V36 Electronic Assembly (Advanced Course)

1. Allocated time: 5h30

5 hours and 30 minutes of competition.

2. Requirements

- Contestants must verify the provided components.
- They will respect the safety rules as well as the jury's instructions.
- They will keep their workstation clean and organized for the duration of the competition.
- It is each contestant's responsibility to bring all of the tools and equipment specified in chart n°6 in the pre-task assignment. The organization will not be able to provide it for them.

3. Procedure

Day -1 (March 24th): On the day before the competition, contestants will be welcomed on the contest stand by members of the jury. A briefing about the organization of the competition and the safety rules will be arranged. Contestants will draw lots in order to be assigned to a work station.
Day 1 (March 25th): Contestants will have 5 hours and 30 minutes to complete the task.
Day 2 (March 26th): Contestants will go on an organized trip.

4. Final Task Assignment

Contestants will assemble a "Digital Echo Chamber" using the assembly instructions provided by the manufacturer (to be provided on the day of the competition), as well as all the components.

It is recommended to start soldering components from the lowest to the highest. For example: low-power resistors then LEDs, ceramic capacitors without bending the leads or damaging the paint…

The colors of resistors are to be read from left to right.

The printed circuit board is to be read in two directions: from top to bottom and from right to left.

The values of the ceramic and plastic capacitors, as well as the LEDs, must be readable (if possible).

Contestants must not solder leads directly, since some soldering irons will not have enough power to do so. Thus, contestants must solder the wire from the speakers and the power supply directly onto the printed circuit board.

Contestants will bend the leads from the resistors and the LEDs to a 90° angle with half-round pliers then press these components against the circuit board when soldering them.

After having soldered a component crossing through the circuit board, contestants will cut the exceeding length of the leads as close to the solder as they can.

The technical object to be produced is not commercialized. Thus, contestants will not clean the circuit board in order for the jury to evaluate the quality of the soldering.

Work steps:

Before powering on, each contestant will control his/her work.
They will notify the jury after having performed that verification.

Before powering on, the jury will also control the work of each contestant.
Contestants will switch on the device under the jury's supervision.

Testing of the various functions of the device by each contestant:

Name of the tested function	**Evaluation of the jury:** **Proper functioning?**	
	YES	**NO**
On – Off		
Volume Minimal setting then maximum		
Microphone level Microphone sensitivity		
Delay Delay time		
Feedback level Echo		

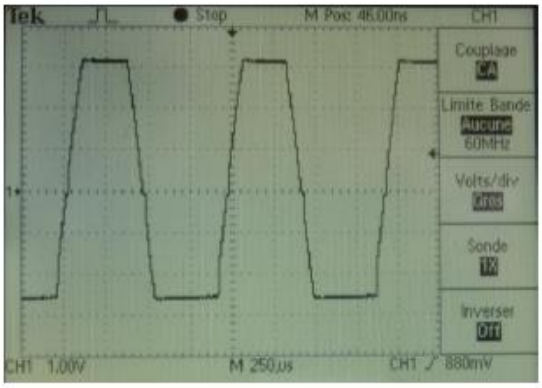
Measurements with an oscilloscope and a function generator

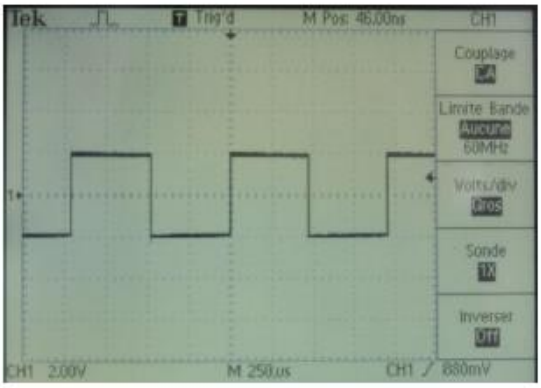
Preparation:

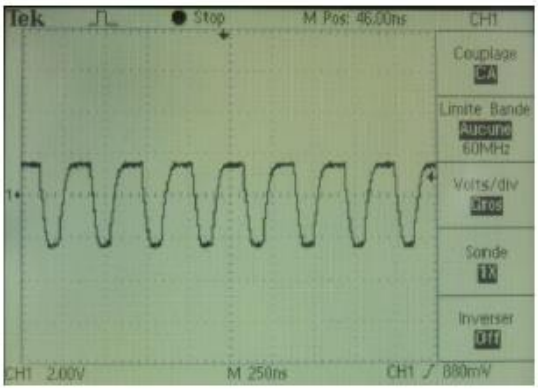
1. Set the function generator to 1000 Hz.
2. Select the sinusoidal alternating waveform.
3. Set the sinusoidal alternating waveform to a 2 Volt amplitude.
4. Unsolder the speakers in order to prevent them from working.
5. Unsolder the microphone and solder two wires in its place.
6. Plug the function generator on the two wires replacing the microphone.
7. Prepare the oscilloscope in order to perform measurements.
8. All potentiometers are set to maximum.

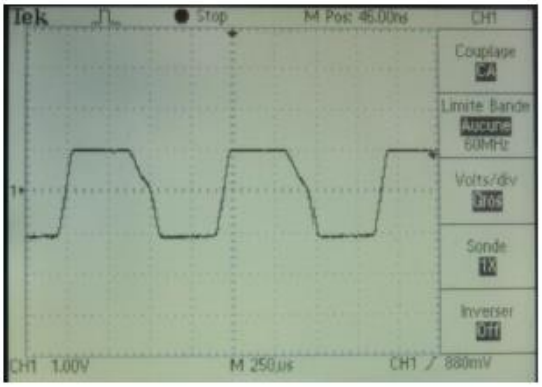
Measurements:

1. Place the oscilloscope on point A. (Circle the right answer)

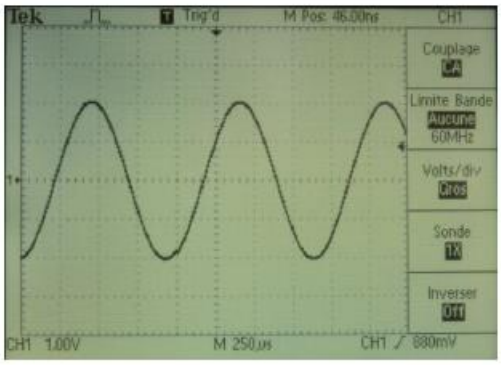


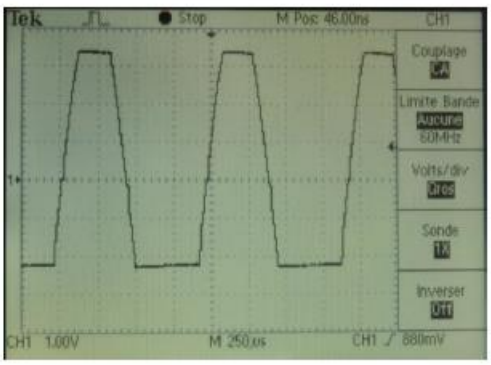


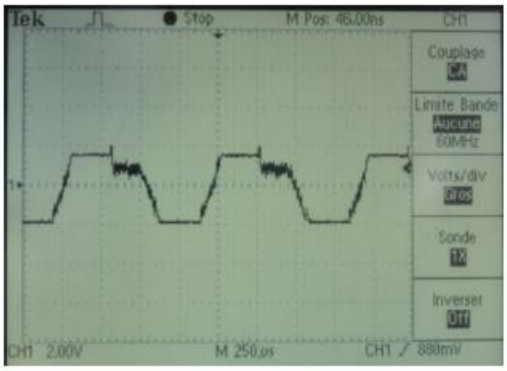


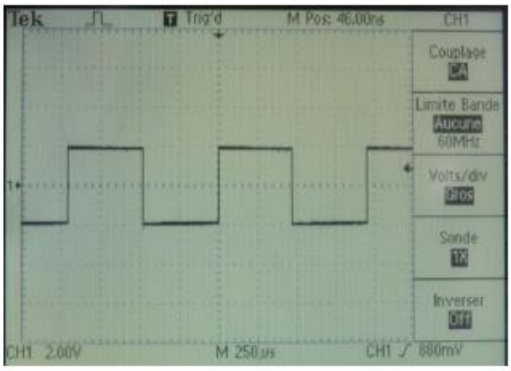


2. Place the oscilloscope on point B. (Circle the right answer)

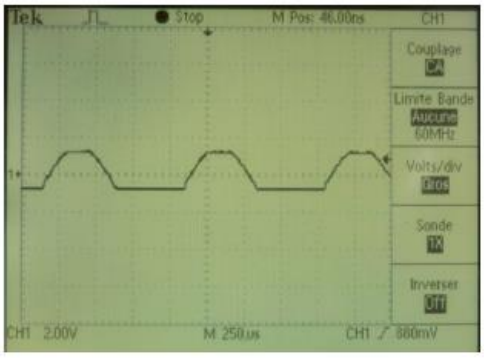


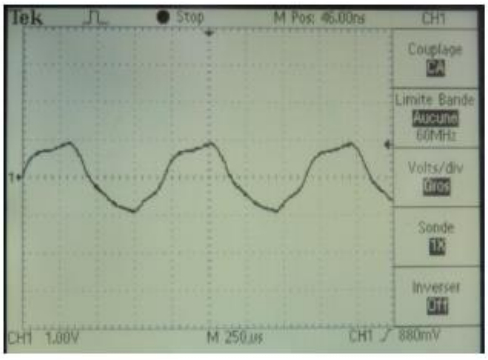


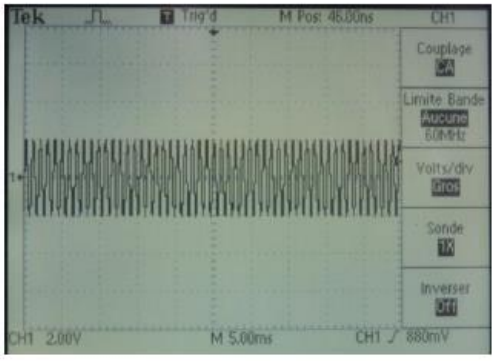




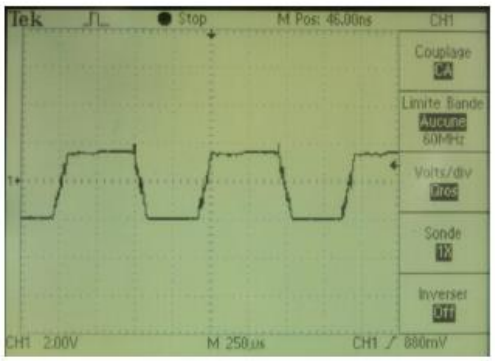
3. Place the oscilloscope on point C. (Circle the right answer)

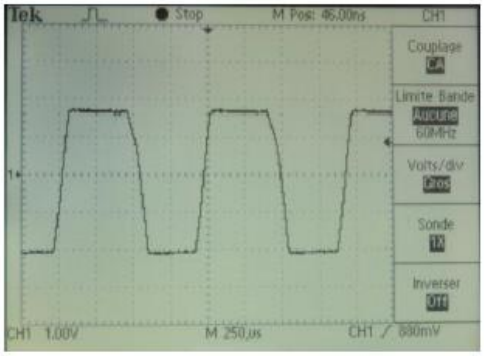


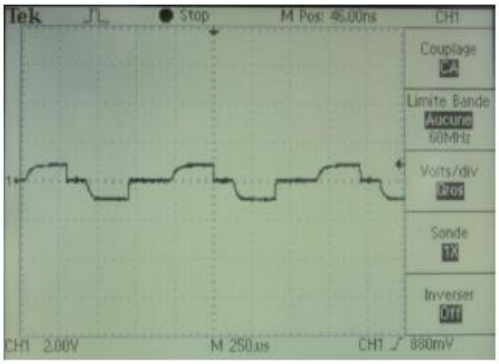


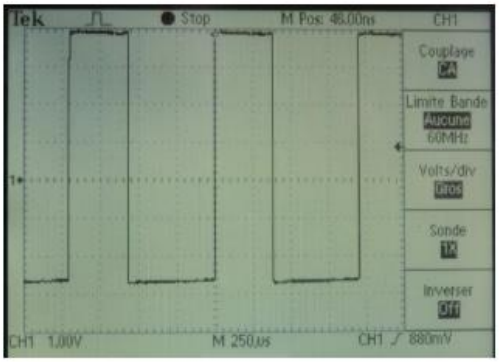


4. Place the oscilloscope on point D. (Circle the right answer)

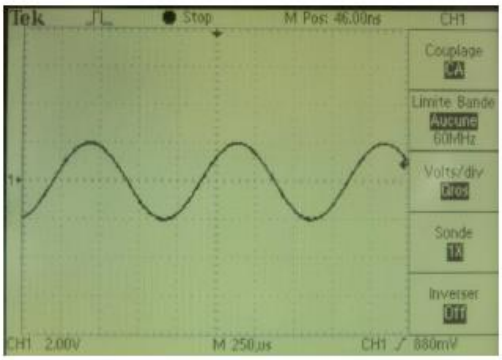


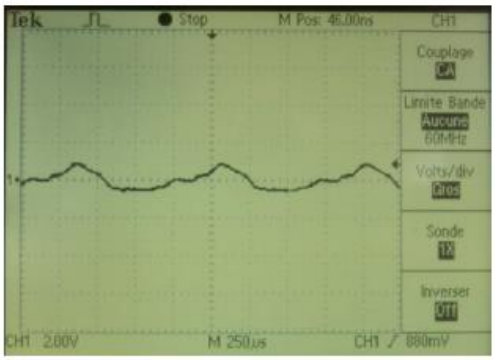


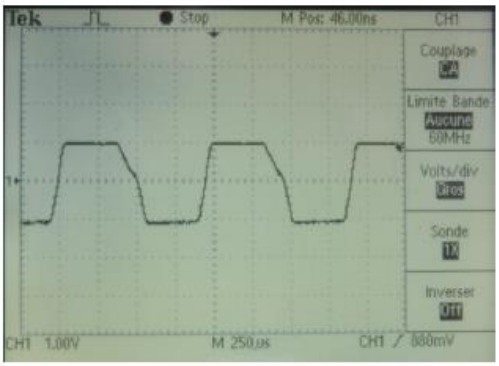


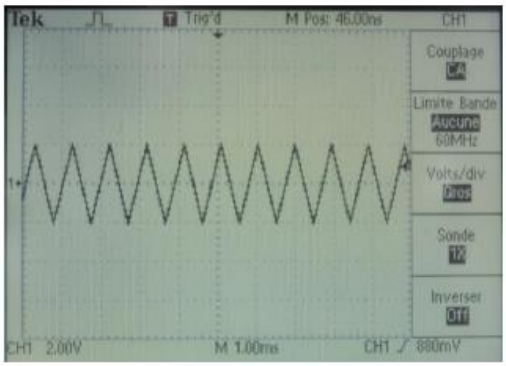


5. Place the oscilloscope on point E. (Circle the right answer)

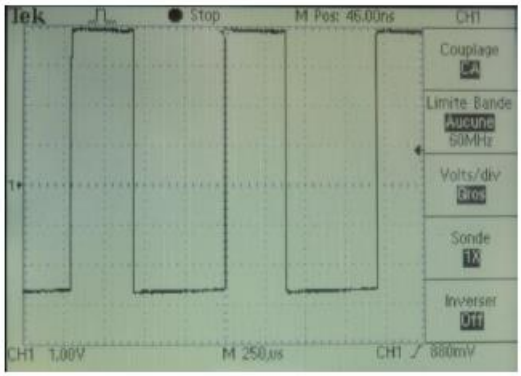


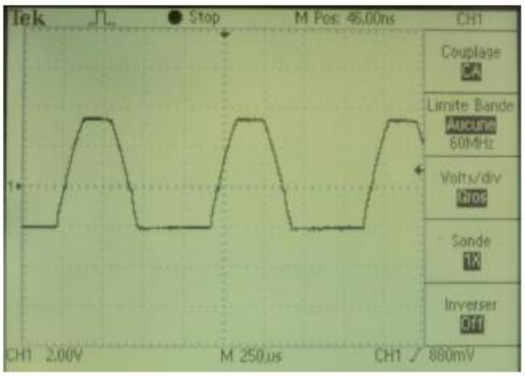


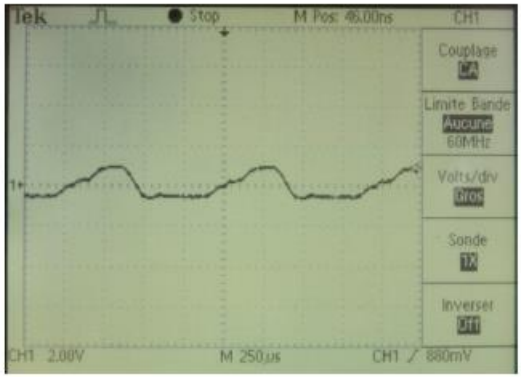


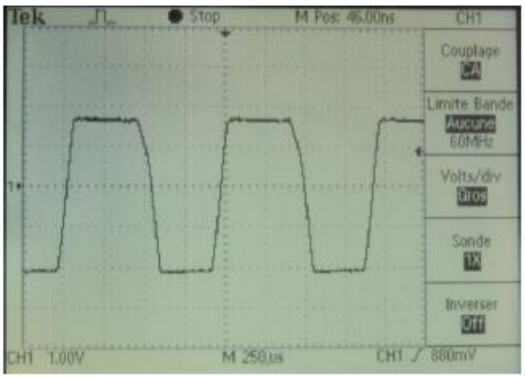


6. Place the oscilloscope on point F. (Circle the right answer)









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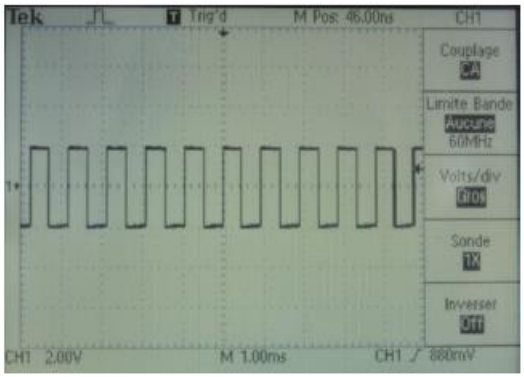
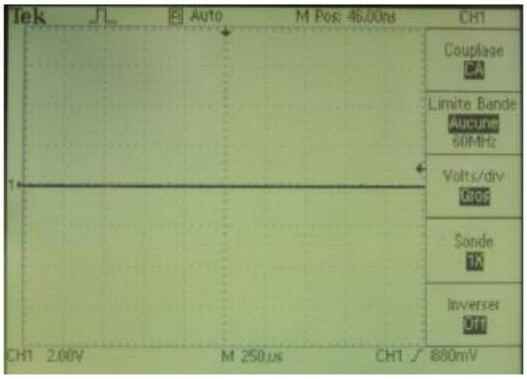
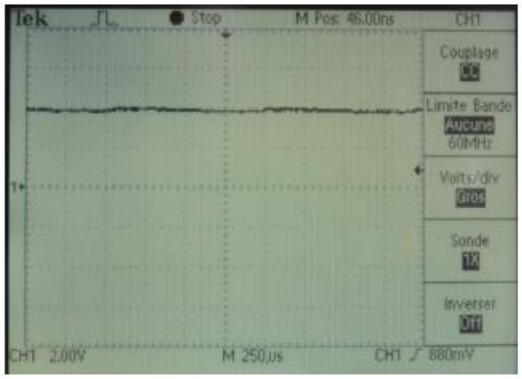
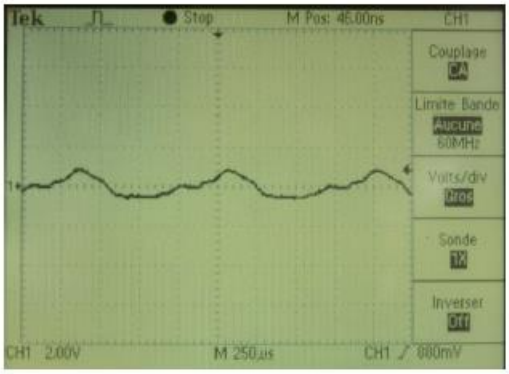
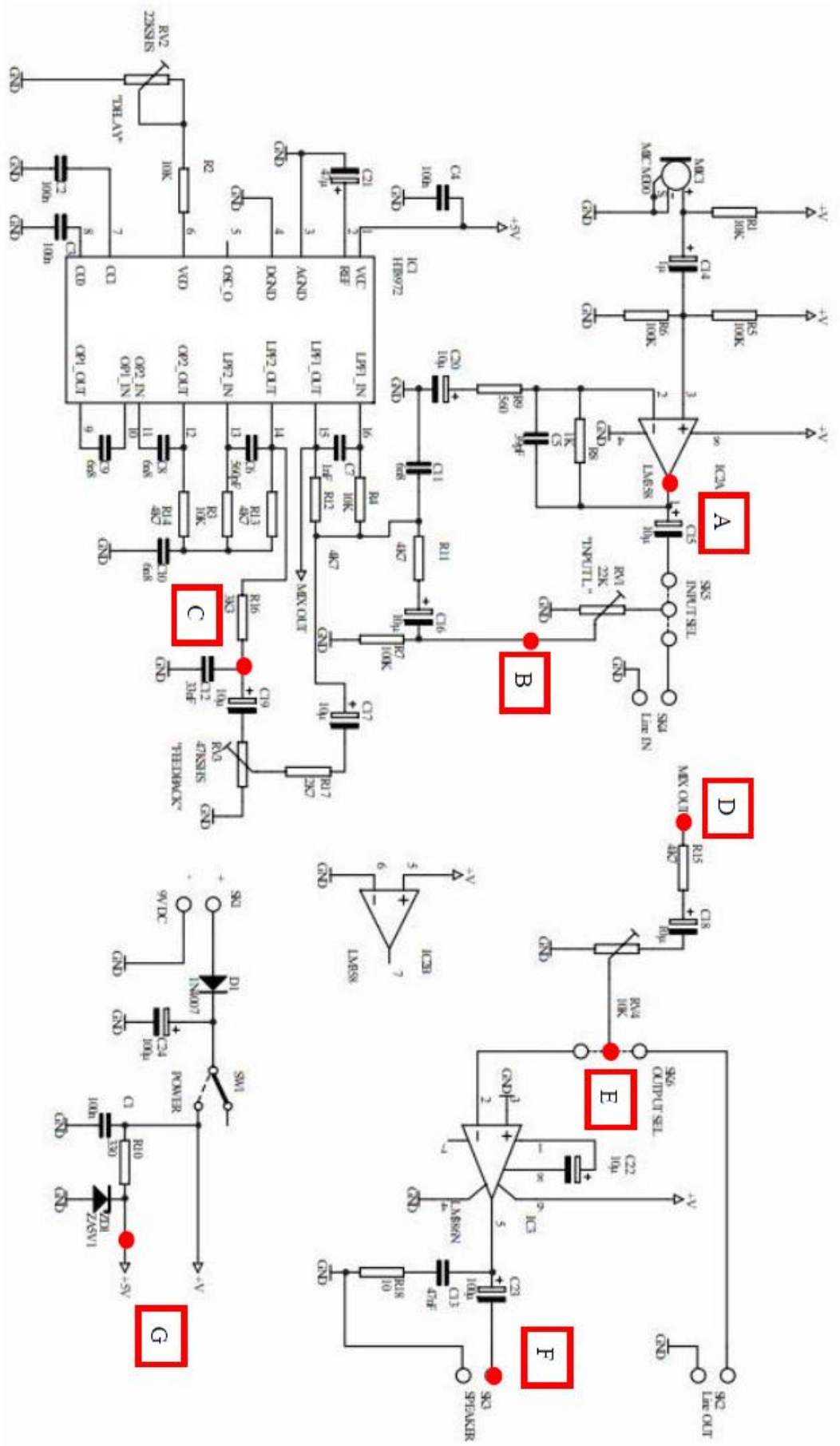
7. Place the oscilloscope on point G. (Circle the right answer)











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N°	Evaluation criteria	Scoring scale
	Generalities	**18**
01	The polarities of the chemical capacitors, of the LEDs, of the microchips and of the microphone are respected (-2 points per error)	8
02	IC2 and IC3 are not reversed	2
03	The axis of the potentiometers are in place	2
04	Leads are not soldered	2
05	INPUT SEL: the jumper is on mic	2
06	OUTPUT SEL: the jumper is on spk	2
	Powering the system on	**10**
07	The device functions with the microphone	2
08	The 4 potentiometers are operational separately when speaking into the microphone (2 points by potentiometer)	8
	Evaluation of the requirements and completion	**42**
09	The read direction of the resistors is respected in the horizontal direction = tolerance to the right	2
10	The read direction of the resistors is respected in the vertical direction = tolerance to the right	2
11	The 4 potentiometers are in the right places: RV1-RV2=22K; RV3=47K; RV4=10K (1point per potentiometer)	4
12	All of the resistors' leads are bent	4
13	All the resistors and LEDs are pressed against the circuit board	4
14	All the circuit boards are properly pressed on their support	4
15	The paint on the components is not chipped	2
16	The soldered joints are of good quality (shiny, not too thick and cone-shaped)	16
17	The exceeding length of the leads crossing through the circuit board is cut as close to the solder as possible	4
	Measurements	**18**
18	The equipment is plugged properly	4
19	Connection of the oscilloscope on point A	2
20	Connection of the oscilloscope on point B	2
21	Connection of the oscilloscope on point C	2
22	Connection of the oscilloscope on point D	2

23	Connection of the oscilloscope on point E	2
24	Connection of the oscilloscope on point F	2
25	Connection of the oscilloscope on point G	2
Visual troubleshooting		**12**
26	The chart is filled correctly (-3 points per error)	12
TOTAL POINTS		**100**

Abi wishes you a good competition!