

## **Experiment No: 03**

**Experiment Name:** Fault finding and Troubleshooting of a project board

### **Objectives**

- To examine a project board's internal circuit components
- To understand the process of locating problems in an electrical circuit
- To understand the procedure for diagnosing an electrical circuit

### **Theory**

Fault detection is the process of testing the performance of electrical equipment to see if it is safe and performing properly.

Troubleshooting is a methodical technique to problem resolution that is frequently used to identify and resolve problems with complicated machinery, electronics, computers, and software systems. Checking the terminal voltages across different terminals of components, checking the continuity of the current for open circuit faults, components such as resistors, capacitors, and transistors, and their status checking whether they are functional or not are all part of the troubleshooting process.

### **Construction of project board**

SL NO.	Component Name	Quantity	Model/Rating
1	Fuse	1	(N/A)/800mA
2	DC Voltage Control Transistor	2	LM317/+15V, LM337/-15V
3	Capacitors	3	(N/A)1000 $\mu$ F $\times$ 2; 4700 $\mu$ F
4	Bridge Rectifier	2	PEC (AG150)
5	Transistor	1	UA7805KC-8447/+5V, 5A(fixed)
6	Transistor	4	425-9015B
7	Zener Diode	4	1N4007
8	Transformer	1	230V/15V; 1.5A
9	Potentiometers	2	10k $\Omega$
10	Resistors	8	0.5 $\Omega$ $\times$ 2; (N/A) $\times$ 6

### **Key Features of project board**

- 3M double sided sticky tape on back to attach to your circuit board of choice
- Large working area
- Rows are connected in sets of five
- Middle divider separates board

### **Process of Fault-Finding & Troubleshooting**

#### **Steps of Fault-finding**

The fault-finding process includes proper observation of the circuit and testing it with the help of appropriate instruments. First, we must look for the obvious faults. To find faults in an electrical circuit we must follow these steps-

Step 1: Check the supply to the circuit

- Check for broken wire.
- Check the on-off switch of the project board.
- Check the fuse if it's damaged/broken/burned out.

Step 2: Check the inputs to the circuit

Step 3: Check the output ports of the project board

Step 4: Check the operation of the any other switches

If there are no obvious faults, there must be internal damage to the circuit board. We must open the Project board and check for damaged components.

### **Checking for internally damaged components**

We checked the circuit board with our naked eyes for any burned-out or exploded components. There was none, we started to check the circuit components with proper instruments. In the laboratory, we checked the components using a *Multimeter*. Not all the components were checked. Transistors, resistors, capacitors, and the short wires or the portion of the circuit for circulating current were checked.

### **Findings**

There were no damaged wires or transistors or resistors. We found out that the fuse was broken.

### **Troubleshooting**

We followed these rules for troubleshooting-

1. Observing the components carefully
2. Finding the problem
3. Selecting the proper troubleshooting instruments
4. Powering up the circuit
5. Checking for individual components faults
6. Checking the main controller
7. Changing the damaged components if necessary

We replaced the blown fuse with a new one. However, we were unable to put it into operation. There could be some further issues that we haven't discovered yet. We didn't have an appropriate device to test the transformer or the ICs. There could be issues with such circuit parts. We were unable to modify those due to a paucity of instrument and circuit elements.

### **Conclusion**

The experiment was meticulously carried out. Every (possible) component was tested. We discovered a problem with the fuse, however replacing it did not cure the problem. We were unable to locate any further internal circuit issues. The project board was removed for further examination and repair. We assumed that the issue was with the ICs or the Transformer, which we couldn't test. We learned the procedure of fault-finding and troubleshooting from this experience. We could have addressed, or at least correctly diagnosed, the problem with this project board if we had used the right tools.