

BME 3512 Biomedical Laboratory Equipment List

Agilent E3630A DC Power Supply

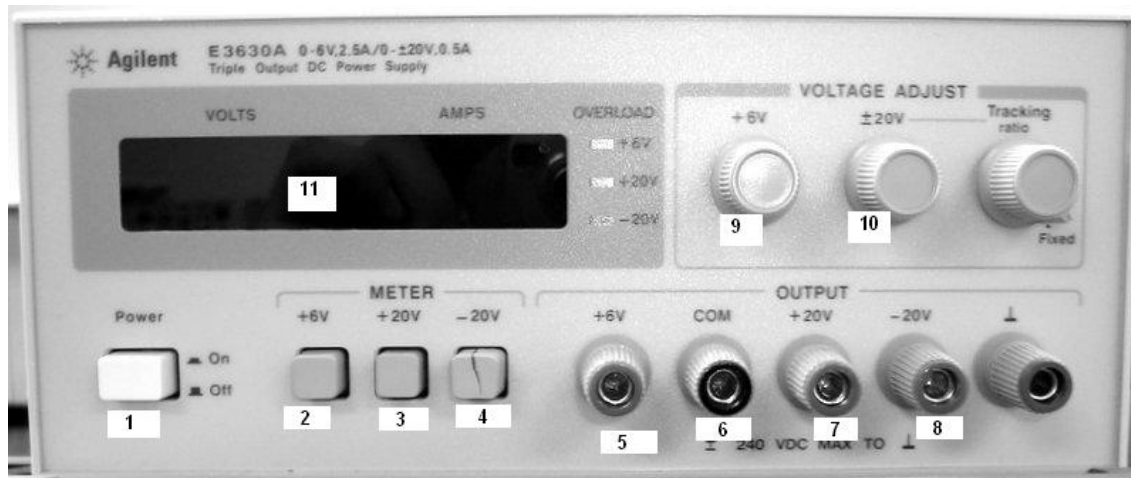
Agilent 54622A Digital Oscilloscope

Agilent 33120A Function / Waveform Generator

APPA 95 Digital Multimeter

Component Layout Breadboard

Agilent E3630A DC Power Supply

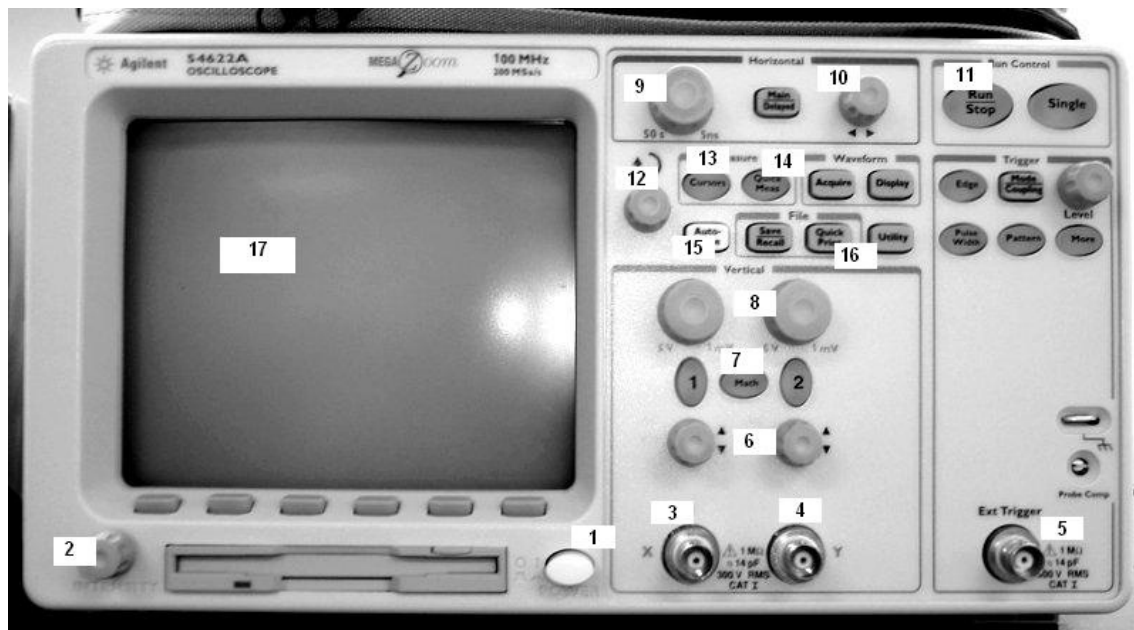


- 1) Power supply
- 2) Should be pressed in when you are adjusting the +6 V knob
- 3) Should be pressed in when you are adjusting the +20 V knob
- 4) Should be pressed in when you are adjusting the -20 V knob
- 5) +6 V output
- 6) COM port should always be connected to the ground
- 7) +20 V output
- 8) -20 V output
- 9) By turning this +6 V knob you can acquire DC voltages between 0 and +6 V
- 10) By turning this ±20 V knob you can acquire DC voltages between -20V and +20V
- 11) Display

Example: If we want to acquire a DC voltage output of +12 V the steps followed are

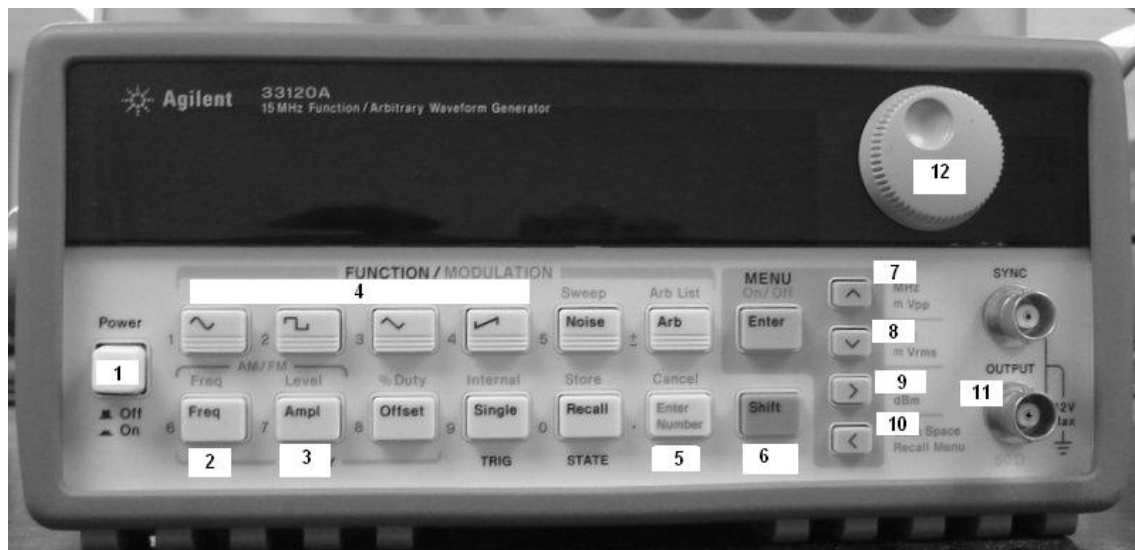
- Switch on the button 1
- Press button 3 and then adjust the knob indicated by 10 until you have 12 on the screen 11
- Connect 7 to the breadboard and 6 to the ground and you get the required setting

Agilent 54622A Digital Oscilloscope



1. Power switch
2. Intensity of the wave on the Cathode ray screen can be increased or decreased with the help of this knob. Remember that the intensity of the wave should always be low
3. Channel 1 input
4. Channel 2 input
5. External trigger
6. Using these knobs the waves on the screen can be moved vertically
7. Using the math button we can acquire some special waves like the channel 1 – channel 2 wave output, integral of channel 1 output, differential of channel 1 output etc.
8. The volts per division on the screen can be adjusted by using this knob. Indirectly what we are doing here is we are trying to zoom in the wave
9. The time per division can be adjusted i.e. the horizontal width of the wave can be adjusted using this knob
10. The wave on the screen can be moved horizontally using this knob
11. We can freeze the wave on the screen using this button and we can run the wave back by pressing the same button
12. This knob is mostly used when we try to measure the wave amplitude and the wave time period using CURSORS
13. Cursors are used to measure the different wave parameters
14. Quick measurements give the various parameters of the wave automatically but this is not accurate than the cursors
15. By using this button, the wave on the cathode ray screen adjusts itself to the best fit on the horizontal and the vertical directions
16. To store the wave form on the floppy we first freeze the wave by pressing the 11 button and then press this button
17. Screen

Agilent 33120A Function / Waveform Generator



1. Power Switch
2. Frequency Switch (To select or change the frequency)
3. Amplitude Switch (To select or change the amplitude)
4. Four different Switches to select four different wave forms, one at a time
5. Enter number allows the user to enter the numerical value of the required amplitude and the frequency of the output wave
6. Shift key allows the user to shift the decimal points of the amplitude or the frequency of the output wave
7. Allows the user to select the unit of MHz or Vpp of the output wave
8. Allows the user to select the unit of KHz or Vrms of the output wave
9. Allows the user to select the unit of Hz or dB of the output wave
10. Similar to Backspace in the keyboard of the computer
11. To required output wave is obtained by attaching a probe to output pin

Apart from all these we can find that there are numbers from 0-9 beside many of the switches. These are used to enter the numerical values.

Examples:

- If we want to acquire a square wave of 110 Vp-p, 60 Hz the steps are
 - Switch on the power which is indicated by 1
 - To enter the frequency press 5 and then press 2 and then enter number 60 and then press 9. This gives you an output of 60 Hz
 - To enter the amplitude press 5 and then press 3 and then enter the number 110 and finally press 7. This gives you an output of 110Vp-p.
 - Now to select the square wave press the button which indicates the square wave in 4 and lo you have the required output which is 110 Vp-p, 60 Hz square wave.

Instructions for Switching Agilent 33120A Signal Generator to “High Z” Termination

The default setting on the Agilent 33120A signal generator is to set the output termination to a 50 Ω load; however, this setting needs to be changed such that the output termination is an open circuit, or “High Z.” To do this, follow the procedures listed below.

Each time you turn on the signal generator, you’ll need to follow these procedures. If you restart the signal generator, you’ll also need to complete these steps.

- 1) Press the “Shift” Button
- 2) Press the “Enter” Button
- 3) Turn the dial until the display reads “D: SYS MENU”
- 4) Press the Down Arrow; the display will now display “1: OUT TERM”
- 5) Press the Down Arrow; the display will now display “50 Ω OHM”
- 6) Turn the dial until the display reads “High Z”
- 7) Press the “Enter” Button; if the setting has been accepted, the display will briefly show the word “ENTERED”, then return the frequency display.

HERE ARE QUICK-START INSTRUCTIONS: JUST PRESS THE BUTTONS!

- 1) **SHIFT**
- 2) **ENTER**
- 3) **RIGHT ARROW: 3 TIMES**
- 4) **DOWN ARROW: 2 TIMES**
- 5) **RIGHT ARROW: 1 TIME**
- 6) **ENTER**

QUICK-CHECK: HOW DO YOU KNOW IF YOU’VE CHANGED THE SETTING?

On oscilloscope startup, the default peak-to-peak amplitude is 100 mV_{pp} when the output terminations is set to 50 Ω . **When you change the output termination to “High Z”, the default peak-to-peak amplitude will be displayed as 200 mV_{pp}. This is the correct setting!**

AAPA 95 Digital Multimeter

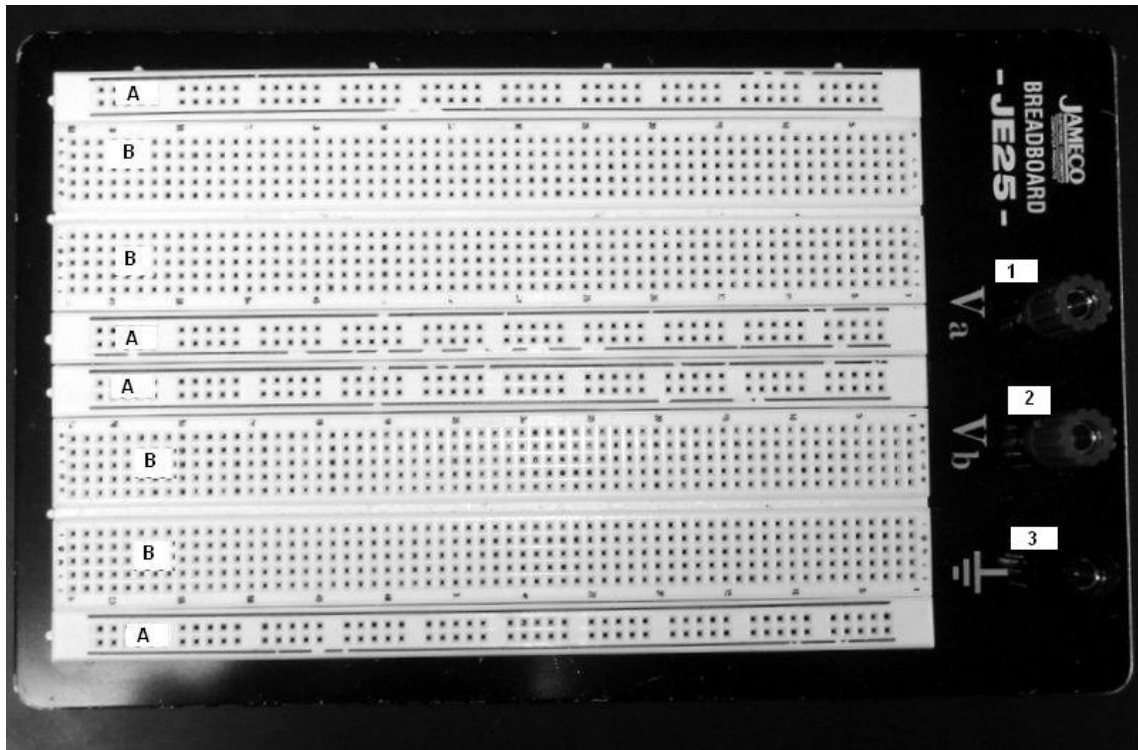


Measurement

Range

AC & DC Voltage	400mV to 750V AC	400mV to 1000V DC
AC & DC Current	400 uA to 20A AC	400 uA to 20A DC
Resistance	400 Ohms to 40 MOhms	
Capacitance	4 nFarads to 40 uFarads	
Frequency Counter	4 KHz to 30 MHz	
Diode Tester		
Logic Tester		
Transistor hFE Measurements		

Component Layout Breadboard



Jameco JE25 Breadboard 1660 Total Contact Points	
Breadboard #1 Total Contacts = 830	Breadboard #2 Total Contacts = 830
Left Buss Blue 50	Left Buss Blue 50
Left Buss Red 50	Left Buss Red 50
Contact Points $2 \times 5 \times 63 = 630$	Contact Points $2 \times 5 \times 63 = 630$
Right Buss Blue 50	Right Buss Blue 50
Right Buss Red 50	Right Buss Red 50

Jameco JE25 Layout Grid Points

	a	b	c	d	e	f	g	h	i	j	
1											1
2											2
3											3
4											4
5											5
6											6
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