

Action Builder Manual

July 31st, 2008 – ROBOBUILDER

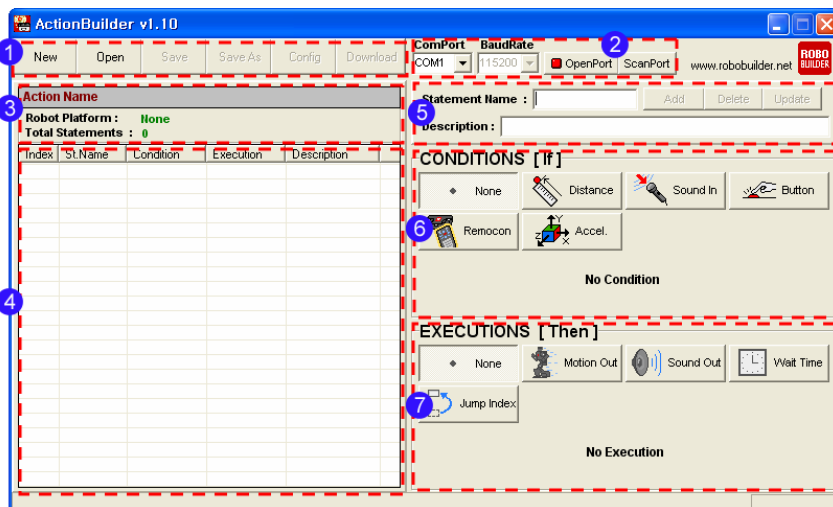
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1. What is the ActionBuilder?

ActionBuilder is the software tool that is used to create and manage an action file of a Robot. The user can create, edit, save, and download an action. An action is the robot's behavior that includes its motion and its interaction with the external world using its sensors such as sound and vision.

2. Screen Layout



① Menu Bar

- . New : creates a new action file.
- . Open : opens an existing action file (*.rba).
- . Save : saves the running action file.
- . Save As : saves the running action file as a different name.
- . Config : configures the file properties.
- . Download : transfers an action file to the control box.

② PC Port Connection

- . ComPort : sets the port on PC to connect the robot with.
- . BaudRate : sets the data communication speed (default:115,200kbps).
- . OpenPort : opens the set PC port to connect the robot with.
- . ScanPort : scans, finds, and opens the PC port connected with the robot automatically.

③ Action File Information

- . Action Name : displays the name of the action file currently running.
- . Robot Platform : displays the robot platform type on which the action file will be played.
- . Total Statements : displays the number of statements in the action file.

④ Statement List

- . Index : displays the index number of the statement.
- . St. Name : displays the name of the statement.
- . Condition : displays the condition part of the statement.
- . Execution : displays the execution part of the statement.
- . Description : displays the description of the statement.

⑤ Statement Editing

- . Statement Name : displays the statement name. It is also used to type in the name for the statement.
- . Description : displays the description of the statement. It is also used to type in the description for the statement.
- . Add : add a new statement in the action file.
- . Delete : delete the selected statement from the action file.
- . Update : update the change to the statement.

⑥ Conditions[if]

- . None : no condition
- . Distance : condition of visual distance detection
- . Sound In : condition of sound detection
- . Button : condition of the buttons on the control box
- . Remocon : condition of inputs from remote controller [IR remote control, compatible joystick etc]
- . Accel. : X, Y, Z Axis Acceleration Condition

⑦ Executions[then]

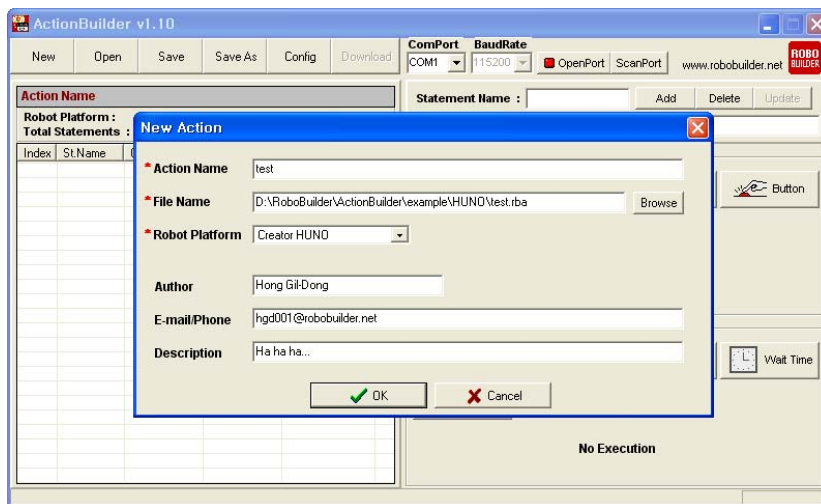
- . None : no execution
- . Motion Out : play the selected motion file.
- . Sound Out : play the selected sound source.
- . Wait Time : wait for the specified amount of time [in millisecond].
- . Jump Index : jumps to the statement of specified index number.

3. Creating a New Action File (example: Creator HUNO)

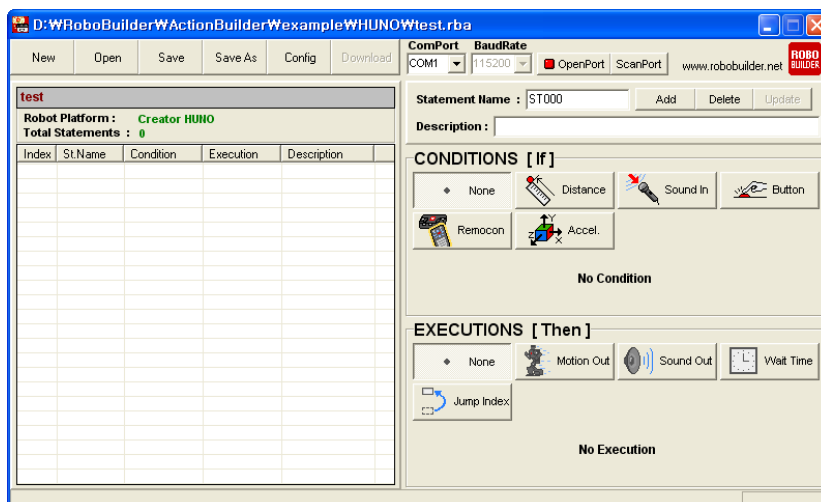
This example is about creating an action file that makes the robot first take the basic posture, and then wait for 2 seconds to react to an external sound by showing an arm attack motion.

※ Please refer to the appendix[Motion & Sound List] for detail list of [Motion Out] and [Sound Out].

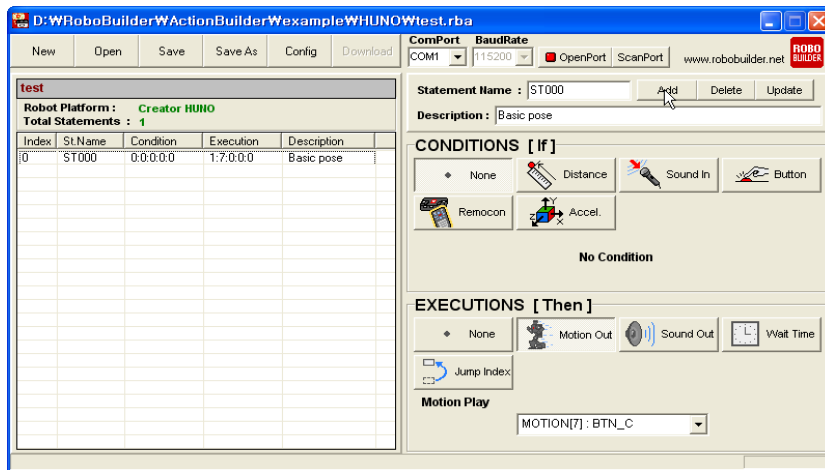
01 Select [New] on the menu bar. In the [New Action] window, assign the action name, the file name, the directory path, and the platform type. Then click [OK]. Author, e-mail, description are optional inputs. (example: action name = test, file name = test.rba, robot platform = Creator HUNO)



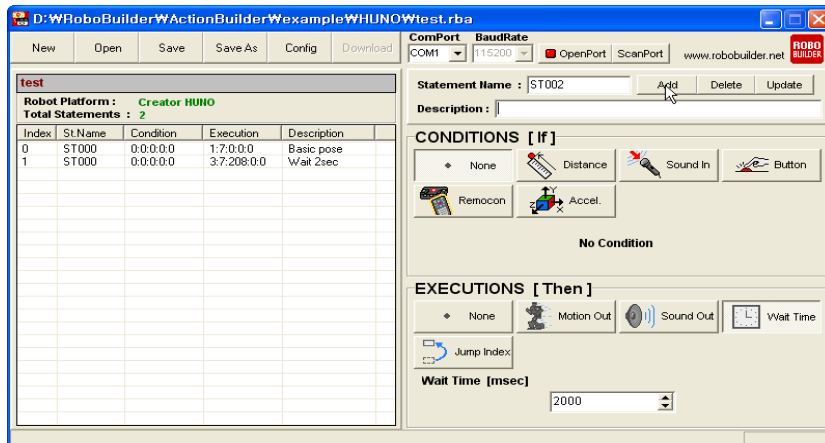
02 A new file for Creator Huno is created and the [Add] and [Delete] buttons become activated.



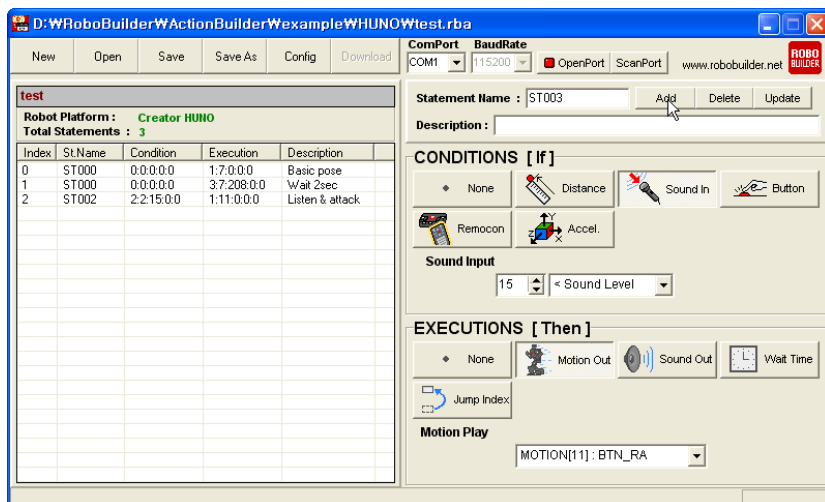
03 Select [None] for condition[if], and select [Motion Out, MOTION[7]:BTN_C] for execution[then]. If needed change the statement name and description and then click [Add] button. Then the statement is added to the Statement List section to the left. (example: take the basic posture without any condition.)



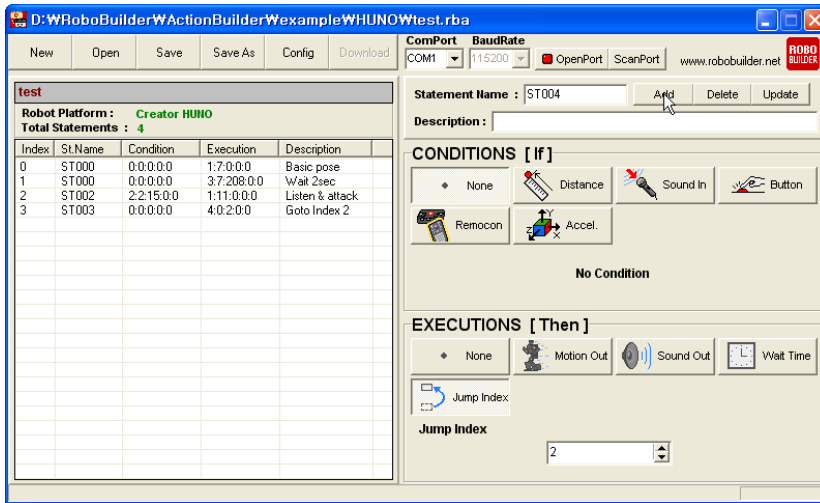
04 Select [None] for condition[if], and select [Wait Time, 2000] for execution[then]. If needed change the statement name and description and then click [Add] button. Then the statement is added to the Statement List section to the left. (example: wait for 2 seconds without any condition.)



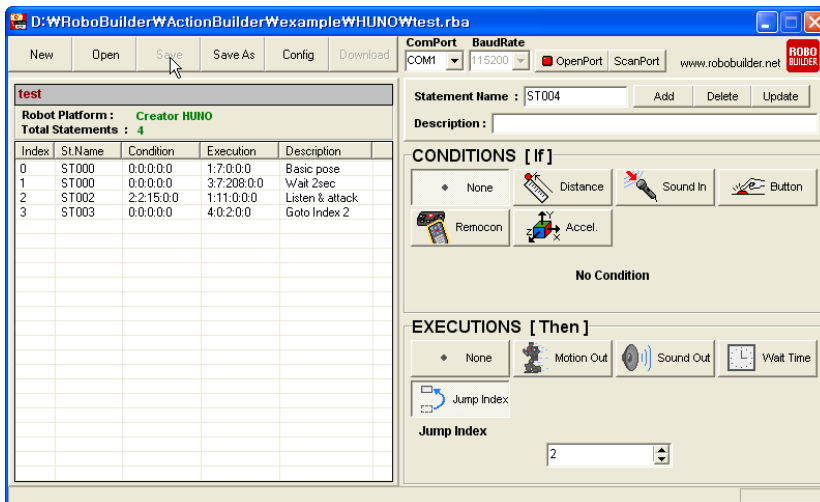
05 Select [Sound In, 15<Sound Level] for condition[if], and select [Motion Out, MOTION[11]:BTN_RA] for execution[then].]. If needed change the statement name and description and then click [Add] button. Then the statement is added to the Statement List section to the left. (example : if the robot detects a sound of more than level 15, it plays an right-arm attack motion.)



06 Select [None] for condition[if], and select [Jump Index, 2] for execution[then].]. If needed change the statement name and description and then click [Add] button. Then the statement is added to the Statement List section to the left. (example : jumps to statement 2 without any condition.)

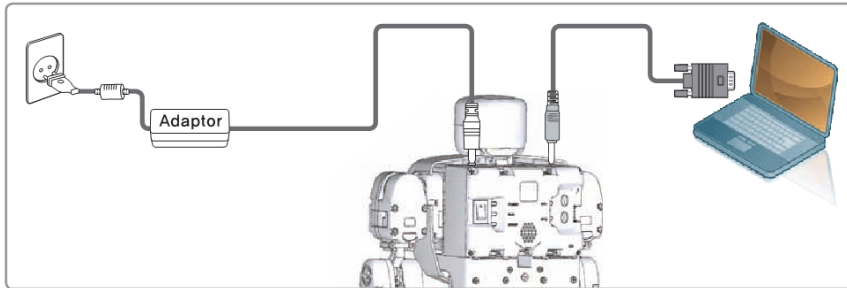


07 Click [Save] in the menu bar to save the action file. (example : test.rba)

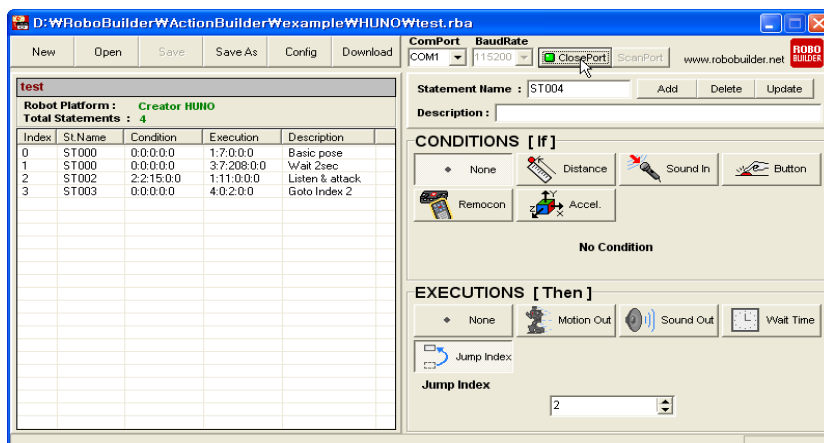


4. Transferring an Action File to the Control Box (example: test.rba)

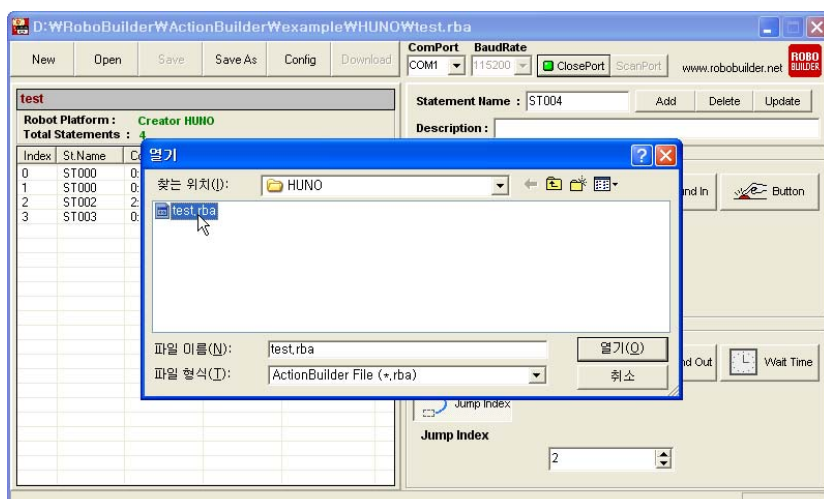
01 Connect the power supply to the control box, and use the PC cable to connect the robot to the PC. Turn on the power switch on the control box.



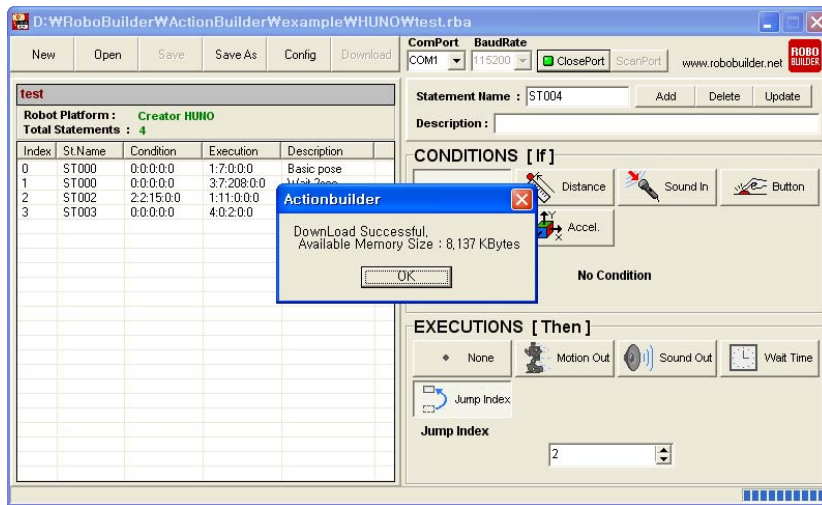
02 Open the ActionBuilder software. Click [ScanPort] and then it automatically scan and open the com port connected with the robot. (※ Caution : On a PC using a device such as Bluetooth Dongle that involves many virtual ports, the [ScanPort] button may not work properly. In this case, please choose the [ComPort] manually and then click [OpenPort].)



03 Click [Download] in the menu bar, and select the action file to transfer to the control box. Then Click [Open].



04 The selected action file is transferred to the control box, and the [Download Successful] window pops up. Then click [OK] to finish the transfer.



05 In order to play the transferred action file, first click [ClosePort] to disconnect the robot from comport. Use the remote controller to press and hold the button # and then press the numeric button (1~0) together. For example, the first action file is played when you press # button and 1 button together. If you want to stop the action file, turn off the power.

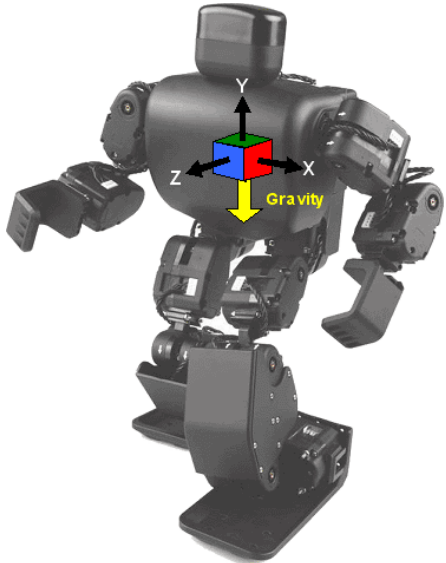
※ CAUTION

1. Once file transfer begins, all action files already existing in the control box are deleted and the new files overwrite from the beginning of the ROM memory. The first file transferred is assigned to the button 1 of the remote controller, the second file transferred is assigned to button 2, and the third file to button 3 and so on. Therefore, you have to plan and decide which action file to assign to which button before you actually start transferring the files.
2. When you transfer action files, the motion files are not affected.
3. If the size of a particular action file is too large, the control box may not be able to save up to 10 action files.
4. The control box firmware has to be upgraded up to version 2.0 in order to use the ActionBuilder features.

5. Use Tri-axial Acceleration Sensor (Option) (Example : test2.rba)

Below example is described that Robot automatically stands up if Robot fall down in front and rear side. Robot recognize the front/rear falls down itself, and A button function (remote control) is proceeded automatically for front falls down, and B button function (remote control) is proceeded automatically for lying down.

※ Acceleration Sensor Direction / Data

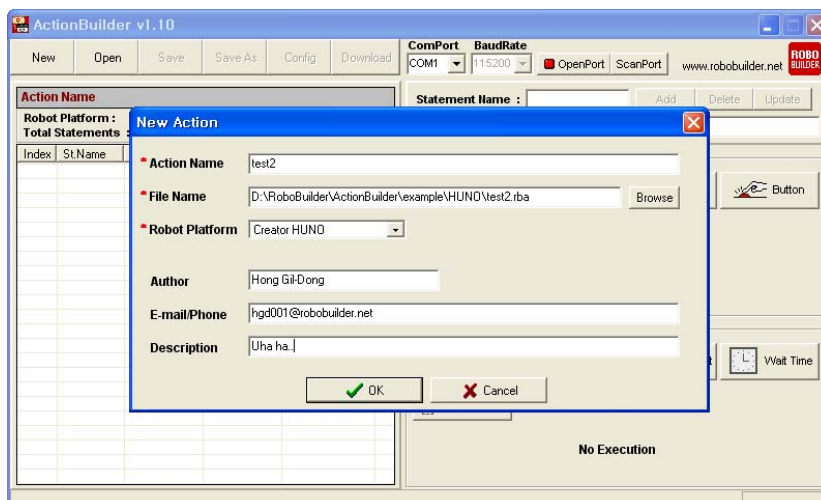
 <p>Figure 5-1</p>	<p>Measured X, Y, Z axis value is indicated by integral number from -7 to +7. Integral number 1 can be translated as "1/4g". Note) g : gravity acceleration</p> <p>For instance, Value would be X=0g, Y=0g, Z=-1g if Robot lies down, because all gravity acceleration direction is minus(-). Therefore, you can judge whether Robot is lies down or not, as long as you check acceleration data would be $-1 < X < 1$, $-1 < Y < 1$, $-5 < Z < -3$ (Please refer to Figure 5-1)</p>
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※ Cautions

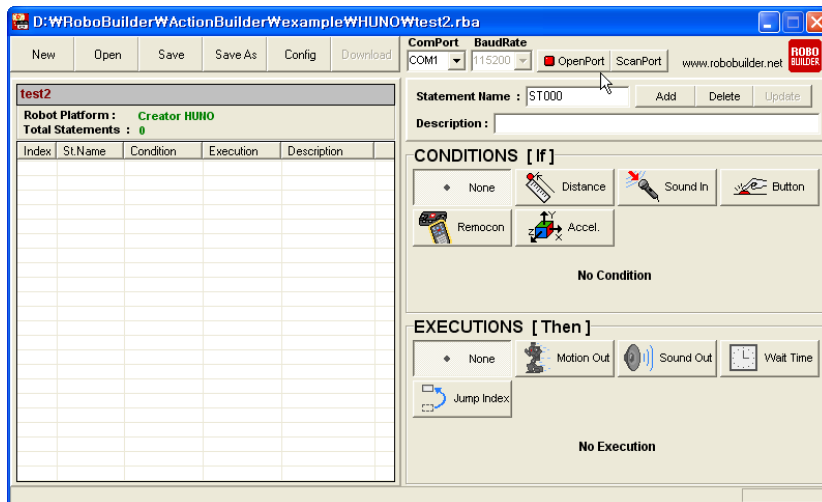
In order to Tri-axial acceleration sensor,

1. Equip the Tri-axial acceleration sensor board (RBX-ACL3A01).
2. Upgrade RBC (Control Box) firmware to Ver. 2.09

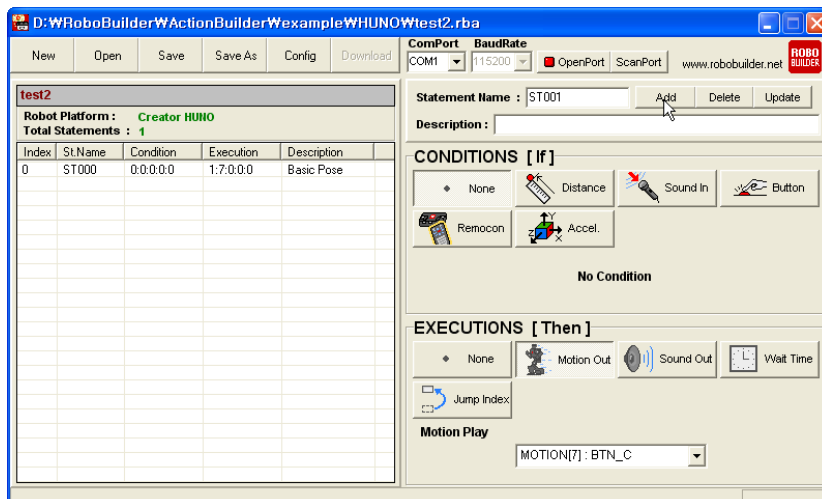
01 Select [New] in Menu Bar. In New Action window, select Action Name, File Name, Path, Platform. (Example : Action Name - test2, File Name - test2.rba, Platform - Creator HUNO)



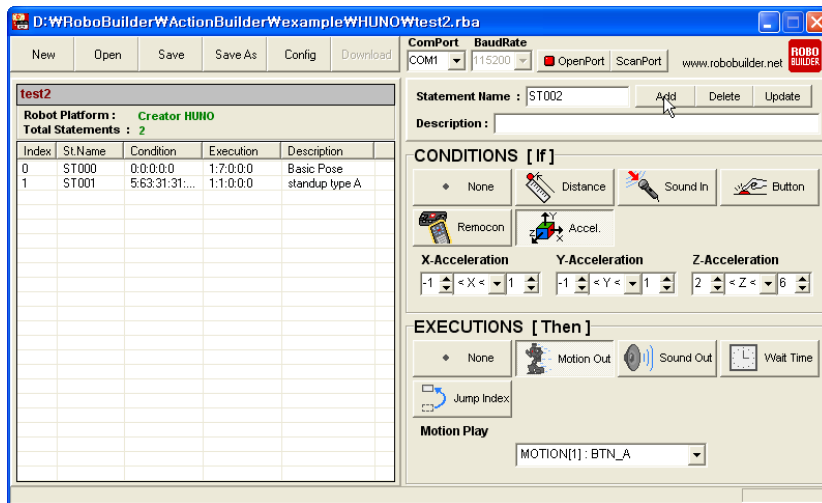
02 It generates Creator HUNO Type new Action file, and Add Button is activated, which can add statement.



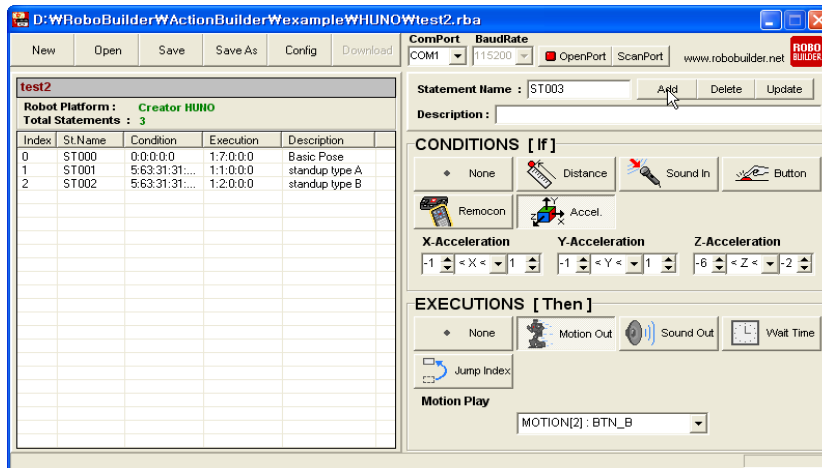
03 Select condition [If] statement None, then select Execution – Motion Out – MOTION[7]:BTN_C. Change statement name and description as you want and, click Add Button for adding action statement (Example: Run basic posture motion without condition)



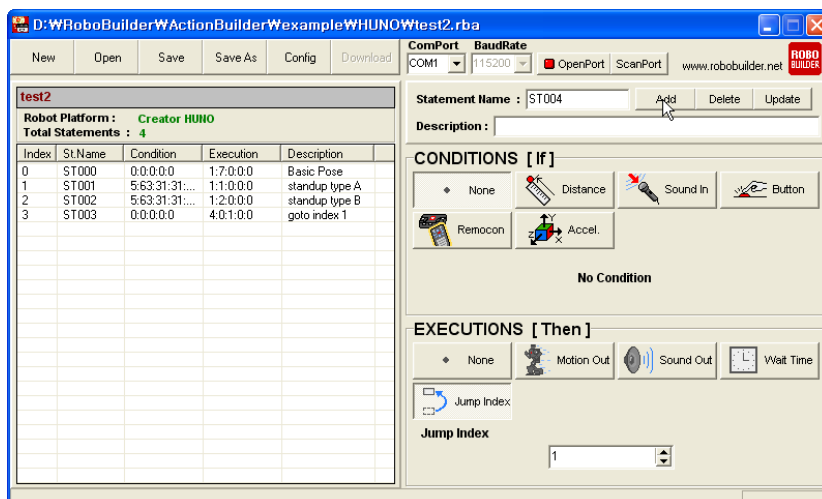
04 Select condition [If] as Accel., $-1 < X < 1$, $-1 < Y < 1$, $2 < Z < 6$, executions : Motion Out, MOTION[1]:BTN_A, change the statement name and description as you want, then, select [Add] for adding in statement list (Example : If Robot falls down, proceed “stand up”)



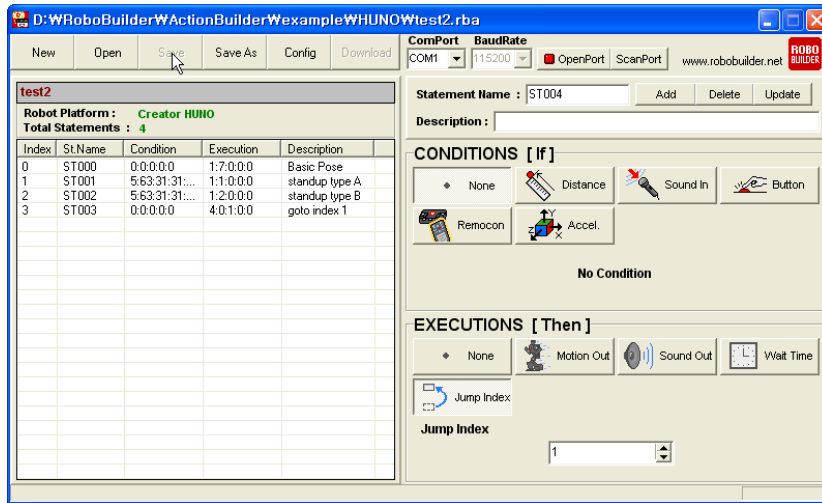
05 Select condition [If] as Accel., $-1 < X < 1$, $-1 < Y < 1$, $-6 < Z < -2$, executions : Motion Out, MOTION[2]:BTN_B, change the statement name and description as you want, then, select [Add] for adding in statement list (Example : If Robot lies down, proceed “stand up”)



06 Select condition [If] None, and Jump Index 1 for execution, change the statement name and description as you want, then select [Add] for adding in statement list (Example : Moved statement Index 1)



07 Select [Save] in Menubar, and save it (Example : test2.rba)



08 Refer to chapter 4 for Download / Execution.