KRC-3AD Wireless Controller

Instruction Manual

Translated By:

About this Product

This product utilizes both the KRC-3AD transmitter and KRR-1 receiver, and is only intended for use as a robot remote controller. Please keep this manual close by and reference often to get the most out of using your KRC-3AD wireless controller set.

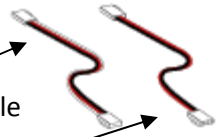
Product Contents

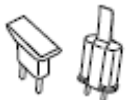
– please confirm that your controller set contains the following parts –


KRR-1 Antenna


Kit Guidance

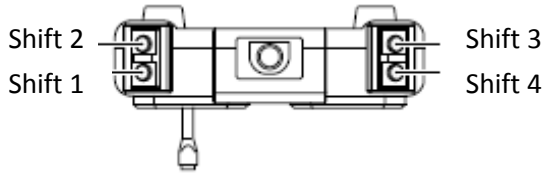

KRR-1 Receiver

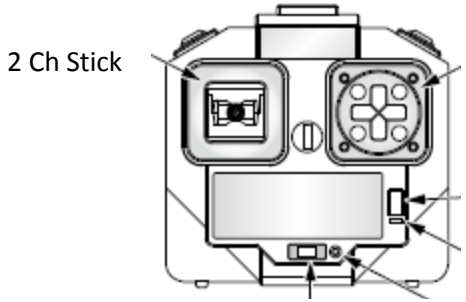

(1) KRR-1 Connection cable
(2) Red and Black Start Cables


Pierce Crystal Transceiver

※ TX (transmitter) ※ RX (receiver)

Terms and Assignments





When Power drops below 8V the power lamp will flash in 0.5 second intervals

Specs

【KRC-3AD】

Communications Protocol: FM-PCM
Frequency: Crystal replaceable (AD band)
Operating Method: 2 Ch. Stick + 12 buttons
Dimensions: 158 × 150 × 43 (mm) ※ excluding antenna protrusion
Weight: 269 g (excluding batteries and Crystal)
Power supply: 8 AAA batteries (sold separately)
Current consumption: 30 mA or less
Corresponding receiver: KRR-1
Compatible Control Boards: RCB-3HV, RCB-3J, RCB-1(HV), Motion Processor (HV)

Specs

【RCC-1】

Receiving system: super- heterodyne
Frequency: Crystal replaceable (AD band)
Dimensions: 29.3 × 24.4 × 17mm (excluding protrusion)
Weight: 10 g (without Crystal)
Current consumption: 10 mA

Requirements for Safe Use

Caution This view is the wrong treatment: If done as shown there is a possibility of injury or damage to equipment.

Warning This view is the wrong treatment: If done as shown there is a possibility of serious injury or even death.

Usage Notice

Warning Things you should not do!

- Do not cut, cluster or bend the receiver antenna wire. Receiver sensitivity will decrease.
- Do not change the polarity of the electrical connections. Damage to equipment may occur
- Do not over clock the crystal or operate at excessive temperatures.
- Do not use under the influence of drugs, alcohol or medication.

Caution Things you should pay attention to!

- When applying/cutting power to the unit, start with the Transmitter → Receiver, or Receiver → Transmitter, respectively. If done in the reverse order, noise from the receiver may cause a malfunction.

Warning Things you should pay attention to!

- This unit is intended for use with robots. Anything else is not supported and may be dangerous.
- Only Kondo approved crystals are recommended for this unit. Anything else is not supported and may cause erratic behavior from the transceiver and potentially damage to the unit.
- Only use Kondo authorized parts with the unit. All parts that come with the KRC-3AD are Kondo approved. Using any other parts in lieu of Kondo parts is not authorized and Kondo is not liable for any damages that occur as a result thereof.
- Before applying power to the transmitter, check to make sure that nobody else is using the same frequency of your KRC-3AD. In such case, neither operator will be able to adequately control their robot.
- You have to confirm that the setting and body movement both match. If these are different, it may cause the robot to go out of control.

Warning Things you should pay attention to!

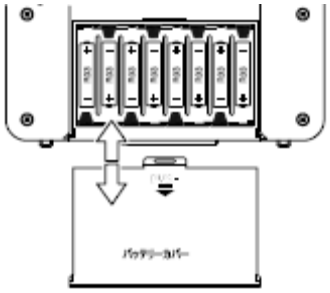
- Be sure to remove the battery after use. There are times that fire may occur if left unattended with the switch turned on.
- Keep batteries out of reach of children and infants.

Caution Things you should pay attention to!

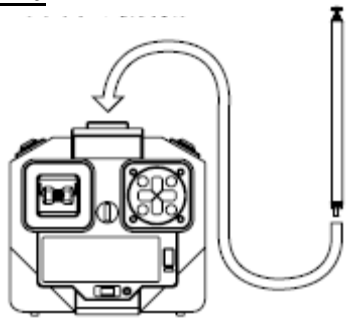
- Remove the batteries from the transceiver during extended periods of inactive use. Failure to do so may result in battery fluid leakage into the battery storage compartment which could result in permanent damage to the equipment.
- Pay close attention to store the unit in a proper location, and avoid such places as:
  - Extremely hot, cold, (more than 40 ℃, -10 ℃) areas of high humidity.
  - Exposure to direct sunlight, or areas of high vibration or dust.

Assembling the Transmitter

Removing and installing the batteries
Four to eight single-use batteries with staggered polarity between each battery. Alkaline batteries are recommended.

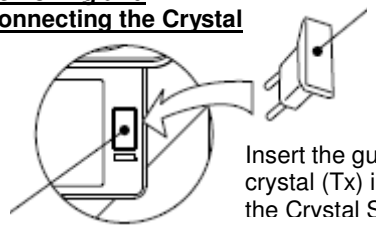


Removing and Connecting the Antenna

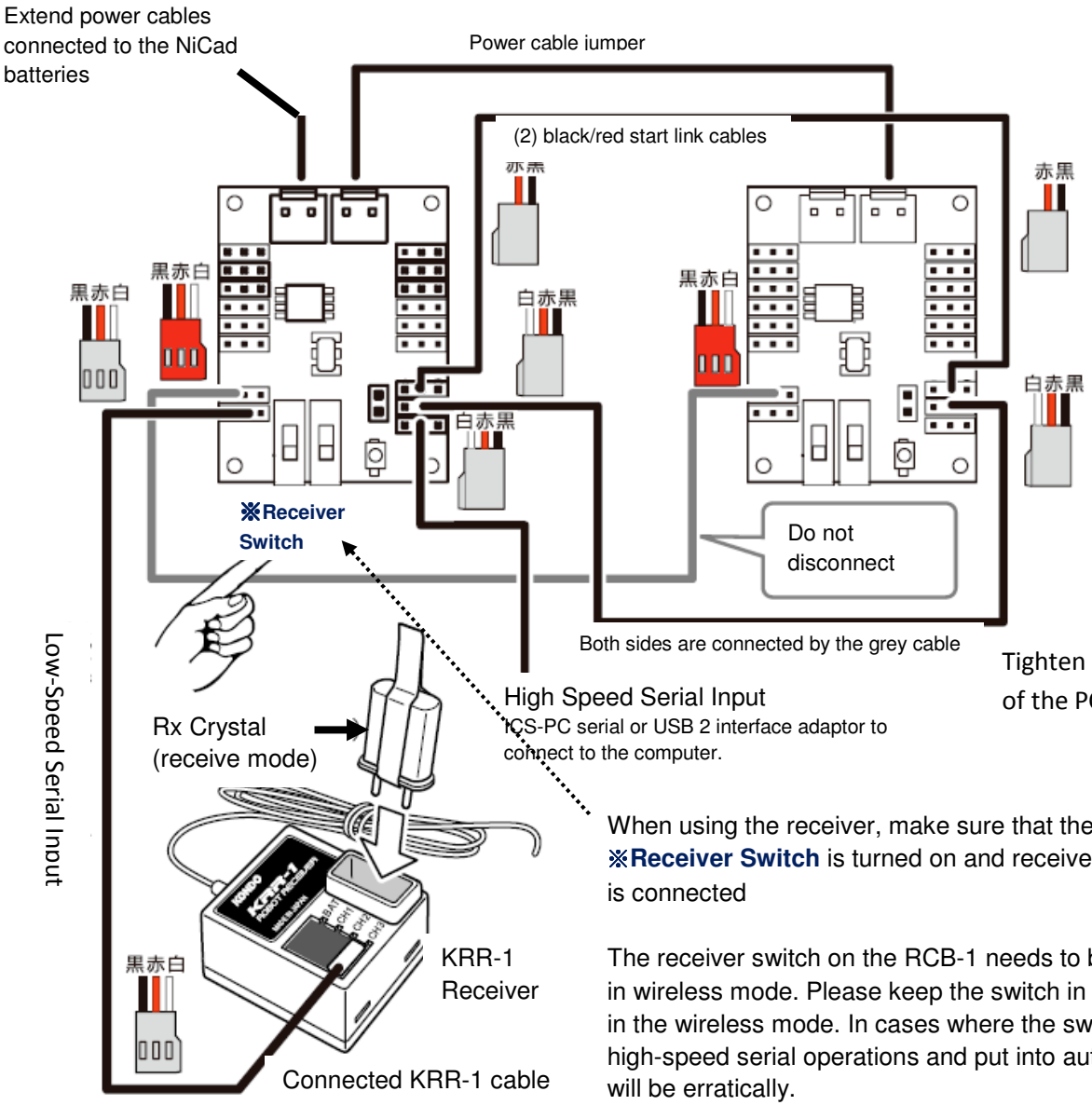


1. Insert antenna into screw hole
2. Turn counterclockwise until tight

Removing and Connecting the Crystal



Attaching the KRR-1 to RCB-1



Stop: It is necessary to change the KRC-3AD from transmit mode to Low Speed Serial Mode. Please refer to the KRC-3 Manager for an explanation

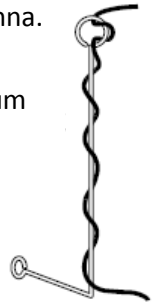
In order to connect the KRR1 to the RCB1, the start link cable must be properly connected! Also make sure the antenna is properly connected to the receiver and wound up neatly and out of the way. The antenna is the entry point into the receiver for the receive signal. Cases where the antenna is improperly connected or damaged, the signal may not effectively enter the receiver which will decrease the effective distance of the unit.

The same is true for the RCB-1HV!

Tighten with the end of the PCB cover

Wrapping the antenna. Please do not wrap around the aluminum frame. Use plastic parts.

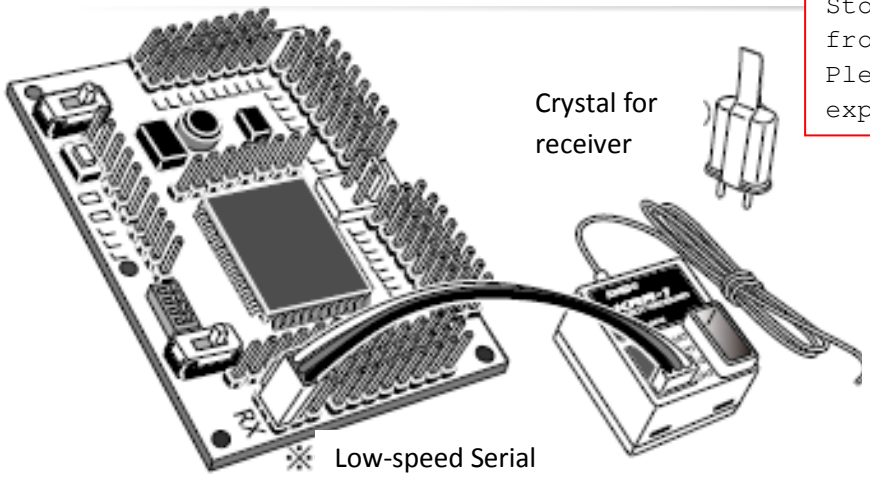
Only bend the antenna as much as necessary.



When using the receiver, make sure that the **※Receiver Switch** is turned on and receiver is connected

The receiver switch on the RCB-1 needs to be in the ON position when operating in wireless mode. Please keep the switch in the OFF position when not operating in the wireless mode. In cases where the switch is left in the ON position during high-speed serial operations and put into auto start mode, the auto start operation will be erratically.

Connecting the KRR-1 and Motion Processor



Stop: It is necessary to change the KRC-3AD from transmit mode to Low Speed Serial Mode. Please refer to the KRC-3 Manager for an explanation

When connecting KRR-1 t o the motion processor, it is necessary to connect to the low-speed serial terminal. The receiver will automatically start receiving the signal when the power switch is set to the ON position. If you would like to learn more about the motion processor settings, please refer to the motion processor manual or Kondo website.

RCB-1 Settings

RCB-1 side of the software on the PC controller settings HeartToHeart external signal input patterns (button combinations) to assign each scenario and the motion, if the operation of radio control. The buttons in the software window correspond to the stick and the actual buttons on the controller. As show in the image below, pushing the upper left direction on the stick, or the upper left (O) button on the eight button key pad has the same effect as pushing the corresponding buttons on the software.

Input Method Settings Window

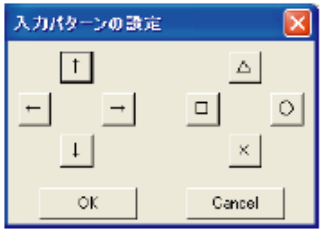
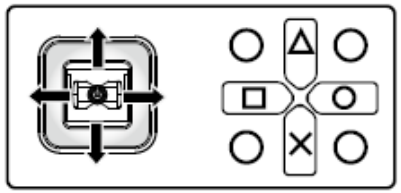
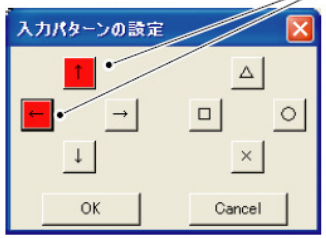


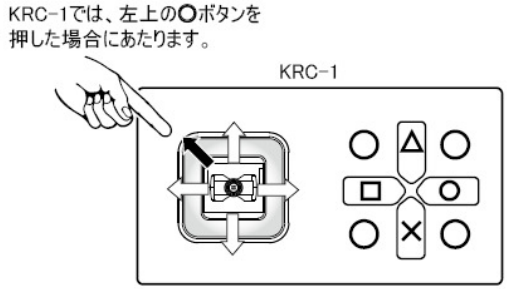
Image of RCB-1 Software Window



KRC-3AD

Software



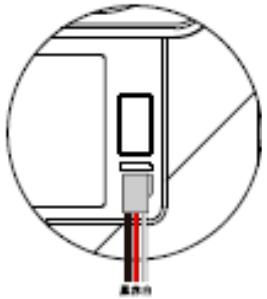


During wireless mode, when a motion has been sent to the robot, the receiver will ignore any inputs from the controller while the motion is in playback

ICS Setting

"ICS USB adapter" is not supplied with the. Please purchase separately.

Connecting



Connect the ICS-USB adapter cable to the connector on the opposite side of the ICS port on the KRC-3AD

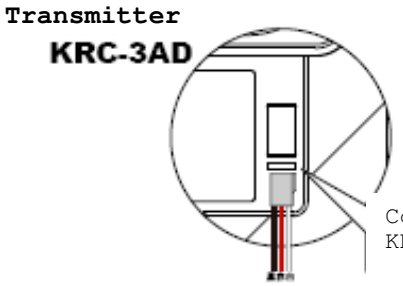
※ ICS-USB adapter connects to the PC's USB port.

Start the ICS configuration software (KRC-3 manager) on the PC and configuration the COM Ports.

※ Continuous power to the light indicates successful connection. Blinking light means the connection failed.

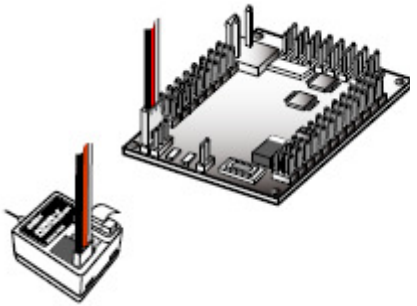
Please refer to the KRC-3 Manager manual for directions on how to use.

For Wired Connections



Connect the KRC-3's ICS port to the controller board's low-speed serial ports terminal via the connection cable.
Switch the control board to ON. At this time, please confirm that the LED on the KRC-3AD is blinking.

Connecting the RCB-3HV/3J



Connect the KRR-1 Connector Cable to the KRR-1 (BAT) and the RCB-3HV/3J low-speed serial terminal (Rx).

The RCB link cable is not included.

RCB-3HV (RCB-3J) setting flow

STEP1 Option: Configure the RCB-3 receive signal settings by HTH3

STEP2 Confirm Receive: Confirm if the RCB-3 is receiving a signal

STEP3 Play a Motion Scenario: Play the motion sequences that have already been written to the RCB-3 board.

STEP4 Motion Data Input to Settings to the Controller: Assign wireless values to the motion data and save.

STEP5 Decide a Motion Branch: Edit motions such as the wireless controlled loop.

STEP6 Initiate motions with the stick. Refine the contents of STEP 5.

STEP7 Master Slave through Mixing Function: Changes

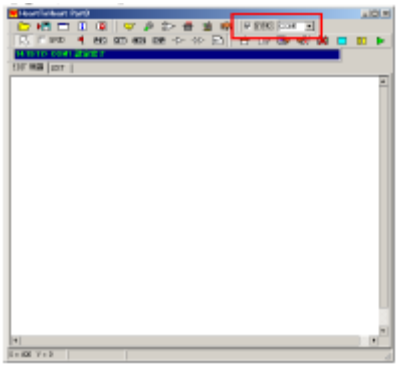
in the amount of servo stick to reflect the amount of movement.

STEP8 Mixing Function Application: Shift the position of the servo after mixing.

Note: RCB-3HV, RCB-3J are referred to as "RCB-3" for brevity.

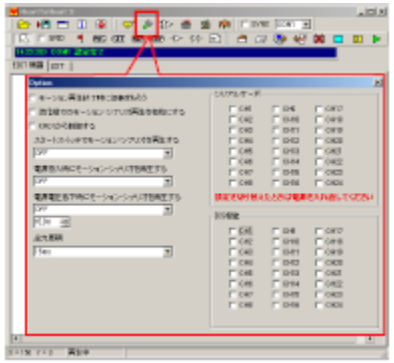
STEP 1 Option Settings

Receive signal settings for RCB-3HV, RCB-3J (RCB-3) coming from the KRC-3AD.



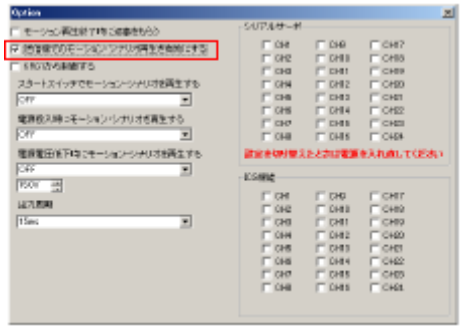
1. Start the H2H3 software. Set the appropriate COM port and check the SYNC box. Note: the image below is H2H3 V.1.03.

2. Connect RCB-3 board to the computer then apply power.



3. Click the “Option” (green wrench) button in the software and open the Option Window. Note: the window will not open if the RCB is not connected to the computer, or power is not applied.

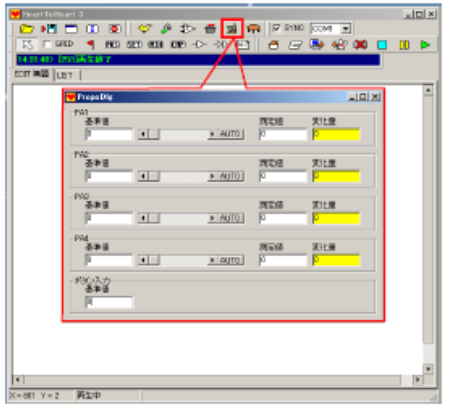
4. Click the box for the transmitter motion scenario playback. Second box on the top left.



5. Close the Option window. Settings take effect immediately after closing.

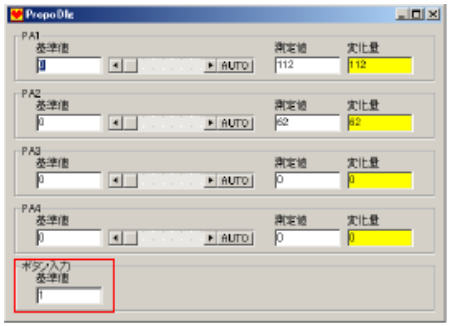
STEP 2 Confirm Receive

Confirm that a signal is being sent from the KRC-3 to the RCB-3.



1. Verify that the RCB-3 low-speed serial + receiver (Rx) terminals are connected properly. Please refer to the RCB-3 manual on how to connect the receiver to the RCB-3.
2. Turn on the KRC-3. The RCB-3 and the receiver are plugged in correctly if the RCB-3 red LED lights up. However, the light may flash depending on the degree of signal that it is receiving.
3. Click the software transmitter button, and open the propo dialogue. Note: the window will not open if the RCB is not connected to the computer, or power is not applied.

4. Operate the KRC-3AD stick and buttons.

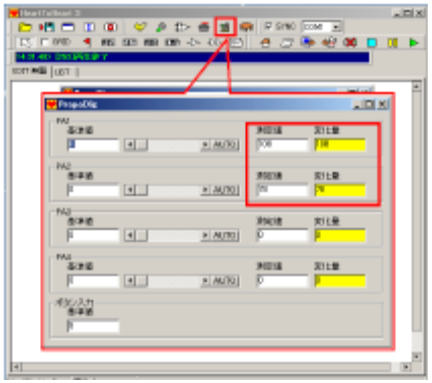


If the button values change from 0, the low speed serial signal is receiving successfully. Button values (controller values) are operation values of stick and button. The values are used to play RCB-3motion scenario or to separate internal motion.

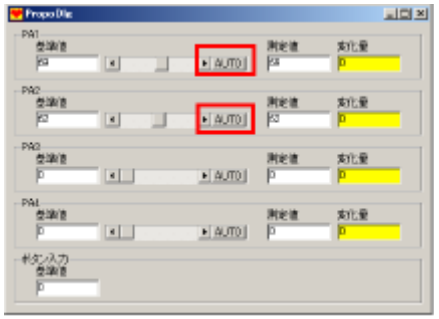
※ KRC set ICS-3 (transmit mode) will be extended to low-speed serial input button and the value does not change. Please refer to the ICS manual for information on the setting for the ICS.

5. Operating the Stick: Confirm changes from the reference value for PA1 to the changed value of PA2.

PA1: Stick Up and Down
PA2: Stick Left and Right



6. Setting the reference values. Set the stick to the neutral position and click [AUTO] for PA1 and PA2.



Close the window

This will save the stick's current position as a reference value.

The KRC-3AD does not utilize PA3 and PA4.

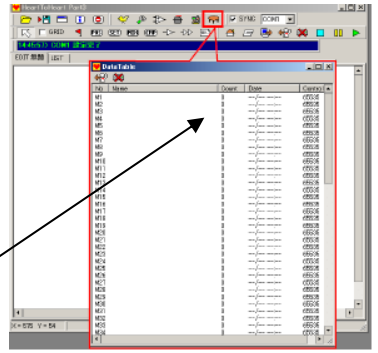
STEP 3 Playing the Motion Files Wirelessly

Steps to wirelessly playback the motion files that have been written to the RCB-3.

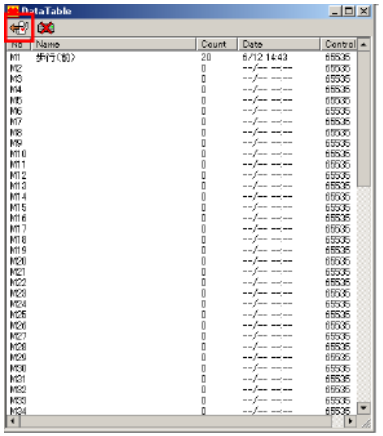
1. Writing the motion file to the RCB-3 in advance.

   Note: Please refer to the RCB-3 manual on instructions on how to write motion files to the RCB

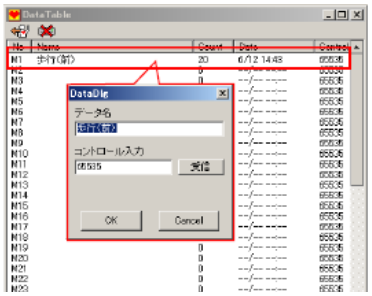
2. Click the "Table" button to open the Data Table



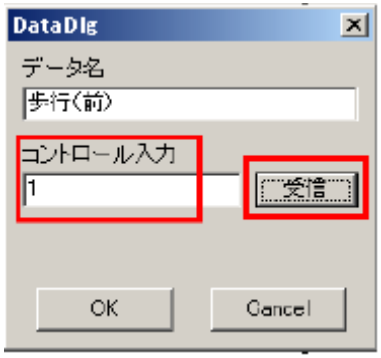
3. Click the Read button in the upper left to read the motion file that was written to the RCB-3. ※The data table does not show anything after starting up in HTH3、HTHJ



4. Double click the data file for the wireless motion playback file that you want to configure. The window will open.



5. The selected motion file that you want to assign to a stick or button on the KRC-3AD will be assigned an input value automatically after pressing the Receive button. For example, in order to walk forward, you will push forward on the KRC-3AD stick. Upon pushing the "Receive" button, the value will automatically change from 65535 to 1.



Please see the end of the reference materials for information on assigning control input values to the KRC-3AD stick and buttons.

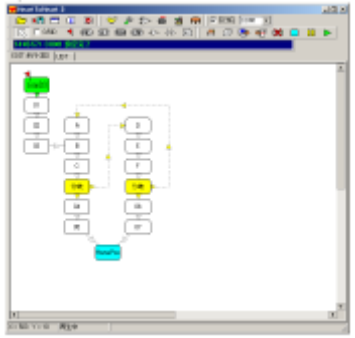
You should now be able to play back the assigned motion through the KRC-3AD.

You can do the same for other motions and assign them to other unused positions on the stick or buttons.

STEP 4 Setting the Controller Input Value for the Motion Data

Back in STEP 3 we assigned wireless value to existing motion file, but you can also edit the motion before assigning to the controller input.

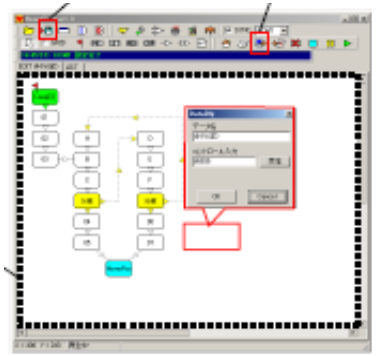
1. Open the Motion Data



2. Double click an empty area on the data stage to open the data dialogue.

3. Set the controller input value the same as in STEP 3 and click the OK button. The data dialogue

Save Button　　Write Button



Data Stage

window will close.

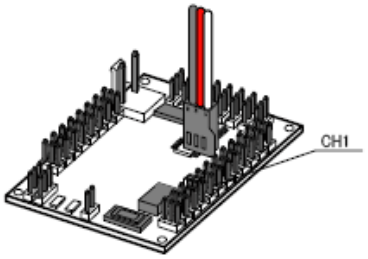
4. Click the Save button on the menu bar to save the motion and the controller input value.

5. Finally, click the write button on the menu bar to write the motion and controller input values to the RCB.

As of now, the motion data and the controller input value are set, and you should be able to play back the motion that was assigned to the motion data with the KRC-3AD.

STEP 5 Using control input values to judge the internal separation of motion

You can continue to play a motion by holding down the button.

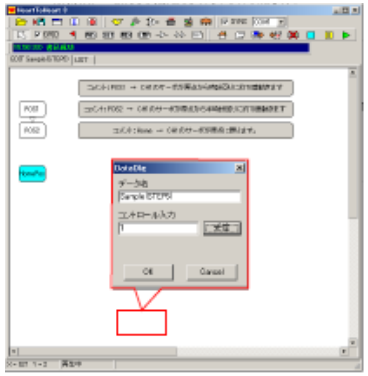


1. How to connect a servo motor to CH1 on the RCB-3.

2. Open sample motion [Sample STEP 5-1]

3. Set the controller input for a sample motion the same as in STEP 4.

4. Press the SET button. Arrange the SET object to the top of the data sheet.

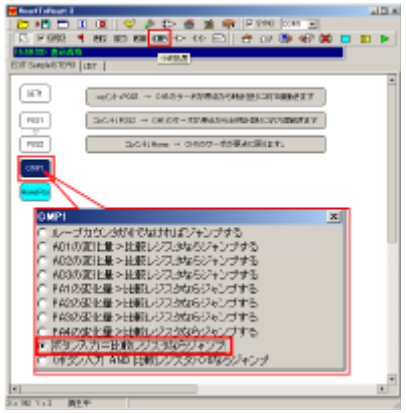


5. Double click the SET button to open the window as shown on the right.

To set a numeric value into the register, place a check in the 3rd box to the top titled [set the number in the comparing resistor], enter the same value that was set for the controller input previously in the data dialogue.

6. Close the Window. The value will automatically set once the window is closed.

7. Press the CMP button. Arrange the CMP object to the top of the data sheet.



8. Double click the CMP1 button to open the window as shown on the right. Select the field [Jump if cotton input equals the comparing register] as shown to the right.

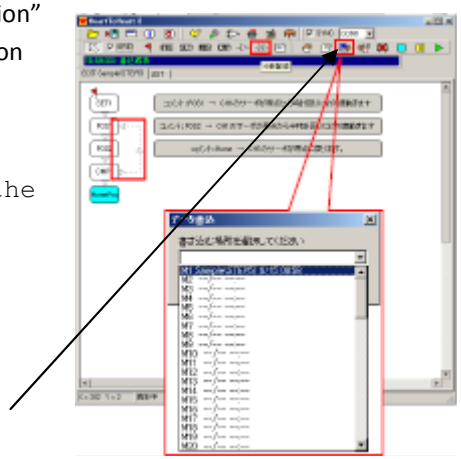
9. Close the Window. The value will automatically set once the window is closed.

10. Click the “connection wiring” button and connect SET1 to POS1、POS2 to CMP1、 and CMP1 to HomePOS.

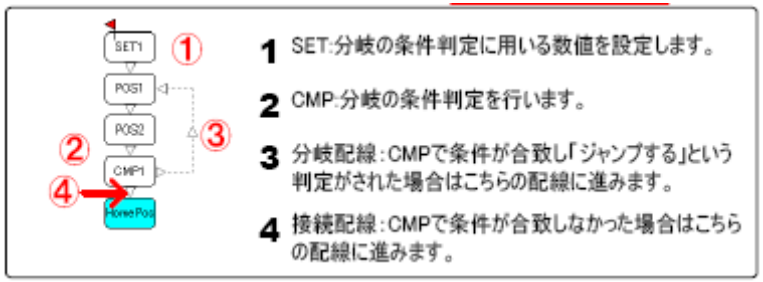
11. Click the “origin” button and attach the start flag to SET1. The motion will now begin from SET1.

12. Click on the “branching connection” button and branch the connection between CMP1 and POS1.

13. If the "button is continuously pressed the the motion will loop. Now, the "Motion is ready and branched as shown below.



14. Finally, in order to make sure that the created motion is written to the PCB, click the “write” button on the menu bar.



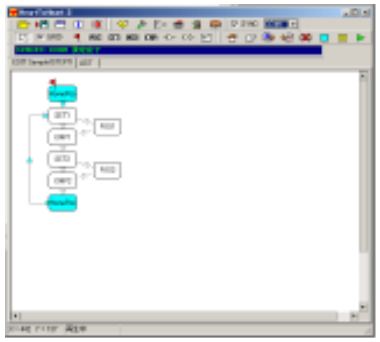
This motion created and written to RCB-3 can now be played; please confirm that the KRC-3 actually works.

STEP 6 Using changes in stick value to judge the internal separation of motion

Advanced level content learned in STEP5.
Using changes in stick value to judge the internal separation of motion

RCB-3 Settings

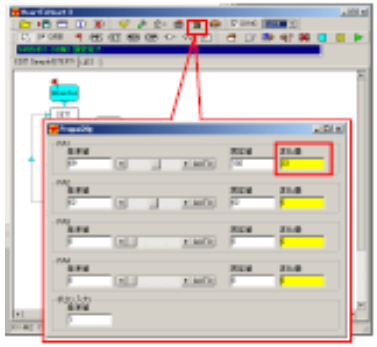
1. Connecting the servo to CH 1 on the RCB-3. KHR series robots can now be used as is.



2. Open sample motion [Sample, STEP6-1].

3. Open the Propo Dialogue. Move the stick and watch. PA1 and PA2 should have changed values. PA2 should have a different value.

   Close the dialogue window after you are finished.

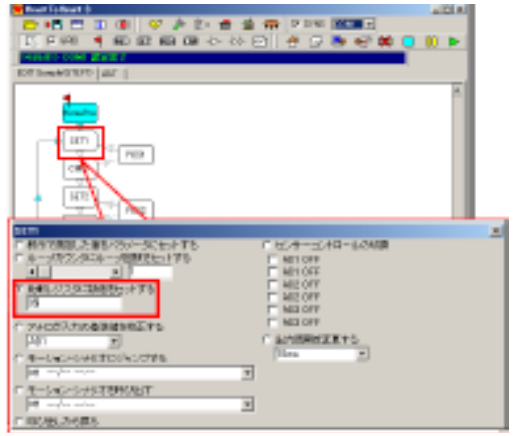


4. Open SET 1 and set the threshold boundaries.

   Instructions:

   a. Double click the SET1 button to open the window as shown on the right.

      To set a numeric value into the register, place a check in the 3rd box to the top titled [set the number in the comparing resistor]



   b. Enter the 35 in the data dialogue.

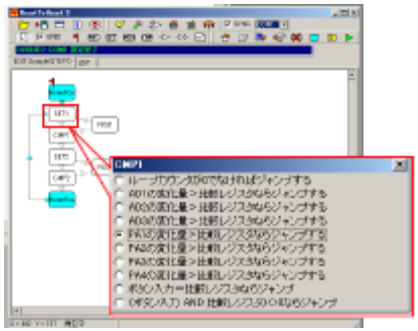
   c. After input, hit the enter key.

   d. Close the window

   ※比較レジスタ＝「35」は、スティックを前に８割程度倒した値に相当します

5. Open CMP1 to set the branch conditions. 「PA1の変化量>比較レジスタならジャンプする」を選択します

   Close the window.

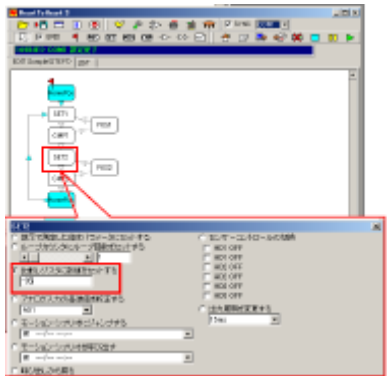


6. Open SET2 and set the threshold boundaries.

   Instructions:

   a. Double click the SET2 button to open the window as shown on the right.

      To set a numeric value into the register, place a check in the 3rd box to the top titled [set the number in the comparing resistor]



   b. Enter the -35 in the data dialogue.

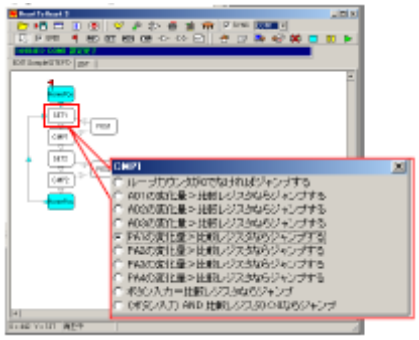
   c. After input, hit the enter key.

   d. Close the window

※比較レジスタ＝「-35」は、スティックを後ろに８割程度倒した値に相当します。

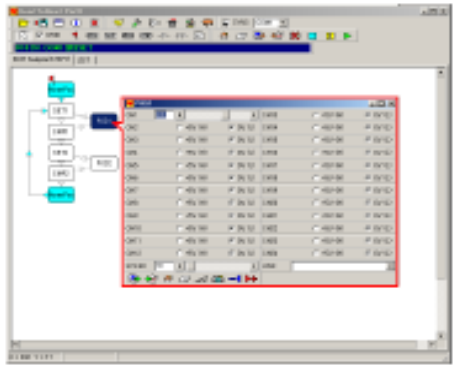
7. Open CMP2 to set the branch conditions

   a. PA1 の変化量>比較レジスタならジャンプする」を選択します



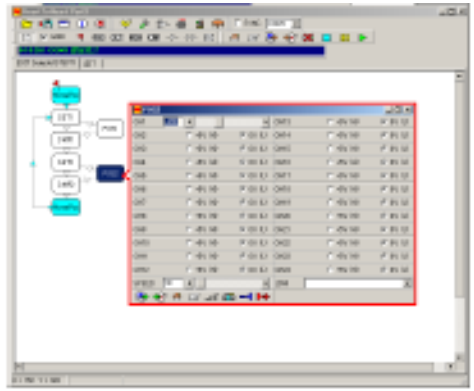
   b. Close the window.

8. Open POS1 and set the servo position to 200. You have succeeded if the servo rotates 70 degrees clockwise. Note: if it is note operating properly, confirm that the SYNC box is checked in the H2H3 menu bar.

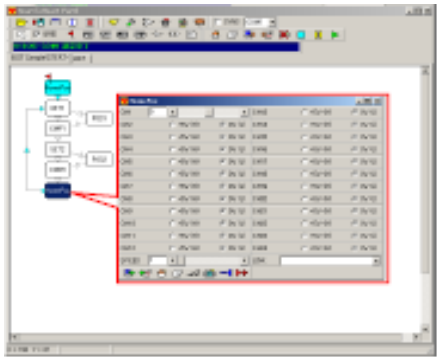


CMP1 branch POS1 the match when conditions will be executed

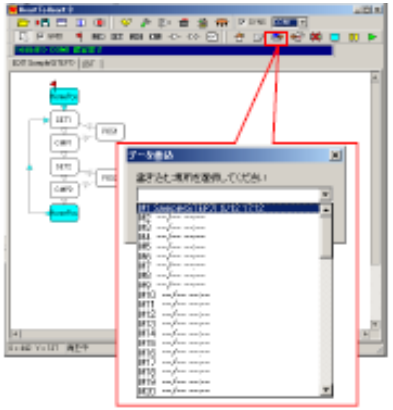
9. Open POS2 and set the servo position to -200. You have succeeded if the servo rotates 70 degrees COUNTER clockwise. Note: if it is note operating properly, confirm that the SYNC box is checked in the H2H3 menu bar. CMP2 branch POS2 the match when conditions will be executed



10. Open the HomePos item and confirm that the servos home position has been set to 0. As for the HomePos, even for CMP1 and CMP2, if the conditions do not match it will execute.

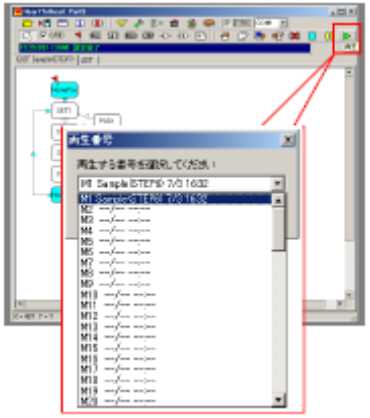


11. Press the write button to write the file to the RCB-3 once you are finished.

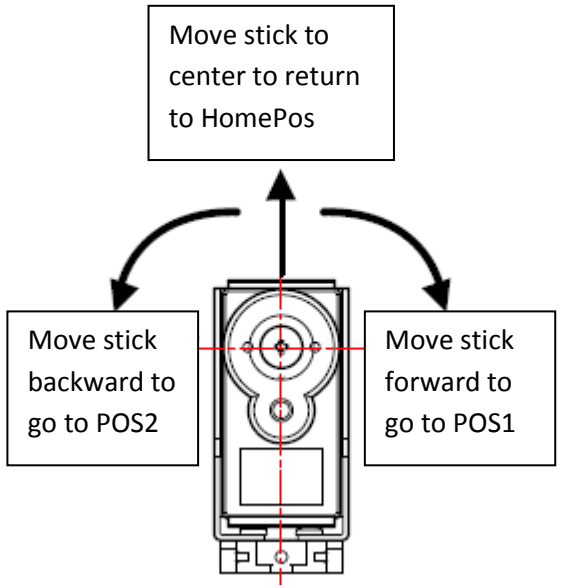


Operation

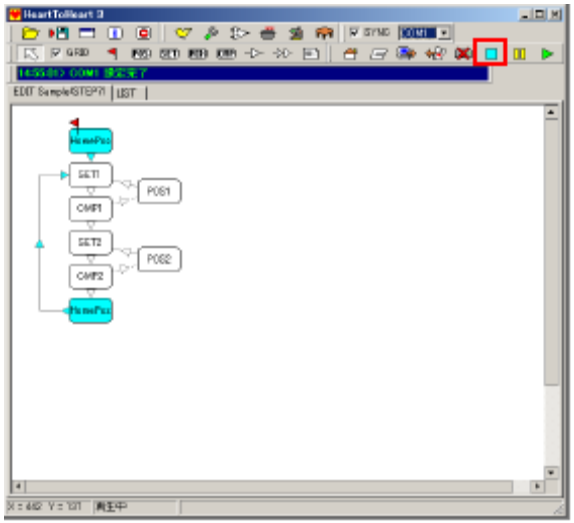
1. Press the Start button on the H2H3 menu bar to play back the previously written motion file.



2. You should have successful results when you move the stick forward and back.



3. Press the Stop button on the HTH3 menu bar when you want to end the motion.

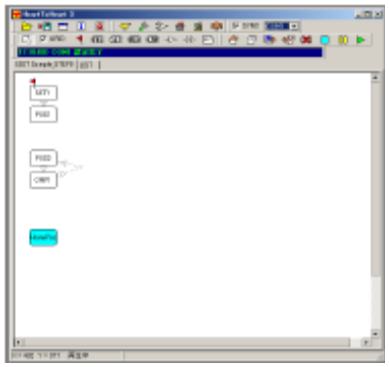


STEP7 Master Slave through Mixing Function

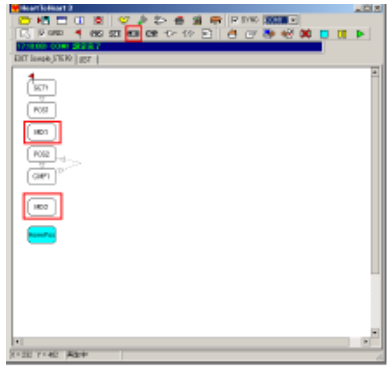
There is a function on the KRC-3AD stick that can be used to directly reflect changes in the servos. This means that you can control the servos in real time through the master slave mode.

Note: this function cannot be used on the RCB-3J.

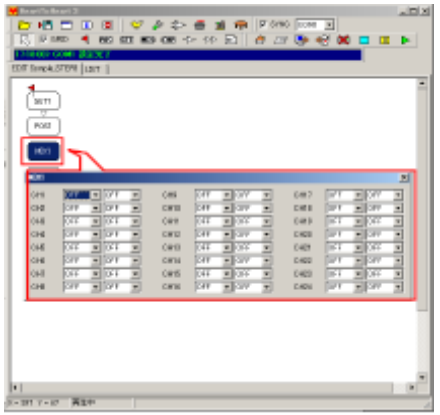
1. Connecting a servo to CH1 on the RCB-3. (KHR series robots can be used as is) open Sample STEP 7-1.



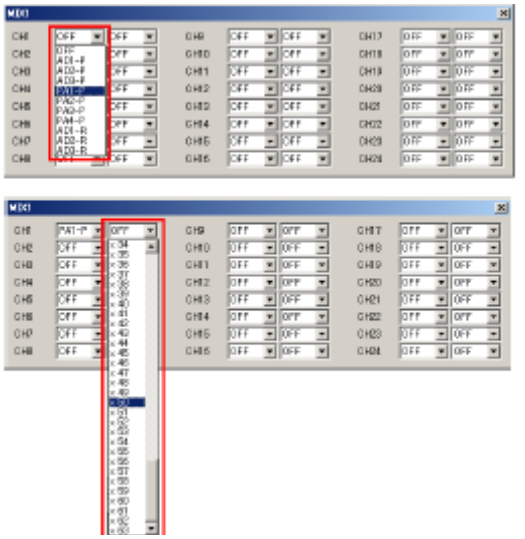
2. Click the MIX button and arrange MIX1 and MIX2



3. Double click MIX1 and open the window.



4. Mixing multiples and exponentials: choose PA1 from the right side CH1 drop down menu. Choose X 50 from the PA1 left side pull down menu.



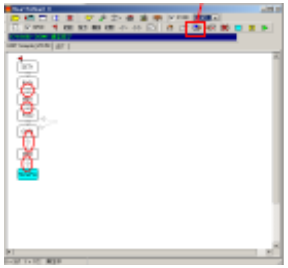
5. After the settings are complete, close the window,

6. Select [PA1] in left pull-down menu in the CH 1 row on the MIX2 (SET3) dialogue window. Leave the second pull down menu OFF. Mixing for PA1 is set to OFF.

When PA1-PA4 is not selected in the pull down menu on the left, the OFF setting for mixing will be effective.

7. Connect the items as shown to the right.

8. Click the Write button to write the created motion to the RCB-3 board.



Motion Execution

1. Press the「△」button on the KRC-3AD to execute the motion.

2. While holding down the 「△」button and moving the stick longitudinally, if the servos move in real time with the stick motion, you have succeeded this far.

3. If you release the 「△」button, the motion will come out of the loop state, mixing will turn off, and the motion will end.\

Once you have succeeded in assigning the mixing function to a motion, please go back and turn OFF the mixing function after the motion is finished.

If the mixing function is not set to OFF, it will still be in effect for other motions when executed.

STEP 8 Mixing Function Application

Mixing obtained by learning how to hold the position.

Learn how to keep the position that was acquired through mixing.

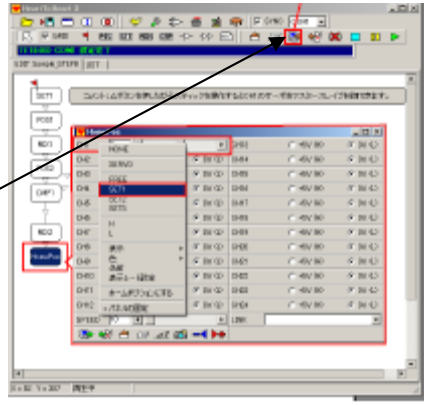
Motion Settings

1. Connect a servo to RCB-3 CH1.

2. Open the Sample motion created in STEP 7 (sample STEP 7-2).

3. Open HomePos, right click the top panel of CH 1, and select SET1.

4. Close the HomePos window and write the file by clicking the write button.



Motion Execution

1. Press the 「△」 button on the KRC-3AD to execute the motion.

2. Hold down the 「△」 button while moving the stick longitudinally to test the master slave feature of the servos.

3. Release the 「△」 button while in motion to terminate the loop. If this works, you have succeeded at configuring the controller for master slave.

RCB-3 Controller Data Input Index

	RCB-3 Data input values				
	w/out shift	Shift 1	Shift 2	Shift 3	Shift 4
Neutral	0	512	1024	2048	4096
↑	1	513	1025	2049	4097
↓	2	514	1026	2050	4098
→	4	516	1028	2052	4100
↗	5	517	1029	2053	4101
↖	6	518	1030	2054	4102
←	8	520	1032	2056	4104
↙	9	521	1033	2057	4105
↘	10	522	1034	2058	4106
△	16	528	1040	2064	4112
×	32	544	1056	2080	4128
○	64	576	1088	2112	4160
△○	80	592	1104	2128	4176
×○	96	608	1120	2144	4192
□	256	768	1280	2304	4352
△□	272	784	1296	2320	4368
×□	288	800	1312	2336	4384