AlHanif Instructor

From: Goodwin Burce [bwin2net@telus.net]
Sent: March 18, 2007 9:45 AM
To: Goodwin Burce
Subject: JEOPARDY SWITCH
Attachments: jeopar1.gif; jeopar2.gif; jeopar3.gif; jeopar4.gif; jeopar5.gif; jeopar6.gif; jeopar7.gif

How the Jeopardy Board Works

The rest of this document contains a step-by-step explanation of the Jeopardy Board in action. Each step refers to a schematic drawing that shows the position of each switch on the board. On these diagrams, a slash through a set of contacts indicates that those contacts are closed. The schematic diagram symbols and their meanings are shown in Figure 1. Now let's follow the sequence as the first team buzzes in.

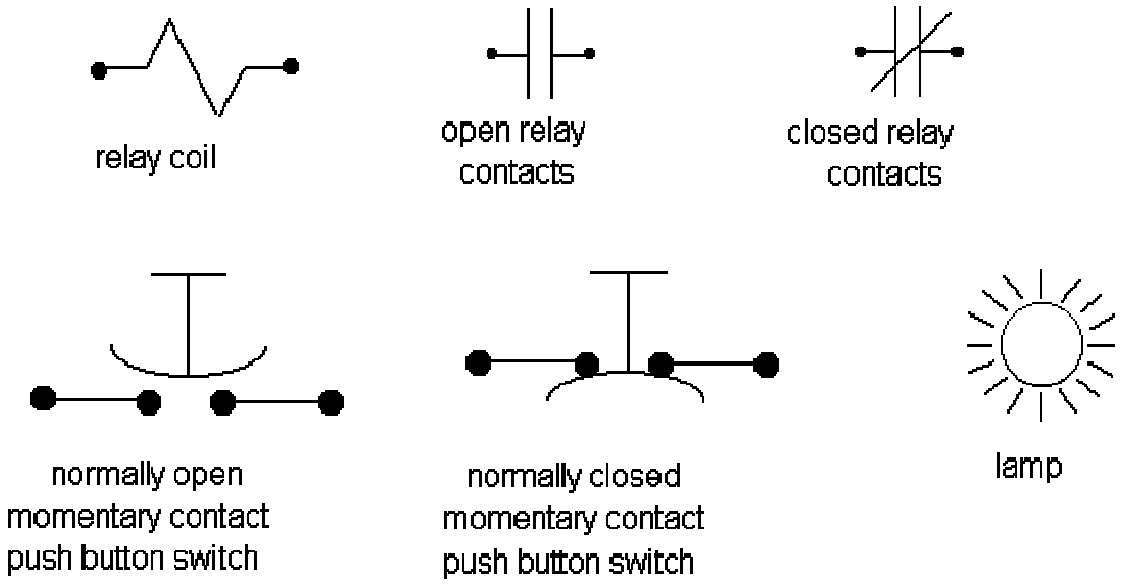

Figure 1. Schematic diagram symbols.

1. **Figure 2 shows the configuration after the master switch has been reset, before any team buzzes in. None of the relays or lights is energized.**

2. **One team member buzzes in by pressing and closing switch S_1. Figure 3 shows the configuration of the circuit just after the switch is closed. Notice that there is now a complete circuit to relay R_1 and to lamp L_1 through the R_2 contacts, the R_3 contacts, S_1, and the R_4 contacts. Both the R_1 and L_1 will now energize. Also note that the buzzer cannot sound, because the R_4 contacts in series with S_1 are still opened.**

3. **After R_1 energizes, its contacts will toggle. Those that were closed will now be open, and those that were open will now close. This configuration is shown in Figure 4. Notice that the R_2 and R_3 relay coils are locked out now, because the normally closed R_1 contacts in their circuits are now opened. Also notice that R_4 is now energized, since the normally opened R_1 contacts in its circuit are now closed.**

4. **Figure 5 shows the configuration after the R_4 contacts have toggled. Now there is a circuit to the buzzer through the R_2 contacts, the R_3 contacts, S_1, and the R_4 contacts, and the buzzer sounds. Also, the normally closed R_4 contacts next to the R_1 coil are now open, ensuring that when S_1 is released, the buzzer will go off. Although similar R_4 contacts are in the circuits with switches S_2 and S_3, pushing these switches will not cause the buzzer to sound because the open R_1 contacts in the S_2 and S_3 circuits prevent a closed circuit through these switches to the buzzer.**

5. **Figure 6 shows the configuration after S_1 is released. Notice that the R_1 contacts continue to provide a complete circuit to the R_1 coil. These contacts are called "holding contacts" because they allow R_1 to hold itself in. Notice that because of the now open R_4 contacts, the buzzer will not sound unless S_1 is depressed. The circuit will stay in this configuration until it is reset by the Reset switch.**

6. **Figure 7 shows the configuration immediately after the Reset switch is depressed. This action causes all current to be interrupted. All relay coils will be de-energized and the switches and contacts will return to the configuration in Figure 2. The board has been reset and is ready for the next answer!**

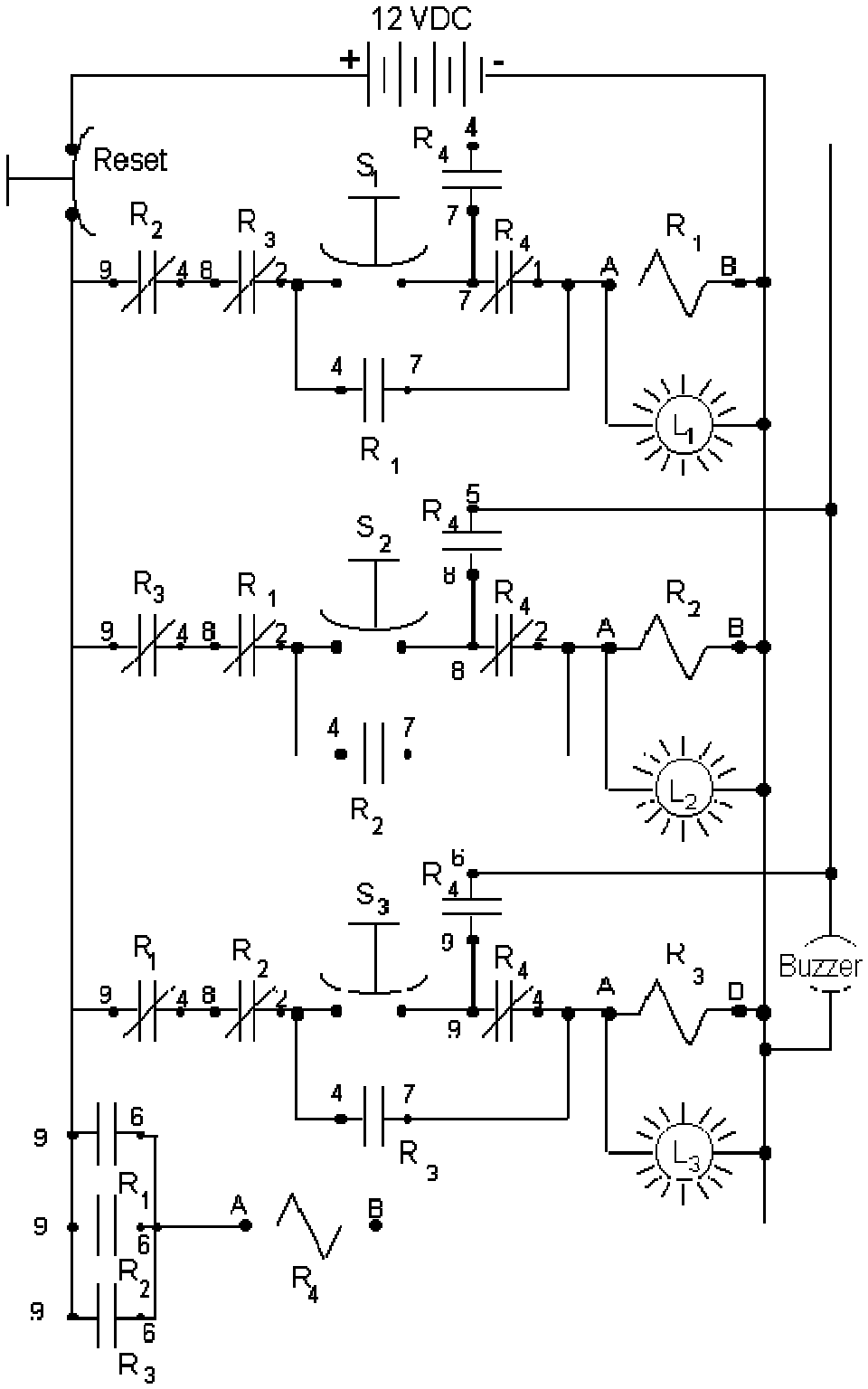

Figure 2. Configuration of switches before activation.

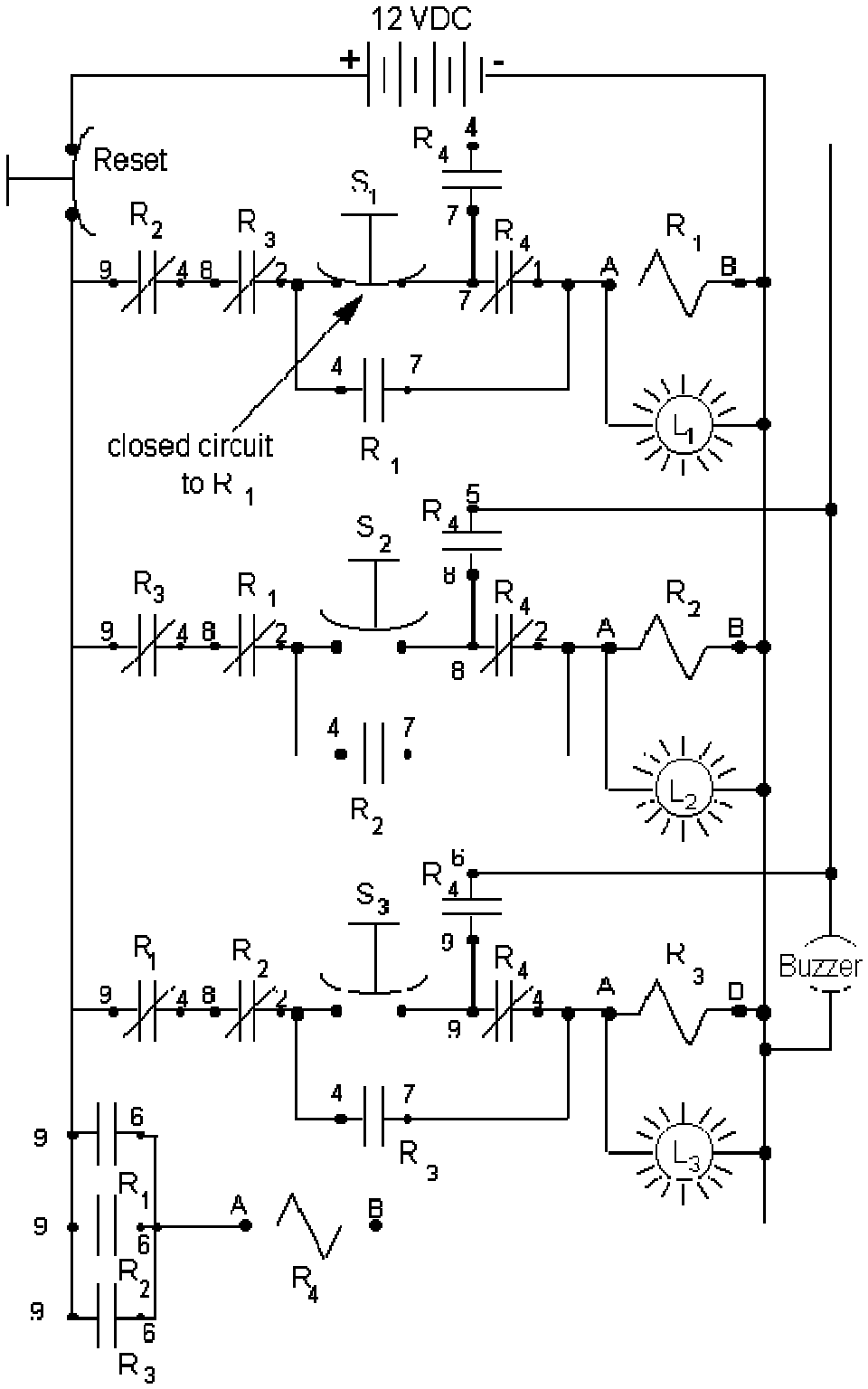

Figure 3. Circuit configuration after closing switch S_1.

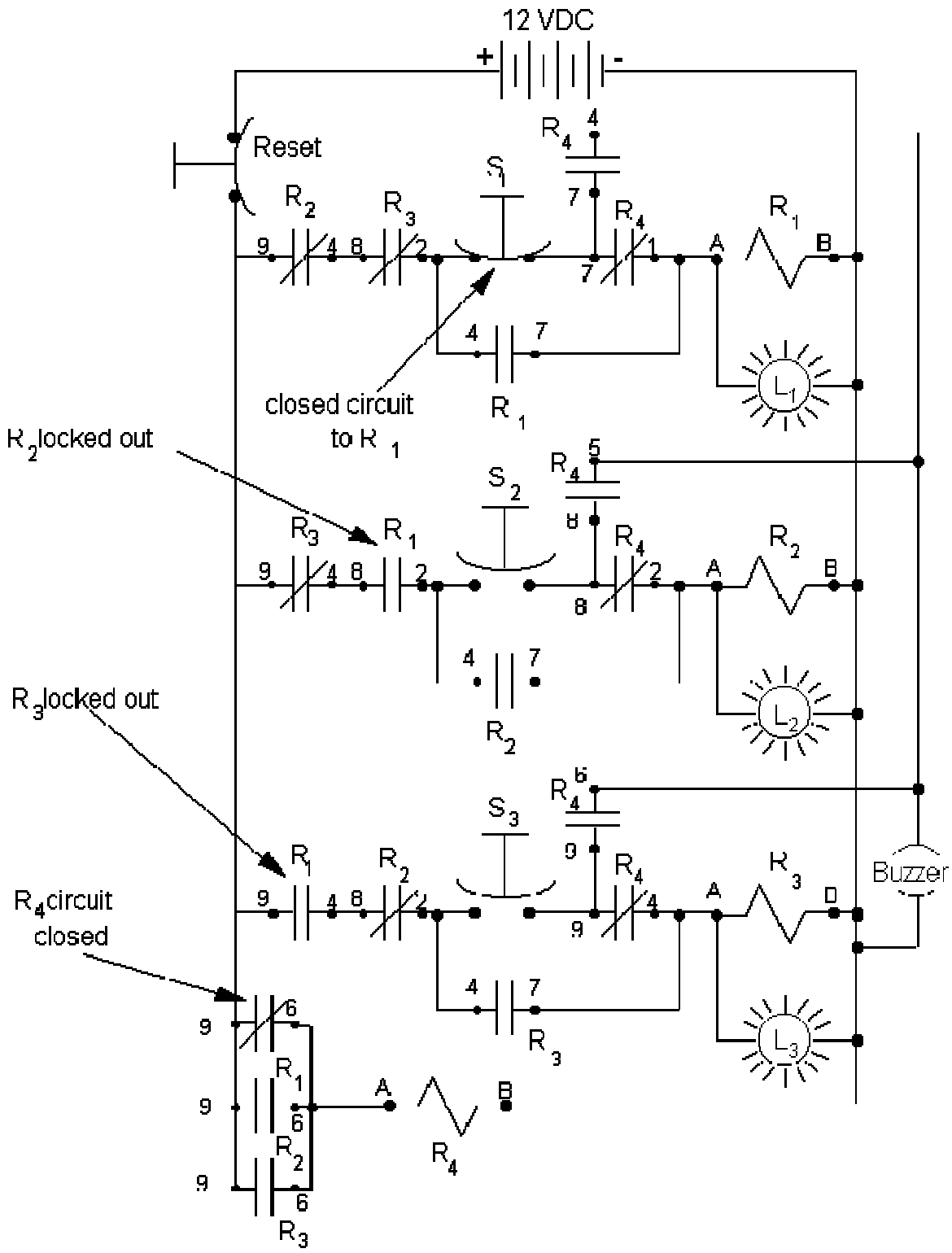

Figure 4. Configuration after R_1 relay energizes.

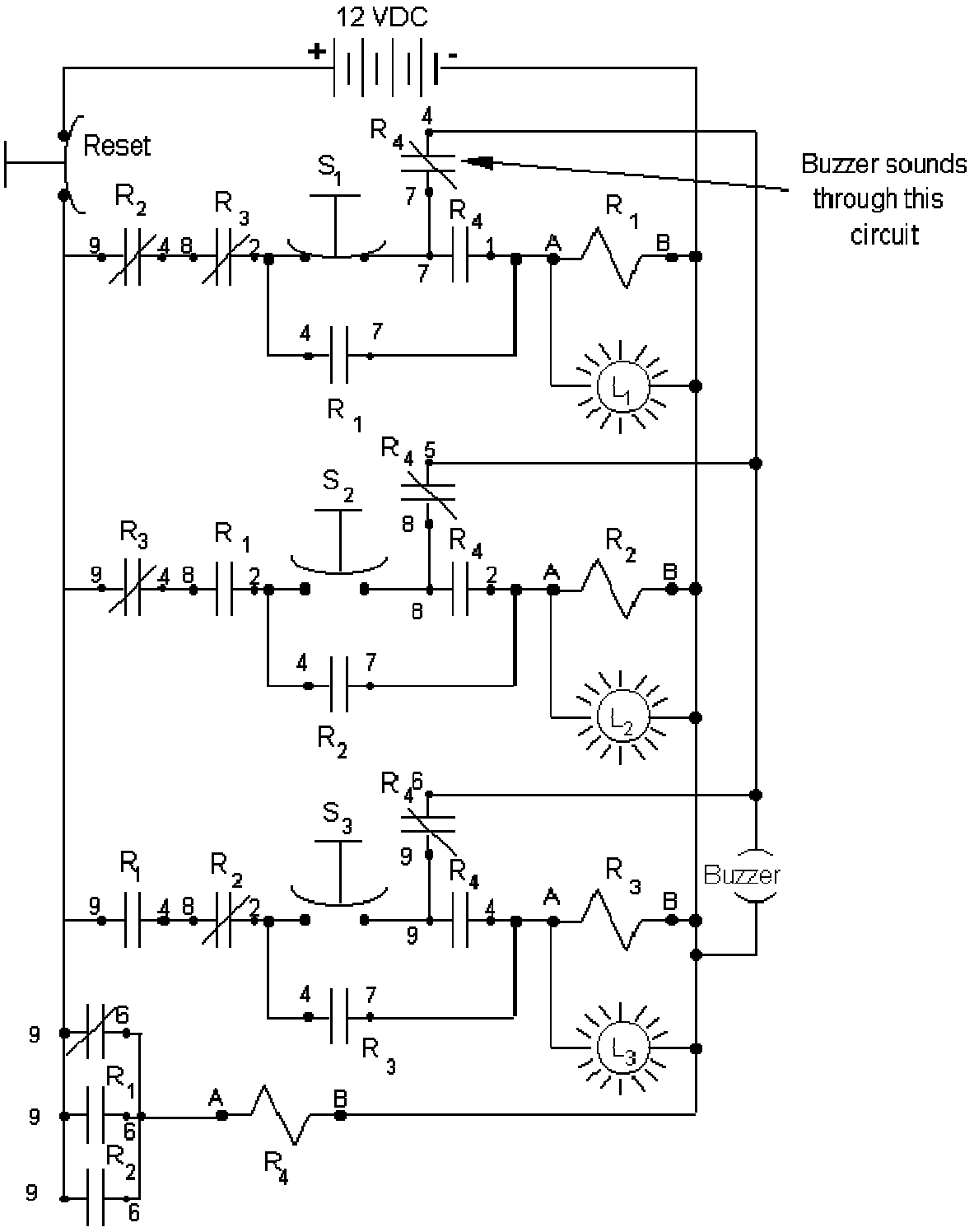

Figure 5. Configuration after R_4 is energized.

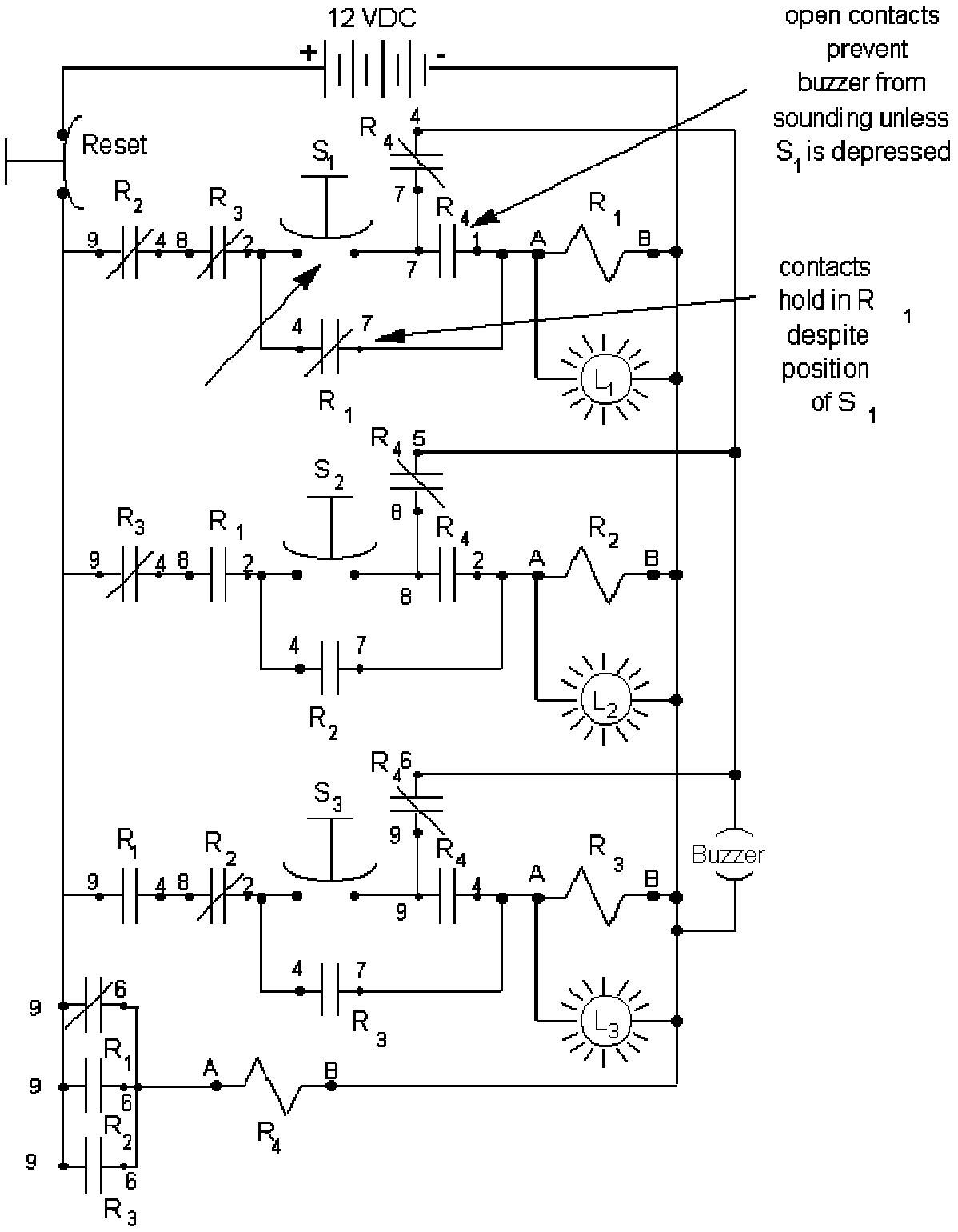

Figure 6. Configuration after S_1 is released.

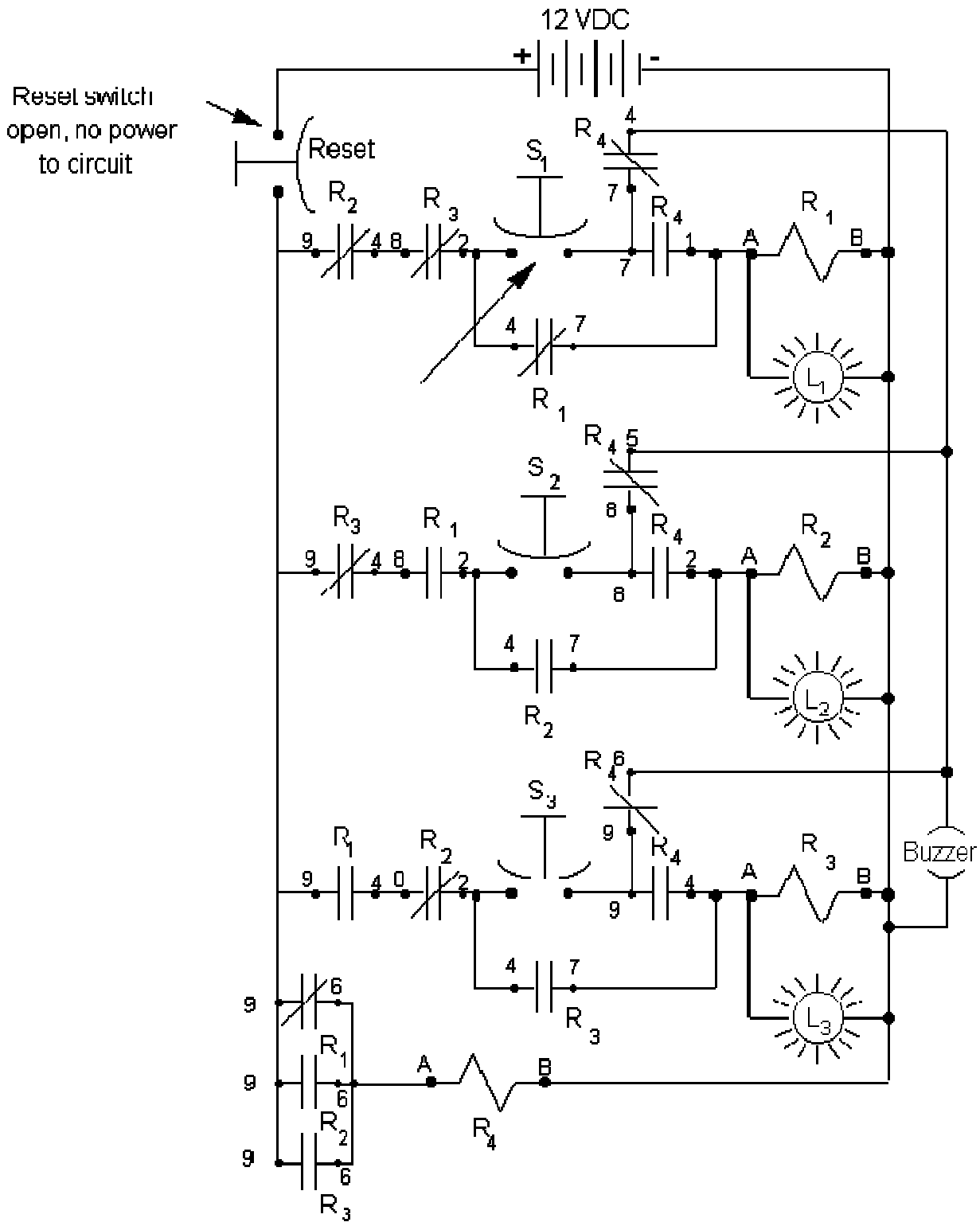

Figure 7. Configuration immediately after Reset switch is depressed