



National Skill Competition **worldskills**
INTERNATIONAL VOCATIONAL TRAINING ORGANIZATION



Industrial Maintenance

Test Project



Skill Area: Industrial Electronics

National Skills Competition Date: March 30 –31, 2005

Skills Jamaica Competition March 30-31, 2005

General Instructions

- (1) 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.
- (2) The time will be specified according to the test project.
- (3) Minor adjustments may be made to the test project on the day of the competition where a new test project will be issued to the competitor.
- (4) Competitors are expected to identify all equipment/ materials/ingredients needed and submit list to the competitions committee no later than January 28, 2004.
- (5) **Please note that all competitors should provide their own small tools and utensils.**
- (6) Competitors will be given a schedule two days before the competition. Debriefings will also be conducted for all competitors on March 28, 2004.
- (7) 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.
- (8) All competitors should be present for the opening ceremony along with their instructors/coaches.
- (9) Rehearsal for the opening ceremony will be held on the evening of March 28, 2005 (National Indoor Sport Center at 6 pm).

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Introduction

This project proposal is designed to test, over a period of 6 hours within two days, the high strength or good accuracy of the range of skills that are required in the Electronics Vocation.

Transistor Checker

It is able to check transistors, in the circuit, down to 40 ohms across the collector-base or base-emitter junctions. It can also check the output power transistors on amplifier circuits.

Circuit operation is as follows. The 555 timer (IC1) is set up as a 12hz multi vibrator. The output on pin 3 drives the 4027 flip-flop (IC2). This flip-flop divides the input frequency by two and delivers complementary voltage outputs to pin 15 and 14. The outputs are connected to LED1 and LED2 through the current limiting resistor R3. The LED's are arranged so that when the polarity across the circuit is one way only one LED will light and when the polarity reverses the other LED will light, therefore when no transistor is connected to the tester the LED's will alternately flash. The IC2 outputs are also connected to resistors R4 and R5 with the junction of these two resistors connected to the base of the transistor being tested. With a good transistor connected to the tester, the transistor will turn on and produce a short across the LED pair. If a good NPN transistor is connected then LED1 will flash by itself and if a good PNP transistor is connected then LED2 will flash by itself. If the transistor is open both LED's will flash and if the transistor is shorted then neither LED will flash.

Competitor's Instructions

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

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 is 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 loose marks.

General:

Do not lean across any machine or equipment.

Clean the area and equipment after each usage.

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 cover 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
Solder Station
Cooper Clad Board (50mm X 100mm)

Multi-meter
Solder Sucker

EQUIPMENT TO BE PROVIDED BY THE ORGANISERS

The equipment and tools is be supplied by the organisers.

CANDIDATE WORK AREA

Each candidate work area should contain the following equipment.

EQUIPMENT

- Computers
- Printers

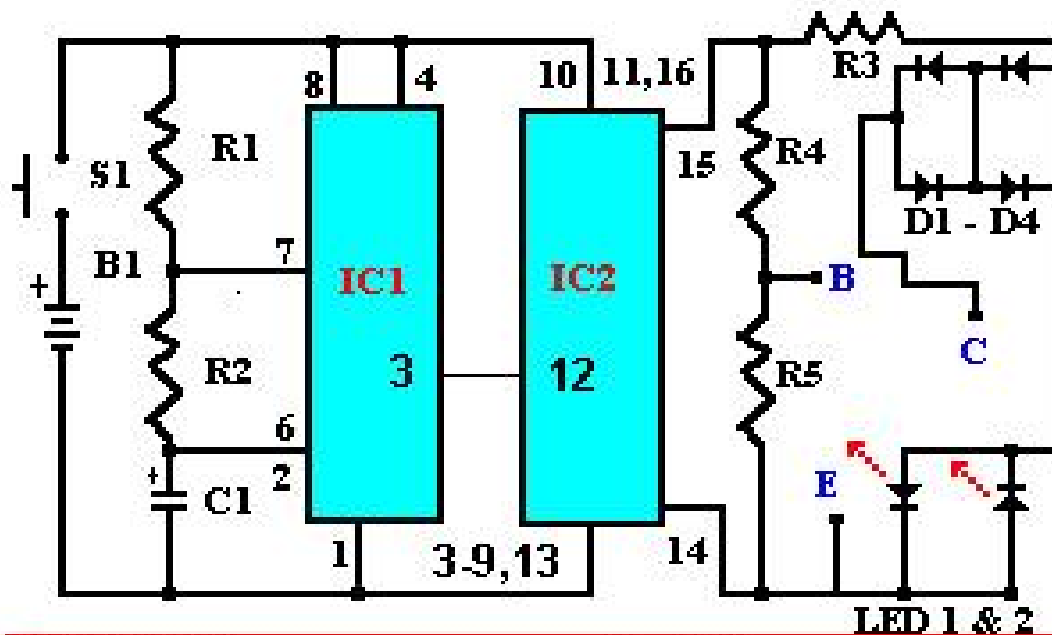
PARTS LIST PER CANDIDATE

- 9 volts dc battery (PP3)
- 1 off 1uF 16v Electrolytic
- 4 off 1N4148 (diodes)
- 1 off 555 Timer (IC)
- 1 off 4027 DUAL FF (IC)
- 1 off 50K ohms- $\frac{1}{4}$ watt 5%
- 1 off 270 ohms- $\frac{1}{4}$ watt 5%
- 1 off 220 ohms- $\frac{1}{4}$ watt 5%
- 1 off 330 ohms- $\frac{1}{4}$ watt 5%
- 1 off 10K ohms-- $\frac{1}{4}$ watt 5%
- 2 off Light Emitting Diode (LED)
- Miniature Push Button (Normally Open)

MATERIAL LIST

- 1- Roll Silver Solder
- 10 feet hook-up Wires
- 1 Gallon itching solvent

TEST PROJECT DESIGN CIRCUIT



B1 - 9VOLT

C1 - 1uf 16v

D1 - D4 1N4148

IC1 - 555 TIMER

IC2 - 4027 DUAL FF

R1 - 10K

R2 - 50K

R3 - 270

R4 - 220

R5 - 330

S1 - PUSH SWITCH NO

B = BASE

E = EMITTER

C = COLLECTOR