

DR SIM

for HOVIS Lite/Eco+/Genie

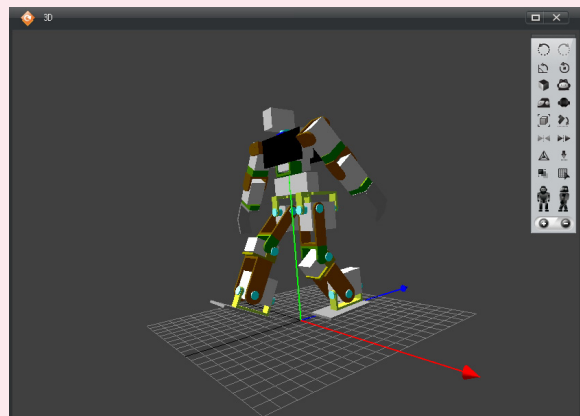
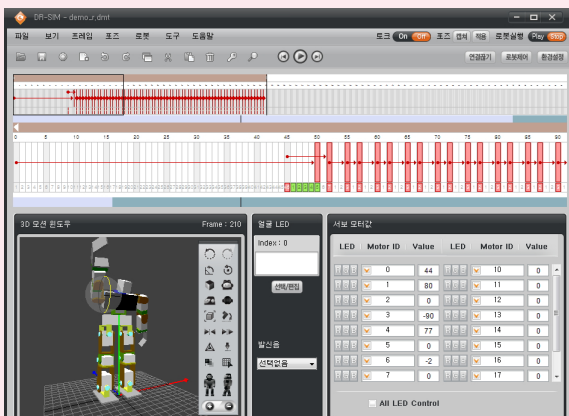
- DR-SIM Installation
- Hello DR-SIM
- DR-SIM User Interface
- Help
- DR-SIM Download
- Creating Motion



DR-SIM for HOVIS Lite

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01

Installation

DR-SIM Introduction

DR-SIM, also called 'motion editor' is an easy to use robot motion editing software tool. In addition to motion creation, editing, and capturing actual robot motion, DR-SIM supports powerful simulation function that allows the user to simulate the motion prior to applying it to the robot. DR-SIM also incorporates timeline feature similar to the ones found in video editing software.

Timeline allows the user to create motion based on time and to add multimedia effect to the motion by adding LED lighting effect and sound in the timeline.

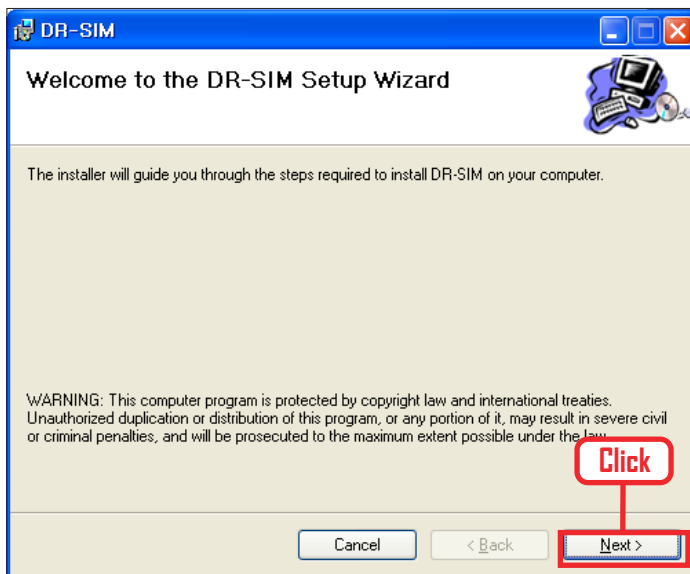
- System requirement
- Minimum Intel Pentium 800 Mhz
- Windows XP, Windows Vista, Windows 7
- Minimum 256 MB RAM
- Hard Disk Space 300 MB required
- USB Port
- Macintosh(under development)

Follow Instructions / From installation to running the program



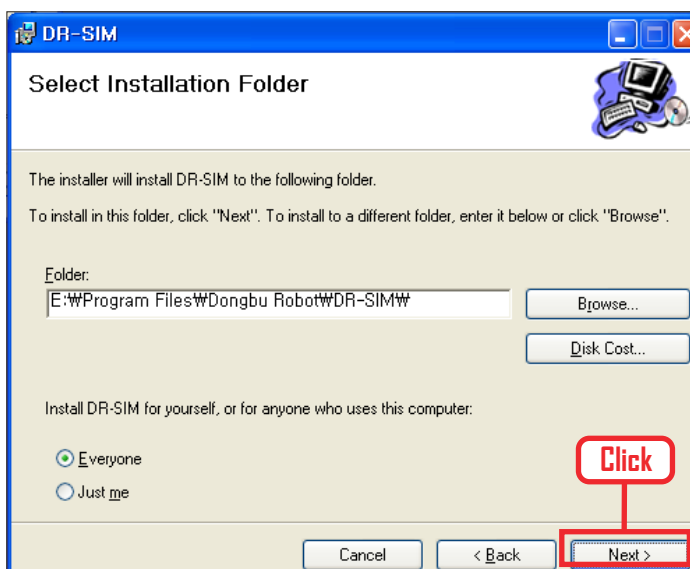
01 Installation File

Click on installation file.



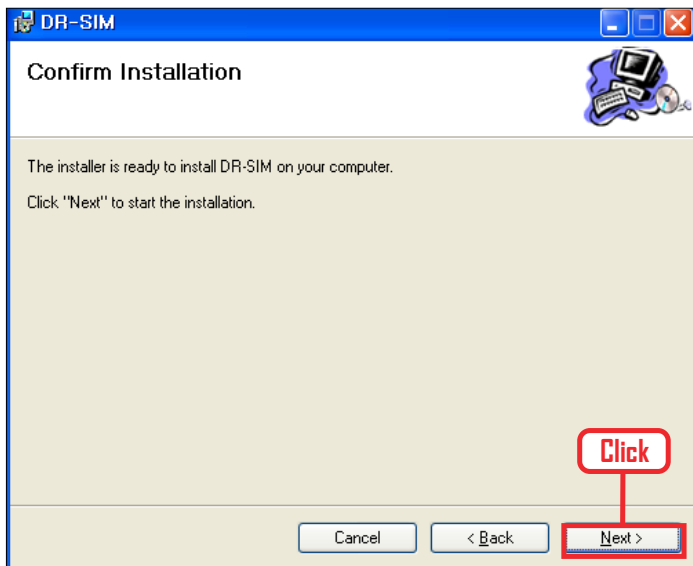
02 Start installation wizard

Click "Next" button.



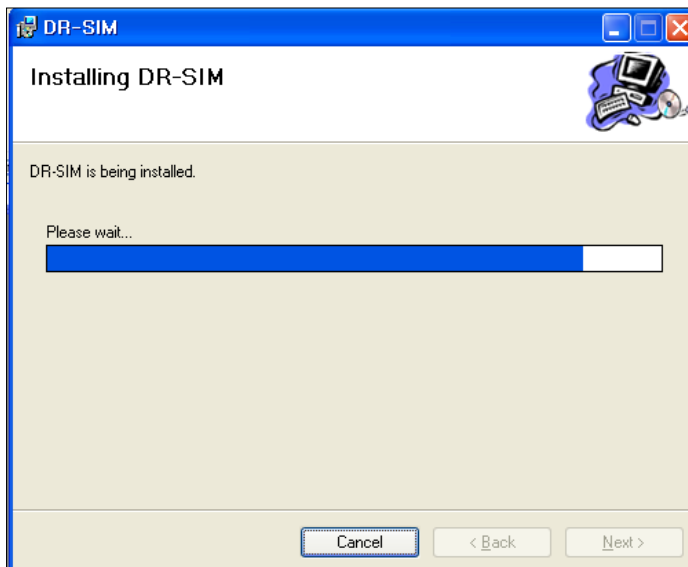
03 Select installation folder

Click "Next" button.



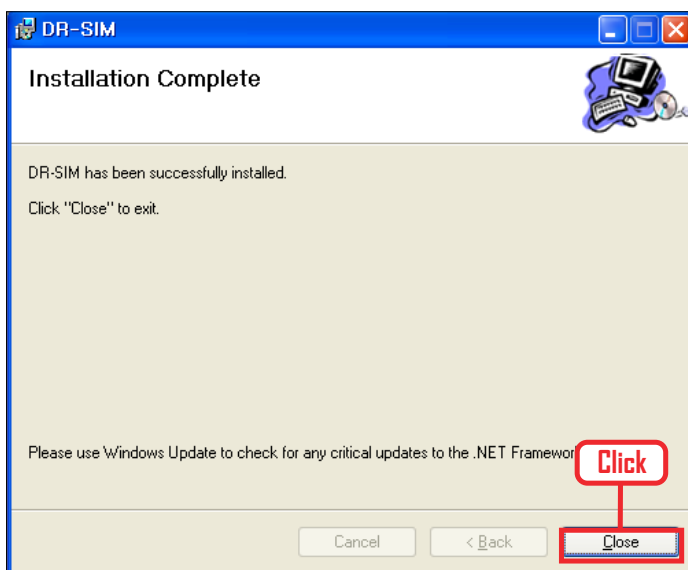
04 Confirm installation

Click "Next" button.



05 Start installation

Starting installation,
Wait until the installation bar ends.



06 Confirm installation

Click "Close" button
Software installation complete.

07 Check executable file

Check for the executable file, desktop shortcut icon and from Windows Start > All Programs > Dongbu Robot > DR-SIM. Click on the executable file to run the program.

If the program did not install properly, install the Microsoft, Net Framework 3.5 and try again.

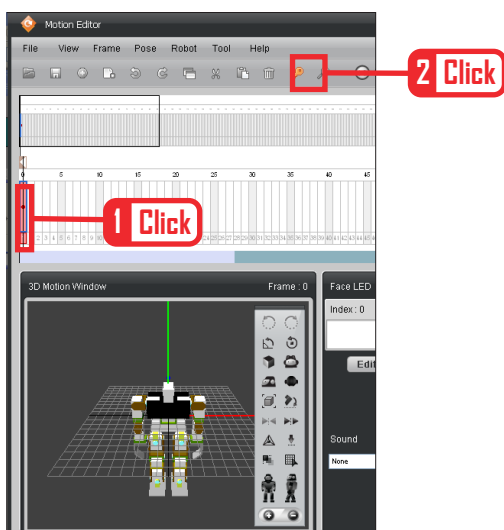
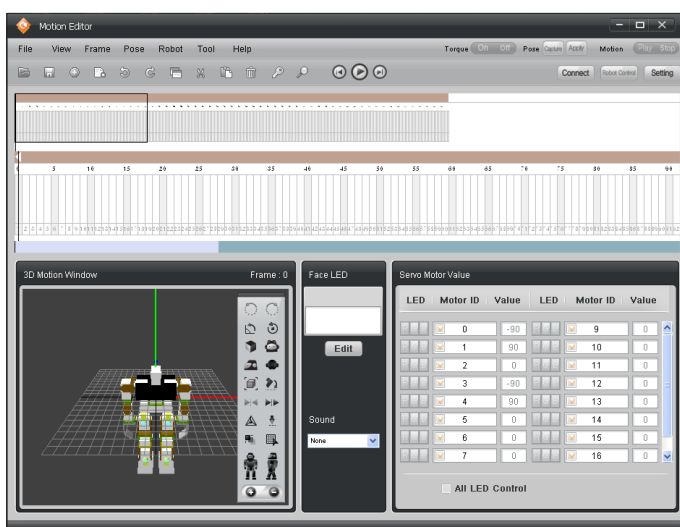


Hello DR-SIM

02

First example of creating motion. Use DR-SIM to create simple motion and run the motion simulation.

Connect to the robot and download the created motion file and then check the motion being applied by the robot.



00 Run program

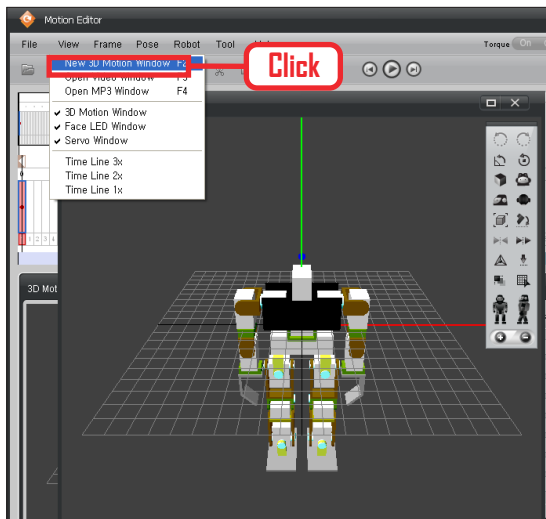
Click on DR-SIM icon and run the program.

01 Full Screen

DR-SIM Full Screen.
Timeline is in the middle and motion editor at bottom.
Motion is usually created or edited using the timeline and 3D motion window.

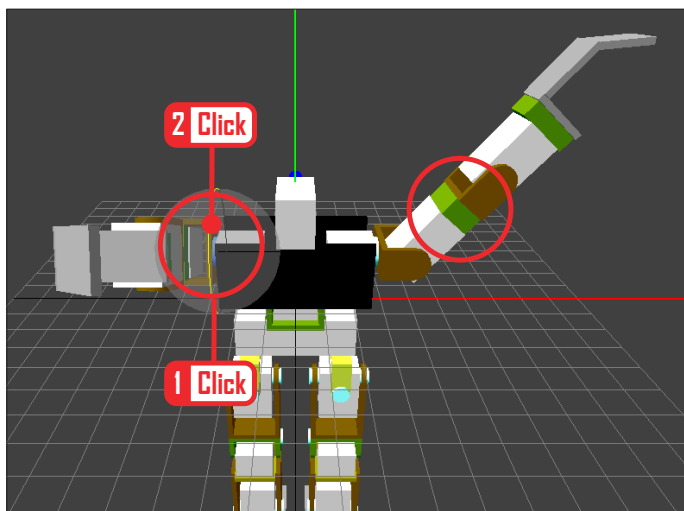
02 Basic Posture

Insert the basic posture in the robot motion starting point or in the first frame.
Place the posture in the 3D motion window as basic posture. Click first frame. Insert the key frame at the top. Click on (Key icon).
Basic posture has been inserted in the key frame.
If the posture in the 3D motion window is not a basic posture, select it as basic posture from the tool bar on the right. (Shortcut Alt + I)



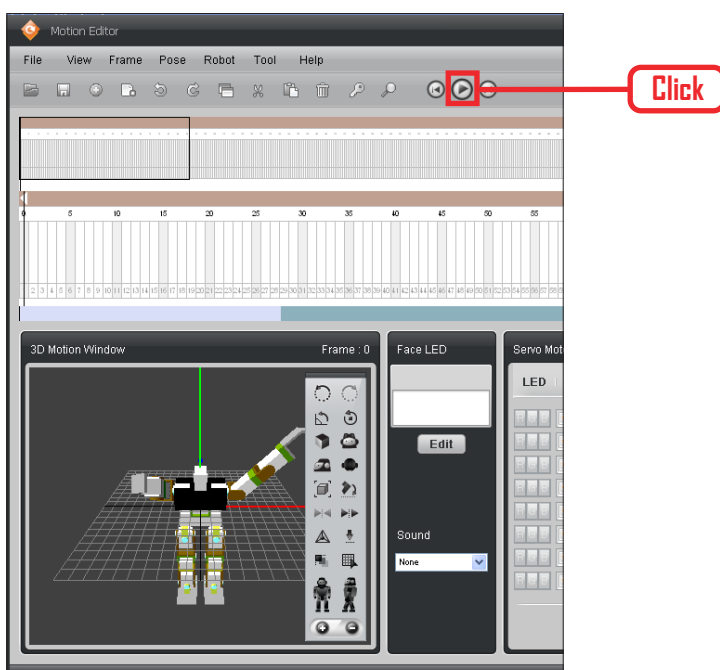
03 3D Window

To enlarge the 3D window, Menu > View > Click on 'New 3D Window'. Click and drag to enlarge the new 3D window.



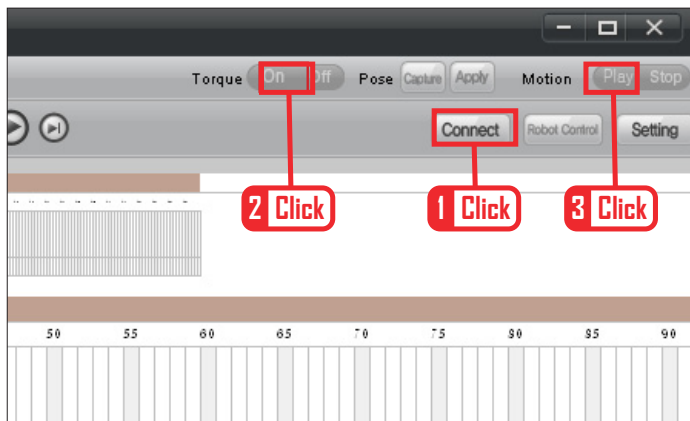
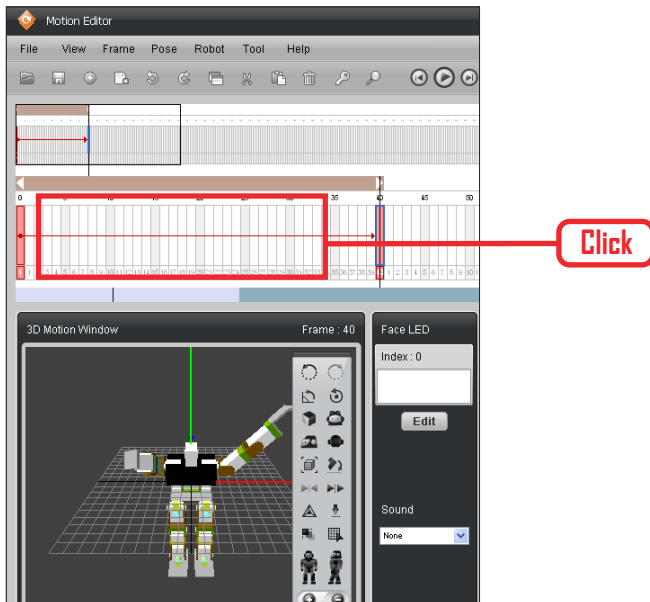
04 Motion Edit

Click on the robot joint and thin yellow joint movement line will appear. Click and hold left mouse button on the line and drag. Lift the left hand up left and the right hand up front.



05 Insert Edited Motion

Insert the motion edited in 3D window into desired timeframe. After inserting the motion, click on the "⏪" at the top to view the simulation in the 3D window.



06 Inserted Frame Midpoint Check

To view the motion between two frames, click on the timeframe section between the basic motion and the edited motion.

07 Connecting to Robot

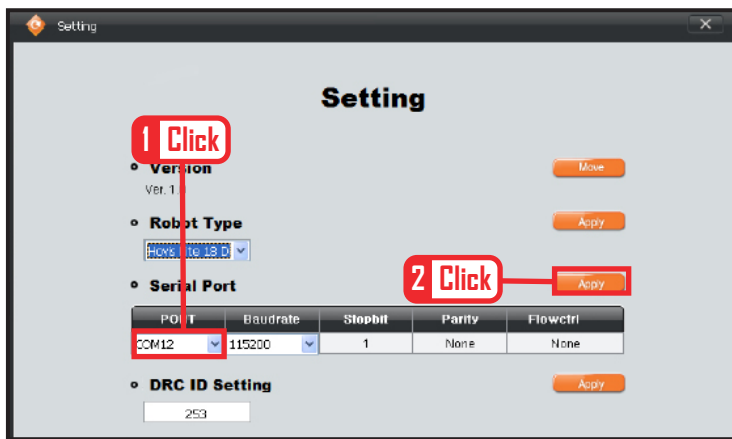
Use the USB to Serial converter cable to connect the robot to the USB port of PC or notebook computer. Click “Connect” icon to make the connection. Check the Com port if the connection does not occur. Click “Torque On” button and try moving the robot arm or the leg by hand. Torque is on if the robot does not move. Click on “Robot Play” button and robot will move following the created motion, This ends the first lesson on creating robot motion and play.

08 Reference : COM Port Setting

If the connection to the robot does not occur, it is most likely due to wrong Com port settings.

Right click on “My Computer”, click on “Properties” to open “System Properties” window, click on “Hardware” tab to open the device manager.

Click Com port to view the list of configurable Com ports. Select COM2 connected to the USB and save. Com port connected to the robot should now be open.

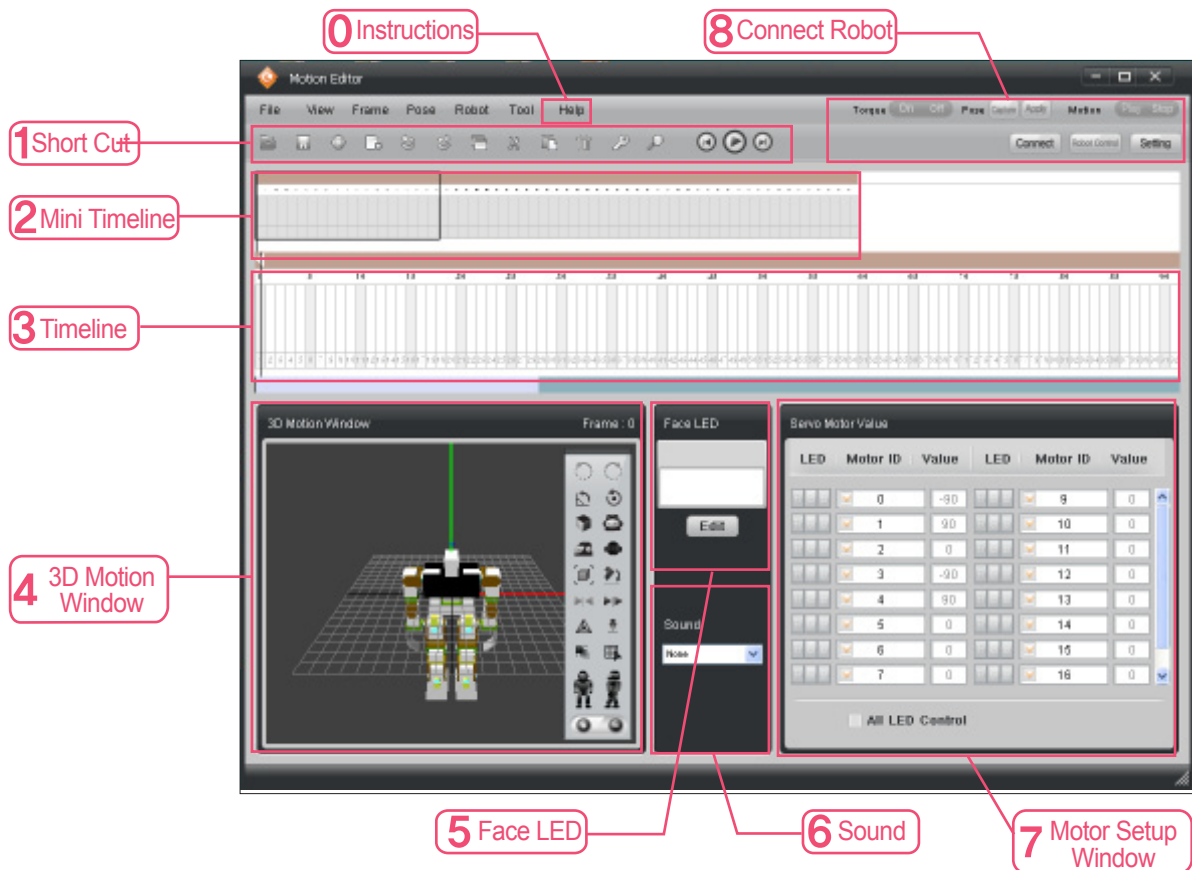


09 Reference : COM Port Setting

Select COM2 and save.
Robot and PC software should now connect.

User Interface

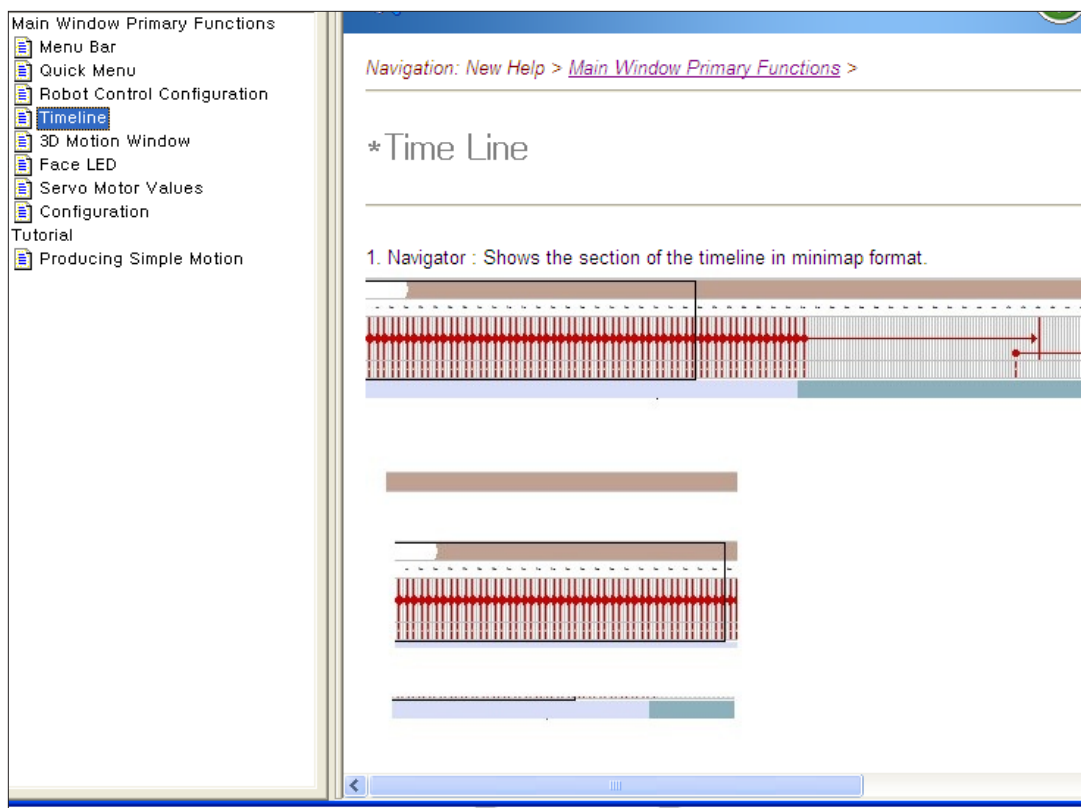
03



- 0 Instructions :** DR-SIM detailed user instructions. Press F1 to view Help .
- 1 Short Cut :** Collection of frequently used menus. Simulation Play, Insert Keyframe, and etc.
- 2 Mini Timeline :** Shows the outline of whole timeframe.
- 3 Timeline :** Created or edited motion can be placed by time.
- 4 3D Motion Window :** Edit robot motion or view the motion simulation.
- 5 Face LED :** Enables user to edit Face LED. Insert into timeframe after editing.
- 6 Sound :** Select saved sound. Insert into timeframe after selection.
- 7 Motor Setup Window :** Configure values and LED settings by ID for all motors used in the robot.
- 8 Connect Robot :** Shortcut for connecting to the robot. Used to download motion file to the robot or to capture actual robot motion.

04 Help

Click 'Help' on the menu bar to popup the help window. We recommend reading the Help files prior to using the DR-SIMprogram. (Click 'Help') Click'Index') Click 'Timeline' on left menu → Window shown below will open up



- **Com Setting** : Instruction on setting up the COM port.
- **Main Window Major Functions** : Instructions on how to use program functions.

Menu Bar
Quick Menu
Robot Control Setting
Timeline
3D Motion Window
Face LED
Servo Motor Values
Environment Setting

- **Tutorial**

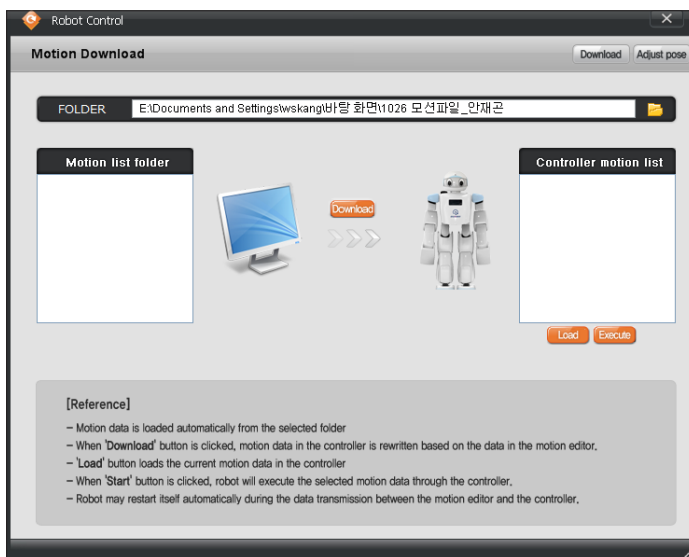
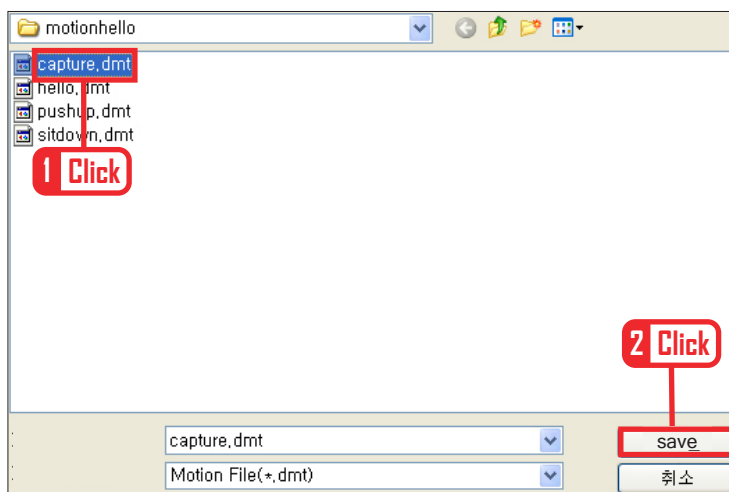
Creating Simple Motion : Explanation about sample motion creation.

Check our website for more motion samples.

05

Download

Edited motions are saved as a file. Saved motions files can be batch downloaded to the DRC controller (Existing files in the DRC will be deleted). Downloaded files are given a number according to the order of download which then can be loaded and used by DR-Visual Logic(Task Editor).



Save Robot Motion

To save the robot motion, File > Save As > insert file name and save.

01 Robot Control

With the robot and DR-SIM connected, click on “Robot Control” icon.

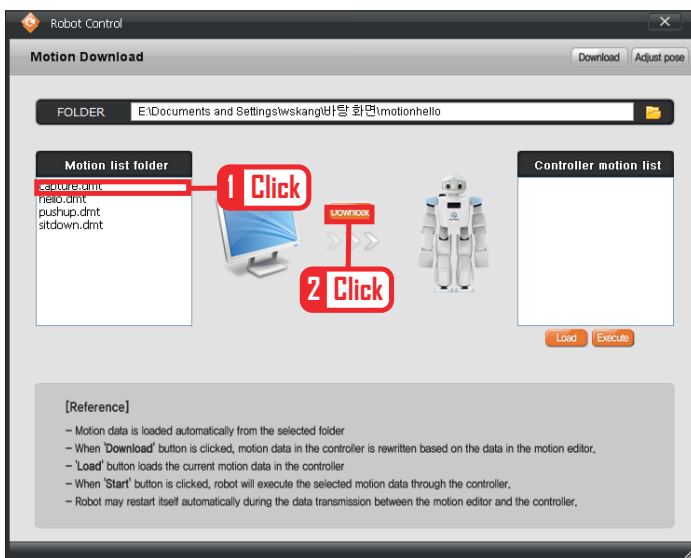
02 Robot Control Window

Motion information download popup opens up. Top section shows the directory of saved motion files. Left window shows motion list saved in the PC. Files downloaded to the DRC will be listed by number on the right window.



03 Open Saved File Folder

Click on the folder icon at the right side of the folder directory to open up the folder search popup window. Click to select the folder where the motion files are saved.



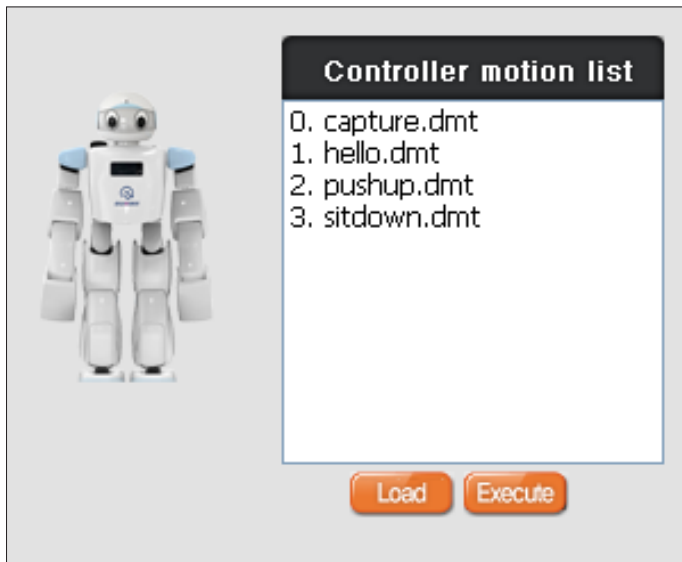
04 Motion List

Left window shows the list of motions in the selected folder. Place the cursor on the list and click the download icon.



05 Download

Robot motions will be downloaded one at a time.



06 Controller Motion List

Once all the motions are downloaded, motions will be listed from number 0 in the controller motion list window on the right side.

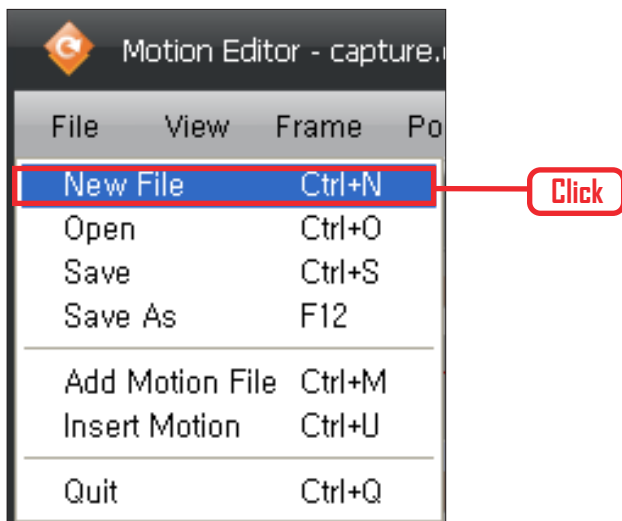
Numbers can be called up by index when programming with DR-Visual Logic (Task Editor). This ends the lesson in robot motion download.

06

Creating Motion

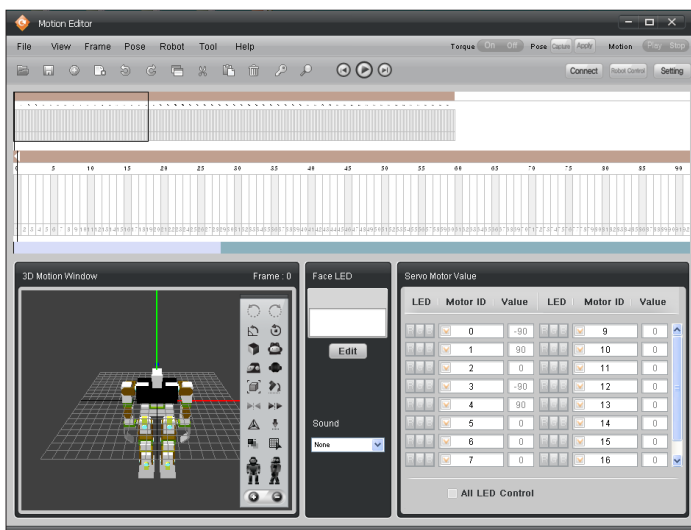
Creating Motion – Step by Step

There are two different methods of creating motion. One method is to use the 3D motion window, motion can be created by clicking on robot joints and using the motion lines. Another way is to capture the motion from the robot. Following lesson will show how to create motion by using both methods.



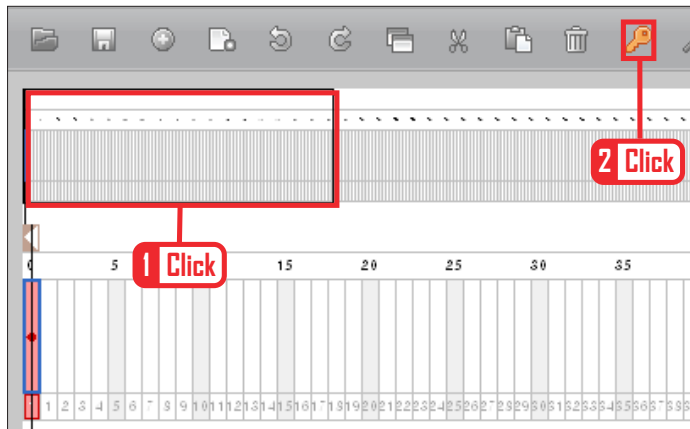
01 New File

File > Click on 'New File'.



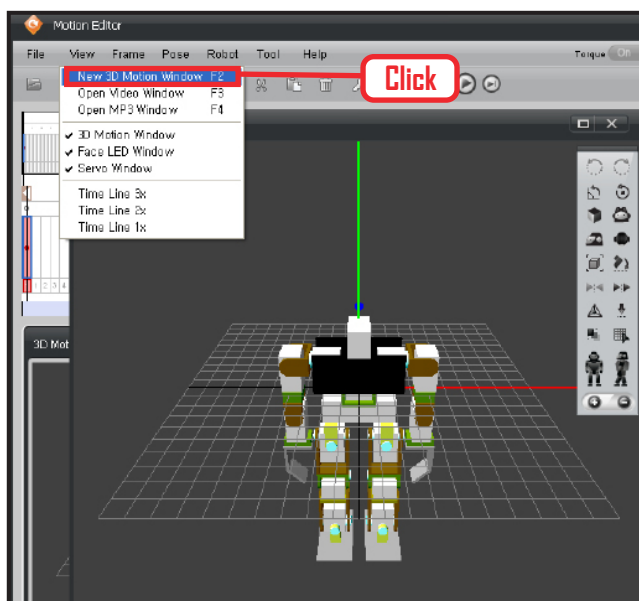
02 New Motion Window

Previous motion window will disappear and new robot 3D motion window will open.



03 First Frame

Insert the basic posture into the first frame. Click on the first frame and then click on the key frame insert.

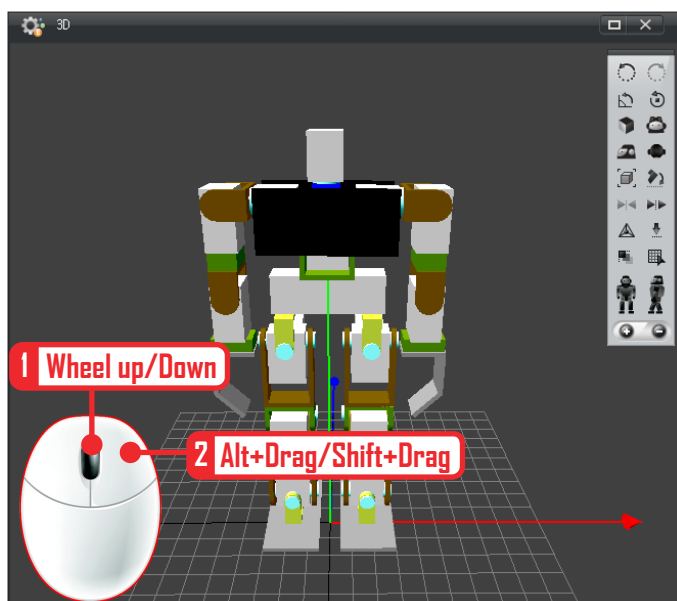


04 New Motion Window

Motion window can be opened up separately and enlarged to conveniently edit motion on screen.

Total of three 3D motion windows can be opened at same time and placed side by side or top and bottom to be used for editing.

View > Click on 'New 3D Motion Window'. Use the mouse to drag and enlarge the newly opened 3D popup window.



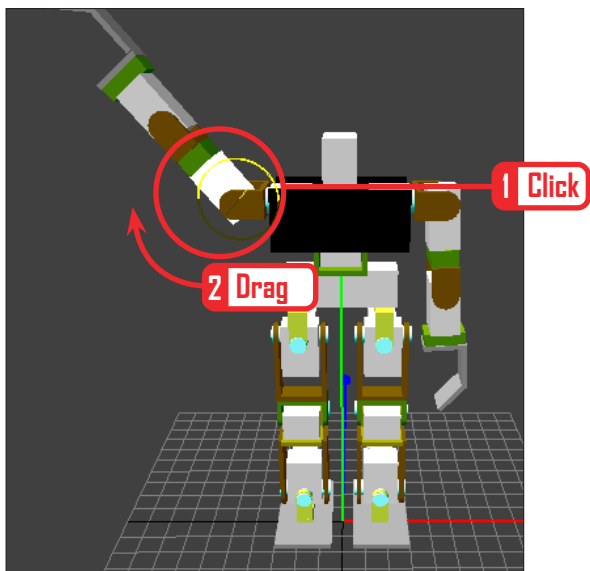
05 Enlarging Robot

Robot in the edit window can be enlarged.

Click on an empty space and use the mouse wheel to zoom in or out.

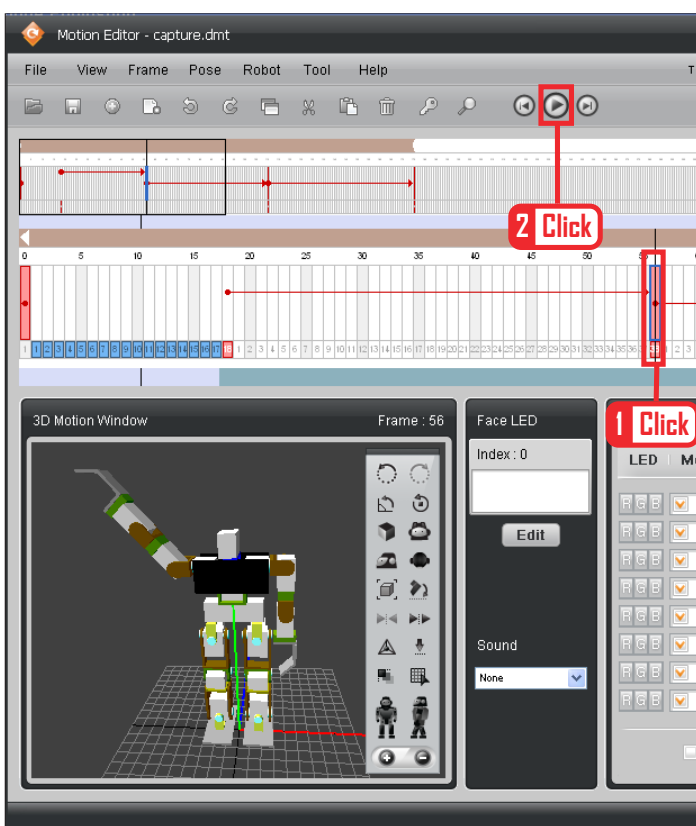
To change the angle, press and hold the right mouse button and drag.

To change the robot position, press shift + press and hold right mouse button and drag.



06 Edit Arm Motion

Lifting the arm, Click on the shoulder area and yellow motion line will appear. Click and drag along the motion line to lift the arm.



07 Insert Key Frame

Insert the lifted arm motion into the frame. Click on the desired frame and then click on 'key' icon to insert the motion.



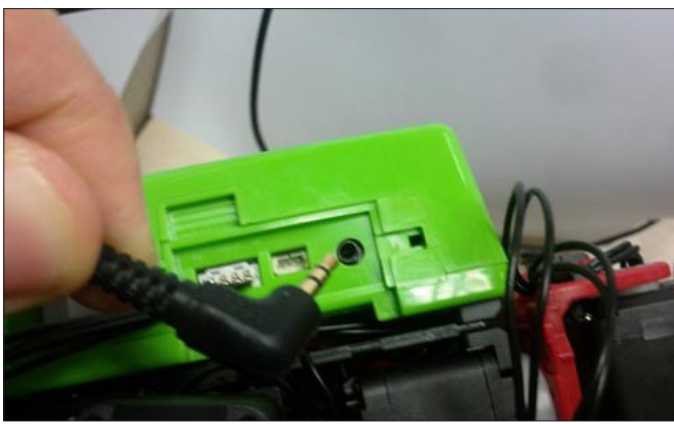
08 – 1 USB to Serial Converter

Start connection to the robot, USB to Serial conversion cable that connects robot to the PC/Notebook USB port,



08-2 USB port

Connection to the PCs with Serial Port in the back can be made using the serial cable but connection to notebook computers without the serial port requires USB to Serial converter.



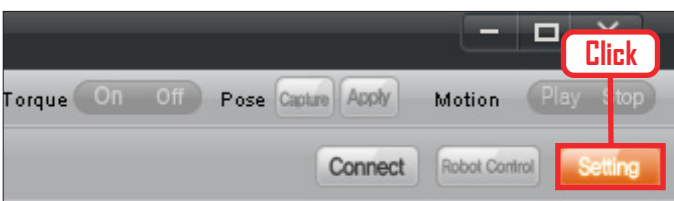
08-3 Connecting to Robot

Connect the RS232C audio jack to the robot.



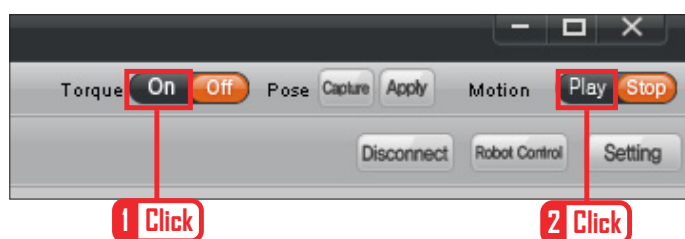
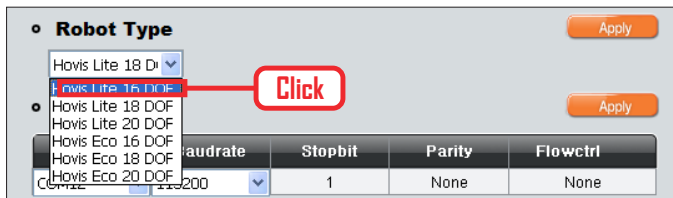
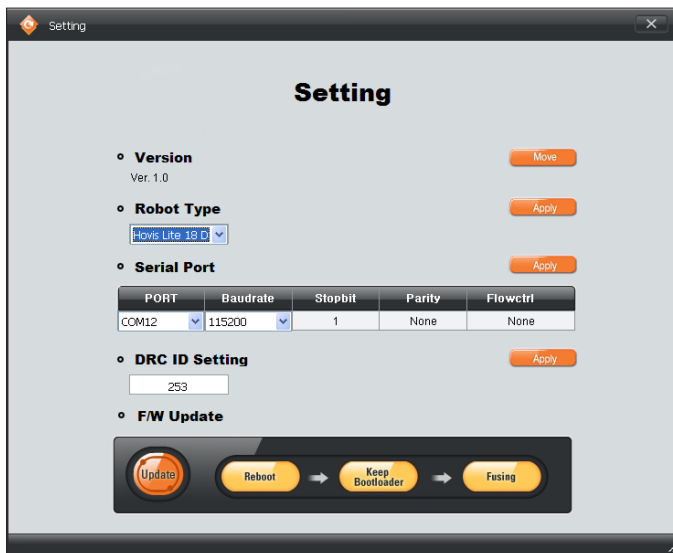
08-4 Robot Port

Looking at top of the DRC controller, you will find serial port connecting to the PC, head side servo motor port, and power port. Photo shows all three ports connected.



08-5 Robot Connection Button

Menu for making connection to the robot is located at top right of DR-SIM window. Click on 'Environment Setup' button to configure the COM Port.



09 Environment Setup

Environment Setup window shows DR-SIM version, robot selection, and Communications setting.

1 0 Robot Selection

DR-SIM provides total of 6 different types of humanoid robot. Most basic robot is the 16 axis humanoid.

Select the type of robot that was assembled.

Select Hovis Lite 16 DOF

1 1 COM Port Selection

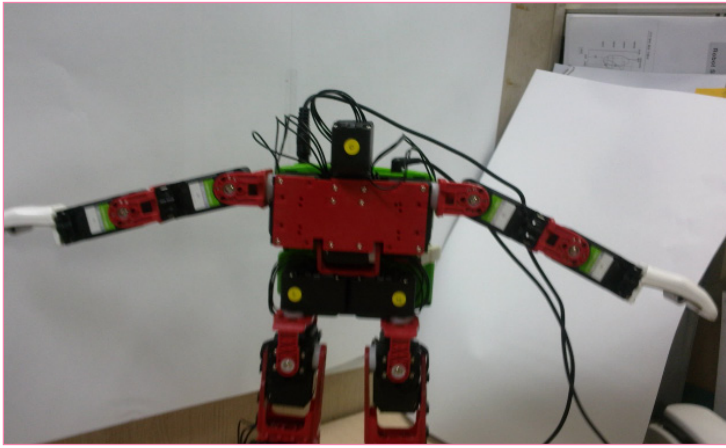
“PORT” shows the COM Port numbers that can be selected. Select one of the ports. If there is no connection, go to the hardware properties in windows and check the number of the COM port that can be used.

1 2 Connecting

Click on the ‘Connect’ icon.

1 3 Connection

As shown in the left photo, Torque button becomes active when connection to the robot is made. Click “Torque On” button to operate the robot and click ‘Play’ button to play current motion.



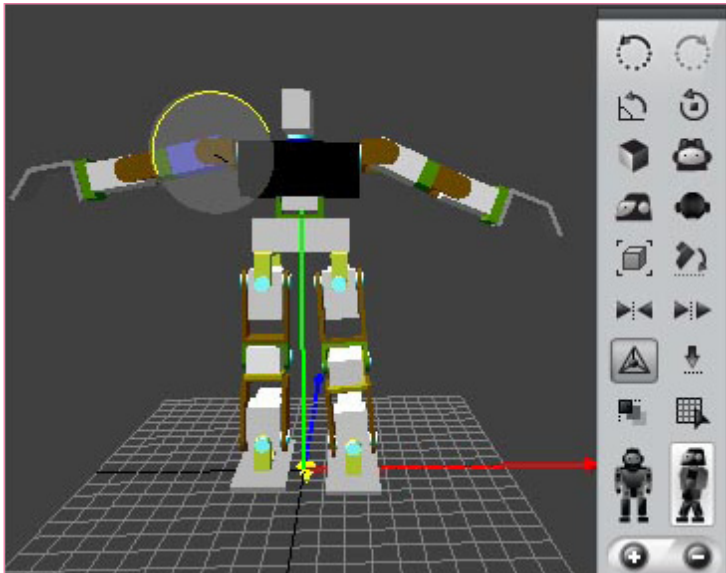
1 4 Robot Motion for Capture

This lesson will show how to capture and edit motion from the robot. Click "Torque Off" button and then manually manipulate the robot to make desired motion.



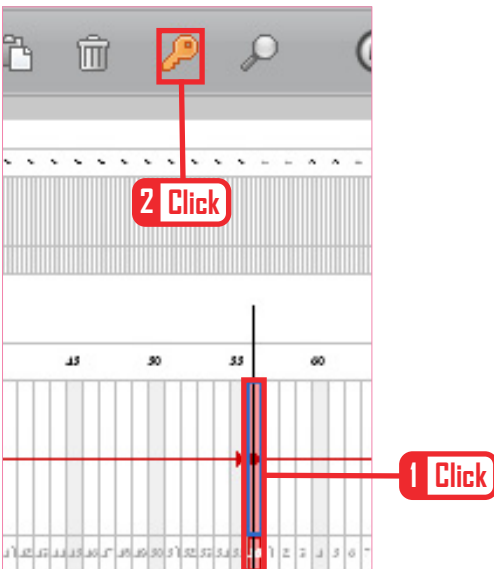
1 5 – 1 Capture

Click 'Capture' button.



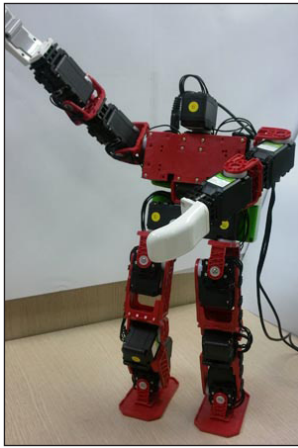
1 5 – 2 Show Captured Motion in 3D Window

Captured motion is shown in the 3D motion window as soon as capture button is clicked.



1 5 – 3 Insert Key Frame

Insert captured motion into the desired frame. Click on the frame first and then click on the key frame.



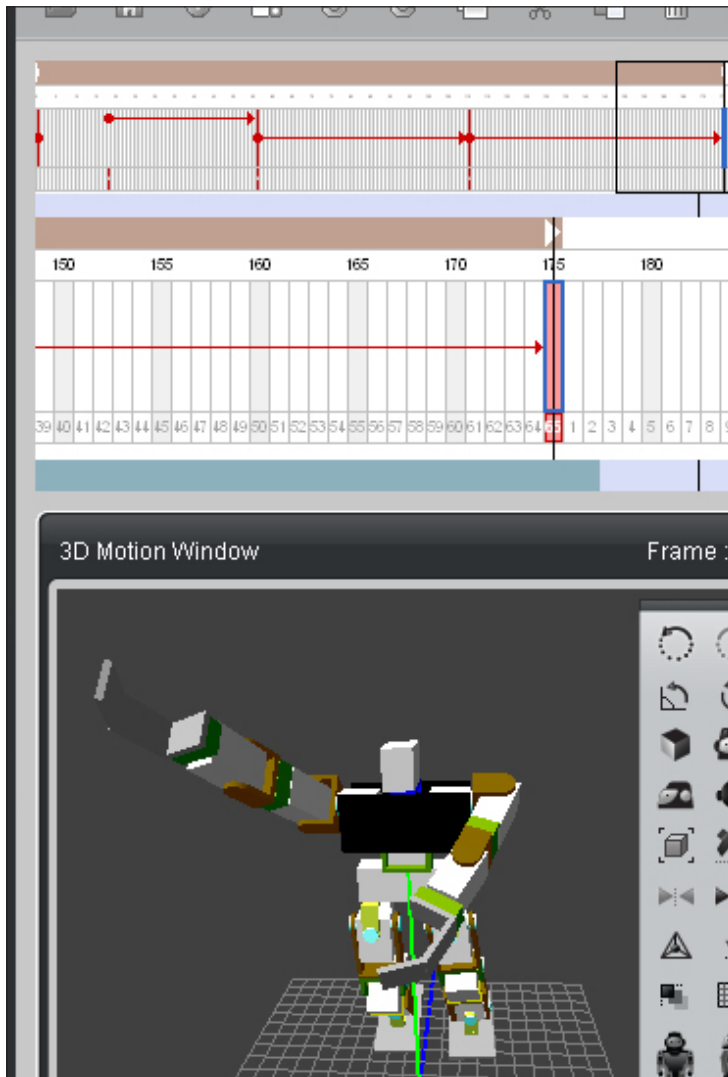
16-1 Different Motion

Manually make a different motion.



16-2 Capture

Capture.



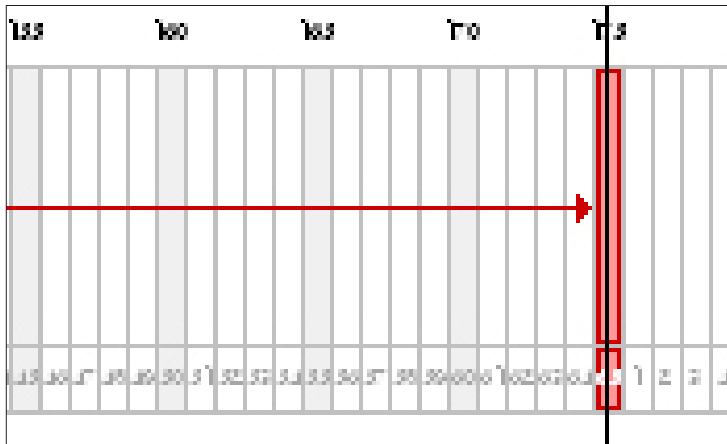
17 Check Motion

Compare the manually made motion with the motion in the 3D motion window.



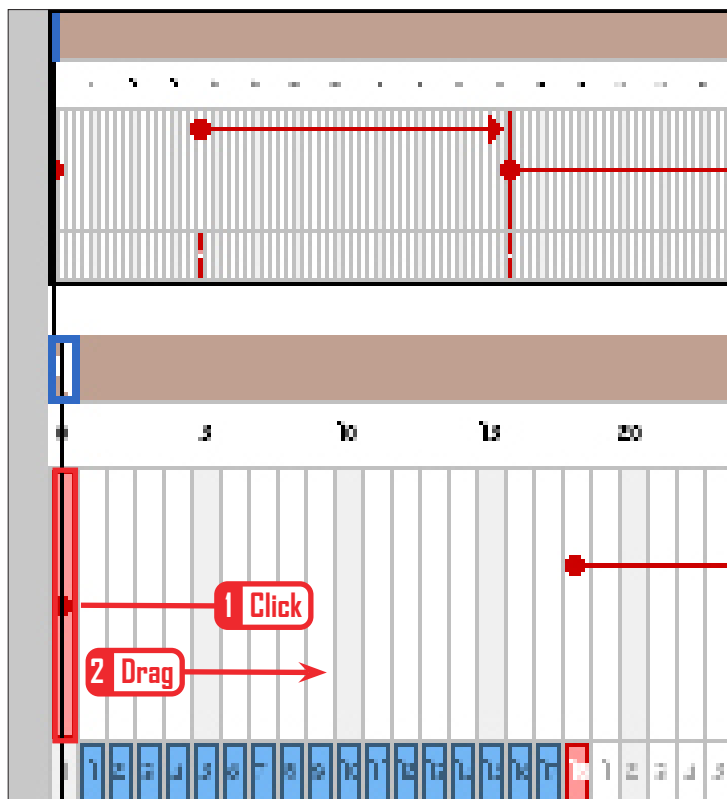
18 Capturing

Capture the newly made motion



19 Insert Key Frame

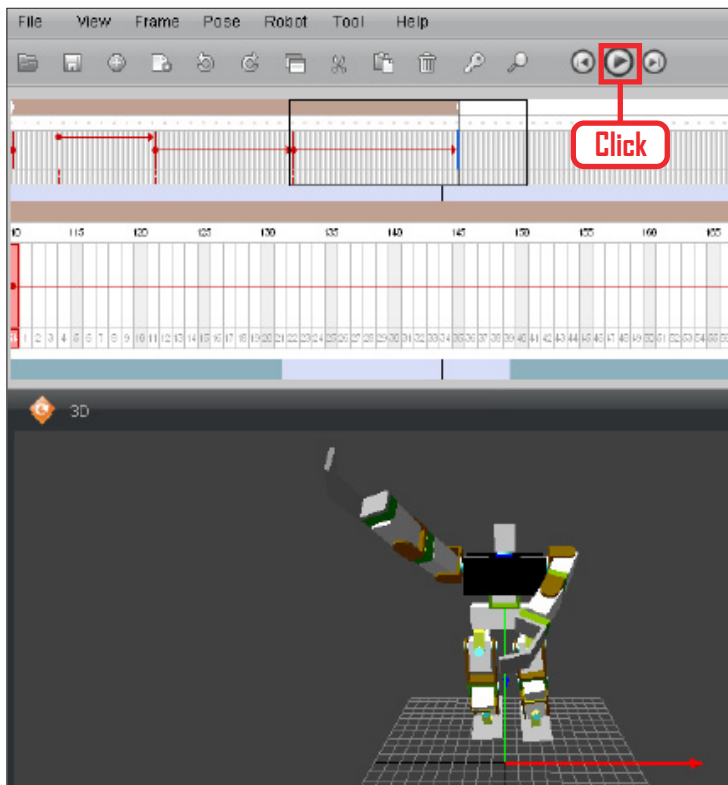
Insert motion in the desired frame.



20 Delay Value

Robot may make a sudden movement if there is a large motion difference between the first and the second motion key frame. To prevent such a sudden movement, there is a way slow down the first motion.

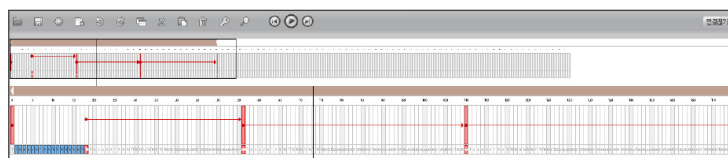
Click bottom of the frame and drag to the right with left mouse button pressed. Such an action will show up as photo on the left and Delay value will be created.



21 Screen Play

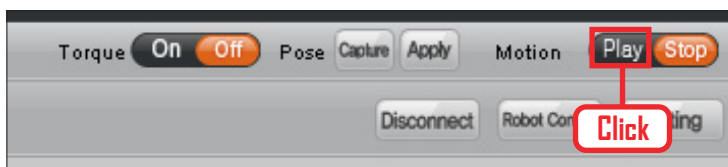
Play the created motion in the motion window.

Click 'Play' icon.



22 Play

Progress line shows the motion being played progressing on the time frame.



23 Play On Robot

Apply and play the motion on robot. Click 'Play' button located near top right.



24 Robot Motion

Left photo shows the motion created in 3D motion window, middle and right photos show captured motions. When played, motions will be played consecutively.

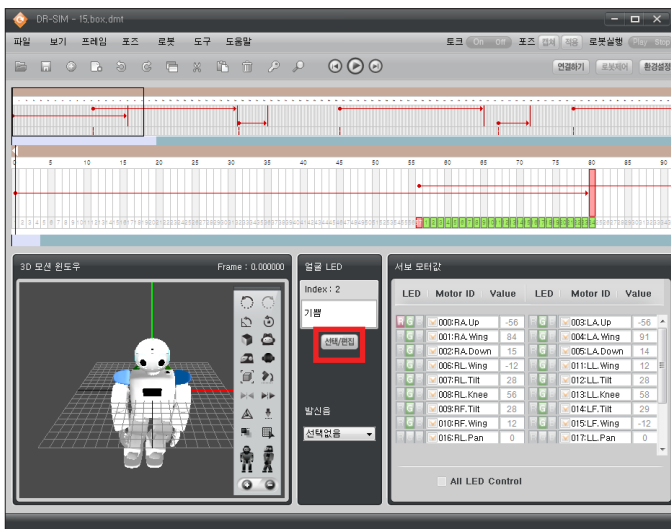
07

Multimedia Effect

Editing and applying face LED effect to robot motion

We will use DR-SIM to apply face LED effect to the robot motion.

Face LED enables robot to simulate emotions during motion. Steps in creating and running facial LED effect consists of editing face LED effect according to each type of emotion, saving LED effect to PC, downloading to the robot, and applying effect from the motion frame to the robot motion.



01 Face LED edit window

Click Face LED > Select/Edit button to open face LED edit window.



02 Edit face LED according to each type of emotion.

Edit face LED according to each type of emotion. In this example, we will edit face LED to express happiness.

- (1) Click "happy" from the emotion list window on the left
- (2) Select desired color from the color palette window and use mouse click to apply to the robot forehead, ears, nose, and eyes. (Color applied to eyes only).
- (3) Save edited effect. (Save to PC).
- (4) Try editing other emotions.



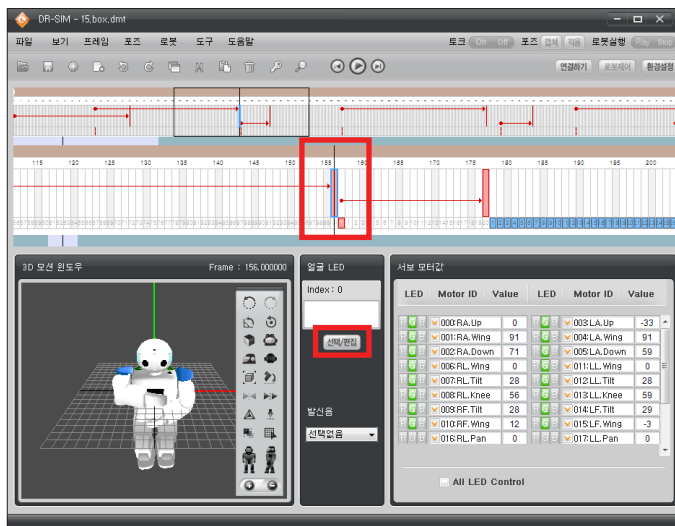
O3 Download face LED effect

Edited face LED effect must be downloaded to the robot in order to apply the effect to the motion.

Press download button to download the edited/saved LED data to the robot.

※ Prior to downloading, check robot power status and robot to PC connection.

※ It takes approximately 10s to download complete LED data to the robot.



O4 Applying to robot motion

Apply edited LED data to robot motion

(1) Select motion frame to apply LED effect.

(2) Click select/edit button from the face LED window.

(3) Select effect from the list window on the left and then click select button below.

(4) Apply LED effect to other motion frames.

