

Robotronics

The Leader In Safety Education Products

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Bobby the Boat and Coastie Operating Manual

Version 6.5

Bobby the Boat and Coastie Operating Manual

Congratulations on your purchase of a ROBOTRONICS, Inc. robot. Your robot has been carefully constructed of the highest quality components. Its design is the result of years of experience building robots. You will find it an extremely effective spokesperson for your organization. It is built for ease of operation, maintenance and repair. It is built so that you can easily expand its functions making its usefulness grow as your needs grow.

Please read this manual carefully. It will help you make the most of your robot. Attention to maintenance will greatly prolong the life of your robot. Most problems you encounter will be minor and the manual will provide an answer. Please feel free to contact us if you have unanswered questions relating to operation, maintenance, and repair. Also, if you have technical questions relating to expanding the functions of your robot, we would be most happy to help.

Sincerely,

ROBOTRONICS, Inc.



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Springville, Utah 84663
www.Robotronics.com
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* These sections can be used to place additional notes that you would like to record, during your use of the robot and information sent from Robotronics; such as the technical tips section of the newsletter.

Limited Warranty

All robots and accessories have a limited 6-month warranty, which covers all parts and labor. This period covers the normal burn-in for electronic components. Experience has shown that this warranty period catches most component defects and other possible flaws. If you have a problem, we are anxious to help. Our desire is to be certain you receive a quality product and excellent service.

Warranty work is specifically limited to correction of defects by repair or replacement of faulty equipment or parts. The robot shall be repaired or replaced at Seller's option. Equipment returned to the factory for repair must have pre-authorization from our service department and must be sent freight pre-paid, and will be returned freight pre-paid by UPS ground or common carrier. If you need parts sent by air shipment you will be responsible to pay the additional shipping charges.

In no event shall ROBOTRONICS, Inc. be liable for any incidental or consequential damages in connection with or arising from the use of the robot, this manual or any procedures herein.

The buyer is further responsible to ensure that proper and complete training be given to those operating the robot system as all aspects of such operation cannot be covered in a brief manual such as this.

In no event shall ROBOTRONICS, Inc. be liable for any incidental or consequential damages in connection with or arising from the use of this manual or any procedures contained herein.

If You Have A Problem

Call our service department and explain the problem. **The phone number is (801) 489-4466.** Most difficulties are minor and can be solved easily over the phone. If possible, have the robot near the phone when you call.

Important: Have the robot serial number and model number ready. This will help our technician identify the model of robot you have. The serial and model number sticker is located on the robot frame on the right side. In the Appendix, the Lower Robot - Top View shows the location of the serial number sticker.

Record the vital information from your robot here for future access

Date Received: _____
 Customer Number: _____
 Robot Model Number: _____
 Robot Serial Number: _____
 Brand of Radio Control: _____
 Frequency of Radio Control: _____
Voice Frequencies
 Operator Transmitter: _____
 Operator Receiver: _____

Upon the receipt of your product, save all packing materials to return the product if needed.

If you must return a part or the robot for repair, pack it carefully and send it prepaid according to instructions. You must obtain a return authorization number from the service department before shipping the robot or a part to the factory.

Parts of the robot are best sent by a carrier such as UPS, Fed. Ex. or U.S. mail, because shipping is based on the actual weight of the package. Be sure to insure the shipment for the correct value. A freight company such as Roadway should be used only for the complete robot, because their shipping charges are based on 100 pound minimums.

For international shipments, you will be responsible for paying customs duties, taxes and other fees. The shipment must be labeled on the paperwork and on the outside of the container that it is “**For Educational Purposes**”. If it is a “**warranty replacement**” or a “**repair return**” this also must be indicated both ways on the customs documentation. Contact your customs agency on how to document the shipment correctly to avoid unnecessary customs charges.

After The Warranty Repair and Help

Our technical staff is always available to help with your questions. Again, most problems are easily solved. The robot design is very modular to make removal of a part of the robot very easy. For example the main electronics box, which houses most of the electronic circuitry, can be removed from the frame of the robot. If you do need technical help or replacement parts, call our Service Dept. We can usually ship them the following day you call. Please call our service department for a return authorization number before sending a part or your robot in for repair or modifications.

Service Department phone number: 801-489-4466.

Part 1 General Operating Instructions

CHAPTER 1 Getting Started

OPERATING HINTS

ROBOTRONICS, Inc. robots are a unique and exciting tool in the hands of a skilled and trained operator. The operator provides much of the excitement the robot conveys. The selection and training of the operator should be done carefully, so as to provide a person with good judgment and an outgoing personality. The operator is the single most important feature that the robot has. Nevertheless, with a little practice anyone can learn to operate the robot and even those with a shy personality can be very effective using the robot. The following points will help in your operation of the robot.

Operate the robot with charged batteries in the transmitter and robot.

Never operate the robot out of line-of-sight.

The operator must have the radio control in their hands when the robot is on. If you need to set the radio control down, turn the robot off first.

Always have a trained person posted near the robot to help in crowd control, and to protect the robot from vandalism. This person is also available to answer questions and interact with the robot.

Operating distance should never exceed 100 feet. When moving the robot through crowds, the robot should be operated slowly and smoothly without any sudden changes of direction. Walls, turns, and other obstacles are hazards to be avoided. Safe clearance should be maintained between these obstacles and the robot.

Never leave the robot "ON" when unattended or in direct sunlight for extended periods of time.

The robot is designed to be operated on hard, smooth surfaces and carpet. Avoid extra deep shag carpet, dirt, gravel, or grass surfaces. Avoid steep inclines or large uneven surfaces such as curbs, gutters, or uncovered electrical lines.

When using the robot on a stage, the area just in front of the stage should be clear of children for about 10 feet.

When attempting to operate the robot for the first time, do so in a large flat area without obstacles. The operation of the controls should be done in a smooth, fluid manner. Avoid jerking starts and stops or overreacting to the controls. When first practicing movement, it is sometimes helpful to follow behind the robot, as robot movement will match stick movement. (Controls respond opposite when the robot is facing the operator.)

The robot can be a highly successful tool for education and entertainment. Appropriate jokes, stories and general conversation can be very effective. Children of all ages are strongly attracted to the robot. They will talk to it, hug it, kiss it, and generally treat it as a good friend. The smaller sized robots are very effective with children. They are light in weight and just the right size to communicate with children. The most important ingredient to the use and effective operation of the robot is common sense. The following instructions will help you get set up and start using the robot.

SETUP AND HOW TO OPERATE THE ROBOT

Step # 1 Read the manual

Read and study this manual completely before operating the robot.

Step # 2 Charge and install the batteries

Connect the RC battery charger to the radio control transmitter. There is a charging jack on the side of it. You can charge the robot battery outside or inside the robot. To charge outside the robot use the alligator clips adapter included with the charger. To charge inside the robot use the round plug adapter that plugs into the shore connector at the back of the robot. After this is connected to the robot, put the main robot switch to the recharge position.

Installing the robot battery:

1. Position the battery so that the posts face the rear of the robot. In this position, the battery wire will naturally run to the robot battery connector.
2. Connect the robot battery connector to the robot connector. Red will go to red and black to black. This connection is polarity protected and can be connected only the correct way.
3. Secure the battery in place with the battery strap. Adjust the clip on the strap if necessary so that when you put the two clips together, the strap is holding the battery in place tight.

Step # 3 Install the upper robot on the lower

1. Set the upper robot on the lower robot body.
2. Connect the round 37-pin connector coming from the top to the round receptacle on the main electronics box. When connecting this rotate it until it sits down into its mate connection and turn the ring clockwise until it is secure.
3. Locate the four body latches and push the pins into the body to secure the upper robot to the lower. Two of the latches are located in the middle and two at the back. To latch these you will need to reach in through the trunk or back door.



CAUTION

Before operating the robot or transporting the robot on the cart or in a vehicle; the upper robot must be properly latched to the lower by pushing the latch pins in. Failure to do this could cause damage to the upper robot if it fell off.

Step # 4 Voice System Set Up

Put 9-Volt batteries in the voice units (Eveready Alkaline fit tighter). Make sure you follow the polarity sticker. Put the units on opposite sides of your waist. Plug the headset into the units. On the 151 Receiver the plug goes into the headphones jack. Adjust the voice system volume control to the level you want. The voice speaking volume adjustment is inside the trunk on the voice receiver. The hearing volume level is adjusted on the 151 Receiver that you wear. The Nady 331 Receiver in the robot should have the antenna extended all the way out.

Step # 5 Tape Player Set Up

Put a cassette tape in and press play. The tape player volume can be changed on the tape player itself, which can be accessed through the trunk or rear door. You will activate the tape player from the switch on the RC.



Step # 6 Powering up

Turn the Radio Control (RC) "ON" first and then turn the robot "ON". Check that the RC battery level meter reads to the right. Extend the RC antenna about halfway out. The "ON/OFF" switch for the robot is located inside the trunk on the main electronics panel. Push the switch up to turn the robot on (On/Off positions are labeled). *On some newer models the switch is externally located at the back right corner of the cabin, just above the deck. It is a On/Off/Recharge switch.*

Step # 7 Test all the functions

Test all of the robot's functions: The voice both ways, eyelids, eyes, tape, siren, lights, and drive movement for proper operation. Test any optional features that you have. Use the red and green lights only for short periods of time to keep them cool.

The robot is now ready to operate.

Step # 8 Optional Accessories Setup

For information about these, see the optional accessories section. This includes options such as the voice modifier and water squirter. These sections will give you step by step instructions for setup and related diagrams.

Step # 9 Powering Down

1. Turn off the voice equipment on your belt.
2. Turn the robot power switch to the "OFF" position.
3. Turn off the RC unit.

Step # 10 Charge the batteries again at the end of your program!

Connect the robot battery to the charger and bring it back to a full charge before leaving the robot.

All of the major functions of the robot each have a section in the manual with more details and diagrams. Refer to these for more in depth information. The Appendix has pictures and diagrams of where various parts are in the robot. These will help you become familiar with where the parts are located and their function.

TRANSPORTING THE ROBOT

Before transporting the robot, remove the robot battery from the robot. The vehicle that you use to transport the robot should have adequate shock absorption. Vans and cars used for passengers would be the best. Transporting the robot in a trailer is not recommended because trailers typically do not have the same level of shock absorption as a car or van. A good rule of thumb to follow is that if the vehicle is adequate for transporting a computer, it should also be fine for the robot.

Double check that the upper robot is latched and secure. There are four latches that must be latched to secure the upper robot to the lower robot (See the diagram below). These pins must be pushed in to secure the upper robot.

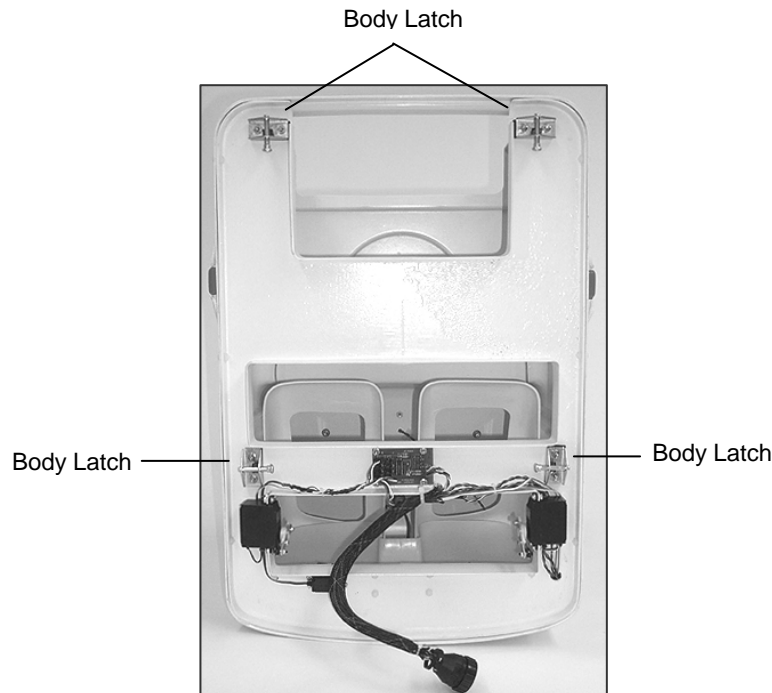
To strap the robot on the cart, roll the robot on to the cart with the back wheels first. The back wheels will drop in to the recesses. Pull the S-hooks on the cart up to each of the four eye-hooks under the front and back bumpers of the robot.

You can leave the robot on the transport cart while the robot is in transit, to keep the robot from rolling around. Have the robot cover on the robot to keep the body from getting scratched.



CAUTION

If the upper robot is not properly latched before transport, it could come off while moving the robot with the transport cart or in a vehicle, causing damage to the upper robot.



Part 2 Subsystems of the Robot

Functionally, the robot is made up of the following basic subsystems:

- A. Radio Control System (Control)
- B. Voice System (Audio)
- C. Cassette Tape Player (Audio)
- D. Siren (Audio)
- E. Robot Battery Systems
- F. Drive Motors
- G. Eyelids and Eyes Left and Right

The systems block diagram found in the Appendix, shows how the various subsystems and their components are interrelated.

Following are explanations of each subsystem, some operating instructions, and trouble shooting hints where appropriate.

CHAPTER 2 Radio Control System

Refer to the diagram showing the radio control transmitter for the location of controls. Check all of the trim adjustments on the transmitter and make sure they are in their center position. Extend the Radio Control Transmitter Antenna 1/4 to 1/2 way. Turn the Radio Control Transmitter on first and then turn on the main robot power switch. It is necessary for the robot to always have an operating signal when it is on, if there is no signal you will not have full control of the robot.

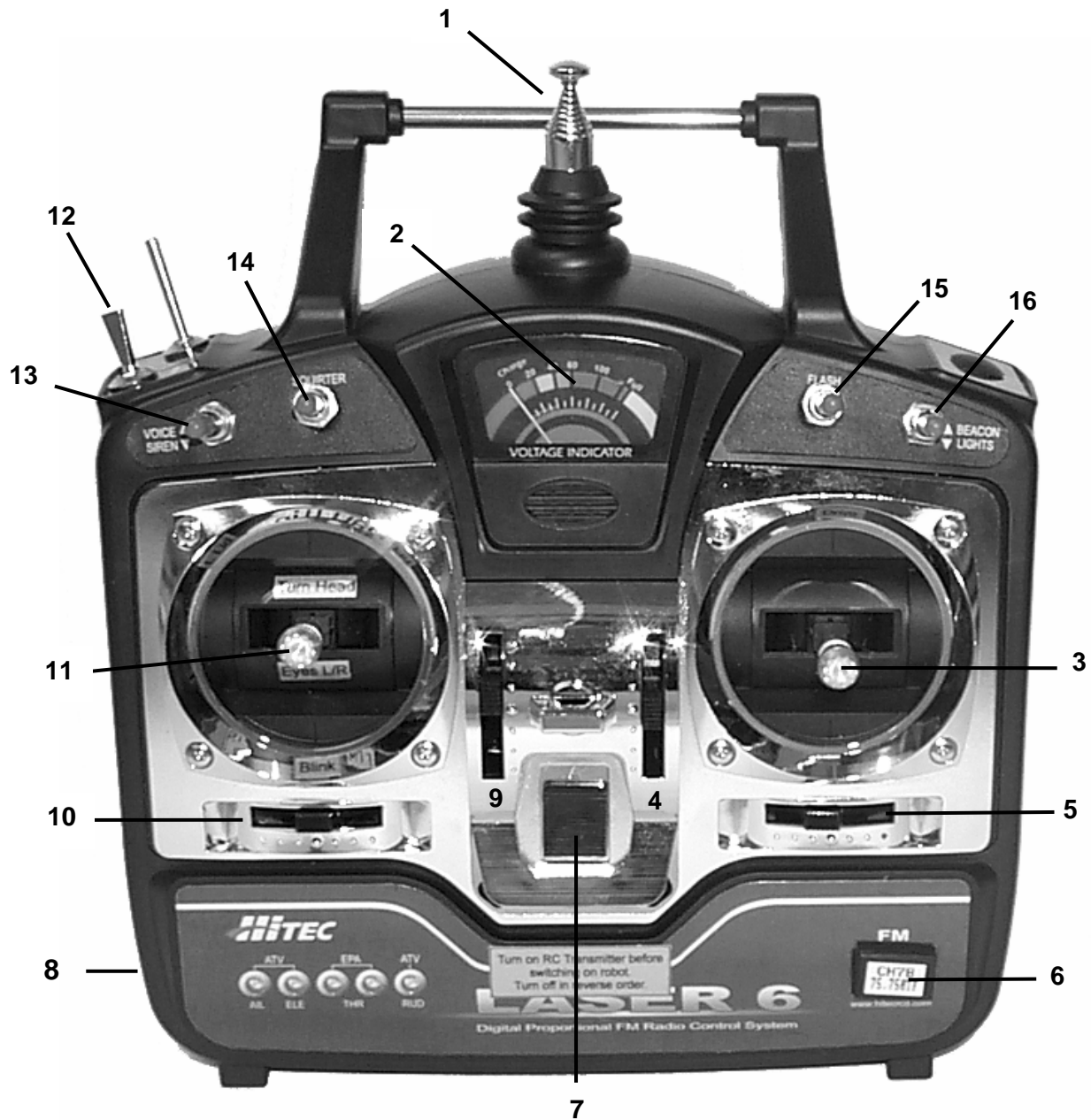
The right hand joystick controls movement of the robot's drive wheels. Pushing the stick forward will cause the robot to move forward. Pulling the stick back will cause the robot to move backward. Moving the stick to the right or left will cause the robot to turn to the right or left respectively. Movement is fully proportional so any variation or combination of movement is possible. The horizontal and vertical trim tabs to the left and below the joystick are for centering and should be typically left in the center. The only time that you would need to move these trims is if the robot started moving slightly on its own. In this case move them slightly until the robot stops.

Control of the left and right eyelids is on the left joystick. The left and right eyelid are controlled in the corners forward and blink to the back. The eyes left and right move when you turn the head. The eyes will look in the direction that you are turning, adding animation to the robot.

The left joystick left and right moves the Character' head on robots with a Character driving it. On other robots this stick controls the eyes left and right. The slider control below the stick should be left in the center so that the head stays in the center. Forward and back movement of the joystick does not control a function.

For a detail of other functions, see the radio control diagram on the next page. All of these functions are labeled on the radio control itself.

RADIO CONTROL TRANSMITTER (Hi-Tec)



RC TRANSMITTER CONTROLS

Note: The following information on the transmitter controls includes information for a variety of similar robots.



1. Telescopic Transmitter Aerial.
2. Transmitter Battery Voltage Meter (Expand Scale Voltmeter)
3. Right control Stick-
Up and Down – Robot drive motors, forward and reverse.
Right and Left – Robot drive motors steering. Left and right turns.
4. Forward/Reverse Trim lever for right control stick. Normal = Center. Neutralizes the drive motors. If the robot is moving slightly slide this a few clicks until robot stops moving.
5. Left and right Trim lever for right control stick. Normal = Center. Neutralizes the drive motors. If the robot is moving slightly slide this a few clicks until robot stops moving.
6. Crystal.
7. On/Off Switch.
8. Recharge jack. Plug the RC battery charger in here to recharge the internal battery. The charge light will come on, on the charger.
9. Forward and reverse trim lever for the left control stick. Normal = Center. Unused.
10. Left and right Trim lever for left control stick. Normal = Center. Centers the head on robots with head movement (Character in Vehicle).
11. Left Control Stick
Left and right movement - Turning of the head left and right (Character in Vehicle) and eyes left and right.
Up – Left lid and Right lid
Down – Blink

Top Switch Functions

12. Tape player
13. Voice (Pitch Shifter on and off to use the MP3 music) and Siren
14. Squirter
15. Up- Spotlight
Down-
16. Beacon and Running Lights(Navigation Lights)

THE NICKEL METAL HYDRIDE (NI-MH) RC TRANSMITTER BATTERY

The NI-MH RC transmitter battery will last about 5-6 hours on a full charge. Charge the battery for **16 hours**. A charge jack is provided on the transmitter for recharging its internal batteries. This round jack is located on the right side of the radio control. (See the radio control diagram) The RC power switch must be in the off position when the charger is plugged into it and must remain in the off position while charging. A light on the charger will be on, when charging.



Caution: Do not overcharge the batteries as this could cause permanent damage to the transmitter batteries. (Doubling the normal charging time is the type of over charging that is meant here, and the battery getting hot.) When the battery level needle goes in the red, the robot should be turned off because the robot could act erratic without the transmitter signal.

To avoid a RC battery going dead during a presentation, start the program with a fully charged battery or be aware of how much charge there is left in the battery. If you have an extra battery or the optional 110 Volt RC Power Supply, you can connect one of these and keep going.

To install the NI-MH battery pack you need to take the battery cover off the RC. Disconnect the RC battery and put the NI-MH battery in its place.

RC Battery and Charger Specifications

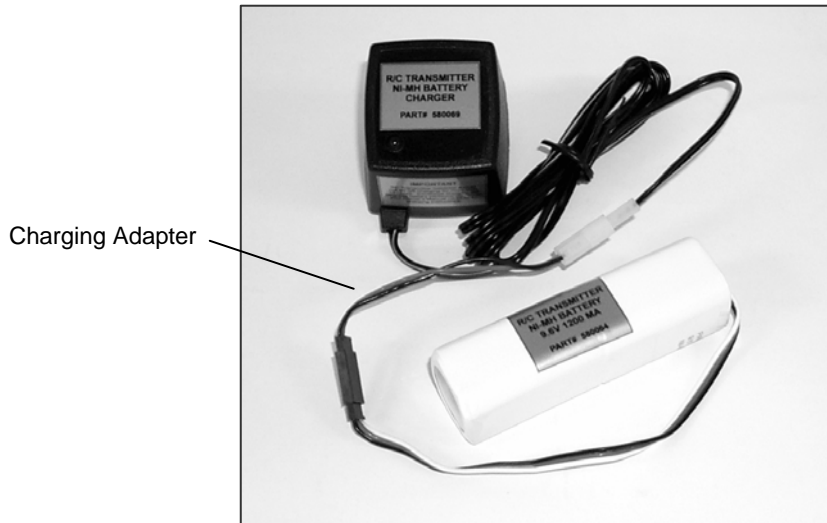
RC transmitter battery	9.6 Volts	700mAH
RC transmitter battery charger	11.6 Volts	70mA

NI-MH RC Battery and Charger Specifications

NI-MH RC transmitter battery	9.6 Volts	1300mAH
NI-MH RC transmitter battery charger	1.6 Volts	130mA

Adapter for Charging an Extra NI-MH RC Transmitter Battery

If you have an extra NI-MH RC battery, you can charge this outside the RC. You may need to do this while you are using the robot or if you need to charge both batteries at the same time. The adapter needed to do this is in the control case or it is on your charger. It has a white connector on one side and a connection on the other end that will go directly to your battery. If the barrel adapter is currently on the charger, disconnect it and connect the other adapter. The charging time is still 14 hours.



110 Volt RC Transmitter Power Supply Option

The 110V RC Power Supply is a power unit that plugs into a standard electrical outlet and in to the RC transmitter. This allows you to have continuous power without using batteries. This connects into the same connection as the battery. To make the connection you need to take the battery door off the RC. The wire feeds through a slot in the battery door. When you re-close the case be sure that the wire is not pinched. With this option, you do need to stand near an electrical outlet or have an extension cord.

CHAPTER 3 Voice System

The Voice System consists of two separate communication links. One link transmits the operator's voice to the robot. When you speak into the headset mic, this audio goes to a transmitter on your belt. This audio is transmitted to a receiver in the robot. The audio signal then goes from the receiver through a mixing circuit on the main board. It is then fed into the amplifier which amplifies the signal through the robot's speakers.

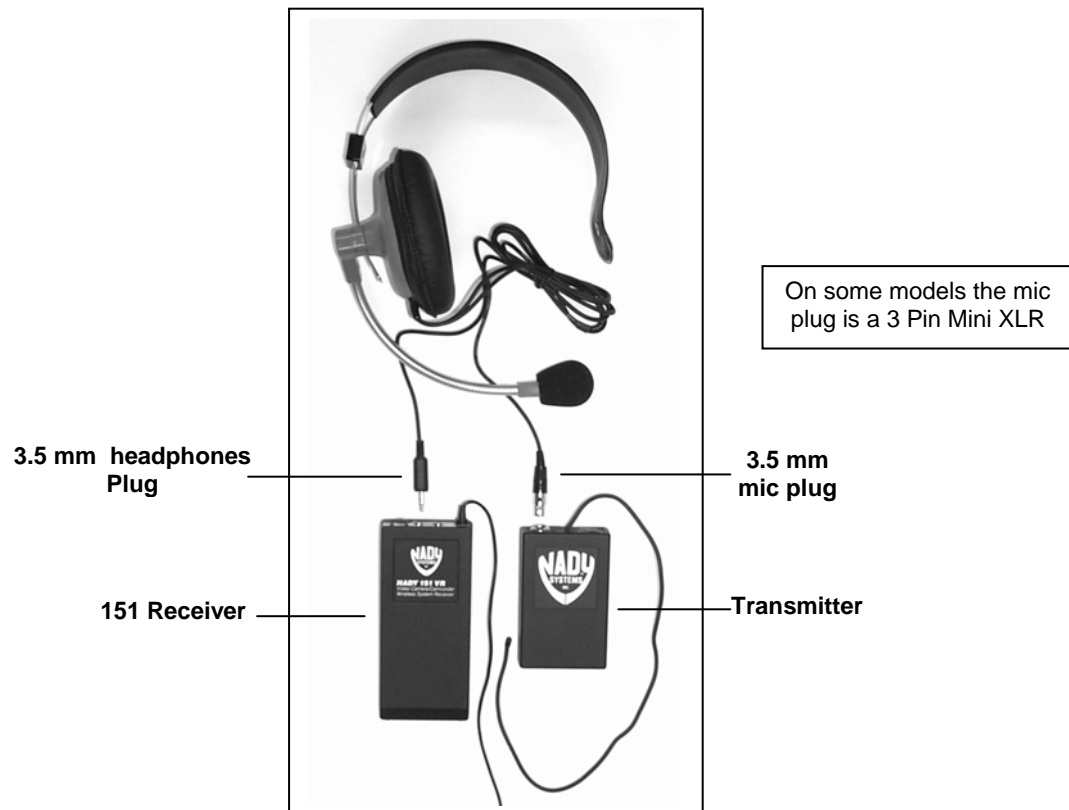
The second voice link transmits the audio detected by the Mic element (located in the front of the robot) to the 151 receiver (which is worn by the operator). This is amplified and sent to the speaker in the operator's headset.

Important: The operator's transmitter and receiver should be kept as far separate as possible, such as on opposite sides of the operator's waist. Do not attach the units together, this may cause interference effects. The antennas should not be wrapped around each other or around the headset wire but should hang freely.

Location of Voice Units

Voice Transmitter-	Operator wears
Voice Receiver-	On the main electronics box in the lower robot.
151 Transmitter-	On the frame in the robot. The robot mic connects to it.
151 Receiver-	Operator wears

Operator's Voice Transmitter, Receiver, and Headset



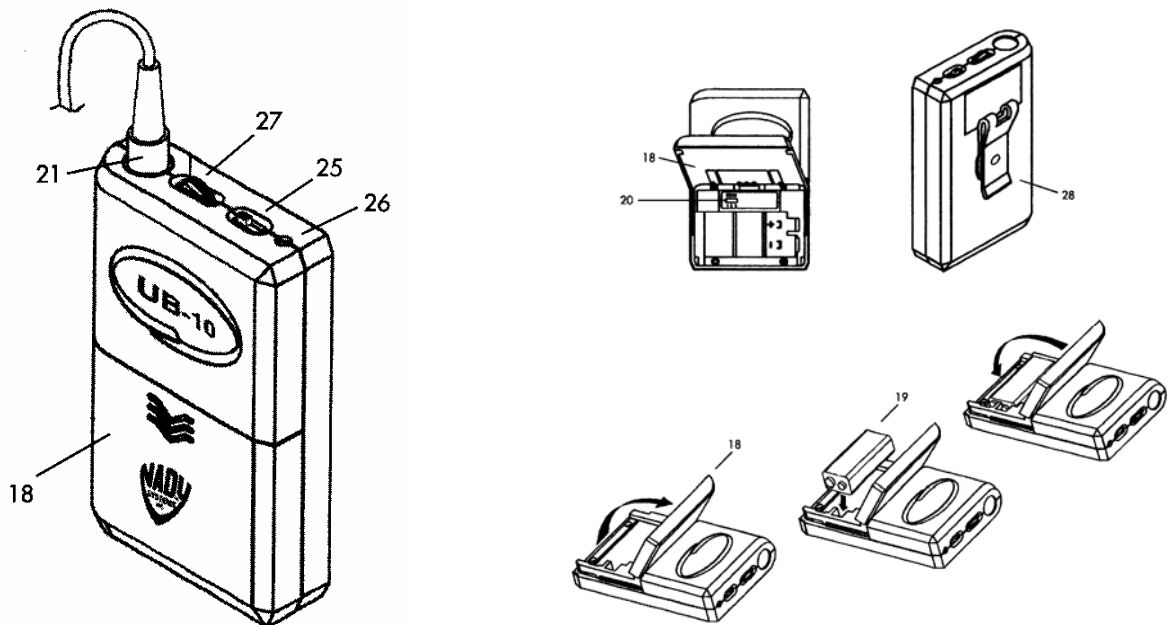
How to Operate the Operator's Transmitter

1. Open the battery door.
2. Use a 9 Volt alkaline battery and insert it according to the diagram inside the battery compartment.
3. Place the headset on your head and adjust the microphone to approximately 1 inch from your mouth.
4. Plug the round connector from the headset into the top of the transmitter.
5. Move slide switches to the "ON" position.
6. On the UB-10 there is a volume adjust on the unit.

Function of the LED

When turning on the power switch, with a fresh alkaline 9-Volt, the battery light will blink on momentarily and go out. This indicates that it is powering up and that the battery is good. Because the light is a low battery indicator, when the light is on constant, this indicates the battery is too low-below 7 Volts. Replace with a new alkaline battery.

Tip: The operator's voice units both have metal clips that contact the posts of the 9-volt battery. These must be bent out from time to time to keep this contact good.



- 18. Battery Compartment
- 19. 9 V Alkaline Battery
- 20. Input Selector Switch (Leave On 3 Lavalier)
- 21. 3.5 mm jack
- 25. Off/Standby/On switch
- 26. Battery Indicator LED
- 27. Volume- Input Level Control
- 28. Belt Clip

How to Operate the Receiver (in Robot)

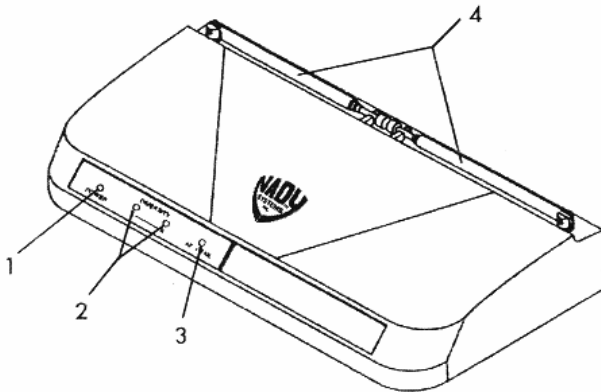
There are two adjustments on the receiver. The **volume** is on the back of the receiver, which you may set to the desired volume. On the UHF UB-10 you can change the volume on your belt transmitter *on the fly*. The other adjustment is the **sensitivity**. This is factory preset to maximum sensitivity. This effects how sensitive the receiver is to the transmitter signal. Typically you would never need to adjust this. The only exception would be if you get squelch when the transmitter is off. You can deal with this by simply turning on the belt transmitter whenever the robot is turned on. You could turn the sensitivity down slightly but turn the adjustment as little as possible, because adjusting it will affect the range.

Function of the LEDs

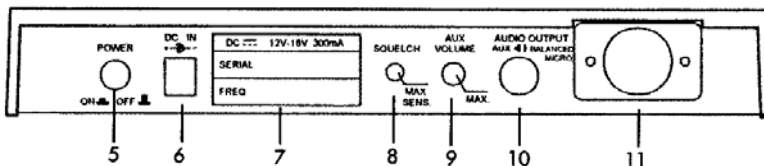
TX LED- This indicates that you are receiving a signal from the transmitter. On some units it is a single TX light. On other units it may have an A or B that it will alternate between.

AF LED- This light indicates that audio is going through the receiver. It will flash as you speak into your headset mic.

Tip: For best range extend the receiver antenna(s) as much as possible, not allowing it to touch metal.



1. Power On LED Indicator
2. Diversity LED Indicators
3. AF Peak LED Indicator
4. Antennas
5. Power Switch (Leave On)
6. DC Input Jack
7. Frequency Label
8. Squelch Control
9. Aux. Volume Control
10. Audio Output
11. Balanced Mic. Audio Output XI R



How to Operate the 151 Transmitter (in Robot)

No adjustment is needed. The switches will be preset to on at the factory. It receives its power from the robot. No 9 Volt battery is needed.

Function of the LED

When the robot is turned on, this light flashes and then goes out. This indicates that the transmitter is getting power.

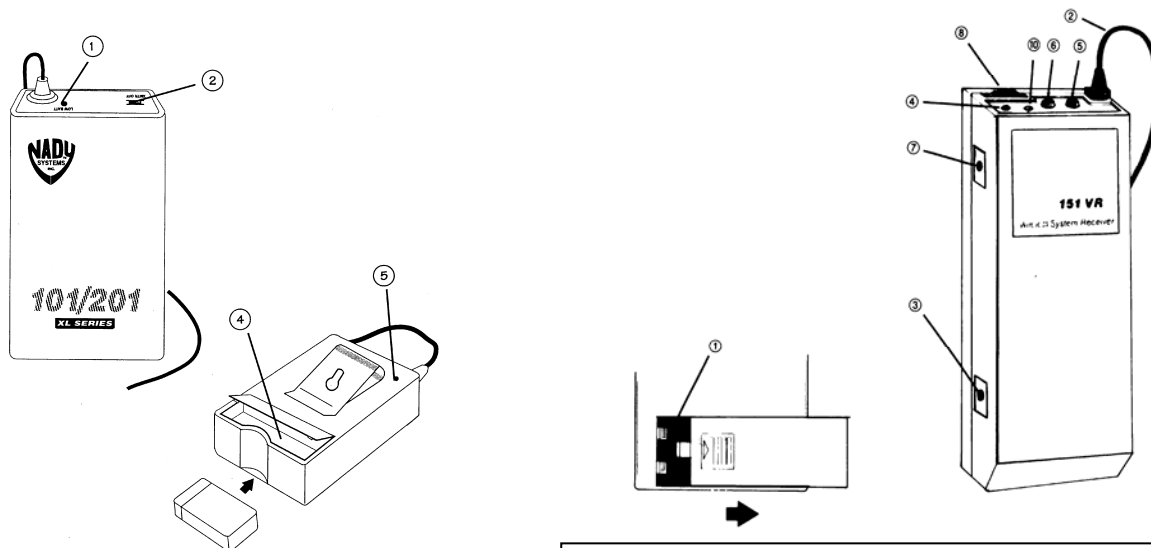
How to Operate the 151 Receiver (Operator)

1. Remove the battery door.
2. Use a 9-Volt alkaline battery and insert it according to the diagram in the battery compartment.
3. Plug the small round connector from the headset into the headphone jack on the top of the 151 receiver.
4. Turn the volume knob clockwise to the desired volume (if volume is too loud you will hear a loud high-pitched feedback noise. Turn the volume down until the feedback is gone.

Function of LEDs

When turning the volume knob on with a fresh alkaline battery, the red light will blink on momentarily and go out. This indicates that it is powering up and that the battery has enough charge on it. As labeled, the light is a low battery indicator. When the light is on constant, this indicates that the battery is below 7 Volts. It then would need to be replaced.

Tip: The operator's voice units both have metal clips that contact the posts of the 9-Volt battery. These must be bent out from time to time to keep this contact good.



1. Low Battery Indicator
 2. Off/Mute/On Switch
 3. Antenna
 4. Battery Compartment (Not used)
 5. Audio Level Trim
- No 9V Battery Needed in Robot TX Unit**

1. Battery door
 2. Antenna
 3. Mute control- Used if RF causes squelch. Leave Fully counter-clockwise for best range and reception.
 4. Green TX LED- Indicates signal being received.
 6. Headphones jack
 8. Volume On/Off
 10. Low Battery LED- On steady means low battery.
 - 5 & 7 Unused
- USE ALKALINE 9 VOLT BATTERIES**



Warnings

1. **Do not unplug or plug in the DC power plug on the robot receiver with the robot power on.** If the power is left on, the plug will short out and could damage the receiver. The fuse in line on the power wire that is plugged into this receiver may blow. This fuse is a round black fuse holder. If this fuse is not blown but no RX power light is on, check the audio fuse on the main fuse block in the electronics box.
2. Do not leave the voice units in direct sunlight or in a damp place for any length of time.
3. Remove batteries if voices will not be used for an extended period of time.
4. Keep voices and headset in the carrying case when not in use.
5. Generally when the robot is on, the operator's transmitter should be on. This will avoid the receiver on the robot picking up radio frequency interference and putting out static (see intermittent static problem of Voice System Troubleshooting).
6. Turn off the 151 receiver or remove the headset before turning off the robot. You can get a squelch in your headset when you turn off the robot.

Troubleshooting the Voice

For any voice problem, perform the following steps first:

1. Check to see that the batteries are good in the operator's transmitter and in the 151 receiver. Normally when you turn the 151 receiver on, the low battery light should blink on and go off. When turning on the power switch of the transmitter, the light should blink on and go off. If either of these lights stays on constant, the 9-volt battery is too low and must be replaced.
2. Check that the battery is in the correct polarity and confirm that the battery contacts are making a solid connection to the spring clips inside the compartment. Bend them out slightly if necessary. If the battery is making intermittent contact in the Transmitter, try a different brand battery. Certain brand batteries are bigger than others.
3. Check all switch positions both on the operator and robot voice units. This includes the audio and the power switches. See the Voice Unit Diagrams for details about the correct position of these switches.
4. Check all plugs to and from the voices for proper connection.
5. Check the LED lights. When operating normally, the Receiver in the robot has a red TX light on. The UHF UB-10 Receiver has two LEDs, A and B to indicate that a signal is being received. The 151 Receiver has a green TX light. These lights indicate that a signal is being sent from the respective transmitter and that the receiver is receiving this signal.

See the next page for specific problems and their solutions.

Problem	Cause	Solution
<p>Voice System <u>Always do the following first:</u> 1. Replace the 9 Volt batteries with new ones. USE ALKALINE! 2. Bend the battery contact out for better contact with the post of the 9 Volt battery. 3. Check power and audio switches, and lights on all voice units. 4. Check plug to and from the voices for proper connection. 5. Check if the transmit (TX) lights are coming on.</p>		
Operator cannot talk	1. Low Battery. LED on steady or no LED flash. 2. Battery posts not touching the metal clips in the operator's transmitter. 3. No power to the 101 Receiver. If yes, continue. 4. No TX light on the Receiver. If yes, continue. 5. Audio wires going through pitch shifter connected wrong. 6. Headset plug to transmitter broken. 7. Still not working. Call Robotronics.	1. Replace the 9 Volt battery. Is battery inserted in correct polarity? 2. Bend out the metal clips. Put foam under clips. 3. Check the in line fuse to the Receiver in robot and audio fuse on main fuse block. 4. Check Sensitivity adjustment on back of Receiver. It should be on Max. Sens. 5. The wire should go from audio out of receiver to input of pitch shifter, then from output A into the main box and plug on to the main board. 6. Take apart and look for broken wire or solder joint. TEST- Connect robot mic to transmitter. If it now works, problem is in headset. Repair or replace. 7. Send transmitter, receiver, and headset in.
Operator cannot hear	1. Low Battery. LED on steady or no LED flash. 2. Battery posts not touching the metal clips in the operator's receiver 3. Headset plug to 151 RX has a broken wire. 4. Robot 151 transmitter not turned on. 5. Power plug to robot 151 transmitter unplugged. 6. If you have no TX light on 151 RX mute could be out of adjustment 7. Robot microphone in robot is bad. 8. Still not working. Call Robotronics.	1. Replace the 9 Volt battery. 2. Bend out the metal clips. Put foam under clips. 3. Unscrew cover of plug and look for broken wire. 4. Turn on audio and power. 5. Find wire and plug it back in. 6. Adjust the mute on the 151 RX to max. which is fully CCW. 7. Order a replacement. TEST- Plug your headset into the robot transmitter in place of the robot microphone and test. 8. Send robot mic, transmitter, receiver, and headset.
Voice Operates but cuts out. Should get 50 feet without any cutouts.	1. Low Battery. 2. Sensitivity Adjustment down too far. 3. Broken, loose or retracted antenna	1. Replace the 9 Volt battery. 2. Sensitivity adjustments should be at max. on the 151 Receiver and robot receiver. 3. Extend robot receiver antenna or replace broken antenna.
Squelch coming from robot	1. No signal being sent to the robot 2. Sensitivity is too sensitive.	1. Turn on the operator's transmitter. 2. Very slightly adjust sensitivity down from max. (This will decrease your range)
Squelch in headset when turning robot off.	1. 151 Receiver slightly too sensitive. 2. 151 RX picking up interference in your area.	1. Adjust 151 RX mute slightly CW 2. Always turn off 151 RX and remove headset before you turn off robot.

MOVING MOUTH

Function- The moving mouth is a feature where the mouth moves as the operator speaks through the robot. The amount of the movement is effected by the level of volume of the voice. This level is effected by the Receiver volume level and the position of the headset microphone to the operator's mouth. The sensitivity is set based on a typical voice volume and the headset microphone being about 1 inch from the operator's mouth.

Adjustment- The adjustment is preset at the factory and should not need any adjustment. If an adjustment is necessary, see the Main Circuit Board diagram in the Appendix for the location of it. It is labeled Moving Mouth sensitivity. When this pot is adjusted clockwise this makes the mouth more sensitive to your voice and turning it counter-clockwise makes it less sensitive.

Location of the Adjustment

Main Electronics Box in Vehicle.

Operator's Voice Transmitter and Receiver



CHAPTER 4 Cassette Tape Player System (Optional)

The tape player is an option if you have a CD player. The CD manual is in the inside cover of this manual.

The cassette tape player system is located inside the robot on the metal electronics box. The system is activated by remote control from the radio control box. (Additional instructions are on the next page.)

How to Play A Cassette Tape

1. Insert a regular type cassette tape into the player.
2. Push the play button on the cassette player.
3. Move the radio tape select switch to the tape position.
4. Activate the switch on the radio control labeled tape.
5. Adjust the volume to desired level.
6. On some models there is a normal or Extra Bass switch.

The tape head of the cassette player should be cleaned after every 25 to 30 hours of use. Always remove the cassette tape when not in use. This will prevent flat spots on the capstan roller.

There are cassette tapes available from Robotronics with safety songs or you can customize your own tape to work with your program.

Troubleshooting Cassette Player

No operation when you activate the tape function:

1. Is the cassette fully inserted ,play switch pushed, and the volume level up.
2. Is the cassette unit receiving power?
If not, make sure that the mode switch on the cassette player is in tape mode.
If it is still not working check the **wiring, plugs and the audio fuse** on the fuse block.
(See the Fuse Block Detail)
3. Is the Radio Control Transmitter "ON" and working? Listen for the cassette motor and check to see if the power light or FM stereo light is on as the R.C. is activated.

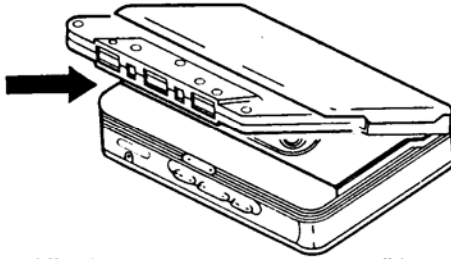
Sound Quality is poor:

1. Test the cassette tape on some other player. If the cassette tape is OK, clean player and try again.
2. If the tape is running slow, loosen the tape by spinning it with a pencil. Try a different tape. The tape running slow may be an indication of worn out belts that need to be replaced or the cassette player needs to be replaced.

Cassette Tape Player

INSERTING A TAPE

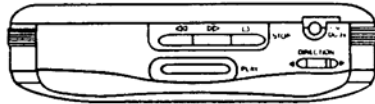
The MRX-225 can play any pre-recorded cassette tape (mono or stereo). Simply insert the cassette as shown below. Then, proceed to "Playing a Tape" in this manual.



1. Lift the cassette compartment lid as shown.
2. Insert the cassette with its open edge facing you and with the full reel to the left.
3. Close the compartment lid.

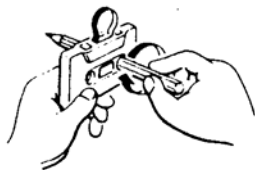
FAST FORWARD/REWIND

Press F FWD or REW to quickly move the tape in the desired direction.



Note: Be sure to press STOP when the fast forward or rewind is finished, to avoid damaging the player.

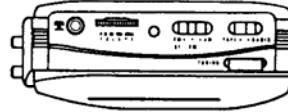
Tighten Tape Slack—Before loading a cassette, take up any slack in the tape by turning the tab hub with a six-sided pencil. Avoid touching the tape.



Reduce Tape Tension—If you repeatedly play both sides of a tape without using fast forward or rewind, the tape can become tightly wound. Before playing the tape, fast-forward the entire tape. Then, completely rewind it.

PLAYING A TAPE

To play a cassette tape, begin by inserting the cassette as described in "Inserting a Cassette" and then follow these steps:



1. Move TAPE/RADIO to TAPE.
2. Connect your headphone to the HEADPHONE jack.
3. Press PLAY.
4. To stop the tape, press STOP.

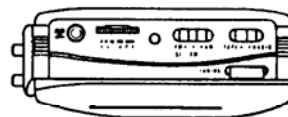
TAPE TIPS

The following tips can help you get the best performance and the longest life from your cassette player and radio.

Use Long Cassettes—The use of tapes longer than 90 minutes is not recommended due to possible stretching of the actual tape material.

RADIO OPERATION

1. Set VOLUME to its lowest setting.
2. Set TAPE/RADIO to RADIO.
3. Connect the headphones to the player's headphone jack.
4. Move AM/FM to select FM or AM.



5. Move the tuner dial to select the desired station.
6. In order to listen to FM stereo, set the FM STEREO/FM/AM switch to FM STEREO.
7. Adjust VOLUME for the desired sound.
8. To turn off the radio, set TAPE/RADIO to TAPE.

Graphic Equalizer



Adjust the three equalizer settings for the best bass, midrange, and treble sounds.

Radio Reception Hints

- The headphone's wire is also the FM antenna. For best reception, be sure it is completely uncoiled.
- If you are receiving a weak FM stereo station, you can improve reception by setting **BAND** to **FM**. The sound will no longer be stereo, but reception should be improved.
- The AM antenna is built in. If you are having difficulty receiving a particular station, changing the position of the radio might improve reception.

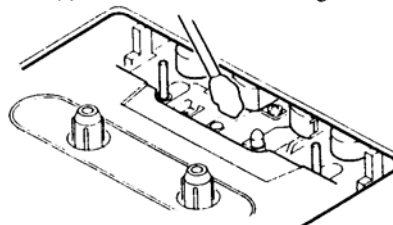
Warning: Do not use benzene, thinners, or other solvents to clean the cabinet, since they may warp or deform the plastic.

Be Careful of High Temperatures!

Use and store the MRX-225 only in normal temperature environments. Temperature extremes can shorten the life of electronic devices, damage batteries, and distort or melt plastic parts.

CARE AND MAINTENANCE

Routine maintenance of the playback head and pinch roller will increase the life of the player. Your Memorex dealer can provide you with different types of cleaners, such as a cleaner cassette you insert in the unit or a cleaning solution applied with a head cleaning stick.



Caution: If you are manually cleaning the playback head and pinch roller, take care not to damage the surface of the head.

To clean the cabinet, use a soft dry cotton cloth to remove the dirt. If the cabinet is very dirty, use a damp cotton cloth, and be sure you dry the cabinet afterwards.

SPECIFICATIONS

Tape System	4 Track
	2 Channel Stereo
Tape Speed	1 7/8 Inches/sec.
Frequency Response	63Hz—10,000Hz
Frequency Coverage	AM530—1710 KHz
	FM88—108 MHz
Aerials	Built-in (Ferrite Bar/Coil AM Aerial)
	Headphone Cord As FM Aerial
Power Output	20mW + 20mW
Output Jack	3.5mm Stereo
Power Source	DC 3V—two AA
	External Power
	3V Source Jack,
	Centered Pin (—) Negative
Dimension	5 Inches x 3 3/8 Inches
	x 1 1/4 Inches (HWD)
Weight	12 ozs. (Without Batteries)

As a continuing effort to improve our products, specifications are subject to change without notice.

CHAPTER 5 Siren

The robot siren is operated by remote control from the Radio Control Transmitter. The siren circuitry is located on the main circuit board. See the Main Electronics Box diagram, in the Appendix, for the location of the siren volume, mode select and oscillation frequency adjust. The **volume of the siren** is controlled by a trim pot on the main board. Turning the pot clockwise will increase the volume of the siren. Turn the pot counterclockwise to decrease volume. Three different sirens are available. Choose the siren you want by moving the jumper located on the **siren mode select**. To control the oscillating speed, adjust the **siren frequency trim pot** in the siren circuit. The siren mode select is set to the common siren for your robot. If the siren mode select is changed, the siren frequency will very likely need to be adjusted.

NOTE: The volume and oscillation are preset at the factory and do not need to be adjusted unless you want a different volume level or oscillation speed.

Troubleshooting Siren

1. Check if the audio booster is working by testing the voice or activating the cassette player. If you get no voice or cassette audio, check the audio fuse on the fuse block in the main electronics box. Also check the speaker connections at the speakers.
2. Call the Robotronics' Service Department for assistance.

CHAPTER 6 Robot Battery System

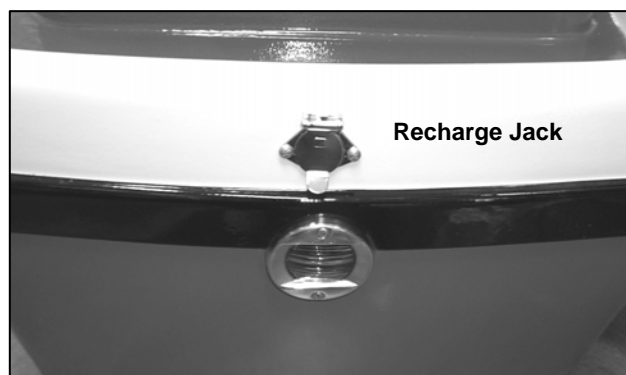
ROBOT BATTERY

The battery in the robot is a rechargeable sealed lead-acid Gel type battery **12 Volt 33AH**. This type of battery is very dependable and safe. It can be repeatedly charged and discharged.

How to Recharge

1. To recharge the robot battery, first open the trunk or rear door and unplug the battery from the main component board. You could also remove the battery from the robot.
2. Connect the charger wires to the battery, red to the red (POSITIVE +) post and black to the black (NEGATIVE -) post. There are alligator clips or an in-line connection. You can charge an extra battery outside the robot while you are using the robot.
3. Plug the line cord of the charger into a 110-volt AC outlet. Leave the trunk cover off or open during charging for ventilation. Keep the AC power connection as short as possible especially when using an extension cord.
4. On some models there is a recharge jack on the boat. Connect the round plug of the charger to the shore connector on the back of the boat. Put the main robot switch to the recharge position. Plug the charger into a 110 V outlet and the charger light will come on.
5. The red LED will come on during charging and the green when the battery is charged and ready to use. Both red and green on indicates that you are in the middle stage of charging.

The robot is supplied with an automatic type battery charger. This will recharge the battery full in about 8 hours depending on how long you have operated the robot. It will not overcharge the battery if left "ON" indefinitely. It goes to a float charge mode once the battery is fully charged.



Taking Care of the Robot Battery

The number one rule for battery care is to keep the batteries fully charged at all times. Like all batteries, there is some discharge that occurs every day. Because of this you should charge up the battery **monthly** during periods when the robot is not being used.

Also, the automatic battery charger can be left connected for extended periods of time to keep the batteries at full.

It is a good practice to rotate the batteries if you have two or more.

For a battery that is outside the robot, store the battery on a wood or rubber surface not concrete floors.

Caution



If the wires to the battery have been removed, observe properly polarity when re-connecting. The red wire goes to the positive terminal and black wire to the negative terminal. Damage to electronics could result if the polarity is wrong.

Important

Charge the battery to a full charge right after each use of the robot and monthly when not in constant use.

ROBOT BATTERY CHARGER

The charger supplied with the robot is designed to both recharge your battery, and extend your battery's life. It produces 12 Volts DC at a full 6 Amps. It will charge the battery in about 8 hours depending on how long you have used the robot. After the battery is charged, the green LED will come on and the battery is ready to use. At this point the charger is charging at a FLOAT or maintenance rate. At this rate you can leave the charger connected for extended periods of time.

Charge Pro Model 2606A 6 Amp Battery Charger

Status Indicating Lights

Red on-The battery is discharged and is being recharged at the maximum 6 Amp rate of the charger (stage 1).

Red and green both on-The battery is charging at the stage 2 rate of 1.5 to 5 Amps.

Green on-Your battery is charged and ready to use. It is now on float charge (stage 3).

Personal Safety Precautions

Warnings

HAZARD OF EXPLOSIVE GAS MIXTURE

When charging, a lead acid battery gives off hydrogen gas. The Gel type battery is a lead acid battery with pressure relief type vents. Although it only gives off a small percentage of the gas that a wet lead acid battery does, the following precautions should be observed:

1. Charge the battery in a dry, well ventilated area. This is why it is important that you leave the trunk or door open. You can also remove the battery from the robot.

2. Do not position your face over the battery, at any time while making connections.
3. Do not smoke, strike a match, or cause a spark in the vicinity of the battery during charging.
4. Always unplug the AC supply cord before connecting or disconnecting the charger leads from the battery.
5. Do not drop a metal tool onto the battery.
6. Do not expose the charger to rain.
7. Replace defective cords and wires immediately.
8. Do not operate this charger with a two bladed adapter plug or extension cord. Doing so can result in serious personal injury.
9. To reduce the risk of shock, connect only to a properly grounded outlet.

If the Battery is not taking a Charge

Make sure that the charger is working by connecting it to a battery that is known to be good.

Leave the charger on for a few days and see if the battery starts taking a charge. Turn the robot on and try to operate it. Connect to the charger again. If it still will not take a charge, it's time to replace the battery.

CHAPTER 7 Drive Motor System

Your robot is provided with two high quality industrial grade drive motors. Each motor controls a drive wheel-left and right. Steering of the robot is accomplished by varying the speed and direction of these motors. For example, when the left motor runs faster than the right, the robot turns to the right.

Each drive motor is connected to its drive wheel via pulleys and 1/2" wide rubber timing belts. The pulley set screws and bolts should be kept tight.

Trouble-Shooting - Drive

Perform the following steps first when trouble-shooting a drive problem:

1. **Check drive belts and motor pulley set screws.** Especially if you hear the motors activate but the robot does not move.
2. **Check connections to motor controls and motor leads.** These are blue and yellow wires coming from the electronics box and going to the drive motors. There is a white connector in line. The joystick could be pushed in the on position while the connector is being checked for an intermittent connection. If there is a bad connection, the connector and/or pins should be replaced. While doing the test just explained, have the robot wheels off the ground.

Note: The best way to look at what the drive motors and wheels are doing is to put something under the back of the robot to get the wheels off the ground. You will then be able to see exactly what motor and wheel is working or not working, and in what direction.

Neither drive operates: Check both fuses in the fuse block. Check set screws on the motor pulleys.

One drive motor does not operate either direction: Check the specific drive fuse on the fuse block (left or right). See the fuse block detail to identify the correct fuse, or look for any blown fuses. The fuse block is located in the main electronics box. If after replacing, the fuse blows again, the **drive motor** or **drive circuit** could be causing the problem.

Drive motor- If the drive motor is the problem, you would have likely heard the motor grinding or scraping before the fuse blew. To test the motor for operation, swap the motor wires. It is best to have the robot wheels off the ground when doing this test, in order to see which wheel is operating. The motor wires are blue/yellow wires hanging down below the electronics box. You may have to remove the robot battery, to make the swap. If now the wheel/motor on the side in question operates and sounds fine then the motor is good.

Drive circuit-(motor control) If the drive motor is good, the drive circuit (motor control) could be the cause of the fuse blowing. If this is the case, check for broken or shorted wires and if nothing is found, contact the Robotronics' service department for assistance.

One drive motor operates only in one direction: The motor control circuit is likely the cause of this. The problem is in the drive circuit. Send the main electronics to Robotronics for repair or contact our Service Department.

The robot is not driving straight: (Veering when you drive)

Note: Before making this adjustment, be sure that your motor pulley set screws are tight and that both motors appear to be working forward and reverse. To check this prop the back of the robot off the ground.

To locate the adjustment, see the Robot Main Electronics Box diagram in the Appendix. They are labeled **Forward Drive adjust and Reverse Drive adjust**. You will need a small flat head precision screwdriver to make the adjustment. The cover of the main electronics box would need to be removed to access the adjustment. Take the cover of the box completely off and set outside the robot so that it cannot touch the post(s) of the robot battery.

Forward Drive Adjust Pot - Effects forward straightness of drive.

Robot veering left- Adjust it counter-clockwise

Robot veering right- Adjust it clockwise

Reverse Drive Adjust Pot- Effects reverse straightness of drive.

Robot veering left- Adjust it counter-clockwise

Robot veering right- Adjust it clockwise

If the robot veers, the reason is that one motor is going faster than the other at any given position of the joystick. For example if at full speed, the robot veers to the right, this means that the left motor is going faster than the right motor. To correct this you would adjust the forward drive adjust pot clockwise to slow down the left motor in the forward direction. You may need to do some trial and error to get it just right. To do this, adjust the necessary adjustment pot very slightly and then drive the robot to see if the robot is driving straighter. Continue the adjustment until it drives suitably for you. It is best to use full speed during the adjusting, because this will act as a good reference point.

The robot is moving slightly even though the drive stick is at neutral:

Move the sliders next to the drive stick until the robot neutrals out. This is called trimming the stick.

Contact the Robotronics' Service Department if you need any assistance or parts.

CHAPTER 8 Eyelids and Eyes Left and Right

The eyelid and eyes left and right movement is accomplished by three servo motors in the top. When the switch on the radio control is activated, this signal is sent to the radio control receiver in the robot. The micro-controller in the robot decodes this signal and a new signal is sent to the eyes servo board. The eyes servo board is located on the underside of the top of the robot. To see it, the top would need to be removed and the top turned on its side. The wires connected to this board take the signal to the servo itself and operate the shaft of the servo motor to turn clockwise or counter-clockwise for opening or closing. The rotation of the servo motor shaft is coupled to the eyelid and eyeballs with a servo arm and then an eyelid rod.

Troubleshooting Eyes

An eyelid or the eyes left and right does not operate:

1. Check the linkage from the servo motor. Look for the servo arm off the servo shaft or the eyelid off the ball link.
2. Follow the wires from the specific servo motor with the problem. The wire will run to the eye servo board. If it is disconnected, reconnect according to the eye servo board diagram. If the servo does not work correctly (wrong direction), try one of the other outputs on the eye servo board.

One of the eyelids is at a different level than the other:

1. If the eyelid rod is bent, bend it back into position.
2. If the servo saver arm (white and metal arm interconnecting the servo and the rod), is solid and secure the position of the eyelid can be positioned to match the other eyelid. To remove the servo saver arm, the set screw must be removed. The eyelid level can be changed by altering the length of the eyelid rod or changing the position of the servo saver arm on the servo motor shaft.

There is no operation of any of the eye functions:

1. The wires that bring the signal to the eyes servo board are gray and yellow. 5 volts power are the black and red wires that connect to the eyes servo board. If these wires are connected, follow them back to the board that they originate. Wires originate at the Patches board.

CHAPTER 9 OPTIONAL ACCESSORIES

Water Squirter System

There are two types of systems. Look at the picture on the following pages to find yours. The new system has a reservoir in the robot that you remove to refill. It is held by an elastic band. It does not need the refill switch or a overflow nozzle. This saves time and gives you a larger reservoir.

New- Fill the Water Bottle: Remove the water bottle inside the rear of the robot by disconnecting the tube from the water connector. Push on the metal clip to release it. Fill with water and replace. Make sure you have the elastic around the bottle when you put it back in.

New- Squirt Water: Just hit the switch on the control to squirt.

* These instructions are for a second type of system.

Water Squirter parts and where to find them

Refill bottle - Comes with the robot.

Water squirter nozzle - Typically located in the front of the lower robot. In the mouth on some models

Water squirter switch - Rear left side of the robot. Open rear hatch to access.

Refill fuse (5 Amp-AGC type) On the red wire between the switch and the main circuit board.

Overflow nozzle - Under the back of the robot.

Female water connector - Next to the water squirter switch.

Water pump and reservoir - Located on the middle left in the lower robot.

How to fill your water squirter system

1. Unplug the water line coming from the water squirter nozzle to the female water connector and plug in the filler bottle in its place.
2. Hold the water squirter switch on the robot in the momentary position and the water will pump from the filler bottle to the reservoir. You will know the reservoir is full when water comes out the overflow. There is a change in the sound of the motor when the water starts filling and then another change when it is full.
3. Plug the water line back in and switch the water squirter switch to the "on" position.

How to operate your water squirter system:

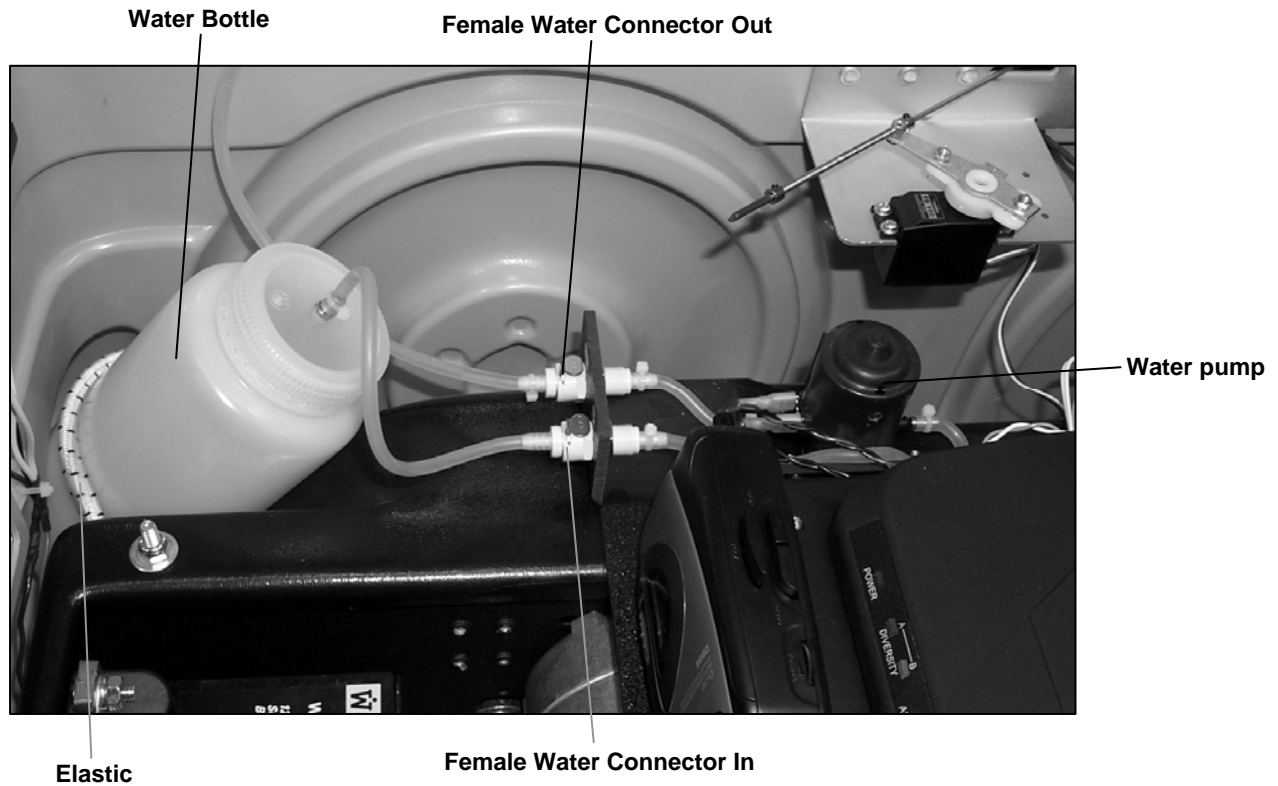
1. The water squirter system must have water first. If not, fill your water squirter system. Operating the water pump without water running through it for more than 10 seconds is not good for the pump.
2. The water squirter switch, on the robot, must be in the "on" position.
3. To squirt water move the *squirter* switch on the radio control transmitter to the on position. This is a momentary spring loaded switch so that you can get short bursts of squirting.



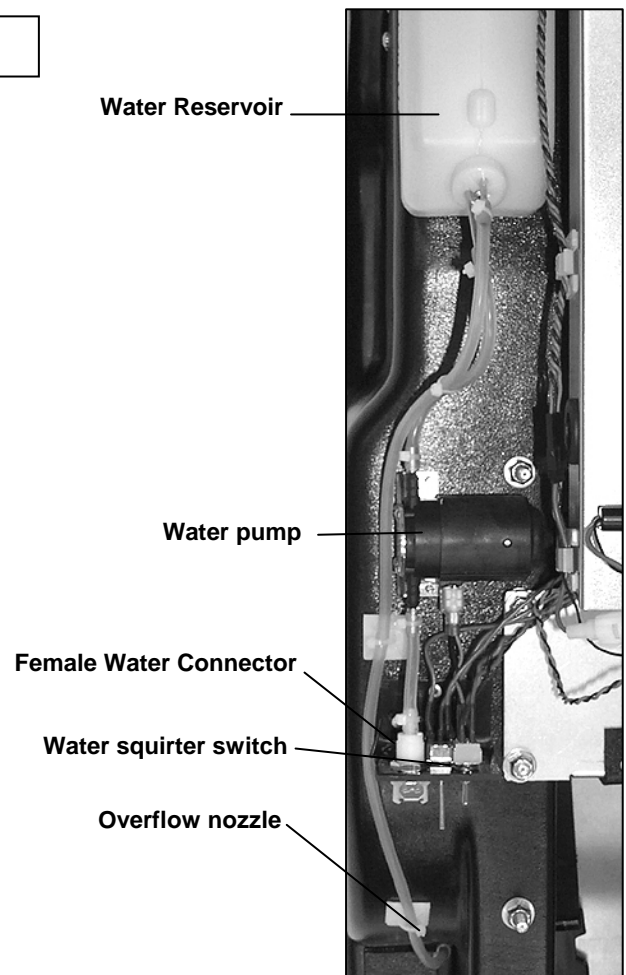
CAUTION

The water squirter system should not be operated without water in it.

The parts of the water squirter are shown on the next page.

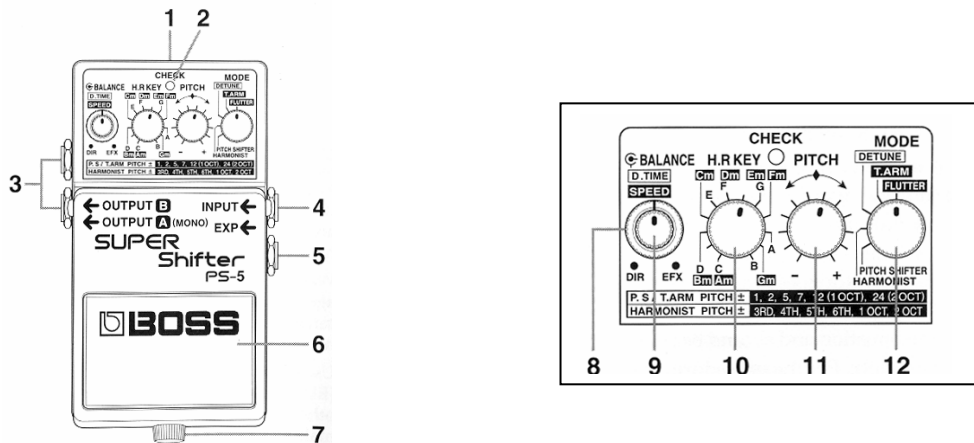


New Squirter System



Voice Modifier Instructions - Option

The pitch shifter (voice modifier) can change the operator's voice to disguise it and create a robot character type voice. The operator's voice signal is received like normal by the voice receiver in the robot. The signal is then sent from the audio out of the receiver to the **Input Jack** of the pitch shifter. It is modified and sent from the shifter **Output A** to the voice 'audio in' on the main circuit board.



1. Power Jack – 9 Volts center negative
2. Check indicator – Power indicator and show whether an effect is on or off.
3. Output Jacks. Output A is what we us.
4. Input Jack.
5. EXP Jack. No used.
6. Pedal Switch. Turns it on or off.
7. Thumbscrew. To release pedal.
8. D.Time Speed Knob – Delay time. Not used in pitch shifter or harmonist mode.
9. Balance knob – This adjust the output balance between the direct sound and the effect sound. Typically set this on EFX for the full effect.
10. H.R. Key switch. Not used.
11. Pitch Switch. Adjusts the amount of pitch shift.
12. Mode Switch. Selects the mode. Typically use the pitch shifter mode.

The pedal on the pitch shifter is used to turn it on and off. When the pitch shifter is on, the power light labeled 'check' will be lit. The shifter will take a few seconds to power up. To turn it off, push the pedal again. If the pitch shifter is not turned on, your unmodified voice will come through the Smoke Alarm.

The pitch shifter has two basic effects; a digital pitch shifter and a delay. There are many variations of these two effects. When used as a pitch shifter, you can vary the shift within +/- 2 octaves. Set the mode knob to Pitch shifter and then vary the pitch knob until you get the sound of voice that you want. You can get a similar effect with the harmonist position but the pitch

Optional Accessories: Voice Modifier

shifter gives you the best sound. These are the most common modes used because these modes give you the ability to adjust the shift of your voice to exactly what you want whether up or down. About 2:00 on the pitch knob gives you a good voice.

The shifter gets power from the robot battery; no internal battery is needed. If the cover of the main electronics box ever needs to be removed, do not allow the shifter power wire plug, to contact the metal box. The metal box surface has a ground connection. The fuse related to the shifter is the audio fuse located on the fuse block.

Below is a typical setting for the robot voice. This will give you a shifted cartoon character or robot type voice.

Balance-clockwise
Pitch-About 2:00
Mode-pitch shifter

