US Army Corps
of Engineers®

Seamoor Safety Operating Manual

October 2002

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Chapter 1

General Operating Instructions

If you have any problems, questions, or concerns contact any of the following people:

Your Division Representative on the National Water Safety Products Advisory Committee (NWSPAC). A list of representatives can be found at http://watersafety.usace.army.mil

Pam Doty, National Seamoor Coordinator, 217-774-3951 or Pamela.J.Doty@mvs02.usace.army.mil

Robotronics (Monday – Friday) Paul George, 801-489-4466

Section 1
Getting Started

Operating Hints

Here are some very important operating tips that you should be aware of.

Seamoor's Top Ten List:

10. **Use your normal voice.** When speaking into the headset microphone speak in your normal voice. The headset microphone should be approximately one inch away from your mouth when speaking into it.

9. **The Right-Right Rule.** It works best if you stand behind Seamoor with your right to his right to operate him because then Seamoor will move in the same direction that you move the controls on the radio control handset. The operating distance should never exceed 100 feet.

8. **Battery Limitations.** It is possible that the longest period of time that Seamoor can be operated without stopping to change the batteries is 2 to 3 hours. If properly maintained a fully charged robot battery should last 2 to 3 hours and a fully charged radio control handset battery should last 5 hours. The 9-volt batteries should be replaced whenever you are having difficulty either hearing or talking through the headset.

7. **Seamoor's Assistant.** An adult should accompany Seamoor at all times and serve as Seamoor's assistant. This person helps maneuver Seamoor through crowds, protects Seamoor from damage, stimulates interaction between the audience and Seamoor, and answers questions about Seamoor. People, especially kids will try to poke Seamoor eyes out, ride the watercraft, pull Seamoor's hands off the handlebars, poke and beat on the microphone that is on the front of the watercraft, pull Seamoor's tail, you name it and they will try it. Adults will try to set their kids up on Seamoor for them to take a ride or to have their picture taken. Seamoor's assistant should be as polite as possible but firm when dealing with people that could potentially damage Seamoor. Don't be afraid to ask someone to leave Seamoor alone.

6. **Hidden Operator Rule.** Try to stay out-of-sight as much as possible while operating Seamoor but at the same time always keep Seamoor and his assistant in sight.

5. **Climate Control.** Seamoor, the radio control handset, or the headset should never be left in the direct sunlight or in a damp area for any extended period of time.

4. **Low Battery Identification.** You should never let the radio control handset battery or the robot battery fully discharge. If this happens it could affect the memory of the battery and it could make it difficult to recharge. If Seamoor starts to act erratic and performing functions on its own this is a sign that the charge in the robot battery is getting low. If this happens you need to shutdown Seamoor and either recharge the battery that is in the robot or replace it with a fully charged battery.

3. **Proper Surfaces.** Seamoor must only be operated on hard, smooth surfaces. Avoid shag carpet, dirt, sand, gravel, grass surfaces, water, steep inclines, or uneven surfaces. Seamoor should not be operated on a carpeted surface if there is a large amount of static electricity present or in a parking lot that has not been closed to vehicle traffic.

2. **Trained Adults Only.** The only people who are allowed to operate Seamoor are adults who have been properly trained.

1. **Use common sense.** The most essential ingredient to the use and effective operation of Seamoor is common sense. Use your head or Seamoor could end up dead.

It is very important that Seamoor interacts with the public.

The person who operates Seamoor has a two-part mission. He or she is the voice of Seamoor and controls all of Seamoor's functions.

It is important that the operator keeps Seamoor ALIVE! It is a good idea that whoever is selected to operate Seamoor has an outgoing personality.

The operator while operating Seamoor:

- must be an adult and should stay "out of sight" as much as possible.

- must wear the handset neck strap around their neck at all times.

- should always keep Seamoor and Seamoor's assistant in sight.

- should speak with their natural voice.
  Seamoor will work magic and transform their voice into its own. The voice transformation is done through a voice synthesizer that is located inside the robot. Before operating Seamoor, the operator should check and make sure all four knobs on the synthesizer are in their correct position.

- will have to wear a headset that has a receiver and transmitter attached to it.
  The transmitter and receiver should be placed away from each other, one on each side of the operator's body. If the operator cannot hear or talk through the headset while operating Seamoor, replace the 9-volt alkaline batteries that are located within the receiver and transmitter.

- must not offend or embarrass anyone and should not use any language that is inappropriate.

The following are suggestions that the operator can use while interacting with the public.

1. "Hi, what is your name? My name is Seamoor." Seamoor's last name is Safety.

2. "How old are you? I am _____ years old." (When talking about Seamoor's age use a legal age for personal watercraft operators in your state. After that you could go into more details of why you are that old.)

3. "Are you enjoying the _____?" (Put in boat show or event name)

4. "Have you ever ridden on a personal watercraft before?"
   If so – "Did you have fun and wear your life jacket?"
   If not – "It is a lot of fun and you should try it if you ever get the chance. If you do ride a personal watercraft make sure you learn how to ride it safely and wear your life jacket."

5. "What is the most important thing to wear while you are riding on a personal watercraft or in a boat?" "A life jacket, you are correct. Good job!"

6. "Would you like to hear my siren?"
7. "My friend here is a park ranger for the U.S. Army Corps of Engineers. His or Her name is _____. She or He does a great job and has a lot of fun. Would you like to be a park ranger someday?"

8. "My friend Park Ranger _____ works at _____. Have you ever been there before?"

9. “I like to eat sea slugs, outboard motors, and ?. What do you like to eat?”

10. “Would you like to hear a song?”

11. “Would you like to sing a song? What song would you like to sing?” If they can’t think of one suggest something like Row, Row, Row Your Boat.

12. Tell simple jokes. Make sure they are appropriate and will not offend anyone.
    - What do you called a witch that goes to the beach?
      A sand-witch
    - Why do cows wear bells?
      Because their horns don't work.
    - What do you call a ghost who keeps his head above water?
      A boooooey

13. This can be used to give the operator a break or be used to recharge Seamoor’s batteries.
    “It is time for me to take a nap. It has been fun talking to you and I hope that you enjoy the _____ (place event title here) and remember when you are on or near the water remember to play it safe. Bye, bye.”

    Note: If Seamoor starts to act erratic or operating on his own this is a good indication that his batteries need recharged.)

14. Since Seamoor doesn’t have wings he is generally not referred to as a dragon but as a Sea Serpent. Animated characters that look similar to Seamoor include characters on the Dragon Tales cartoon and Sypro the Dragon a PlayStation game character. If someone asks if Seamoor is related to one of these characters you can say that they are his distant dragon cousins.

Here are some tips on how to control people that get out of hand while interacting with Seamoor:
An adult should accompany Seamoor at all times and serve as Seamoor’s assistant. This person is primarily responsible for controlling anyone that gets out of hand while they are interacting with Seamoor.

People, especially kids will try to poke Seamoor eyes out, ride the watercraft, pull Seamoor’s hands off the handlebars, poke and beat on the microphone that is on the front of the watercraft, pull Seamoor’s tail, you name it and they will try it. Adults will try to set their kids up on Seamoor for them to take a ride or to have their picture taken. Seamoor’s assistant should be as polite as possible but firm when dealing with people that could potentially damage Seamoor. Don’t be afraid to ask someone to leave Seamoor alone.

Kids sometimes can be distracted from messing with Seamoor by asking them questions or by giving them something to do such as handout stickers and fun books. If that doesn’t work ask the kid if they are with someone. If the kid points out someone that they are with, the person that is operating Seamoor should go and talk to that person and let them know what is happening.

If someone is really getting out of control and it is too much for Seamoor’s assistant to handle the person operating Seamoor must step in and see if they can help with the situation. At this point it is more important that Seamoor be protected from damage then worrying about if someone will figure out how Seamoor is being operated.

Section 2
Setup and How to Operate Seamoor

Step #1 – Unloading Seamoor

1. When the shipping cases with Seamoor in them arrive at your project unload them and place them in a climate controlled room right side up. Do not leave them outside.

Step #2 – Understand that Seamoor is not a toy

1. Seamoor is probably unlike any remote control or robotic piece of equipment that you have every operated before, so don't assume that you can just grab the controls and go.
2. Seamoor is a very expensive piece of electronic equipment and if it is not handled and operated properly it can be damaged to where it is not operational.
3. Train your people on how to properly handle and operate Seamoor. Seamoor is a unique and exciting tool that is not hard to operate, but before you let anyone operate Seamoor you need to ensure that they are properly trained.
4. If you or your personnel damages Seamoor you or your project will be responsible for paying for the repairs.

Step #3 – Start viewing the training video

1. The video will explain the proper procedures that you will need to take to properly setup and operate Seamoor.
2. Anyone who is going to operate Seamoor should watch the training video.

The following steps are explained on the training video.

Step #4 – Unpack Seamoor

Step #5 – Charge the batteries (More details concerning the Radio Control Handset Battery is on page 16 and Robot Battery on pages 25 – 27)
Be certain that the robot battery and hand control set battery are fully charged before operating Seamoor.

<u>Installing the robot battery if it is not already installed</u>

- Put the robot battery in the compartment in the back of the watercraft portion of the robot. You will need to remove the seat to install the battery. Seamoor is bolted to the seat, so Seamoor will stay on the seat when you remove it. To remove the seat, there is a thumbscrew on the back of the seat. Twist the thumbscrew until the seat is released. Lift the seat up slightly, but do not remove it until you unplug the round 16-pin plug under the seat. To release the plug twist the ring until it releases.
- Lower the battery into the battery compartment. 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.
- Secure the battery in place with the straps that are provided.

> 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.

Step #6 – Powering Up
Turn the hand control set on first and then turn the robot on. Check that the hand control set battery voltage meter reads to the right. The on/off switch for the robot is located under the hull plate that is in front of the handlebars.

Step #7 – Set the volumes and voice modifier (More details concerning the cassette player is on page 23 and voice receiver inside the robot is in Section 2 starting on page 17)
Check that the volume of the voice and tape player are at the level that you want. The tape player volume can be changed on the tape player itself, which can be accessed by removing the hull plate in front of the handlebars. The volume for Seamoor's voice is on the back of the voice receiver, which can be accessed by removing the seat. Check the voice modifier to see if it is set properly. All four knobs should be set on their painted marks. The voice modifier is located in the front of the watercraft portion of the robot.

Step #8 – Test all of the functions (More details concerning the Radio Control Handset System and Functions starts on page 12)
Test all of the functions: Go down the list on the pre/post checklist and check all of the functions to ensure that they are operating properly.

Step #9 – Operate Seamoor with common sense

Step #10 – Powering down
Turn the main switch inside the robot off first and then turn off the hand control set. Turn off the headset voice transmitter and voice receiver.

Step #11 – Charge the batteries again
Charge the robot battery and the hand control set battery after each and every use. Connect the robot battery to the charger and bring it back to a full charge. Place the hand control set battery on the charger to bring it back to a full charge. Do not overcharge the hand control set battery. While charging this battery, periodically check the voltage meter on the hand control set to see if it is fully charged.

Step #12 – Proper transporting and storage (More details on Page 10 and 36)
1. Use the transport cart if you need to move Seamoor more than 100 feet with the power off. Never push Seamoor unless the robot is turned completely off.
2. Properly store the hand control set, headset, etc. back into the carrying case.
3. Place Seamoor in the shipping cases to transport the robot in a vehicle.
4. Store Seamoor in a climate controlled room.

Step #13 – Fill out paperwork (Copies of paperwork are in Appendix C)
Fill out the pre/post checklists, trip ticket, and activity report when necessary.

Note:
All of the major functions of Seamoor each have a section in this manual with more details and diagrams. Refer to these for more in depth information. The appendix section of this manual has pictures and diagrams of where various parts of Seamoor are located.

Section 3

Transporting Seamoor in a Vehicle

When transporting Seamoor in a vehicle you must place the watercraft portion of the robot on the black transport cart and place the dust cover over the robot. Secure the character portion of the robot in a seat with a seat belt. The vehicle that you use to transport Seamoor should have adequate shock absorption. Vans and sport utility vehicles would be the best. Transporting the robot in a trailer is not recommended because trailers typically do not have the same level of shock absorption as a vehicle. A good rule of thumb to follow is that if the vehicle is adequate for transporting a computer it should also be adequate enough to transport Seamoor.

Transporting Seamoor using the Transport Cart

When you are not operating Seamoor and you need to move him more than 100 feet you must use the transport cart. Double check that Seamoor and his seat are latched and secure. Two people will be needed to place Seamoor on the transport cart. Roll Seamoor on to the cart with the back wheels first. One person will hold Seamoor on the cart and the other person will lift the back of Seamoor up and over the lip on the back of the cart. The back wheels will drop in to the recesses on the cart. Pull the S-hooks on the cart up to each of the three U-bolts on the outside of the robot. Place the dust cover on Seamoor after he is secured to the cart.

You can leave Seamoor on the transport cart while storing him a climate controlled room.

> Caution
>
> After Seamoor is placed on the cart, lift up the cart using your legs and hold onto the cart so that it does not become off balanced and flip over.
>
> If Seamoor is not properly latched onto the transport cart he could come off of the cart while moving him, causing damage to the robot.

Chapter 2

Subsystems of the Robot

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

Section 1
Radio Control Handset System

The Radio Control Handset System consists of the unit held by the operator and the receiver with its associated components in the robot. The Radio Control Handset converts movements of the control sticks and switches into a coded radio signal, which is transmitted by handset to the Radio Control Receiver within the robot. The signal is received and then decoded by the microcontroller, which is on the main circuit board in the vehicle. The micro-controller controls functions based on what was sent from the radio control handset.

Radio Control Handset Operating Instructions

Refer to the diagram showing the radio control handset for the location of controls. Check all of the trim adjustments on the handset and make sure they are in their center position. Extend the Radio Control Handset Antenna 1/4 to 1/2 way. Turn the Radio Control Handset 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 adjusted periodically.

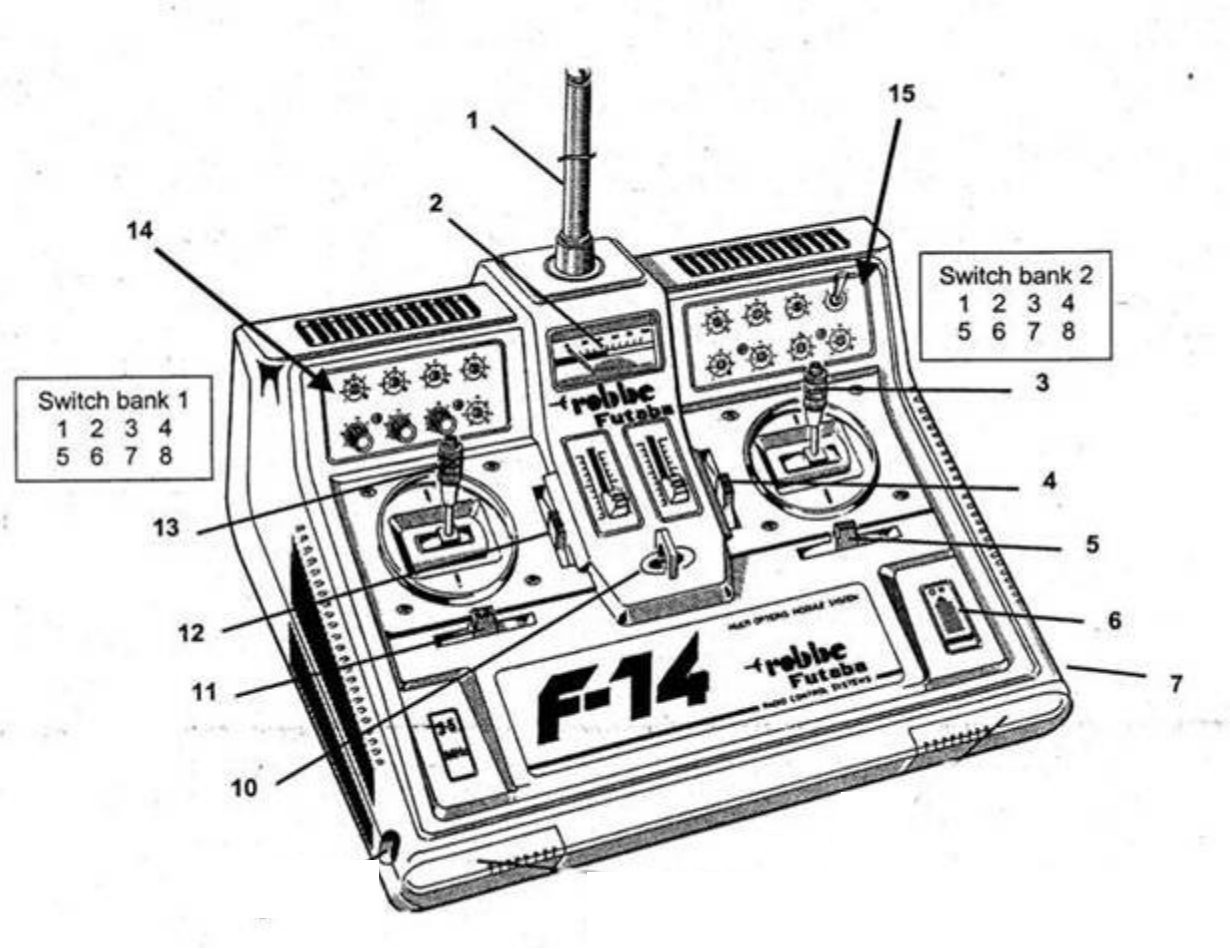
Control of the left and right eyelids is on Switch bank 1, switches #5 and #7 (See the radio control handset diagram) found on the upper left hand of the Radio Control Handset. Pushing it closes the eyelids. The eyelids can be operated together with switch #6. Pushing this switch closes the eyelids for blinking of the eyelids. 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 moves the Character head left and right. The slider control below the stick should be 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 handset diagram on the next page. All of these functions are labeled on the radio control handset.

A charge plug is provided on the handset for recharging its internal battery (#7 on the diagram). The handset power switch must be in the off position before charging the batteries. A charge light on the charger will come on while charging.

Radio Control Handset



Attach Lanyard
to Handset Here

Radio Control Handset Functions

1. Telescopic Transmitter Antenna. This antenna is removable. When placing the antenna on the hand control set do not over tighten it. When storing it in the case it should be removed and placed on the Velcro strip provided on the hand control set. When operating the robot extend the antenna ¼ to ½ way out.

2. Battery Voltage Meter. When the hand control set is turned on and the voltage meter needle stays in the red, recharge the battery. Never let the needle go completely to zero. Always recharge the battery as soon as the needle starts to enter the red zone.

3. Right Control Stick:
   Up and Down – Robot drive motors, forward and reverse
   Right and Left – Robot drive motors, left and right turns

4. Forward/Reverse Trim Lever for Right Control Stick. Normal = Center. Neutrals the drive motors. If the robot is moving slightly slide this a few clicks until robot stops moving. When this lever is moved the robot will move. The lever should always stay in the center.

5. Left and Right Trim Lever for Right Control Stick. Normal = Center. Neutrals the drive motors. If the robot is moving slightly slide this a few clicks until the robot stops moving. When this lever is moved the robot will move. The lever should always stay in the center.

6. On / Off Switch. When powering up Seamoor turn the handset on first then turn on the main robot power switch. When turning off Seamoor turn the main robot power switch off first then turn off the hand control set.

7. Recharge Jack. Plug the RC battery charger in here to recharge the internal battery.

8. Not listed on the diagram.

9. Not listed on the diagram.

10. Neck strap connecting hook. The neck strap should always be connected to the hand control set. The strap should be around the operator's neck at all times when operating Seamoor.

11. Left and Right Trim Lever for Left Control Stick. Normal = Center. Centers the head of Seamoor. When this lever is moved the eyes and head will move. The lever should always stay in the center.

12. Forward and Reverse Trim Lever for the Left Control Stick. This lever does not operate anything on Seamoor.

13. Left Control Stick.
   Left and right movement – Turning Seamoor's head left and right.
   Up and down movement – This movement does not operate anything on Seamoor.

14. Switch Bank 1

5. Left eye blink – pull switch towards you
6. Both eyes blink – pull switch towards you
7. Right eye blink – pull switch towards you
   Siren – push switch away from you
8. Put Seamoor to sleep – Pull switch towards you

To wake Seamoor up pull either the left or right eye blink switch towards you

15. Switch Bank 2

7. This switch does not operate anything on Seamoor.
8. Cassette player

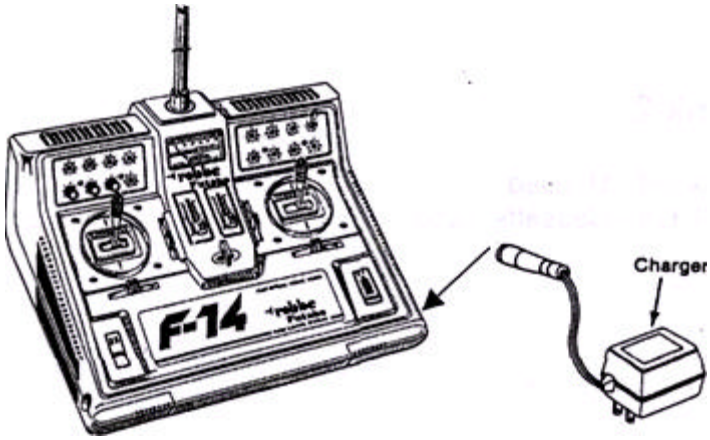
The play button on the cassette player inside the boat must be pushed in and volume adjusted before this switch will work.

To turn cassette player on push switch away from you. To turn cassette player off pull switch towards you.

The Radio Control Handset Battery

The Radio Control Handset battery will last about 5-6 hours on a full charge. It could take up to 16 hours to recharge this battery. A charge jack is provided on the handset for recharging its internal batteries. This round jack is located on the right side of the handset. (See the radio control handset diagram) The handset 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.

To avoid the handset 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.



Caution

Do not overcharge the Radio Control Handset battery as this could cause permanent damage to the battery. (Doubling the normal charging time is the type of over charging that is meant here and the battery getting hot.) When the voltage meter needle is on 20, the robot should be turned off because the robot could act erratic without the handset signal.

Section 2
Headset Voice System

The Headset Voice System consists of two separate communication links. One link transmits the operator's voice, which is detected by the microphone on the operator's headset and is transmitted by the headset voice transmitter (which is worn by the operator) to the receiver in the robot. The audio signal then goes from the receiver through the mixing circuit and then is fed into the amplifier, which amplifies the signal through the robot's speakers.

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

Important: The headset voice transmitter and voice 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. The antennas should not be wrapped around each other or around the headset wire but should hang freely.

How to Operate the Headset Voice 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. Plug the round connector from the headset (has three contacts) into the top of the voice transmitter.
4. Place the headset on your head and adjust the microphone to approximately 1 inch from your mouth.
5. Move the slide switch to the "ON" position.
   a. 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 low**.** Replace with a new alkaline battery. If you are having problems hearing your voice through the robot replace the 9-volt battery with a new one.

The headset voice transmitter and receiver 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.

How to Operate the Voice Receiver inside the Robot

The volume control for Seamoor is on the back of the receiver inside the robot, which you may set to the desired volume. The receiver is in the back of the watercraft portion of the robot.

Tip: For best range extend the receiver antenna as much as possible, not allowing it to touch metal or interfere with the robot battery.

How to Operate the Voice Transmitter inside the Robot

No adjustment is needed. The switch should be left on at all times. It has the same switches and appearance as the headset voice transmitter.

How to Operate the Headset Voice Receiver

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 headset voice receiver.
4. Turn the volume knob 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.
    a. 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. The light is a low battery indicator. When the light is on constant, this indicates that the battery is low. It then would need to be replaced. If you are having trouble hearing through the headset replace the 9-volt battery with a new one.

The headset voice transmitter and receiver 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.

Warnings

1. Do not leave the headset voice units in direct sunlight or in a damp place for any length of time.
2. Remove batteries from the headset voice transmitter and receiver after every use.
3. Keep headset, voice transmitter and receiver in the carrying case when not in use.
4. Generally when the robot is on, the headset voice transmitter should at least be on. This will avoid the voice receiver in the robot picking up radio frequency interference and putting out static (see intermittent static problem of Voice System Troubleshooting).

Troubleshooting Voice

For any voice problem, perform the following steps first:

1. Replace the 9-volt alkaline batteries with new ones.
2. Check that the batteries are 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 headset voice units, try a different brand battery. Certain brand batteries are a slightly different size.
3. Check all switch positions to ensure that they are on.
4. Check all plugs on the headset voice units for proper connection.
5. When operating normally, the Voice Receiver in the robot has a red light on. The Voice Receiver in the robot is located in the back of the watercraft portion of the robot. The Headset Voice Receiver has a green light. These lights indicate that a signal is being sent from the transmitter and that the receiver is receiving a signal.

See the next page for specific problems and their solutions.

Perform the following depending on the symptoms of the problem:

The operator cannot speak through the robot:

1. Perform steps 1-5 above.
2. Turn off and then on, the headset voice transmitter. The low battery indicator light should blink off and then back on. If it does not, replace the 9-volt battery with a new one and make sure that the battery is making good contact with the battery clips.
3. If the headset voice transmitter light does blink on and go out, go to the Voice Receiver in the robot. It is located in the back portion of the watercraft portion of the robot. Look for a power light on the voice receiver. If there is no power light, check the fuse that is on the power wire plugged into the voice receiver. This is a black round fuse holder in line at the Voice Receiver unit. This is a 1 Amp Fuse. Make sure that Seamoor is completely shut off before checking this fuse.
4. Activate the cassette to test if the audio system is working. If the cassette fails to play, then check speaker connections and power plugs to the audio booster, and check the audio fuse on the fuse block. This is located inside on the outside of the main electronics box (see the diagrams showing the fuse block). One of these fuses could have blown if the power plug to the robot voice receiver was plugged in or unplugged with the robot power on.
5. Check the headset wire plug that plugs into the headset voice transmitter. This is a three pin contact.

The operator cannot hear from the robot:

1. Perform step one above.
2. If the headset voice receiver green light is not on check to make sure the voice transmitter in the robot is on.
3. Check the headset voice receiver plug wire. Make sure the headset wire is plugged into the headphone jack on the voice receiver. If the plug wires are good, the robot microphone could be the problem.
4. Test the robot microphone by connecting it to the headset voice transmitter. After making this connection, talk into the robot microphone. If you hear yourself out of the robot speakers, the microphone is good. If you cannot hear yourself, the microphone plug has a bad connection or the complete microphone and wire needs to be replaced.

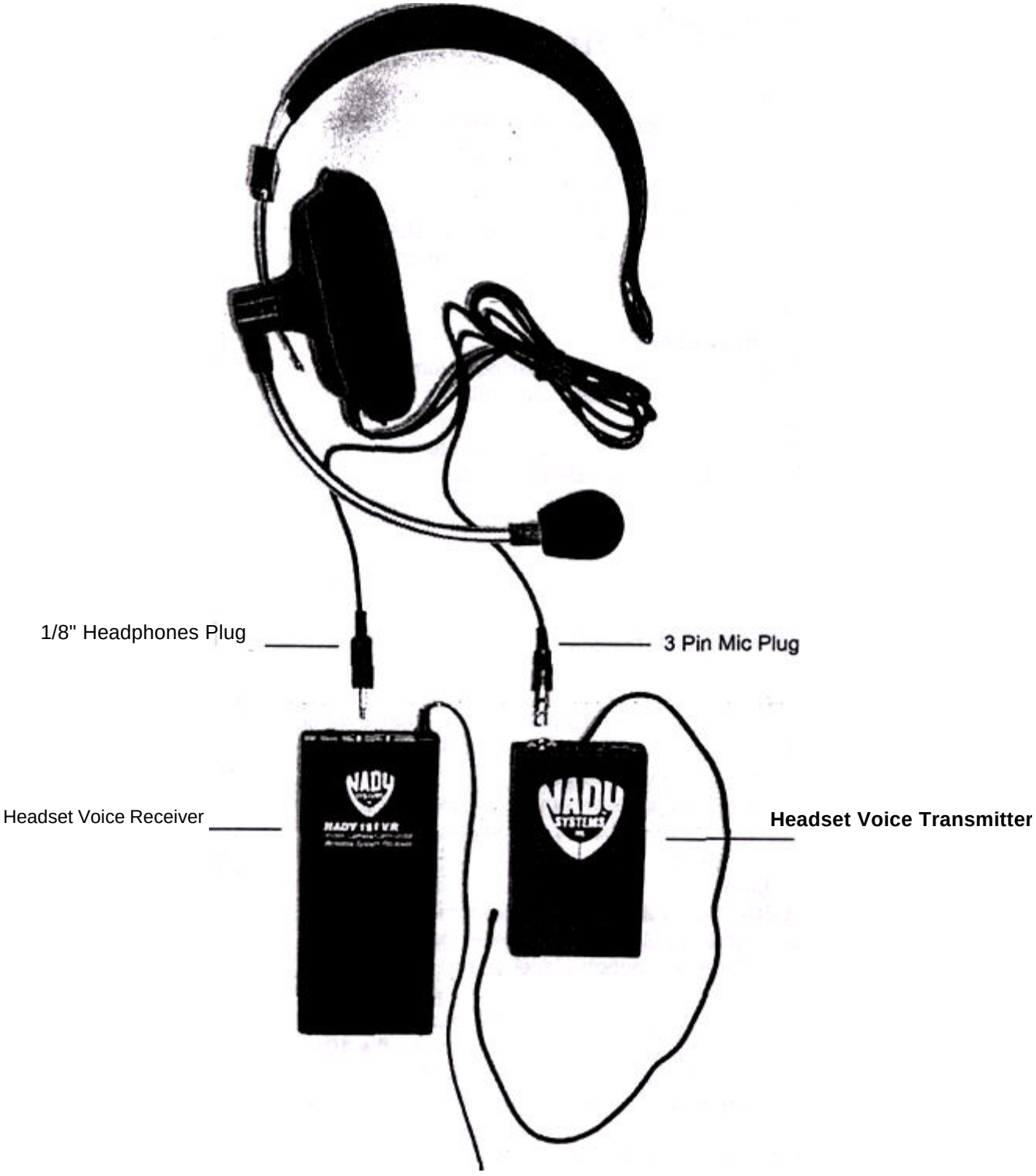
The voice operates but at certain distances there are cutout problems:

1. Replace the 9-volt batteries in the headset voice units.
2. Check for broken or loose antennas on headset and robot voice units.
3. Check for a bad connection on the plugs coming from the headset and plugging into the voice transmitter and receiver. Move the headset wires around to determine if there is a bad plug or wire.
4. Make sure that the operator voice units are worn away from each other, on opposite sides of the operator's body. The antennas also should not wrap around each other or the headset wire.

MOVING MOUTH

The moving mouth is a feature where Seamoor's mouth moves as the operator speaks through the robot. The amount of the movement is affected by the level of volume of the voice. This level is affected by the robot voice receiver volume level and the position of the headset microphone to the operator's mouth. The headset microphone should be about 1 inch from the operator's mouth.

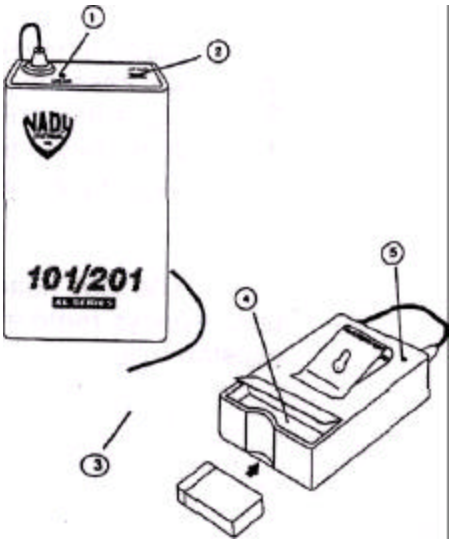
Headset Voice Transmitter and Receiver



Voice Unit Diagrams

(Operator to Robot)

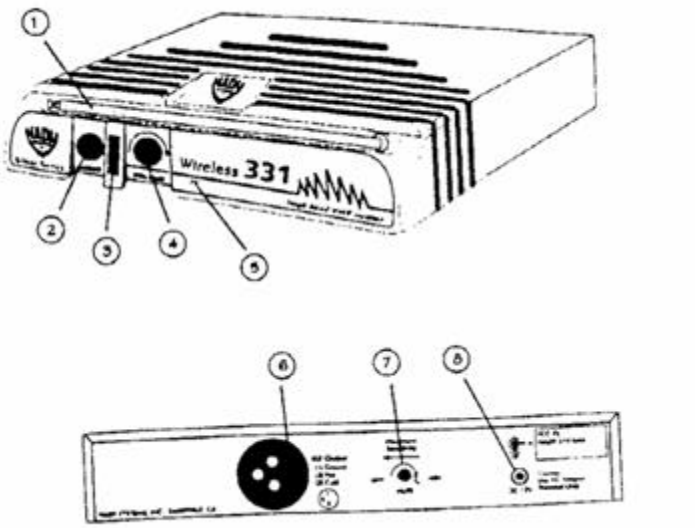
Headset Voice Transmitter



(1) **Low Battery indicator**
(2) **Off/Mute/On switch**
(3) **Antenna**
(4) **Battery Compartment**
(5) **Audio level trim**

Plug the headset into the 3 pin jack in the center.
USE ALKALINE TYPE 9-VOLT BATTERIES

Voice Receiver inside the robot

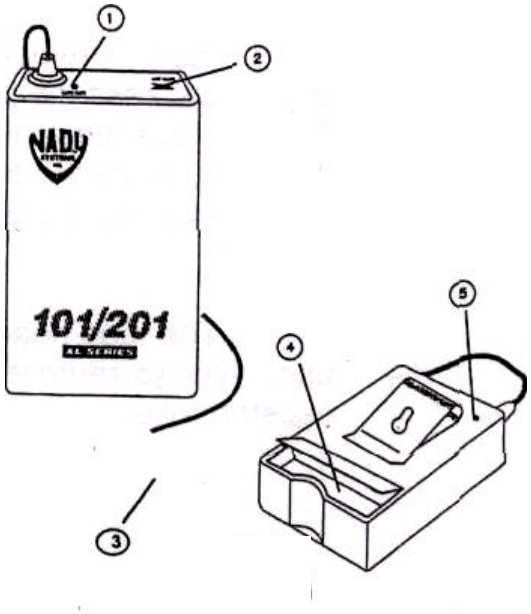


(1) **Antenna**
(2) **Audio Out Jack**
(3) **Power switch-** LED lights when unit is switched on and getting power. Leave on because unit powers up when the robot is turned on.
(4) **Volume adjust**
(5) **Red LED Light -** It is on when the Headset Voice Transmitter is on because a signal is being sent and received.
(6) **Audio Out** - Unused
(7) **Mute control (Sensitivity)-** Do not adjust
(8) **Power input jack** – Caution: Do not plug in or unplug with the robot power on.

Voice Unit Diagrams

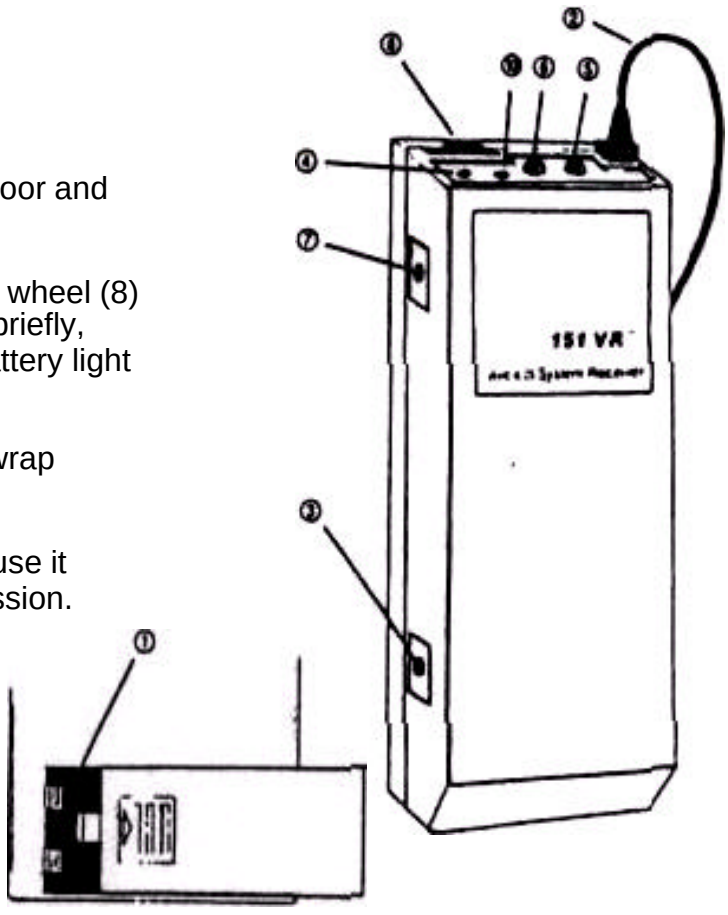
Robot to Operator

Transmitter inside the Robot



The switches are preset at the factory to be on and the adjustment at maximum.
(1) **Low Battery indicator-** Will give a single quick flash when the on/off switch is turned on. Because this unit gets power from the main robot battery if it stays on, the main battery is low.
(2) **Off/Mute/On switch**
(3) **Antenna**
(4) **Battery Compartment –** 9-volt battery is not needed because transmitter is connected to main robot battery
(5) **Audio level trim**

Headset Voice Receiver



(1) **Battery Compartment-** Slide off the battery door and insert a 9-Volt battery observing correct polarity.

Turn the receiver on by rotating the on/off volume wheel (8) clockwise. The **Low Battery Light** (10) will flash briefly, indicating adequate battery strength. If the low battery light is on constant, during use, replace the battery.

(2) **Antenna-** Hang down fully. Do not allow it to wrap around the headset wire or other antenna.
(3) **Mute control –** Do not adjust this control
(4) **Green light -** Is on when the robot is on because it indicates that the receiver is picking up a transmission.
(5) & (7) Unused.
(6) **Headphone jack-** Plug the headset into it.
USE ALKALINE TYPE 9-VOLT BATTERIES.

Section 3
Cassette Tape System

The cassette tape system is located inside the robot on the metal electronics box. The system is activated by the switch on the radio control handset.

How to Play a Cassette Tape

1. Insert a regular type cassette tape into the player.
2. Depress the play button on the cassette player.
3. Move the radio tape select switch to the tape position.
4. Activate the tape from the switch on the radio control handset.
5. Adjust the volume to desired level.

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.

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 Vehicle Fuse Block Detail)

3. Is the Radio Control Handset "ON" and working? Listen for the cassette motor and check to see if the power light or FM stereo light is on as the Radio Control Handset 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.

Section 4
Siren

The robot siren is operated by a switch on the Radio Control Handset.

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.

Section 5
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 the Robot Battery Outside of the Robot

To recharge the robot battery, first open the trunk hatch and unplug the battery from the main component board. Remove the battery from the robot and connect the charger wire to the battery. Finally connect the line cord of the charger into a 110-volt AC outlet.

How to Recharge the Robot Battery Inside the Robot

To recharge the robot battery, remove the hull plate in front of the handlebars and move the main power switch to charge. Plug in the charger wire into the recharge outlet inside the robot. Finally connect the line cord of the charger into a 110-volt AC outlet.

The robot is supplied with an automatic type battery charger. This will recharge the battery full in 10 to 14 hours. This type of charger will not overcharge the battery if left "ON" indefinitely. Avoid leaving it charging for more than 5 days. Generally remove the battery from the charger when the charger indicates a full charge. More charging instructions are in the charger section.

Caution

Batteries are provided with a polarized connector to avoid connecting the battery backwards and damaging the robots circuitry. If these connections are disturbed, please be careful to observe proper polarity when reconnecting the battery. Use a digital voltmeter, if necessary to verify polarity of the battery and at the end of the connector of the battery.

It is best not to allow the robot battery to go completely dead as this shortens the life of the battery and makes recharging more difficult. **Fully charge the battery after each use.**

Important: Charge the battery to a full charge right after using the robot. Gel type batteries will be damaged if not kept fully charge at all times.

ROBOT BATTERY CHARGER

Instructions for Proper Use and Operation

WARNING: 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. Wear safety glasses or goggles.
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. Charge battery in a dry, well ventilated area.
5. Always unplug the AC supply cord before connecting or disconnecting the charger leads from the battery.

As additional protection from the hazard of electrical shock:

6. Do not expose the charger to rain.
7. Replace defective cords and wires immediately.

General Information for Charging Gel type Batteries

1. The time required to fully charge a battery will, of course, depend on the battery ampere hour rating and the amount which the battery has been discharged. The charger ammeter reading is your best indication of the battery's state of charge. In most cases, if the battery has been discharged at all, the current meter will initially read close to 10 amperes. After 5 minutes or so, the meter will drop to some lower level. This reading can be used as a rough guide to determine the state of charge as shown on the front panel of the charger. Do not use the initial reading obtained just after starting the battery charge. Some charger models will have a battery fully charged light to indicate a full charge.

2. When fully charged, a new battery in good condition may cause the meter to "bounce" around the "0" mark. This is normal and, in fact, indicates a true "full" charge. As it ages or is wearing out, a battery may, in some cases, not drop below 1 ampere no matter how long it is left connected to the charger.

3. If an audible click is heard when connecting the battery charger leads to the battery, or if the meter is seen to move abruptly to the right (off scale), disconnect the charger leads immediately. They have been connected in reverse polarity. **Always connect the red (+ or positive) clip to the positive terminal of the battery and the black (- or negative) clip to the negative battery terminal.**

4. In some cases, a severely discharged battery can cause the circuit breaker to open because the battery is drawing more current than the charger can safely provide. If such is the case, it is permissible to let the charger run for as much as 10 minutes with the circuit breaker turning the charger on and off. The circuit breaker resets automatically. There is no reset button provided.

If the charger does not stay on after 10 minutes, disconnect the charger from the battery. The battery most likely has a shorted cell and needs replacement.

5. In some cases, a battery, which is discharged completely, will not draw any noticeable current when the charger is connected and the power cord plugged in. A battery that behaves in this way is most likely in a "sulfated" condition. The condition is caused by leaving a battery in a discharged condition for a length of time.

If the Battery is not Holding a Charge

If this condition is encountered, leave the charger on the battery for, up to, one week and occasionally look at the meter to see if the battery is drawing any current. Connect and disconnect the power cord and watch the meter, at the same time, to see if the meter moves, indicating that the battery is drawing some current. Try using the battery and see if it runs your equipment. If it does, but not for a normal time repeat the charge and discharge two or three times. The battery may recover. If the battery does not recover, it must be replaced.

6. A fully charged Gel type battery can be left in storage for, at least, six months under normal conditions. If the storage temperature is above 90 degrees F, the battery should be connected to the charger every three months for 24 hours. At lower temperatures, a "boost" charge for 24 hours need only be done every six months.

7. This charger is not recommended for continuous charging of Gel type batteries. The charger should be disconnected from the battery once the ammeter shows the battery to be fully charged. Because of the automatic nature of this charger, no harm will be done if the charger is occasionally left on for a week or two after the battery reaches the full charge condition.

Section 6
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. Do the other radio control handset functions operate? Do the other Radio Control Handset features work such as siren and tape? If they do not, check the fuses on the robot battery and fuses on the main fuse block in the main electronics box. Especially look at the fuse labeled 5-Volt Regulator Processor and 5-Volt Regulator Receiver (see the fuse block detail in the Appendix). Chapter 11 explains how to access the main electronics box.

2. Check drive belts and motor pulley set screws. Especially if you hear the motors activate but the robot does not move.

3. 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.

Perform the following depending on the symptoms indicated:

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 the fuse on the robot battery. One of the fuses supplies power to the drive.

One drive only 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. Contact the Robotronics' Service Department.

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

Note: Be sure that both motors are operating forward and reverse at about the same speed, and that the motor pulley set screws and drive belts are tight.

Section 7
Character Head Turning System

The main components of this system consist of the head turning motor, motor control circuit, and the feedback pot. When you move the joystick on the radio control handset, a signal is sent to the receiver in the Robot. The receiver sends this signal to the microcontroller on the Character board. The motor control circuit is on the Character board. The motor control circuit is directed by the signal to send 12 Volts to the motor and in what polarity. What polarity is sent to the motor will cause the motor to move right or left.

The job of the feedback pot is to track the position of the head and continually relay information to the motor control circuit and micro-controller so that when you release the joystick and it goes back to center, the head also goes back to center.

Location of Parts

Motor control circuit-On the Character Board mounted on the inside the chest of Character.
Feedback pot- Directly below the motor.
Set screw - On the inside of the neck.

Troubleshooting Head

The head is out of position but operates:

The head could have been hit out of position or the set screw is loose. Try to move the head manually. Do not force the head to turn. If you can, move it back into the correct position and make sure the set screw is tight. The set screw can be accessed through the shoulder access hole. If you cannot manually move the head, you may need to loosen the set screw re-position it and then tighten the set screw.

The head motor is keeping the head position to the extreme left or right or the head motor is not operating:

Contact a National Water Safety Products Advisory Committee Member. The upper robot character will probably need to be sent to Robotronics for repairs, so that the fabric can be put back in place properly.

Section 8
Eyelids and Eyes Left and Right

The eyelid and eyes left and right movement is accomplished by three servo motors in Character or upper robot. When the switch on the radio control handset 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 inside of the robot character's head. 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

Problems with the eyes should rarely occur, but if they do note the problem on the pre/post checklist so that the problem can be fixed when periodic maintenance is performed.

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 the eye servo board. If it is disconnected, reconnect according to the eye servo board diagram. The diagram is located in the appendices. 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, carefully 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.

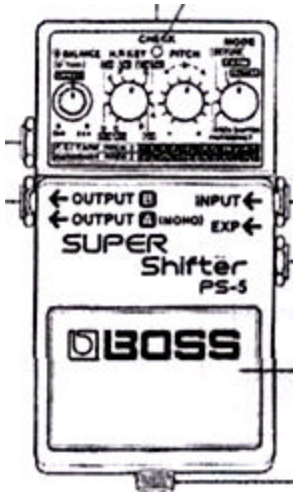
There is no operation of any of the eye functions:

1. The wires that bring the signal to the eyes servo board are gray and yellow. Five volts power wires 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 character board that is located inside the character.

Section 9

Voice Modifier

The pitch shifter (voice modifier) can change the operator's voice to disguise it and create a robot character type voice. There are painted guide marks on the voice modifier to indicate where each knob should be set.



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.

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 voice will not be modified as a character voice.

Chapter 3

Assembly and Disassembly

Section 1
Assembly & Disassembly

Install the steering handle and the hull plate

1. Put the steering handle on the motor shaft that is sticking up. Tighten the set screw with an Allen wrench to secure it on the shaft.
2. Install the hull plate in front of the handlebars over the motor and the on/off switch.

Install robot battery and character on watercraft portion of the robot

1. Put the battery in the robot through the opening in the seat. Attach the strap around the battery and tighten.
2. Put the seat and Seamoor on the opening but connect the round plug down in the robot before completely putting the seat on. Now slide the seat into the slotted holes. Screw in the thumbscrew until it's tight. As you twist the thumbscrew, the seat will slide forward until it is tight.
3. Put Seamoor's hands on the handles velcro. Put the safety strap around his wrist.

Removing the upper portion of the watercraft portion of the robot to access the electronic panel and main fuse box

1. Remove the character from the watercraft portion of the robot.
2. Remove the robot battery from the robot.
3. Remove the hull plate that is in front of the handlebars.
4. Disconnect the microphone wire from the voice transmitter in the front of the robot.
5. Remove the four nuts underneath the front and rear of the robot that hold the body on the frame. You will need a 3/8” socket or wrench.
6. Reach in the opening below the steering handle and disconnect the 37-pin round connector from the main electronic box.
7. As you remove the body you will need to disconnect one or two white connectors that feed power to the steering handle motor and circuit board.

Chapter 4

Maintenance

Section 1

Regular Maintenance Checklist

Periodically the robot should receive a thorough inspection.

1. Examine the exterior of the robot and make repairs as necessary. See the robot body repair instructions if needed.
2. Remove the upper robot. Check all bolts and nuts for tightness.
3. Examine electrical wiring and connectors for looseness and wear.
4. Clean and lubricate mechanical parts of the robot such as the front wheel casters as needed. 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.
5. Clean the cassette tape system with the cassette player cleaning tape located in the black carrying case.
6. Wash the watercraft portion of the robot with mild soap. Rubbing alcohol can be used on stains that won't come off with soap. Do not use alcohol on the windows or pupils. Apply Armor-All protectant after washing the robot body.
7. Check the Radio Control Handset System and Headset Voice Units for broken wires, controls, cases, etc. The metal clips that are in the headset voice units and contact the 9-Volt batteries, should be bent out routinely to maintain good contact.
8. Fully charge the battery and test all robot system functions. This must be done on a daily basis when the robot is in constant use. Remember, 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.

To prolong the life of your robot system, always store in a safe place away from **light, dust, moisture,** and excessive heat. **To keep dust and light away from the robot, the dust cover must be used.** The robot and radio control handset batteries should be stored fully charged. Transport and store the robot standing up, never upside down!

Section 2

Care of Seamoor

General maintenance of your robot should include taking care of the Seamoor's fabric covering. Keep the robot covered when not in use to keep dust and dirt off and to protect the fabric and clothing. A good idea is to have two people operate the robot, one to operate it and the second to help people interface with the robot. The person can protect the robot from sticky fingers, dirty shoes, ball point pens, etc. and can pass out stickers, coloring books, and help give your presentation.

If Seamoor's fabric gets dirty you can use a damp soft cloth and warm water. A drop or two of mild liquid detergent, such as Woolite, in the warm water before applying it with a damp cloth should remove most skin oils and other dirt buildup. **Do not get the robot wet!** Then rub gently with a soft dry towel until it is dry.

Section 3
Storage

Storing your robot for any length of time.

1. Charge the robot battery. (Storing the battery for any length of time without being fully charged will permanently damage the battery.)

2. Charge the Radio Control Handset battery as per instructions.

3. Remove batteries from headset voice transmitter and receiver.

4. The Radio Control Handset and headset voice units 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 affecting 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

Troubleshooting Guide

Quick Reference Troubleshooting

More detailed troubleshooting by system is included with each subsystem.

Problem	Possible Cause	Solution
GENERAL		
No functions operate.	a. RC battery not charged.	a. Fully charge until needle is up.
	b. Broken wire from receiver to main board.	b. Resolder or repair wire.
	c. Fuse blown.	c. Check 5 volt Reg. and Processor fuse.
	d. Robot not getting power.	d. Check pins of battery and robot connector. Check on/off switch wires. Check ground wires.
VOICE SYSTEM		
Always do the following first: 1. Replace the 9 volt batteries with new ones. USE ALKALINE ONLY! 2. Bend the battery contact out for better contact with the posts of the 9 volt battery. 3. Check power and audio switches, and lights on all voice units. 4. Check plugs to and from the voices for proper connection. 5. Check if the Transmit (TX) lights are coming on.		
Operator cannot talk.	a. Low battery.	a. Replace 9 volt battery.
	b. No power to the 101 Receiver.	b. Check in line fuse to 101 RX and audio fuse on main electronics box.
	c. Headset plug to transmitter broken.	c. Take apart and look for broken wire.
Operator cannot hear.	a. Low battery.	a. Replace 9 volt battery.
	b. Headset plug to 151 Rx has a broken wire.	b. Unscrew cover of plug and look for broken wire.
	c. Robot 151 transmitter not turned on.	c. Turn on audio and power.
Voice operates but cuts out.	a. Low battery.	a. Replace the 9 volt battery.
	b. Broken or loose antenna.	b. Tighten 101 Receiver antenna.
	c. Sensitivity adjustment down too far.	c. Sensitivity adjustments should be fully at max. 101 Rx- Max.=Fully CW 151 Rx- Max.=Fully CCW.
Squelch coming from robot.	a. No signal being sent to the robot.	a. Turn on the operator's 101 transmitter
	b. Sensitivity is too sensitive.	b. Adjust sensitivity on 101 Receiver. Turn it slightly CCW.
Squelch in headset when turning robot off.	a. 151 Receiver slightly too sensitive.	a. Adjust 151 Rx Mute slightly CW.
	b. 151 Rx picking up interference in your area.	b. Always turn off 151 Rx then robot.
CASSETTE AND RADIO		
No tape operation.	a. Tape player not on tape mode.	a. Put mode select to tape.
	b. Play button not pushed.	b. Must push play button before hitting the switch on the radio control
	c. Tape is too tight.	c. Loosen with pencil by spinning.
	d. Power wire or plug is broken or not connected.	d. Replace plug or re-connect the wire.
	e. Radio control or tape circuit not working.	e. Contact Robotronics for help.
No siren, or voice either.	a. Audio fuse blown.	a. Replace fuse. See Fuse block diagram.
Poor quality sound or slow sound.	a. Belts worn out and slipping.	a. Replace cassette player or belts.

More detailed troubleshooting by system is included with each subsystem.

Problem	Possible Cause	Solution
SIREN		
No siren.	a. Audio fuse blown.	a. Replace fuse on main electronics box in Vehicle.
siren volume not loud enough. repaired.	a. Booster problem if tape and voice vol. low also.	a. Replace or have booster
	b. Adjust siren volume if tape and voice okay.	a. See siren volume adjust on main board.
ROBOT BATTERY SYSTEMS		
No functions will operate. position.	a. Check wires and connector from battery to robot.	a. Push pin in until it clicks in place. Pin could have slipped out of
	b. Battery is very low or charger is bad.	b. Test for 12 Volts with Voltmeter. Fully charge. Charger meter needle should bounce around 0 or 1 when at full charge.
Battery will not take a full charge.	a. Battery has not been kept fully charged.	a. Charge and discharge repeatedly. May need to be replaced.
Drive Motors		
Neither drive operates only.	a. Both drive fuses blown. b. Radio control -drive section.	a. Replace drive fuses- fuse block. b. Contact Robotronics' for help.
One drive only does not operate.	a. Drive fuse blown. b. Drive motor pulley loose. c. Broken connection at motor connector. d. Drive circuit not getting power. e. Drive motor shorted or gears broken.	a. Replace drive fuse- fuse block. b. Tighten motor pulley set screw(s). c. Check blue/yellow wires and in line motor connector at motor. d. Check wires coming from fuse block to motor circuit on the main board. e. Repair or replace motor.
Character Head Turning Motor System		
Head is out of position but operates. screw.	a. Head set screw loosen.	a. Reposition head and tighten set
Head motor is keeping head only in not centered position.	a. Head turning pot or pot shaft slipped.	a. Re-center head by adjusting head turning pot.
Head motor is not operating.	a. Character Board not getting power. b. Broken wire.	a. Check motor in line fuse 1.5 Amp. b. Check power and motor wires.
Eyelids and Eyes Left and Right		
An eyelid or eyes L/R does not operate.	a. Linkage came off. b. Servo wire broken or wire out of eye servo board.	a. Open Character head and re-attach. b. Trace wires from servo motor in head all the way to the eyes servo board.
One of the eyelids is at a different level.	a. Eyelid rod bent or eyelid out of adjustment.	a. Straighten bent rod or change eyelid by loosening set screw and changing the eyelid position to the right level.
No operation of any eye functions. red	a. Wire(s) bringing 5 volts and signal to eye servo board are not making a connection.	a. Locate the wires Gray/black/yellow , & black trace from eyes servo board back to the Character main board.
R&NR		

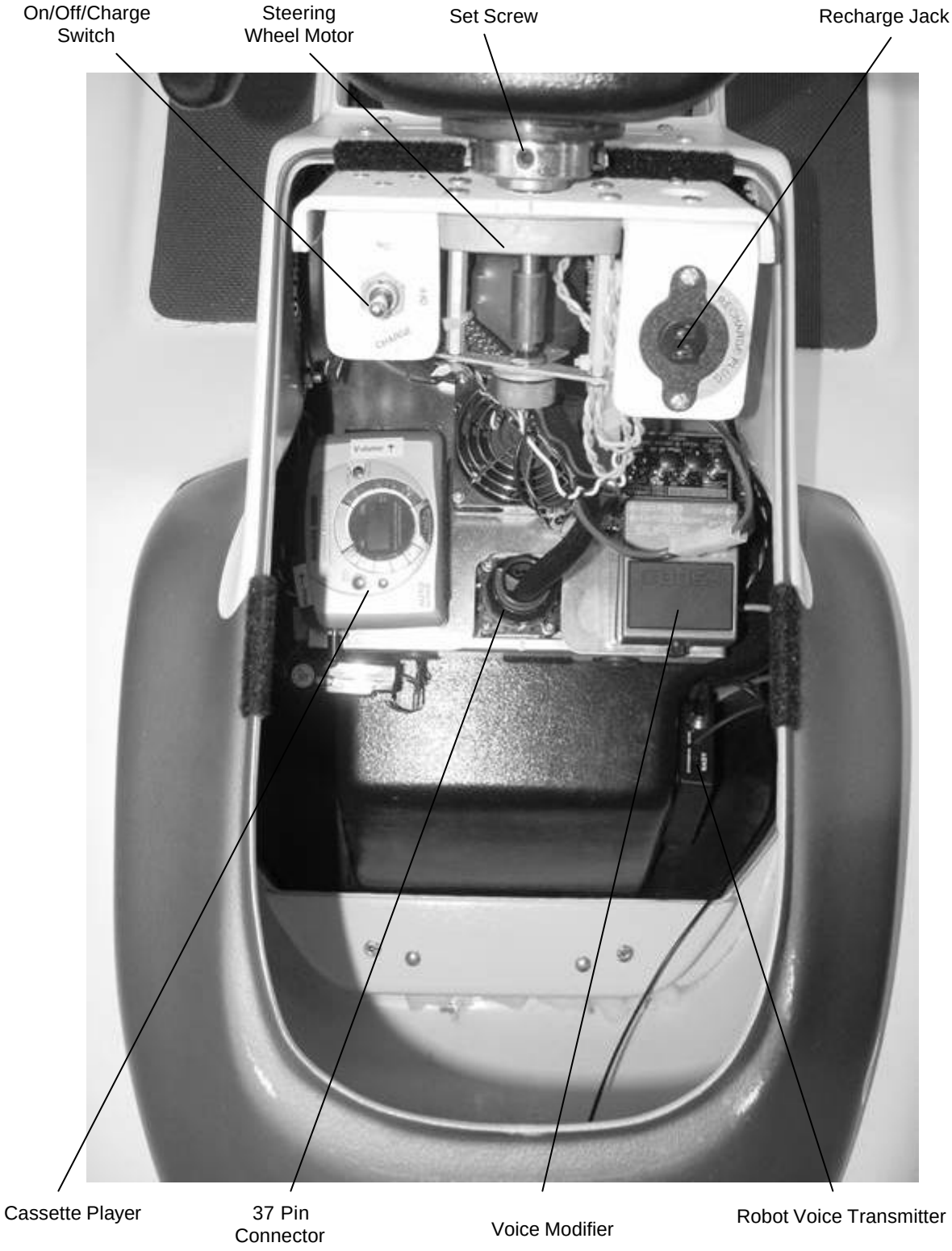
VOICE MODIFIER (PITCH SHIFTER)		
Voice not being modified.	a. Modifier not turned on.	a. Push pedal on modifier.
	b. Audio wires not plugged in correctly.	b. Wire 1=101Rx to P.S. IN Wire 2=P.S. OUT to main board.
	c. Modifier not getting power; no check light.	c. Test with voltmeter. Broken wire?

If you have any questions or concerns about Seamoor contact a National Water Safety Products Advisory Committee member. Information on how to contact a committee member is located at http://watersafety.usace.army.mil.

Appendix B

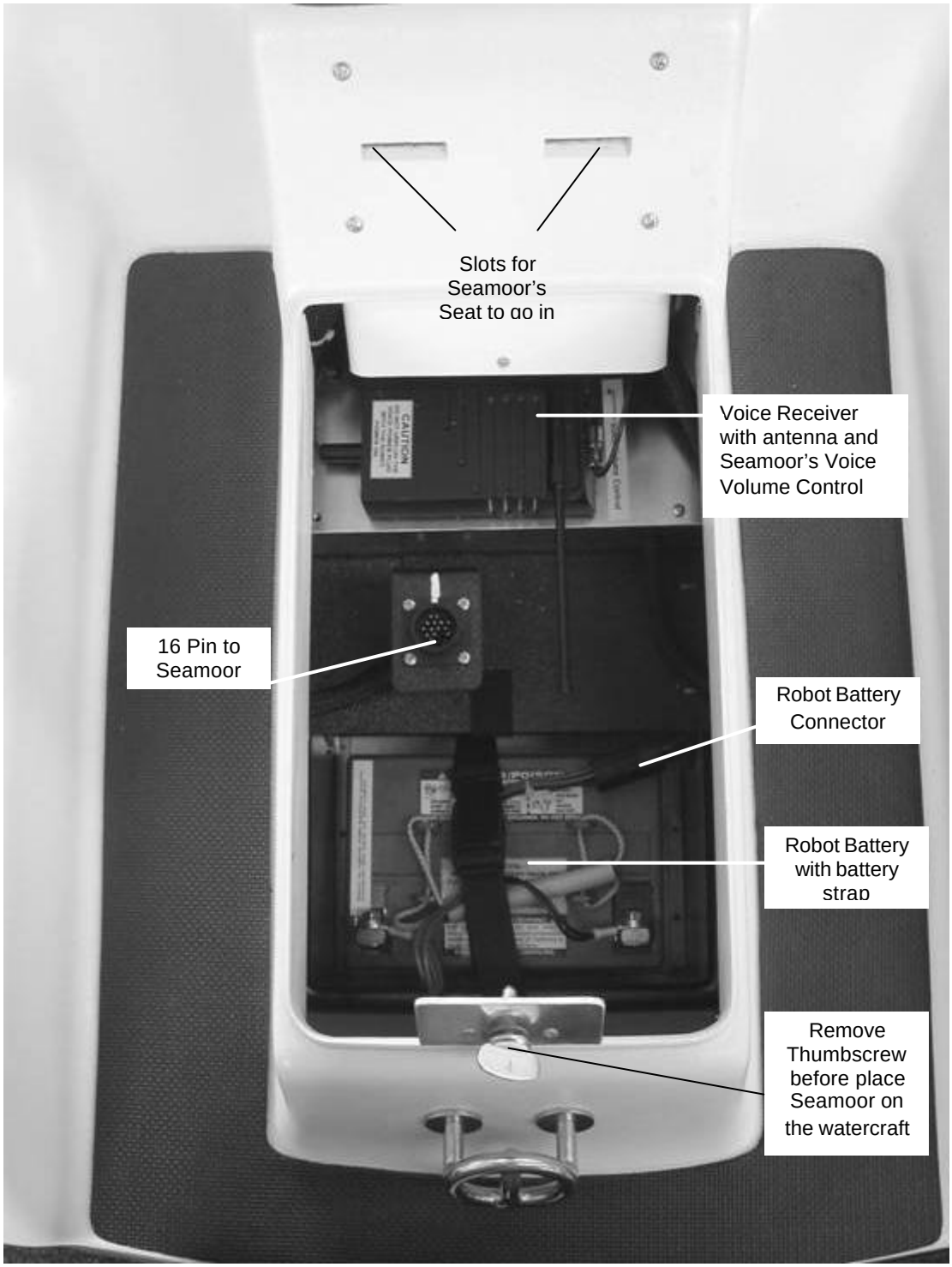
Robot Parts Identification

Watercraft Portion of the Robot
Front Inside View



The hull plate fits over this opening.

Watercraft Portion of the Robot Back Inside View



Bottom View
Seamoor on the Seat

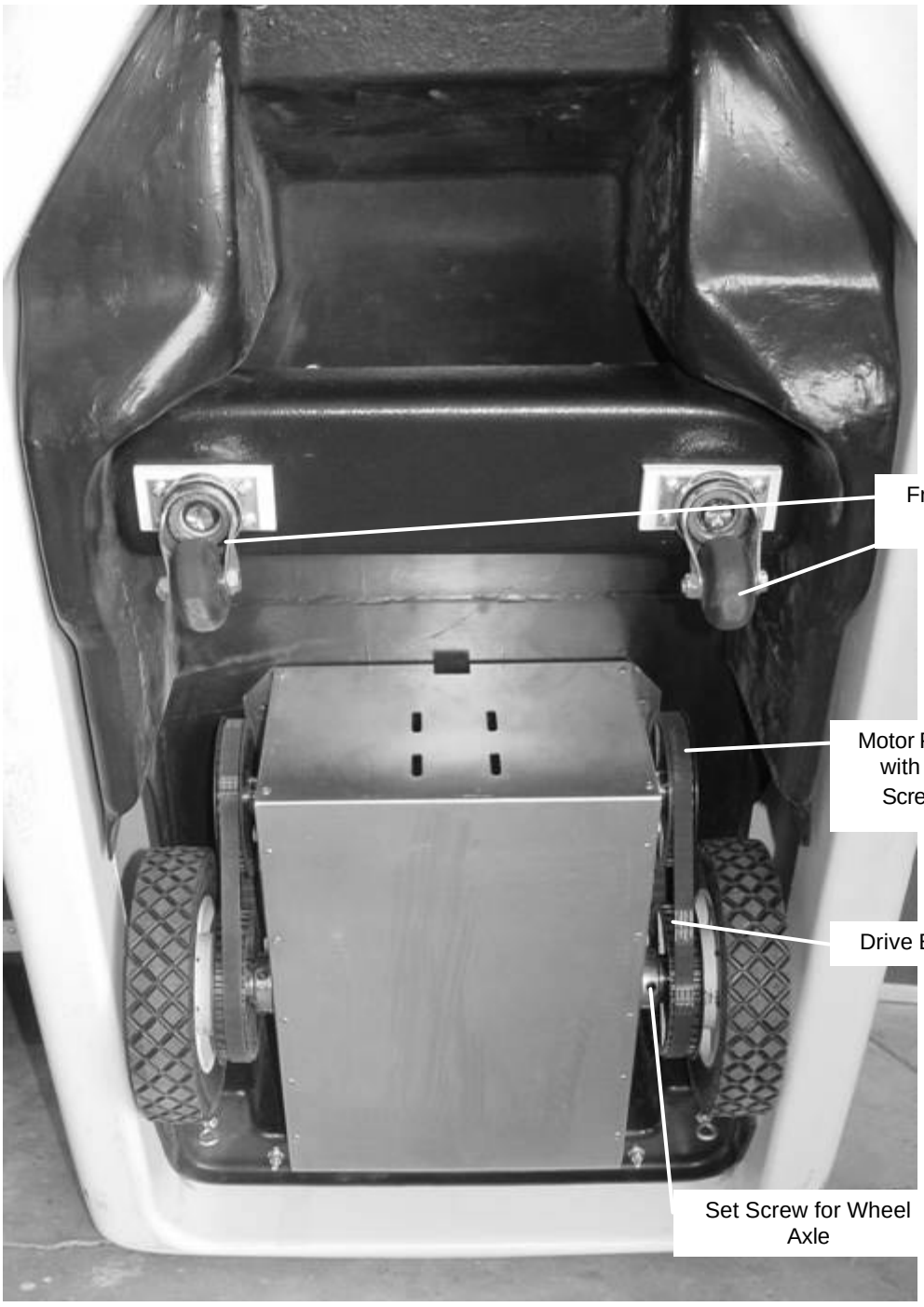
Tabs that go into the slots on the watercraft portion of the robot

16-Pin Connector

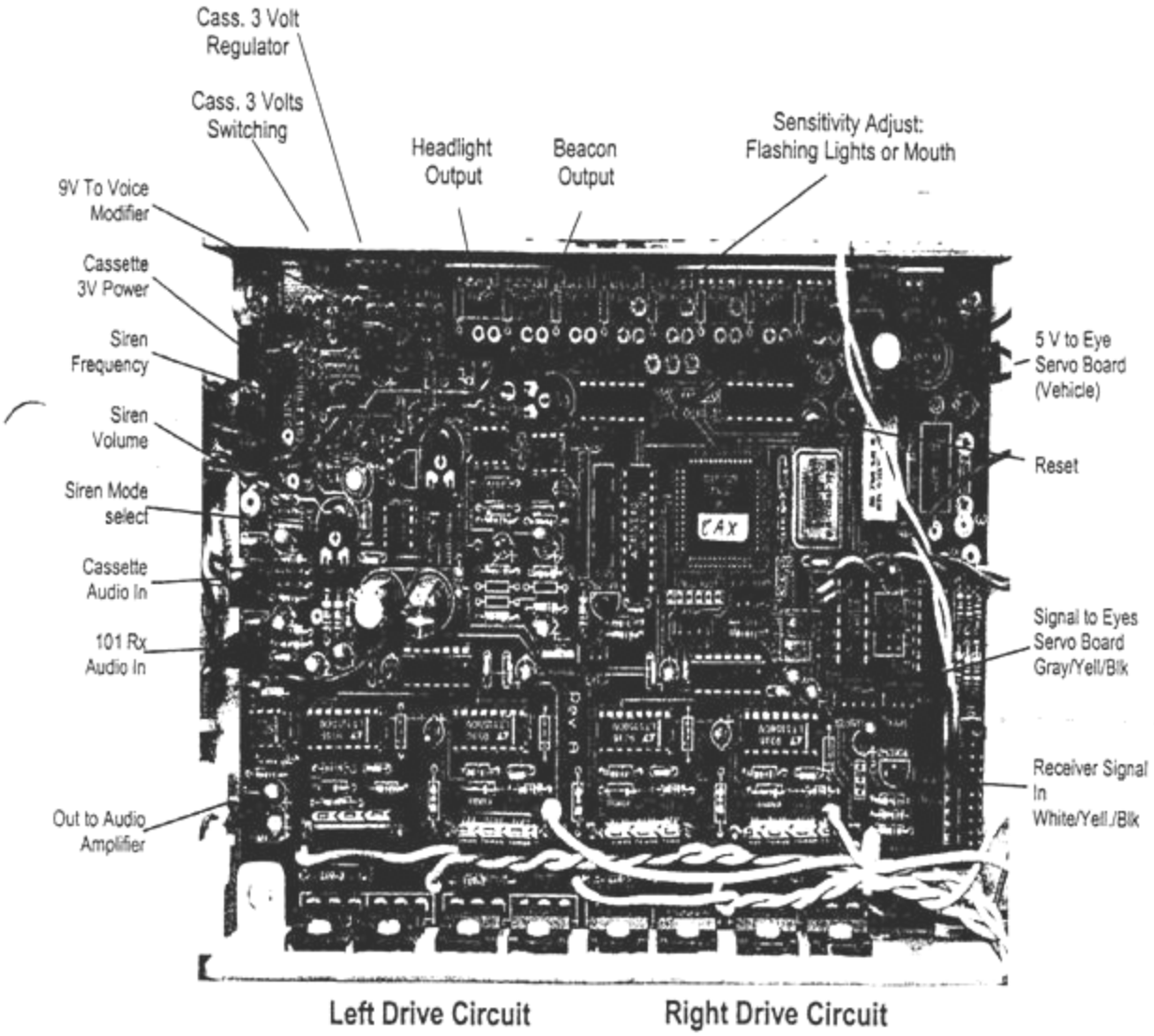
Bolts holding Seamoor on to the seat
Do Not Remove

Hole for thumbscrew

Robot Bottom View



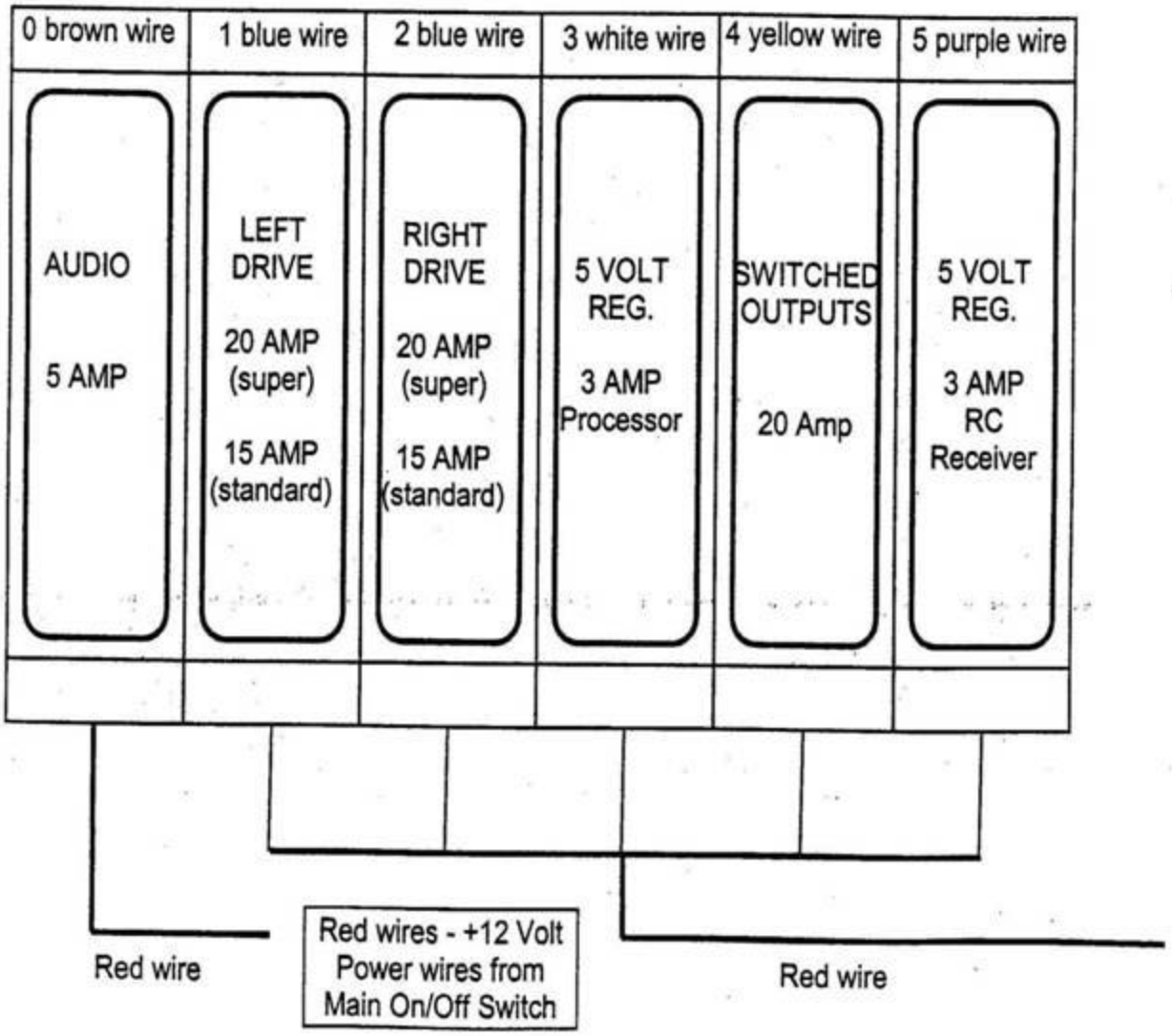
Robot Main Electronic Board



Character- Head movement, tape player, siren, eyes operation, voice system, and mouth circuit.

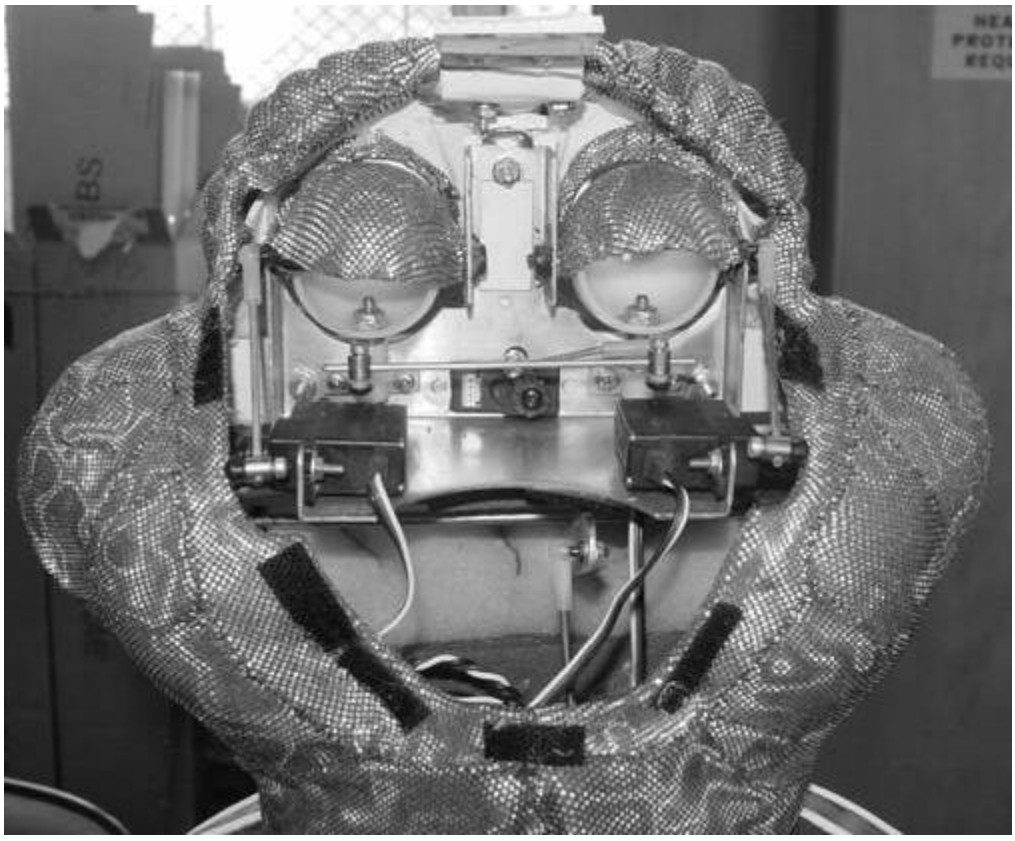
Fuse Box Located Inside Main Electronic Box

Use AGC Fast Acting Type Fuses



Audio - (Fuse 0) Robot voice transmitter (151), Robot voice receiver (101), audio booster, active filter, cassette player, siren.
Switching - (Fuse 4) Cassette player, siren. This applies to the switching on and off of these functions.
Switched Outputs – Switched outputs include headlights and flashing lights
Power to Character control board - includes head turning, mouth, steering servo, and eyes servos (eye servo board). Comes off the switched output fuse

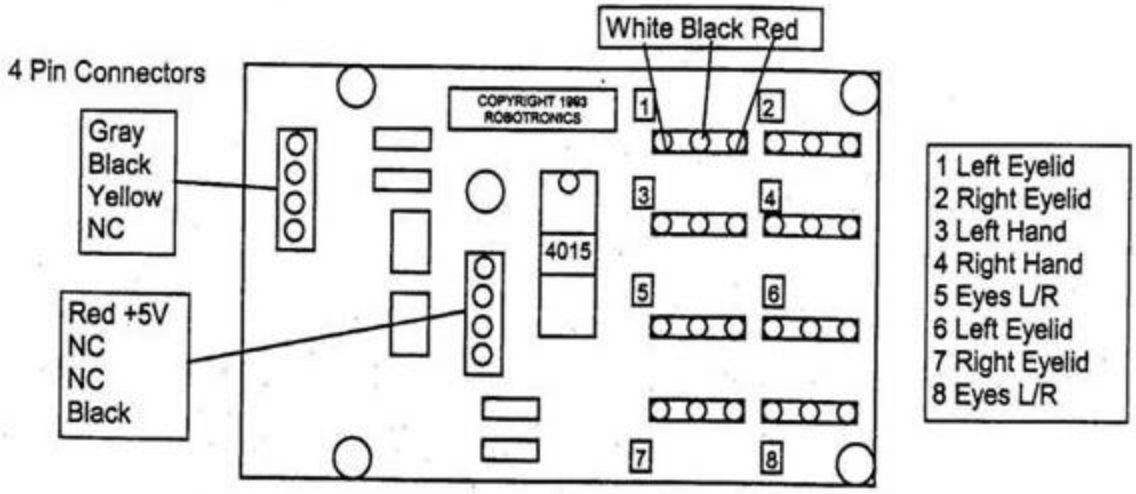
Character Head
Inside View



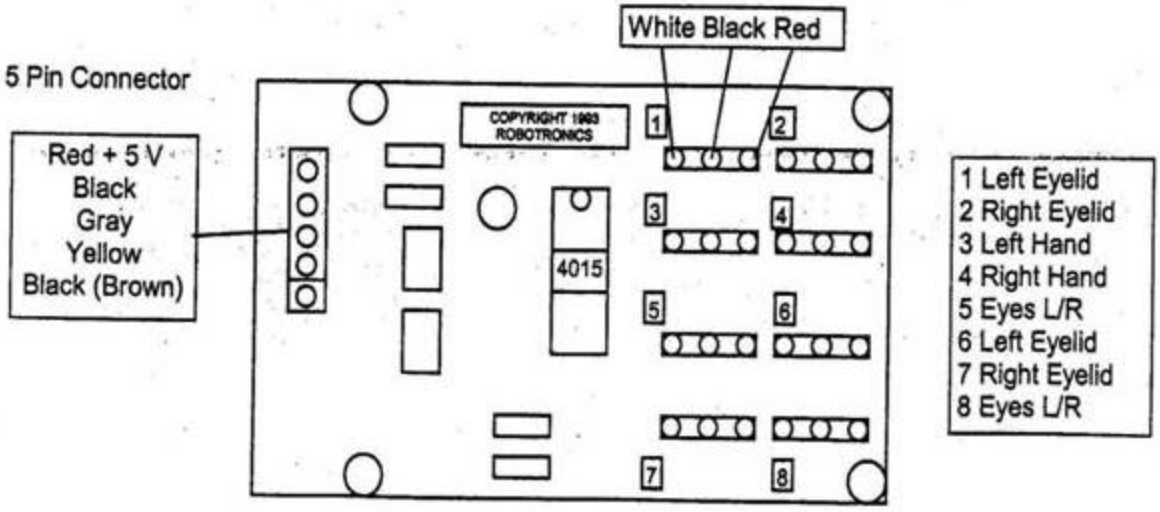
Do Not Remove the Back of Seamoor's Head unless you have been instructed to do so to fix a problem.

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
Seamoor robot	6,7, and 8	In Upper robot

Carrying Case Diagram

Empty

Empty

Battery Charger for
Radio Control Handset

Headset Voice Transmitter

Remove battery before storing

Place antenna in loosely

Cassette Player Cleaning Tape and Cassette Tape with Water Safety Songs

Headset Voice Receiver

Remove battery before storing
Place antenna in loosely

Radio Control Handset

Place in outside down with antenna and neck strap attached

Headset

Don’t wrap wires around the headset. Place them in loosely.

Appendix C

Administrative Documentation

PRE \ POST CHECKLIST FOR SEAMOOR

The person responsible for Seamoor must fill out this form.

Mark the appropriate one: Pre-Checklist _____ Post-checklist _____

Pre-Checklist:
If you are using this as a pre-checklist:
View the training video before filling out this form.

Post- Checklist:
If you are using this as a post-checklist:
You must fill out this form before shipping Seamoor.

Project Name: _____ **Date:** _____

Your name: _____

INSPECT THE ITEMS THAT ARE LISTED BELOW

- Check the appropriate column. If something is not operating properly note it in the comments section.
- If you check "No" for any of the items below notify the National Water Safety Products Advisory Committee Member that represents your Division before operating Seamoor again.

Is this function working properly?	**Yes**	**No**
Check to make sure you have everything. (A list of everything that you should have is included with this form.)		
Watercraft portion of the robot is in good condition besides minor scrapes and scratches. Serpent body is in good condition; body is not ripped and is clean.		
Radio Control Handset in good condition. Antenna and neck strap are attached to the handset. **The operator should have the neck strap around their neck at all times while operating Seamoor.**		
Headset and accessories are in good condition. Install new 9-volt alkaline batteries in the headset voice receiver and voice transmitter.		
Batteries chargers are in good condition. There should be one for the robot battery and one for the radio control handset.		
Lanyard is in place on Seamoor's left wrist		
When powering up Seamoor turn the radio control handset on first and then turn on the main robot power switch. When shutting Seamoor down turn off the main robot power switch and then turn off the radio control handset. Refer to the manual to find out what the controls on the handset do.		
Robot moves back and forth and side to side with no problems.		
Seamoor's head turns from side to side.		
Handlebars turn from side to side.		
Seamoor's mouth moves while talking through the headset.		
Seamoor's voice works.		
You can hear through the head set		
Seamoor's eyes both blink and move side to side		
Siren works		
Tape player works		

After you turn off Seamoor recharge the robot body battery, store everything properly, and fill out the trip ticket.

COMMENTS:

Items that should be in the shipping cases:

1. Seamoor portion and watercraft portion of the robot
2. Dust Cover for Seamoor
3. Transport Cart
4. 10 amp Battery Charger for Robot Battery
5. Two 12-volt robot batteries
6. Carrying Case
    a. Radio Control Handset with Neck Strap attached
    b. Headset
    c. Headset Voice Transmitter
    d. Headset Voice Receiver
    e. Battery Charger for Radio Control Handset
    f. Cassette Player Cleaning Tape
    g. Cassette that contains Water Safety Songs

ACCIDENT PREVENTION PROGRAM
JOB HAZARD ANALYSIS

1. **Contract No.** N/A	2. **Project:**	3. **Activity:** Operation of Seamoor
4. **Date:**		

7. **Item:**	8. **Phase of Work:**	9. **Safety Hazard:**	10. **Precautionary Action Taken:**
	Battery Charging	Hazard of Explosive Gas Mixture (When charging the lead acid Robot Battery, which is a Gel type battery it gives off a small amount of hydrogen gas.)	1. Wear Safety Glasses or Goggles. 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. Charge battery in a dry, well ventilated area. 5. Always unplug the AC supply cord before connecting or disconnecting the charger leads from the battery.
		Electrical Shock	1. Do not expose the charger to rain or any type of moisture. 2. Replace defective cords and wires immediately. 3. Do not expose or operate Seamoor in the rain or any type of moisture.
	Lifting Transport Cart with Seamoor on it Loading and Unloading Seamoor Lifting Shipping Cases	Back and Leg Strain	1. Two people should work together to perform these functions. 2. Bend down with knees and lift with your legs. 3. Use handles provided and proper gripping so that the weight is balanced out between the two people.

11. **Seamoor Operator:**

(Signature and Title)

12. Report discussed with Seamoor Operator on:	**13. Seamoor Trainer:**
Date	(Signature and Title)

IMPORTANT: Every time Seamoor is transported it must be secured on the transporting cart or in the shipping cases.

Activity Location	Nomenclature	Model #	Serial #	Reporting Period
(Your Project Name)	SeaMoor (Robotic PWC and Serpent)	100-304-100-006B	010530001	(The time period that you have Seamoor)

TRIP TICKET

Date (Mo/Day)	Operator (Last name, 1st initial)	Location Where Seamoor was Operated	Estimated Operation Time	Maintenance: Record dates for the following things — Robot Battery Charged #1	Robot Battery Charged #2	Radio Control Handset Battery Charged	Cass. Player Cleaned	Is everything operating properly: Yes	No	Comments
4/19/02	Mathias, A	Lake Shelbyville	1 hour	4/19/02		4/19/02		X		

Notes on battery charging: Further explanation is located in the operating manual.

Robot Battery: Do Not Fully Discharge This Battery. This battery must be recharged after every use. It might take up to 10 to 14 hours to recharge this battery.

Radio Control Handset Battery: Do not overcharge or fully discharge this battery. This battery can be recharged after every use. It might take up to 16 hours to recharge this battery.

Seamoor Activity Report

Project Name: _____ Date: _____

Contact Person: _____

Types of activities Seamoor was involved in while at your project:

Interpretive Programs: On-site total _____ # of direct contacts _____

Off-site total _____ # of direct contacts _____

Types of groups programs were conducted for: _____

Special Events: On-site total _____ # of direct contacts _____

Off-site total: _____ # of direct contacts _____

Types of Special Events: _____

Public Relations: (Please include copies of the following if possible)

	Total
News Releases	_____
Public Service Announcements (PSAs)	_____
Newspaper or Magazine Articles	_____
TV News Clips	_____

Please provide a brief summary of how Seamoor promoted water safety while visiting your project (If needed you can use the back of this page)

Please provide any suggestions that you think would improve Seamoor's National Campaign:

Please mail the following items:

This form, Pre and Post Checklist, Trip Ticket, Training Video, and if possible anything associated with Seamoor that might help us promote and improve this campaign, such as photos (digital or prints), slides, video clips, news releases, articles, program outlines, scripts, handouts, stickers, buttons, etc.

To: U.S. Army Corps of Engineers
National Operation Center for Water Safety
201 N. Third Street
Walla Walla, WA 99362

Thank you for taking care of Seamoor while he was at your project.

GBL REQUEST
SHIPMENT OF GOVERNMENT PROPERTY

REQUESTING OFFICE (complete this portion)

1. Request a Government Bill of Lading be issued to effect the following shipment of Government property:

   a. Shipment date and time: _____

   b. Requested delivery date and time: _____

   c. Shipped From (Origin): _____
   _____
   City/State/Zip:_____
   Point of Contact: (name)_____
   (phone)_____

   d. Shipped To(Destination): _____
   City/State/Zip: _____
   Point of Contact: (name)_____
   (phone)_____

   e. Description of property shipped:

Type of Item	Quantity – Weight – Length – Width – Height
Electronic Equipment	2 pieces 500 lbs
	(1 of 2) 52.5” - 30.5” – 37.5” (300 lbs)
	(2 of 2) 42.5” – 30.5” – 38.5” (200 lbs)

   f. Requested Carrier to provide Tarping: Yes _____ / No ___X___
   g. Request Carrier to load and/or unload: Yes __X___ / No _____

LM-T (complete this portion)

2. BIDS:
   a. Company Name: _____
   Point of Contact:_____
   Phone #: _____
   Amount Bid: _____

   b. Company Name: _____
   Point of Contact: _____
   Phone #: _____
   Amount Bid:_____

   c. Company Name: _____
   Point of Contact: _____
   Phone #: _____
   Amount Bid: _____

3. PR & C #: _____

Request to Use Seamoor

Your name _____

Corps of Engineers Project Name _____

Corps of Engineers Division in which your project is located _____

Address _____

Phone Number _____

Fax Number _____

Email Address _____

Shipping Address if different then the above address _____

Dates you would like to schedule Seamoor _____

Name or type of event that Seamoor will be used at _____

Estimated number of contacts _____

Mail this request to:
Pam Doty
US Army Corps of Engineers
RR 4, Box 128B
Shelbyville, IL 62565

Or email to: Pamela.J.Doty@mvs02.usace.army.mil

Notes

Technical Tips