

SONY®

4-659-403-11(1)



Action Composer

Action

Motion

Sound

LED

AIBO  
Master  
Studio  
Setup

Behavior Arranger

Behavior

# *AIBO Master Studio*

**ERF-PC03** *English Edition*

## User's Guide

## For the customers in U.S.A.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

## For the customers in Canada

This Class B digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

### Note:

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

You are cautioned that any changes or modifications not expressly approved in this manual could void your authority to operate this equipment.

## For Customers in Europe

CE (EMC) Marking Conformity Remarks

- a) This equipment complies with EN55022. Class B digital for use in following areas : residential, business, and light-industrial.
- b) This product conforms with the following European Directive:  
89/336/EEC (EMC directive)

## Für Kunden in Europa

Hinweise zur Konformität mit dem CE-Zeichen (EMV)

- a) Dieses Gerät entspricht der europäischen Norm EN55022 Klasse B (digital) für die Verwendung in folgenden Gebieten: Wohngebiete, Gewerbegebiete und Leichtindustrialgebiete.
- b) Dieses Gerät erfüllt die folgende europäische Richtlinie:  
89/336/EWG (EMV-Richtlinie)

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## Customer Support

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How to contact the AIBO Customer Link.

### U.S.A and Canada

1-800-427-2988 (U.S.A.)

Email address: [aibosupport@info.sel.sony.com](mailto:aibosupport@info.sel.sony.com)

### In Europe

English line: +44 (0)-20-7365-2938

German line: +49 (0)-69-9508-6310

French line: +33 (0)-1-5569-5118

### In Australia

Call +1300-36-2426 (toll free within Australia)

E-mail address: [cicci@ap.sony.com](mailto:cicci@ap.sony.com)

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+65-473-8500

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**OPEN-R**

“OPEN-R” is the standard interface for the entertainment robot system that Sony is actively promoting. This interface expands the capability of the entertainment robot through a flexible combination of hardware and interchangeable software to suit various applications.

AIBO Master Studio ERF-PC03 conforms to OPEN-R version 1.1, 1.1.1 and version 1.1.2.

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Furthermore, “™” and “®” are not mentioned in each case in this manual.

Information about AIBO is also available on the Internet at:

<http://www.aibo.com/>

# Sources of information

There are two AIBO Master Studio manuals.

## User's Guide (this manual)

The User's Guide includes an overview of AIBO Master Studio; installation, setup and other information required to operate AIBO; and how to use the programs that make up AIBO Master Studio.

## Tutorial Guide

The Tutorial Guide gives examples of how to use AIBO Master Studio. If this is the first time you're using AIBO Master Studio, please follow the tutorial and try all of the operations to get acquainted with AIBO Master Studio. You can also learn tips for using the product.

### Note

Most illustrations and images are of AIBO ERS-210.

## About the Online Manual

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The User's Guide and the Tutorial Guide are also available online as PDF files. To view these files, you need "Acrobat Reader for Windows." First install Acrobat Reader.

## Installing Acrobat Reader

You can install "Acrobat Reader ver. 5.0 for Windows" from the accompanying CD-ROM. From Windows Explorer, double-click the CD-ROM drive's "\Adobe\ar500eng.exe" file. The setup program will start; just follow the instructions that appear on the screen to install the application.

### Note

If you use a version older than "Acrobat Reader ver4.05 for Windows," text and images may not be correctly displayed.

## To view the Online Manual

Click the Start button in Windows and choose Programs\* - AIBO Master Studio - User's Guide (or Tutorial Guide).

\* If you are using Windows XP, click All Programs instead of Programs hereinafter.

You can also display online manuals by choosing from the Help menu in any AIBO Master Studio application.

### Tip

You can also display online manuals by double-clicking "User's Guide.pdf" or "Tutorial Guide.pdf" in the Doc folder of the CD-ROM.

## Help Menu

You can refer to Behavior Arranger commands in this manual as well as the Help system. Click the Start button in Windows, choose Programs - AIBO Master Studio- Command Reference, or select the Help menu from within Behavior Arranger, then Command Reference.

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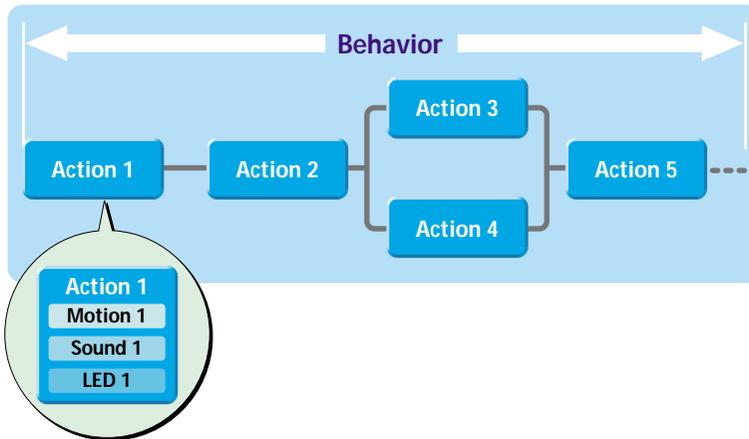
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# AIBO's "behavior" and "action"

AIBO's movements are made up of comparatively brief units of movement ("motions") — raising its face, taking steps — which are performed sequentially. Besides motion, AIBO expresses itself in various ways by emitting sound (melodies and sound effects) and flashing its LED lights. In AIBO Master Studio, motion, sound and LED lights combined make up an "action" and actions are strung together to produce continuous movement called a "behavior."



To use AIBO Master Studio, you need to understand the relationship between behaviors and actions.

# What is AIBO Master Studio?

AIBO Master Studio is an application that enables you to design actions and behaviors that your can AIBO perform. Create programs that make AIBO play games or act like a pet with unique actions and behaviors, so you can enjoy your own AIBO characteristics.

AIBO Master Studio is compatible with wireless LANs (ERS-210/220 only), so you can efficiently make behaviors and actions using a wireless LAN.

## Compatible AIBO Models

AIBO Master Studio ver.1.1 is compatible with the following AIBO models.

- AIBO ERS-210
- AIBO ERS-220
- AIBO-ERS-310 series

## Program Configuration

The AIBO Master Studio Program is made up of four programs as follows.

### AIBO Master Studio Setup

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Before programming actions and behaviors using AIBO Master Studio, copy the necessary system files for operating AIBO to a “Memory Stick” by using the AIBO Master Studio Setup program.

If you use AIBO Master Studio in a wireless LAN environment, you need to set up items such as a User ID, password, and AIBO IP address.

### Quick Behavior Arranger

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Quick Behavior Arranger is a simple behavior creation program. A wizard screen appears so you can easily create behaviors by following on-screen directions.

You can put together a behavior program by using only the built-in actions. Or, you can make original actions with Action Composer and use them in your behavior program.

## Behavior Arranger

---

This application is a tool for making behavior programs for your AIBO. For instance, you can make a program to make AIBO walk along the perimeter of a square, or turn right or take a few steps backward when you touch its head.

You can create behaviors that are more intricate by adding branches and subgroups of behaviors to the behavior program. Version 1.1 can create programs with voice-recognition capabilities and sounds (media link sounds, tonal scales).

You can put together a behavior program by using just the built-in actions. Or, you can make original actions with Action Composer and use these in your behavior program.

## Action Composer

---

This application lets you modify a sample action or create an action from scratch. Take a simple yawn: a person yawning with the mouth wide open makes a completely different impression from one who hides the yawn behind a hand. By using original actions tailored to each situation, your AIBO will become capable of individual expressions.

With Action Composer, you create an action that synchronizes the three elements: motion, sound and LED. For example, a yawn that escapes as soon as AIBO opens its mouth or a dance that AIBO performs to music. The actions you make will be used in Quick Behavior Arranger or Behavior Arranger as part of a behavior program.

## Compatibility with former versions

### Data compatibility

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You can use behavior programs and action files (action library files, action files, element files) created with AIBO Master Studio version 1.01 in version 1.1. (AIBO Master Studio recognizes files except sound files as AIBO ERS-210 data. Sound files can be commonly used with the ERS-210/220/310 series.)

### “Memory Stick” system file compatibility

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A “Memory Stick” used with AIBO Master Studio version 1.0/1.01 can be used if you copy version 1.1 system files to it. Do not use older version system files.

## Redistribution of programs

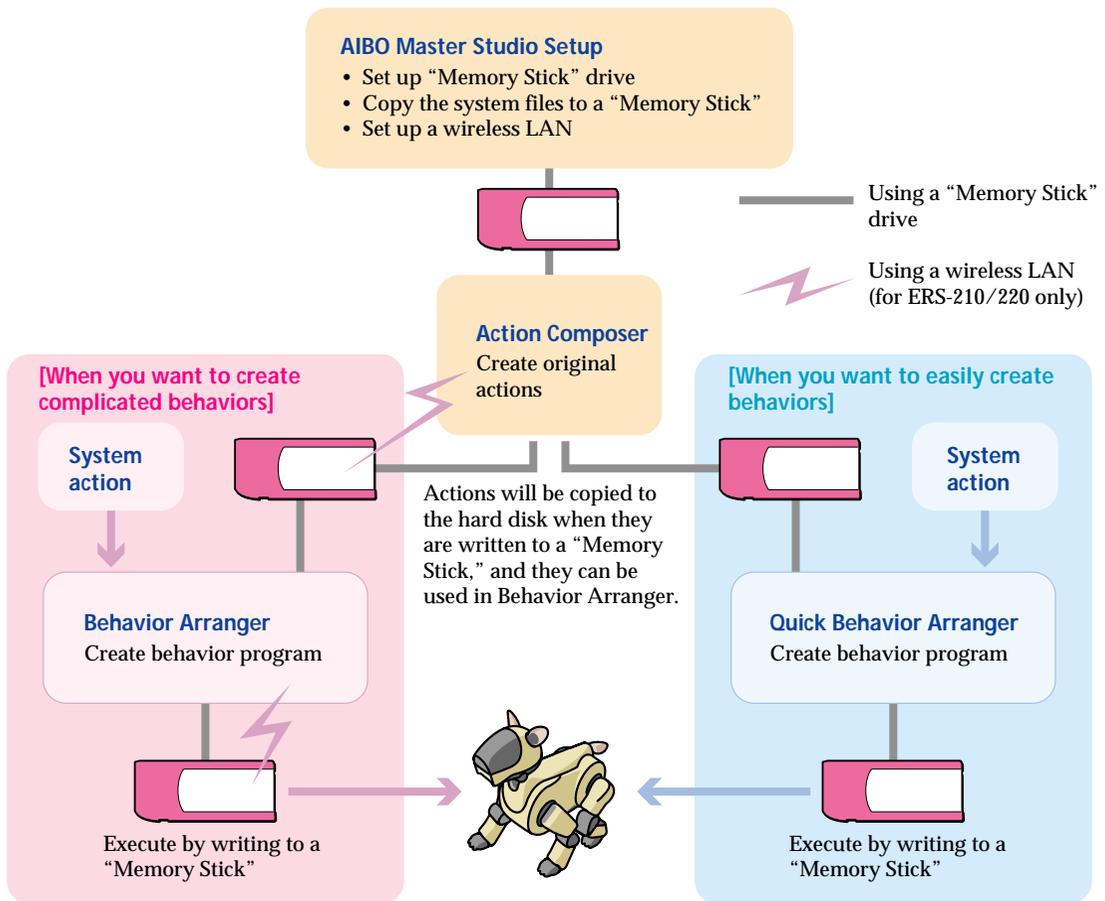
Created programs (files saved to a “Memory Stick”), system files, and the interpreter can be redistributed. See `redist.txt` in one of the installed folders for details.

## Relationships Between Programs

In order to use AIBO Master Studio, first set up various items using the AIBO Master Studio Setup program, and copy the necessary system files for operating your AIBO model to a “Memory Stick.” Then you can create actions to be used by the behavior program.

When you install AIBO Master Studio, built-in actions (system actions) will be copied to the hard disk. If there aren’t enough actions, or you want to create original ones, you can program actions using Action Composer.

Once you have all actions prepared, arrange them using Quick Behavior Arranger or Behavior Arranger to make behavior programs, and execute them by using a “Memory Stick” or a wireless LAN.



# AIBO State

Depending on AIBO's mode, a built-in program may interrupt your behavior program and run instead. When AIBO resumes normal mode, the interrupted behavior program is reset and starts running again from the top. Before you have fun with your programs, look at the diagram below to understand how AIBO's modes will affect your behavior programs.

## Normal mode

Your program is executed from the beginning and AIBO moves as programmed.



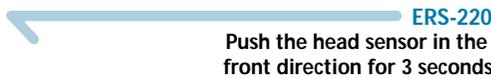
## Notes

- Do not use AIBO in places subject to vibrations, on an incline, or at a place where it might drop.
- Do not surround AIBO with objects that may obstruct its movements.

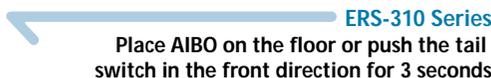
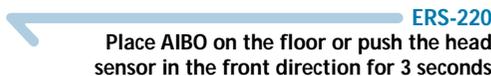
Falls down



Something gets caught in its leg or neck joints



AIBO is picked up



## Jam condition

Joints loosen up



Mode indicator flashes



Mode indicator flashes



Mode indicator flashes

## Picked-up condition

When you lift up AIBO, it becomes still and quiet in this mode.



Mode indicator flashes



Mode indicator lights



Mode indicator lights

↓ To charge the battery pack  
See the manual for the AIBO unit.

## Notes

- AIBO will not move when it is being charged, i.e. it's connected to the AC adapter.
- Do not execute your program while AIBO is on the Station (Energy Station or Stand with Energy Station Core) or on the Stand.



# Checking supplied accessories

First, check that you have all the supplied accessories.

■ CD-ROM

■ “Memory Stick,” and case, and “Memory Stick” labels (3 labels)

The included AIBO Programming Memory Stick ERA-MS008 is the same as the ones sold separately in stores. Save data you create using AIBO Master Studio on this “Memory Stick.”

■ Printed material

- End-User License Agreement
- User’s Guide (this book)
- Tutorial Guide
- Key code sticker (set of two)

The key code is required to install the software. Place the key code sticker on the CD-ROM case, and keep it in a safe place.

# System requirements

You need to have an IBM PC/AT compatible machine with the following specifications:

<b>OS</b>	Microsoft Windows XP Microsoft Windows 2000 Professional (Service Pack 1 or newer) Microsoft Windows Millennium Edition Microsoft Windows 98 Second Edition English/French/German/Chinese Edition
<b>CPU</b>	Intel MMX Pentium 300 MHz and or greater
<b>RAM</b>	64 MB or greater
<b>Drive:</b>	Hard disk drive: 120MB or greater CD-ROM drive (required for software installation)
<b>Video card and display</b>	800 × 600 pixels or greater, High-color (16 bit) or greater
<b>Sound:</b>	Sound chip compatible with the OS, or a sound card and speakers (required for creating/checking AIBO sounds).

**“Memory Stick” system requirements:**

Built-in “Memory Stick” drive or “Memory Stick” reader/writer

**Wireless LAN system requirements (ERS-210/220 only optional):**

- Wireless LAN PC cards\* compliant with the IEEE 802.11b
- or
- An access point\* compliant with the IEEE 802.11b standard (for wireless communications with a computer connected to a wired LAN.)

\* Please use Sony recommended products.

# Set up

## Installing the software

Install AIBO Master Studio from the accompanying CD-ROM.

### 1 Turn on your PC and start Windows.

#### Notes

- End all applications and virus detection programs before running the setup program.
- When installing to Windows 2000, or Windows XP log on as the administrator or as an Administrators Group member.

### 2 Insert the supplied CD-ROM in the CD-ROM drive.

The setup program is executed automatically. If the Setup program does not start, double-click the “Setup.exe” file in the CD-ROM drive. Follow the on-screen instructions.

#### Note

Please see the attached key code sticker for the key code.

## Uninstalling the software

If you don't need AIBO Master Studio any longer, go to the Windows Control Panel and choose Add/Remove Programs to delete it.

#### Note

This procedure removes all programs and data that were installed. Data made by the user will not be deleted.

## Set up “Memory Stick” drive

In order to use a “Memory Stick” with AIBO Master Studio, you first need to set the “Memory Stick” drive.

#### Note

You need a “Memory Stick” drive even if you use AIBO Master Studio with a wireless LAN. Make certain that you perform both “Set Up ‘Memory Stick’ Drive” and “Set Up Wireless LAN.”

### 1 Click the Start button in Windows and choose Programs - AIBO Master Studio - AIBO Master Studio Setup.

The AIBO Master Studio Setup dialog box appears.

### 2 Set the “Memory Stick” drive

The screenshot shows the 'AIBO Master Studio Setup' dialog box. The 'Memory Stick' section is highlighted with a red box. The 'Drive Path' field is empty, and a red arrow points to the drive selection icon (a floppy disk) next to it. Other fields include AIBO Model Name (ERS-210(E)), IP Address, Subnet Mask, Default Gateway, Host Name, SSID, WEP key, Action Mode (2: Auto Mode), and Wireless Channel (1). The 'Use AIBO Wireless LAN Card' checkbox is checked. The 'User ID' field contains 'aibo', and the 'Password' and 'Confirm Password' fields contain '\*\*\*\*\*'. There are 'Import' and 'Export' buttons for the SSID field, and 'OK' and 'Cancel' buttons at the bottom.

Enter the drive path  
Make certain that you specify a path immediately below the root (\).

If you don't know the drive path, click the  icon to choose the drive.

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### 3 Click OK

The “Memory Stick” drive will be set.

**Note**

If other AIBO Master Studio applications are running, restart the programs to activate the applications.

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## Create a “Memory Stick” appropriate for your AIBO model

In order to use the included “Memory Stick” or a separately sold “AIBO Programming Memory Stick” with AIBO Master Studio, you need the system files (OPEN-R folder) that are necessary for AIBO movements. Make certain that you copy the system files using the following method before using a “Memory Stick” for the first time.

**Note**

- Regular “Memory Sticks” sold in stores and “Memory Sticks” loaded with AIBO-ware applications cannot be used. (Programs you create on such a “Memory Stick” cannot be executed on AIBO.)
- You cannot write system files for several AIBO models to a “Memory Stick” at the same time.
- You can also use a “Memory Stick” used with an older version. If older version system files exist, delete the OPEN-R folder using Windows Explorer, and copy the system files again.

**Tip**

- Once you copy system files, you don’t need to copy them again unless you change the AIBO model. If you want to change the AIBO model, copy the system files again.
- If you copy system files onto a used “Memory Stick,” it will be overwritten, and saved Behavior Programs and Action Libraries will be deleted. However, wireless LAN settings won’t be overwritten, so you don’t need to set them up again.

- 1 Click the Start button in Windows and choose Programs - AIBO Master Studio - AIBO Master Studio Setup.

The AIBO Master Studio Setup dialog box appears.

- 2 Insert a “Memory Stick” into the drive.

- 3 Select your AIBO model.



Select your AIBO model name.

An (E) model name means it does English voice-recognition.

- 4 Click Copy System Files.

The system files for the selected model will be overwritten on the “Memory Stick” in the specified drive.

- 5 Click OK

## Setting up a wireless LAN environment

If you are using AIBO ERS-210/220, you can wirelessly transfer programs and data that you have created between AIBO and your PC by using AIBO wireless LAN card (sold separately).

### Features available with wireless LAN environment

Wireless LAN makes the features listed below possible. You’ll be able to make actions and behaviors more efficiently because you’ll be able to test them in the process.

- Upload behavior programs
- Command AIBO to execute behaviors (You can trace a group box that is currently being executed.)
- Upload the action library
- Command AIBO to test-run actions and elements (motions, sounds, LED’s)

### Required equipment

Both your AIBO and PC need to support wireless LAN and be capable of wireless LAN communication.

The AIBO Master Studio software enables wireless communication between your PC and a single AIBO.

#### For AIBO

You will need both of the following:

- **AIBO Wireless LAN Card**  
For instructions on installing the card in AIBO, please refer to the manual of the AIBO Wireless LAN Card.

- **“Memory Stick”**

Use the “Memory Stick” included in the AIBO package or an AIBO Programming Memory Stick (sold separately) to which the appropriate system files have been copied.

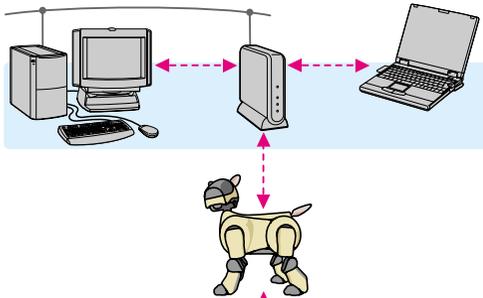
## For the PC

You will need either of the following:

- A PC equipped with an IEEE802.11b-compatible wireless LAN card\*
- PC connected to a wired LAN through an access point\* compliant with the IEEE 802.11b standard

\* Please use Sony recommended products.

### When an access point is used



### When an access point is not used



#### Notes

The PC can be connected to the access point via wireless LAN or wired LAN (network cable).

- To connect the PC to the access point via wireless LAN, install an IEEE802.11b-compatible wireless LAN card on the PC.
- To connect the PC to the access point via wired LAN, you will need a hub and two network cables.

## Wireless LAN information setup

Insert the AIBO wireless LAN card into your AIBO, and start the setup program.

#### Tip

You can set up a wireless LAN connection using a LAN by inserting a "Memory Stick" with the appropriate system files in AIBO and using a computer connected to the LAN. Please see the wireless LAN card operating manual for details.

#### Note

If you insert a "Memory Stick" and start AIBO while the AIBO wireless LAN card is pulled out, the network settings on the "Memory Stick" will return to default values.

You can proceed with set up in AIBO Master Studio Setup by inserting a "Memory Stick" into the "Memory Stick" drive.

- 1 Click the Start button in Windows and choose Programs - AIBO Master Studio - AIBO Master Studio Setup.

The AIBO Master Studio Setup dialog box appears.

- 2 Insert the "Memory Stick" with the appropriate system files into the drive.

### 3 Set up wireless LAN information.

- ① Check the Use AIBO Wireless LAN Card box.
- ② If you want to display “Memory Stick” information click [Import].
- ③ Input the AIBO IP address (AIBO wireless LAN card).
- ④ Input the Subnet Mask.
- ⑤ Input the Default Gateway IP address. You may omit specifying an IP address, in which case the default gateway will not be used.
- ⑥ Input the AIBO name (up to 8 alphanumerical characters) that will be used in the wireless zone.
- ⑦ Input the wireless network name (up to 32 alphanumerical characters).
- ⑧ Input the key characters to be used for encryption of wireless data (5 alphanumerical characters). If you don't want to use encryption, do not enter anything.
- ⑨ Select the Action mode (wireless LAN topology).
- ⑩ Select the wireless channel (when you use ad hoc mode).

- ⑪ Input the user ID (up to 8 alphanumerical characters) to log on to the wireless network.
- ⑫ Input password (up to 8 alphanumerical characters) to log on to the wireless network.
- ⑬ Enter the same password you input in step ⑫ again to confirm it.

#### Tip

If you don't designate a user ID and password, anyone can access your AIBO wireless LAN connection without authentication, so we recommend that you set up a user ID and password.

### 4 Click [Export].

This saves the wireless LAN settings and makes wireless LAN functions available to AIBO Master Studio.

### 5 Click [OK] to close the window.

#### Tip

The wireless LAN setup information that is input last will also be stored on the PC, so you don't need to input information from the beginning every time you use a new “Memory Stick.”

## Execute Connection Test

If you insert the “Memory Stick” that you used to set up the wireless LAN into AIBO, boot AIBO, and click Test Connection, that will execute an AIBO connection test using the set wireless LAN information.



# Overview

Quick Behavior Arranger enables you to create two kinds of programs. It's a wizard, so even people who aren't familiar with the program can easily create AIBO programs.

The Tutorial Guide explains how to use Quick Behavior Arranger using examples.

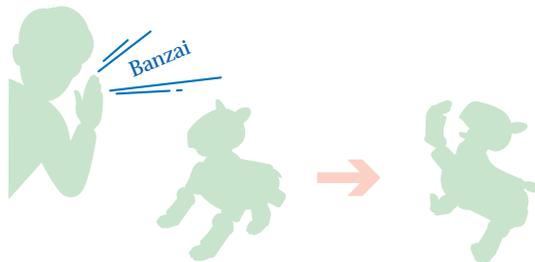
- **Sequential Execution Type**

A behavior program describing a series of AIBO actions such as “stand up, move, and sit down.”



- **Stimulus - Driven Execution Type**

A behavior program that makes use of sensor inputs, voice recognition, and other functions.



Fewer commands are available in Quick Behavior Arranger compared to Behavior Arranger, so use Behavior Arranger if you want to create complicated programs.

## How to use original actions

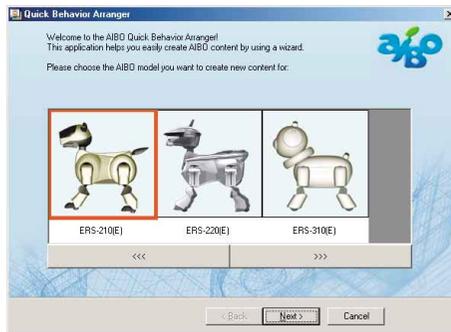
You can add original actions in addition to system actions that are already prepared to behaviors. If you use original actions, use Action Composer first to save an action library onto a “Memory Stick.” For details about Action Composer, see “Chapter 5 Action Composer” (page 71).

# How to Create Behaviors

Start Quick Behavior Arranger, and create behavior programs by following the instructions on the screen.

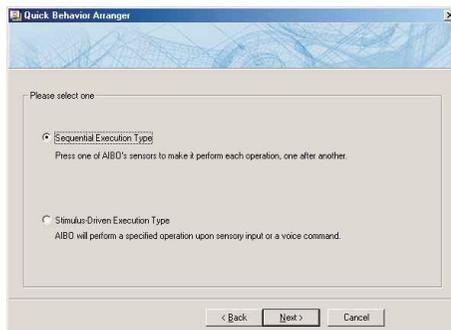
- 1 Click the Start button in Windows and choose Programs - AIBO Master Studio - Quick Behavior Arranger.

A window to select the model appears.



- 2 Select your AIBO model name and click Next.

Select your AIBO model and click Next. A window to select the program type appears.



- 3 Select Behavior Program type and click Next.

Follow the instructions on the screen.

### Note

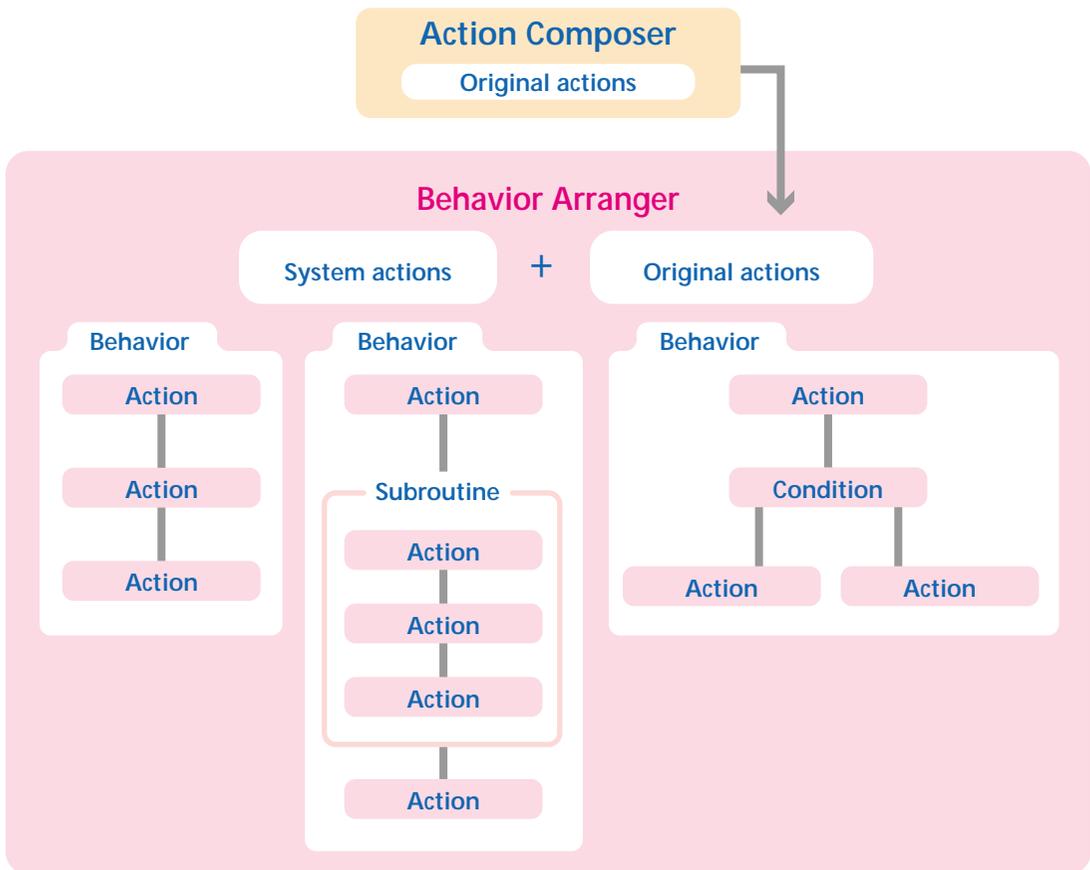
You can use Behavior Arranger to edit programs created using Quick Behavior Arranger. If you open a program that you created in Behavior Arranger, it automatically places as many action boxes as there are action selection fields. If you don't input anything in an action selection field, the action box won't have any commands.





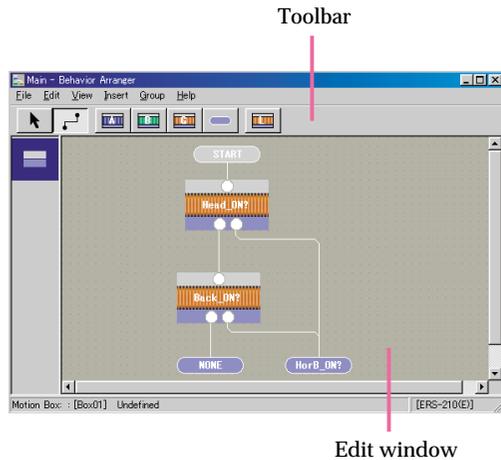
# Overview

Behavior Arranger shows ABIO behaviors in a flowchart to create behavior programs. You can create anything from programs made of simple sequential actions such as “stand up and walk” to complicated programs using branching programs, and subroutines using conditions such as “when the head is touched, turn right.” You can use events that use sensor switches, as well as voice recognition words in English, and sounds (media link sounds and tonal scales), as conditions. You can quickly create behavior programs using built-in system actions in Behavior Arranger. If you want to use your own original actions, create actions using Action Composer and arrange them in Behavior Arranger to incorporate the actions in programs. For Action Composer details, see “Chapter 5 Action Composer” (page 71).



# Main components of Behavior Arranger

In Behavior Arranger, program structures are expressed as flowcharts, making the programming process easier to understand. Choose from among the several boxes on the toolbar, drag them to the edit window, and connect them to create a flowchart.



## Mouse modes

In the edit window, operate the mouse by switching between the two modes.

**Mouse: normal mode** 

Select this mode to place and move boxes in the edit window.

**Mouse: link mode** 

Select this mode to connect boxes that have been placed in the edit window. When you drag from the terminal (round white dot) of one box to the box you want to connect, a line appears linking the two boxes.

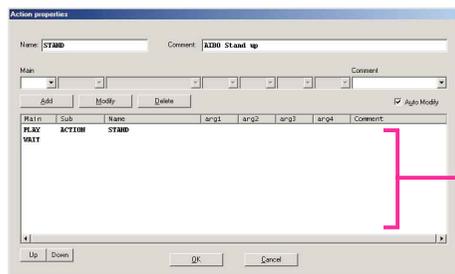
## Boxes

Input commands in boxes and connect the boxes with the mouse.

### Action box

The box is used for designating commands such as AIBO actions other than branching conditions. Sequential commands can be designated in one box. Commands in an action box are designated in the Action properties dialog box.

#### Action properties dialog box



Designate sequential commands in one box.

PLAY, STOP, QUIT, ADD and SUB are examples of action box commands.

Example:

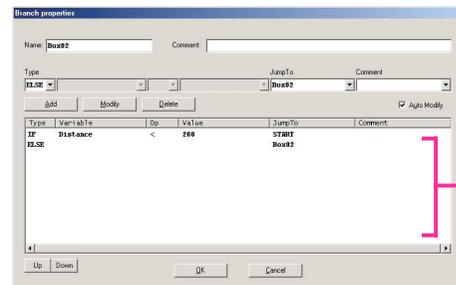
Main	Sub	Name	Horizontal	Distance
PLAY	ACTION	WALK	20	100

The example above commands AIBO to walk for about 100 mm at an angle of 20° to the left. (For the horizontal angle, + indicates an angle to the left and - indicates an angle to the right. The actual distance AIBO walks will depend on the condition of the floor.)

### Branch box

This box is for designating a branch in the program. Branch conditions in a branch box are designated in the Branch properties dialog box.

#### Branch properties dialog box



Designate conditions and jump destinations.

IF, AND, OR and ELSE are examples of branch commands.

Example:

Type	Variable	Op	Value	Jump to
IF	DISTANCE	<	200	LeftTurn
ELSE				MoveForward

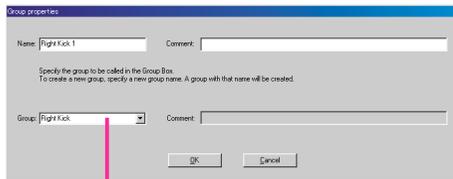
In the example above, if the distance to an obstacle is less than 200mm, the program jumps to the box named LeftTurn, and in all other cases jumps to the box named MoveForward.

## Group box

A box containing subroutine (grouped programs). The subroutine called by a group box is designated in the Group properties dialog box.

Groups form levels. In Behavior Arranger, due to programming limitations, an upper-level group can activate a lower-level group but not vice-versa. (When group A activates group B, group A is at a higher level than group B.)

### Group properties dialog box



Choose a subroutine (group).

A group at the highest level is a Main group.

Saved behavior programs (.be) can be used as subroutines in other programs.

It is very convenient if you create programs to be used as subroutines beforehand, and add them to the Behavior Library Folder (\AIBO Master Studio\BA\Library) in AIBO Master Studio. Click library box  to select subroutines.

## Terminal box

The terminal box indicates the beginning or end of a program or a subroutine. The START box and END box in the Main group that are displayed when you first start making a program or subroutine are also terminal boxes. Designate the name of a terminal box in Terminal properties.

### Terminal properties dialog box



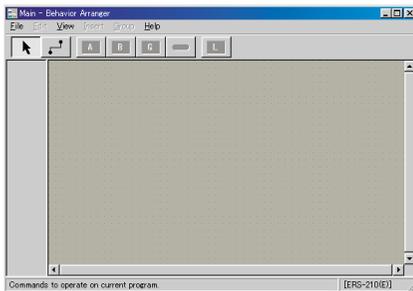
# Creating and Editing Behaviors

Create behavior programs either by starting Behavior Arranger and creating new programs, or by editing programs that you already have. This section explains how to create a new behavior program.

## Start

- 1 Click the Start button in Windows and choose Programs - AIBO Master Studio and click Behavior Arranger.

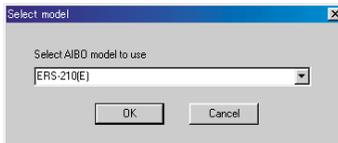
Behavior Arranger will start.



For an explanation of Behavior Arranger names and functions, see “Behavior Arranger” in “Chapter 6 Reference” (page 108).

- 2 From the menu, choose File-New.

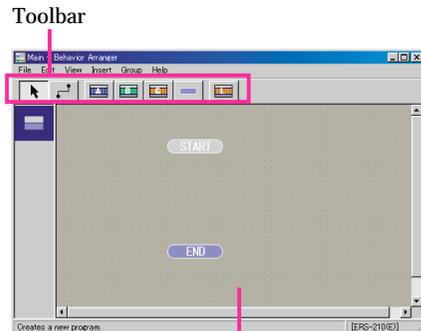
The Select model dialog box appears.



- 3 Select your AIBO model

Select your AIBO model name, and click OK.

START Box and END Box appear in the Edit window.



Edit window

### Tip

If you want to edit a program that you already have, select File-Open from the menu to load the file that you want to edit. Programs that you created using previous versions of AIBO Master Studio will be loaded as AIBO ERS-210 programs.

## Arranging Boxes

Position boxes in which to designate commands in the edit window.

### 1 Select a box

Click the Box button on the toolbar or select Box from the Insert menu. A highlighted box appears.

#### Tip

You can also select Box from the context menu that appears by right-clicking on the edit window.

### 2 Position a box

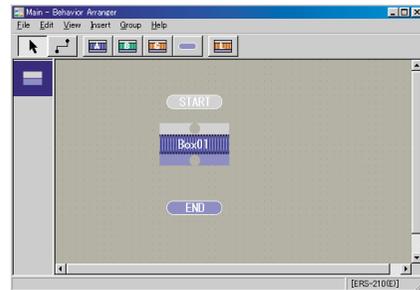
Click the position you would like the box to move to in the edit window. The box's properties dialog box appears.

### 3 Input content for the box.

Input box commands in the properties dialog box. For details, see “Creating and Editing Boxes” (page 40). You can change the contents of a box later, so you may create the overall flow of a program by allocating empty boxes, then input commands into those boxes.

### 4 Close properties dialog box

Click OK in the properties dialog box. Box will be positioned in the edit window.



### 5 Allocate as many boxes as you need

Repeat steps 1 to 4 to position as many boxes as you need.

#### Note

You can use around 10,000 boxes in Behavior Arranger. However, since AIBO main memory is shared with the Action Library and AIBO system files, the number of boxes and commands that can be used in Behavior Arranger will be reduced if memory-intensive actions are used.

## How to move boxes

Put the mouse in normal mode and drag the box that you want to move.

## How to delete boxes

Select the box that you want to delete and press the Delete key. You can also delete by right-clicking on a box and selecting Delete Box from the context menu.

## Connect Boxes

Once you position boxes in the edit window, connect box terminals to associate them with each other.

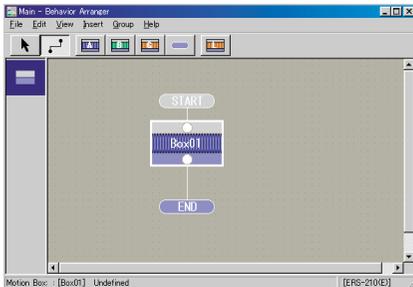
A round dot on the top of a box is an input terminal, and a round dot at the bottom of a box is an output terminal.

### 1 Put the mouse in link mode

Click  on the Toolbar.

### 2 Drag from the source box to the destination box

A white line will appear between the boxes, and the output terminal of the source and the input terminal of the destination box will be connected.



### 3 Connect the rest of the boxes

Repeat the dragging process to connect all of the boxes.

## How to connect branch boxes

Connect branch boxes by designating the branching conditions. Determine subsequent processes according to conditions such as “with the word ‘hello,’ shift process to movement A,” or “stop if approaching an obstacle.”

As many output terminals as branching conditions designated in the Branch properties dialog box will be set up. If you place the mouse cursor on an output terminal, the conditional expression will be displayed. If you drag from any output terminal to a destination box, corresponding conditional expressions and subsequent processes will be connected. You can also connect a branch box and destination box by dragging without having to first set up the Branch properties dialog box of a branch box. In this case, you need to designate one or more branching conditions to branch to a destination box in the Condition dialog box that will appear as you drag.

## Connecting group boxes with several output terminals

---

If there are several output terminal boxes in a group (subroutine), as many output terminals as terminal boxes will appear for a corresponding group box. If you place the mouse cursor on an output terminal, the corresponding terminal box name will appear, so check the box name, choose a terminal, and drag it to the destination box to connect it.

## Disconnecting boxes

---

Select a line to disconnect and press the Delete key.

You can also use the following alternative methods.

- Use the Delete Connection context menu item that appears when you right-click a line.
- Right-click on the output terminal or the box, and choose Delete Connection from the context menu (if there are several connections, a selection menu will appear).

### Note

If you delete a box, any connection lines from the box's output terminals will also be deleted at the same time.

## Moving the connecting line

---

Set the mouse to normal mode, select the line you want to move and drag it to the new position.

### Tip

- A straight connection line with no angles cannot be moved.
- Connection lines cannot be moved to overlap their own box.
- For a group box designated to a group with several terminals, you can rearrange the terminals to eliminate line crossovers. For details, see "Rearranging terminals." (page 49)

## Save and Execute Behaviors

Save created behavior programs using a “Memory Stick” drive (“Memory Stick” Reader/Writer) or using a wireless LAN, and execute them on AIBO.

### Note

System files for different models cannot be saved to the same “Memory Stick.”

### Tip

Programs created in Behavior Arranger will be saved in \OPEN-R\APP\PC\AMS\R-CODE.R on a “Memory Stick.”

### When you use “Memory Stick” drive

- 1 Insert a “Memory Stick” with the appropriate system files into the drive.

- 2 While the behavior program is displayed in the edit window, from the menu select File - Save to Memory Stick.

When saving is completed, a confirmation message will appear.

- 3 Insert the “Memory Stick” into AIBO and boot AIBO.

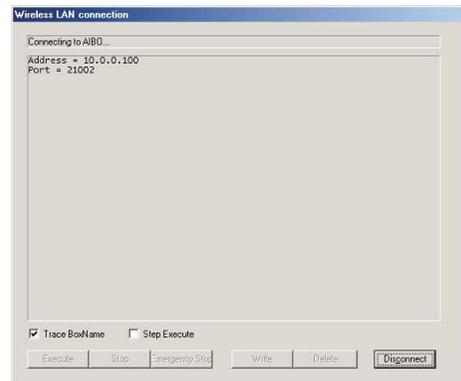
When AIBO is booted, a behavior program will be automatically executed. If you want to execute it again, press the Pause button on AIBO to stop the movement, and reboot.

### When you use a wireless LAN

- 1 Insert a “Memory Stick” with the appropriate system files into AIBO, and boot AIBO.

- 2 While the behavior program is displayed in the edit window, from the menu select File - Wireless LAN Connection.

Wireless LAN connection will appear and the computer connects to AIBO over the wireless LAN.



- 3 Click the function button that you want to use.

#### Execute

Transfers a behavior program to the “Memory Stick” inserted into AIBO and executes it.

#### Stop

Stops a process that is being executed by AIBO after the current action is completed.

**Emergency Stop**

Immediately stops a process that is being executed by AIBO including the current actions. AIBO will be unstable after an emergency stop, and if you select Execute again, AIBO will start “stretching.”

**Write**

Transfers the behavior program to the “Memory Stick” inserted in AIBO without executing it.

(The same as selecting the File-Save to Memory Stick from the menu.)

**Delete**

Deletes the behavior program from the “Memory Stick” inserted in AIBO.

**Check Box****Trace Box Name**

Displays the group and box name of a program that is being executed in AIBO.

This is convenient to see if there are errors in the program.

**Step Execute**

If this is checked, execution pauses every time an action completes in the program.

To continue, click the Execute button again. This is convenient to see if there are errors in the program.

If this isn’t checked, clicking the Execute button will play the program from the beginning.

---

#### **4 If the program execution is complete, click Disconnect.**

The wireless LAN connection will be disconnected, and the dialog box will close.

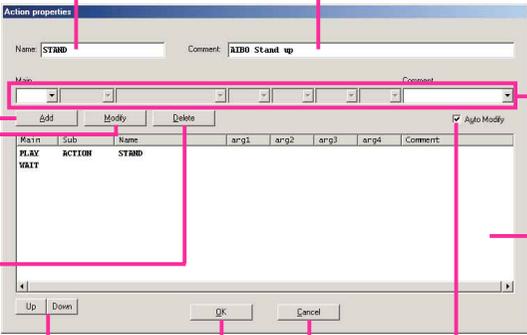
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# Creating and Editing Boxes

Create or edit boxes, and specify program commands. Please see “Command Reference” (page 52) for available command details.

## Action box

When you place an action box in the edit window or double-click on an existing box, the Action properties dialog box is displayed. Sequential commands (other than branching) can be designated in one box.



**1 Name**  
Input the box name.

**2 Comment**  
Type in your comments about the box (optional).

**3 Combo box**  
Specify commands and parameters starting with the Main command. The number of parameters and boxes you need to specify are determined by the command. Column with \* Discretionary input is available. Column with # Numerical input is available. Comment: type in comments about the command (optional)

**4 Add**  
Click this button to add to the list a command specified in the combo box.

**Modify**  
Reflects changes made in the combo box to the list.

**Delete**  
Deletes the selected line from the list.

**5 OK**  
Closes the dialog box.

**Cancel**  
Cancels a new box or an operation in the Action Properties dialog box.

**Auto Modify**  
If you check this, changes in the Combo box will automatically reflect the selected command.

**List**  
Lists the commands designated for this box. AIBO will execute commands in the order that they appear in this list.

**[Up] [Down]**  
Moves the selected line up or down the list.

Main	Sub	Name	arg1	arg2	arg3	arg4	Comment
PLAY	ACTION	STAND					
WALK							

### To edit a command in the list

- ① Select a command from the list.
- ② To change, add changes to the command in the combo box and click Modify.  
To delete, click Delete.  
To change the list order, click [Up] [Down] and move the line up or down the list.

## Branch box

When you place a branch box in the edit window or double-click on an existing box, the Branch properties dialog box is displayed. Branch conditions are designated in this box.

**4 Add**  
Click this button to add to the list a condition specified in the combo box.

**1 Name**  
Input the box name.

**2 Comment**  
Type in your comments about the box (optional).

**3 Combo box**  
Enter branch conditions.  
Type: Branch condition  
Variable: First operand  
Op: Comparison operator  
Value: Second operand  
**Jump To:**  
The box to jump to when a condition is met  
**Comment:**  
Comments about the command (optional)

**Modify**  
Reflects changes made in the combo box to the list.

**Delete**  
Deletes the selected line from the list.

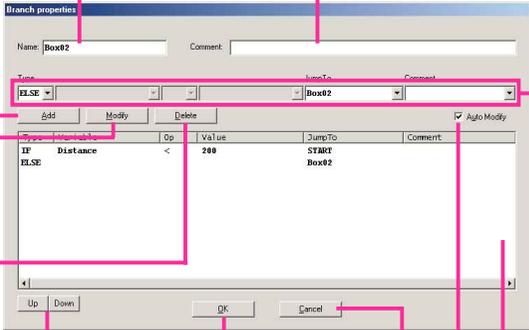
**5 OK**  
Closes the dialog box.

**Cancel**  
Cancels a new box or an operation in the Branch Properties dialog box.

**List**  
Lists the conditions designated for this box. Decisions based on conditions are made in the order the conditions appear on the list.

**Auto Modify**  
If you check this, changes in the Combo box will automatically reflect the selected command.

**Up** **Down**  
Moves the selected line up or down the list.



Type	Variable	Op	Value	Jump To	Comment
IF	Distance	<	200	START	Box02
ELSE					

### To edit a command in the list

- ① Select a command from the list.
- ② To change, add changes to the condition in the combo box and click Modify.  
To delete, click Delete.  
To change the list order, click [Up] [Down] and move the line up or down the list.

## Condition dialog box

You can designate branch conditions for a branch box in dialog boxes other than the Branch properties dialog box.

Put the mouse in link mode, and designate conditions in the Condition dialog box that appears when you drag from the branch box to the action box to jump to.

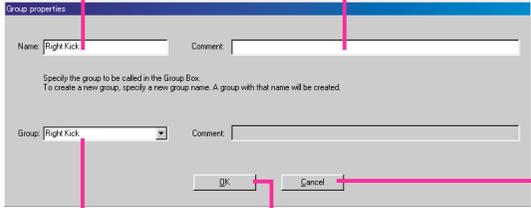
**1** Combo box  
Enter branch conditions.  
If you don't have several destinations in the branch box, select ELSE.  
Var1:  
First operand  
Op: Comparison operator  
Var2:  
Second operand

**2** Specify AND/OR for the conditions entered in step 1.  
AND:  
branch is determined by AND conditions when there are several conditions  
OR: branch is determined by OR conditions when there are several conditions

**3** OK  
Closes the dialog box.  
Cancel  
Cancels the operation.

## Group box

When you place a group box in the edit window or double-click on a group box without a designated group, the Group properties dialog box is displayed. Specify the group (subroutine) to activate in this box. If a group is already specified, right-click on the box and select Properties from the menu to display it.



**1 Name**  
Input the box name.

**2 Comment**  
Type in your comments about the box (optional).

**3 Group**  
Specify the name of the group activated by this box. Select from the existing group (including libraries) or input a new group name. If you input a new group name, a group will be created and its edit window will appear.

**4 OK**  
Closes the dialog box.

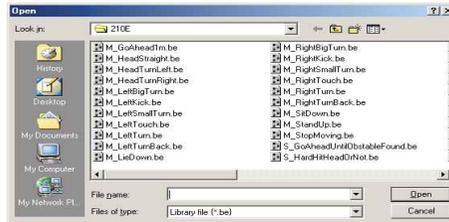
**Cancel**  
Cancels a new box or an operation in the Group Properties dialog box.

### Note

A group box and a group are different. A group box is something that activates a group, and a group is a subroutine entity. Even if you delete a group box, the group won't be deleted. In the same manner, even if you delete a group, the group box won't be deleted.

## How to designate a library to a group box

If you save a behavior program, you can use the behavior program as a subroutine when making another program. A group of these programs (.be) is called a (behavior) library. AIBO Master Studio provides several libraries in the AIBO Master Studio\BA\Library folder for your use. When you place a library box  in the edit window, the Open dialog box is displayed. Specify the program to be activated by the library box.



A group box will be placed in the edit window (a library box is a kind of group box). When you right-click on the box and choose Properties from the context menu, a Group properties dialog box is displayed.

- 1 Name**  
Input the box name.  
(The library name appears initially.)
- 2 Comment**  
Type in your comments about the box (optional).

**3 OK**  
Closes the dialog box.

**Cancel**  
Cancels an operation.

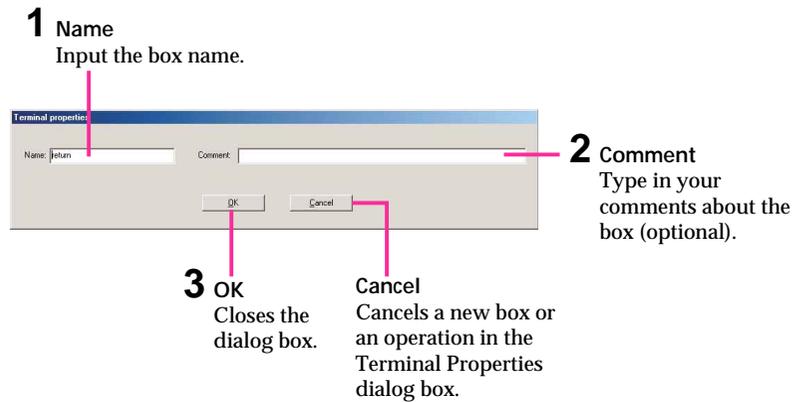
**Group**  
The chosen library is displayed.

### Note

If actions other than system actions (i.e. actions made with Action Composer) are used in the behavior library, you need to save an action library that include the actions to a "Memory Stick" in advance using Action Composer.

## Terminal box

When you place a terminal box in the edit window or double-click a terminal box, the Terminal properties dialog box is displayed. Enter the terminal box name and comments in this box.



At the end of subroutine, input a box name such as RETURN to indicate that the process will return to the main program. Terminal box names can be entered freely, for example, QUIT, END and RETURN.

# Using Groups

## Making a group

Follow the procedure below to make a group (subroutine) that will be activated by a group box.

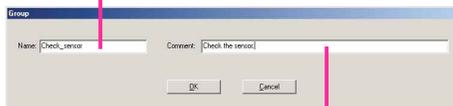
### When You Create Subroutines

- 1 From the menu, select **Group - Create New Group**.

A Group dialog box appears.

- 2 Define the group.

- ① **Name**  
Input the group name.



- ② **Comment**  
Type in your comments about the group (optional).

- 3 Close the dialog box.

Click OK in the Group dialog box.  
An edit window opens for the new group.

- 4 Create a behavior program (in the same manner as for a main group).

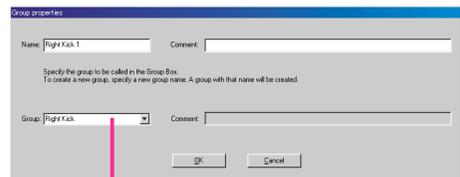
- 5 From the menu, select **File - Close this Window**.

It returns to the edit window of the program that activates the created group (subroutine).

#### Note

Even if you close the edit window for a group, the group isn't deleted.

- 6 Place a group box, and designate a group name used in the Group combo box of the Group properties dialog box.



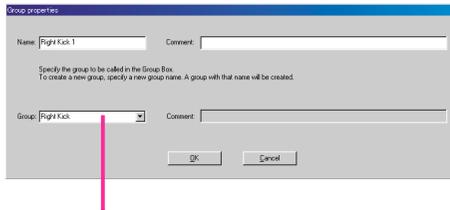
Select a group name that you've made as the group to activate.

For details, see "Group Box" (page 43).

## When You Create a group (Subroutine) from a Group Box

---

- 1 Position the group box in the edit window, and input the name of the group in the Group properties dialog box.



Input the group name to be created.

A group will be created and an edit window for the group opens. The group box to activate the created group will be placed in the original edit window.

- 2 Create a behavior program (in the same manner as for a main group).
- 3 From the menu, select File-Close this Window.

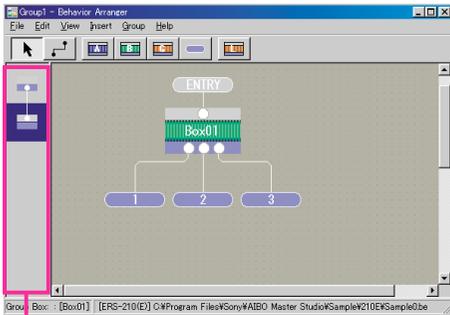
**Tip**

Even if you close the edit window for a group, the group isn't deleted.

---

## Moving from group to group

If a group includes a child group (subroutine), you can move it from one group to another by using the history bar, and see a history of moves between groups.



History bar

You can move a group box that you want to edit to a child group (subroutine) by double-clicking it, and the program will appear in the edit window. Such moves between groups will appear in the history bar. The main group always appears on top, and the history will be updated as you create child groups (subroutines).

Groups displayed in the history bar can be accessed by clicking on one of the boxes displayed in the bar.

### Note

When you access a different subgroup from the same group, a different trace is displayed in the history bar.

### Key operation

Home	Moves to the Main group.
End	Moves to the group indicated at the bottom of the history bar.
Page Up	Moves to the group directly above in the history bar.
Page Down	Moves to the group directly below in the history bar.

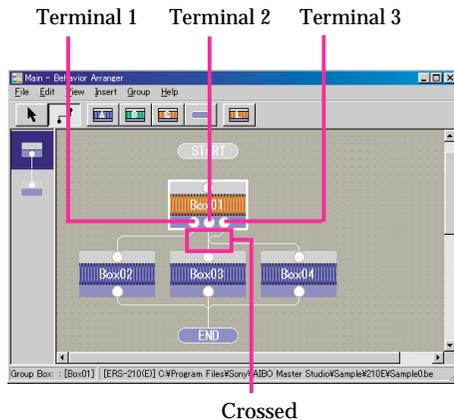
### Mouse operation

Left double-click	Opens the chosen group in the edit window.
Place the mouse pointer over a box in the history bar	Displays the group name.

## Rearranging terminals

If a group that has several output terminal boxes is activated from a group box, you can rearrange the terminals to keep the connection lines from crossing.

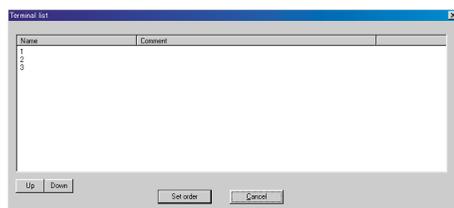
- 1 In the group box, place the mouse pointer over the terminals to check the names of the terminals you want to rearrange.



- 2 Double-click the group box. The program defined by the group box is displayed.

- 3 Choose Group - Set Order of Terminals.

The Terminal list is displayed.

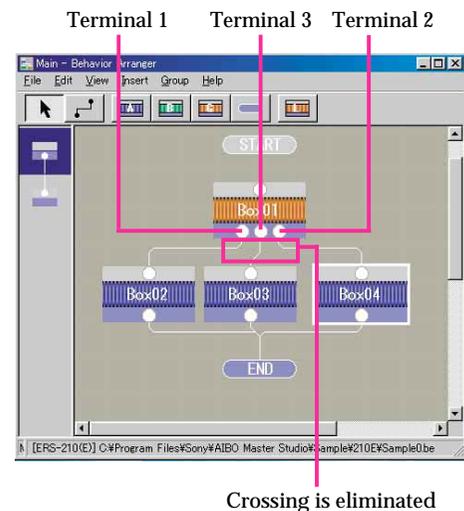


- 4 Choose a line and click [Up] [Down] to change the terminal order.

In the case of a Step 1 screen, change the order to [1] [3] [2].

- 5 When you've rearranged the order, click Set order.

When you return to the group box, you'll find the terminals arranged in the new order and the crossed lines will have disappeared.





# Printing Behaviors

You can print a flowchart of behavior programs that you have created. Please set up the page before printing.

## Page Setup

- 1 From the menu, select File - Page Setup.

The Page Setup dialog box appears.

**Tip**

You can change the printer you want to use by clicking Printer.

- 2 Set Paper, Orientation, and Margins.

- 3 Click OK.

## Print

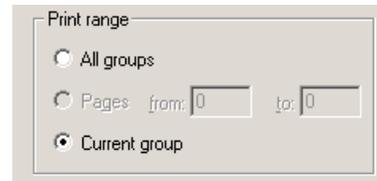
- 1 From the menu, select File - Print.

The Print dialog box appears.

- 2 Set the Print, Print range, and Number of copies to be printed.

**Tip**

When the main group of a behavior program has a child group (subroutine), you can print flowcharts of the main group and child groups by choosing All groups.



- 3 Click OK.

A flowchart of the behavior program that is displayed in the edit window will be printed.

# Command Reference

You can refer to Behavior Arranger commands in this manual as well as the Help system. Click the Start button in Windows, choose Programs -AIBO Master Studio- Command Reference, or select the Help menu from within Behavior Arranger, then Command Reference.

## Action box commands

### Action playback commands (Play-Action)

Overwrite  
execution

This section shows a list of names for built-in system actions (commands are listed alphabetically). These commands can be used when “Play” is chosen in Main and “Action” is chosen in Sub.

For overwrite execution, see “Programming precautions” (page 55).

#### Tips

Main [Play] - Sub [Action+] displays actions that were saved in Action Composer.

	Overwrite execution
<b>CHGPOS.STATR.NORMAL</b>	<b>NG</b>
Hangs head sorrowfully and lies down on the floor.	
<b>CHGPOS.WALK.NORMAL</b>	<b>NG</b>
Changes to walking position.	
<b>CONTACT.FRONT.HEAD</b>	<b>NG</b>
Heads the ball	
<b>CONTACT.FRONT.HEADL</b>	<b>NG</b>
Heads the ball to the left.	
<b>CONTACT.FRONT.HEADR</b>	<b>NG</b>
Heads the ball to the right.	
<b>CONTACT.RIGHT.TOUCH</b>	<b>NG</b>
Sits and with the right paw touches an object at the specified distance.	
Horizontal angle 0 to 80 Unit: °	
Distance Distance from AIBO Unit: mm	
<b>CONTACT.RIGHT.TOUCH2</b>	<b>NG</b>
Crouches and with the right paw touches an object at the specified distance.	
Horizontal angle 0 to 80 Unit: °	
Distance Distance from AIBO Unit: mm	
<b>KICK</b>	<b>NG</b>
Kicks the specified position.	
Horizontal angle -30 to 30 Unit: °	
Distance Distance from AIBO Unit: mm	
<b>LIE</b>	<b>NG</b>
Lies down in the normal posture.	
<b>MOVE_HEAD</b>	<b>OK</b>
Looks in the specified direction.	
Alias for MOVE.HEAD.NORMAL.	
Horizontal angle -60 to 60 Unit: °	
Vertical angle -60 to 20 Unit: °	
<b>MOVE.HEAD.FAST</b>	<b>OK</b>
Looks quickly in the specified direction.	
Horizontal angle -60 to 60 Unit: °	
Vertical angle -60 to 20 Unit: °	
<b>MOVE.HEAD.NORMAL</b>	<b>OK</b>
Looks in the specified direction.	
Horizontal angle -60 to 60 Unit: °	
Vertical angle -60 to 20 Unit: °	
<b>MOVE.HEAD.SLOW</b>	<b>OK</b>
Looks slowly in the specified direction.	
Horizontal angle -60 to 60 Unit: °	
Vertical angle -60 to 20 Unit: °	

	Overwrite execution		Overwrite execution
<b>MOVE.MOVE.NORMAL</b>	<b>OK</b>	<b>PALONE.AUTO.TAILH</b> (ERS-210 only)	<b>OK</b>
Walks to the designated position. Horizontal angle -180 to 180 Unit: ° Distance 0 to 10,000 Unit: mm		Wags tail left to right.	
<b>MOVE.MOVE.SLOW</b>	<b>OK</b>	<b>PALONE.AUTO.TAILROT</b> (ERS-210 only)	<b>OK</b>
Walks slowly to the specified position. Horizontal angle -180 to 180 Unit: ° Distance 0 to 10,000 Unit: mm		Rotates tail.	
<b>MOVE.MOVE.SMALL</b>	<b>OK</b>	<b>PALONE.AUTO.TAILSTOP</b> (ERS-210 only)	<b>OK</b>
Walks taking small steps to the specified position. Horizontal angle -180 to 180 Unit: ° Distance 0 to 10,000 Unit: mm		Stops moving tail.	
<b>MOVE.TURN.NORMAL</b>	<b>OK</b>	<b>PALONE.AUTO.TAILUP</b> (ERS-210 only)	<b>OK</b>
Turns around to face the specified direction. Horizontal angle -180 to 180 Unit: ° (+: counter-clockwise, -: clockwise)		Raises tail.	
<b>MOVE.TURN.SLOW</b>	<b>OK</b>	<b>PALONE.AUTO.TAILV</b> (ERS-210 only)	<b>OK</b>
Turns around slowly to face the specified direction. Horizontal angle -180 to 180 Unit: ° (+: counter-clockwise, -: clockwise)		Wags tail up and down.	
<b>PALONE.AUTO.EAR</b> (ERS-210 only)	<b>OK</b>	<b>SEARCH</b>	<b>OK</b>
Moves both ears.		Searches for an object starting from the current direction. Alias for SEARCH.HEAD.NORMAL. Object Pink ball (included in AIBO unit)	
<b>PALONE.AUTO.EARL</b> (ERS-210 only)	<b>OK</b>	<b>SEARCH.HEAD.LOWCENT</b>	<b>OK</b>
Moves the left ear.		Looks down and searches for an object. Object Pink Ball (included in AIBO unit)	
<b>PALONE.AUTO.EARR</b> (ERS-210 only)	<b>OK</b>	<b>SEARCH.HEAD.NORMAL</b>	<b>OK</b>
Moves the right ear.		Looks in the current direction to search for an object. Object Pink Ball (included in AIBO unit)	
<b>PALONE.AUTO.EARSTOP</b> (ERS-210 only)	<b>OK</b>	<b>SEARCH.HEAD.NORMALCENT</b>	<b>OK</b>
Stops moving ears.		Looks in front and searches for an object. Object Pink Ball (included in AIBO unit)	
<b>PALONE.AUTO.TAILD</b> (ERS-210 only)	<b>OK</b>	<b>SEARCH.HEAD.SLOW</b>	<b>OK</b>
Lowers tail.		Looks in the current direction to search slowly for an object. Object Pink Ball (included in AIBO unit)	
		<b>SEARCH.HEAD.SLOWCENT</b>	<b>OK</b>
		Looks in front and searches slowly for an object. Object Pink Ball (included in AIBO unit)	

	Overwrite execution		Overwrite execution
<b>SIT</b>	<b>NG</b>		
Sits.			
<b>SMESS.ERROR.ERROR1</b>	<b>OK</b>		
Error notice 1 for debugging.			
<b>ERS-210:</b>		Flashes the mode indicator, the left eye lights (three) and the tail light.	
<b>ERS-220:</b>		Turns on both the right and left face side lights in blue, and the mode indicator.	
<b>ERS-310 series:</b>		Quickly flashes the horn light alternately in blue/orange, and turns on the mode indicator.	
<b>SMESS.ERROR.ERROR2</b>	<b>OK</b>		
Error notice 2 for debugging.			
<b>ERS-210:</b>		Flashes the mode indicator, the right eye lights (three) and the tail light.	
<b>ERS-220:</b>		Flashes both the right and left face side lights in blue, and the mode indicator.	
<b>ERS-310 series:</b>		Slowly flashes the horn light alternately in blue/orange, and turns on the mode indicator.	
<b>SMESS.NOTICE.NOTICE1</b>	<b>OK</b>		
Notice 1 for debugging.			
<b>ERS-210:</b>		Turn on the mode indicator, the eye lights (all), and the tail light.	
<b>ERS-220:</b>		Flashes the left face side light in blue.	
<b>ERS-310 series:</b>		Slowly flashes the horn light in orange, and turns on the mode indicator.	
<b>SMESS.NOTICE.NOTICE2</b>	<b>OK</b>		
Notice 2 for debugging.			
<b>ERS-210:</b>		Turn on the mode indicator, the eye lights (all), and the tail light.	
<b>ERS-220:</b>		Flashes the right face side light in blue.	
<b>ERS-310 series:</b>		Slowly flashes the horn light in orange, and turns on the mode indicator.	
<b>SMESS.MODE.CLEAR</b>	<b>OK</b>		
Clears debugging display.			
<b>STAND</b>	<b>NG</b>		
Stands.			
<b>STOP_WALK</b>	<b>NG</b>		
Stops walking.			
<b>TOUCH</b>	<b>NG</b>		
Sits down and touches an object at the specified position with right front leg.			
Alias for CONTACT.RIGHT.TOUCH.			
<b>Horizontal angle</b>		0 to 80 Unit: °	
<b>Distance</b>		Distance from AIBO Unit: mm	
<b>TRACK_HEAD</b>	<b>OK</b>		
Tracks the object in sight. (AIBO won't look for it if it loses it.)			
<b>Object</b>		Pink Ball (included in AIBO unit)	
<b>TURN</b>	<b>OK</b>		
Alias for MOVE.TURN.NORMAL.			
<b>Horizontal angle</b>		-180 to 180 Unit: °	
		(+: counter-clockwise, -: clockwise)	
<b>WALK</b>	<b>OK</b>		
Alias for MOVE.MOVE.NORMAL.			
<b>Horizontal angle</b>		-180 to 180 Unit: °	
<b>Distance</b>		0 to 10,000 Unit: mm	

## Programming precautions

- **Command Completion**

Since action commands (PLAY) such as “walk” and “shake head left and right” take time from execution to completion of the action, AIBO returns a completion notice when the action is completed. If you create a program that executes action commands after a completion notice is received, Individual actions can be steadily executed in sequence.

- **Overwriting command execution**

AIBO can execute several commands at the same time, such as “while walking, flash LED and play sound.” However, simultaneous execution of several commands is possible only if resources that the commands use (such as body parts, LEDs, and sounds) don't overlap. For example, if you designate a command to turn off a LED after a command to turn on the same LED, only the last command will be executed and the LED will be turned off. If you designate a command to raise the right leg and a command to lower the same leg before the first action completes, AIBO will lower the right leg in the middle of raising it. Such overlaps are called overwriting command execution. Overwriting command execution doesn't apply to all action commands, so see explanation of each individual command to see if overwriting execution is possible.

## Commands that use variables

---

The commands in this section execute arithmetic operations using variables.

### Restrictions on variables

Observe the following restrictions when using variables.

- Variable names cannot be longer than 32 characters.
  - Use only alphanumeric characters and underscores in variable names.
  - A variable name consisting only of capital letters cannot be used.
  - A value must be a 16-bit integer, between  $-32,768$  and  $+32,767$ .
- 

#### SET

Assigns a value to the variable.

---

#### CLR

Clears a sensor variable.

---

#### ADD

Addition

$[\text{Variable}^*] = [\text{Variable}^*] + [\text{Var}/\text{Value}^*]$

---

#### SUB

Subtraction

$[\text{Variable}^*] = [\text{Variable}^*] - [\text{Var}/\text{Value}^*]$

---

#### MUL

Multiplication

$[\text{Variable}^*] = [\text{Variable}^*] \times [\text{Var}/\text{Value}^*]$

---

#### DIV

Division

$[\text{Variable}^*] = [\text{Variable}^*] \div [\text{Var}/\text{Value}^*]$

---

#### MOD

Remainder

$[\text{Variable}^*] = [\text{Variable}^*] \% [\text{Var}/\text{Value}^*]$

---

---

**IOR**

Logical OR (logical OR per bit)  
 [Variable\*] | [Var/Value\*]

---

**XOR**

Exclusive OR (exclusive OR per bit)  
 [Variable\*] ^ [Val/Value\*]

---

**RND**

Random number  
 Generates a random number from a specified range of [From#] to [To#].  
 Variable\* The random number generated  
 From#/To# Range of the random number

---

**VSAVE**

Saves the value of a variable. Saves the value of a variable in a file in a “Memory Stick.”  
 The name of the file to be saved is  
 \OPEN-R\APP\PC\AMS\<<variable name>.SAV.

**Note**

Up to 8-character variable names can be saved due to file system restrictions.

---

**VLOAD**

Loads the value of a variable from a file in a “Memory Stick.”  
 The name of the file to be loaded is  
 \OPEN-R\APP\PC\AMS\<<variable name>.SAV.

**Note**

Up to 8-character variable names can be saved due to file system restrictions.

---

**VDUMP**

Displays the variable (when executing with a wireless LAN).

---



---

**Other commands**

---

**STOP**

Stops AIBO.  
 If an action is being played back, AIBO is stopped after the action is completed.

---

**QUIT**

Stops AIBO immediately.  
 AIBO is stopped even in mid-action.

---

**WAIT**

Waits for the current action to end and confirms completion before executing the command that follows the WAIT command.

---

## Variables

The following variables can be used in action boxes and branch boxes in addition to user variables.

### Common to all models

#### Using the AIBO internal clock

##### Year

Year      Effective range: 2000 or later

##### Month

Month

##### Day

Day

##### Hour

Hour (24-hour system)

##### Min

Minutes

##### Sec

Seconds (resolution: 2 seconds)

##### Dow

Day of the week (Sunday = 0, Monday = 1, ....., Saturday = 6)

### Other variables

#### Status

Detects if it has fallen or is in normal state. When AIBO falls down, the variable is set to "1."

To clear the variable, use the SET command to enter "0."

(When AIBO falls down, it gets up automatically and the program is executed again from the beginning.)

#### Wait

The length of time set for the Wait command

Unit: ms

#### Brightness

Brightness of the surroundings (0 - 255)

Darker with smaller numbers, brighter with larger numbers.

#### Pink\_Ball

When the pink ball is detected, the variable is set to "1."

To clear the variable, use the SET command to enter "0."

#### Pink\_Ball\_H

Horizontal angle of the pink ball      Unit: °

#### Pink\_Ball\_V

Vertical angle of the pink ball      Unit: °

#### Pink\_Ball\_D

Distance to the pink ball      Unit: mm

---

**AU\_AiboSound**

Used for AIBO-ware with media link mode capability.

When an AIBO sound such as a media link sound is detected, the variable is set to "1."

To clear the variable, use the SET command to enter "0."

---

**AU\_AiboSound\_ID**

Tone ID of an AIBO sound such as a media link sound. (See "Media link sound that can be used for sound recognition" <page 60>.)

---

**AU\_AiboTone**

When a command tonal scale used for AIBO ERS-110/111 is detected, the variable is set to "1."

To clear the variable, use the SET command to enter "0."

---

**AU\_AiboTone\_ID**

Tonal scale ID used for AIBO ERS-110/111. (See "Tonal scales that can be used for sound recognition" <page 62>.)

---

**AU\_Voice**

When a word is detected using voice recognition, the variable is set to "1."

To clear the variable, use the SET command to enter "0."

---

**AU\_Voice\_ID**

ID of a word detected using voice recognition. (See "Words that can be used for voice recognition" <page 59>.)

---

**Batt\_Rest**

Remaining AIBO battery power      Unit: %

---

**Batt\_Temp**

AIBO battery temperature      Unit: °C

---

---

**Body\_Temp**

AIBO Temperature      Unit: °C

---

**Distance**

Distance from the obstacle sensor to an obstacle.

If there are no obstacles, "900" will return.

Effective range: 0 - 600      Unit: mm

---

## Words that can be used for voice recognition

The following voice recognition terms can be used as AU\_Voice\_ID variables. What action AIBO should take in response to a word input can be freely determined.

ID		When to use (example)
1	AIBO	Talk to AIBO
2	What's your name?	Ask its name (Use an action with a WAV file in which the name is recorded).
3	Say hello	Ask to say hello
4	Shake paw	Ask to shake a paw
5	Morning	Morning greeting
6	Hello	Daytime greeting
7	Good night	Night greeting
8	See you	Part with AIBO
9	How are you?	Ask how AIBO is doing
10	Hey AIBO	Talk to AIBO
11	Thanks	Express gratitude
12	Sorry	Apologize
13	Cheer up	Cheer up
14	Banzai	Play together
15	That's right	Tell AIBO something is right
16	That's wrong	Tell AIBO something is wrong
17	Good AIBO	Praise
18	Stop it	Scold
19	Let's play!	Ask AIBO to play.
20	Sing a song	Make AIBO sing a song.
21	Dance	Ask AIBO to dance
22	Show time	Ask AIBO to perform
23	Pose for me	Ask for a special pause
24	Clown around	Ask AIBO to do something silly
25	Show off	Ask AIBO to do something it is good at
26	Say message	Make AIBO say something
27	Let's be secret	Tell a secret story
28	Open sesame	Break a spell with a magic word
29	Happy day	Tell a funny thing
30	Stand up	Make AIBO stand up
31	Lie down	Make AIBO lie down
32	Sit down	Make AIBO sit down
33	Turn right	Make AIBO turn or move right
34	Turn left	Make AIBO turn or move left
35	Go forward	Make AIBO go forward
36	Go backward	Make AIBO back off
37	Go ahead	Make AIBO start doing something
38	Stop	Make AIBO stop doing something
39	Faster	Make AIBO do something faster
40	Slow down	Make AIBO do something slower
41	Pink ball	Make AIBO respond to the pink ball
42	Right leg kick	Make AIBO kick the pink ball with its right hind leg
43	Right leg touch	Make AIBO touch the pink ball with its right foreleg

44	Left leg kick	Make AIBO kick the pink ball with its left hind leg
45	Left leg touch	Make AIBO touch the pink ball with its left foreleg
46	Ready set go	Make AIBO start competing
47	You won	Tell AIBO that it won
48	You lost	Tell AIBO that it lost
49	Action one	Free use
50	Action two	Free use
51	Action three	Free use
52	Action four	Free use
53	Action five	Free use

## Media link sounds that can be used for sound recognition

AIBO-ware “AIBO Pal (ERF-310AW07E)” for AIBO ERS-310 series is equipped with a “Media link mode” that enables AIBO to communicate with media by responding to specific sound signals from media such as television and video. AIBO Master Studio version 1.1 can create programs to detect such media link sounds.

The following media link sound can be used for variable AU\_AiboSound\_ID. (There are sound files in the installed Sample\AiboSound folder.) Media link sounds include explanations of how AIBO ERS-310 series with AIBO Pal installed will react, but the actions AIBO should take in response to media link sounds can be freely determined.

### Note

For details of media link mode, see the operating manual attach to the individual product.

ID	File name	Reaction of AIBO ERS-310 series with AIBO Pal (ERF-310AW07E) installed
1	AS_Start_AC	If you have two AIBO ERS-310 series units with AIBO Pal installed, and they hear this melody, they will begin communication between each other. (Same as letting AIBO recognize the word "Talk to your friend.")
2	AS02_Start_ML1	Starts media link mode. (Same as letting it recognize the phrases "Media link mode.")
3	AS03_Start_ML2	
4	AS04_Start_ML3	
5	AS05_End_ML	Ends media link mode, and returns to autonomous mode. (Same as letting AIBO recognize the word "That's it.")
6	AS06_Hello	Raises a front paw in greeting.
7	AS07_Bye	Waves a front paw to say goodbye.
8	AS08_Sleep	Lies on its stomach and pretends to sleep.
9	AS09_Nod_Short	Gives a short nod.
10	AS10_Nod_Long	Gives a long nod.
11	AS11_Expect	Shows great expectation.
12	AS12_Yes	Responds positively.
13	AS13_No	Responds negatively.
14	AS14_Question	Responds questioningly.
15	AS15_Joy	Pose of joy.
16	AS16_Happy	Pose of great joy.
17	AS17_Disgust	Pose of reluctance.

18	AS18_Surprise	Pose of surprise.
19	AS19_Sad	Pose of sadness.
20	AS20_Relief	Pose of relieved look.
21	AS21_Appeal	Requests and desires.
22	AS22_Action	Performs various characteristic actions.
23	AS23_Dance	Dances.
24	AS24_Song1	Sings.
25	AS25_Song2	
26	AS26_Fav_Dance	Performs favorite dance.
27	AS27_Fear	Pose of fear.
28	AS28_Greet	Bows.
29	AS29_Pose	Poses for photo opportunity.
30	AS30_Cheer	Raises both front paws.
31	AS31_Look	Pose of caution.
32	AS32_Abash	Pose of shyness.
33	AS33_Charm	Acts charmingly.
34	AS34_Type_Check	Tells you its characteristic type. (Same as letting AIBO recognize the word "Do you feel okay?")
35	AS35_Call	Notices incoming call.

## Tonal scales that can be used for sound recognition

Using AIBO's perfect pitch, you can utilize tonal scales as AIBO ERS110/111 commands. AIBO Master Studio version 1.1 can create programs to detect such tonal scales.

The following tonal scales can be used for the variable AU\_AiboTone\_ID. (Use sounds in the installed Sample\AiboTone folder and AIBO ERS-110/111 sound commander for input.) What action AIBO should take in response to tonal scales can be freely determined.

\*ID 1 – 34 are command type A, and 35 – 68 are command type B.

ID	Tonal Scale	Sound file	ID	Tonal Scale	Sound file	Button in the sound controller that comes with AIBO ERS-110/111*		Settings of AIBO ERS-110/111	
						Command number method	Short scale method	Meaning of tonal scale	Action mode
1	C5 D5 E5	AT01.mid	35	C6 D6 E6	AT35.mid	00→SEND	CDE	Set AIBO to the autonomous mode	Motion modes in general
2	C5 E5 D5	AT02.mid	36	C6 E6 D6	AT36.mid	01→SEND	CED	Set AIBO to the game mode	
3	E5 C5 D5	AT03.mid	37	E6 C6 D6	AT37.mid	02→SEND	ECD	Set AIBO to the performance mode	
4	E5 D5 C5	AT04.mid	38	E6 D6 C6	AT38.mid	03→SEND	EDC	Set AIBO to the "charging posture"	
5	G5 C5 D5	AT05.mid	39	G6 C6 D6	AT39.mid	81→SEND	GCD	Set AIBO to the command type A	
6	G5 D5 C5	AT06.mid	40	G6 D6 C6	AT40.mid	83→SEND	GDC	Set AIBO to the command type B	
7	C5 G5 D5	AT07.mid	41	C6 G6 D5	AT41.mid	84→SEND	CGD	Lower the volume one level	
8	C5 D5 G5	AT08.mid	42	C6 D6 G6	AT42.mid	86→SEND	CDG	Raise the volume one level	
9	D5 E5 C5	AT09.mid	43	D6 E6 C6	AT43.mid	88→SEND	DEC	Set AIBO to the sleep8 mode	
10	D5 C5 E5	AT10.mid	44	D6 C6 E6	AT44.mid	89→SEND	DCE	Set AIBO to the sleep mode	

\*ID 1 – 34 are command type A, and 35 – 68 are command type B.

ID	Tonal Scale	Sound file	ID	Tonal Scale	Sound file	Button in the sound controller that comes with AIBO ERS-110/111*		Settings of AIBO ERS-110/111	
						Command number method	Short scale method	Meaning of tonal scale	Action mode
11	C5 Eb5 G5	AT11.mid	45	C6 Eb6 G6	AT45.mid	11→SEND	CD#G	Stand up	Performance mode
12	C5 G5 Eb5	AT12.mid	46	C6 G6 Eb6	AT46.mid	12→SEND	CGD#	Sit down	
13	G5 Eb5 C5	AT13.mid	47	G6 Eb6 C6	AT47.mid	13→SEND	GD#C	Lay down	
14	C5 E5 F5	AT14.mid	48	C6 E6 F6	AT48.mid	31→SEND	CEF	Show Style 1	
15	C5 F5 E5	AT15.mid	49	C6 F6 E6	AT49.mid	32→SEND	CFE	Show Style 2	
16	F5 C5 E5	AT16.mid	50	F6 C6 E6	AT50.mid	33→SEND	FCE	Show Style 3	
17	F5 E5 C5	AT17.mid	51	F6 E6 C6	AT51.mid	34→SEND	FEC	Show Style 4	
18	C5 F5 G5	AT18.mid	52	C6 F65 G6	AT52.mid	41→SEND	CFG	Show Performance 1	
19	C5 G5 F5	AT19.mid	53	C6 G6 F6	AT53.mid	42→SEND	CGF	Show Performance 2	
20	G5 C5 F5	AT20.mid	54	G6 C6 F6	AT54.mid	43→SEND	GCF	Show Performance 3	
21	G5 F5 C5	AT21.mid	55	G6 F6 C6	AT55.mid	44→SEND	GFC	Show Performance 4	
22	F5 C5 G5	AT22.mid	56	F6 C6 G6	AT56.mid	45→SEND	FCG	Show Performance 5	
23	C5 D5 F5	AT23.mid	57	C6 D6 F6	AT57.mid	52→SEND	CDF	Move forward	Game mode
24	Eb5 C5 F5	AT24.mid	58	Eb6 C6 F6	AT58.mid	55→SEND	D#CF	Stop	
25	C5 F5 D5	AT25.mid	59	C6 F6 D6	AT59.mid	58→SEND	CFD	Move backward	
26	D5 F5 C5	AT26.mid	60	D6 F6 C6	AT60.mid	51→SEND	DFC	Kick with the left foot	
27	D5 C5 F5	AT27.mid	61	D6 C6 F6	AT61.mid	53→SEND	DCF	Kick with the right foot	
28	F5 D5 C5	AT28.mid	62	F6 D6 C6	AT62.mid	54→SEND	FDC	Turn to the left	
29	F5 C5 D5	AT29.mid	63	F6 C6 D6	AT63.mid	56→SEND	FCD	Turn to the right	
30	Eb5 F5 C5	AT30.mid	64	Eb6 F6 C6	AT64.mid	50→SEND	D#FC	Turn the ball tracking function on/off	
31	C5 Eb5 F5	AT31.mid	65	C6 Eb6 F6	AT65.mid	5#→SEND	CD#F	Pose of triumph	
32	C5 F5 Eb5	AT32.mid	66	C6 F6 Eb6	AT66.mid	5*→SEND	CFD#	Pose of vexation	
33	F5 C5 Eb5	AT33.mid	67	F6 C6 Eb6	AT67.mid	57→SEND	FCD#	Pick up an object	
34	F5 Eb5 C5	AT34.mid	68	F6 Eb6 C	AT68.mid	59→SEND	FD#C	Release an object	

## For AIBO ERS-210/220

---

### Using AIBO touch sensors

---

#### Head\_ON

- ERS-210: When the head sensor is pressed, the variable is set to “1.”
- ERS-220: When the head sensor is pushed down, the variable is set to “1.”
- To clear the variable, use the SET command to enter “0.”
- 

#### Head\_OFF

- ERS-210: The length of time the head sensor is pressed.
- ERS-220: The length of time the head sensor is pushed down.
- Effective range: 0 to 10,000      Unit: ms
- 

#### Head\_Pat

- ERS-210: When the head sensor is patted twice back and forth, the variable is set to “1.”
- ERS-220: When the head sensor is pushed to the back, the variable is set to “1.”
- To clear the variable, use the SET command to enter “0.”
- 

#### Head\_Hit

- ERS-210: When the head sensor is strongly pressed for a short time, the variable is set to “1.”
- ERS-220: When the head sensor is pushed to the front, the variable is set to “1.”
- To clear the variable, use the SET command to enter “0.”
- 

#### Head\_LONG

- ERS-210: When the head sensor is pressed for 3 seconds or longer, the variable is set to “1.”
- ERS-220: When the head sensor is pushed down for 3 seconds or longer, the variable is set to “1.”
- To clear the variable, use the SET command to enter “0.”
- 

#### Back\_ON

- When the back sensor is pressed, the variable is set to “1.”
- To clear the variable, use the SET command to enter “0.”
- 

#### Back\_OFF

- The length of time the back sensor is pressed.
- Effective range: 0 to 10,000      Unit: ms
- 

#### Back\_LONG

- When the back sensor is pressed for 3 seconds or longer, the variable is set to “1.”
- To clear the variable, use the SET command to enter “0.”
- 

#### Jaw\_ON

- When the chin/face sensor is pressed, the variable is set to “1.”
- To clear the variable, use the SET command to enter “0.”
- 

#### Jaw\_OFF

- The length of time the chin/face sensor was pressed.
- Effective range: 0 to 10,000      Unit: ms
- 

#### JAW\_LONG

- When the chin/face sensor is pressed for 3 seconds or longer, the variable is set to “1.”
- To clear the variable, use the SET command to enter “0.”

---

**RFleg\_ON**

When the paw sensor on the front right leg is pressed, the variable is set to “1.”

To clear the variable, use the SET command to enter “0.”

---

**RFleg\_OFF**

The length of time the paw sensor on the front right leg is pressed.

**Effective range:** 0 to 10,000      **Unit:** ms

---

**LFleg\_ON**

When the paw sensor on the front left leg is pressed, the variable is set to “1.”

To clear the variable, use the SET command to enter “0.”

---

**LFleg\_OFF**

The length of time the paw sensor on the front left leg was pressed.

**Effective range:** 0 to 10,000      **Unit:** ms

---

**RRleg\_ON**

When the paw sensor on the hind right leg is pressed, the variable is set to “1.”

To clear the variable, use the SET command to enter “0.”

---

**RRleg\_OFF**

The length of time the paw sensor on the hind right leg was pressed.

**Effective range:** 0 to 10,000      **Unit:** ms

---

**LRleg\_ON**

When the paw sensor on the hind left leg is pressed, the variable is set to “1.”

To clear the variable, use the SET command to enter “0.”

---

---

**LRleg\_OFF**

The length of time the paw sensor on the hind left leg was pressed.

**Effective range:** 0 to 10,000      **Unit:** ms

---

**RTail\_ON** (ERS-220 only)

When the tail sensor (light) is pressed, the variable is set to “1.”

To clear the variable, use the SET command to enter “0.”

---

**RTail\_OFF** (ERS-220 only)

The length of time the tail sensor (light) is pressed.

**Effective range:** 0 to 10,000      **Unit:** ms

---

**RTail\_LONG** (ERS-220 only)

When the tail sensor (light) is pressed for 3 seconds or longer, the variable is set to “1.”

To clear the variable, use the SET command to enter “0.”

---

**CTail\_ON** (ERS-220 only)

When the tail sensor (center) is pressed, the variable is set to “1.”

To clear the variable, use the SET command to enter “0.”

---

**CTail\_OFF** (ERS-220 only)

The length of time the tail sensor (center) was pressed.

**Effective range:** 0 to 10,000      **Unit:** ms

---

**CTail\_LONG** (ERS-220 only)

When the tail sensor (center) is pressed for 3 seconds or longer, the variable is set to “1.”

To clear the variable, use the SET command to enter “0.”

---

**LTail\_ON** (ERS-220 only)

When the tail sensor (left) is pressed, the variable is set to "1."

To clear the variable, use the SET command to enter "0."

**LTail\_OFF** (ERS-220 only)

The length of time the tail sensor (left) was pressed.

Effective range: 0 to 10,000      Unit: ms

**LTail\_LONG** (ERS-220 only)

When the tail sensor (left) is pressed for 3 seconds or longer, the variable is set to "1."

To clear the variable, use the SET command to enter "0."

## Using AIBO joint angles

**Head\_Tilt**

Head: angle of vertical (up and down) direction

Unit: °

**Head\_Pan**

Head: angle of horizontal (right and left) direction

Unit: °

**Head\_Roll**

Head: rolling angle      Unit: °

**Mouth** (ERS-210 only)

Mouth: opening angle      Unit: °

**RFleg\_1**

First joint of front right leg (shoulder): angle of front and back direction      Unit: °

**RFleg\_2**

First joint of front right leg (shoulder): angle of right and left direction      Unit: °

**RFleg\_3**

Second joint of front right leg (elbow): angle of front and back direction      Unit: °

**LFleg\_1**

First joint of front left leg (shoulder): angle of front and back direction      Unit: °

**LFleg\_2**

First joint of front left leg (shoulder): angle of right and left direction      Unit: °

**LFleg\_3**

Second joint of front left leg (elbow): angle of front and back direction      Unit: °

**RRleg\_1**

First joint of hind right leg (hip): angle of front and back direction      Unit: °

**RRleg\_2**

First joint of hind right leg (hip): angle of right and left direction      Unit: °

**RRleg\_3**

Second joint of hind right leg (knee): angle of front and back direction      Unit: °

**LRleg\_1**

First joint of hind left leg (hip): angle of front and back direction      Unit: °

**LRleg\_2**

First joint of hind left leg (hip): angle of right and left direction      Unit: °

**LRleg\_3**

Second joint of hind left leg (knee): angle of front and back direction      Unit: °

---

**Tail\_Tilt** (ERS-210 only)

Tail: angle of vertical (up and down)  
direction      Unit: °

---

**Tail\_Pan** (ERS-210 only)

Tail: angle of horizontal (right and left)  
direction      Unit: °

---

---

## For AIBO ERS-310 series

---

### Using AIBO touch sensors

---

**Head\_ON**

When the head is pressed, the variable is set to “1.”  
To clear the variable, use the SET command to enter “0.”

---

**Head\_OFF**

The length of time the head was pressed.  
Effective range: 0 to 10,000      Unit: ms

---

**Head\_Pat**

If the head is pressed to face downward, the variable is set to “1.”  
To clear the variable, use the SET command to enter “0.”

---

**Head\_Hit**

If the head is pressed to face upward, the variable is set to “1.”  
To clear the variable, use the SET command to enter “0.”

---

**Tail\_Roll3**

If the tail is rolled three times (in either direction), the variable is set to “1.”  
To clear the variable, use the SET command to enter “0.”

---

**Tail\_RollR**

If the tail is rolled once to the right, the variable is set to “1.”  
To clear the variable, use the SET command to enter “0.”

---

**Tail\_RollL**

If the tail is rolled once to the left, the variable is set to “1.”

To clear the variable, use the SET command to enter “0.”

---

**Tail\_U\_LONG**

If the tail is pushed toward the front for three seconds, the variable is set to “1.”

To clear the variable, use the SET command to enter “0.”

---

**Tail\_D\_LONG**

If the tail is pushed toward the back for three seconds, the variable is set to “1.”

To clear the variable, use the SET command to enter “0.”

---

**Tail\_R\_LONG**

If the tail is pushed toward the right for three seconds, the variable is set to “1.”

To clear the variable, use the SET command to enter “0.”

---

**Tail\_L\_LONG**

If the tail is pushed toward the left for three seconds, the variable is set to “1.”

To clear the variable, use the SET command to enter “0.”

---

**Tail\_U\_ON**

If the tail is pushed toward the front, the variable is set to “1.”

To clear the variable, use the SET command to enter “0.”

---

---

**Tail\_D\_ON**

If the tail is pushed toward the back, the variable is set to “1.”

To clear the variable, use the SET command to enter “0.”

---

**Tail\_R\_ON**

If the tail is pushed toward the right, the variable is set to “1.”

To clear the variable, use the SET command to enter “0.”

---

**Tail\_L\_ON**

If the tail is pushed toward the left, the variable is set to “1.”

To clear the variable, use the SET command to enter “0.”

---

**RFleg\_ON**

When the paw switch on the front right leg is pressed, the variable is set to “1.”

To clear the variable, use the SET command to enter “0.”

---

**RFleg\_OFF**

The length of time the paw switch on the front right leg was pressed.

Effective range: 0 to 10,000      Unit: ms

---

**LFleg\_ON**

When the paw switch on the front left leg is pressed, the variable is set to “1.”

To clear the variable, use the SET command to enter “0.”

---

**LFleg\_OFF**

The length of time the paw switch on the front left leg was pressed.

Effective range: 0 to 10,000      Unit: ms

---

---

**RRLeg\_ON**

When the paw switch on the hind right leg is pressed, the variable is set to "1."

To clear the variable, use the SET command to enter "0."

---

**RRLeg\_OFF**

The length of time the paw switch on the hind right leg was pressed.

Effective range: 0 to 10,000      Unit: ms

---

**LRLeg\_ON**

When the paw switch on the hind left leg is pressed, the variable is set to "1."

To clear the variable, use the SET command to enter "0."

---

**LRLeg\_OFF**

The length of time the paw switch on the hind left leg was pressed.

Effective range: 0 to 10,000      Unit: ms

---

## Using AIBO joint angles

---

**Head\_Tilt**

Head (bottom of neck): angle of vertical (up and down) direction      Unit: °

---

**Head\_Pan**

Head: angle of horizontal (right and left) direction  
Unit: °

---

**Head\_Tilt2**

Head (area equivalent to face): angle of vertical (up and down) direction      Unit: °

---

**RFLeg\_1**

First joint of front right leg (shoulder): angle of front and back direction      Unit: °

---

---

**RFLeg\_2**

First joint of front right leg (shoulder): angle of right and left direction      Unit: °

---

**RFLeg\_3**

Second joint of front right leg (elbow): angle of front and back direction      Unit: °

---

**LFLeg\_1**

First joint of front left leg (shoulder): angle of front and back direction      Unit: °

---

**LFLeg\_2**

First joint of front left leg (shoulder): angle of right and left direction      Unit: °

---

**LFLeg\_3**

Second joint of front left leg (elbow): angle of front and back direction      Unit: °

---

**RRLeg\_1**

First joint of hind right leg (hip): angle of front and back direction      Unit: °

---

**RRLeg\_2**

First joint of hind right leg (hip): angle of right and left direction      Unit: °

---

**RRLeg\_3**

Second joint of hind right leg (knee): angle of front and back direction      Unit: °

---

**LRLeg\_1**

First joint of hind left leg (hip): angle of front and back direction      Unit: °

---

**LRLeg\_2**

First joint of hind left leg (hip): angle of right and left direction      Unit: °

---

**LRLeg\_3**

Second joint of hind left leg (knee): angle of front and back direction      Unit: °

---





# Overview

The Action Composer application lets you modify the sample actions or create actions from scratch. By using original actions tailored to each situation, your AIBO will become capable of unique expressions.

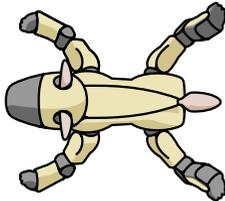
The actions you create are incorporated in a behavior program with Quick Behavior Arranger or Behavior Arranger.

## What you can make with Action Composer

With Action Composer, you can make elements that compose an action, actions themselves and action libraries.

### The three elements of an action

You can make the three elements (motion, sound and LED flashing pattern) that combine to form an action. Elements that are made with Action Composer can be saved as individual files and used to create other actions.



### Motion

AIBO's motions are relatively brief units of movement, such as yawning and offering a paw. A unit of movement that begins with a start pose and finishes with an end pose is defined as a single motion.

A motion is made by placing poses sequentially between the start and end poses. A frame (one frame of movement as in animation) defined with a pose is called a "key frame."

Gaps between key frames are automatically interpolated, both in Action Composer and while AIBO is operating, so that a motion plays back smoothly.

When a motion is saved, a motion file (.mtn) will be made. Key frames cannot be saved individually but they can be copied and used to create other motions.

## Sound

AIBO can use sounds in WAVE and MIDI formats for melodies and sound effects, and import a file made with a commercially available sound editor to use as a sound element in Action Composer. Action Composer is very convenient as you can make MIDI sounds that are compatible with AIBO without worrying about format restrictions. You cannot make WAVE files in Action Composer but you can import and edit WAVE files.

When a sound is saved, a sound file (.wav or .mid) will be made.



## LED

You can specify the flashing patterns and brightness levels for AIBO's body lights (LED). When LED data is saved, an LED file (.led) will be made.



## Action

An action is a combination of elements.

You can make new actions by changing the combination of elements or by using newly created elements. An action does not have to be a combination of all three elements; an action can be made of one element only.

The file that manages this combination of elements is called an action file (.act).

With Action Composer, you can synchronize the timing of the three elements while you put them together. For instance, you can make the LED's flashing pattern synchronize with the motion, or adjust the sound and LED elements to start at the same time.

You can make actions and elements up to 250 seconds long. However, if a motion longer than 30 seconds is played on an ERS-210/220, a great load will be placed on the motor, so create actions and elements that are less than 30 seconds long for those models.

## Action library

An action library is a group of actions. All actions used in a single behavior program are managed by one library.

The file of an action library is called an action library file (.alb).

When an action library is saved to the "Memory Stick," the library is also copied to the PC's hard disk and the library contents can be referred to from Quick Behavior Arranger or Behavior Arranger. On the "Memory Stick," the action library is converted to a format that AIBO can understand, so this file cannot be edited with Action Composer.

### Note

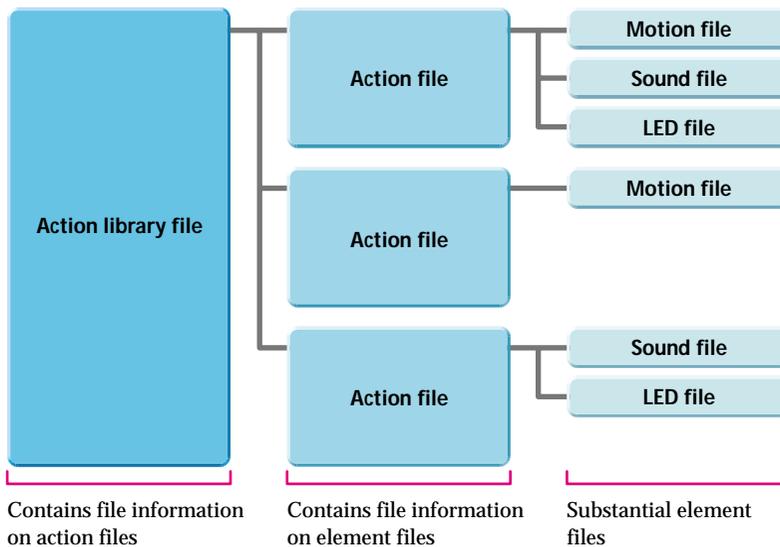
The system actions provided in Quick Behavior Arranger or Behavior Arranger cannot be opened or modified with Action Composer.

## Files that can be created in Action Composer

The five following types of files can be created in Action Composer.

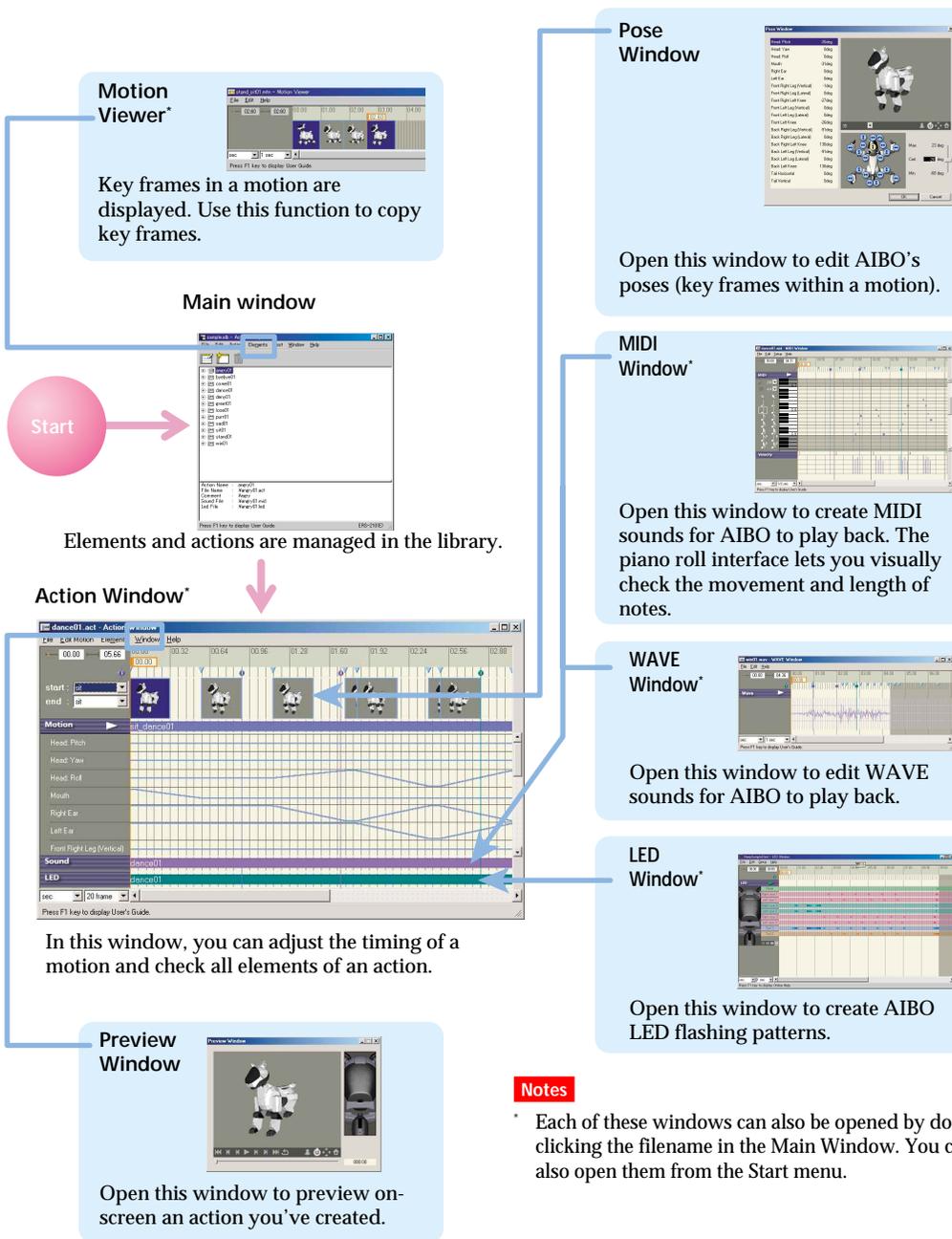
Motion files (.mtn)	Element file
Sound files (.wav, .mid)	Element file
LED files (.led)	Element file
Action files (.act)	Management file of element combination
Action library files (.alb)	Libraries of action files

These files are related to a program as shown in the following diagram. If you transfer individual files directly disregarding their relations, they cannot be used.



## Window organization

Action Composer is made up of several windows as illustrated below.



# Creating and Editing Files

Action library files, action files, and element files can be created in a flowing series or individually. Files can be created by loading and editing existing files, however this section describes how to create new files. Files that you created using previous versions of AIBO Master Studio except sound files can be loaded as AIBO ERS-210 files. (Sound files can be commonly used with AIBO ERS-210/220/310 series).

## Creating a library first

This section describes how to create action library files, action files, and element files in that order. Create action library files according to your needs, such as compiling only actions that are necessary for behaviors, or grouping actions for a specific AIBO model.

- 1 Click the Start button in Windows and choose Programs - AIBO Master Studio - Action Composer.

Action Composer will start.

- 2 From the menu, select File-New Library.

You can also choose Create New Library in the navigation dialog box. The Select Model dialog box appears.



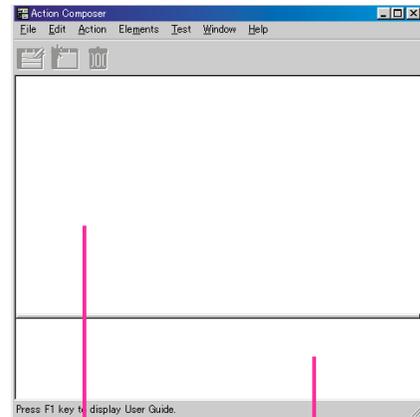
- 3 Select your AIBO model.

Select your AIBO model name and click OK. The Create New Library dialog box appears.

- 4 Create new library file

Choose where to save the file, input the library name, and click Save.

The library file will be created, and the name of the library file you saved will appear as the window title.



Library display area

Detailed information area

### Tip

- Choose a file name (such as a model name) that will help you to associate the action library with the behavior program for easy recognition later.
- You can also select File-Properties from the menu, and input Creator/Company/Comment.

## 5 Create new action file

Either click , or from the menu, select Action-New Action.

The Create Actions dialog box to save action file appears.

## 6 Save new action file

Choose where to save the file, input action file name, and click Save.

An action file will be created and the action name and action file name will appear in the detailed information area of the Main Window.

### Tip

You can also insert comments by selecting Action-Add Comment from the menu.

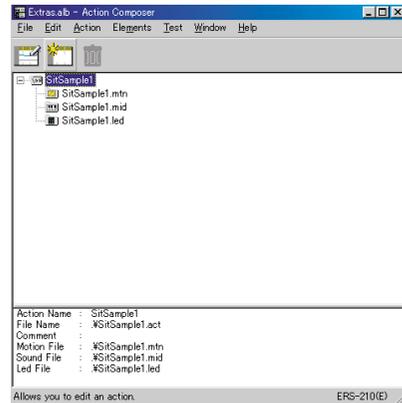
## 7 Click to select an action file to edit, and create a new element file

Create element file by choosing the Elements menu in the Main Window.

Motion file (.mtn)	Click New Motion
MIDI file (.mid)	Click New MIDI
LED file (.led)	Click New LED

When you click a menu item, a dialog box appears for saving a file.

Choose where to save the file, input a file name, and click Save. The file will be created and the file name will appear in the detailed information area of the Main Window.



### Note

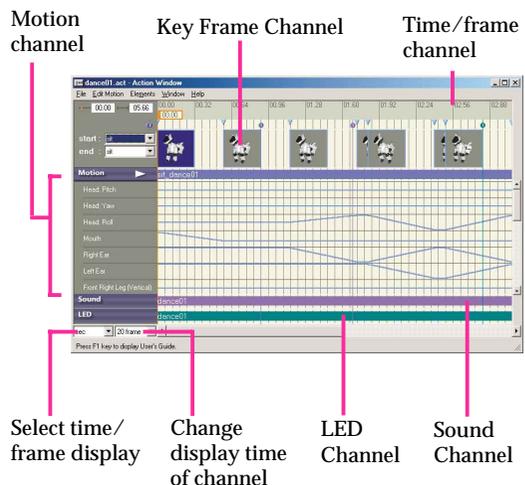
You cannot create WAVE files in Action Composer. If you want to use a WAVE file, prepare it in advance and add it to an action file by choosing Elements-ADD Sound from the menu.

For WAVE file format, see “Principal files” (page 138). You can create WAVE files using software such as the Sound Recorder included in Windows.

## 8 Open action files

While selecting an action file, either click , or from the menu, select Action-Edit Action.

Action Window will appear.



See “Action Composer” in “Chapter 6 Reference” (page 114) for explanation of Action Window names and functions.

---

## 9 Edit elements

Edit motions in the Action Window. Edit sound files in the MIDI or WAVE Window, and LED files in the LED Window. The windows appear when you select Elements-Edit Sound or Elements-Edit LED from the menu. For information about editing elements, see “Editing Elements” (page 82).

### Tip

If you are using sound/LED files with data as elements, you can open each window by double-clicking the sound channel or LED channel in Action Window.

---

## 10 Save each file

When you finish editing an element, save the element file by selecting File-Save from the menu. Save action files and library files in the same manner.

---

## Creating an action file first

If you already have element files that can be used, you can create action files. Motion files can be created at the same time as action files.

- 
- 1 Click the Start button in Windows and choose Programs-AIBO Master Studio-Action Composer Tool-Action Window.**

The Select model dialog box appears.

- 
- 2 Select your AIBO model.**

Select your AIBO model name and click OK.

The Action Window appears.

- 
- 3 Add elements.**

From the Elements menu, select Add Motion, Add Sound or Add LED to add an element.

**Tip**

You can also create motion files by selecting Elements New Motion from the menu.

- 
- 4 Save action file.**

From the menu, select File-Save As to save the action file.

---

To include action files that you have created in an action library file, select Action-Add Action from the Main Window menu.

**Note**

If you add a motion to an action file in the Action Window, then edit the motion and save the action file, the original motion file will also change, so be careful. Try to use a copy of an element when editing as much as possible.

## Creating an element file first

If you create and add element files as you have ideas, that will be very convenient, as you will have a wider variety to choose from when creating actions.

### Motion file

- 1 **Click the Start button in Windows and choose Programs-AIBO Master Studio-Action Composer Tool-Action Window.**

The Select model dialog box appears.

- 2 **Select your AIBO model.**

Select your AIBO model name and click OK.

The Action Window appears.

- 3 **Create a motion file.**

From the menu, select Elements New Motion to create a motion file.

- 4 **Create a motion.**

- 5 **Save the motion.**

From the menu, select Element-Save Motion As to overwrite the file created in step 3.

### Sound file

#### Note

You can make simple edits to a WAVE file in the WAVE Window, but you cannot create a new file. If you want to create a new file, use software such as the Sound Recorder included in Windows. For formats to save to, see “Principal files” (page 138).

- 1 **Click the Start button in Windows and choose Programs-AIBO Master Studio-Action Composer Tool-MIDI Window.**

The MIDI Window appears.

- 2 **Compose a sound.**

- 3 **Save the sound.**

From the menu, select File-Save As to save.

### LED file

- 1 **Click the Start button in Windows and choose Programs-AIBO Master Studio-Action Composer Tool-LED Window.**

The Select model dialog box appears.

---

**2** Select your AIBO model.

Select your AIBO model name and click OK.  
A LED Window appears.

---

---

**4** Save the LED pattern.

From the menu, select File-Save As to save it.

---

---

**3** Create a LED pattern.

## Using action libraries in Behavior Program

Save action library files that you created to a “Memory Stick” by using either a “Memory Stick” drive or by transferring them to AIBO over a wireless LAN. If you save action library files on a “Memory Stick,” they will automatically be copied to the computer hard disk so that you can use them in Behavior Arranger and Quick Behavior Arranger.

**Note**

System files for a different model cannot be saved.

### When you use a “Memory Stick” drive

---

**1** Insert a “Memory Stick” with the appropriate system files into the drive.

---

**2** While the action library you created is displayed in the Main Window, select File-Save Library To Memory Stick from the menu.

---

### When you use a wireless LAN

---

**1** Insert a “Memory Stick” with the appropriate system files into AIBO, and boot AIBO.

---

**2** While the action library you created is displayed in the Main Window, select File - Upload Library To AIBO from the menu.

---

**Tip**

Information about action library files that you created in Action Composer will be saved in the following files in a “Memory Stick.”

```
\OPEN-R\APP\PC\AMS\ACTION.CFG
\OPEN-R\MW\CONF\ERS-xxx.MWC
\OPEN-R\MW\DATA\AUDIO.ODA
\OPEN-R\MW\DATA\LED.ODA
\OPEN-R\MW\DATA\MOTION.ODA
```

# Editing Elements

This section describes how to edit elements.

## Tip

Please refer to the element samples (Sample.alb) and work samples (Extras.alb) in the \Sample\model name folder.

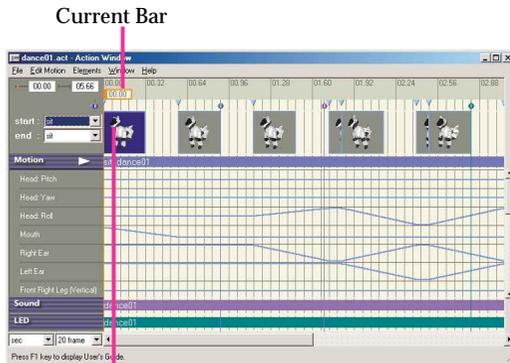
## Motion file

Edit motions using the Action Window. Edit individual poses in key frames in the Pose Window.

### Editing motions

#### How to create a new motion

If you create a new motion file, only the start pose and end pose key frames will appear in the Key Frame Channel. If you arrange numbers of poses (key frames) between the start pose and the end pose, intermediary poses will be automatically filled in to create one motion.



Key Frame

- 1 Click the position in the motion channel at which you want to create a pose.

The Current Bar will move, and the frame at the current position will be selected.

- 2 From the menu, choose **Edit Motion - Change To Key Frame**.

A key frame is created.

- 3 Edit the pose.

If you double-click the key frame that you created, the Pose Window appears. For details on editing a pose, see “Editing Poses.” (page 85)

- 4 Repeat steps 1 to 3 as necessary to create key frames.

- 5 Review the motion

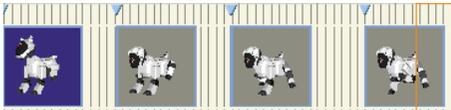
If you click Replay button , the Preview Window will appear and the motion will be replayed.

For names and functions in the Preview Window, see “Action Composer” (page 114) in “Chapter 6 Reference.”

## Editing in the motion channel

### 1 Select the frame you want to edit.

To select a single key frame, click on the key frame. To select subframes other than key frames, move the current bar to select a single frame at the current position. To select sequential key frames together, click the first key frame and then shift-click the last key frame. Selected key frames turn light blue, and the frames turn black.



#### Tip

When you select a frame, changing the zoom rate in the time range box at the bottom-left corner of the window will help you select more easily.

### 2 From the Edit Motion menu, choose the edit command you want.

#### Undo

Cancels the last operation in the key frame channel and returns to the previous state.

#### Redo

Resume an operation canceled by using Undo.

#### Cut

Cuts out the selected frame and copies it to the clipboard.

#### Copy

Copies the selected frame to the clipboard.

#### Overwrite

Overwrites the clipboard contents onto the current position.

#### Paste

Pastes the clipboard contents onto the current position.

#### Delete Frame

Deletes the selected frame. Start and end poses cannot be deleted.

#### Insert Frame

Inserts a subframe in the current position.

#### Change To Key Frame

Changes the selected subframe to a key frame.

Use this function to edit a pose in a subframe or adjust the position of a subframe.

### Using existing motion files

You can insert an existing motion file into a motion you're working on or copy key frames from an existing motion file.

#### ■ To insert a motion

---

**1** Select the frame where you want to insert the motion.

---

**2** From the menu, choose Elements-Insert Motion and choose the motion file.

The selected motion is inserted before the frame.

**Note**

You cannot insert a motion in a starting frame.

---

#### ■ To use a key frame

---

**1** Click the Start button in Windows and choose Programs-AIBO Master Studio-Action Composer Tool-Motion Viewer.

The Motion Viewer window appears.

---

**2** Open a motion file.

From the menu, select File-Open to select a file name. The file's key frame will appear.

---

**3** In the Motion Viewer window, select the frame(s) you want to copy.

Select a key frame as in step 1 of "Editing in the motion channel." To select all the frames, choose Edit-Select All from the menu.

---

**4** From the menu, choose Edit-Copy.

The selected frame(s) is copied to the clipboard.

---

**5** Return to the Action Window and select the frame where you want to insert the frame(s).

---

**6** From the Edit Motion menu, choose Overwrite or Paste.

The copied frame(s) is pasted to the Key frame channel.

---

### Adjusting the positions of key frames

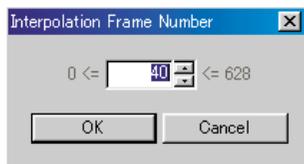
Adjust the position of a key frame to change a movement's timing. All key frames except for the key frame of the start pose can be adjusted.

#### 1 Right-click on a key frame.

The context menu appears.

#### 2 Choose Set Interpolation Frame.

The dialog box appears.



#### 3 Enter the number of subframes from the preceding key frame and click OK.

The key frame moves to the new position.

#### Tip

1 frame is equivalent to 0.016 second.

### To make slight adjustments to the key frame position

Click the motion channel to select a subframe and press the Delete or Insert key on the keyboard. By adding or inserting subframes, you can adjust the position of the key frame.

## Editing Poses

### Changing start and end poses

In the Key frame channel, choose the poses you want from the start and end combo box. Start and end poses cannot be modified.

#### Note

Start and end poses are assigned set poses such as stand, sit or sleep. If you use more than one motion in Behavior Arranger and the second motion starts with a pose that is different from the end pose of the first motion, the set poses make it possible for AIBO's built-in program to make a smooth transition from one motion to the next.

## Setting up a pose

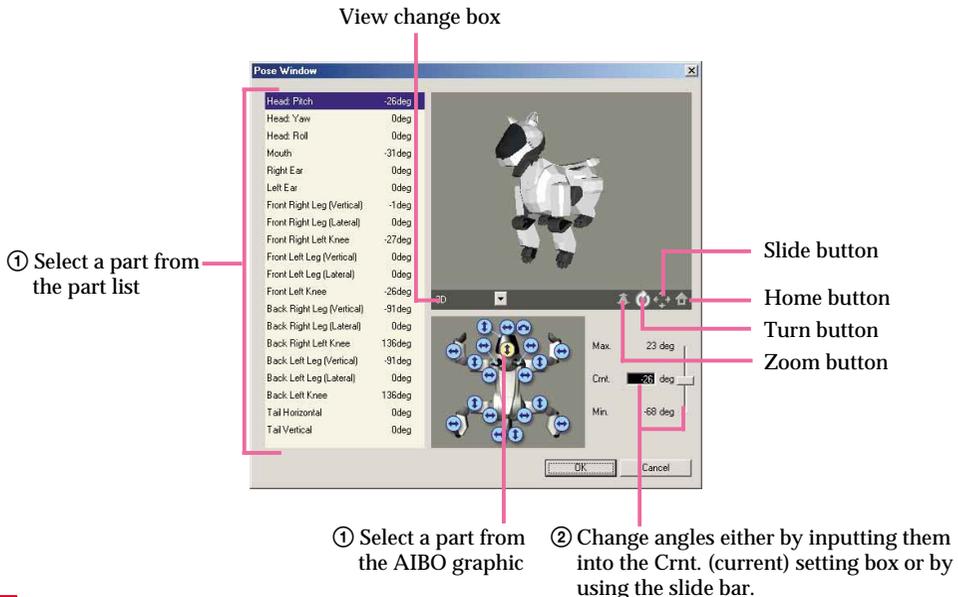
In the Action Window, double-click a key frame in the key frame channel. The Pose Window will appear for you to define a pose.

A pose is defined by specifying the angles of AIBO's joints for any given moment.

### 1 Double-click a key frame displayed in the key frame channel.

The Pose Window opens.

### 2 Select a body part either from the part list or the AIBO graphic, and set the angle.



#### Note

Press the ← → keys on the keyboard to change the angle one degree at a time.

#### ■ To adjust the viewpoint

Choose a viewpoint from the pull-down menu of the switch view box.

Alternatively, select either of the zoom, rotate or pan buttons and drag on the 3D view to adjust the view. Clicking the home position button resets the view to the viewpoint set up in the switch view box (initial setting).

### 3 When you've adjusted AIBO to the pose you want, click OK.

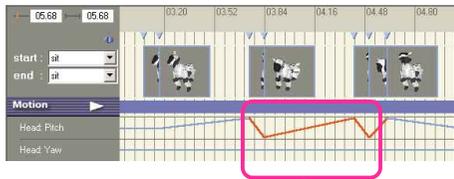
The Pose Window closes, and the pose in the key frame in the Action Window changes to the new pose.

## Precautions on motions

Take the following precautions when making a motion.

For tips on creating motions, see the “Tutorial Guide” advanced course section.

- If the joints move too abruptly from one key frame to another, the graph in the motion channel turns red. Scroll through the motion channel to check for red lines and adjust the motion to make red indications disappear. If a motion with red lines is played back on AIBO, AIBO will not be able to keep up with the designated speed and that may cause AIBO to malfunction. In such a case, though such a file can be saved as a motion file, it cannot be transferred to a “Memory Stick.”



Area where the motion is too fast.

- Shorter motions result in better program response.  
If a motion lasting longer than 30 seconds is played back on a model ERS-210/220, the motors may be overloaded and AIBO may automatically stop moving.  
Do not make motions lasting longer than 30 seconds.
- If AIBO plays back a motion that changes abruptly from the start pose, AIBO may incorrectly interpret that it has fallen down.
- Motions where AIBO's body parts bump into each other, AIBO hits the floor with force, or AIBO falls down heavily may result in AIBO breaking down. If a similar problem occurs when a motion is played back on AIBO, stop AIBO's operation and modify the motion.

## Editing sound

AIBO uses MIDI and WAVE files for sound effects and melodies. The MIDI and WAVE files are edited in separate windows.

### Note

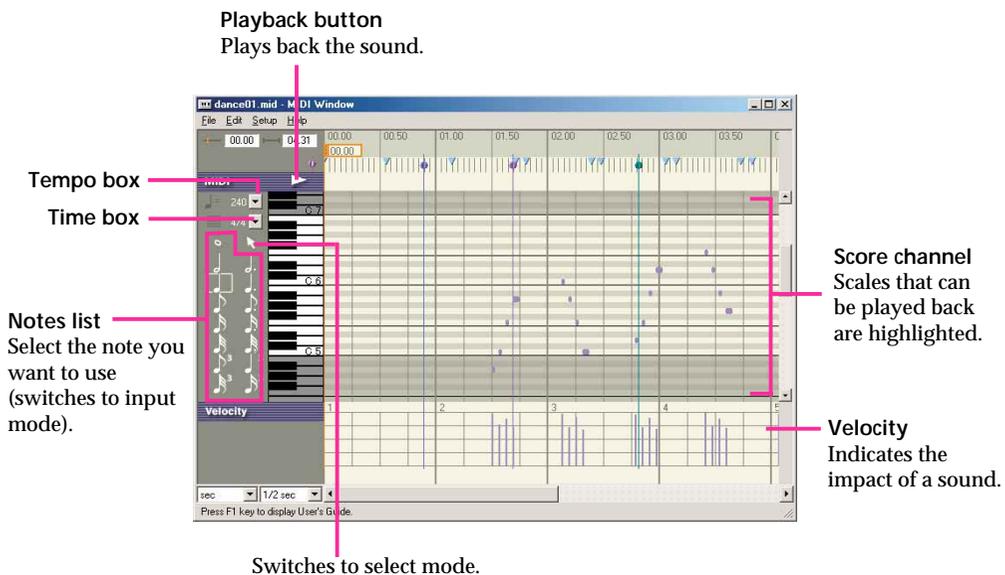
- There are sample media link sounds used in AIBO Pal (ERF-310AW07E) for AIBO ERS-310 series and command sounds (tonal scales) for AIBO ERS-110/111 that you can use as elements. (Behavior Arranger can create programs to respond to these sounds.)  
Media link sounds: installed folder \Sample\AiboSound\  
Tonal scales: installed folder \Sample\AiboTone\  
For the each sound's meaning, see "Media link sounds that can be used for sound recognition" (page 60) and "Tonal scales that can be used for sound recognition" (page 62).
- You can play back sound in either edit window, but if you use the Preview Window, you can play back sound in combination with other elements and check the synchronization. If you use a wireless LAN (AIBO ERS-210/220), we recommend that you test sounds on AIBO. For details, see "Executing tests on AIBO" (page 97).

## MIDI file

Sounds in MIDI format are created and edited in the MIDI window. In Action Composer, you can make MIDI sounds compatible with AIBO without worrying about format restrictions.

The piano-roll interface with a vertical keyboard and a horizontal time frame lets you make and edit sounds intuitively.

### ■ Overview of the MIDI Window



## Setting basic items

Set the items below before you start composing sound.

Tempo box	Choose the number of beats per minute, in quarter notes. You can choose from 120, 160, and 240 beats/min.*
Time box	Choose a rhythm. You can choose from 3/4 and 4/4.

\* If MIDI files edited using commercially available tools have tempos other than those above, open such files in the MIDI Window to add the tempo to the list.

## Composing sound

Specify the note and place sound data on the score channel.

The velocity (impact) of a sound is indicated by the vertical line in the velocity channel. Change the length of the line to adjust the impact of a sound. The length of a sound data on the score channel indicates the length of a note.

### Note

AIBO reproduces only one note at a time (monophonic). You should position sound data so that no more than one note is reproduced at a time. If the notes overlap, the data is converted to monophonic sound when saved to the files.

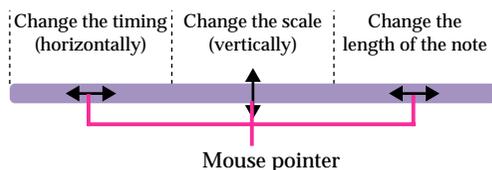
## ■ Making sound data

### 1 Select the note you want and place the sound on the score channel.

If you choose a note, it will change to input mode and the mouse pointer changes to  in the score channel. The length of the sound data corresponds to the note chosen. The velocity is set to maximum and the sound is reproduced. In the input mode, sound data is inserted each time you click the score channel.

### 2 Adjust the sound data as required.

When you place the mouse pointer on an existing sound data, the pointer changes shape depending on the spot and indicates the available editing function. Drag the mouse to make changes.



### 3 Change the velocity as required.

## ■ Changing sound data

### 1 Click .

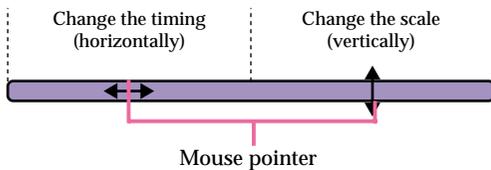
It switches to select mode.

### 2 Select the sound data you want from the score channel and make changes.

Click the sound data you want to change. You can drag on the score channel to select several notes at once. To select all sound data on the score channel, choose Edit-Select All from the menu. Selected sound data is indicated by being surrounded by a black line.

#### To make changes to a sound data

The mouse pointer changes shape depending on the spot and indicates the available editing function.



#### To delete sound data

Press the Delete key on the keyboard.

### 3 Change the velocity as required.

## ■ Changing the velocity

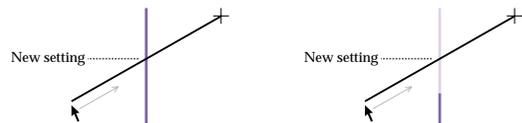
You can change the velocity (impact) of a sound by changing the length of the vertical line in the velocity channel. Velocity for several sounds can be changed together.

You can gradually increase or reduce the volume easily by changing the velocity.

### Drag over the velocity line

For a weaker impact

For a stronger impact



Velocity is set to the point where the line made by the mouse crosses with the vertical line.

## ■ Editing the overall sound data

### 1 Select the sound data you want to edit.

Click  and choose the sound data that you want to change. You can drag on the score channel to select several notes at once. To select all sound data on the score channel, choose Edit-Select All from the menu.

Selected sound data is indicated by being surrounded by a black line.

---

## 2 From the Edit menu, choose the edit command you want.

### Undo

Cancels the last operation and returns to the previous state.

### Redo

Resume an operation canceled by using Undo.

### Cut

Cuts out the selected sound data and copies it to the clipboard.

### Copy

Copies the selected sound data to the clipboard.

### Paste

Pastes the clipboard contents starting from the current position onto the selected scale.

### Insert

Inserts the clipboard contents in the current position for all scales.

### Delete

Deletes the selected sound data.

---

## Using existing sound files

You can use MIDI files created with commercially available sound editors and that are in the format described below.

Use Format0 (single-track/multi-channel)

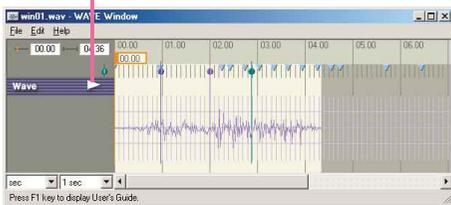
Standard MIDI files. If you open a Format0 file in the MIDI Window and then save it, the data will be converted to a format compatible with AIBO. Functions and limitations are as follows:

- Velocity is effective but volume and expression are not supported.
- The tone cannot be changed since program change/bank select are not supported.
- AIBO emits a single sound at a time (monophonic). If notes overlap, the data is converted to monophonic sound when saved in a file.
- AIBO reproduces notes from C4 to B6 (note numbers 60 to 95). When you specify a note beyond this range, C4 is output. The sound quality of notes C4 to B4 (note numbers 60 to 71) is not as good because of the limitations of AIBO's speakers. We recommend that you use notes higher than C5.
- Resolution: 32 ms. (All notes are quantized at 32 ms intervals.) Do not repeat note boundaries during this time (32ms).
- Channel/track: only 0 is valid for each.
- Do not specify a large amount of data other than note boundaries.

## WAVE file

You can use WAVE files that were made with commercially available sound editors. Use the WAVE Window to edit WAVE files.

**Playback button**  
Plays back the sound



**Wave channel**  
The waveform of the sound is displayed.

### Compatible WAVE files

A WAVE file has a larger data size compared to MIDI files. Avoid using a long WAVE file, or including several WAVE files in a single action library as much as possible. Doing so will affect the amount of space available in the “Memory Stick” for saving other actions.

### ■ Sound format

Use WAVE files with audio formats of 8 kHz, 8-bit, monaural, PCM and that are no larger than 2 MB (250 seconds). Before opening a WAVE file in the WAVE Window, check the format using, for example, the Sound Recorder in Windows.

### Editing a WAVE file

#### 1 Select the segment you want to edit.

On the WAVE channel, click to select the beginning of the segment then shift-click at the end of the segment. The color of the selected segment turns white.

#### Tips

If you click the playback button at this point, you can play back the selected segment.

#### 2 From the Edit menu, choose the edit command you want.

##### Undo

Cancels the last operation and returns to the previous state.

##### Redo

Resume an operation canceled by using Undo.

##### Cut

Cuts out the selected sound and copies it to the clipboard.

##### Copy

Copies the selected sound to the clipboard.

##### Paste

Pastes the clipboard contents onto the current position.

##### Insert

Inserts the clipboard contents in the current position.

##### Delete

Deletes the selected sound.

##### Fade in

Fades in the selected sound.

##### Fade out

Fades out the selected sound.

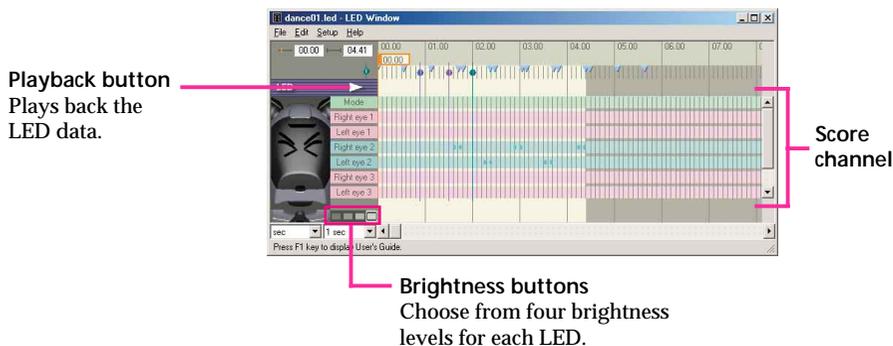
##### Normalize

Normalizes the selected sound (i.e. changes the gain to adjust the maximum amplitude to 100 percent).

## LED file

Flashing LED patterns are created and edited in the LED Window. You can specify the duration and brightness of each LED flash.

All you need to do is select a brightness level for the LED and arrange the LED data in the LED window. The vertical axis represents the LED and the horizontal axis represents time, so you can specify patterns intuitively.



### Tips

- Lights that have several LEDs (the ERS-210 tail light and ERS-310 series horn light) can emit mixed colors.
- You can play back LED data in the LED Window, but if you use the Preview Window, you can play back LED data in combination with other elements and check the synchronization. If you use a wireless LAN, we recommend that you test LED data on AIBO. For details, see “Executing tests on AIBO” (page 97).

### Note

The ERS-220 retractable headlight opens and closes its cover in response to LED lighting. Do not turn the headlight on and off within 500ms due to restrictions regarding opening and closing the structure. Please be careful because Action Composer doesn't have a function to check this.

## Creating LED data

Select a brightness level and arrange the LED data in the LED window.

The length of the arranged LED data corresponds to the duration of the light.

### Specifying LED data

- 1 **Select the brightness level and place LED data on the score channel.**

If you click a LED on the LED plan, it will go into input mode so you can see the corresponding score channel.

The mouse pointer changes to  in the score channel.

When an LED data is placed on the score channel, the corresponding LED in the diagram lights up.

#### Tip

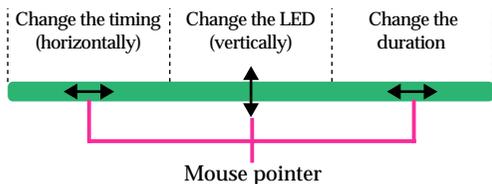
Data will be created with the same duration that was set the last time.

#### Note

The ERS-220 retractable headlight has one brightness level.

- 2 **Adjust the LED data as required.**

When you place the mouse pointer on an existing LED data, the pointer changes shape depending on the spot and indicates the available editing function. Drag the mouse to make changes.



## Changing LED data

- 1 **From the menu, Select Setup - Select Mode.**
- 2 **Select the LED data you want from the score channel and make changes.**

Click the LED data you want to change.

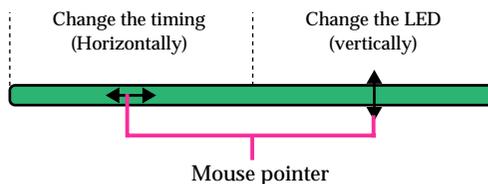
You can drag on the score channel to select several LED data at once.

To select all LED data on the score channel, choose Edit-Select All from the menu.

Selected sound data is indicated by being surrounded by a black line.

#### To make changes to LED data

The mouse pointer changes shape depending on the spot and indicates the available editing function.



#### To delete LED data

Press the Delete key on the keyboard.

#### To change the brightness level

Click the brightness button you want.

## Editing overall LED data

---

### 1 Select the LED data you want to edit.

Select Setup - Select Mode from the menu, and choose the LED data that you want to change. You can drag on the score channel to select several LED data together. To select all LED data on the score channel, choose Edit-Select All from the menu. Selected LED data is indicated by a black line around it.

---

### 2 From the Edit menu, choose the edit command you want.

#### Undo

Cancels the last operation and returns to the previous state.

#### Redo

Resume an operation canceled by using Undo.

#### Cut

Cuts out the selected LED data and copies it to the clipboard.

#### Copy

Copies the selected LED data to the clipboard.

#### Paste

Pastes the clipboard contents starting from the current position onto the selected LED.

#### Insert

Inserts the clipboard contents in the current position for all LEDs.

#### Delete

Deletes the selected LED data.

---

## Synchronizing elements

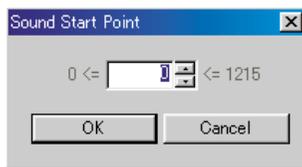
In Action Composer, you can synchronize the three elements by adjusting the starting point of a sound or by using markers.

### Adjusting the starting point of a sound file

You can adjust the point where a sound file (WAVE/MIDI) begins playback. To make adjustments within an element use the markers.

- 1 In the Action Window, choose Elements-Set Sound Start Point from the menu.

The Sound Start Point dialog box appears.



- 2 Specify the starting time in frames and click OK.

The file shifts to the new starting point.

**Note**

One frame equals 0.016 seconds.

### Using markers

You can use markers in elements that are part of actions.

In the Action, MIDI, WAVE and LED Windows, light-blue markers ▼ appear in the key frame channel to indicate the positions of key frames. Refer to these markers when synchronizing sound and LED data with motion. You can also add separate markers in the MIDI, WAVE and LED Windows and refer to these markers to adjust the motion to sound or LED data.

### Adding markers

In each Window, click the marker channel while pressing the Alt key.

A marker appears, its color depending on the Window type. A marker placed in one Window will also appear in the other Windows.



Action Window (Blue)



MIDI/WAVE Window (Purple)



LED Window (Green)

### To erase a marker

In the Window where the marker was made, click the marker while pressing the Alt key. The marker will be erased from all four Windows.

**Note**

Markers can be used when the element is part of an action. If you open an element file directly and edit it independently from an action, the marker function cannot be used.

Open markers from the Action window instead of directly opening the Sound/LED window from the Main window.

## Checking elements and actions

You can check elements and actions that you created with Action Composer by playing them back on a PC or by transferring them to AIBO over a wireless LAN environment (ERS-210/220).

### Previewing on the PC

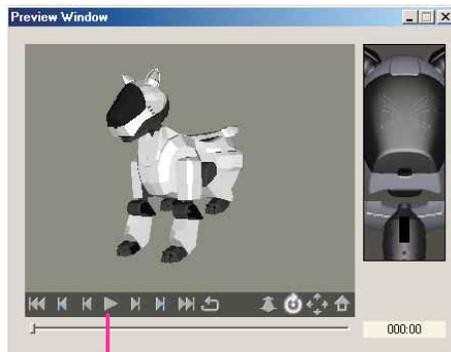
You can check actions that you created by playing them back on the PC.

Click ► (Play back button) in the Action Window.

Elements selected in the Preview Window will be played back in synchronization.

You can preview all elements in the Action Window at the same time in this window.

Click the ► button to see it again.



Playback button

When you finish, click  to close the Preview Window.

### Executing tests on AIBO

You can check overall actions, or individual elements by transferring them to AIBO over a wireless LAN environment to play them back. Motions in particular aren't accurately simulated on a PC, so we recommend you replay them on AIBO to check them out as you create them.

#### Note

Only actions and elements included in action libraries can be tested.

#### 1 Select an action or an element

In Action Composer's Main Window, click an action or element file.

#### 2 Transfer an action or element file

From the menu, choose Test, and the file that you want to run.

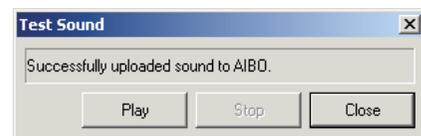
Action file	[Test Action]
-------------	---------------

Motion file	[Test Motion]
-------------	---------------

Sound file	[Test Sound]
------------	--------------

LED file	[Test LED]
----------	------------

A connection will be established with AIBO, and the Test Play dialog appears.



#### 3 Test run

Click Play to start the test. Click Close when the test is completed.

# Printing windows

You can print action library files that you have created to check the component information of each action. You can also print the Action/WAVE/MIDI/LED windows. Set up the page before you print.

## Page Setup

- 1 From the menu, choose File-Page Setup.

The Print Setup dialog box appears.

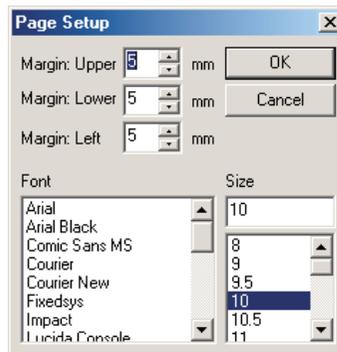
- 2 Set Printer, Paper, and Orientation.

- 3 Click OK.

## Print

- 1 From the menu, choose File-Print.

The Page Setup dialog box appears.



### Note

The Print dialog box appears in the Action/WAVE/MIDI/LED windows. Specify a printer, printing range, and number of copies, and click OK.

- 2 Set margins, font, and point size.

- 3 Click OK.

# Importing/exporting files

Action Composer can import/export library files, and export action files.

## Import/export of action library files

You can import and export an action library file in plb (Packed action LiBrary) format. This enables you to easily exchange action libraries with other AIBO Master Studio users and move libraries between PCs.

### Importing

---

**1** From the menu in the Action Composer Main Window, choose File-Import Library.

---

**2** Choose a file name (.plb) to import.

---

**3** Choose a folder in which to extract the file.

Extracted content will be saved, and the action will be added to an open library file (.alb) automatically at the same time.

---

### Exporting

---

**1** From the menu in the Action Composer Main Window, choose File-Export Library.

---

**2** Specify export destination and a file name (.plb) to save.

The action library will be exported, and a plb format file will be created.

---

## Using other AIBO-ware action files

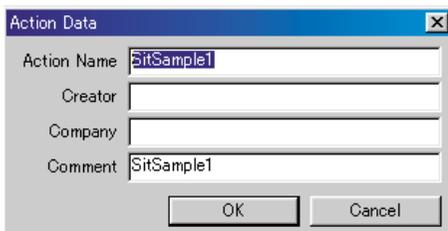
If you export action files to axf (Action Export File) format files, actions can be imported and used depending on the AIBO-ware application. For instructions on importing actions, see each AIBO-ware application's user's guide.

### Exporting action files

---

- 1 In the Action Composer Main Window, choose an action to export, and from the menu, choose Action-Export Action.

The Action Data dialog box appears.



The screenshot shows a dialog box titled "Action Data" with a close button (X) in the top right corner. The dialog contains four text input fields: "Action Name" (containing "SitSample1"), "Creator" (empty), "Company" (empty), and "Comment" (containing "SitSample1"). At the bottom of the dialog are two buttons: "OK" and "Cancel".

- 2 Input Creator, Company, and Comment, and click OK.
  - 3 Select the location to export to and the file name (.axf), and save it.
-



# Troubleshooting

If you experience any of the following difficulties, use this troubleshooting guide to remedy the problem. Refer also to the Readme/FAQ information located in the folder where AIBO Master Studio is installed. Should the problem persist, please contact AIBO Customer Link.

Symptom	Remedy
The software cannot be installed from the CD-ROM.	<ul style="list-style-type: none"> <li>• There isn't enough space in the hard disk.               <ul style="list-style-type: none"> <li>→ Check the hard disk space. If several drives are available, choose a hard disk with adequate space, other than drive C.</li> </ul> </li> <li>• The CD-ROM's auto-play function is switched off.               <ul style="list-style-type: none"> <li>→ Execute the "Setup.exe" file in the CD-ROM.</li> </ul> </li> <li>• Other programs are running.               <ul style="list-style-type: none"> <li>→ First end all programs and then redo setup.</li> </ul> </li> <li>• You're attempting to install the software to Windows NT/Windows 3.1/Windows 95.               <ul style="list-style-type: none"> <li>→ This software runs only on Windows 98 SE/Me/2000 Professional/XP. Install the software to a PC running on a compatible OS.</li> </ul> </li> <li>• The VGA is set to less than 800 × 600 and/or less than 16-bit colors.               <ul style="list-style-type: none"> <li>→ Set VGA to 800 × 600 or greater and 16-bit colors or greater.</li> </ul> </li> <li>• You're attempting to install the software to Windows 2000 Professional/XP as a general user.               <ul style="list-style-type: none"> <li>→ To install, log on as an administrator or an Administrator's Group member.</li> </ul> </li> </ul>
An application does not start up.	<ul style="list-style-type: none"> <li>• There are not enough system resources.               <ul style="list-style-type: none"> <li>→ End all other programs that are running.</li> </ul> </li> <li>• Installed files are damaged.               <ul style="list-style-type: none"> <li>→ Uninstall AIBO Master Studio, then reinstall the software from the CD-ROM (page 20).</li> </ul> </li> <li>• Battery is low               <ul style="list-style-type: none"> <li>→ To be safe, AIBO will stop acting and lie on its stomach. Charge the battery.</li> </ul> </li> </ul>

Symptom	Remedy
Data cannot be written to the “Memory Stick.”	<ul style="list-style-type: none"> <li>• The “Memory Stick” is not inserted correctly. <ul style="list-style-type: none"> <li>→ Check that the “Memory Stick” is inserted in the drive correctly.</li> </ul> </li> <li>• The “Memory Stick” drive is set incorrectly. <ul style="list-style-type: none"> <li>→ Set the drive correctly in the AIBO Master Studio Setup window (page 20).</li> </ul> </li> <li>• System files hasn’t been copied. <ul style="list-style-type: none"> <li>→ To use a “Memory Stick” with AIBO Master Studio, you need to copy the appropriate system files for your AIBO to the “Memory Stick” (page 21).</li> </ul> </li> <li>• The safety switch on the “Memory Stick” is set to LOCK. <ul style="list-style-type: none"> <li>→ Set the switch on the “Memory Stick” to the write-enable position (page 105).</li> </ul> </li> </ul>
When the “Memory Stick” is removed from the PC, the PC screen turns blue and displays a disk-read-error message.	<ul style="list-style-type: none"> <li>• The “Memory Stick” was removed before the PC had completed writing data on the “Memory Stick.” <ul style="list-style-type: none"> <li>→ Insert the “Memory Stick” again and press the Enter key; wait a while then remove the “Memory Stick.”</li> </ul> </li> </ul>
AIBO is not correctly rendered in the Preview Window.	<ul style="list-style-type: none"> <li>• The graphic driver is not the latest version. <ul style="list-style-type: none"> <li>→ The 3D image of AIBO is rendered using OpenGL. OpenGL is processed with the graphic driver or hardware depending on the graphic card used. Please contact the manufacturer of your PC or graphic card.</li> </ul> </li> </ul>
AIBO stops in mid-movement.	<ul style="list-style-type: none"> <li>• A long motion was played back (ERS-210/220). <ul style="list-style-type: none"> <li>→ If AIBO tries to execute a motion that is longer than 30 seconds, the motors are strained and AIBO may automatically stop moving. To return AIBO to normal, press the head sensor for 3 seconds or more for ERS-210, and push the head sensor toward the front for 3 seconds or more for ERS-220.</li> </ul> </li> <li>• AIBO is heating up. <ul style="list-style-type: none"> <li>→ The pause light goes off, and AIBO stops moving. Do not move AIBO until it cools down. When making a program, avoid arranging strenuous motions one after the other.</li> </ul> </li> <li>• Battery is low <ul style="list-style-type: none"> <li>→ To be safe, AIBO will stop acting and lie on its stomach. Charge the battery.</li> </ul> </li> </ul>

Symptom	Remedy
AIBO emits a sad melody and does not move when its pause button is pressed.	<ul style="list-style-type: none"> <li>• Battery is low           <ul style="list-style-type: none"> <li>→ To be safe, AIBO will stop acting and lie on its stomach. Charge the battery.</li> </ul> </li> <li>• The “Memory Stick” contains commercially available AIBO-ware.           <ul style="list-style-type: none"> <li>→ You cannot execute programs on AIBO using a commercially available AIBO-ware “Memory Stick” that already contains an application for operating AIBO such as “AIBO Life.”</li> </ul> </li> <li>• A “Memory Stick” with system files for different AIBO models is used.           <ul style="list-style-type: none"> <li>→ Copy the system files in AIBO Master Studio Setup.</li> </ul> </li> <li>• The data in the “Memory Stick” is damaged.           <ul style="list-style-type: none"> <li>→ Delete the OPEN-R folder on a “Memory Stick” using Windows Explorer. Then copy the system files again using AIBO Master Studio Setup (page 21), and save data from each application again.</li> </ul> </li> </ul>
AIBO does not move when connected to a wireless LAN (ERS-210/220)	<ul style="list-style-type: none"> <li>• The AIBO Wireless LAN Card is not inserted in AIBO.           <ul style="list-style-type: none"> <li>→ Insert the AIBO Wireless LAN Card in AIBO.</li> </ul> </li> <li>• The IP address for the wireless LAN is not set.           <ul style="list-style-type: none"> <li>→ The IP address of the AIBO Wireless LAN Card inserted in AIBO needs to be registered in AIBO Master Studio. (page 23)</li> </ul> </li> <li>• The PC is not set up for wireless LAN communication.           <ul style="list-style-type: none"> <li>→ Check that a wireless LAN card is inserted in the PC or that the PC connects to a wireless LAN access point. (page 24)</li> </ul> </li> <li>• User ID and password are wrong.           <ul style="list-style-type: none"> <li>→ Input a new user ID and password into the “Memory Stick” by using AIBO Master Studio Setup. (page 23)</li> </ul> </li> </ul>
Isn't connected to a wireless LAN (ERS-210/ERS-220)	<ul style="list-style-type: none"> <li>• You removed the AIBO wireless LAN card and booted AIBO.           <ul style="list-style-type: none"> <li>→ Redo wireless LAN information setup (page 23).</li> </ul> </li> </ul>

# “Memory Stick”

## Suitable “Memory Stick” products

AIBO uses an entertainment-robot-dedicated “Memory Stick” as media to record behavior programs.

Programs created and edited with AIBO Master Studio should be saved to the supplied “Memory Stick” (including old version accessories) or to a separately sold “AIBO Programming Memory Stick” and then executed on AIBO. The “Memory Stick” is the interface between your AIBO and the PC.

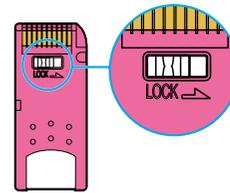
In order to use either of the “Memory Sticks” you first need to copy system files to it to use it in AIBO Master Studio. For details, see “Making a ‘Memory Stick’ appropriate for your AIBO model” (page 21).

## Handling procedures

### About the safety switch

If the safety switch of the “Memory Stick” is set to LOCK, data cannot be saved or erased.

Do not set the safety switch to LOCK when using AIBO Master Studio.



### Precautions on writing to the “Memory Stick”

- Do not format the “Memory Stick” by using the Windows or MS-DOS format commands. If formatted, the “Memory Stick” may not be correctly recognized.
- If you use the “Memory Stick” with the safety switch set to LOCK, the symptoms below may appear. These symptoms do not indicate malfunction of the “Memory Stick” or the “Memory Stick” drive.
  - The message “Unable to write to disk in drive D\*: Data or files may be lost.” appears on the PC screen. (\* The drive letter differs depending on your PC system.)
  - Icons for data that cannot be written remain displayed on the PC screen. (The icons will disappear when the “Memory Stick” is removed.)
- Data stored in the “Memory Stick” may be erased or damaged in the following cases:
  - If the “Memory Stick” is removed or the PC switched off while reading or writing data.
  - If the “Memory Stick” is used in a place subject to static electricity or electric noise.

## Removing the “Memory Stick” from the PC card adapter

To remove the “Memory Stick” from the PC card adapter, click the icon in the Windows taskbar for the “Memory Stick” slot drive and then click Stop Standard IDE/ESDI Hard Disk Controller.

Wait for the message “You may safely remove this device” to appear before removing the “Memory Stick.”

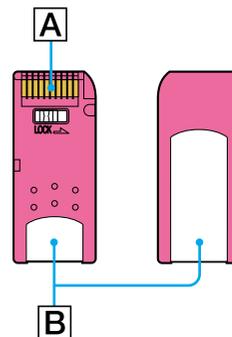
### Note

After the PC finishes writing data to the “Memory Stick,” wait for a while before removing the “Memory Stick.” (If your PC is equipped with a “Memory Stick” slot, wait for approximately 15 seconds.) If you remove the “Memory Stick” immediately after data is written, the monitor screen may turn blue and an error message indicating disk read error may be displayed. If this occurs, insert the “Memory Stick” again and press the Enter key; wait for a while and then remove the “Memory Stick.”

## Precautions on use

To protect the “Memory Stick” from damage and malfunction, observe the following:

- To remove the “Memory Stick” from AIBO while it is still operating, first push the pause button to stop AIBO movements, and make sure that it is safe to remove it before doing so.
- Do not touch terminal **A** with your hand or metal objects.
- Do not stick anything other than a dedicated “Memory Stick” sticker in the area indicated by **B**.
- Do not bend, drop or apply strong physical shock to the “Memory Stick.”
- Do not disassemble or modify the “Memory Stick.”
- Do not let the “Memory Stick” get wet.
- Do not use or store the “Memory Stick” in places subject to:
  - Excessively high temperature, such as a car parked in the sun
  - Direct sunlight
  - High humidity or corrosive gas
- When carrying or storing the “Memory Stick,” keep it in the supplied case.



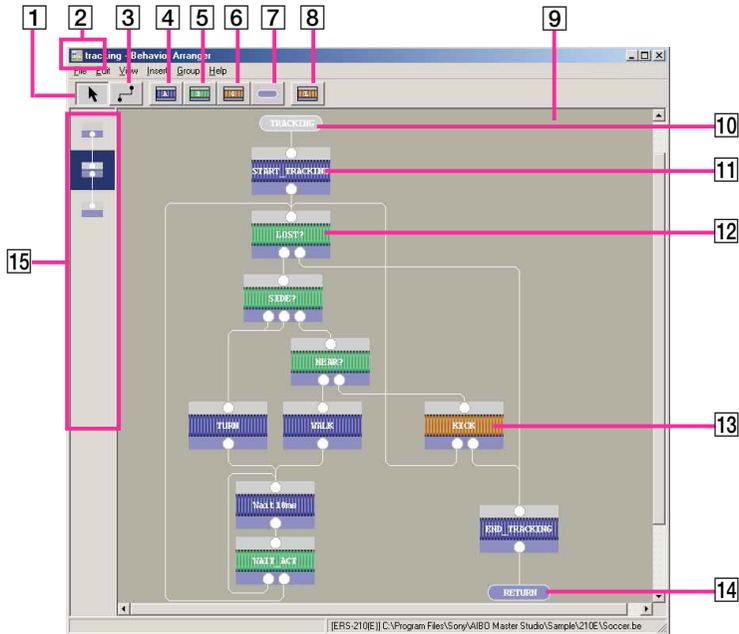
## Specifications

Memory	Flash memory
Capacity	8 MB
Voltage	2.7 V to 3.6 V
Power consumption	Approx. 45 mA, average operation Max. 130 $\mu$ A, standby
Write speed	Max. 1.5 MB/s
Read speed	Max. 2.45 MB/s
Operating temperature	0 °C to 60 °C (32 °F to 140 °F), without condensation
Dimensions	Approx. 21.5 $\times$ 50.0 $\times$ 2.8 mm (0.85 $\times$ 1.97 $\times$ 0.11 in.) (w/h/d)
Mass	Approx. 4 g (0.14 oz)

Design and specifications are subject to change without notice.

# Behavior Arranger

## Names and functions of the window



- 1** **Mouse: Normal mode button**  
Sets the mouse function to normal mode. This button has the same function as the menu's Edit-Mouse:Normal Mode.
- 2** **Group name**  
The name of the group in the window. The group at the top level is Main.
- 3** **Mouse: Link mode button**  
Sets the mouse function to link mode. This button has the same function as the menu's Edit-Mouse:Link Mode.
- 4** **Action box button**  
Inserts an action box. When this button is clicked, the Action Properties dialog opens. This button has the same function as the menu's Insert-Action Box.
- 5** **Branch box button**  
Inserts a branch box. When this button is clicked, the Branch Properties dialog opens. This button has the same function as the menu's Insert-Branch Box.
- 6** **Group box button**  
Inserts a group box. When this button is clicked, the Group Properties dialog opens. This button has the same function as the menu's Insert-Group Box.
- 7** **Terminal box button**  
Inserts a terminal box. When this button is clicked, the Terminal Properties dialog opens. This button has the same function as the menu's Insert-Terminal Box.
- 8** **Library box button**  
Inserts a library. When this button is clicked, the Open dialog opens. This button has the same function as the menu's Insert-Library.

- 9] Edit window**  
This is where you make a program.
- 10] Terminal box (gray)**  
Indicates the start of a program. The box name is START in the Main group and ENTRY in a new group.
- 11] Action box**  
A box that specifies sequential actions.
- 12] Branch box**  
A box that specifies branch conditions.
- 13] Group box**  
A box that specifies the group (subroutine) to be activated.
- 14] Terminal box (blue)**  
Indicates the end of a program. The box is named END in the Main group and RETURN in a new group.
- 15] History bar**  
Displays group levels.

## Menus

### File

---

#### New

Creates a new program. A Main group containing just the START and END terminal boxes is displayed.

#### Open

Opens a program saved in a behavior file (\*.be).

#### Save

Saves the program over an existing file (\*.be).

#### Save As

Saves the program with a new filename.

#### Recent Files

Displays the four files used most recently.

#### Save to Memory Stick

Saves a behavior file to the “Memory Stick” in the drive.

#### Wireless LAN Connection

This feature can be used when wireless LAN is set up. Connecting to wireless LAN lets you upload a program and execute the behavior on AIBO.

#### Page Setup

Set page parameters to print a Behavior Program.

#### Print

Print a Behavior Program.

#### Exit

Ends Behavior Arranger.

## Edit

---

### Undo

Cancel the last operation and return to the previous state.

### Redo

Resume an operation canceled using Undo.

### Cut

Cuts out the selected box.

### Copy

Copies the selected box.

### Paste

Pastes the box that was copied.

### Program Comments

Adds comments to the program.

### Mouse: Normal Mode

Sets the mouse to normal mode.

### Mouse: Link Mode

Sets the mouse to link mode. Connect boxes by dragging the mouse from the first box to the next.

### Select All

Selects all the boxes in the edit window.

## View

---

### Toolbar

Switches on/off the toolbar display.

### History Bar

Switches on/off the history bar display.

### Status Bar

Switches on/off the status bar display.

### Scroll Bar

Switches on/off the scroll bar display.

### Resize Edit Range

Sets the size of the edit area. The area cannot be set to a size smaller than the current edit window.

### Normal View

Displays a standard-sized flowchart (boxes) in the edit window.

### Reduced View [50%]

Reduces the flowchart (boxes) in the edit window to half the normal size.

### Reduced View [25%]

Reduces the flowchart (boxes) in the edit window to a quarter of the normal size.

### Design View

Sets preferences for the appearance of the edit window.

## Insert

---

### Action Box

Inserts an action box.

### Branch Box

Inserts a branch box.

### Group Box

Inserts a group box.

### Terminal Box

Inserts a terminal box.

### Library

Inserts a library in the program being edited. The library takes the form of a group box.

## Group

---

### Create New Group

Creates a new group.

### Delete this Group

Deletes the displayed group. Deleting the group will not delete the group box that calls that group.

### Rename Group

Changes the name of the displayed group.

### View Group Image

Shows the image (.bmp) added to the displayed group.

### Add Image to Group

Adds an image (.bmp) to the displayed group.

### Delete Image from Group

Deletes the image (.bmp) from the displayed group.

### Set Order of Terminals

Changes the order of the terminals on a group box.

### Group List

Displays the group list. Double-click a group name to open that group.

### Group Tree

Displays the group tree. Double-click a group name to open that group.

### Open All Groups

Opens the edit windows of all groups.

### Close All Groups

Closes the edit windows of all groups (excluding the Main group).

## Help

---

### User's Guide

Opens this User's Guide.

### Command Reference

Displays the Command Reference.

### Tutorial Guide

Opens the Tutorial Guide.

### AIBO Homepage

Opens AIBO's homepage. To use this feature, your PC needs to be connected to the Internet and set up with an Internet browser.

### About Behavior Arranger

Displays the application's version information.

## Mouse operation

### Edit window

---

Mouse operations in the edit window are as follows:

#### Left click

On a box:

selects the box

On a connection line:

selects the connection line:

#### Left double-click

Displays properties, opens a group.

#### Left drag

On a box:

moves the box (when mouse is in normal mode).

connects boxes (when mouse is in link mode).

Outside a box:

selects an area (when mouse is in normal mode).

On a connecting line:

moves the line.

#### Ctrl + left click

On a box or connecting line:

selects several boxes or connecting lines.

#### Ctrl + left drag

On a box:

connects boxes (when mouse is in normal mode).

moves the box (when mouse is in link mode).

#### Right click

On a box:

displays the context menu for editing the box.

On a connection line:

displays the Delete Connection context menu.

Outside a box:

displays the same context menu as the Insert menu.

On the terminals of a group or branch box:

displays the context menu for editing the box.

#### Others

- When you place the mouse on the terminal of a group or branch box, terminal information is displayed.
- A drag operation can be cancelled by pressing the Esc key.

### History bar

---

Mouse operations in the history bar are as follows:

#### Left double-click

Opens the chosen group in the edit window.

#### Place the mouse pointer over a box in the history bar

Displays the group name.

## Keyboard operation

### Edit window

Keyboard operations in the edit window are as follows:

#### Directional keys ( ← → ↑ ↓ )

Moves the pointer.

#### Shift + directional keys ( ← → ↑ ↓ )

Moves boxes.

#### Ctrl + Shift + directional keys ( ← → ↑ ↓ )

Moves connecting lines.

#### Ctrl + directional keys ( ← → ↑ ↓ )

Scrolls the edit window.

#### Application key

Displays the context menu.

#### Enter

Displays the box's properties.

#### Shift + Enter

Opens a group.

#### Esc

Aborts an operation.

### Manipulating files

Ctrl + N      Makes a new file.

Ctrl + O      Opens a file.

Ctrl + S      Saves over an existing file.

### Editing

Delete/Ctrl + X      Cuts.

Ctrl + C      Copies.

Insert/Ctrl + V      Pastes.

Ctrl + A      Selects all.

### Making selections

Space bar      Makes a single selection.

Ctrl + space bar

Makes several selections.

Tab

Jumps to next selection.

### Function keys

F1      Displays the User's Guide

F2      Enter program comments.

F3      Sets mouse to normal mode.

F4      Sets mouse to link mode.

F5      Creates an action box.

F6      Creates a branch box.

F7      Creates a group box.

F8      Creates a terminal box.

F9      Inserts a library.

F10      Displays the group list.

F11      Displays the group tree.

F12      Displays AIBO's homepage.

### History bar

Keyboard operation lets you jump among boxes as follows:

Home      To the Main group

End      To the group at bottom of the history bar

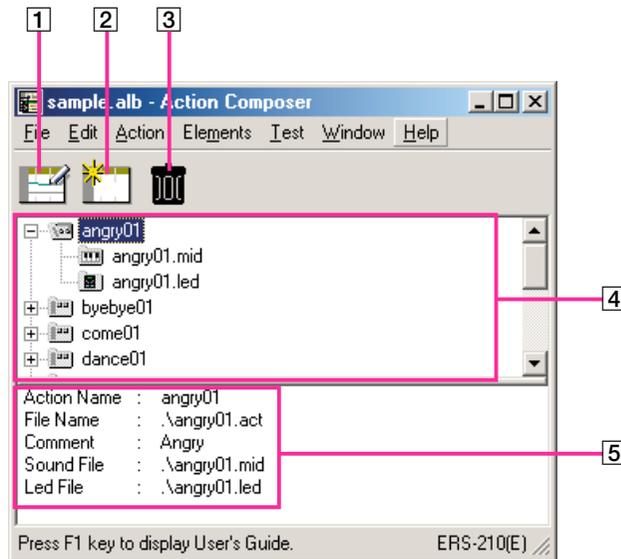
Page Up      To the group right above in the history bar

Page Down      To the group directly below in the history bar

# Action Composer

## Main window

### Names and functions of window



- 1** **New Action button**  
Creates a new action.
- 2** **Edit Action button**  
Edits the selected action. Clicking this button opens the Action Window.
- 3** **Delete Action button**  
Deletes the selected action. Deleting an action will not delete element files.
- 4** **Library display area**  
Shows the tree organization of action and element files. You can select a file to add, edit or delete.  
The actions displayed in this area are managed by a single library file. The library filename is displayed in the title bar.
- 5** **Detailed information area**  
Detailed information of the selected action is displayed in this area.

## Menus

---

### File

#### New Library

Creates a new action library.

#### Open Library

Opens a library saved in the action library file (.alb). Actions and elements in a library are opened at the same time and can be edited.

#### Save Library

Saves the library to an existing file (alb.).

#### Save Library As

Saves the opened library with a new filename.

#### Print

Prints Action Library file content information.

#### Print Preview

Displays the Page Setup dialog to view a print preview.

#### Page Setup

Changes page printing settings.

#### Recent files

Displays up to the last four recently used files.

#### Save Library To Memory Stick

Saves the library to the “Memory Stick.”

#### Upload Library To AIBO

This feature can be used if wireless LAN is set up. Using wireless connection, the library is uploaded to the “Memory Stick” in AIBO.

#### Import Library

Imports the contents of a Library file.

#### Export Library

Exports the contents of an Action Library file.

#### Properties

Displays/inputs properties of the specified action library file.

#### Exit

Ends Action Composer.

### Edit

#### Undo

Cancels the last operation and returns to the previous state.

#### Redo

Resumes an operation canceled using Undo.

#### Cut

Cuts selected actions and elements, and copies them to the clipboard.

**Copy**

Copies selected actions and elements to the clipboard.

**Paste**

Inserts the clipboard contents without renaming its elements.

**Paste Renamed Selection**

Inserts the clipboard contents and renames its elements.

**Action****New Action**

Creates a new action and adds it to the specified library.

**Add Action**

Adds an existing action to the specified library.

**Edit Action**

Edits the specified action. The Action Window appears.

**Delete Action**

Deletes the specified action.

**Rename Action**

Changes the name of the specified action.

**Add Comment**

Add comments to the specified action.

**Export Action**

Exports an action to axf format.

**Elements****New Motion**

Creates a new motion and adds it to the specified action.

**Add Motion**

Add an existing motion to the specified action.

**Preview Motion**

Displays key frames of the specified motion on a timeline. The Motion Preview window appears.

**Delete Motion**

Deletes the specified motion.

**New MIDI**

Creates a new MIDI file and adds it to the specified action.

**Add Sound**

Adds an existing sound file to the specified action.

**Edit Sound**

Edits the specified sound.

**Delete Sound**

Deletes the specified sound.

**New LED**

Creates a new LED file and adds it to the specified action.

**Add LED**

Adds an existing LED file to the specified action.

**Edit LED**

Edits the specified LED file.

**Delete LED**

Deletes the specified LED file.

**Test****Test Action**

You can use this function if you have a wireless LAN connection. Transfers selected actions to AIBO for testing.

**Test Motion**

You can use this function if you have a wireless LAN connection. Transfers selected motions to AIBO for testing.

**Test Sound**

You can use this function if you have a wireless LAN connection. Transfers selected sounds to AIBO for testing.

**Test LED**

You can use this function if you have a wireless LAN connection. Transfers selected LED actions to AIBO for testing.

**Window****Toolbar**

Switches on/off the tool bar display.

**Status bar**

Switches on/off the status bar display.

**Options**

Switches the navigation dialog box on/off when the program starts.

**Help****User's Guide**

Opens this User's Guide.

**Tutorial Guide**

Opens this Tutorial Guide.

**AIBO Homepage**

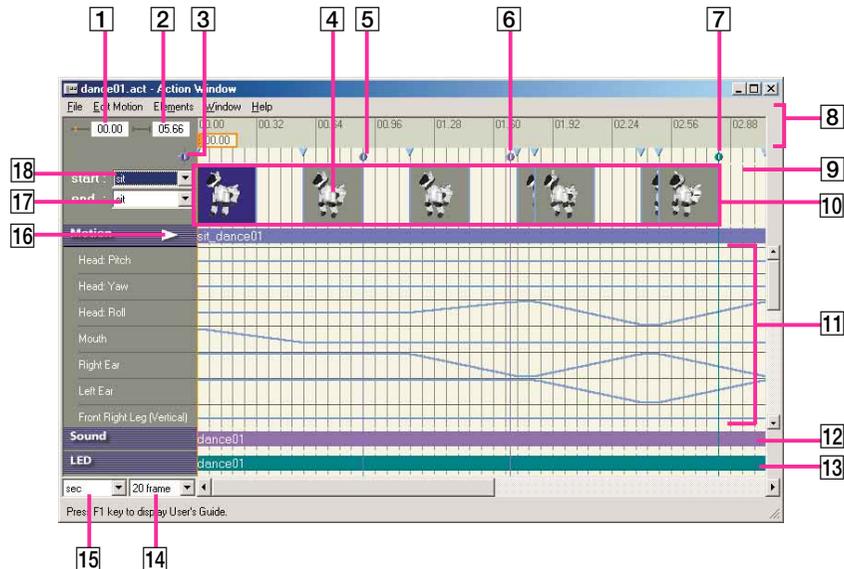
Opens AIBO's homepage. To use this feature, your PC needs to be connected to the Internet and set up with an Internet browser.

**About Action Composer**

Displays the application's version information.

## Action Window

### Names and function of window



- 1** **Current time/frame display**  
Indicates the current position in seconds (unit: 1/100 s) or frames (1 frame = 0.016 s).
- 2** **Total time/frames display**  
Shows the total time (unit: 1/100 s) or frames of the action.
- 3** **Current bar**  
Indicates the current position. The tab shows the time (unit: 1/100 s) or number of frames. When you click on the time/frame channel, the current bar moves and the clicked point becomes the current position.
- 4** **Key frame**  
A frame that defines a pose in the motion. The start and end poses (blue background) cannot be modified. When you double-click a key frame, the Pose Window opens.
- 5** **Action marker (blue)**  
A mark you make in the Action Window as an aid to synchronizing elements.
- 6** **Sound marker (purple)**  
A mark you make in the MIDI or WAVE Window as an aid to synchronizing elements.
- 7** **LED marker (green)**  
A mark you make in the LED Window as an aid to synchronizing elements.
- 8** **Time/frame channel**  
A channel for changing the current position. When you click on the channel, the current bar moves to the clicked point.
- 9** **Start/End dropdowns**  
Dropdown menus for selecting start and end poses.
- 10** **Motion curves**  
Graphical representation of motion data for various body parts.
- 11** **Sound/LED markers**  
Visual indicators for sound and LED events.
- 12** **Sound channel**  
Channel for sound synchronization.
- 13** **LED channel**  
Channel for LED synchronization.
- 14** **Frame rate dropdown**  
Dropdown menu for selecting the frame rate.
- 15** **Pres F1 key**  
Key to display the User's Guide.
- 16** **Motion dropdown**  
Dropdown menu for selecting the motion type.
- 17** **Start dropdown**  
Dropdown menu for selecting the start pose.
- 18** **End dropdown**  
Dropdown menu for selecting the end pose.

- 9] Marker channel**  
Markers added in each Window and ▼ (light blue) marks indicating key frame position are displayed together in this channel. When you click on the channel while pressing the Alt key, an action marker appears. To delete a marker, click on the marker while pressing the Alt key.
- 10] Key frame channel**  
Key frames in a motion added to the action are displayed in this channel.
- 11] Motion channel**  
When a motion is added to the action, this channel shows the transition of each joint angle. If a joint is set to move too quickly, it is highlighted in red.
- 12] Sound channel**  
The sound file added to the action is displayed in this channel. When you double-click the file, the MIDI or WAVE Window is displayed.
- 13] LED channel**  
The LED file added to the action is displayed in this channel. When you double-click the file, the LED Window is displayed.
- 14] Time interval change box**  
Choose from among eight levels in the time/frame display interval for the time/frame channel: 4 frames/8 frames/20 frames/<sup>1</sup>/<sub>2</sub> sec/1 sec/2 sec/4 sec/10 sec.
- 15] sec/frame box**  
Switches display units
- 16] Playback button**  
Plays back motions in the Preview Window.
- 17] End pose box**  
Choose a pose to end the motion.
- 18] Start pose box**  
Choose a pose to start the motion.

## Menus

---

### File

#### New

Creates a new action that is not included in the library. To use this action file after completion, choose Action-Add Action from the Library window and add the action to that library.

#### Open

Opens an existing action file. To use this action file after completion, choose Action-Add Action from the Library window and add the action to that library.

### Save

Saves the displayed action file.

#### Save As

Saves the displayed action file with a new filename. To use this action file after completion, choose Action-Add Action from the Library window and add the action to that library.

### Page Setup

Changes printer page settings.

**Print**

Prints time/frame channel, key frame position, joint angle change graph, sound bar, and LED bar.

**Recent file**

Displays up to the last four recently used files.

**Properties**

Displays/inputs properties of the specified action file.

**Exit**

Closes the Action Window.

**Edit Motion****Undo**

Cancels the last operation in the key frame channel and returns to previous state.

**Redo (R)**

Resume an operation canceled by using Undo.

**Cut**

Cuts out the selected frame and copies it to the clipboard.

**Copy**

Copies the selected frame to the clipboard.

**Overwrite**

Overwrites the clipboard contents onto the current position.

**Paste**

Pastes the clipboard contents onto the current position.

**Delete Frame**

Deletes the selected frame.

**Insert Frame**

Inserts a subframe in the current position.

**Change To Key Frame**

Changes the current subframe to a key frame.

**Select All**

Selects all frames.

**Elements****New Motion**

Creates a new motion.

**Add Motion**

Opens an existing motion file and displays it in the motion channel and in the key frame channel.

**Insert Motion**

Inserts a motion file in the current position.

**Delete Motion**

Deletes the displayed motion.

**Save Motion As**

Saves the displayed motion with a new filename.

### Add Sound

Opens an existing sound file and displays it in the sound channel.

### Edit Sound

Edits the sound that is displayed. The MIDI or WAVE Window appears.

### Delete Sound

Deletes the displayed sound.

### Set Sound Start Point

Changes the starting position of the sound.

### Add LED

Opens an existing LED file and displays it in the LED channel.

### Edit LED

Edits the LED file that is displayed. The LED Window appears.

### Delete LED

Deletes the displayed LED file.

## Window

### Preview Window

Displays the Preview Window.

### AIBO Color

Changes AIBO color.

## Help

### User's Guide

### Tutorial Guide

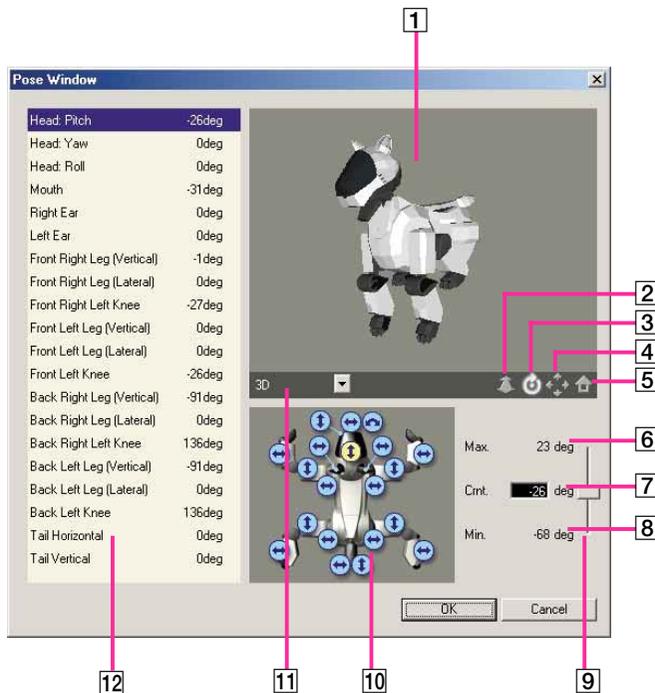
### AIBO Homepage

### About Action Composer

Refer to section on the Main window (page 114).

## Pose Window

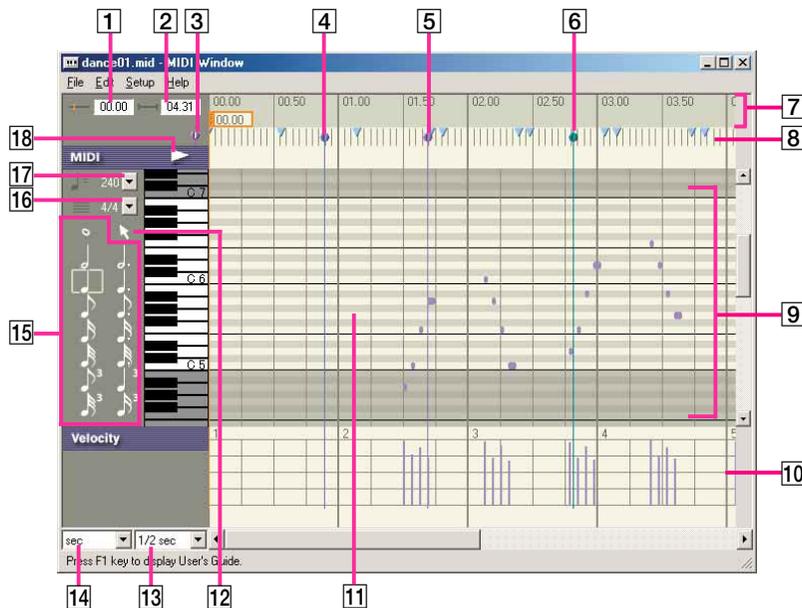
### Names and function of window



- 1** 3D view  
Displays a 3D view of AIBO.
- 2** Zoom button  
Zooms in /out the 3D AIBO. Click this button, then drag on the 3D view.
- 3** Rotate button  
Rotates the 3D AIBO. Click this button, then drag on the 3D view.
- 4** Pan button  
Pans the 3D AIBO. Click this button, then drag on the 3D view.
- 5** Home position button  
Resets the 3D AIBO to the viewpoint set in the switch view box.
- 6** Max. setting box  
Indicates the maximum angle setting.
- 7** Crnt. (Current) setting box  
Enter a number to set the angle.
- 8** Min. setting box  
Indicates the minimum angle setting.
- 9** Angle slide bar  
Slide to set the angle of the selected joint.
- 10** Diagram of AIBO  
Click a part to select it. When you select a part from the list, the selected part will be highlighted in the graphic.
- 11** Switch view box  
Switch the viewpoint of the 3D AIBO.
- 12** Parts list  
A list of AIBO parts that can be set to different angles. Select the part whose angle you want to change.

## MIDI Window

### Names and function of window



- 1** **Current time/frame display**  
Indicates the current position in seconds (unit: 1/100 s) or frames (1 frame = 0.016 s).
- 2** **Total time/frames display**  
Shows the total time (unit: 1/100 s) or frames of the sound.
- 3** **Current bar**  
Indicates the current position. The tab shows the time (unit: 1/100 s) or number of frames. When you click on the time/frame channel, the current bar moves and the clicked point becomes the current position.
- 4** **Action marker (blue)**  
A mark you make in the Action Window as an aid to synchronizing elements.
- 5** **Sound marker (purple)**  
A mark you make in the MIDI or WAVE Window as an aid to synchronizing elements.
- 6** **LED marker (green)**  
A mark you make in the LED Window as an aid to synchronizing elements.
- 7** **Time/frame channel**  
A channel for changing the current position. When you click on the channel, the current bar moves to the clicked point.
- 8** **Marker channel**  
Markers added in each Window and ▼ (light blue) marks indicating key frame position are displayed together in this channel. When you click on the channel while pressing the Alt key, a sound marker appears. To delete a marker, click on the marker while pressing the Alt key.
- 9** **Score channel**  
The area where sound is composed by placing sound data. Scales that AIBO can play back are highlighted.

- 10 Velocity channel**  
The channel where sound impact is specified for each sound data. When a sound data is first placed, it is set to the maximum velocity; the velocity can then be adjusted with the mouse.
- 11 Sound data**  
Specifies the length and scale of a single note.
- 12 Select button**  
It switches to select mode, and enables you to select sound data you have prepared.
- 13 Time interval change box**  
Changes the time interval displayed for a channel. Choose from among eight levels in the time/frame display interval for the time/frame channel: 4 frames/8 frames/20 frames/ $1/2$  sec/1 sec/2 sec/4 sec/10 sec.
- 14 Sec/frame box**  
Switches the display unit.
- 15 Notes list**  
Select the note you want for the sound data. If you select a note, it switches to input mode.
- 16 Time box**  
Select the meter.
- 17 Tempo box**  
Select the number of beats to a minute, in quarter notes.
- 18 Playback button**  
Plays back the sound data on the score channel.

## Menus

---

### File

#### New

Creates a new MIDI file.

#### Open

Opens an existing MIDI file and displays it in the score channel.

#### Save

Saves the displayed MIDI file to an existing file.

#### Save As

Saves the displayed MIDI file with a new filename.

#### Page Setup

Changes printer page settings.

### Print

Prints MIDI file.

### Insert

Inserts a MIDI file in the current position.

### Recent files

Displays up to the last four recently used MIDI files.

### Exit

Closes the MIDI Window.

### Edit

#### Undo

Cancels the last operation and returns to the previous state.

**Redo**

Resume an operation canceled by using Undo.

**Cut**

Cuts out the selected sound data and copies it to the clipboard.

**Copy**

Copies the selected sound data to the clipboard.

**Paste**

Pastes clipboard contents onto the current position.

**Insert**

Inserts clipboard contents in the current position.

**Delete**

Deletes selected sound data.

**Select All**

Selects all sound data on the score channel.

**Setup****Input Mode**

Sets the mode for making sound data. This operation is the same as choosing notes.

**Select Mode**

Sets to the mode for editing sound data. Sets the mode for editing sound data. This operation is the same as choosing .

**MIDI Device**

Selects an output device for MIDI sound. If a sound card does not exist or is not set up, the output device is not shown. MIDI tones can be selected on the PC.

**Help**

[User's Guide](#)

[Tutorial Guide](#)

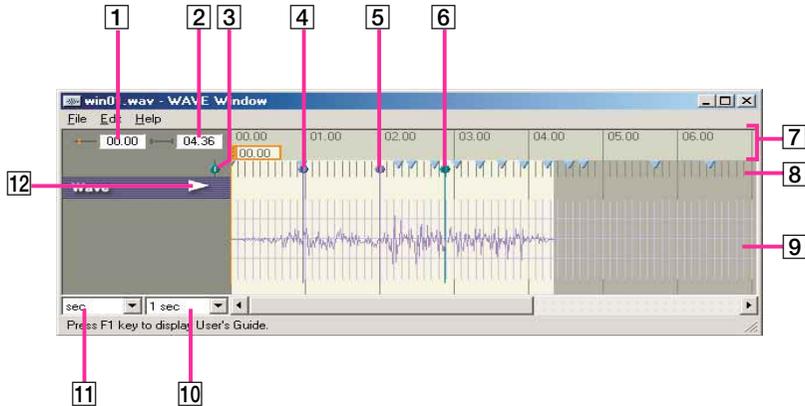
[AIBO Homepage](#)

[About Action Composer...](#)

Refer to the section on the Main window (page 114).

## WAVE Window

### Name and function of window



- 1** **Current time/frame display**  
Indicates the current position in seconds (unit: 1/100 s) or frames (1 frame = 0.016 s).
- 2** **Total time/frames display**  
Shows the total time (unit: 1/100 s) or frames of the sound.
- 3** **Current bar**  
Indicates the current position. The tab shows the time (unit: 1/100 s) or number of frames. When you click on the time/frame channel, the current bar moves and the clicked point becomes the current position.
- 4** **Action marker (blue)**  
A mark you make in the Action Window as an aid to synchronizing elements.
- 5** **Sound marker (purple)**  
A mark you make in the MIDI or WAVE Window as an aid to synchronizing elements.
- 6** **LED marker (green)**  
A mark you make in the LED Window as an aid to synchronizing elements.
- 7** **Time/frame channel**  
A channel for changing the current position. When you click on the channel, the current bar moves to the clicked point.
- 8** **Marker channel**  
Markers added in each Window and ▼ (light blue) marks indicating key frame position are displayed together in this channel. When you click on the channel while pressing the Alt key, a sound marker appears. To delete a marker, click on the marker while pressing the Alt key.
- 9** **WAVE channel**  
Displays the waveform of the sound.
- 10** **Time interval change box**  
Changes the time interval displayed for a channel. Choose from among eight levels in the time/frame display interval for the time/frame channel: 4 frames/8 frames/20 frames/1/2 sec/1 sec/2 sec/4 sec/10 sec.
- 11** **Sec/frame box**  
Switches the display unit.
- 12** **Playback button**  
Plays back the sound.

## Menus

---

### File

#### Open

Opens an existing WAVE file and displays it on the score channel.

#### Save

Saves the displayed WAVE file to an existing file.

#### Save As

Saves the displayed WAVE file with a new filename.

#### Page Setup

Changes printer page settings.

#### Print

Prints a WAVE file.

#### Recent files

Displays up to the last four recently used WAVE files.

#### Exit

Closes the WAVE Window.

### Edit

#### Undo

Cancels the last operation and returns to the previous state.

#### Redo

Resume an operation canceled by using Undo.

### Cut

Cuts out the selected sound and copies it to the clipboard.

### Copy

Copies the selected sound to the clipboard.

### Paste

Pastes clipboard contents onto the current position.

### Insert

Inserts clipboard contents in the current position.

### Delete

Deletes the selected sound.

### Fade in

Fades in the selected sound.

### Fade out

Fades out the selected sound.

### Normalize

Normalizes the selected sound.

### Select All

Selects all sound data.

### Help

[User's Guide](#)

[Tutorial Guide](#)

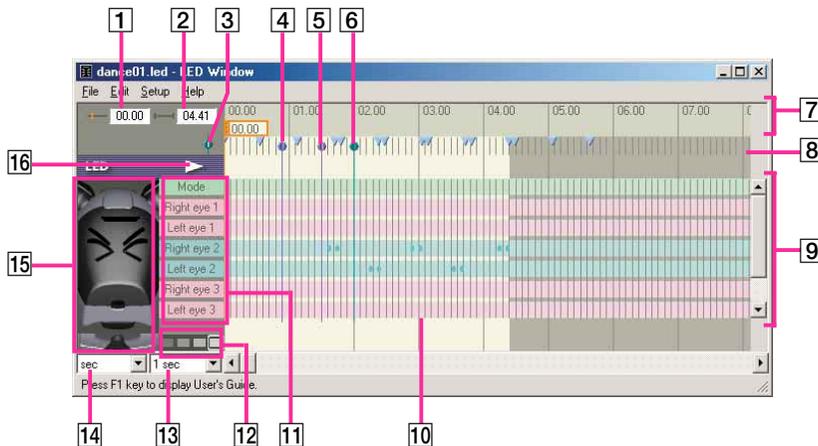
[AIBO Homepage](#)

[About Action Composer](#)

Refer to the section on the Main window (page 114).

## LED Window

### Names and functions of window



- 1** **Current time/frame display**  
Indicates the current position in seconds (unit: 1/100 s) or frames (1 frame = 0.016 s).
- 2** **Total time/frames display**  
Shows the total time (unit: 1/100 s) or frames of the LED.
- 3** **Current bar**  
Indicates the current position. The tab shows the time (unit: 1/100 s) or number of frames. When you click on the time/frame channel, the current bar moves and the clicked point becomes the current position.
- 4** **Action marker (blue)**  
A mark you make in the Action Window as an aid to synchronizing elements.
- 5** **Sound marker (purple)**  
A mark you make in the MIDI or WAVE Window as an aid to synchronizing elements.
- 6** **LED marker (green)**  
A mark you make in the LED Window as an aid to synchronizing elements.
- 7** **Time/frame channel**  
A channel for changing the current position. When you click on the channel, the current bar moves to the clicked point.
- 8** **Marker channel**  
Markers added in each Window and ▼ (light blue) marks indicating key frame position are displayed together in this channel. When you click on the channel while pressing the Alt key, a LED marker appears. To delete a marker, click on the marker while pressing the Alt key.
- 9** **Score channel**  
When LED data is placed in this channel, the timing and brightness of the LED are displayed.

- 10 LED data**  
Specifies the duration and brightness of an LED light.
- 11 LED list**  
A list of LED names corresponding to the score channel.
- 12 Brightness buttons**  
Choose from among four brightness levels.
- 13 Time interval change box**  
Changes the time interval displayed for a channel. Choose from among eight levels in the time/frame display interval for the time/frame channel: 4 frames/8 frames/20 frames/ $1/2$  sec/1 sec/2 sec/4 sec/10 sec.
- 14 Sec/frame box**  
Switches the display unit.
- 15 LED diagram**  
Select LED to switch to input mode. You can see the corresponding LED channel. It also shows the selected color of the LED.
- 16 Playback button**  
Plays back LED pattern.

## Menus

---

### File

#### New

Creates a new LED file.

#### Open

Opens an existing LED file and displays it on the score channel.

#### Save

Saves the displayed LED file to an existing file.

#### Save As

Saves the displayed LED file with a new filename.

#### Page Setup

Changes printer page settings.

### Print

Prints a LED file.

### Insert

Inserts an LED file in the current position.

### Recent files

Displays up to the last four recently used LED files.

### Exit

Closes the LED Window.

### Edit

#### Undo

Cancels the last operation and returns to the previous state.

**Redo**

Resume an operation canceled by using Undo.

**Cut**

Cuts out the selected LED data and copies it to the clipboard.

**Copy**

Copies the selected LED data to the clipboard.

**Paste**

Pastes clipboard contents onto the current position.

**Insert**

Inserts clipboard contents in the current position.

**Delete**

Deletes the selected LED data.

**Select All**

Selects all LED data on the score channel.

**Setup****Input Mode**

Sets the mode for making LED data. This operation is the same as choosing a LED on the LED plan.

**Select Mode**

Sets the mode for editing LED data.

**Brightness 1**

Sets the LED's brightness to 25%.

**Brightness 2**

Sets the LED's brightness to 50%.

**Brightness 3**

Sets the LED's brightness to 75%.

**Brightness 4**

Sets the LED's brightness to 100%.

**Help**

[User's Guide](#)

[Tutorial Guide](#)

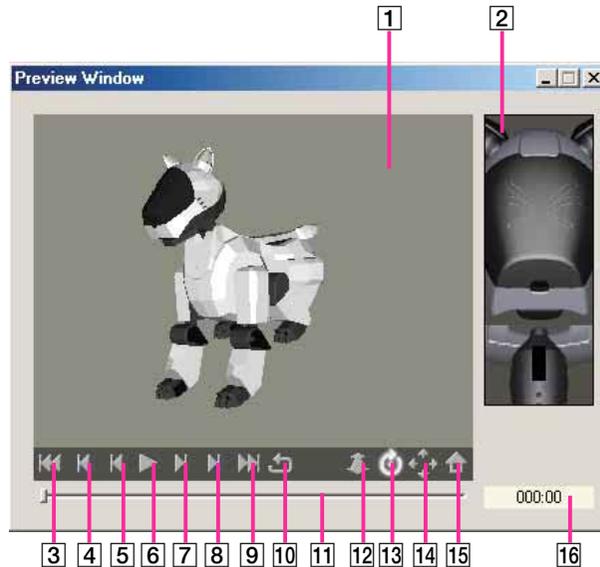
[AIBO Homepage](#)

[About Action Composer](#)

Refer to the section on the Main window (page 114).

## Preview Window

### Names and functions of window

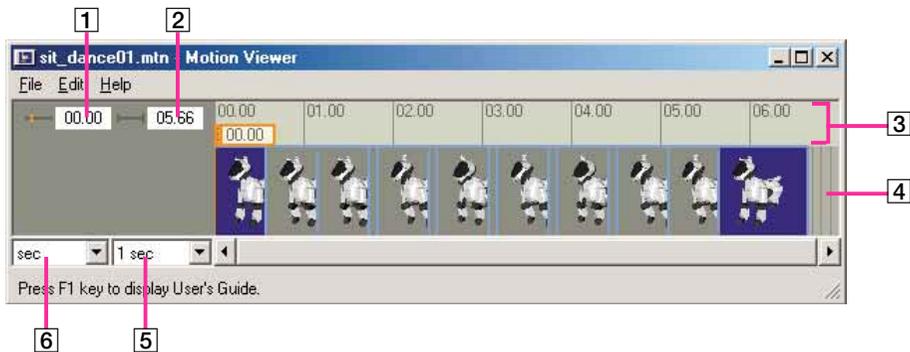


- |  |   |
|--|---|
| <p><b>1</b> 3D view<br/>Displays a 3D view of AIBO.</p> <p><b>2</b> LED display<br/>A preview of the LED data appears.</p> <p><b>3</b> Start pose button<br/>Returns to the start pose.</p> <p><b>4</b> Previous key frame button<br/>Displays the previous key frame.</p> <p><b>5</b> Previous frame button<br/>Displays the previous frame.</p> <p><b>6</b> Playback/stop button<br/>Plays back the action. Click again to stop playback.</p> <p><b>7</b> Next frame button<br/>Displays the next frame.</p> | <p><b>8</b> Next key frame button<br/>Displays the next key frame.</p> <p><b>9</b> End pose button<br/>Jumps to the end pose.</p> <p><b>10</b> Loop playback button<br/>Plays back repeatedly. Click the playback/stop button to stop playback.</p> <p><b>11</b> Slide bar<br/>Slide to change the current position. Use this bar when AIBO is in stop mode.</p> <p><b>12</b> Zoom button<br/>Zooms in /out the 3D AIBO. Click this button, then drag on the 3D view.</p> |
|--|---|

- 13 Rotate button**  
Rotates the 3D AIBO. Click this button, then drag on the 3D view.
- 14 Pan button**  
Pans the 3D AIBO. Click this button, then drag on the 3D view.
- 15 Home position button**  
Resets the 3D AIBO to the view set in the switch view box.
- 16 Current time display**  
Indicates the current position in seconds (unit: 1/100 sec).

## Motion Viewer window

### Names and functions of window



- 1 Current time/frame display**  
Time at current position (unit: 1/100 s) or number of frames (1 frame=0.016 s).
- 2 Total time/frame display**  
Total time of motion file (unit: 1/100 s) or number of frames.
- 3 Time/frame channel**  
Channel that changes current position. If you click it, the current bar moves to the clicked position.
- 4 Key frame channel**  
Channel that displays the key frame of the open motion.
- 5 Time range change box**  
Changes the time displayed for a channel. Choose from among eight levels in the time/frame display interval for the time/frame channel: 4 frames/8 frames/20 frames/ $1/2$  sec/1 sec/2 sec/4 sec/10 sec.
- 6 sec/frame box**  
Switches display units.

## Menus

---

### File

#### Open

Opens an existing motion file and displays the key frames.

#### Print

Prints time/frame channel, key frame position, and joint angle movement graph.

#### Page Setup

Changes printer page settings.

#### Recent files

Displays up to the last four recently used motion files.

#### Exit

Closes the Motion Preview window.

### Edit

#### Copy

Copies the selected key frame to the clipboard. Copied key frames can be used in the Action Window.

#### Select All

Selects all key frames.

### Help

#### User's Guide

#### Tutorial Guide

#### AIBO Homepage

#### About Action Composer

Refer to the section on the Main window (page114).

# Glossary

## AIBO Master Studio Setup terms

### Gateway

Hardware and software device connecting two different systems (a wired LAN and a wireless LAN). It is required if your wireless LAN uses Infrastructure Mode.

### IP address

An IP protocol address (a number) used to specify a network and a node on that network.

### SSID

Service Set Identifier that sets a unique network ID for individual networks. Access points can only communicate with clients that share the same SSID.

### Subnet mask

An IP address is made up of a network address and a host address, and in order to administer more detailed network groups (subnets), host addresses can be divided into network addresses defined by subnets. The subnet mask value indicates the border between a subnet address and a host address.

### Topology

The form of a network. A style combining a wired LAN and a wireless LAN is called an Infrastructure topology, while an independent wireless LAN with a wireless adapter for each device is called an ad hoc topology.

### WEP key

WEP (Wired Equivalent Privacy) is an encryption method to protect wireless data communications. Receivers need to have the same WEP key as senders to decode the encrypted data.

### Wireless LAN

A local area network that uses radio waves and/or infrared to transmit packets through the air instead of using cables.

## Quick Behavior Arranger/ Behavior Arranger terms

### Behavior

An AIBO movement that is made up of several actions. You can create complicated movements, including ones that respond to conditions such as sensor inputs.

### Sequential Execution type

A Behavior Program that executes a series of actions one after another.

### Stimulus - Drive Execution Type

A Behavior Program that runs actions when sensor, sound, and other events occur.

### Subroutine

A small program with a set purpose that is used as needed. When the same process is executed several times, it can be made into an independent program (subroutine) and made available for future use, saving the trouble of writing the same process over again and helping to make programs easier to understand.

## Action Composer terms

### Action

A unit of information that combines the three elements, motion, sound and LED. In Action Composer, the timing of elements can be adjusted to synchronize with each other.

### Element

A component of an action: motion, sound or LED. An action element is a file that contains program data of motion, sound or LED flashing pattern.

### Frames

Key frames and subframes in general.

### Interpolated frame

A frame (pose) that is generated by AIBO or Action Composer to enable a smooth transition from one key frame to another. Subframes are not displayed in Action Composer.

### Key frame

In Action Composer's Action Window or Motion Preview window, a frame that defines a pose in between the start and end poses. AIBO's movements are based on data of key frames and their intervals (time). Key frames can be edited, added or deleted.

### LED

Light (LED) emitted by AIBO. AIBO ERS-210 has a total of nine LED's on its face and tail. Duration and brightness (four levels) can be specified for each LED.

### Motion

Movement beginning with the start pose and ending with the end pose. Between the start and end poses, AIBO can be made to strike other poses.

**Pose**

Data specifying the angle of each AIBO joint. AIBO can be made to move in various ways by specifying the angle of each joint.

Start pose/end pose:

Start and end poses are important basic poses. Even when different poses connect motions, by using set poses, AIBO's built-in program enables AIBO to make a smooth transition from one pose to the next.

Start or end poses can be selected in the start or end pose box in the Action Window but start/end poses cannot be edited, added or deleted.

**Sound**

Sound issued from AIBO's speaker. WAVE and MIDI files can be used. Sound in either format can be edited or a MIDI file created.

**Synchronization**

To adjust the timing among elements. The timing is adjusted in Action Composer, by using the sound, LED or action markers or by adjusting the start point of a sound file (WAVE/MIDI).

Examples of synchronization are making AIBO perform in time to music and making the LED's flash to accentuate AIBO's movements.

**Velocity**

Indicates the strength of a note. Velocity originally means "speed"; since the strength of a note played on the piano depends on how fast the key is pressed, the term velocity indicates the strength of a note in MIDI systems.

# File organization and files

This section indicates the organization and names of files contained in the AIBO Master Studio folder, the folder where the software is installed.

## Common composer

- \AIBO Master Studio\Sample  
(Behavior Arranger, Action Composer sample, learning materials used in the Tutorial, etc.)
- \AIBO Master Studio\REDIST  
(“Memory Stick” images and files that are copied in AIBO Master Studio Setup.)

## Behavior Arranger

- \AIBO Master Studio\BA\bitmap  
(Bitmap files for setting screen preferences)
- \AIBO Master Studio\BA\Library  
(Libraries)

## Principal files

### Behavior file

A file that is edited and created with Behavior Arranger. The behavior file contains AIBO's behavior program, a combination of actions.

Extension: \*.be

### Action library file

A file that is a collection of multiple actions and contains information for each action file. Actions to be used in Behavior Arranger (excluding system actions) are grouped together in an action library file in Action Composer.

Extension: \*.alb

### Action file

A file that contains information on action elements (motion, sound, LED).

Extension: \*.act

### Motion file

A file that contains data on AIBO's movements. Movement data comprises pose data defining the angle of each joint and intervals (time) between each pose.

Extension: \*.mtn

### MIDI sound file

A MIDI file that AIBO plays back. The MIDI sound file is saved in SMF0 format.

Extension: \*.mid

### WAVE sound file

A WAVE file that AIBO plays back. The WAVE sound file is saved in 8-kHz/8-bit/monaural/PCM format.

Extension: \*.wav

### LED file

A file that contains data on the LED flashing pattern. The LED file is saved in SMF0 format.

Extension: \*.led

### Packed action library

This file contains an Action Library, Action files that make up the Action Library, and element files. It is convenient for exchanging complete Action Libraries with other AIBO Master Studio users.

Extension: \*.plb

### Action export file

This file enables actions created in AIBO Master Studio to be made available in AIBO-ware.

Extension: \*.axf

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