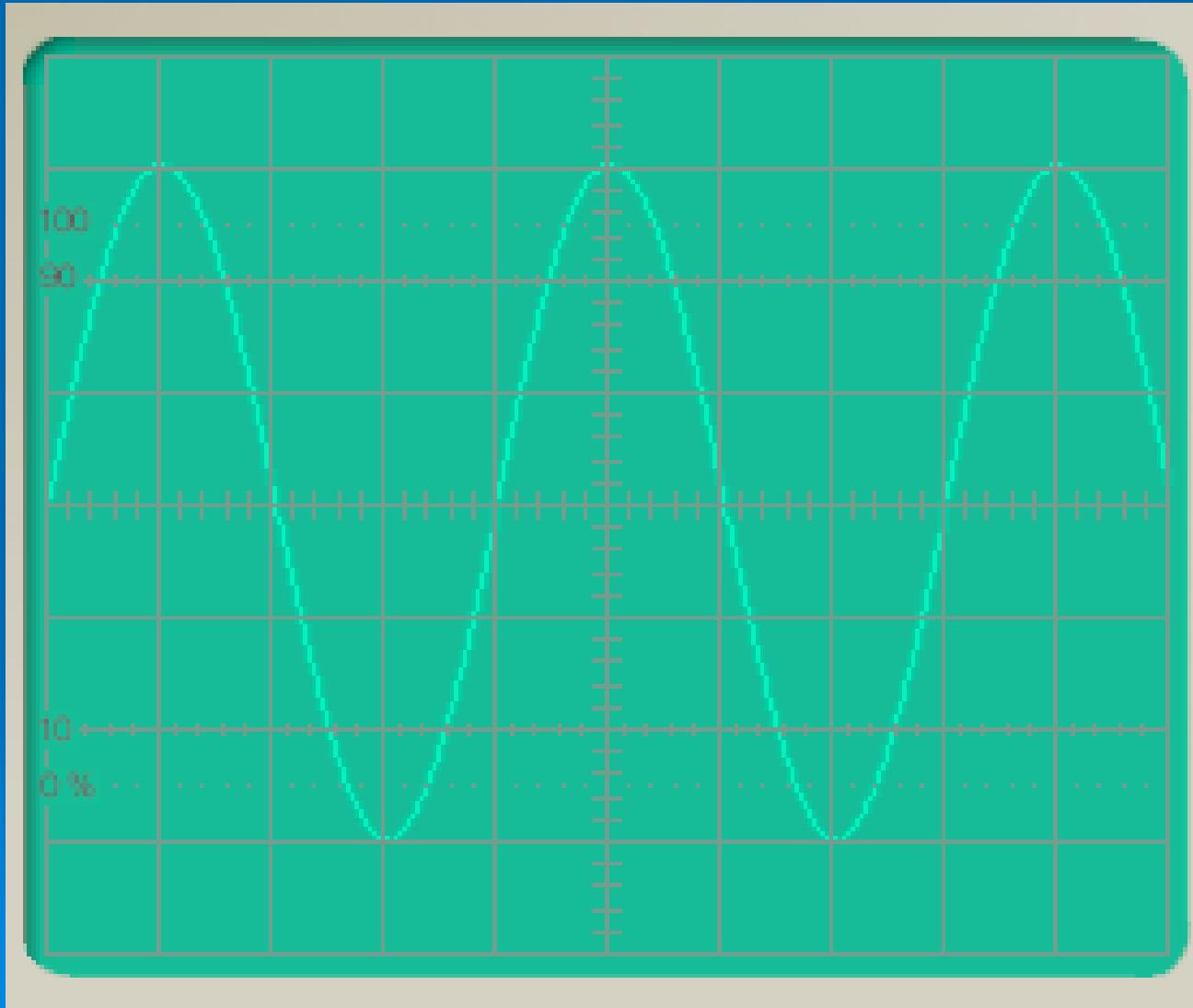
X-MAGnification



Signal frequency



Waveform



TIME/DIV
2 ms

VOLTS/DIV
0.5 V

Controls

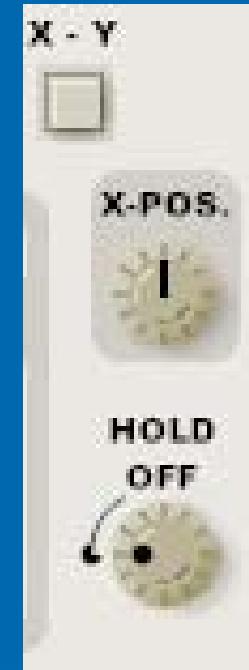
Vertical:

VOLTS/DIV
CAL
Y-POSITION
INVERT



Controls

Tiggering:
AuTo/NORMal
LEVEL
HOLD OFF
TV SEParation
Off/TV-H/TV-V
TRIGger
AC/DC/HF/LF/~, +/-
EXTernal trigger



Controls

CALibration

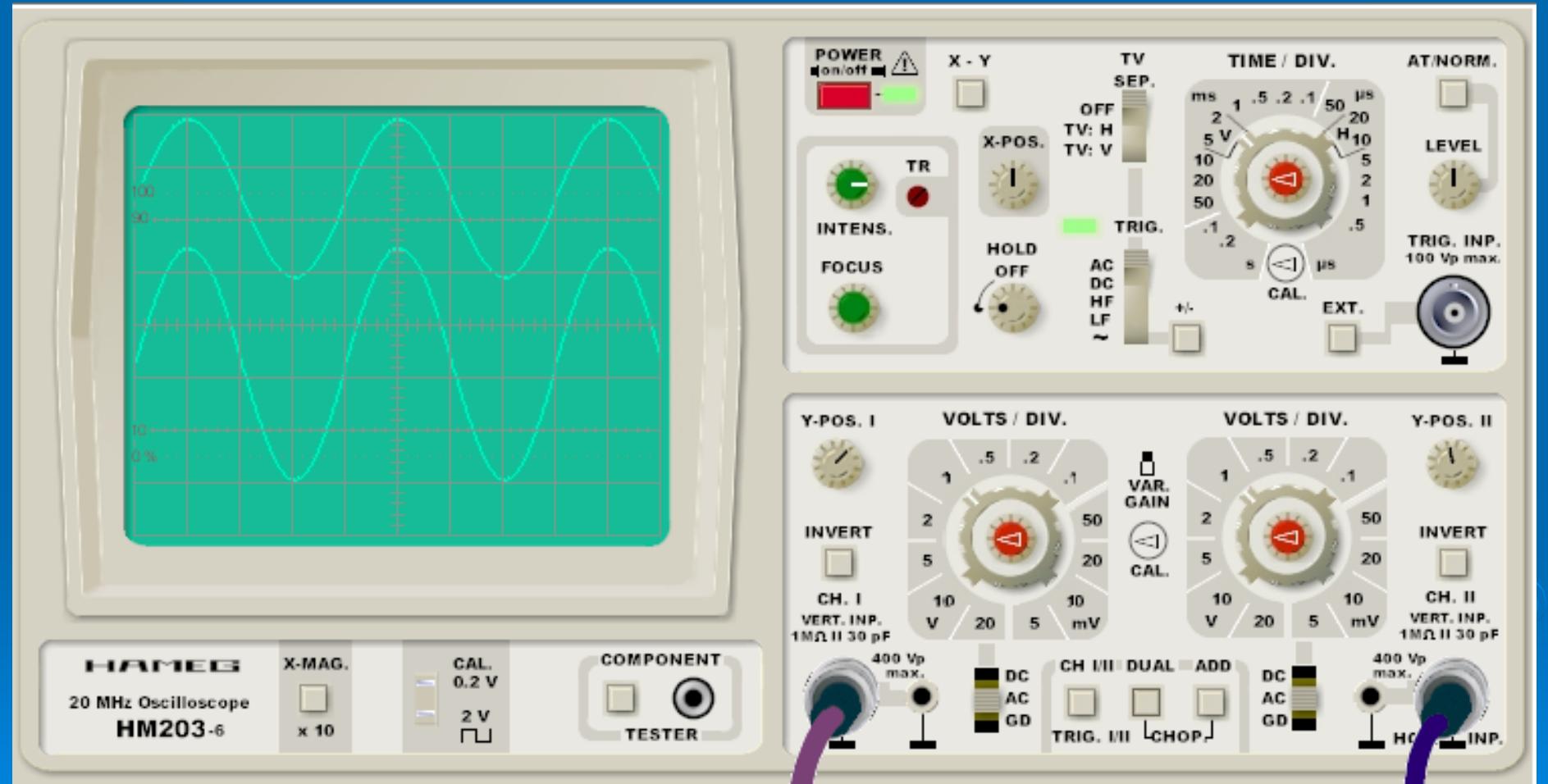


Controls

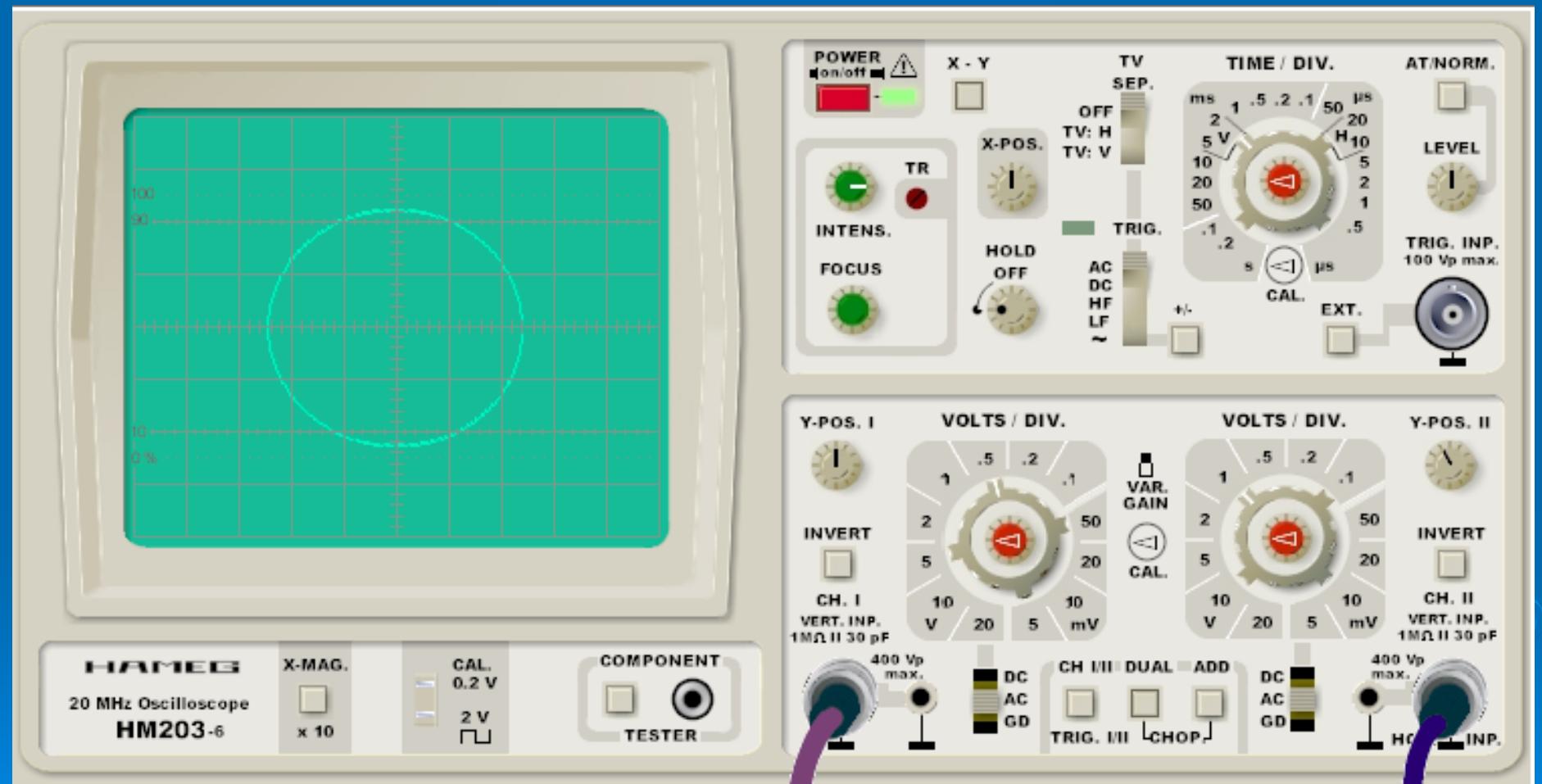
X-Y mode



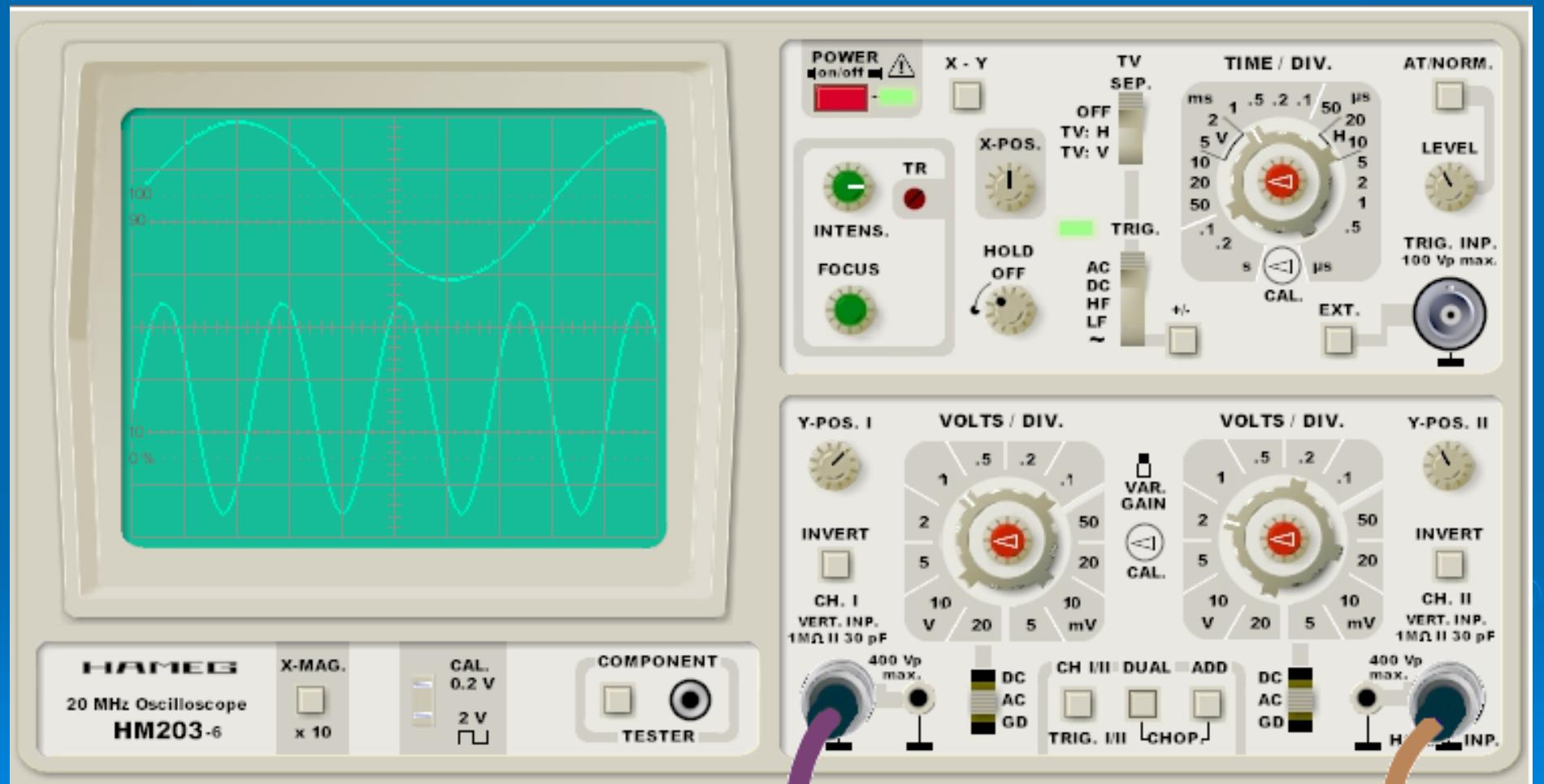
Dual trace, two channels



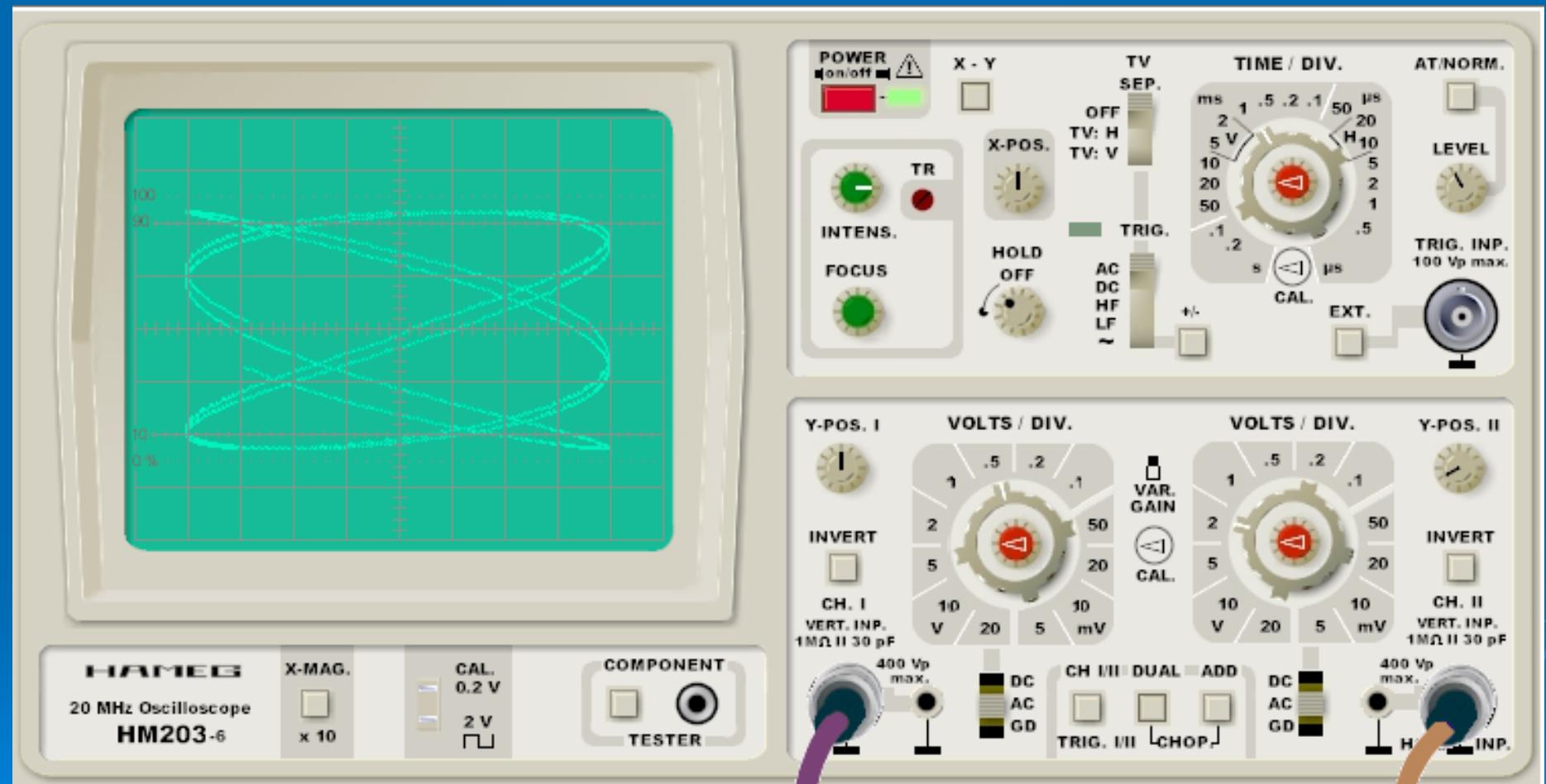
X-Y mode



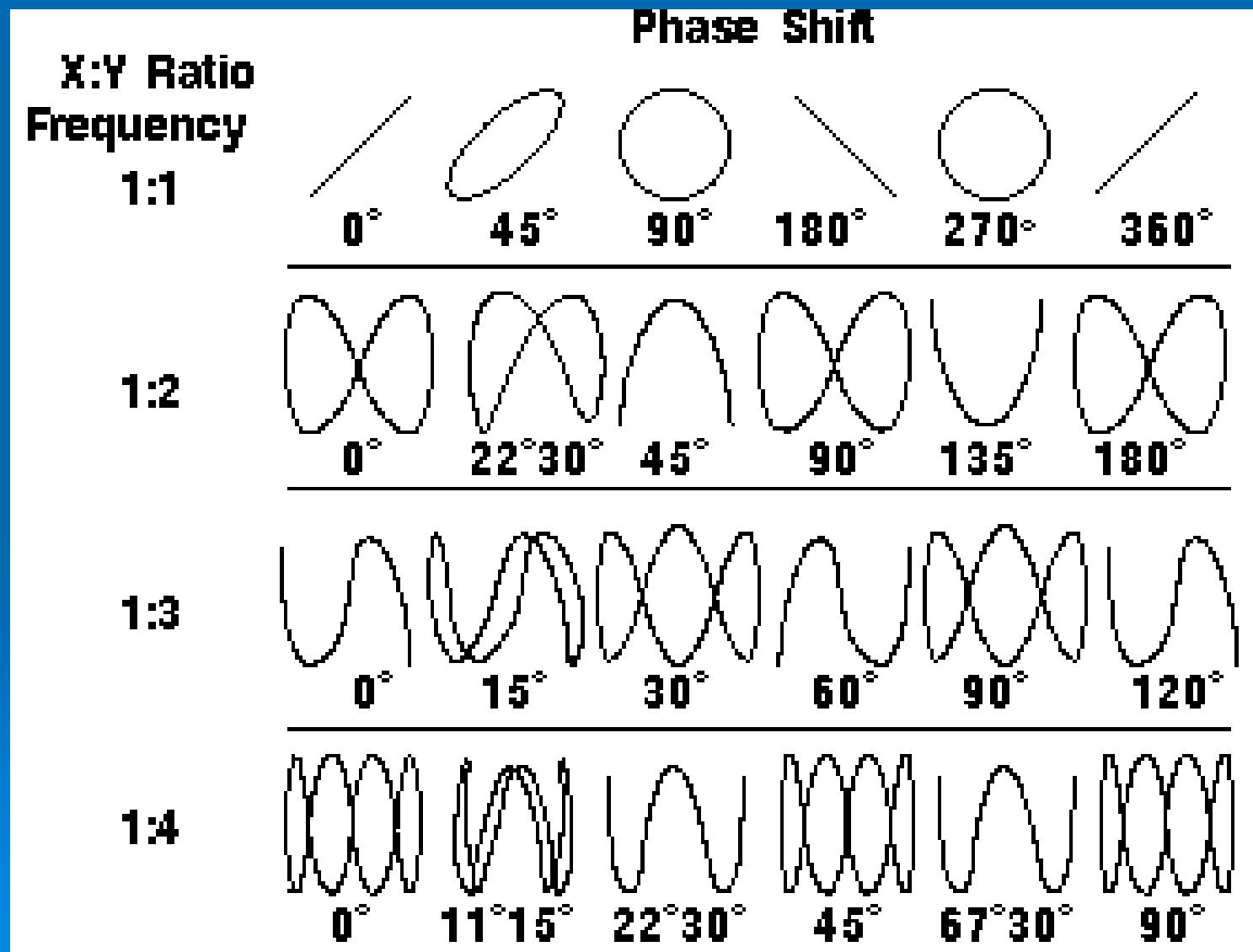
Dual trace, two channels



X-Y mode



Phase shift measurement



Probes

Passive:

x1 / x10 / x100

High Voltage HV

Active:

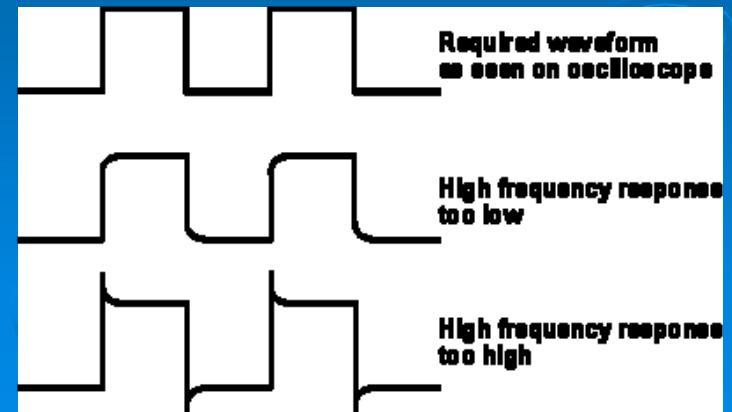
10x / 100x

Differential

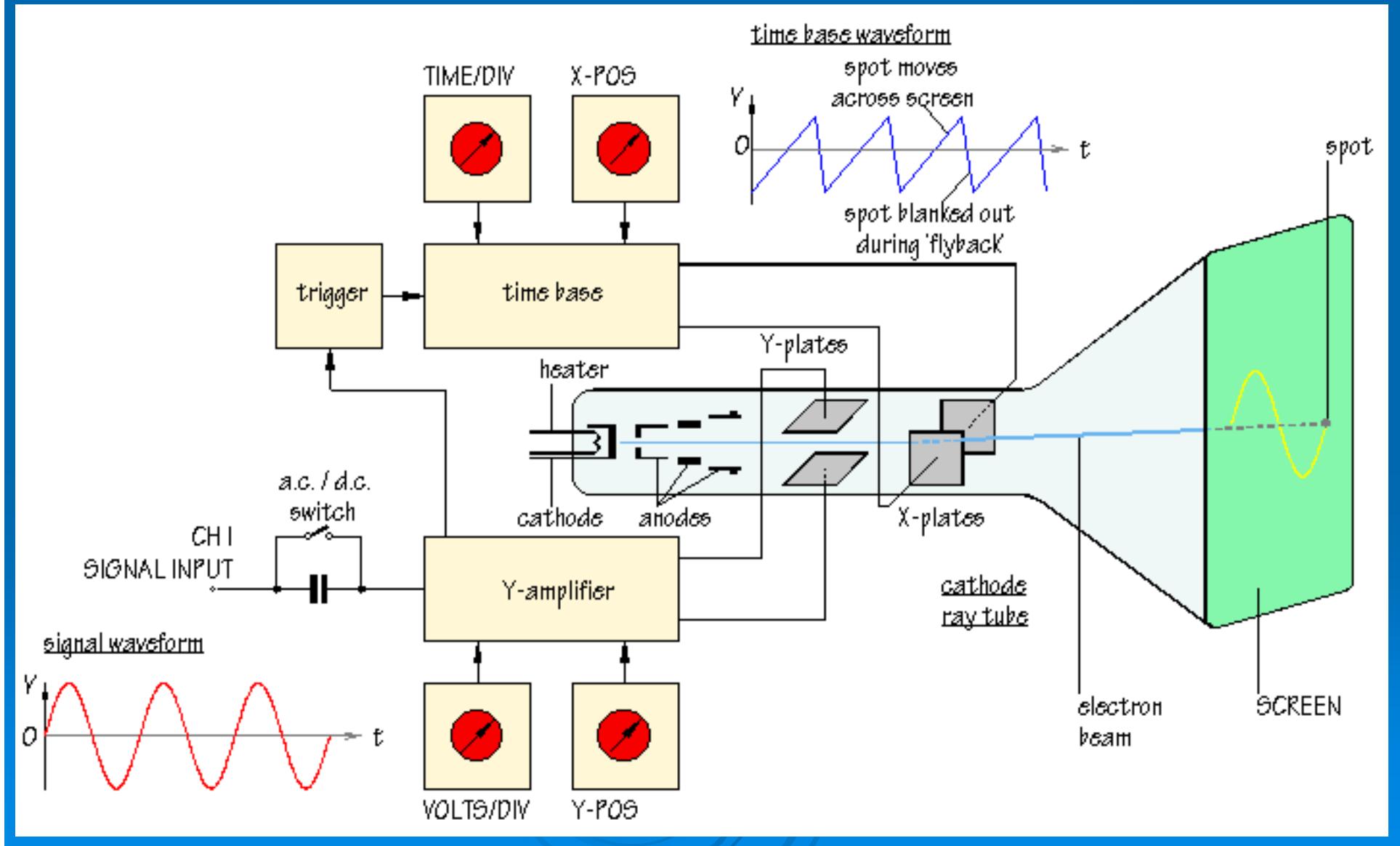


Trimmer

HF/LF compensation

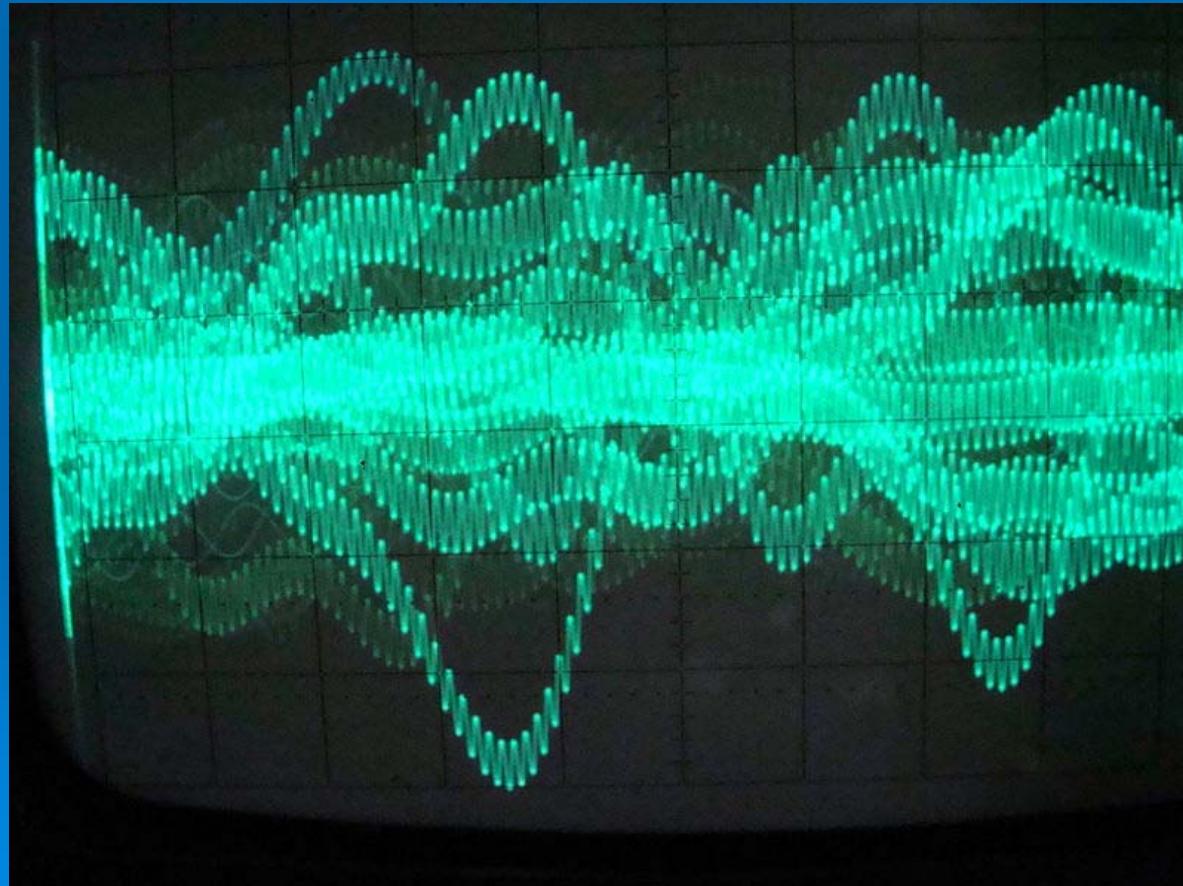


Theory of operation



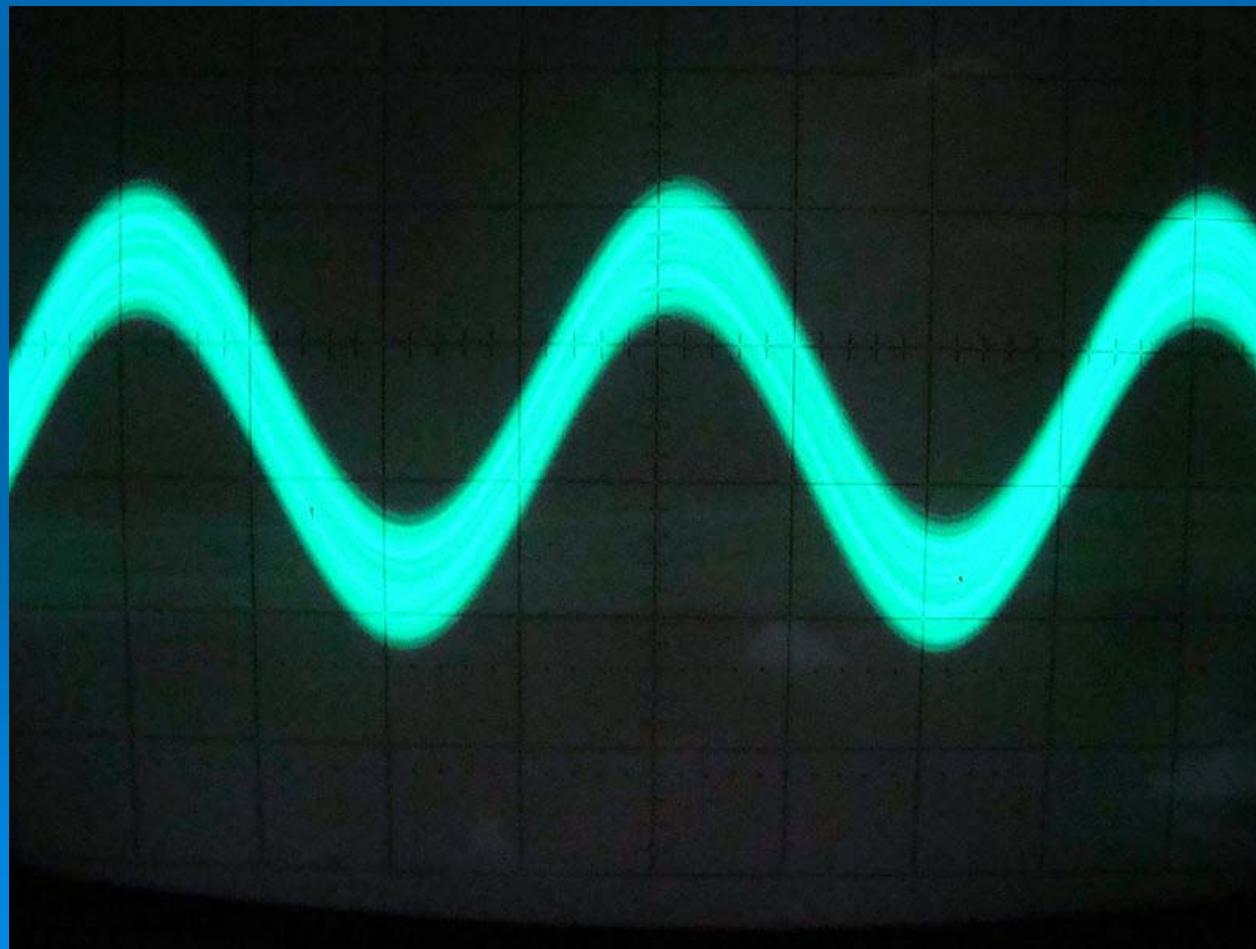
Signal examples

AC mains hum over audio signal



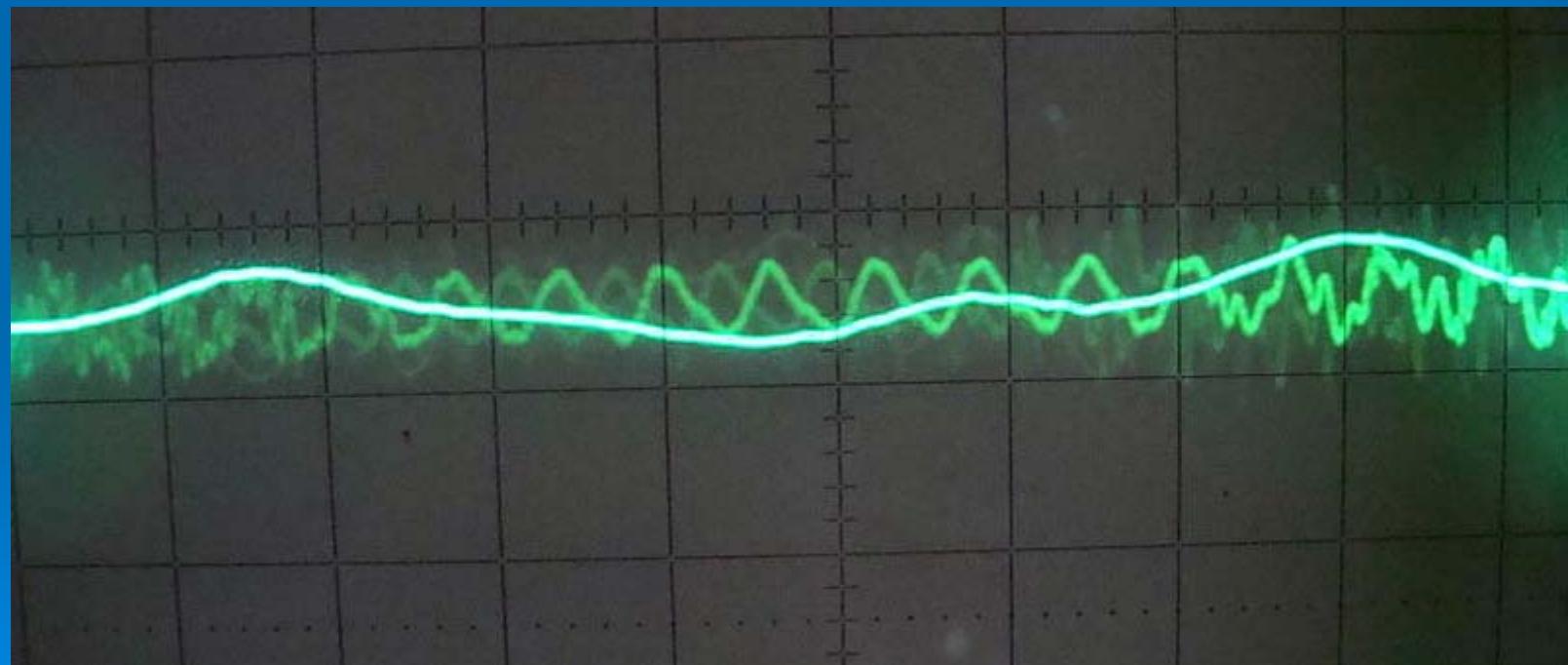
Signal examples

HF signal AM modulated by LF signal



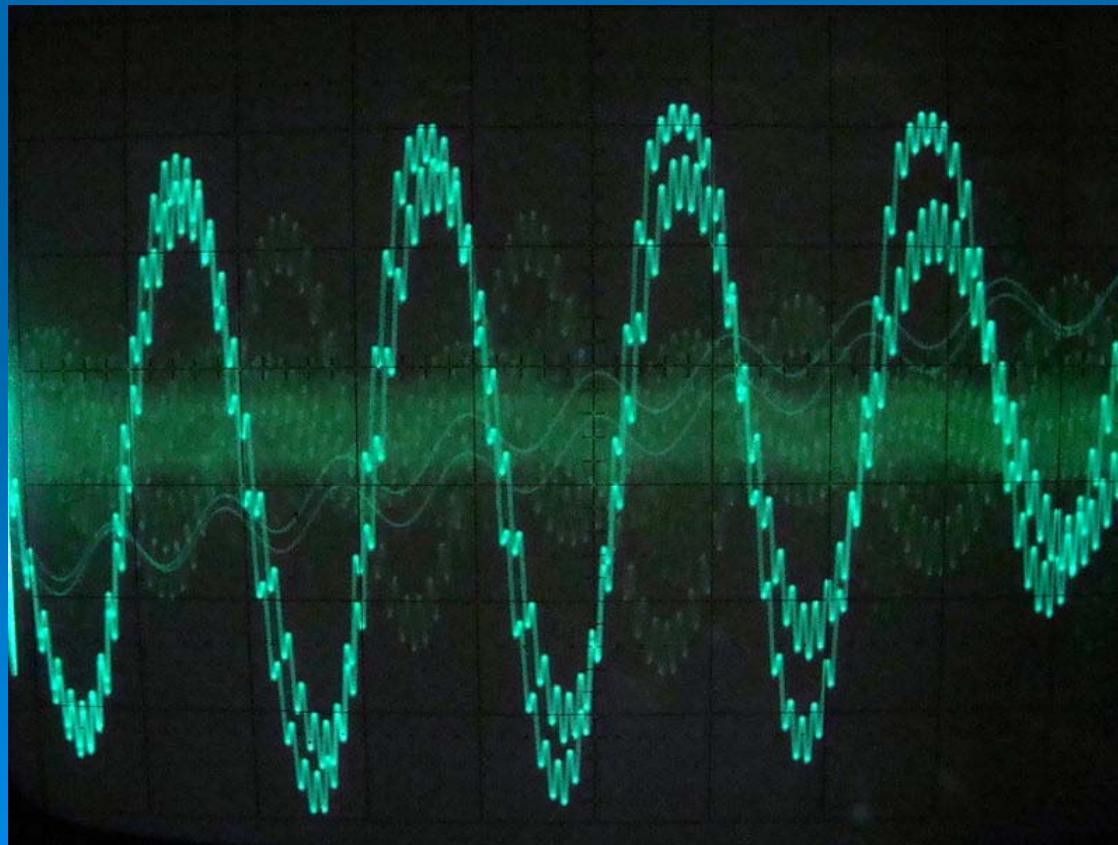
Signal examples

„DC“ signal – magnified to show DC level fluctuation and superimposed noise



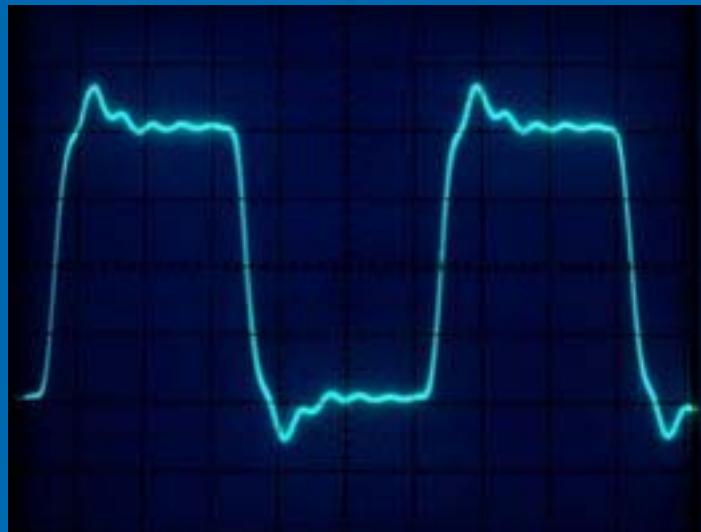
Signal examples

„Sine“ wave - Bad filtration and signal reconstruction at the D/A converter output



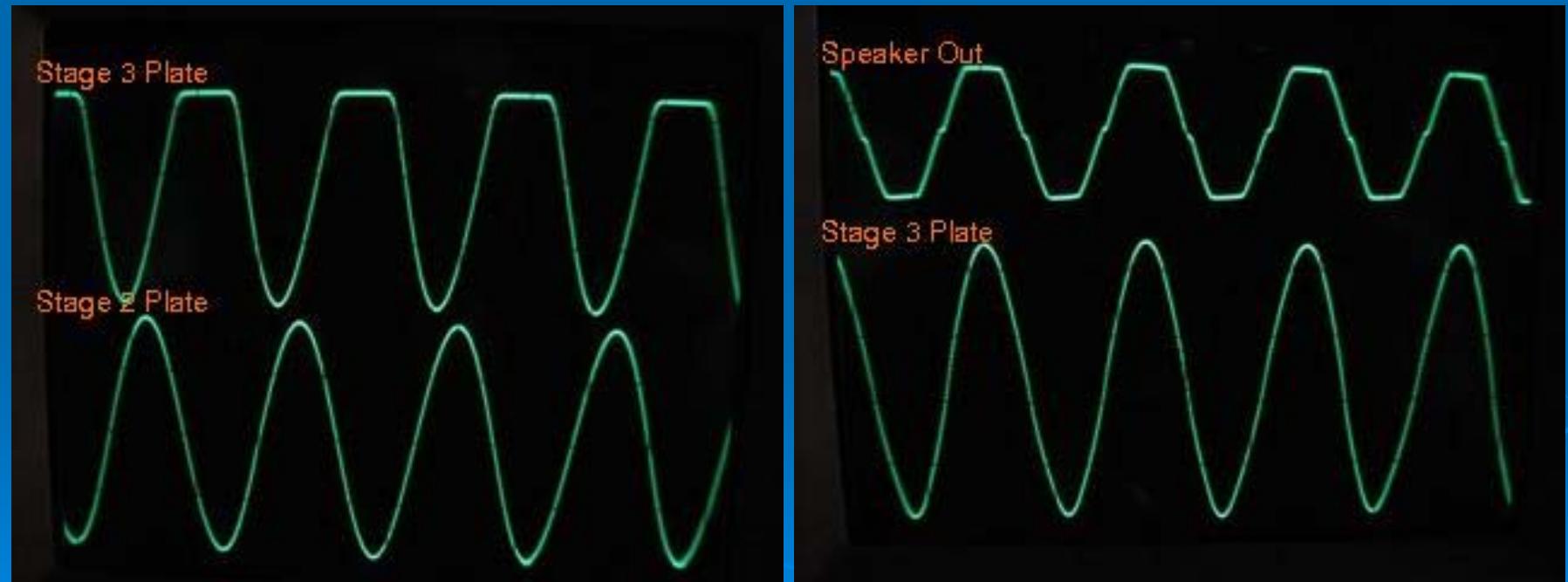
Signal examples

Not so perfect „Square“ waves



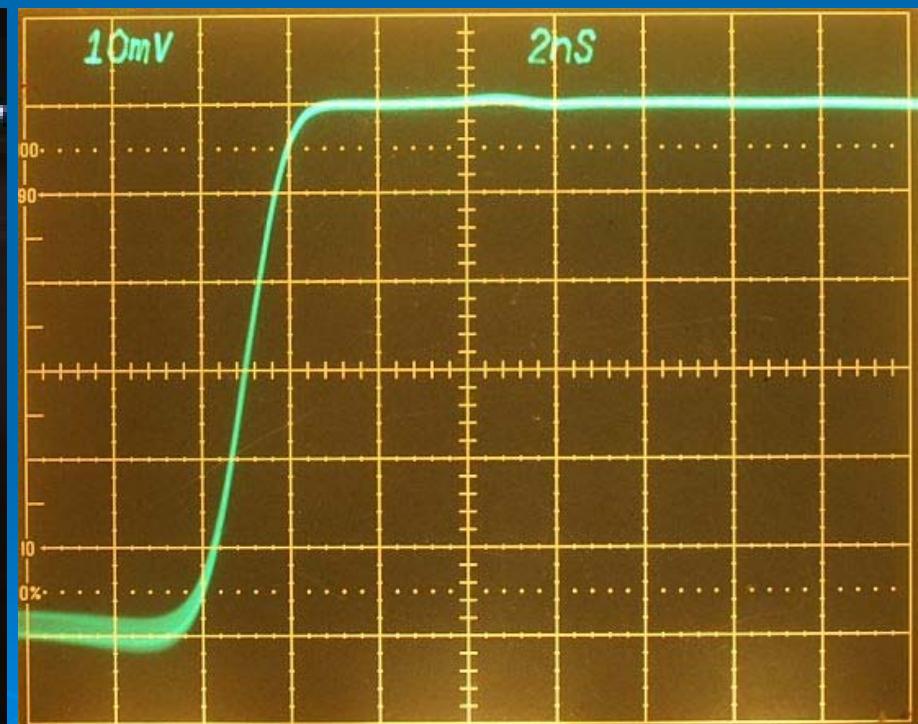
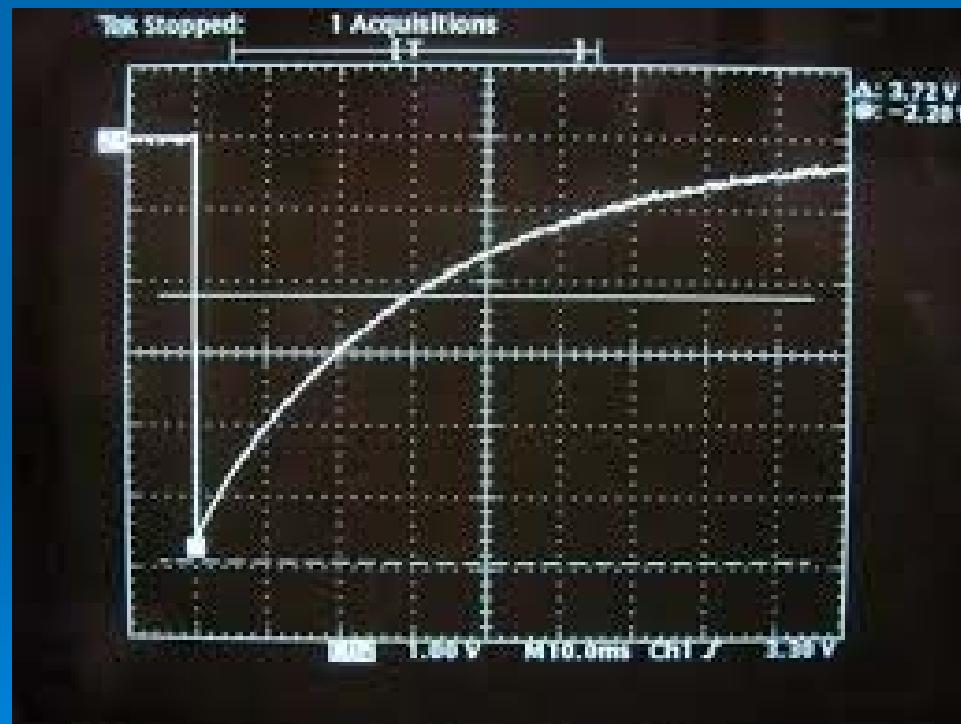
Signal examples

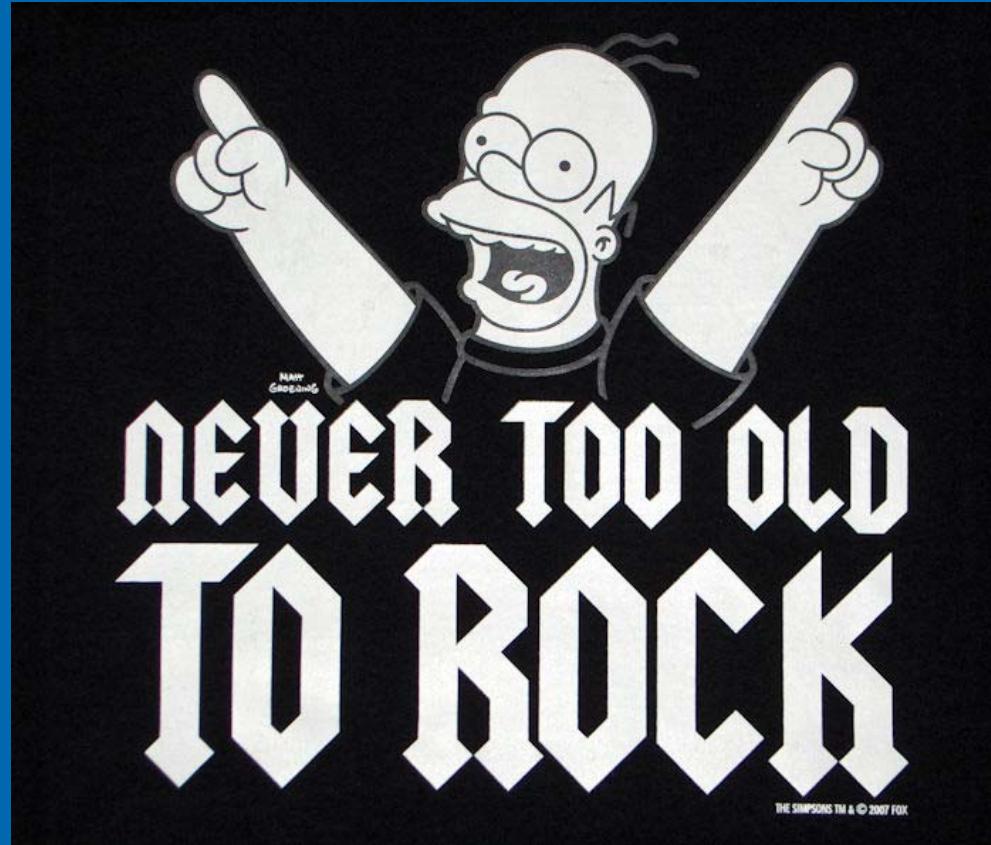
Signal clipping on sine waves



Signal examples

Response time





HOORAY, IT'S OVER!

Marjan Urekar

marjanurekar@gmail.com