# Action Builder Manual

July 31<sup>st</sup>, 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

Actio	nBuilder	v1.10				
New	Open	Save	Save As	Config	Download	ComPort BaudRate COM1 115200 C COM1 www.robobuilder.net
Action Na	ame					Statement Name : Add Delete Update
Robot Pl Total Sta	atform : itements :	None 0				vescription :
Index 5	tName	Condition	Execution	Description		CONDITIONS [IF]
						None Distance Sound In 👱 Buttor
						No Condition
						EXECUTIONS [Then]
						None Motion Out 01) Sound Out Wait Time
						7 Jump Index
						No Execution

#### 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  $\mbox{Out}$  : 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)

🔡 Action	Builder													
New	Open	Save	Save As	Config	Download	ComPort COM1 -	BaudRate	OpenPort S	ScanPort	www.robobuilder.net				
Action Na	Action Name Statement Name : Add Delete Update													
Robot Pla Total Stat	Robot Platform : Total Statements : New Action													
Index St	Name (	* Action N	iame te	est										
-		* File Nam	e D	:\RoboBuilde	r\ActionBuilde	r\example\HL	NO\test.rba		Brows					
		* Robot Pl	atform 🔽	reator HUNO		-								
		Author	П	ong Gil-Dong	_									
	_	E-mail/P	hone h	gd001@robol	ouilder.net									
		Descrip	tion H	a ha ha						Vvait Time				
					🗸 ок		🗙 Cancel			, <u> </u>				
								No Exe	cution					

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

🔛 D: WR	loboBui	lder₩Acti	onBuilder	Nexamp	le₩HUNO	)Wtest.rba 📃 🗖 🔀				
New	Open	Save	Save As	Config	Download	ComPort COM1 V	BaudRate			
<mark>test</mark> Robot PI Total Sta	atform : tements	Creator HU : 0	NO			Statemen Descriptie	t Name : ST000 Add Delete Update			
Index S	t.Name	Condition	Execution	Descript	ion	CONDI Ref EXECL Jun	TIONS [If] None Sound In Second In HIGHT Accel. No Condition TIONS [Then] None Motion Out III Sound Out Weat Time np Index No Execution			

**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.)

New	Open	Save	Save As	Config Down	ComPort BaudRate COM1 V 115200 ComPort ScanPort www.robobuilder.net
test Robot Total S	Platform : Statements	Creator Hl	JNO		Statement Name : ST000 Add Delete Update Description : Basic pose
Index 0	St.Name ST000	Condition 0:0:0:0:0	Execution 1:7:0:0:0	Description Basic pose	CONDITIONS [IF]
					EXECUTIONS [Then]     None     Medion Out
					Motion Play MOTION[7] : BTN_C

**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.)

🔡 D: 🕅	¥RoboBu	ilder\Acti	onBuilder¥	/example₩HUN	O <del>W</del> test.rba
New	Open	Save	Save As	Config Download	ComPort BaudRate
test Robot	Platform :	Creator HI	NO		Statement Name : ST002 Add Delete Update
Total	Statements	: 2			Description :
Index	StName	Condition	Execution	Description	CONDITIONS [ If ]
0	ST000 ST000	0:0:0:0:0 0:0:0:0:0	1:7:0:0:0 3:7:208:0:0	Basic pose Wait 2sec	None Distance Sound In
					Remocon Z
					No Condition
					EXECUTIONS [Then]
					None Motion Out Out Wait Time
					Jump Index
					Wait Time [msec]
					2000

**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.)

<mark>器 D:₩R</mark> New	oboBui Open	IderWActi Save	onBuilderV Save As	Vexample Config	VHUNOWtest.rba
<mark>test</mark> Robot Pla Total Stat	atform : tements	Creator HI : 3	INO		Statement Name : ST003 Add Delete Update Description :
Index         St           0         S1           1         S1           2         S1	EName 000 T000 T000 T002	Condition 0.0.0.0.0 0.00.0.0 2.2.15.0.0	Execution 1:7:00.0 3:7:208:00 1:11:00:0	Descriptio Basic pos Wait 2sec Listen & al	CONDITIONS [f]         • None       Distance         • None       Distance         • Remocon       Distance         • Sound Input       Sound Input         15       < Sound Level

**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.)

🔡 D: V	/RoboBu	ilder₩Acti	onBuilder¥	/example₩HUN0	)Wtest.rba
New	Open	Save	Save As	Config Download	ComPort BaudRate
test					Statement Name : ST004 Arid Delete Update
Robot Total S	Platform : Statements	Creator HL : 4	INO		Description :
Index	St.Name	Condition	Execution	Description	
0 1 2 3	ST000 ST000 ST002 ST003	0:0:0:0:0 0:0:0:0:0 2:2:15:0:0 0:0:0:0:0	1:7:0:00 3:7:208:0:0 1:11:0:0:0 4:0:2:0:0	Basic pose Wait 2sec Listen & attack Goto Index 2	None     Distance     Sound In     Eutron     Remocon     Accel.
					No Condition
					EXECUTIONS [Then]
					None     Motion Out     Motion Out     Wat Time     Vvat Time
					Jump Index

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

🔡 D: Y	/RoboBui	ilder₩Acti	onBuilder∀	¥example₩HUN(	DWtest.rba 🔲 🗖 🗙
New	Open	Save	Save As	Config Download	ComPort BaudRate COM1 v 115200 v OpenPort ScanPort www.robobuilder.net
test					Statement Name : ST004 Add Delete Update
Robot Total S	Platform : Statements	Creator HU : 4	INO		Description :
Index	StName	Condition	Execution	Description	
0 1 2 3	ST000 ST000 ST002 ST003	0.0.0.0 0.0.0.0 2.2.15.0.0 0.0.0.0	1:7:0:0 3:7:208:0:0 1:11:0:0:0 4:0:2:0:0	Basic pose Wait 2sec Listen & attack Goto Index 2	None Distance Sound In Determined In Sound In Determined In Sound In Determined Participation Participation Provided Participation P
					None     Motion Out     Out     Sound Out     Weit Time
					Jump Index

# 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].)

🔡 D:₩	/RoboBui	lder₩Acti	onBuilder₩	fexample₩HUNC	Wtest.rba
New	Open	Save	Save As	Config Download	ComPort BaudRate
test					Statement Name : ST004 Add Delete Update
Robot Total S	Platform : Statements	Creator HU : 4	NO		Description :
Index	StName	Condition	Execution	Description	
0 1 2	ST000 ST000 ST002	0:0:0:0:0 0:0:0:0:0 2:2:15:0:0	1:7:0:0:0 3:7:208:0:0 1:11:0:0:0	Basic pose Wait 2sec Listen & attack	None Distance Sound In
3	ST003	0:0:0:0:0	4:0:2:0:0	Goto Index 2	Remocon Z
					No Condition
					EXECUTIONS [Then]
					None Motion Out Out Sound Out Wait Time
					Jump Index
					Jump Index
					<sup>∠</sup> ▼

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

New	Open	Save	Save As	Config	Download	ComPort	BaudRate	CloseF	ort ScanPor	t www.robot	ouilder.net
<mark>test</mark> Robot Pla Total Stat	atform : tements :	Creator HU	NO			Stateme Descript	nt Name:  ion:	ST004		Add Delet	e Update
Index St 0 ST 1 ST 2 ST 3 ST	Name C 000 0: 000 0: 002 2: 003 0:	( <mark>열기</mark> 찾는 위 Initest.	ti(): 「 toa d	i Huno			•	⊨ Ē ఊ	<b>?</b> ( <b>Ⅲ</b> •	nd In	E Button
		파일 이( 파일 형(	■( <u>N</u> ): Ч( <u>T</u> ):	test, rba ActionBui	lder File (*,rt	a) Cov <sup>or</sup> Jump Ir	imp Index Idex	2	열기( <u>0</u> ) 취소		U Wait Time

**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



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

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)

## ※ 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)

ActionBuil	der v1.10					
New Op	en Save Save	As Config Do	ownload COM1	rt BaudRate 115200 - 0	DpenPort ScanPort	www.robobuilder.net
Action Name			Stater	nent Name :	Add	Delete Update
Robot Platform	New Action					
Index St.Name	Action Name	test2				
	* File Name	D:\RoboBuilder\Actio	onBuilder\example\l	HUNO\test2.rba	Browse	Je Button
	* Robot Platform	Creator HUNO	•			
	Author	Hong Gil-Dong				
	E-mail/Phone	hgd001@robobuilder	r.net			
	Description	Uha ha.				
			ОК	🗙 Cancel		t Vvait lime
					No Execution	_

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

New	Open	Save	Save As	Config	Download	ComPort BaudRate			
est2						Statement Name : ST000 Add Delete Update			
Robot Platform: Creator HUNO Total Statements: 0						Description :			
Index St.Name Condition Execution Description						CONDITIONS [IF]			
						None Distance Sound In			
						Remocon Z Accel.			
						No Condition			
						EXECUTIONS [Then]			
						None Motion Out Out Wait Time			
						Jump Index			
						No Execution			

**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)

🔡 D: V	/RoboBu	ilder₩Actio	onBuilder	#example₩HUN(	DWtest2.rba
New	Open	Save	Save As	Config Download	ComPort BaudRate COM1 115200 ComPort ScanPort www.robobuilder.net
test2					Statement Name : ST001 Add Delete Update
Robot Total S	Platform : Statements	Creator HU : 1	NO		Description :
Index	StName	Condition	Execution	Description	
0	STODO	0:0:0:0	1:7:0:0:0	Basic Pose	None     Distance     Sound In     Distance     Distance
					No Condition
					EXECUTIONS [Then]
					None Motion Out Out Wait Time
					Jump Index
					Motion Play
					MOTION[7]: BTN_C
		•			

**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")

New Open	Save	Save As	Config Downloa	ComPort BaudRate
est2 Robot Platform : Fotal Statements	Creator HU : 2	NO		Statement Name : ST002 Add Delete Update Description :
ndex StName ST000 ST001	Condition 0:0:0:0:0 5:63:31:31:	Execution 1:7:0:0:0 1:1:0:0:0	Description Basic Pose standup type A	CONDITIONS [ If ] None Distance Sound In Sound In Remocon Accel. X-Acceleration Y-Acceleration 1 S < X < 1 S - 1 S < Y < 1 S 2 S < Z < 6 S EXECUTIONS [ Then ] None Motion Out Out Sound Out Wait Time Jump Index Metion Diar

**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")

🔡 D:₩	/RoboBu	ilder₩Actio	onBuilder1	∀examp	le₩HUNO	0₩test2.rba
New	Open	Save	Save As	Config	Download	ComPort BaudRate
test2						Statement Name : ST003 Apd Delete Update
Robot Total S	Platform : Statements	Creator HU : 3	NO			Description :
Index	StName	Condition	Execution	Descripti	ion	
	51000 57001 57002	66331:31 5:63:31:31	1:2:0:00	Basis Po standup standup	ise Wpe A type B	None      Distance      Sound In      Emocon     Penocon     Penocon
					]	

**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)

<mark>}</mark> D:₩	/RoboBu	ilder\Actio	onBuilder	∀examp	le₩HUNO	₩test2.rb	a			
New	Oper	n Save	Save As	Config	Download	ComPort	115200	Te OpenPort	ScanPort www.	robobuilder.net
test2						Statemer	nt Name	: ST004	Add	Delete Update
Robot Total S	Platform : Statements	Creator HU	NO			Descripti	on :		hs	
Index	St.Name	Condition	Execution	Descripti	on	CONDI	TIONS	S [ IF]		
0	ST000	0:0:0:0:0	1:7:0:0:0	Basic Po	se	CONDI			1 80	1
1	ST001	5:63:31:31:	1:1:0:0:0	standup	type A	•	None	Distance	Sound In	e Button
2	ST002	5:63:31:31:	1:2:0:0:0	standup	type B				<u> </u>	
3	ST003	0:0:0:0	4:0:1:0:0	goto inde	ex 1	Re Re	emocon	z		
								No Co	ondition	
						EXECU	JTION	S [Then]		
						•	None	Motion Out	Sound Out	t 🔛 Wait Tim
						Jur 🔁	np Index			
						Jump In	dex			
								1	•	
	·	1	1							

- 😸 D:\RoboBuilder\ActionBuilder\example\HUNO\test2.rba New Open Save As Config Download ComPort BaudRate test2 Statement Name : ST004 Add Delete Update Robot Platform : Creator HUNO Total Statements : 4 Description : 
   Index
   St.Name
   Condition
   Execution
   Description

   0
   ST000
   0.0.0.0
   1.7.0.0
   Basic Pose

   1
   ST001
   563.31.31....
   1.1.0.0.0
   Basic Pose

   2
   ST002
   563.31.31....
   1.2.0.0.0
   standup type A

   3
   ST003
   0.0.0.0
   4.01.0.0
   goto index 1
   CONDITIONS [If] 🍇 Sound In 🛛 👱 Button None Distance Z Accel. -Remocon No Condition EXECUTIONS [Then] None Motion Out Out Wait Time Jump Index Jump Index 1 •
- 07 Select [Save] in Menubar, and save it (Example : test2.rba)

08 Refer to chapter 4 for Download / Execution.