


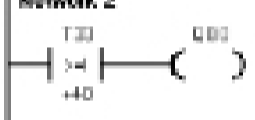
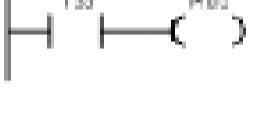
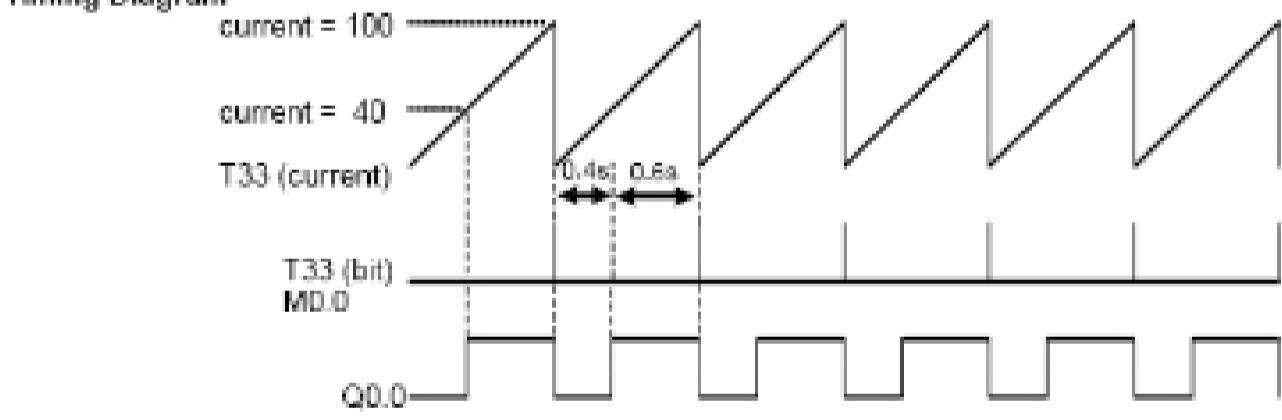
## ECT464 - Programmable Logic Controllers

### Lab 6: Introduction to Siemen's PLC's

**Objective:** To introduce the student to other manufacturers of PLC's and their programming environments.

**Procedures:**

1. Ensure that the power is turned on to the PLC and the serial cable is connected.
2. Go to *START -> All programs -> Simatic -> Step 7 MicroWin -> Step 7 Micro Win* to start a new PLC program.
3. Start by clicking on the Communications Icon. Double click the refresh button and select the S7-224 PLC. Then press OK. We are going to create the following ladder logic program to implement a PWM output.

Example: Sample Program for getting started with STEP 7-Micro/WIN	
<p><b>Network 1</b></p>  <p><b>Network 2</b></p>  <p><b>Network 3</b></p> 	<p><b>Network 1</b> //10 ms timer T33 times out after  // (100 x 10 ms = 1 s) M0.0 pulse is  // too fast to monitor with Status view.</p> <p>LDN M0.0  TON T33, +100</p> <p><b>Network 2</b> //Comparison becomes true at a  //rate that is visible with  //Status view. Turn on Q0.0 after  //(40 x 10 ms = 0.4 s), for a  // 40% OFF/60% ON waveform.</p> <p>LDW&gt;= T33, +40  = Q0.0</p> <p><b>Network 3</b> //T33 (bit) pulse too fast to monitor with  //Status view. Reset the timer through  //M0.0 after the (100 x 10 ms = 1 s) period.</p> <p>LD T33  = M0.0</p>
<p><b>Timing Diagram</b></p> 	

4. Click on the Program Block icon to open the program editor. Notice the instruction tree and the program editor. You use the instruction tree to insert the LAD instructions into the networks of the program editor by dragging and dropping the instructions from the instruction tree to the networks.
5. The first network to be implemented is the Timer. When M0.0 is off (0), this contact turns on and provides power flow to start the timer. To enter the contact for M0.0 either

double-click the Bit Logic icon or click on the plus sign (+) to display the bit logic instructions. Select the Normally Closed contact. Hold down the left mouse button and drag the contact onto the first network. Click on the "???" above the contact and enter the following address: M0.0. Press the Return key to enter the address for the contact. To enter the timer instruction for T33 double-click the Timers icon to display the timer instructions. Select the TON (On-Delay Timer). Hold down the left mouse button and drag the timer onto the first network. Click on the "???" above the timer box and enter the following timer number: T33. Press the Return key to enter the timer number and to move the focus to the preset time (PT) parameter. Enter the following value for the preset time: 100. Press the Return key to enter the value.

6. The next network to implement is the output. When the timer value for T33 is greater than or equal to 40 (40 times 10 milliseconds, or 0.4 seconds), the contact provides power flow to turn on output Q0.0 of the S7-200. To enter the Compare instruction double-click the Compare icon to display the compare instructions. Select the  $\geq I$  instruction (Greater-Than-Or-Equal-To-Integer ). Hold down the left mouse button and drag the compare instruction onto the second network. Click on the "???" above the contact and enter the address for the timer value: T33. Press the Return key to enter the timer number and to move the focus to the other value to be compared with the timer value. Enter the following value to be compared with the timer value: 40. Press the Return key to enter the value. To enter the instruction for turning on output Q0.0 double-click the Bit Logic icon to display the bit logic instructions and select the output coil. Hold down the left mouse button and drag the coil onto the second network. Click on the "???" above the coil and enter the following address: Q0.0. Press the Return key to enter the address for the coil.

7. The last network to implement is the reset of the timer. When the timer reaches the preset value (100) and turns the timer bit on, the contact for T33 turns on. Power flow from this contact turns on the M0.0 memory location. Because the timer is enabled by a Normally Closed contact for M0.0, changing the state of M0.0 from off (0) to on (1) resets the timer. To enter the contact for the timer bit of T33 select the Normally Open contact from the bit logic instructions. Hold down the left mouse button and drag the contact onto the third network. Click on the "???" above the contact and enter the address of the timer bit: T33. Press the Return key to enter the address for the contact. To enter the coil for turning on M0.0 select the output coil from the bit logic instructions. Hold down the left mouse button and drag the output coil onto the third network. Double-click the "???" above the coil and enter the following address: M0.0. Press the Return key to enter the address for the coil.

8. Select File -> Save As and name the project.

9. Select File -> Download to download the project. Press OK.

10. Select PLC -> Run to start the PLC program.

11. You can monitor the program by selecting the Debug > Program Status menu command. STEP 7--Micro/WIN displays the values for the instructions. To stop the program, place the S7-200 in STOP mode by clicking the STOP icon or by selecting the PLC > STOP menu command.

**Analysis/Conclusions:** Write a paragraph answering the following questions.

Why is helpful to know several different brands of PLC's before actually working on a project with one? What have you learned as a result of this lab?