

National Skills Competition

Test Project Electronics

Industrial Maintenance

Industrial Electronics Test Project

National Skill Competition Date :



National Skills Competition

Test Project Electronics

WorldSkills Jamaica Competition April 24 to 25, 2008

General Instructions

1. Each competitor will be required to carry out the test project as specified and will be available on the website three months before the competition.
www.worldskillsjamaica.org
2. Each competitor will be required to carry out the test project as specified on the schedule to be handed out two days before the competition.
3. The time will be specified according to the test project.
4. 20% change will be made to the test project on the day of the competition where a new test project will be issued to the competitor.
5. All materials, ingredients, large equipment and specialized hand tools will be provided.
- 6. Please note that all competitors should provide their own small tools and utensils.**
7. Competitors are expected to identify all equipment/ materials/ingredients needed and submit list to the competitions committee no later than March 7, 2008.
8. Debriefings will also be conducted for all competitors on April 22, 2008.
9. All competitors will get an opportunity to arrange work areas the day before the competition. Where applicable competitors for the second day will arrange their work areas on the evening of day one. Competitors who fall in the second shift will get an opportunity to do their preparation at offsite locations (to be decided) where necessary.
- 10. Competitors and coaches are expected to find their way to the competition village on April 22, 2008 and to depart back home on April 26, 2008**

National Skills Competition

Test Project Electronics

- 11. Transportation will be provided at designated times for all competitors and coaches to and from the competition venue.**
- 12. All coaches will play the role of experts (judges) for the competition**
- 13. Accommodation and meals will be provided for all competitors**
- 14. Accommodation will be provided for coaches only.**
- 15. All other persons that support the competitors will need to make their own accommodation arrangements.**
- 16. Lunch and light refreshment only will be provided for coaches, (experts), workshop supervisors, national trade managers and volunteers.**

17. All competitors should be present for the opening ceremony along with their coaches.
18. Rehearsal for the opening ceremony will be held on the evening of April 22, 2008 in the Indoor Sports Centre.
19. Competitors are not allowed out of the competition village unless permission is granted by the dorm master.
20. All competitors are required to register at the competition village to qualify for entry into the competition.
21. Special permission must be granted if competitors need to reside off campus.

INTRODUCTION

OPERATIONAL AMPLIFIER TONE MIXER

National Skills Competition

Test Project Electronics

This project proposal is designed to mix the tone using an operational amplifier. The OP- AMP is basically a differential amplifier having a large voltage gain, very high input impedance and low out put impedance. The OP – AMP has the “inverting” or (-) input and “noninverting” or (+) input and a single output. The OP - AMP is usually powered by a dual polarity power supply in the range of +/- 5 V to +/- 15 V.

The 324 IC includes four OP – AMPs in a single package. Here you will use two OP – AMPs to make a pair of oscillator and a third OP - AMP to mix their sound.

An amplifier consists of two basic elements:

1. A power supply that supplies a large energy source
2. An amplifier section that mix the tone using an operational amplifier.

Competitors Instructions

All competitors will be allocated a competitor number and work stations by the expert/judge using a ballot system.

National Skills Competition

Test Project Electronics

Equipment

Adequate materials and equipment will be available to each competitor.

Please check all materials and tools when they are supplied to you to ensure they are correct and not damaged.

Marks will be deducted if more materials are required unless it was faulty when supplied.

Replacement parts for any equipment must be requested through an expert/judge.

Personal Safety Rules

During the competition, all candidates MUST follow the safety rules listed below:

Any candidate, who in the opinion of the experts/judges, is not wearing the correct safety attire or is engaging in any unsafe practice, will be stopped and not allowed to continue until the issue is resolved. The candidate will also lose marks.

General

Do not lean across any machine or equipment.

Clean the area and equipment after each usage.

National Skills Competition

Test Project Electronics

Shoes

Fully enclosed work shoes or boots must be worn at all times.

Clothing

Legs must be covered at all times, by either long work trousers or overalls.

Upper body must be covered at all times.

If your hair is long, wear it up or in a hair net.

Clear Safety Glasses

Must be worn when necessary to protect your eyes.

Gloves

Must be worn when necessary to protect your hands.

EQUIPMENT TO BE SUPPLIED BY THE CANDIDATE

Personal Protective Gears

Multi-meter

EQUIPMENT TO BE PROVIDED BY THE ORGANISERS

The equipment and tools is be supplied by the organisers.

National Skills Competition

Test Project Electronics

CANDIDATE WORK AREA

Each candidate work area should contain the following equipment.

EQUIPMENT

Oscilloscope

MATERIALS

Solder wires

1 rolls

Connecting wires

1 roll

Perforated circuit board

90 mm X 140 mm

TOOLS LIST AND OTHER MATERIALS

Soldering iron (40 – 60 watts)

Wire strippers

Soldering iron stand with sponge

Small electric drill

Solder sucker

Track cutters

Solder wire (roll)

½" paint brush

Electronics Tool kit (min 2mm up)

Crocodile clip

Small pliers

Side cutters

Knife

Magnifying glass

Parts List Amplifier

Quantity	Part
4	100 k Resistor
3	10 k Resistor
1	1 k Resistor
2	1 M Resistor
1	0.001µF (ceramic capacitor)
1	1µF (electrolytic capacitor)

National Skills Competition

Test Project Electronics

3	IC 324 ¼ W OP-AMP.
1	Audio transformer
1	8Ω, 2 inches Speaker
1	Miniature switch (on/off)
1	Strip board (90 mm x 140 mm)

Duration – 3 hours

Set up – 1 1/2 hrs

Check – 30 mins

Rebuild – 45 mins

Test – 15 mins

Parts List Power Supply

Quantity	Part
1	110V ac – 6 V dc Transformer
4	1N4148 Diodes
2	16 V 1000 µF Capacitors
1	Analog meter

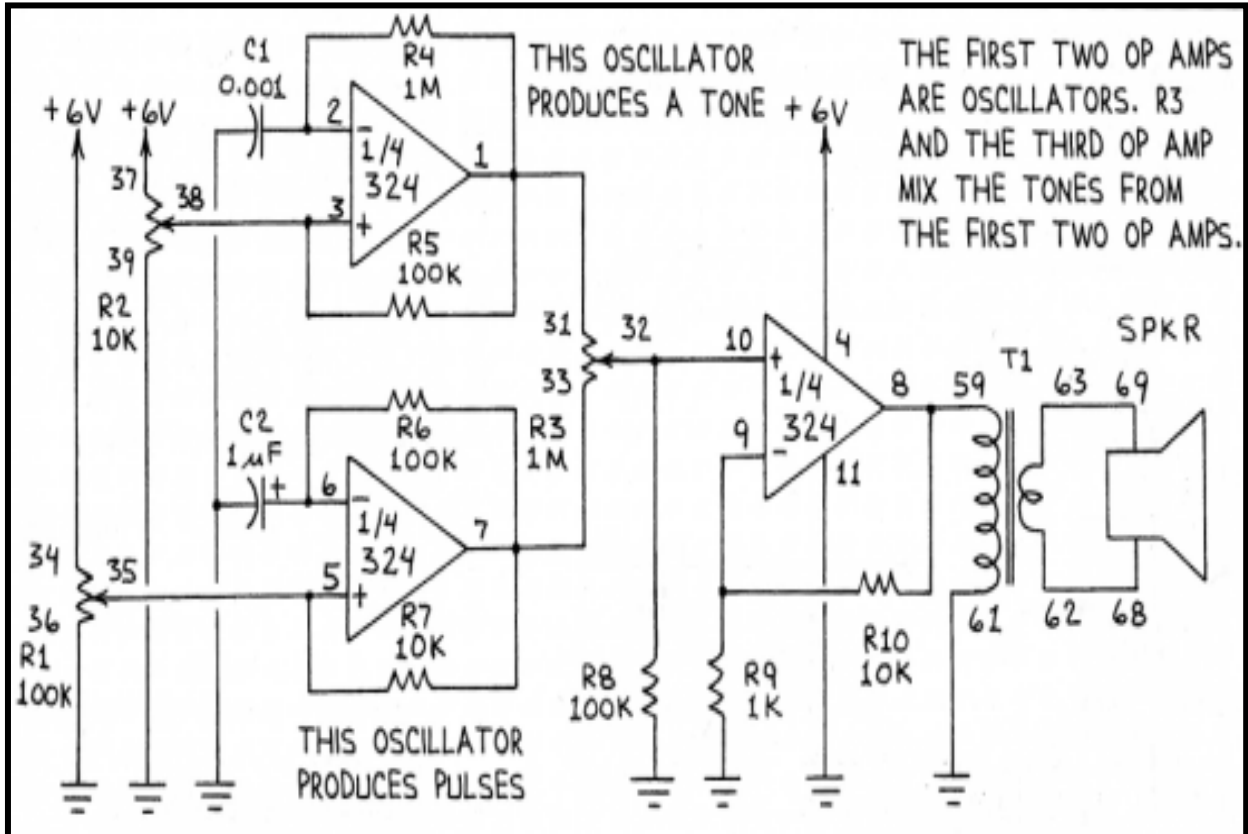
National Skills Competition
Test Project Electronics

National Skills Competition

Test Project Electronics

TEST PROJECT DESIGN CIRCUIT

OP - AMP TONE MIXER



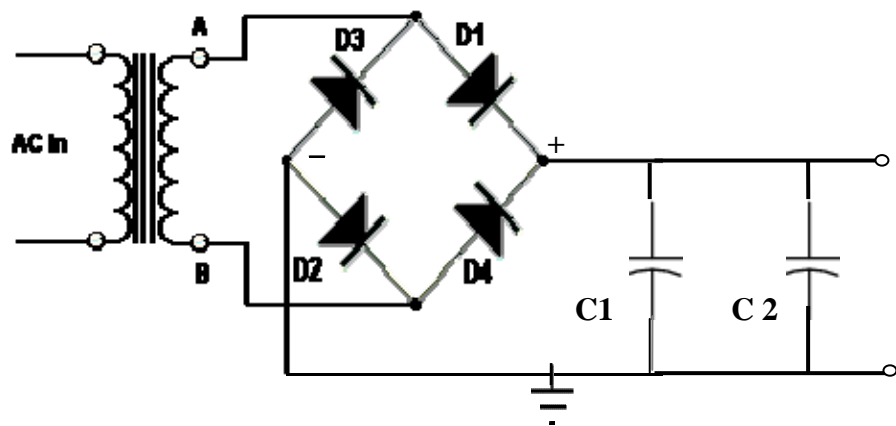
National Skills Competition

Test Project Electronics

TEST PROJECT DESIGN CIRCUIT

Power Supplied

The transformer primary is 110 V and the secondary is 6V. Once it is rectifier you will get 6 V DC. The diode should be rated at 1 A



Duration – (Power supply)

Set up circuit – 50

Check 40

Rebuild 20

Test 10

Total hours – 2 hours

Duration of OP – Amp. Tone Mixer and power supply – 5 hours

National Skills Competition

Test Project Electronics

OBJECTIVE MARKING

FORM 5

Competitor # _____

Skill Area: Industrial Electronics

Criterion #	Aspect of Criterion Description	Mark allotted for objective marking	Total Mark received for objective Marking	Total Mark received for Subjective Marking	Overall Mark Awarded
1	Materials/Components are checked for correct specification Tools selected is based on job specifications Design circuit layout Use appropriate Technology	5			
		3			
		4			
		4			
2	Sketching is done by using the correct technique Sketching was done safely in accordance to industrial practices	8			
		2			
3	Components are installed in accordance to schematic diagram	8			

National Skills Competition

Test Project Electronics

4	<p>Components are soldered using the correct techniques (preheat & tin conductor ends then apply solder)</p> <p>Connections are made according to industrial requirement (Electrical sound & of a Glossy finish)</p> <p>Heat shunting Technique was applied according to standard operation procedures.</p>	10			
		7			
		8			
5	<p>Work is completed within acceptable time</p> <p>Circuit function according to design specification</p>	8			
		10			
6	<p>Explain the operation of the circuit built</p> <p>State the function of each component as it relates to the project.</p> <p>Proper Trouble Shooting Technique</p>	5			
		8			
		10			

National Skills Competition

Test Project Electronics

Total Mark awarded _____ Type of Medal _____

Signatures

Judge 1	Judge 2	Judge 3	Judge 4

Chief Judge
<i>Date</i>

CIS scoring

All competitors will be scored using the Computer Information System (CIS)
– (400 to 600 possible points)

500 – Medallion of excellence

Top three scores will receive gold, then silver, then bronze

National Skills Competition
Test Project Electronics

National Skills Competition

Test Project Electronics

SUBJECTIVE MARKING

FORM 5A

Competitor # _____

Skill Area: Industrial Electronics

Criterion #	Aspect of Criterion - Description	Judge score (Out of 10)					Mark Awarded
		1	2	3	4	5	
1	Preparation						
2	Selection of Tools						
3	Use of Tools						
4	Job Knowledge						
5	Material Usage						
6	House Keeping						
7	Safety						
8	Presentation						
9	Creativity						
10	Originality						

National Skills Competition

Test Project Electronics

Formula for Subjective marking total score:

Exclude the highest and the lowest score and find the average of the remaining three.

Total Mark awarded _____

Signatures

Judge 1

Judge 2

Judge 3

Judge 4

Chief Judge
Date

Score for subjective marking should be entered on form 5 for total score