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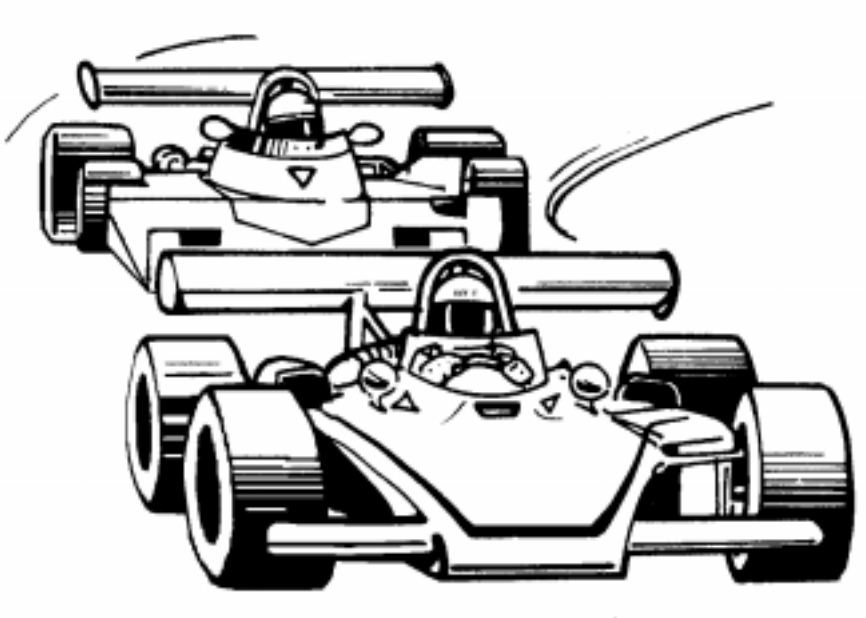
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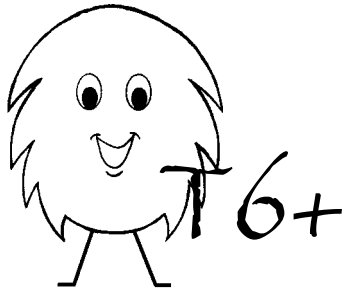
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Notice: This booklet is for use with a T6+ start-up kit and requires the pocket programmer to have software version: 1.5 or higher.

TROL T6GSB-1

Getting Started Booklet

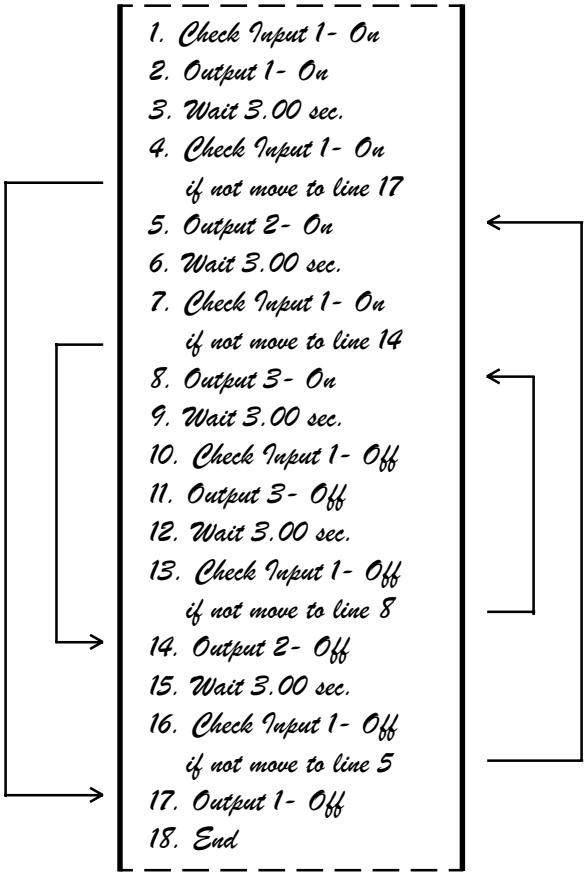




Forward and reverse sequence

Some machine applications require the sequence to reverse at any point. In this example the operator flips a switch to clamp a part into position so that it can be machined. Should the part fail to line up properly, the operator may reverse the clamping sequence to reposition to part.

The machine sequence goes like this: When input 1 is on, the machine sequentially extends three cylinders (outputs 1,2 & 3) to clamp the part. Then input 1 is turned off and the cylinders are retracted in reverse order (last on - first off) to release the part. However, should input 1 change during the clamping or unclamping cycles the sequence must reverse.





HELLO, this booklet is specifically written for first time users of the T6 control system. We'll demonstrate how to use the T6 in as little time as possible. Afterwards, you will be instructed how to erase the program so that your T6 will be like new again!

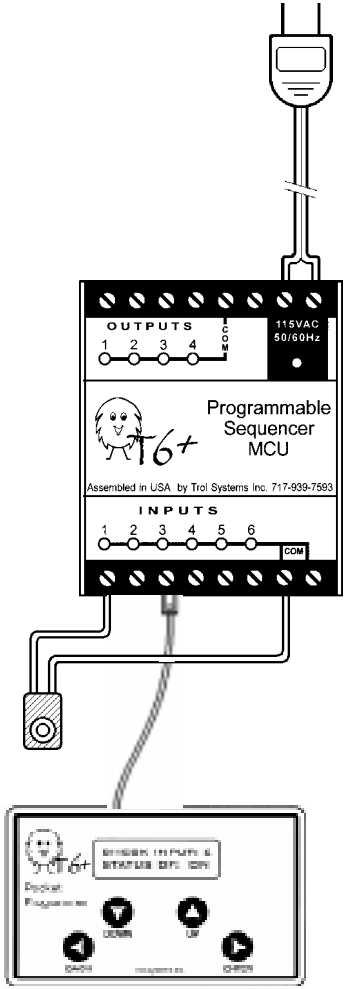
You'll need to make some connections in order to program and run the example. It's best if you can locate a desk or table near an electrical outlet.

❍ Connect the supplied power cord to the terminals marked "115 VAC".

❍ Connect the supplied switch to input #1. One wire goes to the input terminal marked "1", the other wire goes to a common input terminal marked "COM" (either one).

❍ Plug the cable of the pocket programmer into the data port of the controller. Note: If you purchased an optional power pack, do not use it for now.

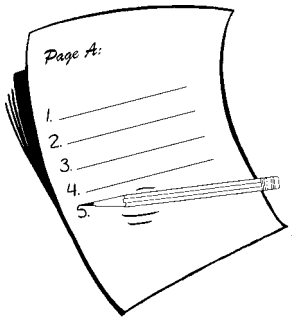
❍ Plug in the power cord and watch the display window of the programmer. It should now be operating. Make sure that it indicates a version level number of 1.5 or higher as this booklet will indicate information based on that software version.



Overview

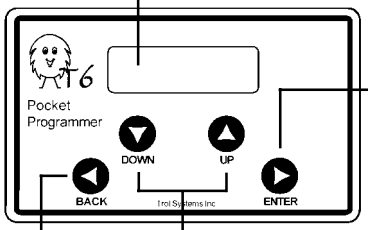
The T6 is programmed by filling in the lines of a page with a function that describes what happens at that point in the sequence. The lines of the page are executed in sequential order, from top to bottom.

Programming a function for the line is done by making selections from a "menu". Once a function is selected and entered, additional selections may be required to complete the line.



It's very important that you record your selections when you begin the program of your project. But to help move things along, this booklet will show you what the page looks like when the example is finished.

The Pocket Programmer is used to write the program and it also serves as a guide when you run the program. Let's take a quick look at how the programmer works.



DISPLAY - will allow you to select a menu, then prompts you to make selections from the menu that you selected.

ENTER - stores the currently displayed selection, then proceeds with the next prompt. The Enter key is also used to move the cursor to the right when making a time/count number selection.

UP / DOWN - used to make choices from the menu to any prompt that ends with a (?) question mark. The choices will scroll past when the button is held pressed down.

BACK - used to correct a mistake while in the Program menu. Pressing the Back key once opens the Edit menu, allowing you to choose the line to correct. Pressing the Back key again will reopen Program menu back to where you where. The Back key is also used to move the cursor to the left when making a time/count number selection.

Counting an input

The input must be checked for both: On and Off. It's then repeated the number of count *less one.* Therefore, in this example input 1 would have to be applied 5 times before output 1 is turned on. That's because the input already cycled once to get to line 12.

```
10. Check Input 1- Off
11. Check Input 1- On
12. Repeat line 10, 4 times
13. Output 1- Turn On
```

Timing an Output while checking an input

Use the Output function set to Timed instead of the Wait function whenever you need to continue with your sequence while an output is also being timed. In this example, output 4 will be turned on for 30 seconds as long as input 1 does not turn back off during that time.

```
18. Check Input 1- On
19. Output 4- Timed 30 sec.
20. Check Input 1- Off
21. Output 4- Turn Off
```

Deciding what to do based on input status

The Check Input function can be set to move the page to a particular line if the input is not of the chosen status. In this example; if input 1 is on, output 2 is turned on. But if input 1 is off, output 3 is turned on. After the proper output was turned on, line 15 is executed.

```
11. Check Input 1- On -
    if not, move to line 14
12. Output 2- On
13. Control a Page -
    Move page A to line 15
14. Output 3- On
15.
```

Note: Write out your program first so that you know which line you need to move to. Then trace the execution under both scenarios to make sure that you planned them correctly. As in this example, both routes merge at line 15 and proceed with the same sequence from that point.

Practical application examples

The following are example programs for typical machine applications. Each example gives you the basic explanation of how it works. With a few changes you can use the same principle in you application. Each example is assumed to be a small section of the full program.

Extending a page

Other pages can be used extend the number of lines that one page has. In this example, Page A needed about 50 lines more than the 200 it has. Page A runs through its sequence, as it nears the bottom of the page, it thaws Page B. Page B then takes care of the rest of the program. But instead of just ending at line 50, Page B must thaw page A so that the sequence can begin another cycle. Page B goes on to freeze itself so it doesn't restart until Page A wants it to. Note: when a page reaches its last line, the End function is automatically entered.

Page A

```
198. Control Page- Thaw B
199. Control Page- Freeze A
200. End
```

Page B

```
50. Control Page- Thaw A
51. Control Page- Freeze B
52. End
```

Detecting a machine error

Many times a machine jam will cause an input not to turn on when expected. In this example, the Check Input is set to the *Off* status. So that it moves to line 36 when the input is on and do the rest of the normal sequence.

```
31. Check Input 1- Off,
    if not move to line 36
32. Wait 0.10 sec.
33. Repeat line 31, 100 times
34. Output 4- On
35. Control Page- freeze A
36. Output 1- On
```

However, if the machine had jammed, the input would stay off. Line 33 will cause the input to be rechecked every tenth of a second. If after 100 checks (10 seconds) the input is still not on, line 34 turns on output 4. (To alert the operator there is a jam). Line 35 will freeze the page from going any farther.

The Main Menu is the first menu to appear. Press the Up or Down keys to see the available choices in this menu. Then choose "*begin a new program*" and press the *Enter* key.

```
BEGIN A NEW
PROGRAM?
```

ENTER

Choose *Page A* by pressing *Enter.* (Using other pages is explained later).

```
PROGRAM MENU
WHICH PAGE: A
```

ENTER

We are now in the Program Menu of Page A. The current page and line number are displayed for a short period of time. Line 1 is now ready to be programmed to perform a function.

```
PAGE: A
LINE: 001
```

```
WHICH FUNCTION
BLANK?
```

Press the Up or Down keys to see the available choices of functions. Choose "*check input*" and press the *Enter* key.

DOWN UP

```
WHICH FUNCTION
CHECK INPUT?
```

ENTER

The function needs to know which of the inputs you want to check. Choose input "*1*". Remember to press the Enter key after making a choice.

```
CHECK INPUT
WHICH ONE? 01
```

Now the function needs to know if you want the status of the input to be on or off. Choose "*ON*".

```
INPUT: 01
FOR STATUS: ON
```

The function can also be set to move to another line if it's not on (off). In this example, we're only concerned about the input being on. So, just select "*NO*".

```
IF NOT ON,
MOVE TO LINE: NO
```

```
PAGE: A
LINE: 002
```

Line 2 is now ready to be programmed. Choose the function "*Output*".

```
WHICH FUNCTION
OUTPUT?
```

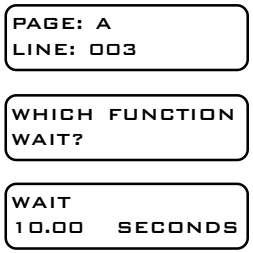
The function needs to know which output you want to control. Select output number "*1*".

```
OUTPUT
WHICH ONE? 01
```

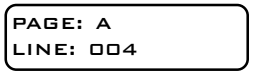
The function also needs to know what you want the output to do. Select to "*turn it on*".

```
OUTPUT: 01
TURN IT ON?
```

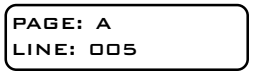
Line 3 is now ready to be programmed. Select the function "*Wait*". Then function needs to know how many seconds it should wait. Select "*10*" seconds by moving the cursor left one space *(Back* key moves left). Adjust the number to read 10.00. Now move the cursor to the right (using the *Enter* key) until the message reads 10.00 OK? With the cursor under "OK?", press *Enter* once more to accept the setting.



For line 4, select "*Output*". Then choose for output number "*1*" to "*turn off* ".



For line 5, select "*End Page*". The Main menu will appear after you end a page.



Sending the program

After ending a page, the Main menu will appear with the default selection of "*send T6 new program*" displayed. Press *Enter*. After a short check cycle a copy of each page, even blank pages, are sent to the T6 controller.



Running the program

After the program is sent, the default selection of "run program in T6" will be displayed. Acknowledge that's what you want by pressing *Enter*.



Conclusion

Thank you for taking the time to try the preceding examples. In that short time you learned how to use all of the menus: Main, Program, Edit and Setup. You learned how to send and run the program. And you learned how additional pages can be used.

A few tips to keep in mind are:

❍ The pocket programmer must be connected to the MCU prior to applying power; otherwise you will not be able to send the program.

❍ When you choose to "begin a new program", the current program of the selected page will be erased.

❍ Write your program down on a numbered tablet first. Then check off each line number as you enter it.

❍ Use the Blank function to create buffer areas to reduce the need to re-number lines when editing. These blank lines can be changed into useful functions later if needed.

❍ As Page A thaws other pages into operation, they will operate independently and at the same time as Page A. If this is not desirable, program the first line of other pages to freeze Page A (don't forget to thaw later).

❍ A page may contain only one End function. If you edit an End function (delete or change it), you may continue to program additional lines until you re-select the End function.

❍ You must remove power in order to exit from the Run mode.

❍ Remember to send the program to the T6 MCU before running it, especially after using the Edit menu.

Choose to edit *Page A*.

```
EDIT CURRENT
PROGRAM?
```

```
EDIT MENU
WHICH PAGE: A
```

Choose to edit line number 6 which contains the End function. Proceed by pressing Enter.

```
PAGE:A  LINE:006
END PAGE
```

Choose to "*insert a line*".

```
PAGE:A  LINE:006
INSERT A LINE?
```

Choose the "*Control a page*" function and set it for *"Page B" to "Thaw"*. After Enter is pressed the new line is displayed.

```
WHICH FUNCTION:
CONTROL A PAGE?
```

Exit the Edit Menu by pressing the *Back* key twice. At the Main menu choose to *"send the program"*, then *to run* the program.

Page A

1. *Check Input 1- Off*
2. *Check Input 1- On*
3. *Output 1- Turn On*
4. *Wait 10.00 sec.*
5. *Output 1- Turn Off*
6. *Thaw Page B*
7. *End*

Page A now looks as shown here and line number 2 should now be displayed. Momentarily press the push button switch. Notice that once Page B is thawed, output 4 begins to cycle on and off continuously. Press the switch again and notice that Page A is still operational. Each page is operating completely independent of the other.

While the MCU is in the Run mode, you can select which page should be displayed by the programmer. Press the *up/down* keys to view the other pages. Of course only pages A and B are operating.

Erasing the example program

Unplug the controller, wait for ten seconds, then plug it back in. At the Main menu, choose "Setup T6 Options". In the Setup Menu, choose to "Erase Program". When complete, choose to "Send Program to T6". The blank pages will replace the programmed ones so the programmer and controller are completely erased- just like new.

Page A

1. *Check Input 1- On*
2. *Output 1- Turn On*
3. *Wait 10.00 sec.*
4. *Output 1- Turn Off*
5. *End*

The program that we wrote may look something like the illustration to the left.

In the Run mode, the pocket programmer will indicate which line of the selected page is being executed.

```
PAGE: A  LINE: 001
CHECK INPUT 1
```

The first line instructs the T6 to check input number 1 to see if it is on. And it will continue to check input 1 until it does turn on.

Momentarily press the push-button switch that is connected to input 1. Notice that output number 1 turned on, but line number 2 was not displayed. That's because functions like "Output" are executed in less than a thousandth of a second, too quick to see! Now line number 3 will be displayed for 10 seconds. Again, lines 4 and 5 will not be displayed due to the speed that they are executed. When the End function is executed, the program restarts back at line number 1.

```
PAGE: A  LINE: 003
WAIT 10.00
```

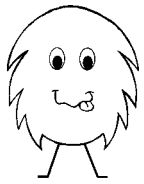
```
PAGE: A  LINE: 001
CHECK INPUT 1
```

Debugging the program

Let's run through the program again, but this time *try holding the switch closed at least 15 seconds*. Notice that output 1 doesn't turn off after 10 seconds anymore.

That's because line 4 turns it off and line 5 restarts the program. But line 1 checks the input which is *already on*, so line 2 will turn it right back on. The speed that all this happens is so fast that output 1 appears to stay on!

It's easy to make the assumption that the output would go off when we look at the program written out. We have a tendency not to consider the real rate that lines are executed, but rather the speed in which we read the lines.



OOPS... I made a mistake!

The sequence should only cycle once, each time the switch is pressed. I wasn't thinking think that someone might hold the switch pressed! This means the page has to be changed so it checks for the switch to be off first!

Editing the program

Pull the power cord out of the wall socket. Leave the programmer connected to the T6. Wait for ten seconds, then plug the power cord back in. At the Main menu, choose to "*edit current program*".

EDIT CURRENT PROGRAM?

Select *Page A*.

EDIT MENU
WHICH PAGE: A

The Edit menu will begin at line 1. Notice that the bottom line tells you what line 1 currently contains. Other lines can also be viewed too, but for now just press *Enter* to edit line 1.

PAGE:A LINE:001
CHECK INPUT #1
FOR STATUS: ON
IF NOT ON
MOVE TO LINE:NO

You need to choose what you want to do to line 1. Choose to "*insert a line*".

PAGE:A LINE:001
INSERT A LINE?

The Program menu will no appear. Choose the "*Check Input*" function, then select input number "*1*". Since we need to make sure the switch is off first, select "Off" for the status. Then, press *Enter* to select "*NO*" for the "if not move" option.

WHICH FUNCTION:
BLANK?

Notice that the contents of line 1 now indicates your new selections.

PAGE:A LINE:001
CHECK INPUT #1
FOR STATUS: OFF
IF NOT OFF,
MOVE TO LINE:NO

Since that is all we needed to change, exit the line by pressing the Back key. And exit from the Edit Menu by pressing the *Back* key again.

BACK

EDIT MENU
WHICH PAGE: A

BACK

The Main menu will now appear.

So, now that we made the changes needed, we're ready to run, right? Not so fast! We only changed the program within the pocket programmer, the T6 still has the old program. So you need to *send the T6 the new program*, then choose to run it.

SEND T6 NEW
PROGRAM?

Page A

1. *Check Input 1- Off*
2. *Check Input 1- On*
3. *Output 1- Turn On*
4. *Wait 10.00 sec.*
5. *Output 1- Turn Off*
6. *End*

The new edited program should look like the illustration on the left. Notice that when we inserted a new line 1, the other lines all moved down one line. This means that we need to renumber those lines.

Programming Tip: While programming, leave some lines blank (perhaps all odd numbered lines) so that you could change a blank line instead of inserting a new line. This will help to reduce the need to renumber lines when editing.

Using Other Pages

Pull the power cord out of the wall socket. Wait for ten seconds, then plug it back in. In this example Page B will be programmed to perform a completely separate task than Page A. Now that you've had some programming experience, this example will move along at a faster pace.

Choose to "*Begin a new program*" from the Main Menu.

BEGIN A NEW
PROGRAM?

Now we'll begin a new program on another page by choosing *Page B*.

PROGRAM MENU
WHICH PAGE: B

We are in the Program menu of Page B. Line 1 is ready to be programmed.

PAGE B
LINE: 001

Continue by Programing Page B as shown.

After ending Page B you will be prompted to send the program. Choose to *Edit Current Program* instead.

Page A determines when other pages are allowed to operate. Therefore, we need to insert a line to thaw Page B.

Page B

1. *Output 4- Turn On*
2. *Wait 5.00 sec.*
3. *Output 4- Turn Off*
4. *Wait 5.00 sec.*
5. *End*

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