


instrumentation and software for research

# Introduction to MED PC®

## Programming: An example program



[www.med-associates.com](http://www.med-associates.com)

---

---

---

---

---

---

---

---

### Overall Goals

- Learn fundamental MSN commands: ON, OFF, #START, STOP..., #R, ADD, SHOW, ZN, #ZN, SX



[www.med-associates.com](http://www.med-associates.com)

---

---

---

---


---

---


---

---

### Rules: Statements I: O ---> T



- Statements must have three components:
  - Input Section
  - Output Section
  - Transition

 INPUT: OUTPUT ---> TRANSITION

- Input Section is to left of colon
- Output Section is between colon and arrow “--->”
- Transition is to right of arrow



[www.med-associates.com](http://www.med-associates.com)

---

---

---

---

---

---

---

---

### ON Command



- ON
- Output command used to turn On the specified Output
- Syntax: **ON P1**
  - Where P1 = number, constant, variable, array element, or mathematical expression

• Example:

After a response on Input 1, turn ON Output 1 and the Pellet Feeder, then go to State 2

```
S.S.1,
S1,
#R1: ON 1, ^PelletFeeder ---> S2
```

www.med-associates.com

---

---

---

---

---

---

---

---

### OFF Command



- OFF
- Output command used to turn Off the specified Output
- Syntax: **OFF P1**
  - Where P1 = number, constant, variable, array element, or mathematical expression

Example:

After a response on Input 1, turn ON Output 1 and the Pellet Feeder, then go to State 2. After 4 seconds, turn OFF Output 1 and the Pellet Feeder and go back to State 1.

```
S.S.1,
S1,
#R1: ON 1, ^PelletFeeder ---> S2
S2,
4": OFF 1, ^PelletFeeder ---> S1
```

www.med-associates.com

---

---

---

---

---

---

---

---

### #R Command



- #R
- Input command used to measure responses on the specified Input (e.g. lever, nose poke, lickometer)
- Syntax:
  - [Number of times] #R[Device that is collecting input]: OUTPUT ---> Transition
  - Where [Number of times] = number of times the response must happen (default =1)
  - [Device that is collecting input] = number, constant, variable, array element, or mathematical expression

• Examples:

After a response on the Left Lever, turn ON the Pellet Feeder, then go to State 2

```
#R^LeftLever: ON ^PelletFeeder ---> S2
```

After 3 responses on the Center Nose Poke, turn ON the Foot Shocker, then go to State 4

```
3#R^CenterNosePoke: ON ^FootShock ---> S4
```

www.med-associates.com

---

---

---

---

---

---

---

---

## ADD Command

- **ADD**
- Output command that increments a variable by one unit.
- Syntax:  
INPUT: **ADD X** ---> TRANSITION  
Where X = the variable to which the value 1 will be added
- Example:  
*After one second, add 1 to the variable C, then go to State 2.*

1': ADD C ---> S2

[www.med-associates.com](http://www.med-associates.com)

---

---

---

---

---

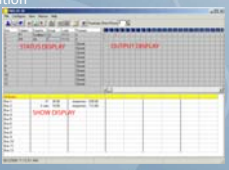
---

---

---

## SHOW Command

- **SHOW**
- Output command that displays information in the Show Area of the MED PC® window.
- Syntax:  
INPUT: OUTPUT; **SHOW P**, Label, X ---> TRANSITION  
Where P = Position in Show Area (1 to 200)  
Label = User-defined name for that position, must begin with letter  
X = Variable value listed in Show Position
- Example:  
*After 1 response on Input 2, add 1 to variable A, and display the value of variable A in position 1. Label this value "Center Key". Then go to State 3.*



#R2: ADD A; SHOW 1, Center Key, A ---> S3

[www.med-associates.com](http://www.med-associates.com)

---

---

---

---

---

---

---

---

## SX (Null) Transition

- **SX**
- Special Transition that "goes nowhere"  
– i.e. the State Set remains in the State it is in
- Syntax:  
INPUT: OUTPUT ---> **SX**
- Example:  
*After 1 minute, Add 1 to variable M, display the value of M in position 3 with the label "Minutes", and go nowhere.*

S2,  
1': ADD M; SHOW 3, Minutes, M ---> SX

[www.med-associates.com](http://www.med-associates.com)

---

---

---

---

---

---

---

---

## #START Command

- #START
- Input command that holds initiation of a procedure until a Start Signal is given by the researcher
- Syntax:  
#START: OUTPUT ---> TRANSITION

Example:

*Wait for a Start Signal. When a Start Signal is issued, turn On the House Light and go to State 2.*

```
#START: ON ^HouseLight ----> S2
```

[www.med-associates.com](http://www.med-associates.com)

---

---

---

---

---

---

---

---

## STOPABORT Transition

- STOPABORT
- Special Transition that causes a program to immediately stop running. Any active Outputs are turned Off. Any data collected up to the STOPABORT command remains in memory and can be saved or printed.
- Syntax:  
INPUT: OUTPUT ---> STOPABORT
- Example:

*After 60 minutes, stop the program and keep all data in memory.*

```
S2,  
60': ----> STOPABORT
```

[www.med-associates.com](http://www.med-associates.com)

---

---

---

---

---

---

---

---

## STOPKILL Transition

- STOPKILL
- Special Transition that causes a program to immediately stop running. Any active Outputs are turned Off. Any data collected is wiped from memory and cannot be recovered.
- Syntax:  
INPUT: OUTPUT ---> STOPKILL
- Example:

*After 1 minute, stop the program and flush data from memory.*

```
S2,  
1': ----> STOPKILL
```

[www.med-associates.com](http://www.med-associates.com)

---

---

---

---

---

---

---

---

### STOPABORTFLUSH Transition



- **STOPABORTFLUSH**
- Special Transition that causes a program to immediately stop running. Any active Outputs are turned Off. Any data collected up to the STOPABORTFLUSH command is saved to the hard disk and then the memory is wiped clean.
- Syntax:  
INPUT: OUTPUT ---> STOPABORTFLUSH
- Example:

After 90 minutes, stop the program, save the data to the hard disk, then wipe the memory clean.

```
S2,
  90': ---> STOPABORTFLUSH
```

www.med-associates.com

---

---

---

---

---

---

---

---

---

---

### Multiple Commands



- Sometimes it is necessary to have more than one Output command strung together. This can be done using semicolons (;) to separate individual Output commands
- Syntax:  
INPUT: OUTPUT#1; OUTPUT#2 ---> TRANSITION
- Example:

After 10 responses on the Right Lever, Add 1 to the variable C, and display the value of variable C in position 4 with the label "Rewards", then remain in the current State.

```
10#R^RightLever: ADD C: SHOW 4, Rewards, C ---> SX
```

www.med-associates.com

---

---

---

---

---

---

---

---

---

---

### Z-Pulse Commands



- **Z-Pulses**
- Z-Pulses are special commands that can function as either Inputs or Outputs. They are used to communicate between State Sets.
- Syntax:  
INPUT: ZN ---> TRANSITION      \Z-Pulse acting as Output  
#ZN: OUTPUT ---> TRANSITION    \Z-Pulse acting as Input  
Where N = integer between 1 and 32. Must be same in both Statements.
- Example:

Start Command in State Set 1 turns on House Light and issues a Z-Pulse. This Z-Pulse then initiates a transition to State 2 of State Set 2.

```
S.S.1,
S1,
  #START: ON ^HouseLight; Z1 ---> S2
S.S.2,
S1,
  #Z1: ---> S2
```

www.med-associates.com

---

---

---

---

---

---

---


---

---

---

### Rules: Z-Pulses

I: ZN ---> T  
 #ZN: O ---> T



- Similar to State Sets and States, Z-Pulses must be numbered
  - Integer between 1 and 32
  - Numbering does not need to be sequential, they are processed in the order in which they occur.
    - Sequential numbering is recommended to reduce confusion

[www.med-associates.com](http://www.med-associates.com)

---

---

---

---

---

---

---

---

---

---

---

---

### Sample Program

*Counting Lever Presses, Controlling Program Flow, and Displaying Information on the MED PC® Screen*




- Wait for a Start Command, then turn on the House Light.
- We want an FR-5 schedule, so turn on the Pellet Feeder after 5 Left Lever Presses.
- Count the Left Lever Presses using a Variable, A, and display the counts in Position 1, labeled "Left Lever Presses".
- Count Rewards using a Variable, B, and display the counts in Position 2, labeled "Rewards".
- Turn the Pellet Feeder Off after 0.05 seconds.
- End the program after 1 minute, but leave the data in memory.

**TIPS:**

- Try using four State Sets with two States each.
- One State Set will be the FR-5 code, another State Set will be a Response Counter, another State Set will be a Reward Counter and Timer, and the last State Set will be a Session Timer.

[www.med-associates.com](http://www.med-associates.com)

---

---

---

---

---

---

---

---

---


---

---

---

### Sample Program

*Your Program should look something like this:*



```

\ This is a sample program
\ This is an FR-5 program
\ Filename: MEDPC04.mcpr
\ Date: July 29, 2009
\ Author: G. Herrera

\ This section is for Outputs
*PelletFeeder = 3      \ My pellet feeder is wired to Output 3
*HouseLight = 7       \ My house light is wired to Output 7

\ This section is for Inputs
*LeftLever = 1        \ My left lever is wired to Input 1

\ Variables used in this program
\ A = Left Lever Response Counter
\ B = Reward Counter

S.S.1.                \ Main Control Logic for FR
S1.
  #START: ON *HouseLight ---> S2

S2.
  #FR*LeftLever: ON *PelletFeeder: 21 ---> S3

S.S.2.                \ Response Counter and Display
S1.
  #START: SHOW 1, Left Lever Presses, A ---> S2

S2.
  #R*LeftLever: ADD A: SHOW 1, Left Lever Presses, A ---> S3

S.S.3.                \ Reward Timer, Count, and Display
S1.
  #R1: ADD B: SHOW 2, Rewards, B ---> S2

S2.
  0.05: OFF *PelletFeeder ---> S1

S.S.4.                \ Session Timer
S1.
  #START: ---> S2

S2.
  1: ---> STOPABORT
  
```

[www.med-associates.com](http://www.med-associates.com)

---

---

---

---

---

---

---

---

---

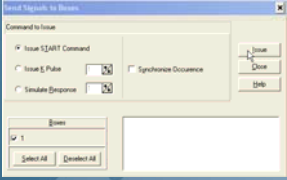
---

---

---



- Manually Issuing a START Command
- Select Configure – Signals, then issue a Start Command



[www.med-associates.com](http://www.med-associates.com)

---

---

---


---

---

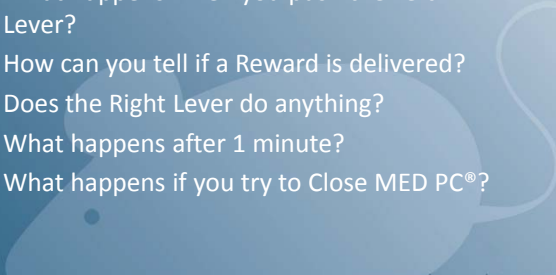
---

---

---



- What happens when you push the Left Lever?
- How can you tell if a Reward is delivered?
- Does the Right Lever do anything?
- What happens after 1 minute?
- What happens if you try to Close MED PC®?



[www.med-associates.com](http://www.med-associates.com)

---

---

---

---

---

---

---

---



[www.med-associates.com](http://www.med-associates.com)

---

---

---


---

---

---


---

---



### Now You Know the Basics

- Try doing your own programming
- Try using State Sets like Tool Boxes:
  - Session timers, reinforcer counters, response counters
- Study the MED PC® Programmers Guide
- Utilize the On-Line Help file in MED PC®
- We're here to help



www.med-associates.com

---

---

---

---

---

---

---

---



### Where to Go for Help?

- [support@med-associates.com](mailto:support@med-associates.com)
- Ph: (802) 527-2343
- Fax: (802)527-5095
- [www.med-associates.com](http://www.med-associates.com)

www.med-associates.com

---

---

---

---

---

---

---

---

### Where to Go for Help?



Researcher's Round Table Discussion Forum  
<http://www.med-associates.com/forums/index.php>

www.med-associates.com

---

---

---

---

---

---

---

---

### Where to Go for Help?

Med State Notation™ Repository

<http://www.med-associates.com/mednr/forum/>

MED associates		
<b>Hardware</b> Questions about your hardware	15 Posts 4 Topics	Last post by <b>John Maynard</b> in the forum <b>Hardware</b> is on August 22, 2006, 09:42:00 pm
<b>Software</b> Questions about MED PC INSTRUMENTAL or other MED software	53 Posts 11 Topics	Last post by <b>Chris Dambacher</b> in the forum <b>Software</b> is on August 22, 2006, 09:42:00 pm
<b>Installation</b> HELP! DO NOT REPLY!	15 Posts 2 Topics	Last post by <b>Steve Haggins</b> in the forum <b>Installation</b> is on August 22, 2006, 09:42:00 pm
<b>Getting Data/Media Procedures</b>		
<b>Recalculation</b> Any questions about programs in this repository go here	11 Posts 0 Topics	
<b>Getting Data &amp; Media</b> Steps are listed here	4 Posts 2 Topics	Last post by <b>Chris Dambacher</b> in the forum <b>Getting Data &amp; Media</b> is on September 04, 2007, 10:02:00 pm
<b>Getting Help</b> For coding or debugging problems here	45 Posts 14 Topics	Last post by <b>Chris Dambacher</b> in the forum <b>Getting Help</b> is on September 04, 2007, 01:22:00 pm
<b>Program Request</b> To test out a feature or request to date programs that are not yet in the repository, post here	11 Posts 0 Topics	Last post by <b>Chris Dambacher</b> in the forum <b>Program Request</b> is on August 22, 2006, 07:34:00 pm

[www.med-associates.com](http://www.med-associates.com)

---

---

---

---

---

---

---

---



Thank You!

Good Luck!

[www.med-associates.com](http://www.med-associates.com)

---

---

---

---

---

---

---

---