

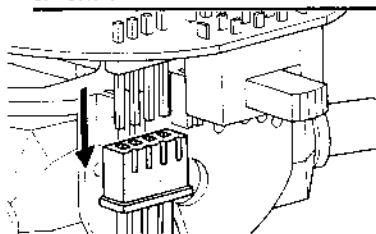
Variation: The operations described from this point on are variations. If you are interested, try them for yourself; however, they are not essential.

Changing the Gears

By changing the gears on the motor units, you can determine whether to prioritize speed or power.

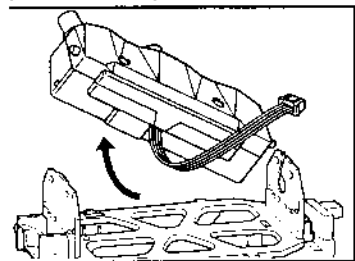
8-1

Turn the POWER switch OFF, then unplug the motor unit connectors from the motherboard. When you do this, be careful not to bend the pins of the motherboard connectors.



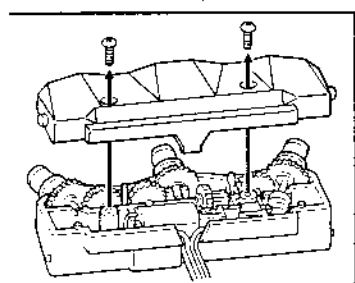
8-2

Remove both motor boxes (including the cables) from the frame. It is easier if you remove the legs first.



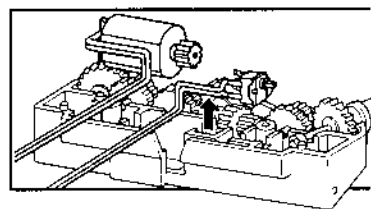
8-3

Remove the screws and open the motor box.



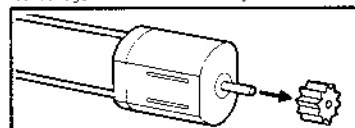
8-4

Remove the motor switch from the gearbox (below).



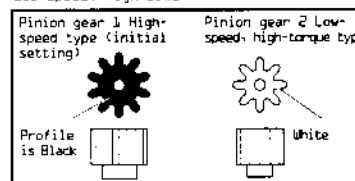
8-5

Using needle-nosed pliers or any other suitable tool, remove the pinion gear from the motor. As you do so, be careful not to damage the teeth of the gear.



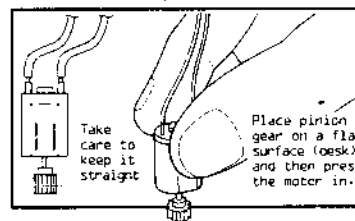
8-6

Select a pinion gear. High-speed type (black): High speed, low power. Low-speed, high-torque type (white): Low speed, high power.



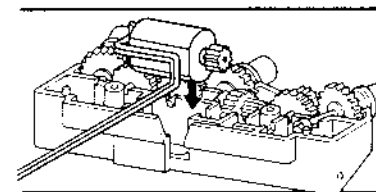
8-7

Press the selected pinion gear into the motor. Press firmly as far as it will go.



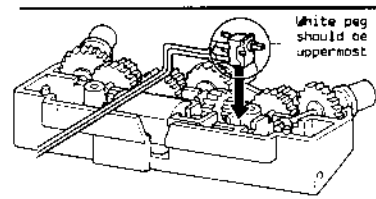
8-8

Install the motor in the gearbox (below).

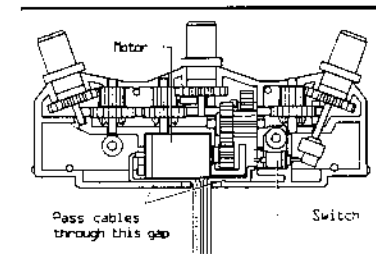


8-9

Install the switch in the gearbox (below).



Pass the cables from the motor and the switch through the gap as shown in the diagram below.

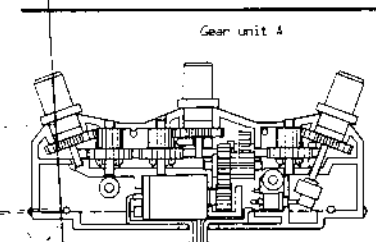


8-10

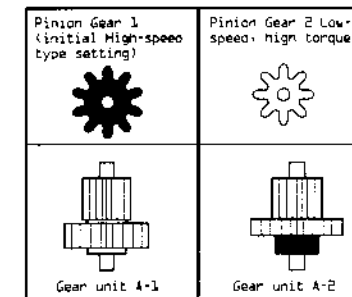
Change gear unit A. Hold it so that you can lift it from above.

APPROVAL RECORD

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Date _____
Reviewed by _____
Date _____

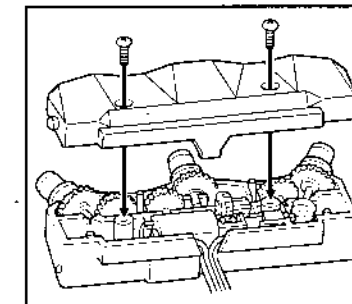


If you are using pinion gear 1, use Gear Unit A-1, and if you are using pinion gear 2, use Gear Unit 1-2.



8-11

Secure the gearbox in position by fastening the screws and re-assemble the motor unit. Fasten the screws firmly to eliminate any gap between the upper and lower parts of the gearbox. When you do this, be careful that the cables pass correctly through the gap, and are not caught between the parts of the gearbox. Use the same pinion gear (ie gear unit A) for both motor units.



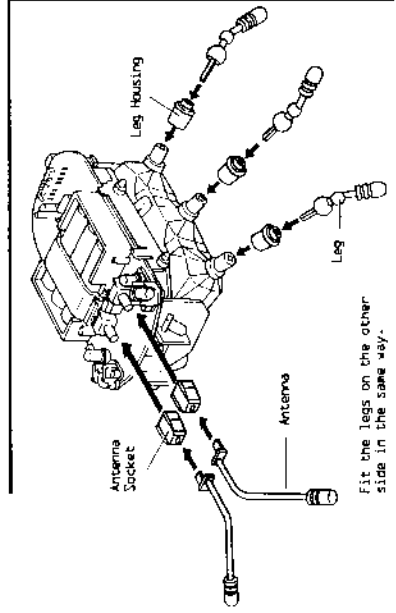
8-12

Attach the motor units to the frame and attach the connectors to the motherboard explained on page 10. When you have done this, the replacement of the gears is complete.

Assembly Variations

9-1

Fitting Plastic Leg and Antenna Parts

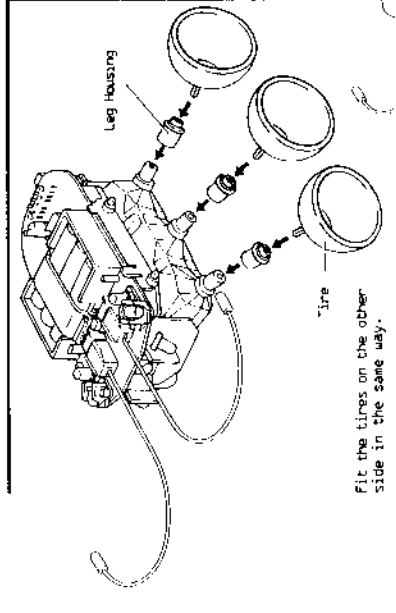


Fit the legs on the other side in the same way.

Use these parts if you prefer to make the assembly process as easy as possible. Note: Turn the power ON before adjusting the angle of the legs.

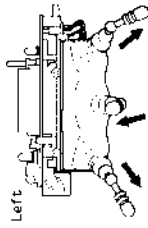
9-2

Fitting the Tires

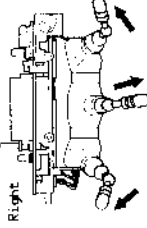


Fit the tires on the other side in the same way.

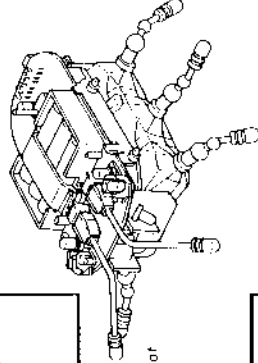
Left



Right



Fit each of the legs at the angle shown in the diagram



The Option connector

The WanderBorg has an Option connector, allowing even more advanced "modeling." The Option connector is on the underside of the WanderBorg's rear end, and allows you to connect an external sensor such as a motor, or an external sensor such as a switch. To use this connector, you will need general knowledge of electrical circuits, a 2.5mm pitch, 4-pin connector (female) "Berk" type or other connector, and the ability to perform soldering. Care is needed when using the Option Connector: creating an inappropriate connection may damage the WanderBorg's circuits.

Caution

Option Connector 2.5mm pitch, 4-pins may have sharp points.

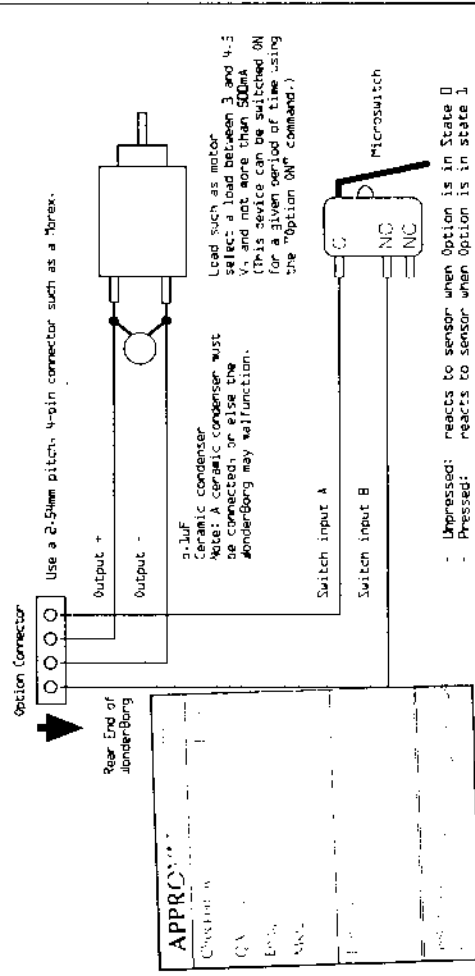
Specifications

- OUTPUT Supply voltage: 4.5V; maximum supply current: 500mA; ON / OFF only
- Out +: Current output connected to robot's battery
- Out -: Open connector
- 2PUP Mechanical electrical contact points (switches, etc); short-circuit resistance: 1kΩ or lower
- Switch input A: Microcontroller input, pulled high (100kΩ)
- Switch input B: Connects to SW (robot's battery)
- This connector allows an additional motor to be added.

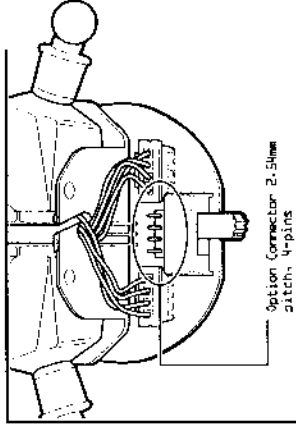
Pin Layout and Reference Circuit

Caution

If an inappropriate external circuit is connected to the Option Connector, this may result in damage to either or both the WanderBorg and the external circuit. Only connect an external circuit if you are fully aware of its specifications.

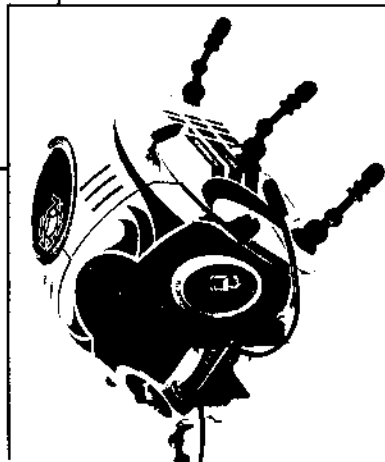


Underside of WanderBorg's rear end



Personalize your WanderBorg

Use the stickers / decals (included) to decorate the shell of your WanderBorg. Paint can also be used to customize the shell (sold separately).



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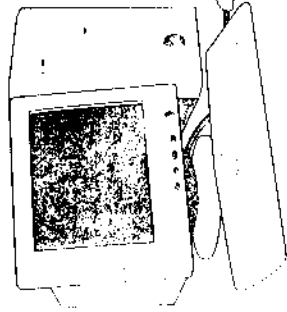
BANDAI (UK) CO., LTD.
QA/QC DEPT.

Introduction

Have you assembled your WonderBorg?

The WonderBorg is not operated by remote control; it is an autonomous robot. In other words, it uses its own sensors to find out about its surroundings and decides for itself how it should move. If you teach your WonderBorg what to do in a given situation, it will exhibit all sorts of behavior. This teaching process is called "programming the WonderBorg".

Ordinary programming requires specialist knowledge of computers, but this is not necessary to program the WonderBorg for PC. This is because you use special software called Robot Works, which allows you to create programs very easily using your computer's mouse. Read on, and learn how to program your own WonderBorg by following our practical guide.



Robot Works software is designed exclusively for Windows ME / 95 / 98 / 95. Robot Works uses your PC's external serial port, so have your PC manual in hand when you begin the setup operation.

System Requirements

- A DOS / V format PC.
- A PC running Windows ME / 95 / 98, and having a 2-sub B0901 serial connector.
- If your PC has a different type of serial connector, you will need suitable adaptor. Contact your PC manufacturer for more information. The use of a USB-to-Serial adapter is not recommended.
- The PC must be a Pentium 100MHz or higher, with at least 8MB of memory, 16-bit color capability or higher, and least 30MB of free disk space.
- A CD-ROM drive is also required, but only when installing the software.

Installing the software

- To install Robot Works, you will need at least 30MB of free disk space.
- Load the Robot Works CD in your PC's CD-ROM drive.
- So into "Robot Works CD" in "My Computer", and double-click the "works-setup" icon. This will activate the installation wizard.

When the Installation wizard starts up, click "Next". If you have any other programs open, close them and then restart the Installation wizard.

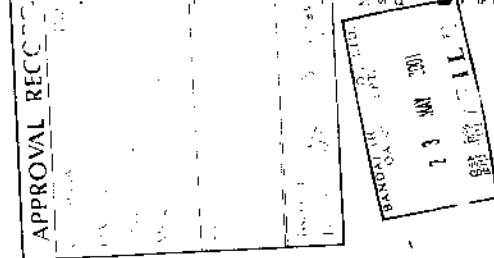
Specify where you want the software to be installed. Most people choose the default option and click "Next" (in this case, the software will be installed in the Program Files folder in the C drive). If you want to install the software to another location, click "Browse". The directory selection screen will then appear. Specify the desired directory, then click "OK". It is now time to specify whether you want Robot Works to appear in the Start menu or in a particular program folder. Most people choose the default option and click "Next" (in this case the software will be installed in the Robot Works folder).

If you want to change the name of the folder, enter the desired name in the topmost box, then click "Next". The screen asking you to confirm whether to go ahead with the installation will now appear. Most people choose the default option and click "Next". In this case, the installation will begin. If you want to change any detail of the installation, click on "Back" and re-set the item in question. The Robot Works installation status screen will now appear. When the progress meter reaches 100%, the installation is complete. When the screen tells you that the installation has been carried out successfully, click "Finish". Robot Works is now installed.

If you chose the relevant default option earlier, the Robot Works shortcut icon will now be present on the Desktop screen. To activate Robot Works, double-click this icon. Note: If the Robot Works icon is not on the desktop screen, go into the Windows start menu, select "Programs", then select "Robot Works", then "Robot Works" again, to activate the program.

Uninstalling Robot Works

To uninstall Robot Works, go into "My Computer", select "Control Panel", select "Add / Remove Programs", when "Add / Remove Programs Properties" is displayed, select "Robot Works" from the list of applications, and click "Remove". Follow the on-screen instructions to remove the application.



- Connecting the Interface

Caution: Be sure to switch the PC power OFF before starting this operation. Use only the Interface supplied with this product. Make sure that no other device is connected to the external serial port of your PC.

1. Connect the interface to the PC's serial port (COM port) using the Interface Cable supplied with this product. Refer to your PC manual to avoid making a mistake. If your PC has more than one serial port, connect the interface to the COM1 serial port.

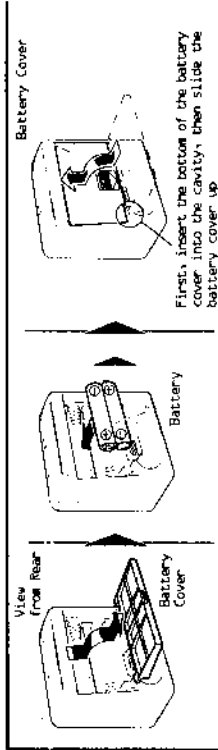
Note: If you own a palm pilot or similar device, you must temporarily disable it in order to connect the interface. Do not allow the interface to connect. Simply click the mouse on your Hot Sync Manager icon (located on the bottom right corner of the screen), and click disable. Do the same to enable it when you are finished playing with the WonderBorg.

Caution

If you are using a notebook PC, for example, the serial port may be the wrong shape for the connector, and in this case you will need a serial port (COM port) adapter. Consult your PC manufacturer for more information. The use of a USB-to-serial adapter is not recommended.

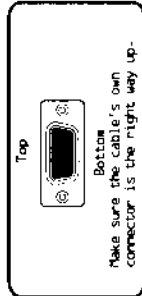
2. Remove the battery cover from the Interface supplied, and insert two AA alkaline batteries as shown in the diagram. Be careful not to insert the batteries the wrong way. Replace the battery cover, then turn the POWER switch ON. If the green lamp (labeled "POWER") on the front of the Interface lights up, it is connected correctly.

Inserting the Batteries



3. Connect the supplied cable to the connector in the back of the interface.

Note: Do not fasten the screws on the left and right sides of the connector.
Note: Do not touch the terminal with your fingers

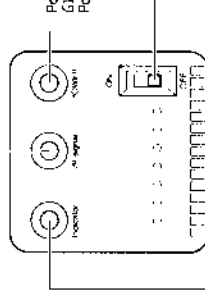


To Ensure Proper Function

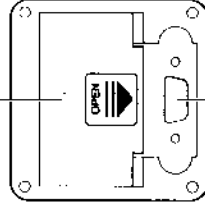
- Do not mix old and new batteries.
- Do not mix different standard (carbon-zinc), or re-chargeable (nickel-cadmium) batteries.
- Battery installation should be done by an adult.
- Non-rechargeable batteries are not to be recharged.
- Rechargeable batteries are to be removed from the toy before being charged.
- If rechargeable batteries are only to be charged under adult supervision.
- If rechargeable batteries of the same or equivalent type as recommended are to be used.
- Batteries are to be inserted with the correct polarity, and follow the toy and/or battery manufacturer's instructions.
- The exposed terminals are not to be shorted.
- Do not dispose of batteries in fire as batteries may explode or leak.

Names of Interface Parts and Their Function

Infrared Transmitter
- Sends programs and Infrared signals to the WonderBorg.



Battery Cover



Indicator Lamp
Flashes when a program or infrared signal is being transmitted

Power Switch
The "up" position is ON and the "down" position is OFF. Be sure to turn this switch off when the equipment is not in use.

Cable Connector
- Connects to the WonderBorg's special Interface Cable. Do not insert any other cable as this could cause the interface to break down.

Points to note

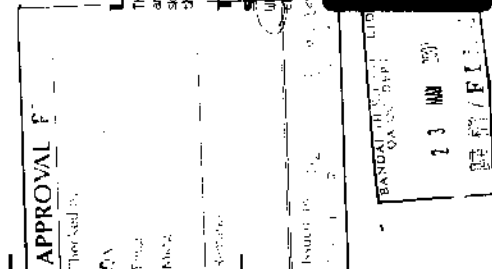
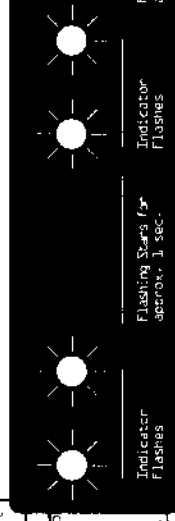
- The interface is a piece of precision electronic equipment. Be careful not to drop it, allow it to get wet, or leave it inside a car during hot weather, anywhere else likely to become very hot, as this could cause it to break down.
- The only cable that should be inserted into the connector on the interface is the special Interface Cable.
- Do not insert any other cable, or any small metal objects such as paperclips or pins.
- Do not touch the Interface Connector terminal with your fingers, or allow any metal objects to come in contact with it.
- The battery life is roughly 100 hours (using a commercially-available alkaline battery).
- If communications errors are becoming more frequent during program transmission (when a communications error occurs, the WonderBorg will emit a long beep), change the batteries. When you do so, replace both batteries with new ones, and make sure the batteries are inserted the correct way.

Using the Interface as an Infrared Signal Transmitter

The Interface can be used to transmit infrared signals to the WonderBorg to guide it and perform other operations. To transmit an infrared signal, bring up the Settings screen in Robot Works, select the type of infrared signal you want to send, then click the START button on the screen.

The flashing of the indicator lamp when an infrared signal is transmitted

When an infrared signal is transmitted, the indicator lamp on the Interface flashes (see diagram below).



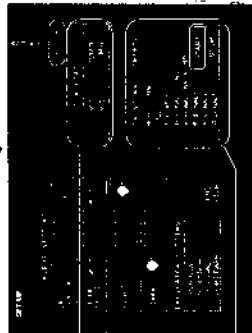
Setting the serial port

Before using Robots Works for the first time, you will need to set the serial port. This is done by opening Robots Works and following the procedure described below.

- 1- When you open Robot Works, the title screen will appear. If you left-click the "CLICK TO START" button, the panel screen will then appear.

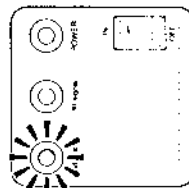


- 2- Click the "Set Up" button on the panel screen to bring up the Settings screen.



- 3- Using the "COM Port" button on the Settings screen, select the port to which the interface is connected.

- 4- Turn the Interface's POWER switch ON, click "Borg Signal" on the "START" button. If all is in order, the red indicator lamp at the left on the interface will start flashing.

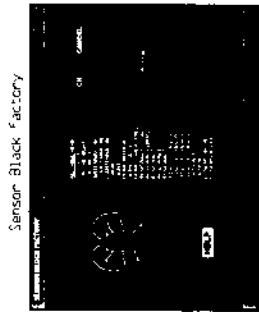
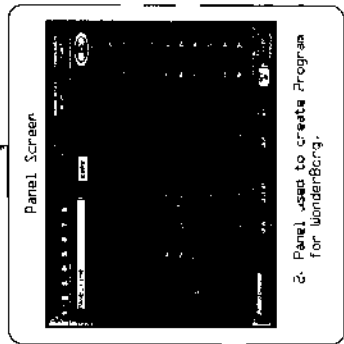
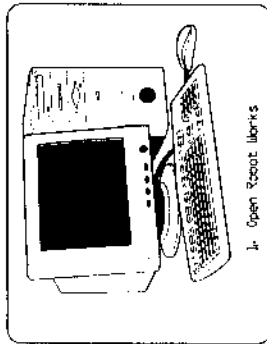


- 5- Click "STOP". The indicator lamp will stop flashing. Click "Return" to return to the panel screen, then click "Quit" to exit from Robot Works.

These settings only need to be specified the first time you use Robot Works. Subsequent settings will be saved so there is no need to repeat the above procedure or subsequence.

Overview of the Programming Operation

The main operating screens in Robot Works, and the way they relate to one another, are shown below.

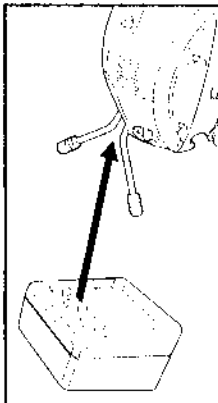


2-3 This Screen is used to set variable Decimators for the sensors used in the program.

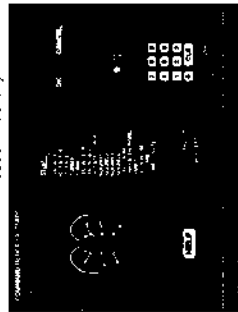
Set Up Screen



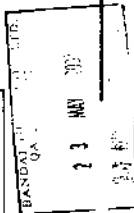
This screen is used to set the sensor sensitivity, the WonderBorg's walking speed, and the LED parameters.



3- The Infrared signal is transmitted from the interface to the WonderBorg.



This Screen is used to specify the desired behavior - pattern and the event.



OVERVIEW OF THE PROGRAMMING OPERATION

- Let's get started!

It's time to try programming your wonderBorg!

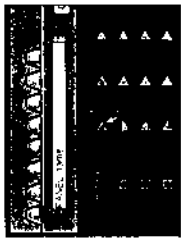
1. Join robots.wonders.com and click "CLICK TO START" on the title screen. The Panel Screen will then appear.

2. Left-click the blue square in the top-left corner of the screen. The Sensor Clock Factory screen will then appear.



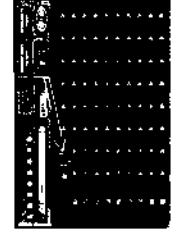
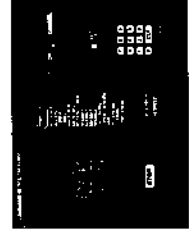
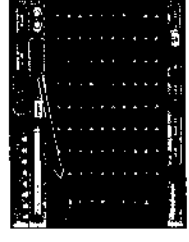
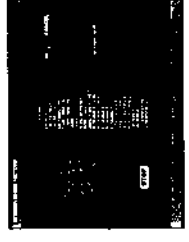
3. This screen is used to specify the sensor settings. On the list, select "Nothing Here", then click the "OK" button.

4. Go back to the Panel Screen. The "Nothing Here" block will be displayed in the Panel. Drag this block and drop it on top of the blue square that you clicked earlier.



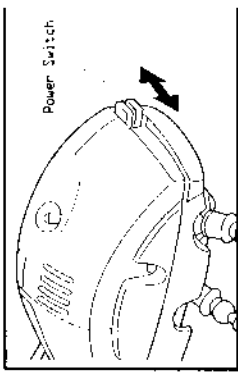
5. The next step is to specify a command. Left-click the blue triangle inside the "Nothing Here" block. The Command Block Factory screen will now appear. In the list, select "Advance", then left-click the "OK" button.

6. Go back to the Panel Screen. The "Advance" block will be displayed. Programming this block to the right side of the "Nothing Here" block using the same procedure as in step 4.

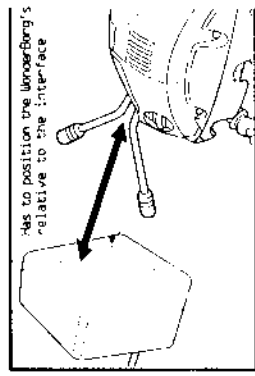


OVERVIEW OF THE PROGRAMMING OPERATION

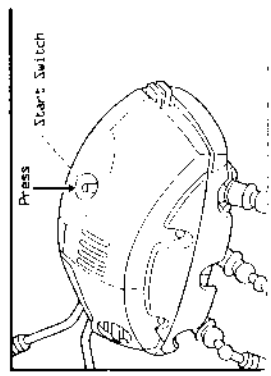
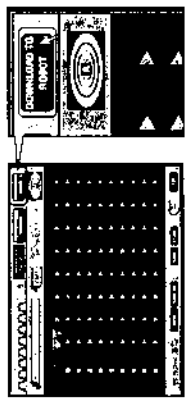
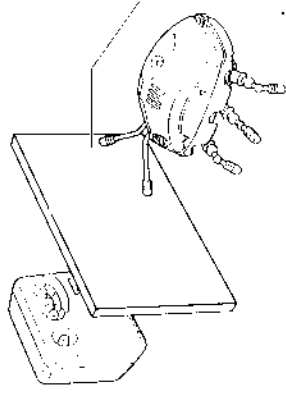
7. You have now created a program that says "When there is nothing there, the wonderBorg just 'goes forward'".



8. Turn the wonderBorg's 'POWER' switch ON.



9. Position the Interface so that the transmitter is facing the wonderBorg's infrared receiver (the wonderBorg should be about 20cm away from the interface). When you do this, make sure there is nothing in between the interface and the wonderBorg (see the illustration below).



10. Press the wonderBorg's 'START' stop button, causing the robot to start. If the wonderBorg now moves continuously forward, your program has been successfully transmitted. Press the 'START' stop button again. The robot will now go back to sleep. Press the wonderBorg to finish.

APPROVAL RECEIPT

Checked by: _____
QA: _____
Error: _____
Mktg: _____
Remarks: _____

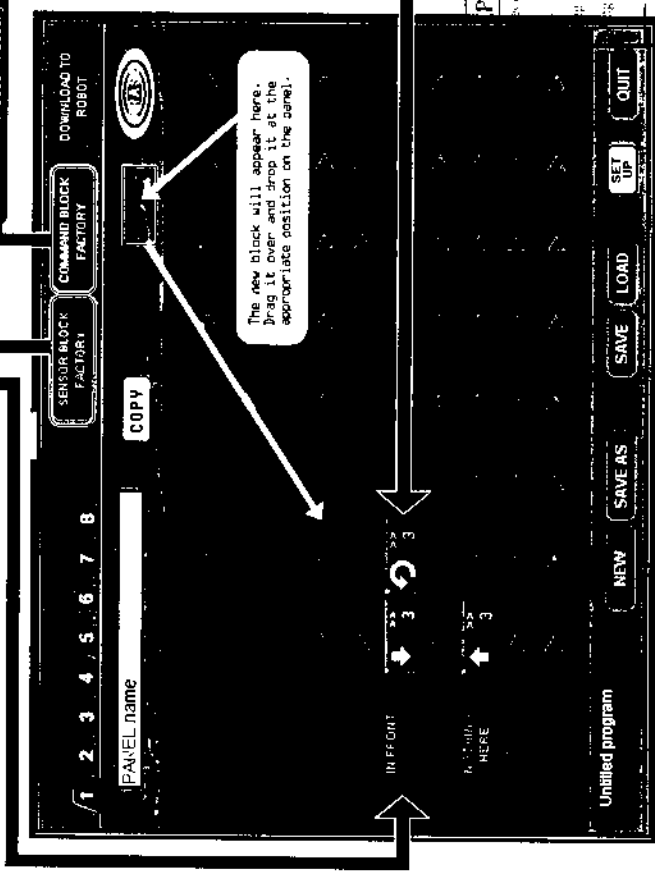
Checked by: _____
QA: _____
Error: _____
Mktg: _____
Remarks: _____

TRANSDATA INC. CO., LTD.
QA DEPT.
13 MAY 2001

- How to Read the Screens

Operations are carried out using three basic screens: the Panel screen, the Sensor Block Factory screen and the Command Block Factory screen. This section explains the role of each screen and how to switch between them.

When you open Robot Works, the title screen appears. After clicking here will take you to the Panel screen.



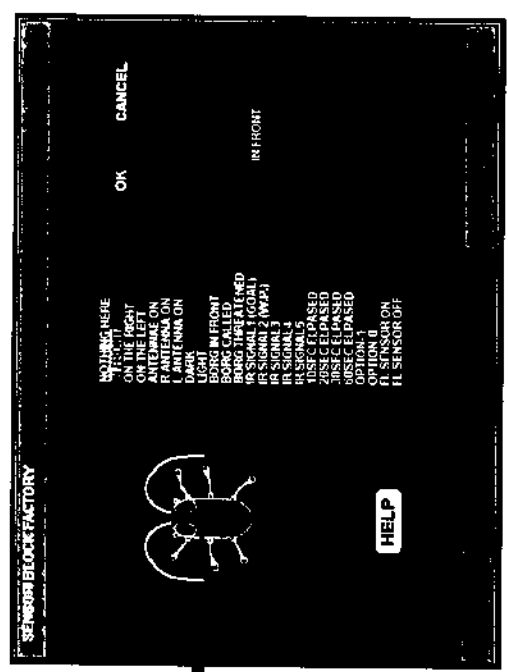
Go to Sensor Block Factory

Note: To go to the Sensor Block Factory, click on the blue squares on the Panel Screen to go to the command block Factory; click one of the pink triangles.

Go to Command Block Factory

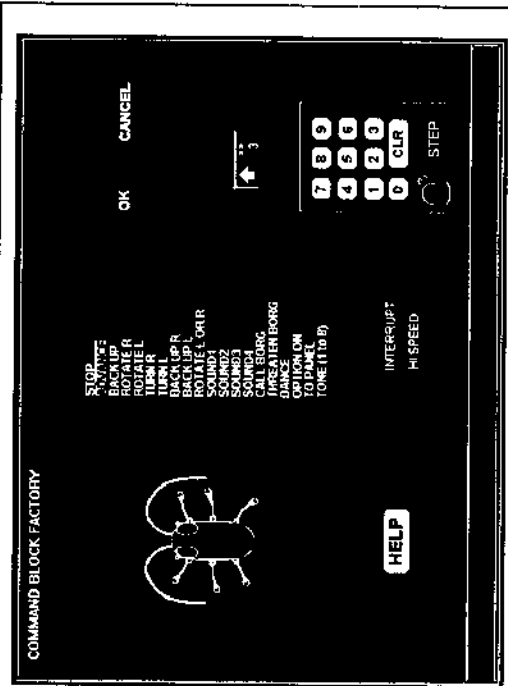
The Panel Screen

This is the main screen used for programming the WonderBorg. Using the mouse to drag and drop blue sensor blocks and red and green command blocks, you can create a program very easily. The illustration above shows a panel after a program has been created.



The Sensor Block Factory

This screen is used to create new sensor blocks on the Panel screen. A sensor block is a block specifying which sensor to use. It consists of yellow text on a blue block.



The Command Block Factory

This screen is used to create new command blocks on the Panel screen. A command block is a block specifying which command to execute. The command consists of an icon and text on a red or green block.