Unit 4: Make Rover Move!	Skill Builder 1: Your First Rover Program

In this first lesson for Unit 4, you will learn about working in the Program Editor to write a program that makes the TI-Innovator Rover move.

Objectives:

- Use the TI-84 Plus CE Program Editor
- Use the **Send(** command to **CONNECT** the TI-Innovator Rover to the TI-Innovator™ Hub
- Make the TI-Innovator Rover move **FORWARD**, **BACKWARD**, **LEFT** and **RIGHT**

Getting Started

- When writing a new program or editing an existing program, TI-Innovator Rover commands are found when you select prgm, then the **Hub** menu, and then **7:Rover (RV)…**.

- To quickly reach the Rover commands, select prgm, then select the left arrow to move to the **Hub** menu, and then select the number **7**.

- Some portions of the final instruction, such as numeric values and optional parameters, are entered as normal keypad characters or selected from another Rover menu.

- Some Rover commands include the closing quotation mark and parenthesis and others do not, indicating that there's (possibly) more to enter within the command. In either case, all commands need to be ended with the closing quotation mark and closing parenthesis.

Your first Rover command tells the TI-Innovator Hub to connect to Rover:

Send("CONNECT RV")

RV is the name of the Rover device.

To create this statement:

1. First, select the prgm key, and then select the **HUB** menu.

2. Then, select the **Rover (RV)…** submenu.

3. Finally, select **Send("CONNECT RV")**. The command is located near the bottom of the submenu.

Next we will add a **Pause** statement. This command pauses the calculator program and waits for the user to press the enter key.
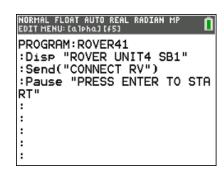
4. Press enter to move to a new line in the program.

5. Press the prgm key and, in the **CTL** menu, select **Pause**.

6. Add an appropriate message after the Pause command such as **"PRESS ENTER TO START"** using the Alpha keys.

When running the program, if you hear a beep from the TI-Innovator Hub before (or while) you see "PRESS ENTER TO START" it means that the **CONNECT RV** command was unsuccessful. Make sure the Rover is turned on.

Driving the Rover

7. Press ⌷enter⌷ at the end of the **Pause** statement in order to add the next command which will cause the Rover to move forward.

8. Press **prgm > Hub > Rover (RV)…**, and then select the **Drive RV…** menu as shown to the right.

9. Select **FORWARD** from the **Drive RV…** menu.

Notice that the command that is pasted into the program is missing the closing quotation mark and the closing parenthesis. We still need to add some information.

```
NORMAL FLOAT AUTO REAL DEGREE MP
Send("RV
1:FORWARD
2:BACKWARD
3:LEFT
4:RIGHT
5:STOP
6:RESUME
7:STAY
8:TO XY
9↓TO POLAR
```

```
NORMAL FLOAT AUTO REAL RADIAN MP
EDIT MENU:[alpha][f5]
PROGRAM:ROVER41
:Disp "ROVER UNIT4 SB1"
:Send("CONNECT RV")
:Pause "PRESS ENTER TO STA
RT"
:Send("RV FORWARD ■
:
:
:
:
```

10. Add the number **1**, and then add the closing quotation mark and a closing parenthesis to the command. The quotation mark is ⌷alpha⌷ ⌷+⌷ and the closing parenthesis key is above the **9** key.

11. Quit the editor (⌷2nd⌷ ⌷mode⌷), and run the program. Be sure that there is about one foot of free space in front of the Rover.

```
NORMAL FLOAT AUTO REAL RADIAN MP
EDIT MENU:[alpha][f5]
PROGRAM:ROVER41
:Disp "ROVER UNIT4 SB1"
:Send("CONNECT RV")
:Pause "PRESS ENTER TO STA
RT"
:Send("RV FORWARD 1")■
:
:
:
:
```

If all is well, then the Rover should move forward. But how far? Study the movement carefully and determine what **FORWARD 1** means.

The calculator displays 'Done' when the program ends. Notice that the program actually ends before the Rover finishes moving. The calculator and the TI-Innovator Hub work at different rates.

Driving Backwards

12. Edit the program, and add the statement **Send("RV BACKWARD 1")** by pressing **prgm > Hub > Rover (RV)… > Drive RV… > BACKWARD**.

13. Then add the number **1** and the closing quotation mark and closing parenthesis as you did in the **FORWARD** statement.

```
NORMAL FLOAT AUTO REAL RADIAN MP
EDIT MENU:[alpha][f5]
PROGRAM:ROVER41
:Pause "PRESS ENTER TO STA
RT"
:Send("RV FORWARD 1")
:Send("RV BACKWARD 1")
:
:
:
:
```

Quit the editor, and run the program again. This time, the Rover should move forward a bit and then back to its original position. If it does, congratulations! You made the Rover move.

Turning

The next two commands in the **Drive RV…** menu are **LEFT** and **RIGHT**. Add these two commands to your program, and run the program again. What do these instructions do?

```
NORMAL FLOAT AUTO REAL RADIAN MP
Send("RV
1:FORWARD
2:BACKWARD
3:LEFT
4:RIGHT
```

Making it Travel

Study the program to the right, and predict what the Rover will do and where it will end up when the program ends. Enter the commands into your calculator, and run the program.

Did your program do what you expected? Can you make a program *with only these commands* that causes the Rover to make a *rectangular* pattern?

```
NORMAL FLOAT AUTO REAL RADIAN MP
EDIT MENU:[alpha][f5]
PROGRAM:ROVER41
RT"█
:Send("RV FORWARD 1")
:Send("RV RIGHT ")
:Send("RV FORWARD 1")
:Send("RV LEFT ")
:Send("RV BACKWARD 1")
:Send("RV LEFT ")
:Send("RV FORWARD 1")
:Send("RV RIGHT ")
```

Using the New Supplemental Program Editor Menu

Access the new supplemental Program Editor menu by pressing **alpha-F5.** Use this menu to copy a line (**5: Copy Line**) and paste the line (**6: Paste Line Below**) below the current cursor line. You can also undo and insert lines and run the program from this menu.

```
1:Execute Program
2:Undo Clear
3:Insert Line Above
4:Cut Line
5:Copy Line
6:Paste Line Below
7:Insert Comment Above
8:Quit Editor   [2nd][quit]
```