

Robotronics®

The Leader In Safety Education Products

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Bobby the Boat™ and Coastie™ Operating Manual

Version 6.6

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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Limited Warranty

All robots and accessories have a limited one year 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.

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: _____

If You Have a Problem Call Service 801-489-4466

- Call our service department and explain the problem. 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
- Have the robot near the phone so that we can help you immediately.

If you need to send a part back to Robotronics for repairs

- Go to our website, Robotronics.com and under the service tab find the repair form. Fill this out and send it back with the part or robot.
- If you have saved the robot boxes and packaging this will make it easier to return the robot.
- Call the service dept. before shipping the robot or a part back to the factory. Pack it carefully and send it prepaid.
- Parts of the robot are best sent by a carrier such as UPS, FedEx. or U.S. mail. A freight company can be used to ship the entire robot. Be sure to insure the shipment for the correct value.
- 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.

Service Department phone number: 801-489-4466.

What's Available on our website

Parts for your robot: Our website contains a parts listing with pricing for some of the parts of the robot such as batteries, chargers, wireless voices, headsets, RC, lights, plastic parts, servo motors, drive motors etc. Any other parts, give us a call.

Maintenance and repair information: If your robot ever needs maintenance work to be done, you can send a part or the complete robot to Robotronics. The website contains information about packaging and shipping. There is a form on the internet to fill out to print and send with your part.

Photo gallery of other robots: You can look at other robots and how they have been painted, customized and decaled.

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. 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. It is important that you observe the following safety guidelines. Include this in any operator training. Practicing with the robot and having a program outline or script will help you have success the first few times out.



- **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 (escort) near the robot for safety purposes**, 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.



- **When using the robot on a stage, the area just in front of the stage should be clear of children for at least 10 feet.**
- Keep the robot indoors with the cover on when not in use. This will keep the robot clean and the color at its best. Direct sunlight/UV light can fade the plastic over time.
- You can paint the body if it fades or if you want to change the color of the body/trim. See the painting instructions for tips.
- Operate the robot with charged batteries in the transmitter and robot.
- Never operate the robot out of line-of-sight.
- Make sure trims (sliders) on the RC are centered prior to turning on the RC and 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. 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.
- If there are other radio controlled robots at the same event, confirm that they are not on the same frequencies. See the diagrams showing your RC and wireless voices to locate these frequencies.
- 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. **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, water squirter, and MP3 Player. 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.

! 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. The vehicle that you use to transport the robot should have adequate shock absorption. Vans and cars used for passengers would be the best. 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.

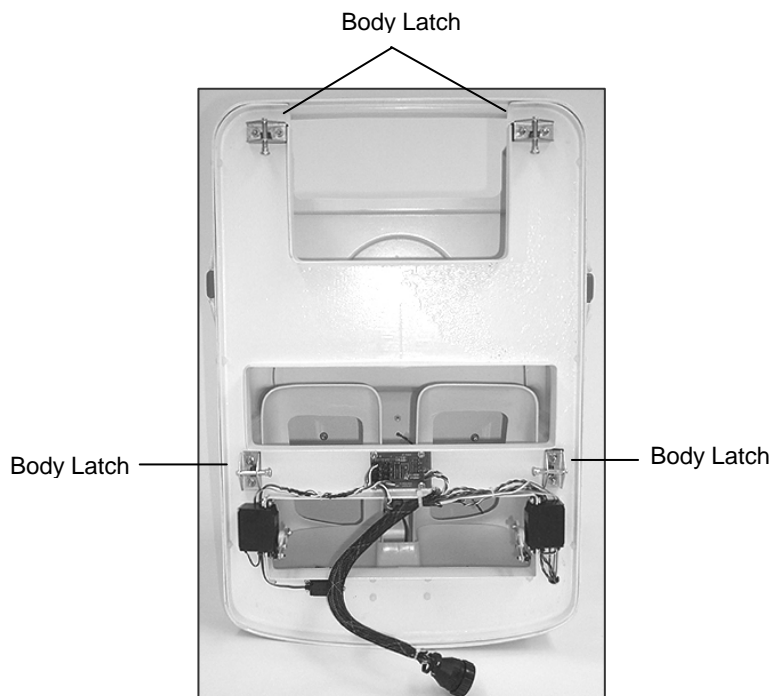
! Double check that the upper robot is latched and secure. There are four latches that must be latched to secure the upper robot to the lower robot (See the diagram below). These pins must be pushed in to secure the upper robot.

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.

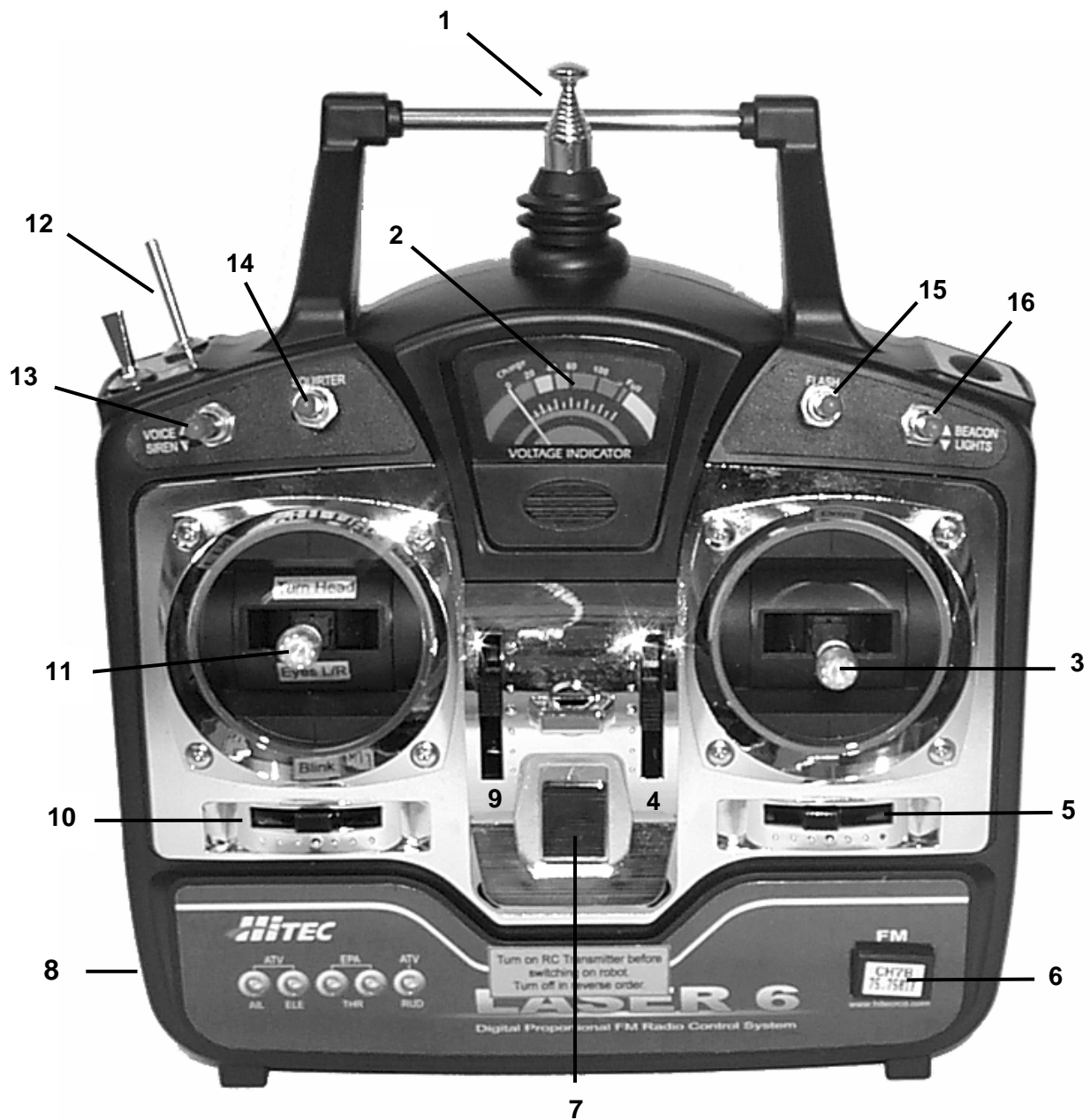
The right hand joystick controls movement of the robot's drive wheels. Pushing the stick forward will cause the robot to move forward. Pulling the stick back will cause the robot to move backward. Moving the stick to the right or left will cause the robot to turn to the right or left respectively. Movement 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.



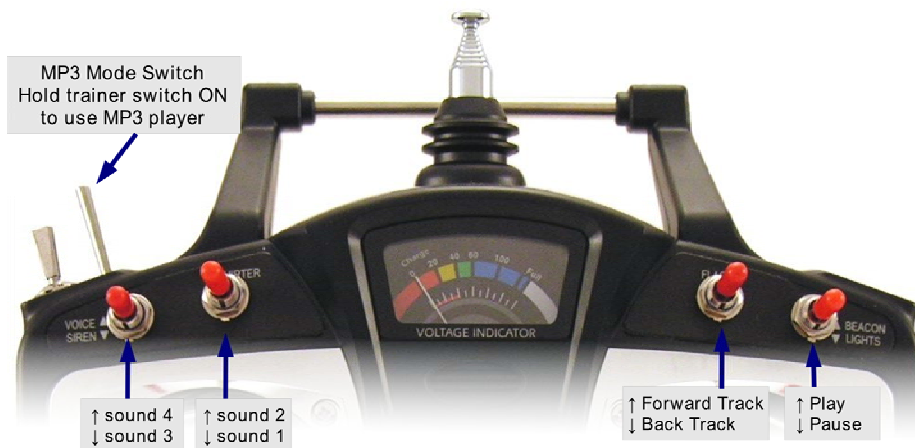
1. Telescopic Transmitter Aerial.
2. Transmitter Battery Voltage Meter (Expand Scale Voltmeter)
3. Right control Stick-
Up and Down – Robot drive motors, forward and reverse.
Right and Left – Robot drive motors steering. Left and right turns.
4. Forward/Reverse Trim lever for right control stick. Normal = 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 or MP3 Player mode switch
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)

Controls for the Integrated MP3 Player Option

The MP3 player is located in the robot and has a SD or MM memory card that you can load music onto. If you have the MP3 player option then your switches will take on other functions when the MP3 mode switch is held on. Two of the switches are for sound effects on the SD memory card. The other two are for playing and selecting songs that you load on to the SD card.



Hold the MP3 switch on to use MP3 Player and to change volume with the left stick.



Switches must stay in the normal position except for mixing which should be off.

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

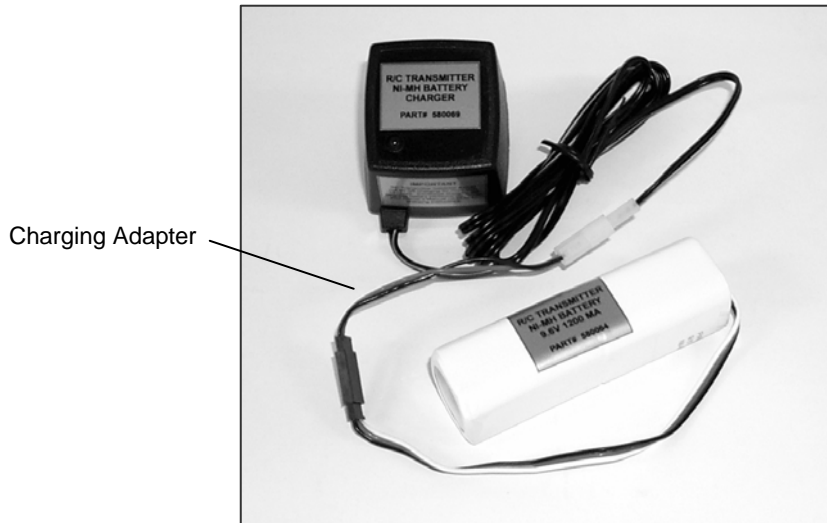
RC transmitter battery	9.6 Volts	700mAH
RC transmitter battery charger	11.6 Volts	70mA

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.

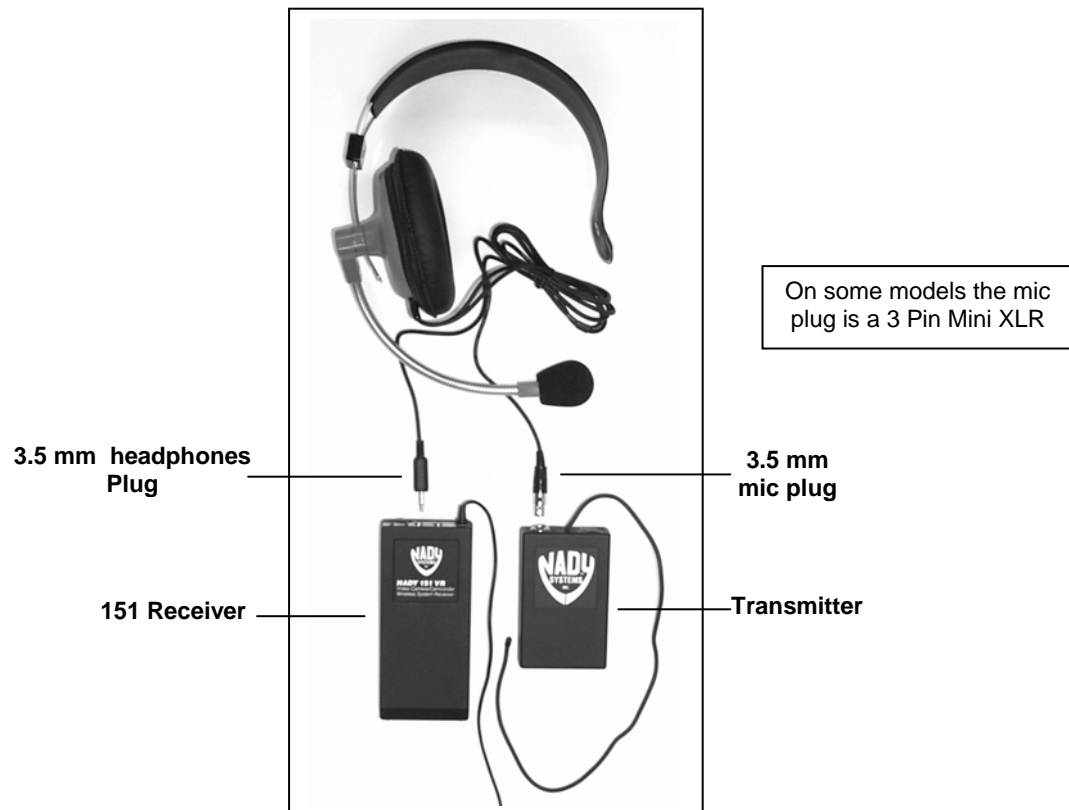
The second voice link transmits the audio detected by the Mic element (located in the front of the robot) to the 151 receiver (which is worn by the operator). This is amplified and sent to the speaker in the operator's headset.

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 in the front left. The robot mic connects to it.
151 Receiver-	Operator wears

Operator's Voice Transmitter, Receiver, and Headset



How to Operate the Operator's Transmitter

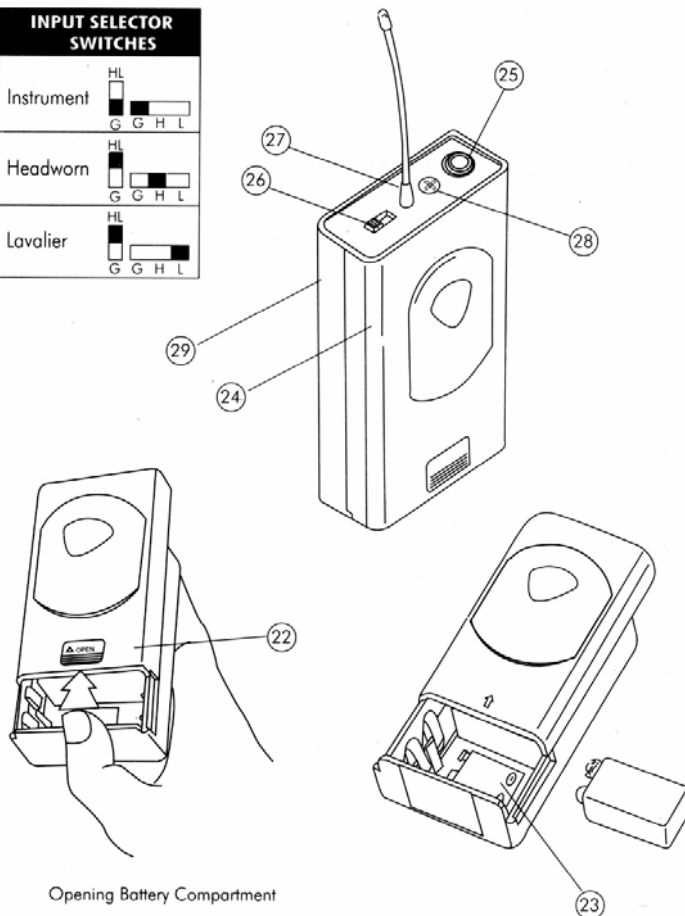
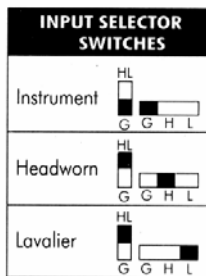
1. Open the battery door.
2. Use a 9 Volt alkaline battery and insert it according to the diagram inside the battery compartment.
3. Place the headset on your head and adjust the microphone to approximately 1 inch from your mouth. If needed, adjust the headset frame so that the earphone and the frame fit comfortably and the earphone is against your ear.
4. Plug the mic plug from the headset into the top of the transmitter.
5. Move slide switches to the "ON" position.
6. On the UB4 there is a Volume input level adjust on the unit.

Frequency channel- Located on the back of the transmitter.

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.



- 22. Sliding door
- 23. 9 V Alkaline Battery
- 24. Front Cover
- 25. 3.5 mm jack
- 26. Off/Standby/On switch
- 27. Antenna
- 28. Volume- Input Level Control
- 29. Belt Clip

Frequency is listed on the back.

Opening Battery Compartment

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.

Frequency label- Located on the side of the receiver.

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. Frequency Label
7. Audio Output
8. DC Input Jack 12V
9. Aux. Volume Control
10. Balanced Mic Audio Output XLR
11. Squelch Control

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)

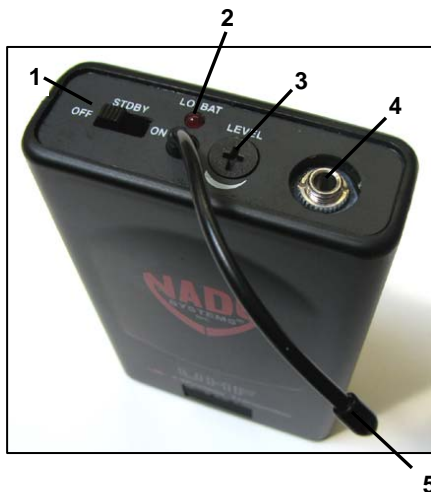
1. Remove the battery door.
2. Use a 9-Volt alkaline battery and insert it according to the diagram in the battery compartment.
3. Plug the small round connector from the headset into the headphone jack on the top of the 151 receiver.
4. Turn the volume knob clockwise to the desired volume (if volume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

Frequency label- Located on the back of the receiver.

Function of LEDs

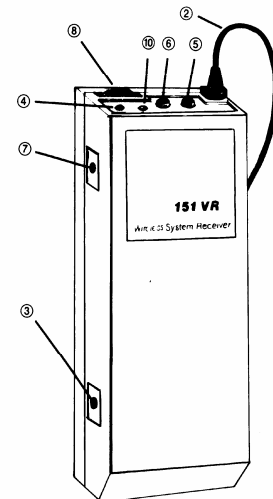
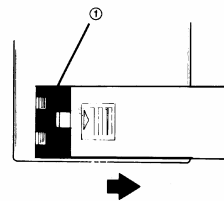
When turning the volume knob on with a fresh alkaline battery, the red light will blink on momentarily and go out. This indicates that it is powering up and that the battery has enough charge on it. As labeled, the light is a low battery indicator. When the light is on constant, this indicates that the 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. Off/Mute/On Switch
 2. Low Battery Indicator
 3. Audio Level Trim
 4. Audio Jack for mic
 5. Antenna
- 9 Volt Battery not needed in robot.**

Frequency listed on back



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



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 not an option if you have an MP3 player.

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.

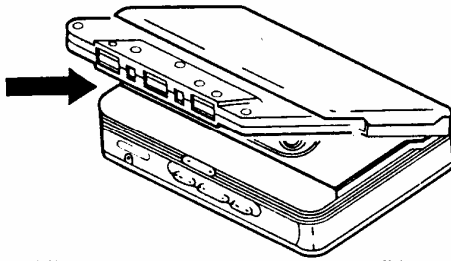
Sound Quality is poor:

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

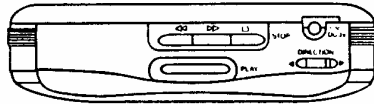
The MRX-225 can play any pre-recorded cassette tape (mono or stereo). Simply insert the cassette as shown below. Then, proceed to "Playing a Tape" in this manual.



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.

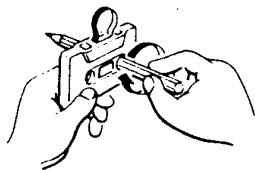
FAST FORWARD/REWIND

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.

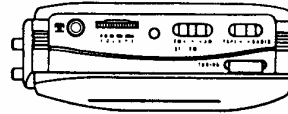
Tighten Tape Slack—Before loading a cassette, take up any slack in the tape by turning the tab hub with a six-sided pencil. Avoid touching the tape.



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**.

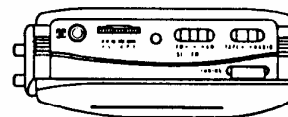
TAPE TIPS

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.

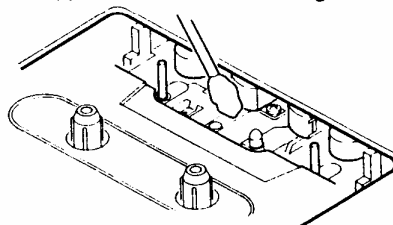
Warning: Do not use benzene, thinners, or other solvents to clean the cabinet, since they may warp or deform the plastic.

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

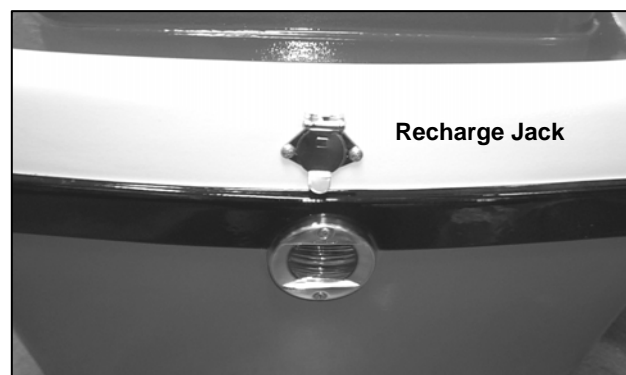
ROBOT BATTERY

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:

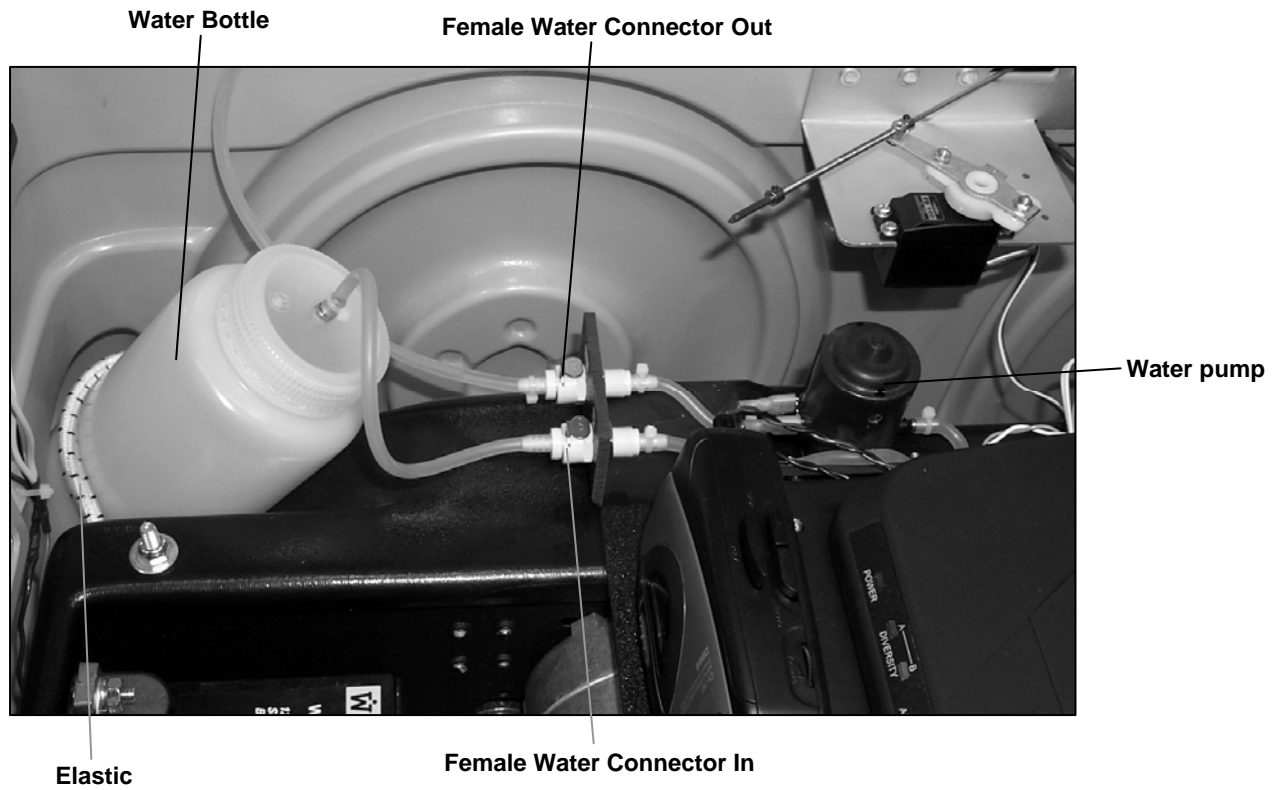
1. The water squirter system must have water first. If not, fill your water squirter system. Operating the water pump without water running through it for more than 10 seconds is not good for the pump.
2. The water squirter switch, on the robot, must be in the "on" position.
3. To squirt water move the *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.

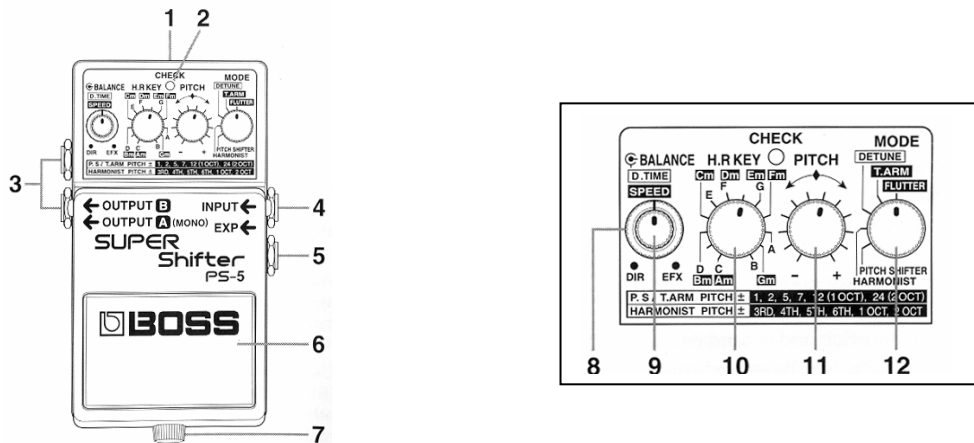
The parts of the water squirter are shown on the next page.



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 operators 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

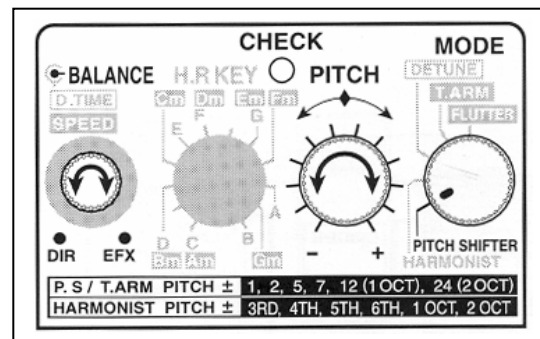
Optional Accessories: Voice Modifier

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



MP3 Player Option

Integrated MP3 Player Features

- Ability to play MP3 files through the robot.
- Memory Storage Card: SD Card.
- Four sound effects stored on the card (horn, rev engine, screeching tires and crash).
- Space on the card to load your own music.
- Selection of songs is done with the RC.

The Integrated MP3 player will only play mp3 format files. The 128kbps compression rate is the best choice for this player for best cueing speed. File names cannot be more than 20 characters long. Abbreviate your file names to accommodate this. When loading music it is important that you load your songs outside the soundfx folder on the card or they will not play.

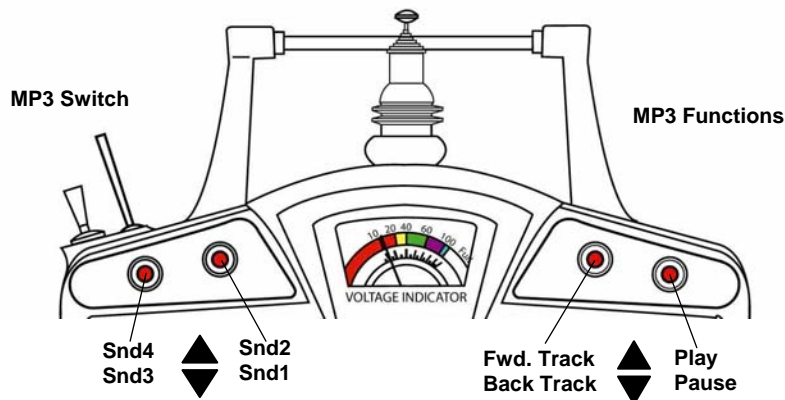
To use the MP3 player you will need access to software that converts audio files to the mp3 format, hardware to put the files on the memory card, and feel comfortable doing those two things.

Important

To load your own music on the card you will need to obtain a card reader that accepts SD or MMC cards. Card readers connect to a USB port on your computer.

Play Music

To play a song, hold the MP3 mode switch and push the play switch shown on the diagram below.



Hold the MP3 switch on to use MP3 Player
and to change volume with the left stick.

Tips

- After you move forward or back to a new track, the music will start right when you release the switch.
- When you scroll to the last track it will stop there. If you want to go to the first track you need to back track.
- If you stop on a song, it will remember that position when you start the mp3 player again, unless you turn off the robot.

- If you want to change the volume of the music/sound effects you can go to the **Road Rage audio amp** and adjust the volume. When you do this, you may also need to adjust the volume of the voice on the voice receiver. Do not turn the amp up too high; not much past 1:00, because you may get some audio distortion.
- You can customize the songs and sound effects that you use for different programs by getting additional cards and adding your own set of sound effects and music.

To Load Music on the Memory Card

Place the card in a card reader. Go into 'My Computer' on your desktop and find the drive that represents the card. Open this and you will see the sound effects folder. Open the source folder where you have your MP3 music or sound effects to transfer to the card. Drag and drop a copy of these files to the card. Make sure to put these files separate from the sound effects folder. You can place the files in the order that you want to use them. Put the memory card back in the MP3 player.

Play Sound Effects

If you want to play a sound effect, hold the MP3 mode switch while you hit the sound effect you want (See the diagram above). You can play any of the sound effects: snd1, snd2, snd3, or snd4 with the switch as shown. If you add sound effects or songs to be played in the place of snd1-4 they must have the filename of **snd1, snd2, snd3, snd4** to play in their place. The sound effects files must be in the soundfx folder.

Removing the SD Card

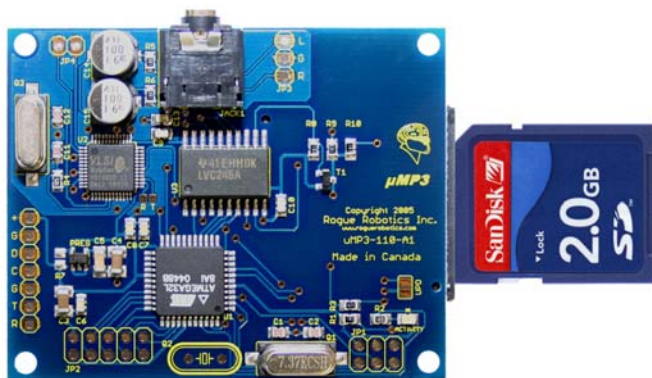
Open the back door of the robot to locate the MP3 player. Push on the memory card and it will slide out part way. Remove the card. Now you can load music on the card. If you need more storage space, get a card with additional capacity. If you need to add the sound effects to a new card, make a copy of the folder with the sound effects on and place it on the new card.

Changing the Volume

While holding the MP3 switch, move the left stick right for volume up and left for volume down.

Order of songs playing

The songs will play in the order that you transfer them to the SD card.



MP3 Player Board
This shows black box inside view

MP3 Player and Adaptor (Belt worn) - Option

The MP3 player and adaptor is an additional audio source to play music or other audio. The MP3/CD player adaptor goes between the headset mic and the voice transmitter. You can also use a CD player with the adaptor. It has one connection to go to the MP3 player. You can use the voice system without the adaptor also. The diagram below shows how to do the hook up.



Using the MP3 Player (See the operating manual in the control case).

1. Install a fresh battery in the MP3 player.
2. Install the software from the CD on your computer to download songs to the player. Connect the USB cable provided from the MP3 player to your computer.
3. Make sure the lock switch is off which locks the controls.
4. Press and hold the play button. Select the music menu and select a track.
5. For more volume, go in to the menu-output settings and change to line out. This will give you a higher volume adjustment.
6. Start the track with the play button. You can pause with this same button. To select a track, use the forward and reverse track buttons.

Auto Shutoff Feature

The auto shutoff feature shuts off the MP3 player if not in use for a designated amount of time. You can change this from 1 minute to 60 minutes. Just go in to the settings menu, auto shutdown. We recommend a setting of at least 25 minutes so that it does not shut off while you are doing a program.

PART 3

CHAPTER 10 Assembly & Disassembly

Installing the robot battery:

1. Position the robot 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.



CAUTION

The robot battery posts should never contact the metal of the main electronics box or the metal of the drive base. This will result in damage to electronic components especially inside the main electronics box.

Installing the upper robot on the lower :

1. Set the upper robot on the lower robot body.
2. 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 compartment where Patches sits. The pins are to the left and right of Patches. The other two are at the back of the robot. To latch these you will need to reach in through the back hatch/trunk.
3. Connect the 37 pin connector that is a round connector and wire bundle running from the upper robot to the lower robot. When connecting this rotate it until it sits down into its mate connection and turn the ring until it is secure.



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.

Removing the main electronics box from the robot:

1. **Always remove the robot battery** from the robot before working with or removing the main electronics box. This is important because the electronics in the box will be damaged if it contacts a post of the robot battery.
2. There are 4 nuts to remove at the base of the main box bracket. Two are at the front and two at the back. There are some wires to disconnect also. These include the speaker wires, headlights, drive motor wires (blue and yellow), power wire to the 151 voice transmitter and the green long antenna wire.

3. The box can now be removed. When removing, do it slowly, making sure that all wires are disconnected.

Removing the drive base from the body: (This would be necessary only if you needed to get to the drive pulleys, belts or remove a drive motor.)

1. Remove the robot battery from The robot before removing the drive base.
2. On some models, the main electronics box and bracket have to be removed first.
3. Disconnect the drive motor wires at the in line connection. These wires are blue and yellow wires going to each drive motor.
4. Rotate the handles of the Link Lock Latches in the drive base counter-clockwise. This will release the latch from the slot of the mounting plate.
5. Lift the back of the robot up and roll the drive base out from under it.

Installing the drive base back into the body:

1. Lift the back of the robot up enough to roll the drive base under and into position.
2. Line up the four aligning threads with their holes and lower the robot onto them.
3. Turn the handle of the Link Lock Latch clockwise and make sure that it pulls down into the slot of the mounting plate.
4. Keep turning the handle until it is turned as far clockwise as possible and then lay down the handle. This locks the mechanism.

Reverse steps for disassembly or assembly.

PART 4

CHAPTER 11 Maintenance

Regular Maintenance Checklist

Periodically the robot should receive a thorough inspection.

1. To prolong the life of your robot system, always store it indoors. Store in a safe place away from **light, dust, moisture**, and excessive heat. **To keep dust and light away from the robot, a robot cover should be used.**
2. The plastic may fade from the effects of UV light over time; especially white bodies. To avoid this you can paint the body. See the painting instructions in this manual.
3. The robot and Radio Control Transmitter batteries should be stored fully charged. The robot battery should be brought to a full charge after each use of the robot so that it always has a full charge on it.
4. Examine the exterior of the robot and make repairs as necessary. See the robot body repair instructions if needed.
5. Remove the upper robot. Check all bolts and nuts for tightness.
6. Examine electrical wiring and connectors for looseness and wear.
7. Clean and lubricate mechanical parts of the robot such as the front wheel casters as needed with a light machine oil or LPS-1. Inspect the drive belt and pulley system making sure that the motor pulley set screws are tight. You can use belt dressing on the drive belts if they are dry or squeaky.
8. Clean the cassette tape system according to instructions in the Cassette Tape and Radio System pages.
9. Wash the robot body with mild soap and water and a soft cloth and reattach the body. (Rubbing alcohol may be used on stains that won't come off with soap. If this causes the finish of the plastic to become dull, apply ARMOR-ALL brand protectant. Do NOT use alcohol on windows or pupils.
10. Check the Radio Control System and Voice Transceiver for broken wires, controls, cases, etc. The metal clips that are in the voice units and contact the 9 Volt battery, should be bent out routinely to maintain good contact.

For a list of recommended tools for a tool kit, see the next page. Ask us about the *Robot Maintenance tool kit* that is available.

Recommended Tool Kit

Fuses- 1, 3, 5, 15, 20, 30 Amp (AGC Type)
4" cable ties
#53 Miniature bayonet bulbs (automotive panel type)
Precision regular Phillips screw drivers
Screwdrivers (flat head and Phillips)
Socket and ratchet set
Needle nose pliers
Crimper/Wire strippers
Wire cutters (diagonal cutters)
7/16" & 3/8" wrenches
Set of Allen wrenches (Especially 3/32" and 1/8" sizes)
Extra 9 Volt alkaline batteries
Small soldering iron and solder
Small can all purpose lubricant
Digital Multimeter (Volts/Ohms)

PAINTING OF THE ROBOT BODY

The following information is only suggestions of painting methods. Contact a professional for assistance.

Preparing the surface:

The robot body is an **ABS plastic** and should be cleaned before painting to remove oils and dirt. This is especially true if the surface has had a protectorant such as Armor-All put on it. If the body has not had a protectorant or other silicone product used on it, you could clean the area with isopropyl alcohol to prepare it. It helps to smooth the rough edges of the scrapes or scratches before painting with a 600 grit sandpaper. You can lightly sand the area to paint with the 600 grit sandpaper or a Scotch-Brite 7448 pad.

Painting the surface:

Method 1

Enamel spray paints such as Krylon Interior/Exterior enamel could be used. This can be touched up easy if the paint ever got a scuff or scrape but is typically just for painting trim, bumpers, gauge plates etc. Carefully cover parts that are not to be painted with masking tape and paper, to protect against over spray.

If you purchased a painted boat, method is what was used. The typical paints used are Dupont and Sherwin Williams automotive paints for plastic surfaces.

Method 2

Note: If you use method 2, you should contact a professional painter that has had experience painting on various types of surfaces. These are automotive type paints and typically include a primer and base coat. For a glossy look you can use a glossy base coat or a clear coat.

Brand- Dupont

Primer: Acrylic Urethane Flexible Primer Surfacer. Primer is optional.

Paint: Acrylic Enamel. Dupont ChromaBase Basecoat.

Brand- PPG

Primer: Check with painter.

Paint: Deltron DBU

Brand- Sikkens

Primer: Plastoflex primer by Sikkens

Paint: Autocryl by Sikkens (two-part acrylic urethane enamel)

The information listed includes suggestions and general information. This material is designed for application only by trained professional painters using proper equipment.

If you have any questions, call our service department at 801-489-4466.

REPAIR OF THE ROBOT BODY

Materials

Super glue

ABS or PVC clear medium bodied glue

Fiberglass mesh

rubber gloves

1. Hold the crack together tightly so that the glue you put on the inside of the body does not run through the crack on to the outside of the body. This would etch into the plastic.
2. If there are pieces of plastic reinforcement across the seam or crack that are unglued, PVC or ABS glue can be used between the reinforcement piece and the body. A clamp could be used to hold the plastic tightly together while drying.
3. Cut a piece of fiberglass mesh to cover the crack.
4. Position the body, so that the seam or crack is horizontal to the table. This will keep the glue from running. Apply some of the PVC or ABS glue along the seam, only on the inside of the body. Check to make sure that the glue is not running through the crack on to the outside of the body. Note: Avoid getting the glue on your hands.
5. Immediately put the fiberglass mesh on the glue and pat it down to saturate into the glue.
6. Apply some more PVC or ABS glue over the fiberglass mesh to saturate it some more.
7. It will dry to the touch in about 30 minutes. Allow 24 hours for complete drying.
8. For cracks that need more strength, glue a piece of ABS plastic across the crack with PVC glue. Use a clamp or something heavy to hold it down while drying.

General Precautions:

Use in a well ventilated area.


Use gloves to avoid getting glue on your hands.

Avoid getting the fiberglass on your skin or clothing. The fiberglass will not hurt you, but could cause skin irritation.

For further precautions, read the super glue, PVC, and ABS container labels.

STORAGE

Storing your robot for any length of time.

1.  Remove robot battery and charge fully as per instructions in battery section. **(Storing the battery for any length of time without being fully charged will permanently damage the battery.)**
2. Charge the RC battery as per instructions.
3. Remove batteries from operators transmitter and receiver.
4. The RC Transmitter and voice pieces should always be stored in the carrying case; this will extend the life and help insure proper operation.
5. Inspect robot for loose bolts or any additional maintenance that may need to be done.
6. Clean the body and top as per instructions in maintenance section. (If robot is stored with a dirty body it may be harder to clean at a later date, as stains may become permanent.)
7. Storing your robot with a dust cover on it will keep the robot clean and protect the body from scratches. It will also keep ultra-violet light from effecting the ABS plastic body.
8. The robot and batteries should be stored in a dry place between 55-75 degrees F. Storing the robot in a safe place will prevent scratches and extend the life.
9. After storing the robot for any length of time always test the robot well in advance of any scheduled activity as it is impossible to anticipate problems. This will ensure time to correct the problem.

APPENDIX A

Quick Reference Troubleshooting

More detailed troubleshooting by system is included with each subsystem. For additional help or parts call our service dept. at 801-489-4466.

Problem	Cause	Solution
General		
No functions operate	1. RC battery not charged	1. Fully charge until the needle is up.
	2. Broken wire from the receiver to main board	2. Resolder or repair wire.
	3. Fuse blown.	3. Check 5 Volt Reg. and processor fuse.
	4. Main board in robot not getting power	4. Check pins of battery and robot connector. Check on/off switch wires. Check ground wires.
	5. Radio Control transmitter or Receiver Crystal broken.	Replace crystals. Send RC and Receiver in to determine if it is a crystal.
Voice System		
<u>Always do the following first:</u>		
6. Replace the 9 Volt batteries with new ones. USE ALKALINE!		
7. Bend the battery contact out for better contact with the post of the 9 Volt battery.		
8. Check power and audio switches, and lights on all voice units.		
9. Check plug to and from the voices for proper connection.		
10. Check if the transmit (TX) lights are coming on.		
Operator cannot talk	Low Battery	Replace the 9 Volt battery.
	No power to the 101 Receiver.	Check the in line fuse to the Receiver in robot and audio fuse on main electronics box.
	Battery posts not touching the metal clips in the operator's transmitter.	Bend out the metal clips.
	Headset plug to transmitter broken.	Take apart and look for broken wire or solder joint.
Operator cannot hear	Low Battery	Replace the 9 Volt battery.
	Battery posts not touching the metal clips in the operator's receiver	Bend out the metal clips.
	Headset plug to 151 RX has a broken wire.	Unscrew cover of plug and look for broken wire.
	Robot 151 transmitter not turned on.	Turn on audio and power.
	Power plug to robot 151 transmitter unplugged.	Find wire and plug it back in.
	If you have no TX light on 151 RX mute could be out of adjustment	Adjust the mute on the 151 RX to max. which is fully CCW.
Voice Operates but cuts out. Should get 50 feet without any cutouts.	Low Battery	Replace the 9 Volt battery
	Sensitivity Adjustment down too far.	Sensitivity adjustments should be at max. on the 151 Receiver and robot receiver.
	Broken, loose or retracted antenna	Extend robot receiver antenna or replace broken antenna.
Squelch coming from robot	No signal being sent to the robot	Turn on the operator's transmitter.
	Sensitivity is too sensitive.	Very slightly adjust sensitivity down from max. (This will decrease your range)
Squelch in headset when turning robot off.	151 Receiver slightly too sensitive.	Adjust 151 RX mute slightly CW
	151 RX picking up interference in your area.	Always turn off 151 RX the robot.
Cassette Player		
No tape operation	Tape player no on tape mode	Put mode select to tape
	Play button not pushed	Must push play button before hitting the switch on the radio control.
	Tape is too tight.	Loose with a pencil by spinning.
	Power wire or plug is broken or not connected.	Replace plug or re-connect the wire.
	Radio control or tape circuit not working	Contact Robotronics for help.
No siren, or voice either.	Audio fuse blown.	Replace the fuse. See fuse block diagram.
Poor quality sound or slow.	Belts worn out and slipping.	Replace cassette player or belts.
Siren		
No siren	Audio fuse blown.	Replace fuse. See fuse block diagram.
Siren volume not loud enough	Booster problem if tape and voice vol. also are not loud enough	Replace or have booster repaired.
	Adjust siren volume if tape and voice okay.	See siren volume adjust on main board.

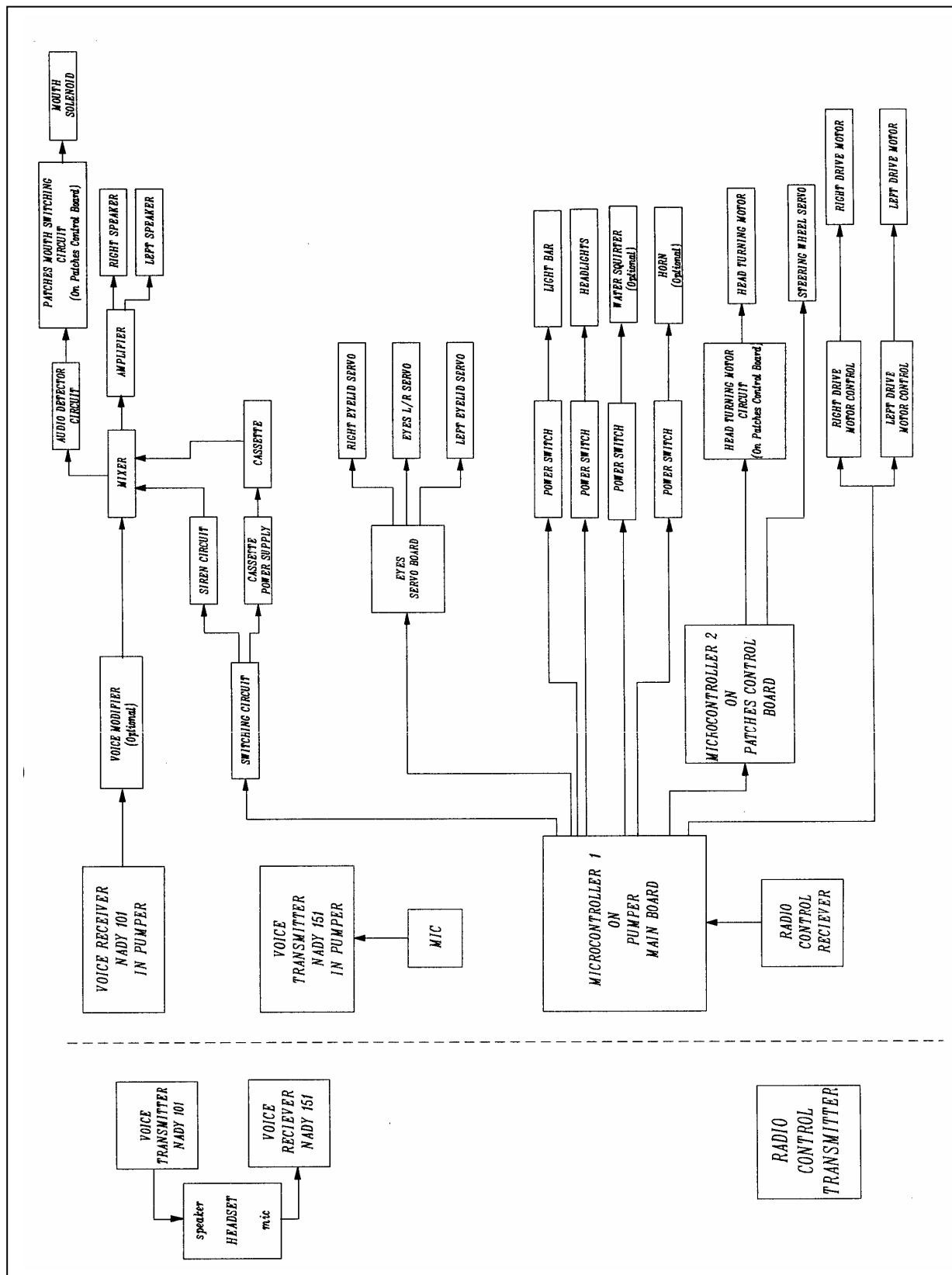
More detailed troubleshooting by system is included with each subsystem. For additional help or parts call our service dept. at 801-489-4466.

Problem	Cause	Solution
Robot Battery System No functions will operate.	Check wires and connector from battery to the robot.	Push battery connector pins in until it clicks in place. Pin could have slipped out of position.
	Battery is very low or bad.	Charge battery or replace if it will not charge. Also test charger.
Battery will not take a full charge. Needle on charger will not move.	Battery has not been kept fully charged	Charge and discharge repeatedly. Replace battery if it does not start charging.
Drive Motors Neither drive operates only. To correctly evaluate drive problems, look at wheels off the ground.	Both drive fuses blown.	Replace drive fuses on fuse block.
	Radio control drive section problem. Contact Robtronics for help.	
One drive only does not operate. Determine first if it is the drive motor or drive circuit. To do this swap the wires that go to the motors at white connector. Same motor still not working then motor is bad. Problem switches to other motor, then problem is in main box possibly the drive circuit itself.	Drive motor pulley loose.	Tighten motor pulley set screws.
	Broken connection at motor connector.	Check blue/yellow wires and in line motor connector at motor
Drive motors moving on their own even when the stick is in the center.	Drive circuit not getting power.	Check drive motor fuses on fuse block (blue wires). Check wires coming from fuse block to motor circuit on the main board. Broken solder joint?
	Drive motor damaged.	Repair or replace motor.
Robot not driving straight.	Drive Circuit on main board problem.	Send main electronics box back to Service Dept.
	Drive trim sliders not in center.	Move drive stick sliders to center or position to neutral the robot.
	Joystick potentiometer broken.	Send to Robotronics for repair.
	One motor pulley set screw loose.	Tighten set screws.
Character Head Turning System Head is out of position but operates.	Straight drive adjustment needs to be adjusted.	Find adjustment on the main circuit board. See diagram of main board in Appendix.
Head motor is keeping head in not centered position	Loose head set screw or head was hit.	Re-position head and tighten set screw. Better to do this with the robot on.
Head motor is not operating	Head turning pot or pot shaft slipped	Re-center head by adjusting head turning feedback pot- blue pot below motor. Then tighten the set screws on the metal tube. See procedure in head section.
	Character board is not getting power	Check fuse on main fuse block.
	Broken wire.	Check power (red/black) and motor wire (blue/yellow).
Eyelids and Eyes Left and Right An eyelid or eyes L/R does not operate	Rod linkage came off.	Get to eyelid rods and ball links and re-attach.
	Servo wire broken or wire came out of eye servo board	Trace wires from servo motor of the eyelid or eyes and follow this wire to the eye servo board to find problem.
One of the eyelids is at a different level	Eyelid rod bent or eyelid out of adjustment	Straighten bent rod or change eyelid position by removing the servo arm. Then shorten or lengthen the rod by twisting the servo arm. You can also change the position of the servo arm on the servo shaft.
No operation of any eye functions.	Connection at eye servo board has come off.	Vehicle- located on underside of upper robot. Robots with Character- located in character.
	Wire(s) bringing 5 Volts and signal to servo board are not making a connection. Broken out of 37 pin connector.	Vehicles- locate the wires (red/black/gray/yellow/black) going from the 37 pin up to the eye servo board. Repair broken wiring. Robots with Character- Check gray/yellow/black and red black to eye servo board.
	No 5 Volts going to eye servo board.	Find broken wire on red/black or check fuse for eye servos on fuse block.

More detailed troubleshooting by system is included with each subsystem. For additional help or parts call our service dept. at 801-489-4466.

Problem	Cause	Solution
Water Squirter Cannot fill reservoir	In-line fuse blown.	Replace the 5 Amp fuse which is in-line on the wire. Follow wire from water squirter switch.
	Broken wire at water squirter switch or coming from main box	Repair break.
Cannot squirt: no pump sound.	Water squirter switch is not in on position.	On position is not the center position.
	Broken wire at pump or W.S. switch.	Repair/re-solder broken wire.
Cannot squirt: pump sound yes	Reservoir empty	Fill Reservoir with filler bottle.
	Water line is not connected to water connector	Connect it.
	Overflow tube and squirt tube are switched at the reservoir.	Swap them back. Overflow tube is the one that is in the top of the bottle and the tube runs to an outlet on the bottom of the frame.
Voice Modifier Voice not being modified	Modifier not turned on.	Push pedal on modifier. Light should come on.
	Audio wires not plugged in correctly	Jumper wire goes from Nady Receiver to Input of Modifier. Wire in Output A of modifier goes to the main board.

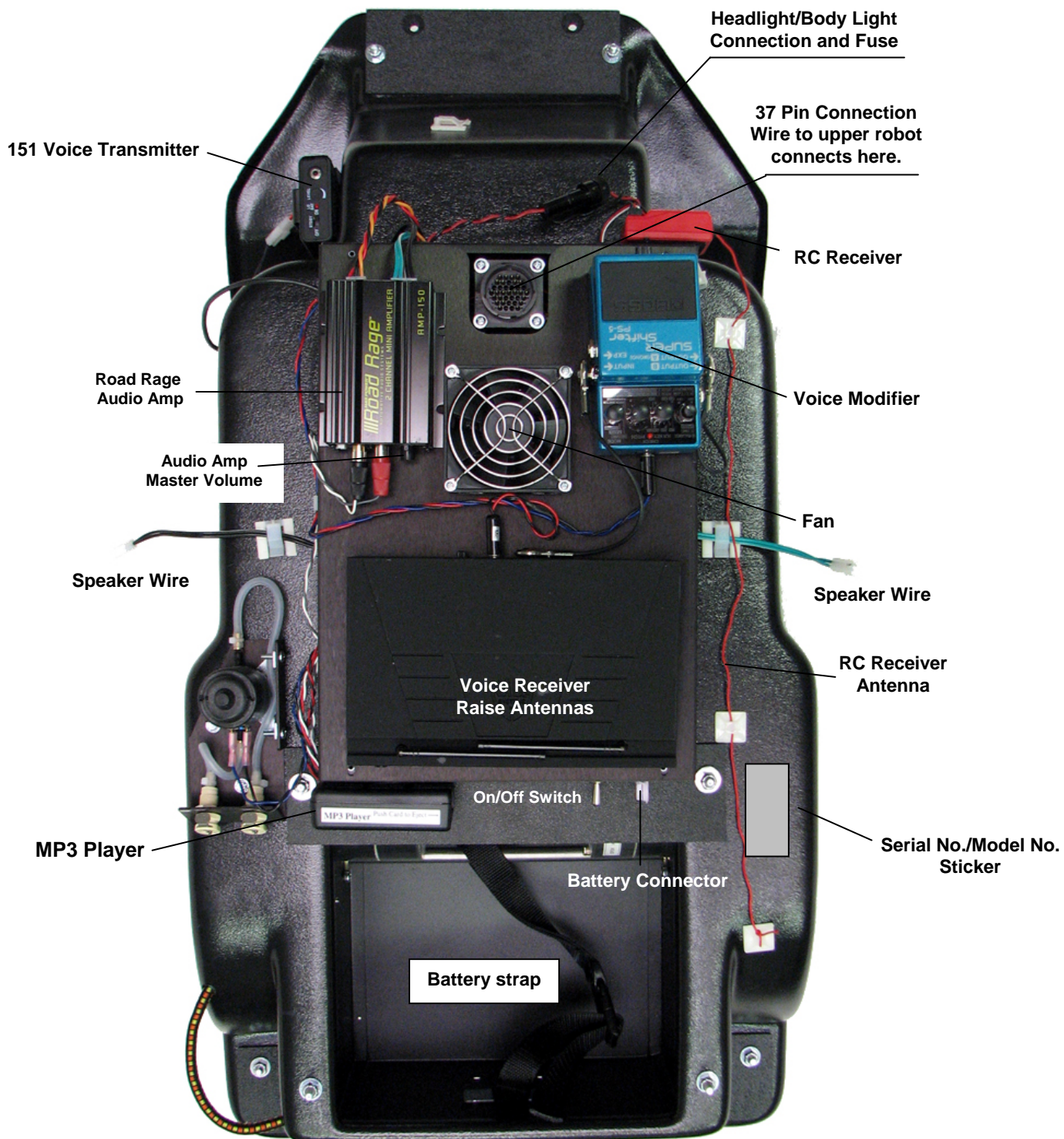
Robot Functional Block Diagram



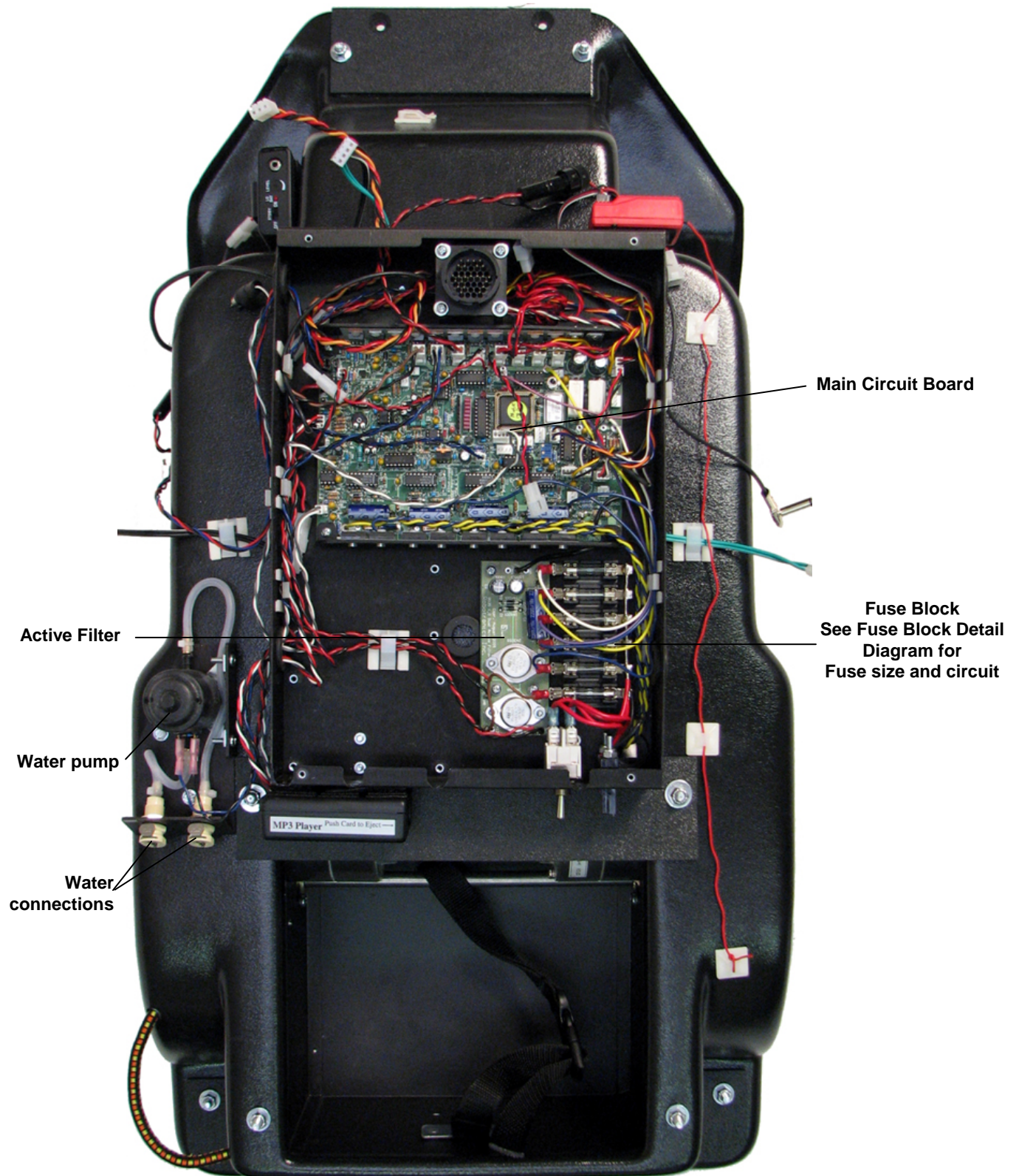
APPENDIX B

ROBOT PARTS IDENTIFICATION

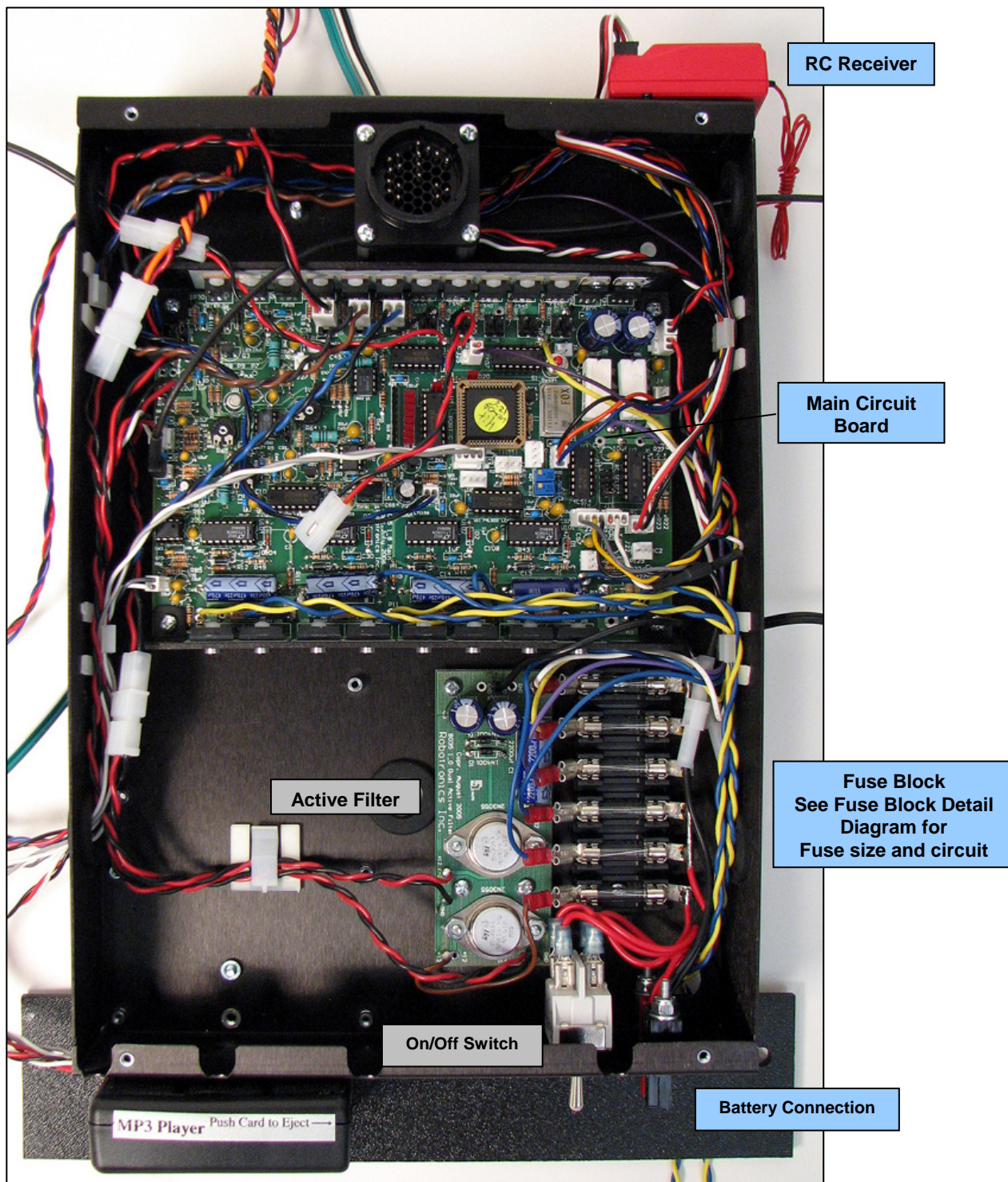
Robot Frame - Top View 1



Robot Frame - Top View Box Open

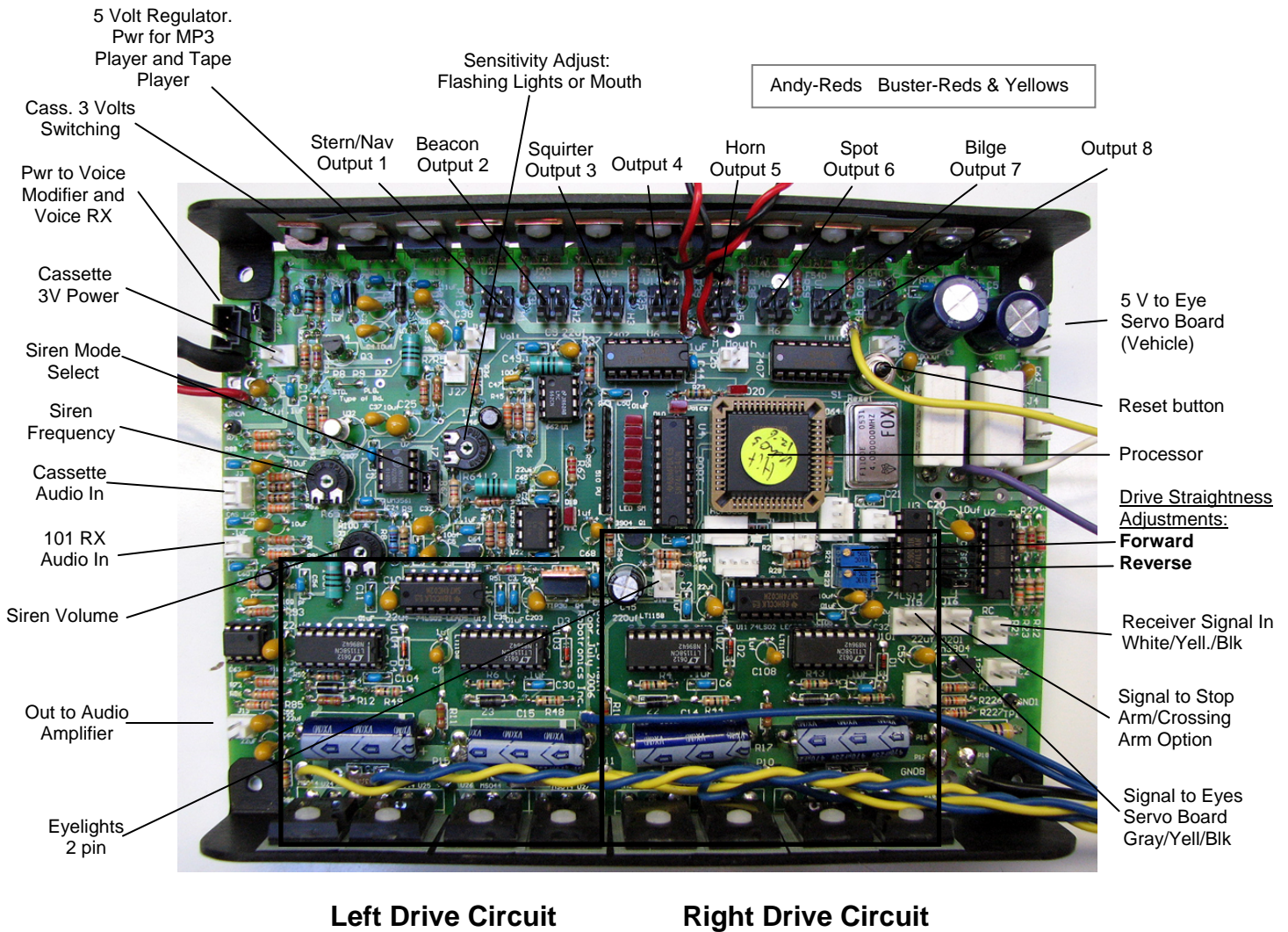


Main Electronics Box

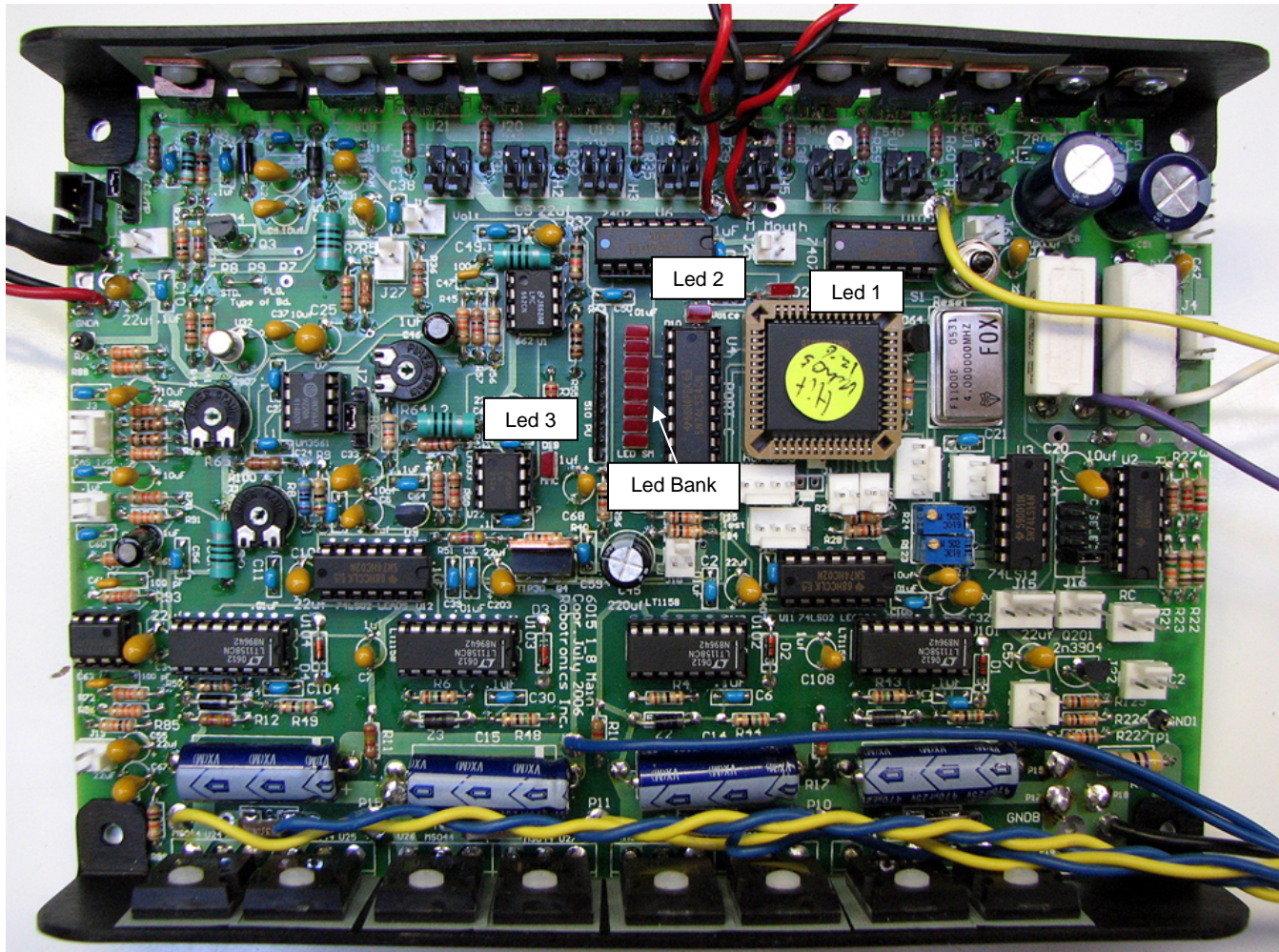


MP3 Player Option or Tape Player

Vehicle Main Electronics Board



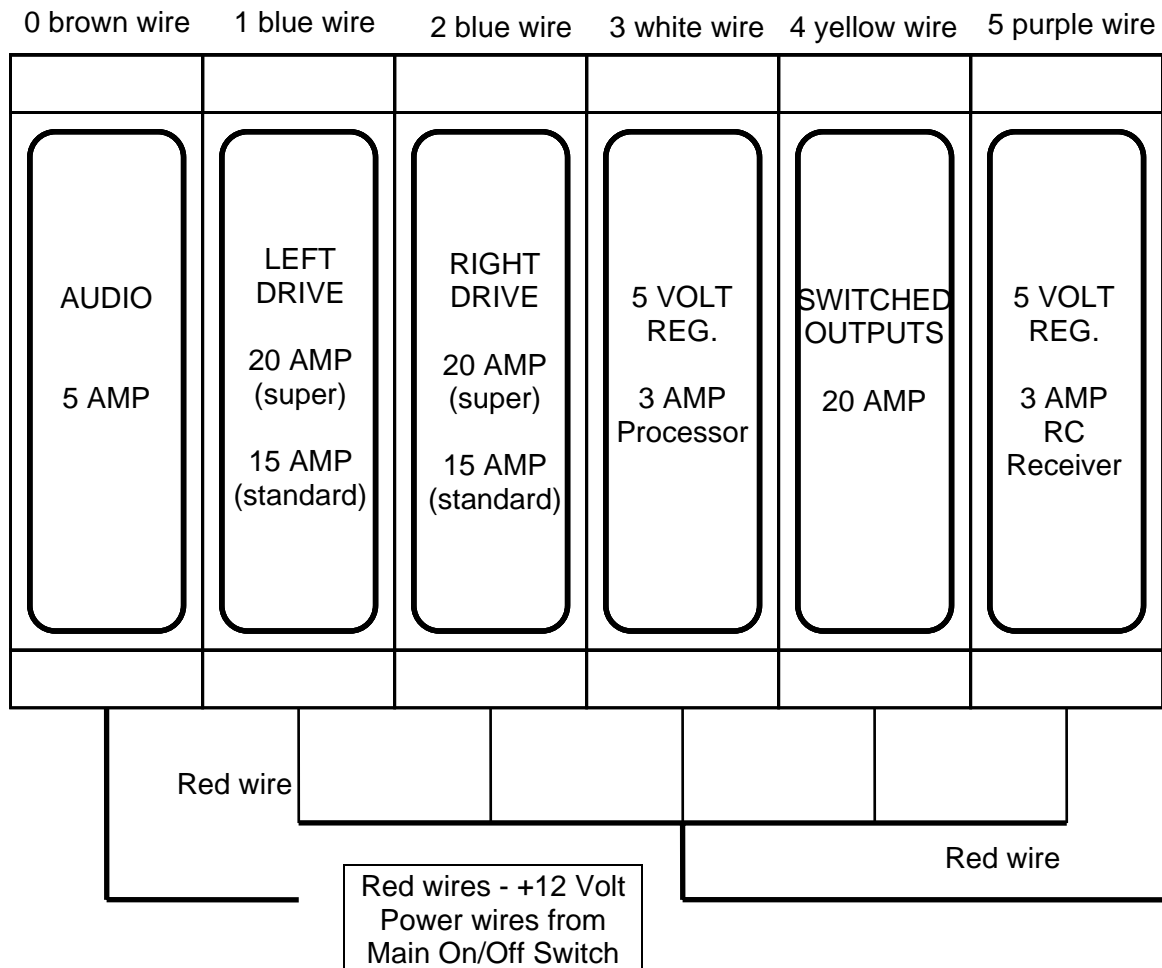
Main Board – LED Functions



Led 1- Failsafe and presence of RC signal. If there is no signal, robot is in failsafe and light is on.
Led 2- Moving mouth or flashing eye-lights detection. This flashes if there is audio coming through.
Led 3- Half-way point of the audio detection. Flashes when there is audio present.
Led Bank- Used for looking at states of the processor, outputs etc. If these are on, the processor is getting 5 V.

Fuse Block Detail

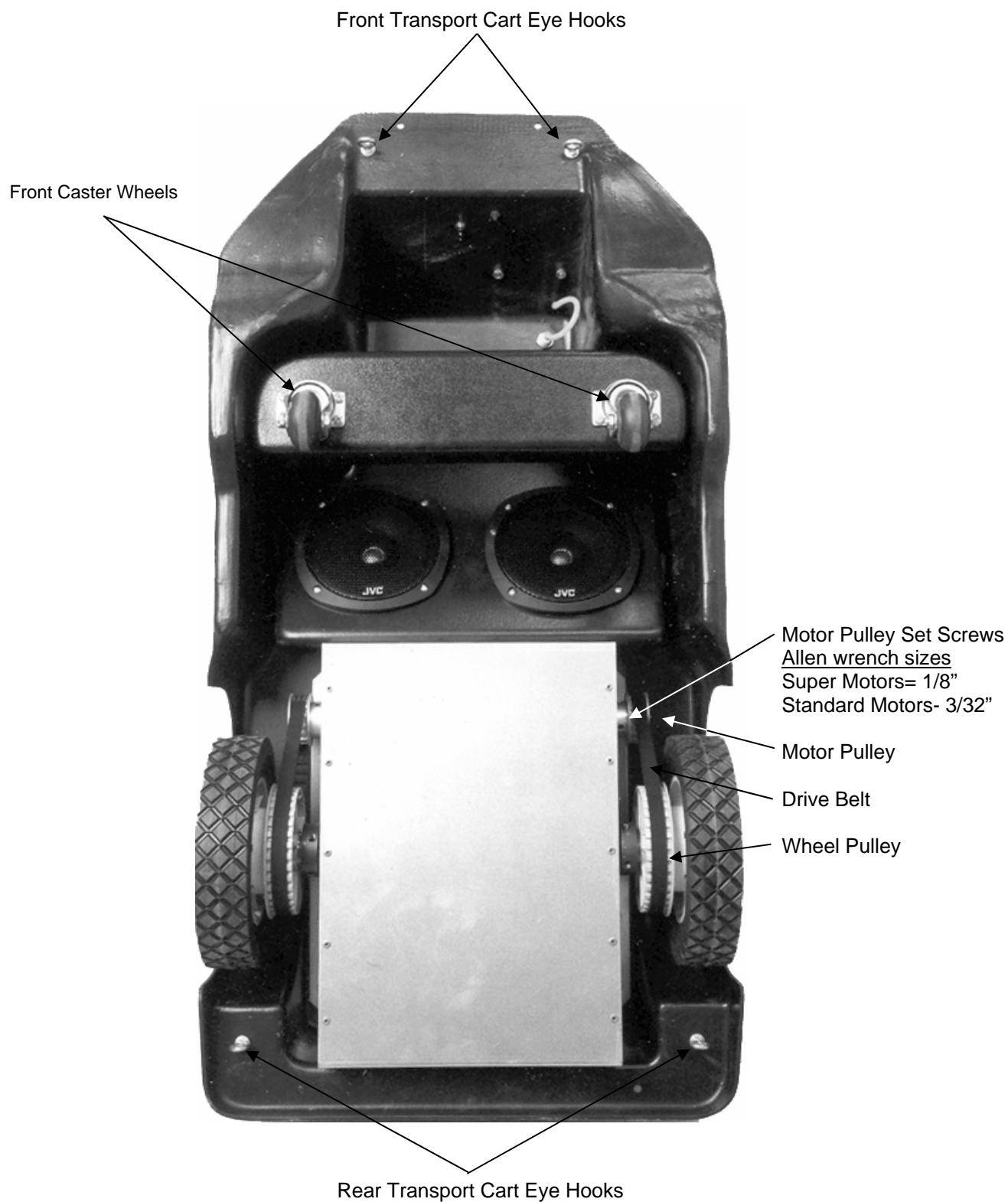
All Fuses are AGC type fuses.



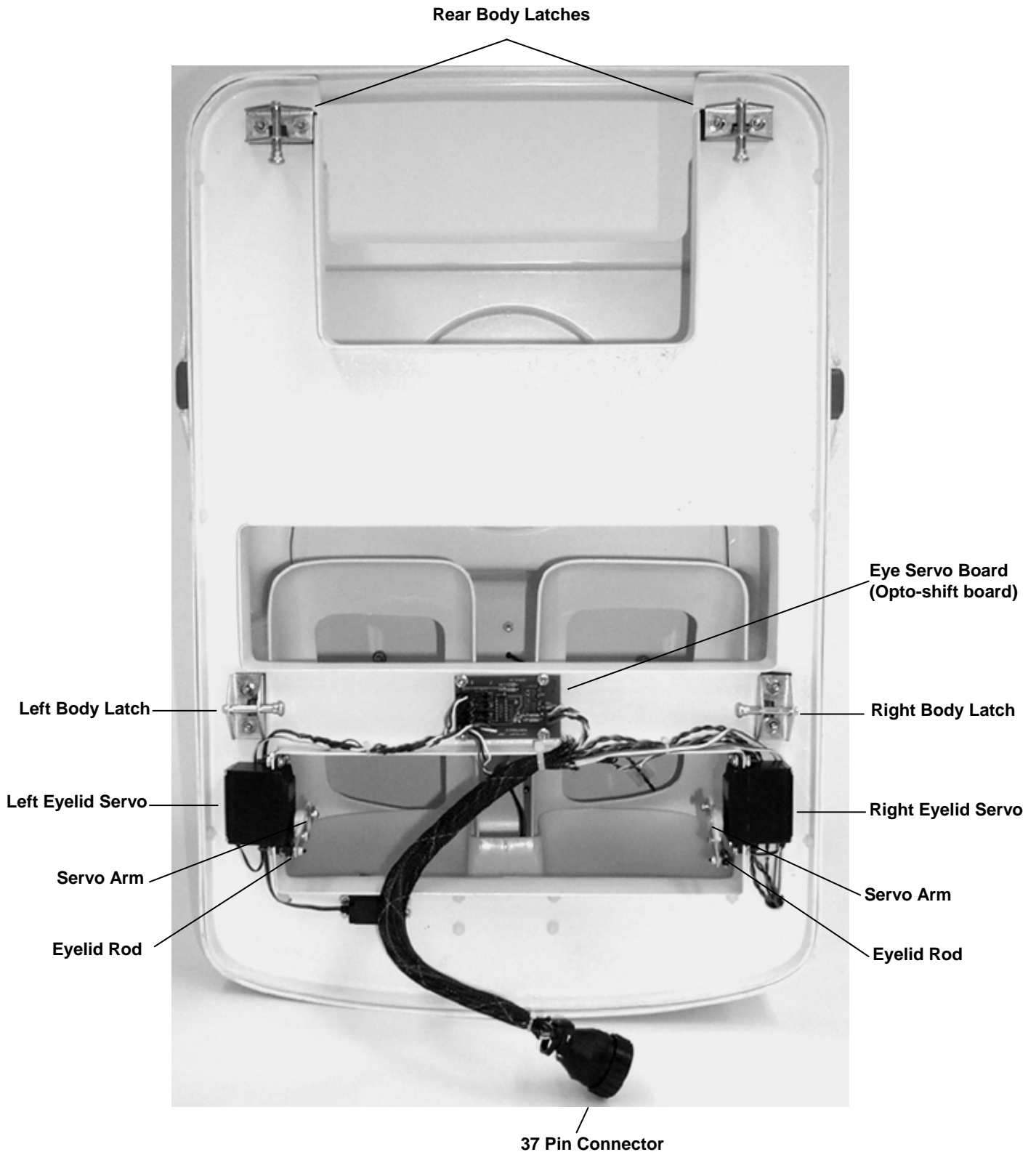
Audio - (Fuse 0) Robot voice transmitter (151), Robot voice receiver (101), audio booster, active filter, cassette player, CD player, and siren.

Switching - (Fuse 4) Cassette player, siren, headlights, beacon, spotlight, horn, and water squirter. This applies to the switching on and off of these functions.

Lower Robot - Bottom View

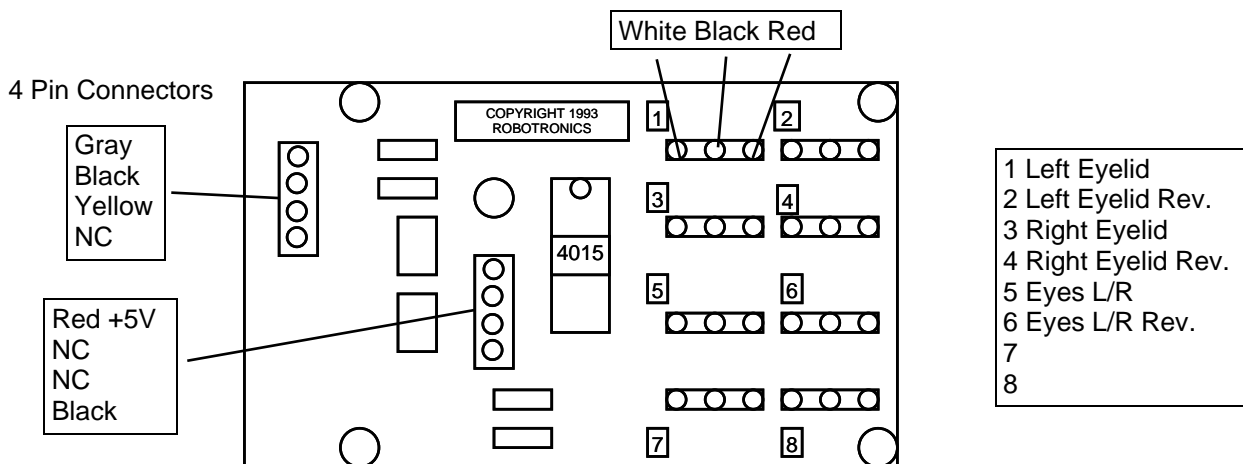


Top – Underside View

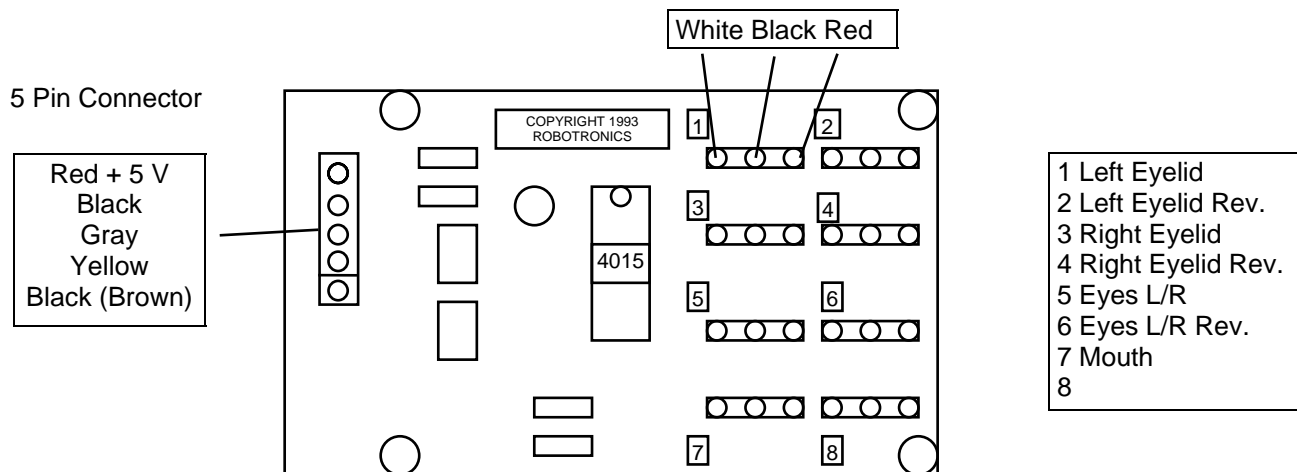


Eyes Servo Board (Opto-Shift Register Board)

Version With Two 4 Pin Connections



Version With One 5 Pin Connection



Robot	Typical Connection	Location of Board in Robot
Bobby the Boat	1,4, and 6	Underside of Upper robot

Notes

Technical Tips

Coastie the Boat™ is a character based on Bobby the Boat™ and manufactured in a certain configuration for use by the U.S. Coast Guard.