UNIT 13
INSTRUCTOR'S MANUAL

TIMERS

1. The concepts of retentive and non-retentive are probably the most difficult material introduced in this unit. Non-retentive timers are fairly common in everyday life. Examples include kitchen timers, alarm clocks, and VCR timers. Retentive timers are much more difficult to provide examples for. The students will have to depend on their experiences with the timers on the PLC to understand this type.

2. Step 16 of the Experiment asks the students to repeat some previous steps using a new program. They are asked for the first time to keep a totally independent record of their observations. You may wish to monitor the process to ensure their data are complete. They will have difficulty with the remainder of the Experiment if their records are carelessly made.

3. Several of the Questions are fairly challenging, asking the students to develop their own, original programs. You may wish to assign these as group activities. The students should be encouraged to search through previous units for models of programs which will help answer the questions.

4. Make sure that the students are confident of their knowledge of timers because timers are used in conjunction with several other functions during PLC programming.

UNIT 13

TIMERS

Objectives

Upon completion of this unit the student will be able to:

1. Describe timer operation.
2. Define the terms "preset value" and "accumulated value," as applied to timers.
3. Write a program using timers.
4. Enter a program with timers into the controller.

Background

A *timer* is a device which allows delay between pairs of events. Upon activation, a timer counts off a preset number of time units before powering the devices it controls. A traffic light is a good example of a timer application. As the light cycles from green to yellow to red, there is a delay between each change. The lengths of these delays are controlled by timers.

There are two types of timers, *on-delay* (TON) and *off-delay (TOF).* The on-delay timer waits for its input element to be energized before it starts timing. The off-delay timer waits for its input element to be de-energized before it starts timing. Many burglar alarms use both types of timers. When the alarm is turned on, an on-delay timer allows several seconds for the door to be locked. An off-delay timer is activated when the door is unlocked. This second timer allows several seconds to turn off the alarm. If the proper actions are not taken in the preset time intervals, the alarm will be activated.

Timers measure time in increments determined by the *time base*. The MicroLogix 1000 has a user selectable time base of 0.01 (10ms) second or 1.0 second. Timing accuracy is –0.01 to +0 in the 0.01 second time base, and 1.5 seconds for the 1 second time base.

Timers have two measures of time. The *preset value* is the length of the delay between activation of the timer and activation of the output. Preset times are included in all programs using timers. The *accumulated value* is the number of time units counted by the timer at any given point. In the Micrologix controllers, the timers time up from zero to their preset values. The accumulated value is the amount of time already timed by the timer.

Retentive timers (RTO) are similar in operation to on-delay timers except that RTO timers remember their accumulated values, even if turned off in the middle of a timing cycle. So they have to be reset each time they reach the preset value. They will not repeat the timing cycle. In the Micrologix only the on-delay timers and retentive timers require reset instructions. Each reset is programmed on a separate rung and controlled by a normally open contact. You will see them in the following examples of timers. You will see TON, TOF and RTO timers in the following examples.

The program in Figure 13-1 shows an on-delay timer controlling an output. When input I:0/0 is energized, on delay timer TON T4:0 times five seconds before it turns on output O:0/4. The timer is reset when input I:0/1 is energized.

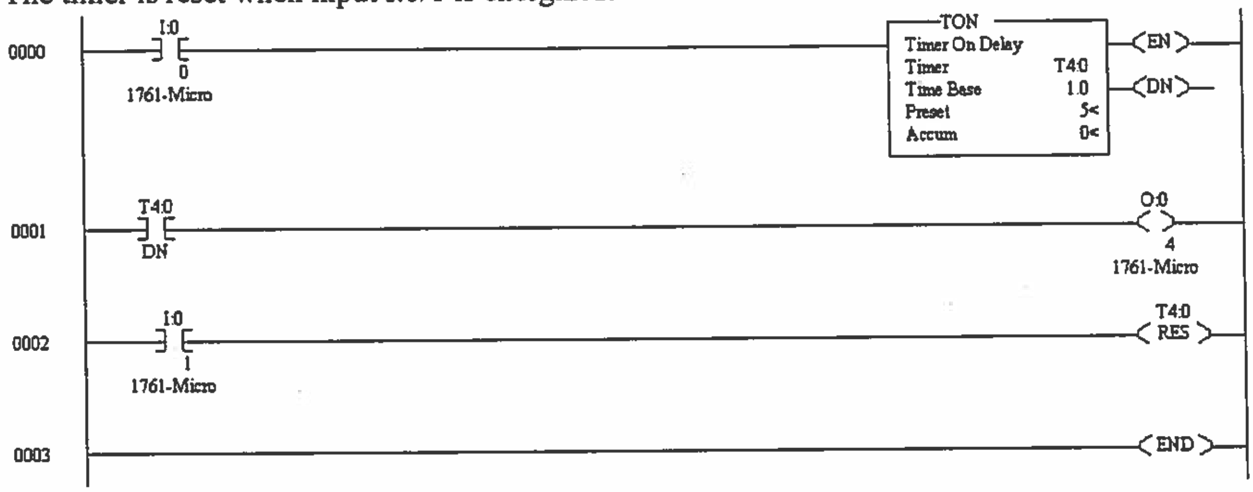


Figure 13-1
Simple Timer Programs

The timer on (TON) instruction is used to delay the turning on or off of an output. The TON instruction begins to count time-base intervals when rung conditions become true. As long as rung conditions remain true. The timer increments its accumulated value (ACC) each scan until it reaches the preset value (PRE). The accumulated value is reset when rung conditions go false, regardless of whether the timer has timed out.

Figure 13-2 shows an off-delay timer controlling a single output element. When input I:0/2 is de-energized, the off delay timer T4:1 times five seconds. After the five second delay, output O:0/3 is activated. The off delay timer is reset by re-energizing input I:0/2.

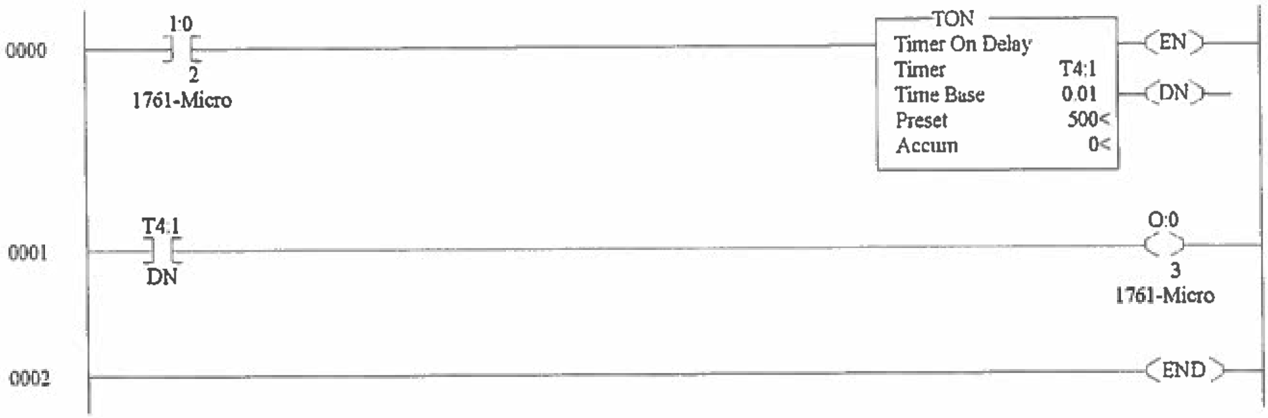


Figure 13-2
Simple Off - Delay Timer Program

The timer off (TOF) instruction is used to delay turning on or off an output. The TOF instruction begins to count time base intervals when the rung conditions remain false, the timer increments its accumulated value (ACC) each scan until it reaches the Preset value (PRE). The controller resets the accumulated value when rung conditions go true regardless of whether the timer has timed out.

Just like in other relays, timers can be used to turn off outputs and to control several outputs at one time. In Figure 13-3, the timer turns on output O:0/1 and turns off output O:0/2 two seconds after input I:0/6 is energized.

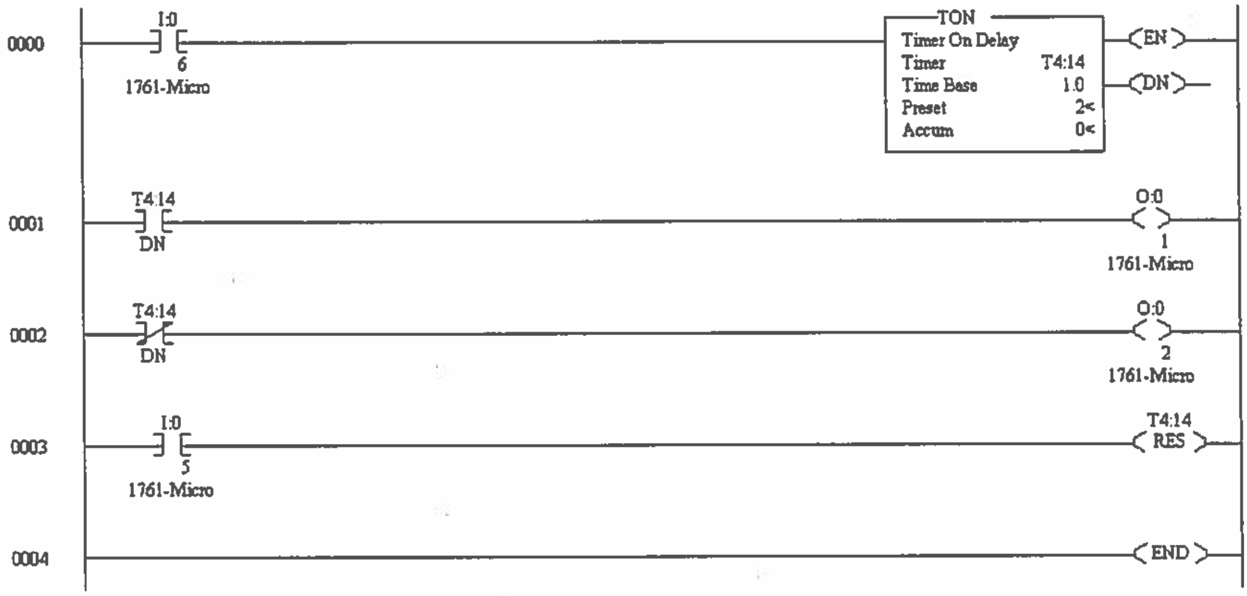


Figure 13-3
Timer Controlling Multiple Outputs

The timers in Figure 13-1 and 13-3 are activated by normally open input elements. When appropriate a normally closed input element can be used to activate a timer.

It is also possible to use several timers in a program to turn elements on and off at a different time intervals. The program segment in Figure 13-4 is an example of two timers controlling three outputs. More efficient use of multiple timers will be covered in Unit 15.

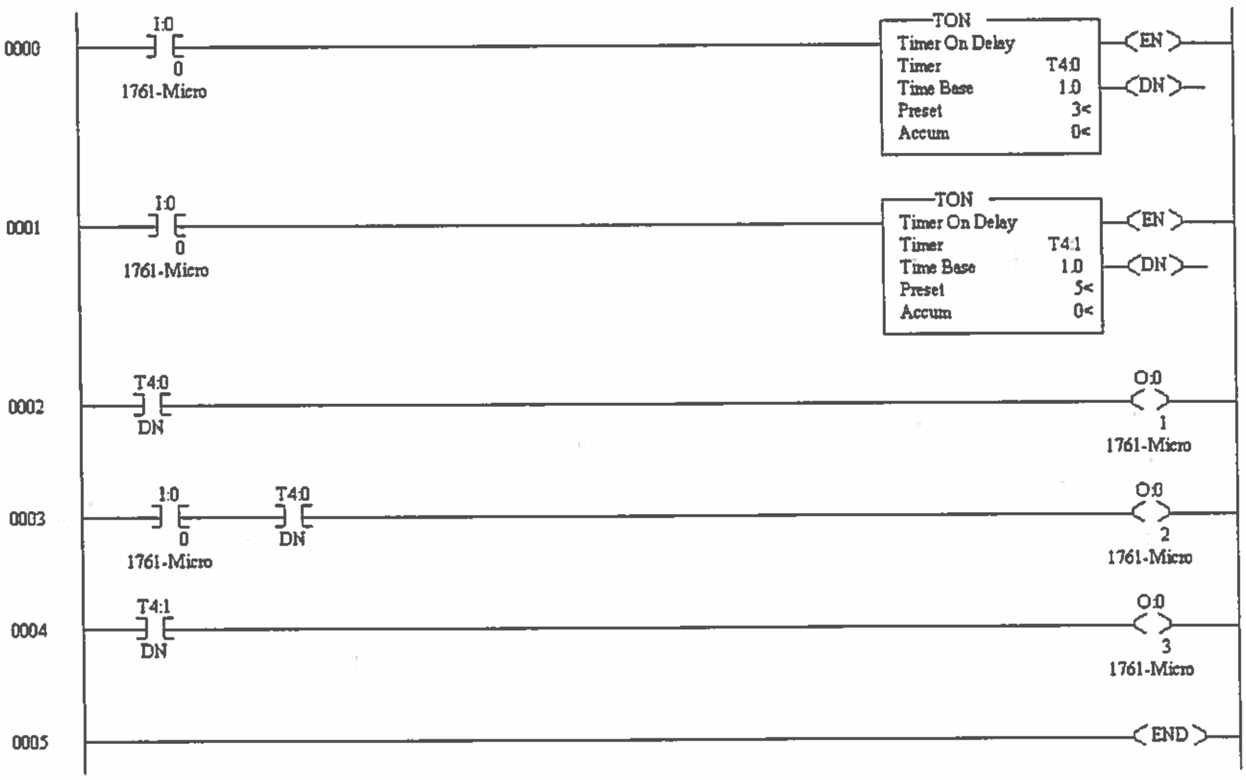


Figure 13-4
Multiple Timers Controlling Multiple Outputs

Programs using timers become more complex as several timers are used to control different operations. The program in Figure 13-5 will turn a light on for five seconds and then turn it off for five seconds. It will repeat this cycle until input I:0/1 is no longer energized.

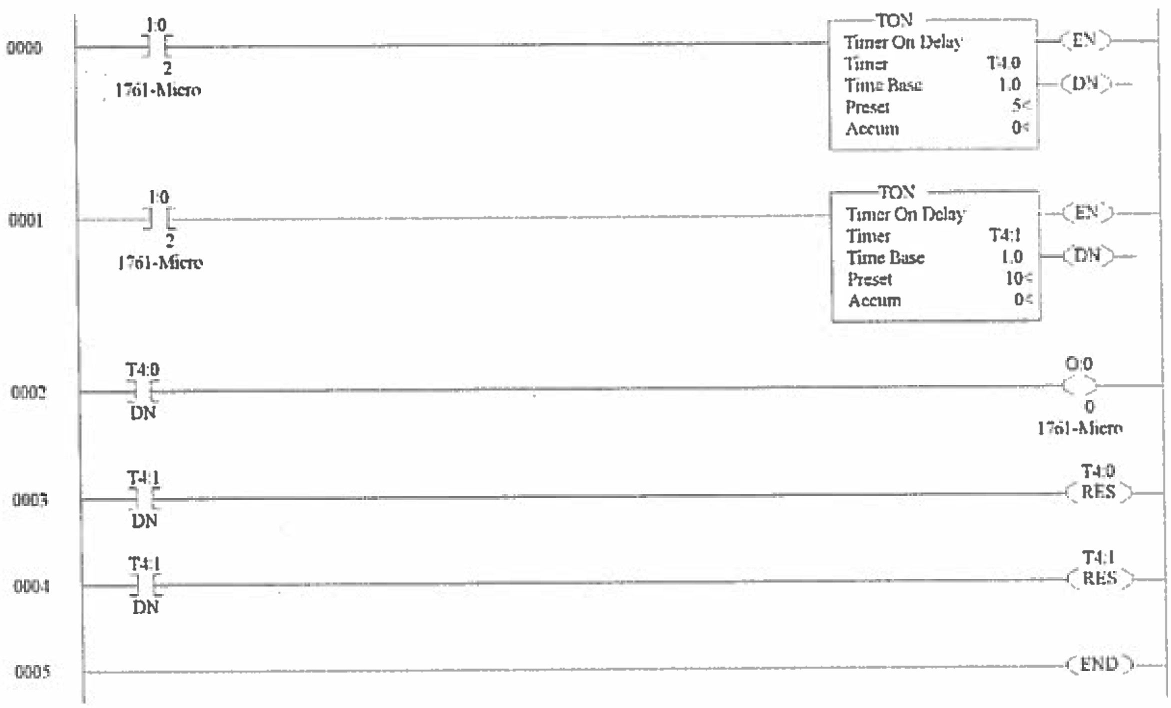


Figure 13-5
Switch and Timer Program

Stepping through this program, when input at I:0/1 is energized, timers TON T4:0 and TON T4:1 both start timing. After five seconds, timer TON T4:0 times up from zero to its preset value and energizes contact TON T4:0. Contact T4:0 turns on O:0/0, the light. Timer TON T4:0 stays on until it is reset. Meanwhile, timer TON T4:1 keeps on timing until it reaches its preset value. When the timer TON T4:1 is activated, it energizes contact T4:1/DN on rungs 4 and 5. This activates the RES instructions and resets both timers to zero (the beginning of their timing cycles). When timer RES T4:0 resets, it opens the contact T4:0 on rung 3, turning off light O:0/0. Since contact I:0/1 is still energized, it restarts the two timers.

The program in Figure 13-6 alternatively turns two lights on and off when input I:0/0 is energized. The timers are set so that the lights will each be on for five seconds. There will be a two second delay between when light O:0/4 turns off and light.

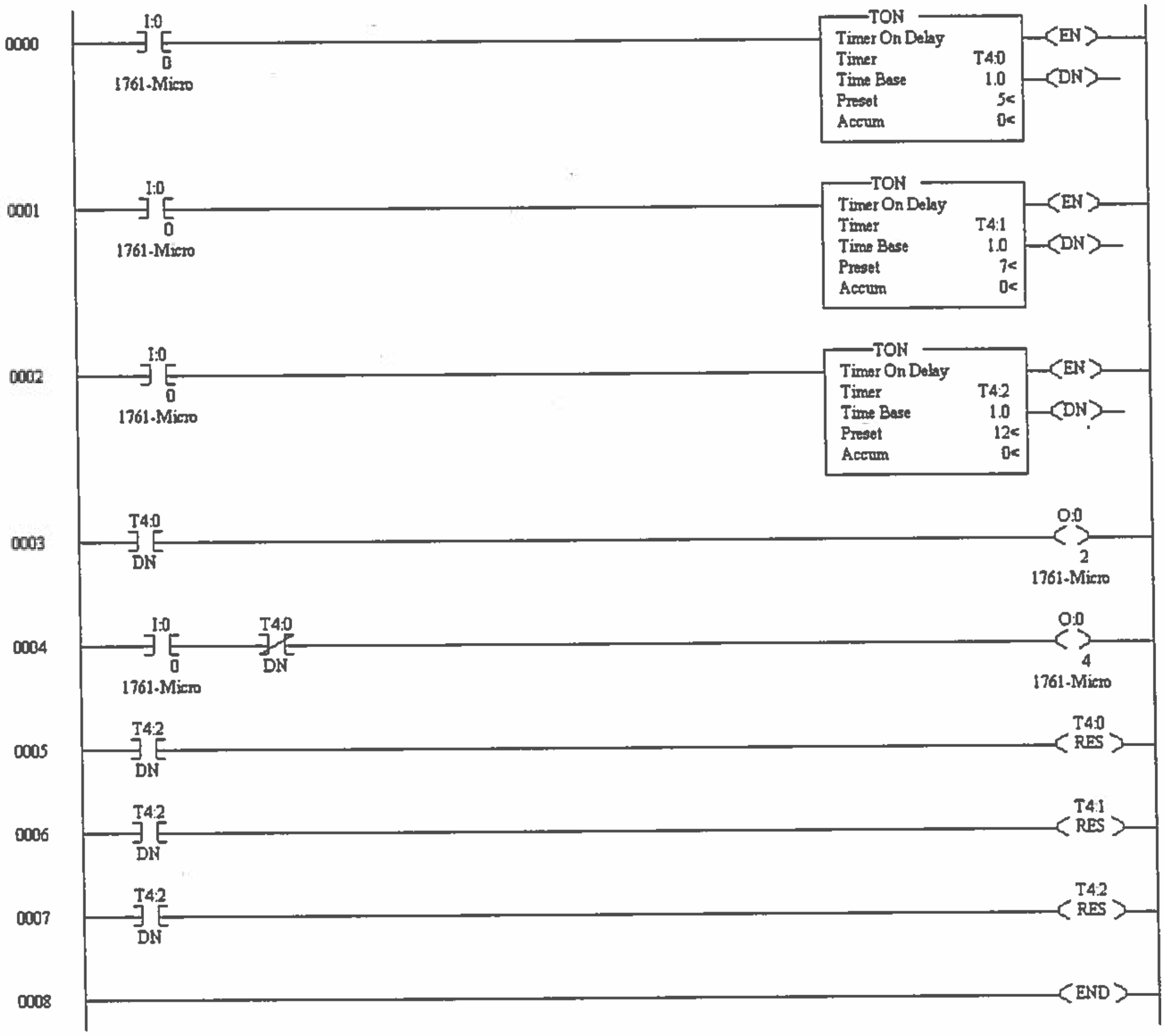


Figure 13-6
Program with Reset Timer

On delay Timer T4:2 is referred to as the reset timer in this program. When timer T4:2 "Times out " it turns on, activating the resets of the timers on rungs 6 and rungs 7. At the same time, it resets itself (rung 8). This causes the entire timing cycle to be repeated. The reset controlled by timer T4:2 will be instantaneous. If you were to observe this program running, it would seem as if contact T4:2 never operated because it is so quick.

RETENTIVE TIMER (RTO):

Use the RTO instruction to turn an output on or off after its timer has been on for a present time interval. The RTO instruction is a retentive instruction that lets the timer stop and start without resetting the accumulated value (ACC)

The RTO instruction retains its accumulated value when any of the following occurs:

- Rung conditions become false;
- You change controller operation from the REM RUN or REM TEST mode to the REM PROGRAM mode;
- The controller loses power;
- A fault occurs.

Because these are retentive timers, when they are turned off they do not automatically reset. These particular retentive timers also keep accumulating time after they have reached their preset values. So they must be reset after each timing cycle. To reset the timers, a timer reset instruction with the same address as the timer is used. The same reset instruction can also be used to reset the timer during the timing cycle (before the output has been activated). Because the RES instruction resets the accumulated value to zero. This in turn causes the done bit to be set by a count down or count up instruction.

Figure 13-7 shows you an example of a Retentive timer (RTO)

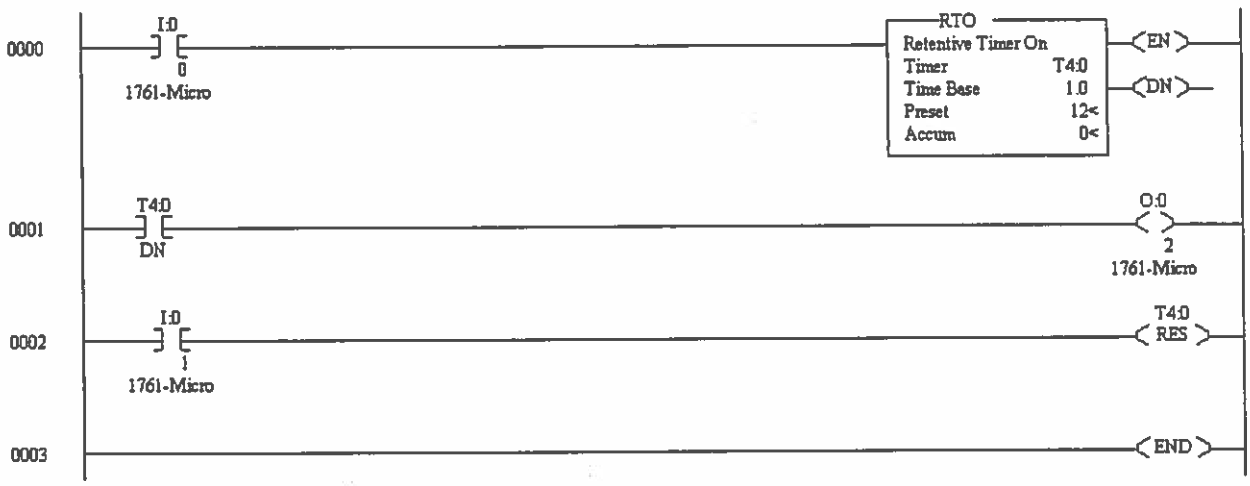


Figure 13-7
Simple Retentive Timer Program

Figure 13-7 shows a retentive timer controlling a single output element. When input I:0/0 is energized, the retentive timer RTO T4:0 times 12 seconds. After the twelve second delay, output O:0/2 is activated. The retentive timer is reset by energizing input I:0/1. These retentive timers also keep accumulating time after they have reached their preset values. So they must reset after each timing cycle.

Programming Keystrokes

Allen-Bradley timers use specific numbers and element symbols to distinguish them from other relay elements. In the Micrologix 1000 the addresses are T4:0 through T4:38 and there are three timer symbols available:

ON-DELAY TIMER (TON) Timer On-delay

OFF-DELAY TIMER (TOF) Timer Off-delay

RETENTIVE TIMER (RTO) Retentive Timer On-delay

RESET ELEMENT (RES) Reset

Both the on-delay and off-delay timers range from 0.001 to 32,767 seconds. Since they time in 1/10th second increments, a ten second delay is programmed as 0100 (100 tenths of a second), 150 seconds as 1500. If 1.0 second increments are used, a ten second delay is programmed as 10 and 150 seconds is 150. The Preset range is from 0.001 to 32,767 as is the Accumulate range.

ON-DELAY TIMER (TON)

The keystrokes below are used to program an on-delay timer element with the address T4:0 and a preset value of 15 seconds.

Timer On-delay → T4:0 → 0.01 → 1500 → 0

The On-delay timer screen is displayed

OFF-DELAY TIMER (TOF)

The keystrokes below are used to program an off-delay timer element with the address T4:0 and a preset value of 15 seconds.

Timer Off-delay → T4:0 → 0.01 → 1500 → 0

The off delay timer screen is displayed

RETENTIVE TIMER (RTO)

The keystrokes below are used to program an retentive timer element with the address T4:0 and a preset value of 15 seconds.

Retentive Timer On-delay → T4:0 → 0.01 → 1500 → 0

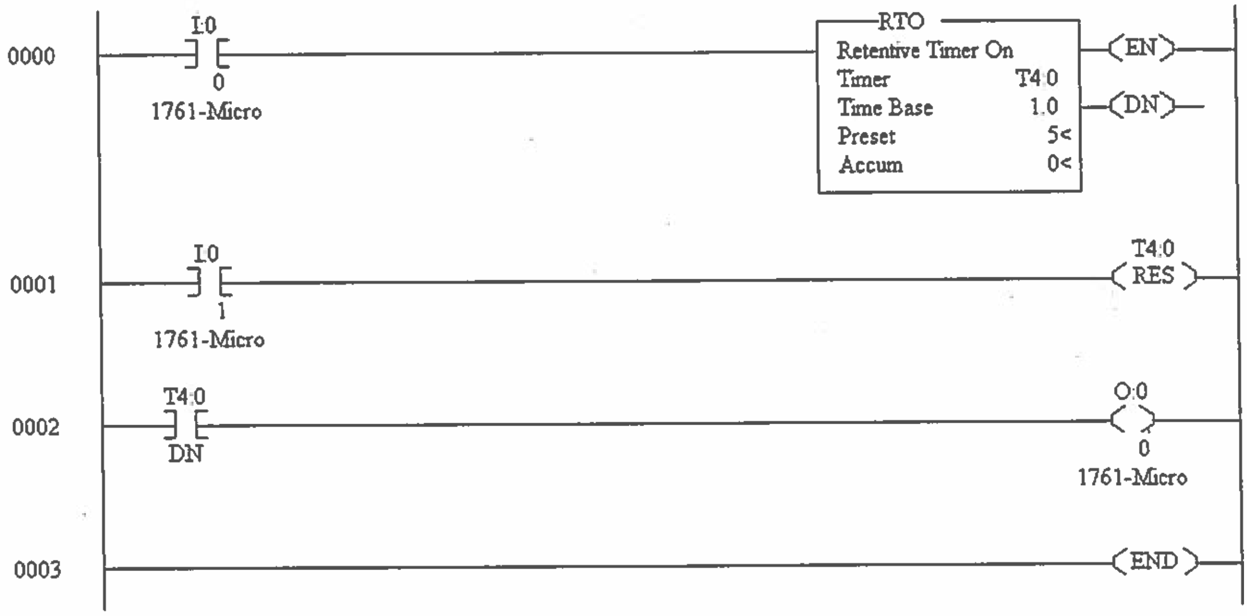
The retentive timer screen appears.

RESET

To enter a reset for the timer, the keystrokes are:

Reset → T4:0

Figure 13-8 is a program with keystrokes for a retentive on-delay timer. When input I:0/0 is energized, the timer will activate output O:0/0 after five seconds. It is reset using a separate input element.



Rung 0	Rung 1	Rung 2
New Rung	New Rung	New Rung
Examine if Closed I:0/0	Examine if Closed I:0/1	Examine if Closed T4:0/DN
Retentive Timer On-delay	Reset T4:0	Output Energized O:0/0
T4:0		
1.0		
5		
0		

Figure 13-8

Retentive Timer On-Delay Program and Keystroke Sequence

EXPERIMENT

Purpose

To explore the operation of timers and timers programs.

Procedure

1. Make all common connections to supply power to the controller and to the input and output devices.
2. Make the connections in Table 13-1.

Switch	Input	Light	Output
0	I:0/0	2	O:0/0
1	I:0/1	1	O:0/1

Table 13-1
Connections for Procedure

3. Prepare the controller for programming.
4. Enter the program in Figure 13-8.
5. Verify, Download, Go Online and Run. Press switch 0 and release it.
   How did the output devices respond in any way?

   The outputs did not respond in any way.

6. Press switch 1 and release it. Now press switch 0, hold it for six seconds and release it.

   a. How do the output devices respond now?

   Light 0 came on 5 seconds after switch 0 was pressed.

   b. Why didn't the light turn off when you released switch 0?

   The reset is controlled by input I:0/1 (switch 1).

   c. How do you turn off the light now that it is lit?

   Press and release switch 1.

7. Try your idea for turning off the light. Did it work? *Answers will vary.*

8. With the timer reset (press and release switch 1), press switch 0 for two seconds and release it. Repeat this two more times.

   a. What happened?

      The light came on during the third pressing of switch 0.

   b. What does this tell you about the operation of the timer ?

      The timer remembers elapsed time so it must be a retentive on-delay timer.

9. Reset the timer.

10. In the ONLINE monitoring mode, find timer T4:0. Use the arrow keys to see the preset value you entered into the controller. Use the arrow keys again to see the accumulated value of the timer. It should read 0 Ac.

11. Repeat Step 8, watching the accumulated value on the computer screen. How does this observation compare with your answer to Step 8?

    The student should have found that the accumulated value is retained on the display. The accumulated value trips the done bit. When the timer is timed out it activates the resets of the timer T4:0.

12. Return to the ONLINE monitoring mode to edit the Accum value of the timer. To execute the edit, complete the following steps:

    a. Locate the timer instruction.
    b. Click to the right of the Accum.
    c. Key in 3 and press enter.

13. Press switch 0 and hold it. Time how long it takes the light to come on.

    The new Accum value begins the timer 3 seconds into the timing cycle, so only 2 seconds are left until the output element is active.

14. Find the timers accumulated value again. While watching the value, press switch 1 to reset the timer.

    a. Why does the AC read when it is reset? *3.0*

b. Why? *The reset is programmed to begin each new timing cycle at the 3 second point (as if 3 seconds had already been timed in the new cycle).*

15 Repeat Steps 4 through 15. However, this time program in an off-delay timer TOF T4:1 in place of the on delay timer RTO T4:0. Its RAC should be left at 3.0 seconds. Keep a careful record of the answers you get for each question.

Compare the two sets of answers to steps 4 through 15.

The Retentive On-delay timer controls when the light will come on. An off-delay in this program controls when the light will turn off. In both cases the reset accumulated value (RAC) of 3.0 begins the reset timing cycles at the 2 second point rather than at the very beginning of the timing cycle.

16. When you are satisfied that you understand how on-delay and off-delay timers operate, set your equipment aside. Then complete the questions which follow.

QUESTIONS

1. Explain the similarities and differences between on-delay and off-delay timers.

   Both retentive on-delay and off-delay timers change the on/off status of an output after a preset amount of time. Only retentive on-delay requires reset to re-start the timing cycle. On-delay timers start timing when their input element are energized. Off-delay timers begin timing when their input elements are de-energized. They do not require a reset to restart the timing cycle.

2. Respond with either TRUE or FALSE:

   a. *False* A retentive timer automatically restarts its timing cycle every time it is turned off.

   b. *True* The preset value indicates the length of time before a timer will change the status of its output elements.

   c. *True* The accumulated value shows the number of time units counted at any given point in the timing cycle.

   d. *True* A reset command keeps the timer as long as the reset is activated.

   e. *False* One timer can never be used to reset itself and another timer.

3. In Figure 13-9, I:0/2 is normally open maintain switch. It is now set in the ON position. Explain how the program operates.

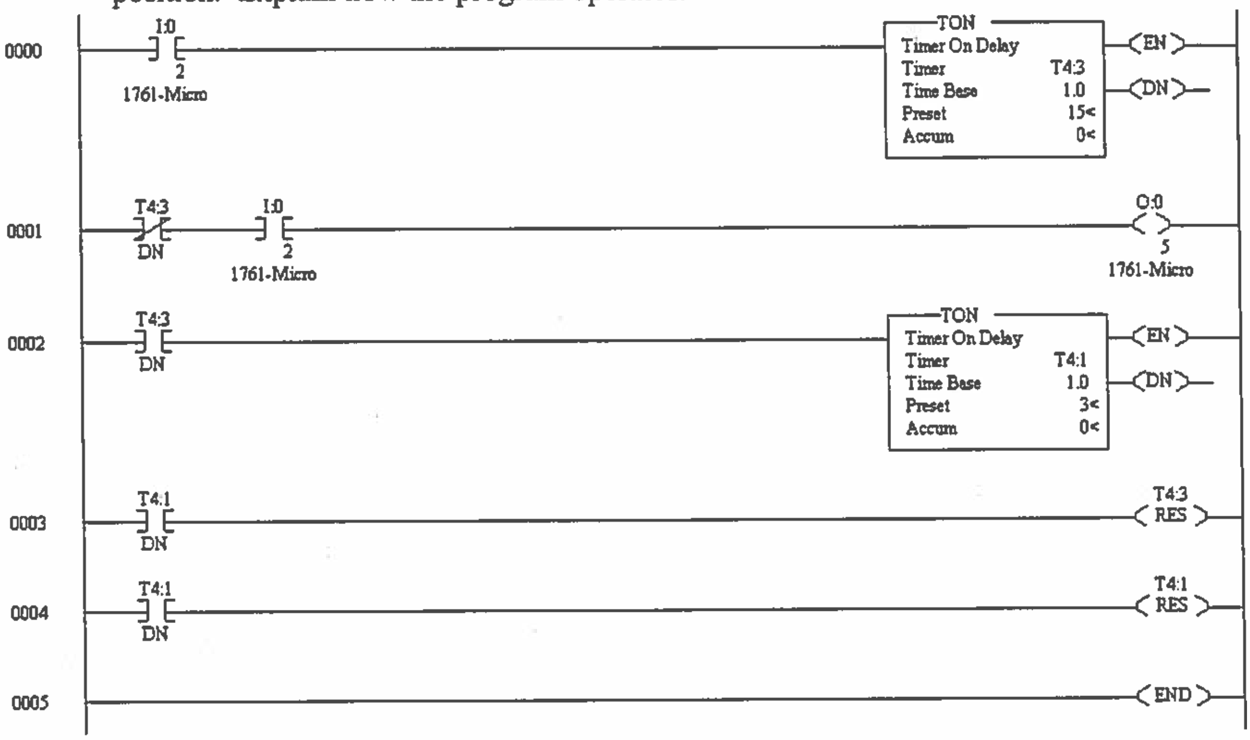
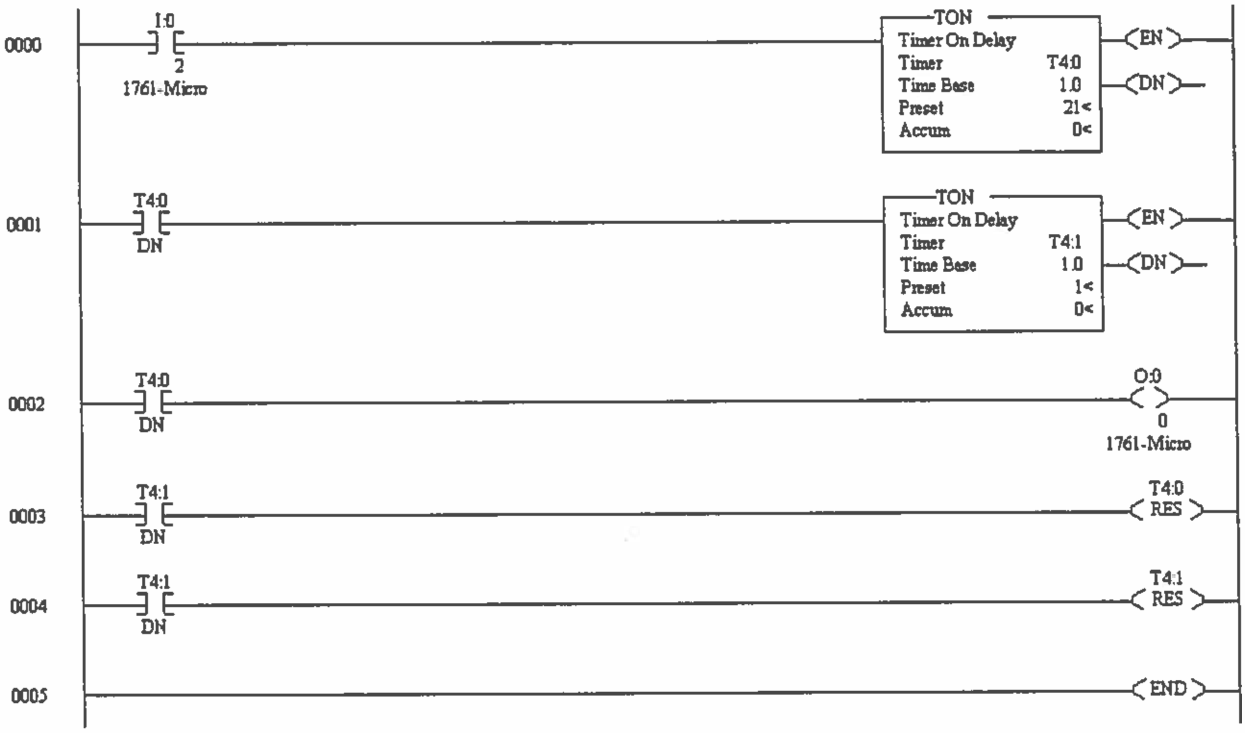


Figure 13-9

When energized, input I:0/2 activates output O:0/5 and timer T4:3. After 15 seconds, timer T4:3 de-activates output O:0/5 and activates timer T4:1. Three seconds later timer T4:1 activates the reset of timer T4:3 and resets itself. This simultaneously turns output O:0/5 back on. There is no external control of the reset of these timers.

4. Write a program to turn on a light after 21 seconds and then turn it back off after 1 second. The cycle must be repeated until a switch is turned off. Give the diagram and the keystroke sequence.



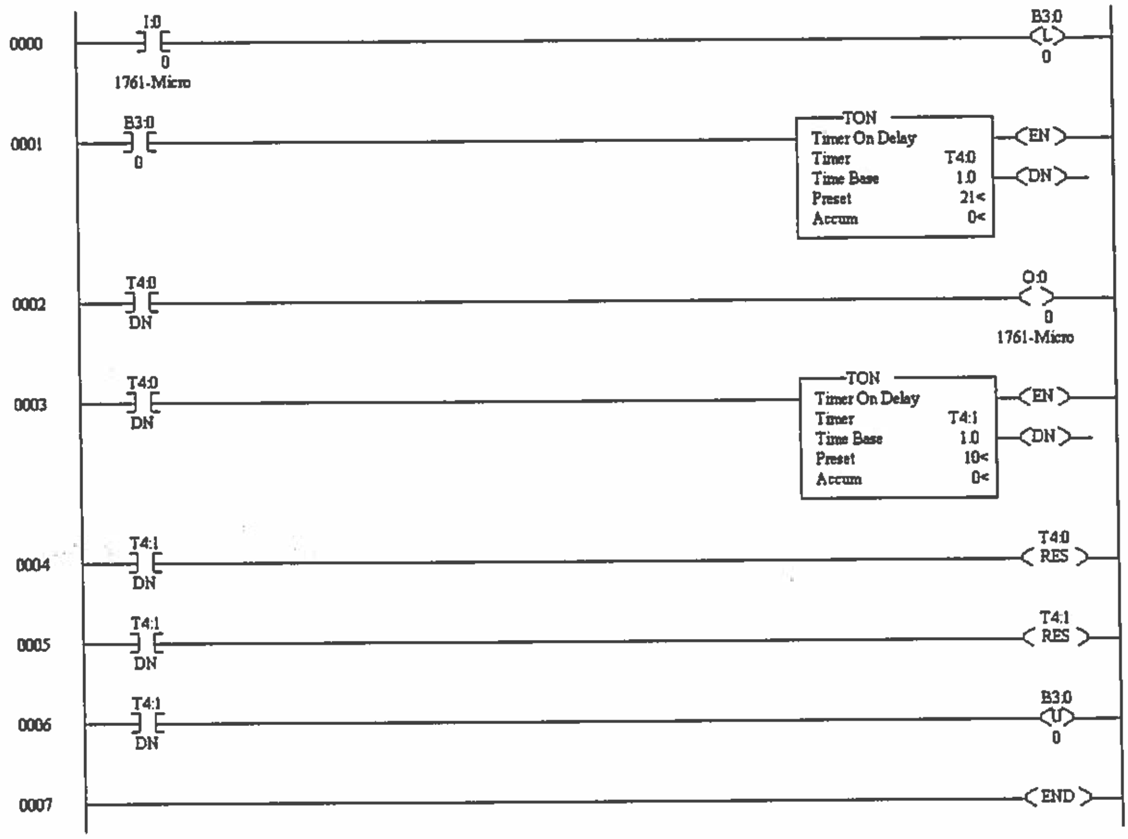
Rung 0	Rung 1	Rung 2	Rung 3	Rung 4
New Rung	New Rung	New Rung	New Rung	New Rung
Examine if Closed	Examine if Closed	Examine if Closed	Examine if Closed	Examine if Closed
1:0/2	T4:1/DN	T4:1/DN		
Timer On-delay	Timer On-delay	Output Energized O:0/0	T4:0/DN	T4:1/DN
T4:0	T4:1		Reset T4:0	Reset T4:0
1.0	1.0			
21	1			
0	0			

Figure 13-10

Input I:0/2 must be connected to a normallv open maintain switch.

(Element addresses mav vary within their acceptable ranges.)

5. From your lab experiences you can tell that removing power from a timer stops the time cycle. Write a program in which the timing cycle continues even when the momentary start switch is released. Don't forget output and restart instructions. Show both the programs and keystroke sequence.



Rung 0
New Rung
Examine if Closed
I:0/0
Output Latch B3:0/0

Rung 1
New Rung
Examine if Closed
B3:0/0
Timer On-delay
T4:0
1.0
21
0

Rung 2
New Rung
Examine if Closed
T4:0/DN
Output Energized O:0/0

Rung 3
New Rung
Examine if Closed
T4:0/DN
Timer On-delay
T4:1
1.0
10
0

Rung 4
New Rung
Examine if Closed
T4:1/DN
Reset T4:0

Rung 5
New Rung
Examine if Closed
T4:1/DN
Reset T4:1

Rung 6
New Rung
Examine if Closed
T4:1/DN
Output Unlatch B3:0/0

Figure 13-11

Input I:0/0 must be connected to a normally open maintain switch.

(Element addresses may vary within their acceptable ranges.)

UNIT 14
INSTRUCTOR'S MANUAL

COUNTERS

1. Counters function in fairly clear-cut ways. However, if a counter is controlled by a normally closed switch with an normally open input it behaves abnormally during its first counting cycle. Supplying power to the system will cause such a counter to increment one unit (for the on status) immediately. Thus, to reach the counter's preset value, the controlling switch must be pressed one time less than the preset value. Counters should not be controlled by normally closed input elements.

2. Question 5 of the Questions requires the students to integrate their knowledge of timers with the new information they have acquired about counters. They may need to be reminded to work on one section of the program at a time, listing all conditions first. They may also need to be referred back to Unit 13 for timer programming information.

UNIT 14

COUNTERS

Objectives

Upon completion of this unit the student will be able to:

1. Explain the operation of a counter.
2. Define the terms "preset value," "accumulated value," and "reset accumulated value" as used with counters.
3. Write a program using counters.
4. Enter a program with counters into the controller.
5. Write a simple program using counters and timers.

Background

Counters are devices which activate a circuit after some pre-defined number of events have occurred . An example of a counter application is a conveyor belt which diverts parts between two machines , as in Figure 14-1. Parts come out of the molding machine at a steady rate. Machine 1 and 2 can handle parts in batches of 5. As the parts are conveyed through the light beam, they are counted by a PLC and directed towards machine 1 by the gate. When the PLC has counted the passing of five parts, it flips the gate , directing the parts to machine 2. When the machine 2 has received five parts, the PLC flips the gate back so that the parts are again directed towards machine 1. It is probable in such a setting that the same or additional counters would be used by the PLC to direct operations, such as stamping, labeling or packing, at machines 1 and 2.

Two values are important to counters. The preset value PR is the number of counts at which the counter will produce an output. The accumulated value indicates the number of units counted by the counter at any given point in time.

A counter unlike a timer, will only increment one time for each off/on cycle of the input controlling the counter. A counter which has been preset for ten increments must have the input controlling it energized ten times before the counter is activated.

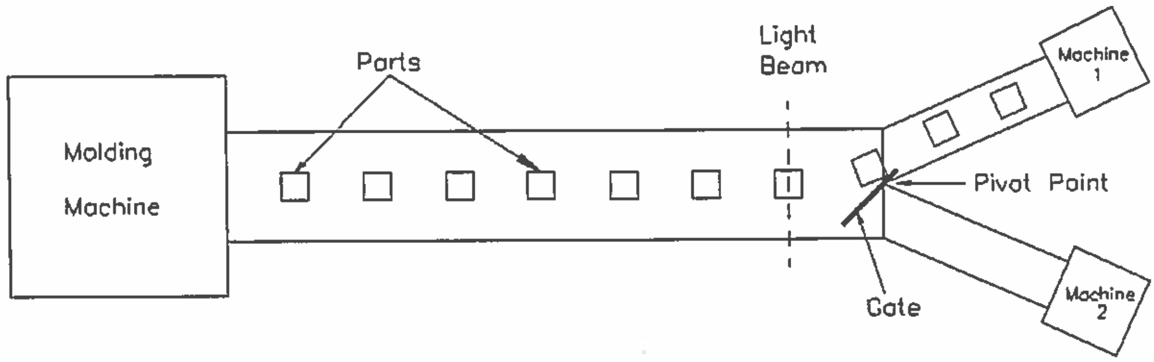


Figure 14-1
Sorting Using a Counter

A counter needs a reset to turn off. The reset is also used to start the counting cycle all over again. The reset is programmed on its on rung and is addressed with the same number as the counter it is resetting. A typical counter program with reset and output rungs is shown in Figure 14-2.

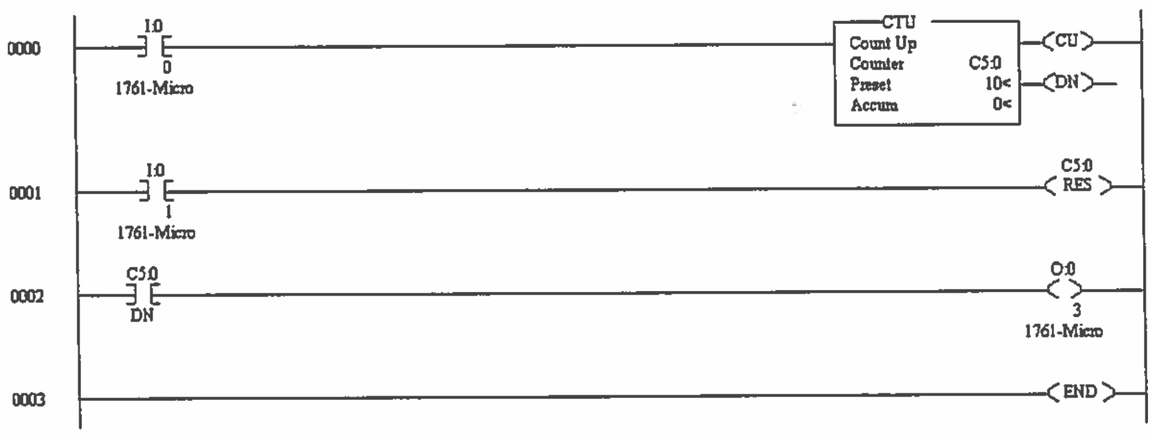


Figure 14-2
Simple Counter Program

The counter C5:0 on rung 1 has a preset value of 10. When input I:0/0 is energized for the tenth time, counter CTU C5:5:0/DN will be activated. This energizes the contacts C5:0 on rung 3 and activates output O:0/3. Counter C5:0 will stay activated until input I:0/1 is energized, causing the reset coil RES C5:0 for counter C5:0 to de-activate the counter. Once I:0/1 is energized, causing the reset coil RES C5:0 for counter C5:0 to de-activate the counter. Once I:0/1 is no longer energized , counter C5:0 can begin counting C5:0 can begin counting again.

A counter can also be used as a normally closed contact. When programmed in this way, the counter, when activated turns off its output. Once the counter is reset, the output comes back on.

Two types of counters are used in PLCs, Down counters and Up counters. A down counter decrements from its preset value to zero. An up counter increments from zero to its preset value.

Programming Keystrokes

Counters, like latching relays and timers, are another form of relay coil. A counter has a preset value and an accumulated value like a timer. Because it is a retentive, a counter must be reset like a timer. The Micrologix 1000 has both up and down counters. The up counters function independently of the down counters and are used for all general counting operations. The down counters are programmed in conjunction with the up counters to create up/down counters. Only the up counters will be studied in this unit.

Counters use addresses C5:0 to C5:31. The counter are identified by distinct up and down counter symbols:

Up Counter (Count Up)	CTU
Down Counter (Count Down)	CTD

The operating range for both types of counters is 1 through 9999.

The reset instruction for a counter is the same as it is for a timer. But when resetting a counter, if the RES instruction is enabled and the counter rung is enabled, the CU or CD bit is reset. If the counter preset value is negative, the RES instruction sets the accumulated value to zero. This in turn caused the done bit to be set by a count down or count up instruction. The reset must carry the same address as the counter it is to reset.

Reset (Counter Address)

Because the reset for a counter looks exactly like the reset for a timer, a counter and a timer may have the same address in a program.

Figure 14-3 is a counter program which turns on output O:0/4 after input I:0/4 has cycled 150 times. Note that the Preset and Accumulate are indicated below the counter and reset symbols, respectively, in the ladder logic diagram. Also note that the counter is activated by a normally open input element.

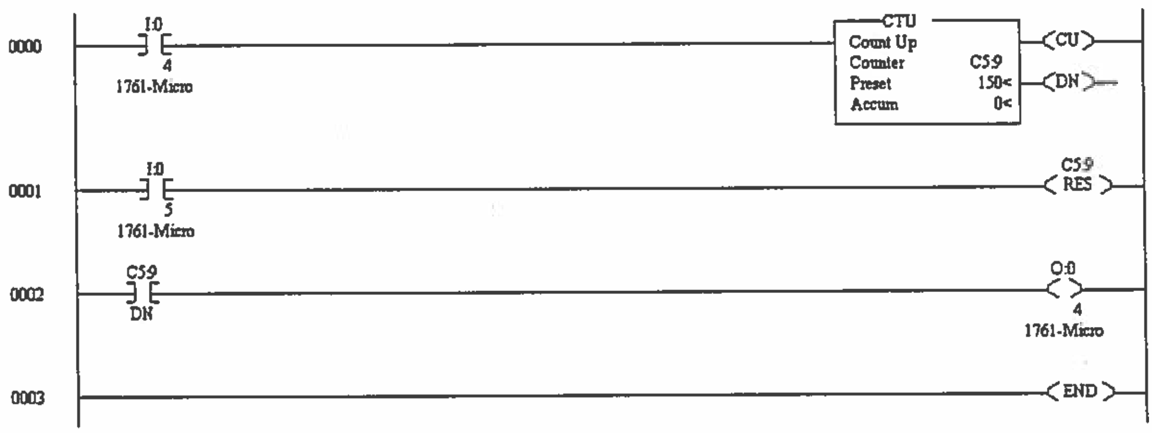


Figure 14-3
Counter Program

EXPERIMENT

Purpose

To examine the operation of counters in a PLC program.

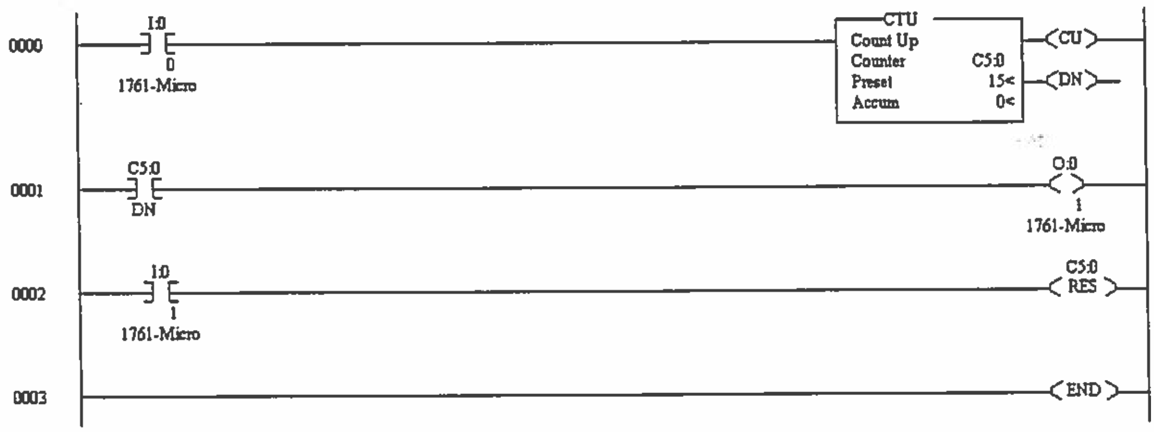
Procedure

1. Make all common connections to the controller, lights and switches, then complete the connections in Table 14-1.

Switch	Input	Light	Output
1	I:0/0	7	O:0/0
0	I:0/1	4	O:0/1

Table 14-1
Connections for Procedure

2. Prepare the controller for programming and enter the program in Figure 14-4.



Rung 0
New Rung
Examine if Closed I:0/0
Count Up
15
0

Rung 1
New Rung
Examine if Closed C5:0/DN
Output Energized O:0/1

Rung 2
New Rung
Examine if Closed I:0/1
Reset C5:0

Figure 14-4
Program for Step 2

3. Study the program above.

How many times must you press switch 1 to make light 4 turn on ? ___*15*___

4. Put the controller in RUN mode and check your answer by pressing the switch.

   a. Were you correct? *Answers will vary.*

   b. If not, why not ? *The student may have keyed in the PR incorrectly, or may have miscounted when pressing switch 1. They should check the PR using editing instructions and then test program operation a second time.*

5. While still in RUN mode, find the counter element C5:0 by using monitoring commands. The preset value and the accumulated value will be displayed in the window. Now press the reset switch.

   a. What does the display read ? ___*7*___

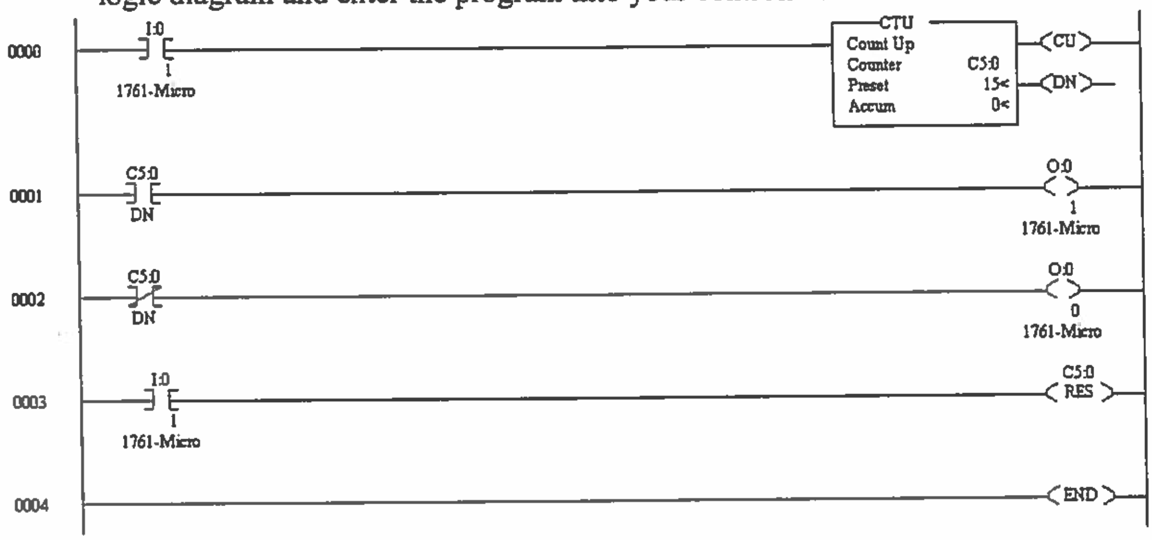
   b. Why? *The reset accumulated value is 7. So the counters accumulated value upon reset must be 7.*

6. Press and hold switch 1 while watching the Accum in the counter instruction. How many counts does the counter make? ___*1*___

7. Press and release switch 1 several times while watching the display. What happens ? Be precise.

Each time switch 1 was pressed the Accum increased by 1 unit. When switch 1 was released, there were no changes. Once AC=15, light 4 came on. The AC continued to increase by 1 unit each time the switch was pressed. The counter will continue to count until it is reset.

8. Modify this program to turn on light 7 when light 4 turns off. Draw the ladder logic diagram and enter the program into your controller.



(The new rung could be added anywhere in the program. It is a good programming practice to group the output rungs as in the diagram above.)

9. Test the program and describe its operation.

When input 1 is energized (switch 1 pressed), counter C5:0 counts one unit. After 8 units normally open contact C5:0 is energized, activating output O:0/1 and turning on light 4. Simultaneously, when normally closed contact C5:0 is de-energized, de-activating output O:0/0 and turning off light 7. When switch 0 is pressed, it energized input I:0/1 . This activates the counter reset instruction and resets the counter.

10. Now set aside your equipment and complete the Questions which follow.

Questions

1. Define the following terms :

   a. Reset: *Sets the counter back to the beginning of its counting cycle.*

   b. Counter: *An internal relay which energizes outputs after some predetermined number of events.*

   c. Accumulated value: *The number of units to be counted at any given time.*

   d. Preset value: *The number of units to be counted before an output controlled by a counter is activated.*

2. How does the counter work?

Each time a counter's input is energized, the counter registers one unit. When the accumulated units decrement to zero from the preset value entered in the program, the counter is activated. At this point outputs controlled by the counter are activated or deactivated as required by the program.

3. Describe the operation of the program in Figure 14-6.

When input I:0/0 is energized, it increments up counter C5:7 one unit. After 127 units, counter C5:7 is activated causing O:0/0 and O:0/4 to come on. Input I:0/2 when energized, resets counter C5:7.

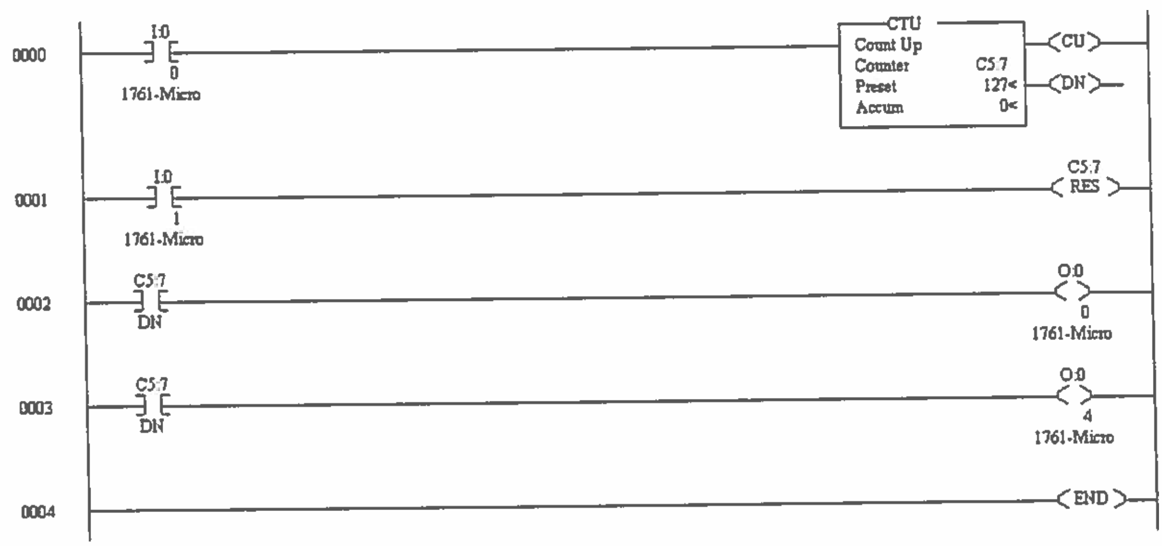
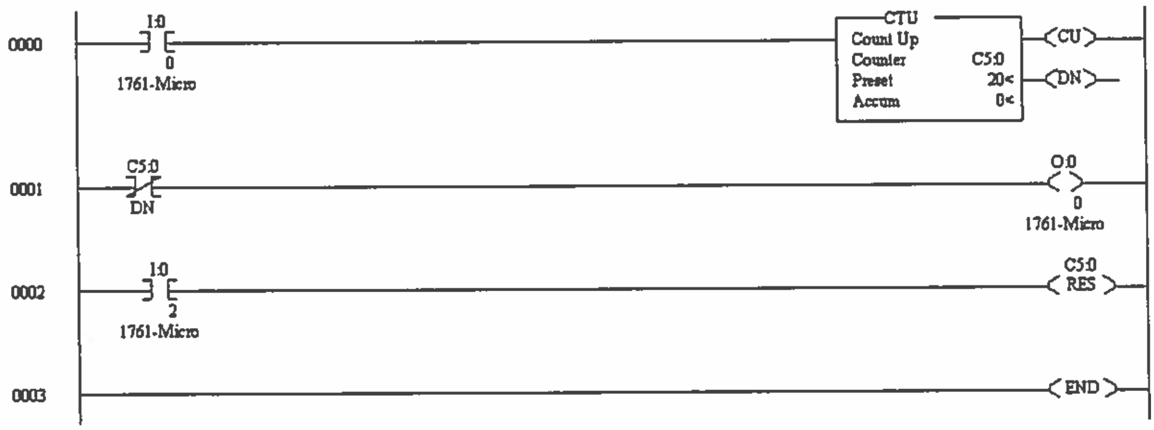


Figure 14-6

4. Write a program to turn off an output after 20 events and to turn it on using a second input. Show both the ladder logic diagram and the ladder logic programming keystrokes.

Assuming I:0/0 and I:0/2 are connected to normally open momentary switches, the program is as follows.

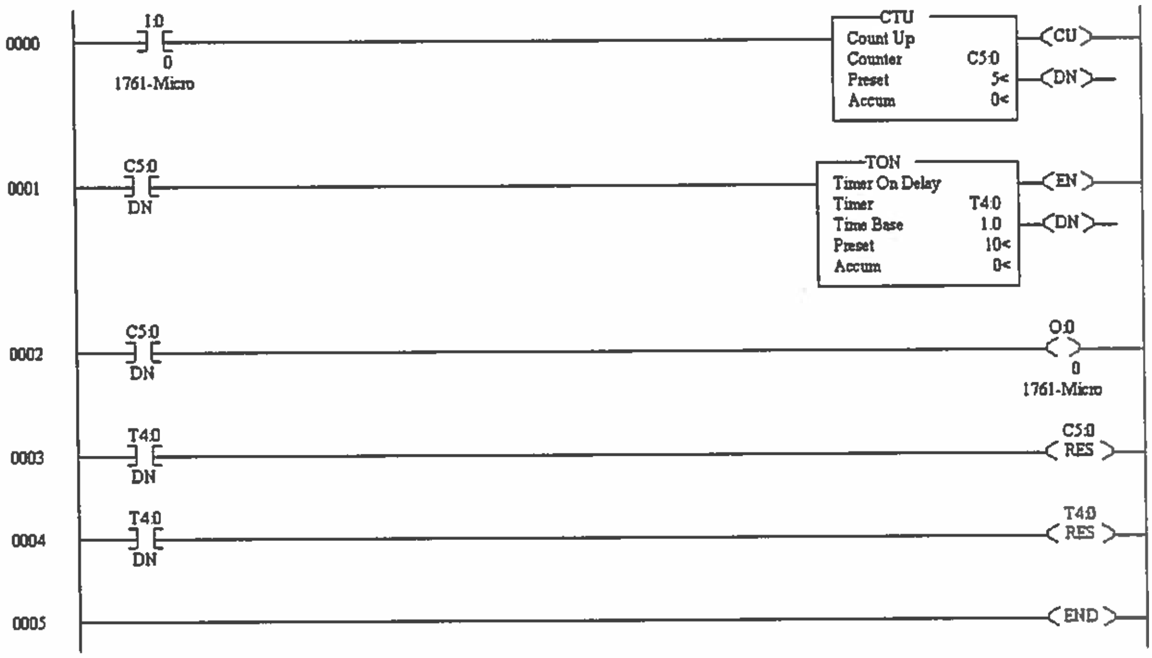


Rung 0	Rung 1	Rung 2
New Rung	New Rung	New Rung
Examine if Closed	Examine if Open	Examine if Closed
I:0/0	C5:0/DN	I:0/2
Count Up	Output Energized O:0/0	Reset C5:0
C5:0		
20		
0		

(Element addresses may vary within their acceptable ranges.)

5. Write a program to turn on a light after 5 events and to turn it off after 10 seconds. Provide both the ladder logic diagram and the ladder logic diagram and the ladder programming keystrokes.

Assuming that I:0/0 is energized by a normally open momentary switch, the program is as follows.



Rung 0
New Rung
Examine if Closed I:0/0
Count Up
C5:0
6
0

Rung 1
New Rung
Examine if Closed C5:0/DN
Timer On-delay
T4:0
1.0
10
0

Rung 2
New Rung
Examine if Closed C5:0/DN
Output Energized O:0/0

Rung 3
New Rung
Examine if Closed T4:0/DN
Reset C5:0

Rung 4
New Rung
Examine if Closed T4:0/DN
Reset T4:0

(Element addresses may vary within their acceptable ranges.)