

Lesson 18  
EET 150

# Operating a Function Generator



## Learning Objectives

**In this lesson you will:**

- see the types of waveforms produced by a function generator
- see the basic controls of a function generator operation
- identify key function generator specifications
- see the how source and load resistance affect generator operation
- locate and identify the basic control groups of a function generator



## Operating a Function Generator

### A Function Generator

- produces sine, square, pulse, triangle and ramp waveforms
- has a variable frequency output
- has adjustable voltage amplitude output
- can add a dc offset to any waveform



## Characteristics of a Function Generator

### Generator Specifications

**Frequency range:** 0.000,001 Hz -20 MHz (lab instrument)

**Amplitude range:** 10 mV<sub>pp</sub>-10 V<sub>pp</sub> (lab instrument)

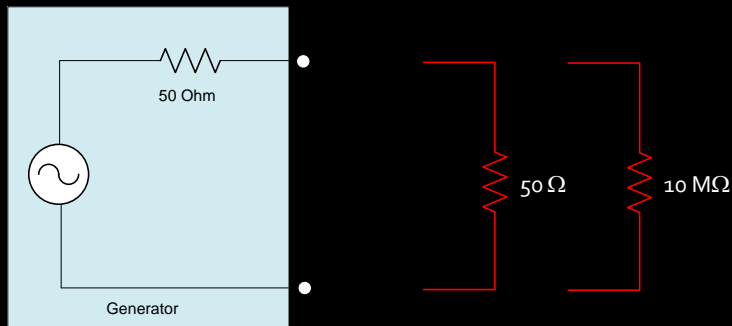
**Total harmonic distortion:** sine and other waves lower better

**Output impedance:** typical 50 ohms (variable on lab instrument)



## Generator Output Impedances

### Voltage and Power Transfer



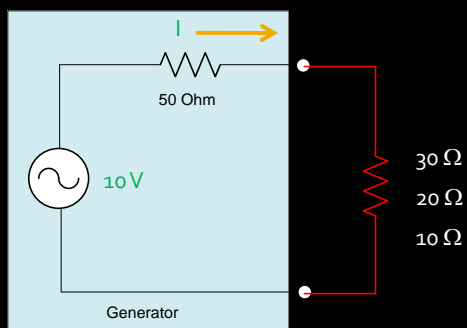
Match load to generator resistance for maximum power

Use high resistance load to get maximum voltage



## Function Generator Output

### Power limits and short circuits



$$I = \frac{10 \text{ V}}{80 \Omega} = 0.125 \text{ A}$$

$$I = \frac{10 \text{ V}}{70 \Omega} = 0.143 \text{ A}$$

$$I = \frac{10 \text{ V}}{60 \Omega} = 0.167 \text{ A}$$

$$I = \frac{10 \text{ V}}{50 \Omega} = 0.200 \text{ A}$$

Short circuit limited by generator internal resistance



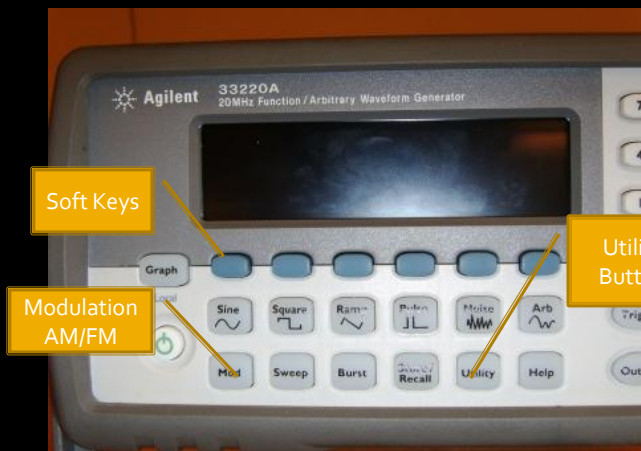
# Function Generator Controls

Identification and location of controls Agilent 33220A



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Identification and location of controls Agilent 33220A



Soft keys change for a given function button

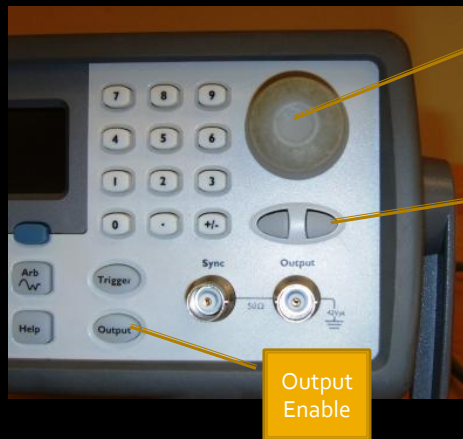
Set waveform characteristics

Utility button gives access to generator output impedance

Use Hi-Z for most work

# Function Generator Controls

Identification and location of controls Agilent 33220A



Main  
Control  
Knob

Output enable must  
be pressed to see  
output

Display cursors control  
digit adjustment

Display  
Cursor  
Controls

Main control knob  
controls frequency  
and amplitude  
adjustments

Output  
Enable



## Coming Next: Multi-stage Troubleshooting

End Lesson 18  
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