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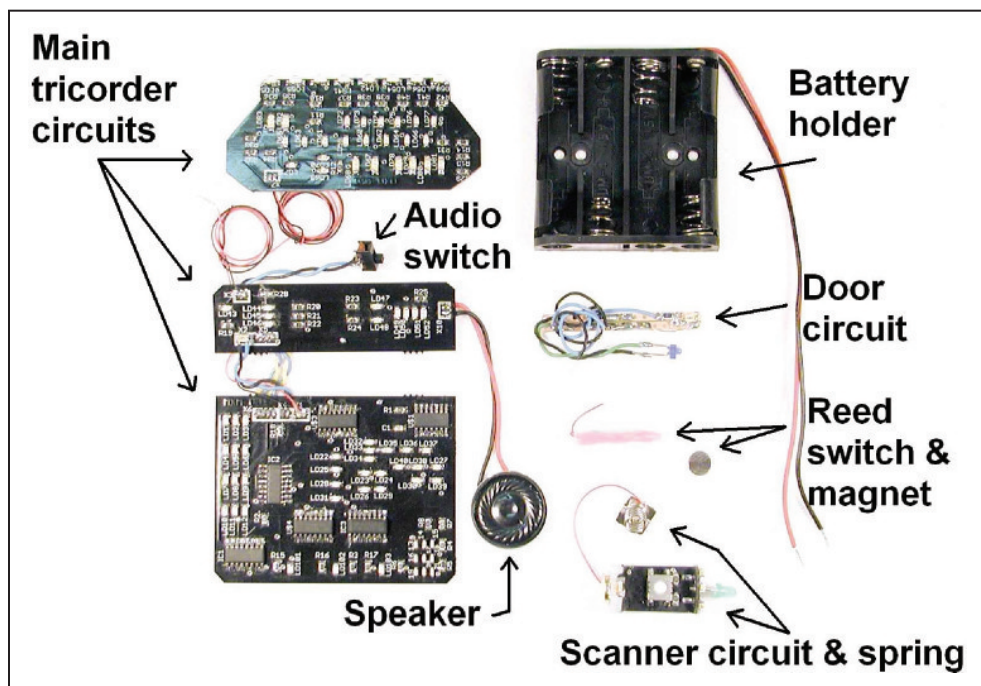
Federation Mark X Medical Tricorder Electronic Upgrade Manual



- **WARNING:** The speaker and small magnet used in this kit could interfere with the operation of pacemakers, hearing aids, etc. Please use caution when handling.
- Please read this manual completely and familiarize yourself with these electronics **before attempting to hook any power to electronics** or installing this upgrade kit.
- This electronic upgrade requires solid prop building and soldering experience.
- This upgrade may require cutting and/or attaching wires with solder.
- Do not attempt to modify the electronic circuits in any way.
- This manual is only intended as a guide for the installation of the electronics. Please use the Mark X Medical Tricorder prop kit manual for prop assembly.
- Requires 4 standard AAA Alkaline batteries (6V).

TOOLS REQUIRED:

- Drill
- Dremel tool
- Hobby knife
- Soldering iron and rosin core solder
- Scissors and wire cutter/stripper
- Hot glue gun and epoxy cement



EXAMINE ALL PARTS AND READ THIS MANUAL COMPLETELY BEFORE HOOKING ANY POWER TO ELECTRONICS:

The Main Circuit modules, scanner and the door circuit all run on 6 volts. And the battery holder supplied in this kit holds four (4) AAA batteries @ 1.5 volts each. However, since the scanner is obviously isolated, it is powered by four (4) LR 1130 coin batteries @ 1.5 volts each.

These instructions have been written so that when followed correctly, your electronics upgrade will go smoothly and your tricorder will look and sound just like the prop in the show upon completion.

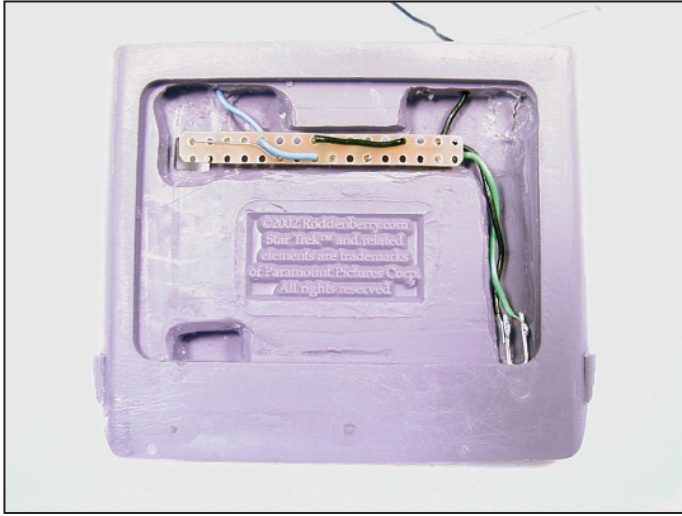
The wires are color coded in order to minimize any confusion. Always match up wire colors (i.e. black/black, red/red, etc.) unless otherwise stated.

Begin by taking the electronics out of the package and laying them out similar to the above photo.

To start with, it is best and easiest to prepare for installing the electronics by drilling, cutting or filling any required holes BEFORE doing anything else. That way you will be familiar with a plan, and also each installation step can be done without having to stop and drill or cut at those points during the build up.

The following steps and pages will go into more detail for electronics installation. Use the prop kit building instructions as the "main" source for prop assembly, in conjunction with steps from these manual pages.

DOOR CIRCUIT, HINGES, AND MAGNET:



Step 1: The door circuit has a small square board mounted LED, and a small round blue LED, attached with wires. You will need to drill out the hole in the corner of the door for the wired LED (see photo on the right above).

You will also need to dremel out a channel for the board to lay into flat, so that the body panel supplied in the prop kit fits flush with the surface of the door (see prop kit instruction manual).

The hinges are the power conductors for the door circuit, and you will need to drill a small hole behind where each hinge will be mounted. Thread one wire through each hole, and solder the positive (blue) wire to the back of one hinge, and the negative (black) wire the back of the other hinge. Solder a 3" piece of red wire to the positive hinge, and a 3" piece of black wire to the negative hinge.

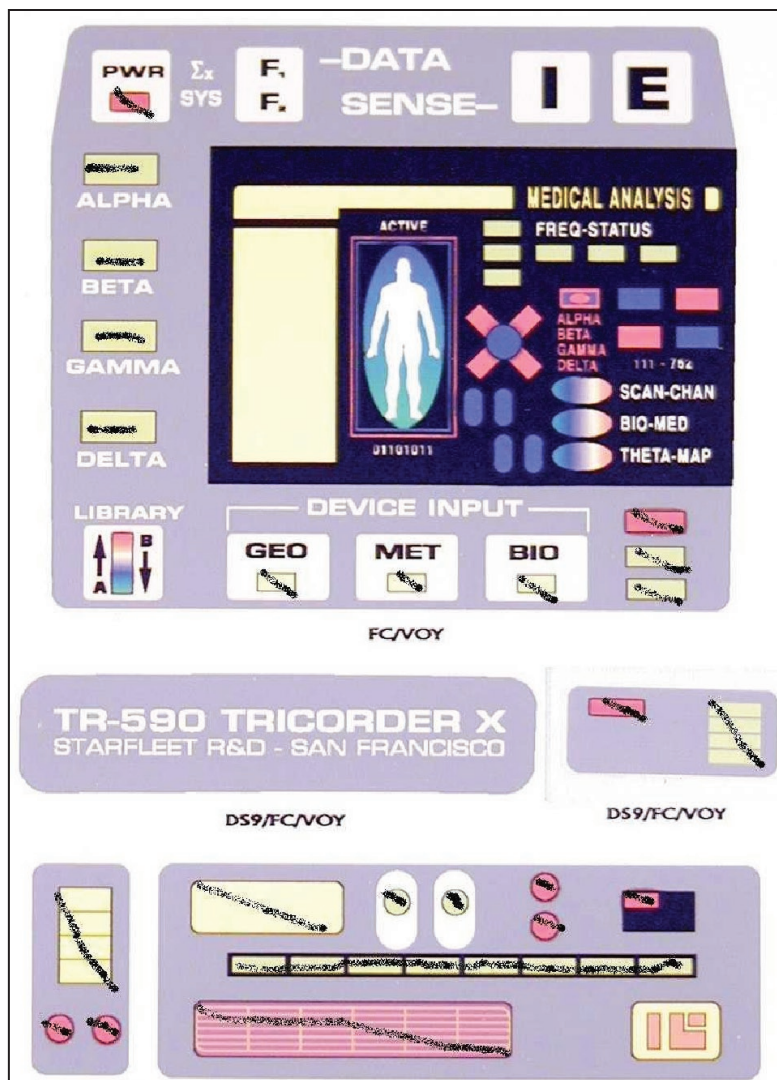
Glue the door circuit board and the round blue LED into place using hot glue or epoxy, as seen in the photo on the left above.

In the right photo above, notice the small, square LED in place under the open square hole. This hole will have a red square lens (supplied with prop kit) glued in place over the LED.

The reed switch used for powering the tricorder is activated with the small round neodymium magnet. The magnet will be buried in the hole on the top inside edge of the door flap (see photo on the right above).

The magnet hole is already there, and you will simply need to glue the magnet into such a position that it works correctly with the reed switch. When properly installed and painted, the magnet will be completely concealed in the flap.

GRAPHICS:



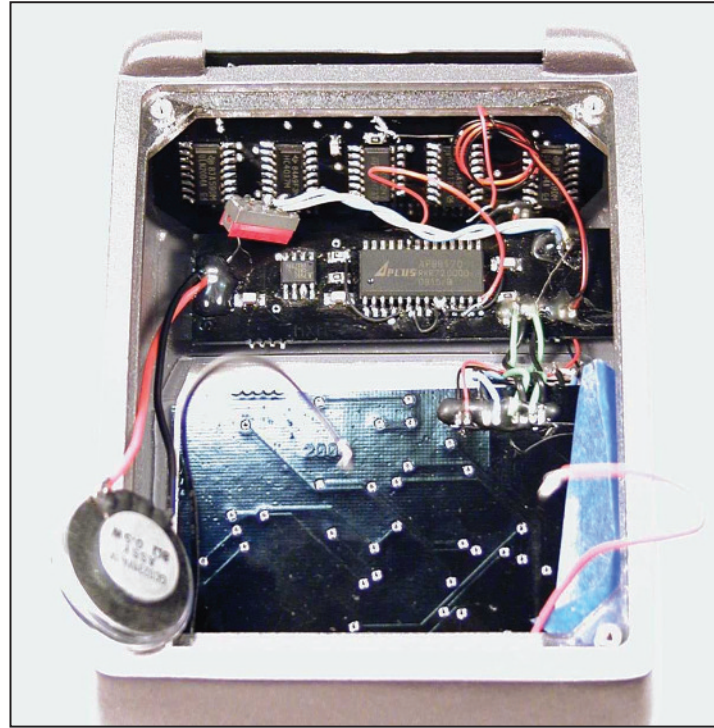
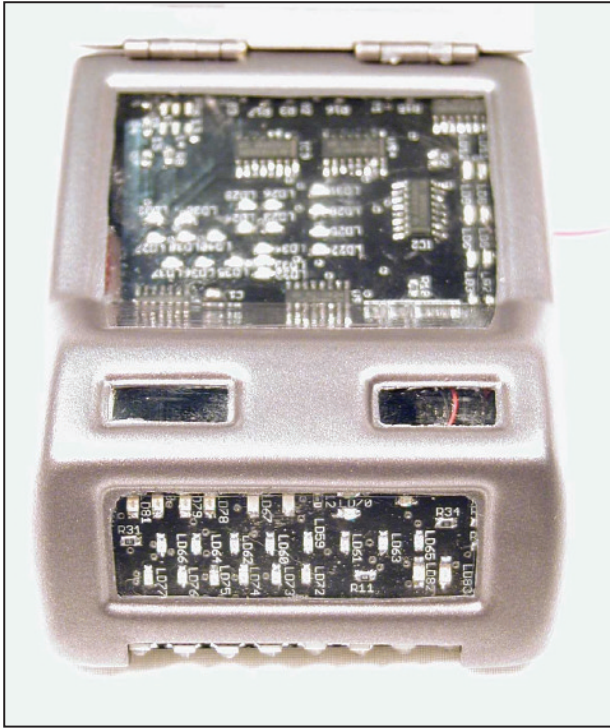
Step 2: You will need to cut out the areas of the graphics that the LEDs will show through by using a small, very sharp hobby knife. Basically, you will remove all the “windows”, such as the ones pointed out by black marker strokes in the above picture.

Rumor has it that this is the method that was used on the props that went to set. So you're in good company with this procedure!

Hint: The holes can be done nicely with a small, hollow brass tube, available at any decent hobby store. Sharpen the inside of the tube with a round file, and then use it as a “hole punch” to remove the circles in the graphics.

Once completed, temporarily attach the graphics to their estimated positions on the face of the tricorder by using some light tack painter's tape. You may still need to be able to move the graphics around a bit while positioning the electronics.

MAIN CIRCUITS:



Step 3: Place the main circuit boards in their estimated positions inside the body of the tricorder by aligning them with the graphics taped in place on the front of the body. Use a small amount of hot glue to hold the circuits in place, allowing you to work between the placement of the graphics and circuits, and find the correct alignment for everything.

Make sure to line everything up correctly....take your time here.

Once you are satisfied, use more hot glue inside to permanently attach the electronics. But BEFORE you attach anything permanently, consider these tips:

You can use clear cellophane tape to diffuse the LED light source. Lay the tape on the clear plastic shells in strips where each LED will be visible. You can do this on both sides of the clear shells to further diffuse.

You also can "mask" out areas to keep the light from bleeding over. The simplest method is using a sharpie pen and marking on the clear shells a thick line around the LED "windows". Make sure to not mark any areas that will be visible!

Another method is making a frisket style mask. You can use thin black paper, mylar, or even black vinyl tape, and simply cut out window areas (duplicating what you did above) but making sure not to block out the main screen section. If you have the color graphics temporarily taped to the face, you can place the above frisket style masks on the inside of the shells. Hold the graphics/shells up to a strong light source and place the masks inside using tape to hold them in place. Make sure to line them up correctly! Again - take your time for these steps. Look at the placements from different angles to be sure.

FINAL ASSEMBLY:

Step 4: Follow the prop building kit instructions for completing the build up. Once everything is done, painted and in place:

1. Solder connect one wire from the reed switch to the BLACK Negative lead wire from the battery holder.
2. Solder connect the other wire from the reed switch to all of the remaining BLACK Negative wires, including the negative hinge wire.
3. Solder connect together all of the RED Positive wires, including the Positive hinge wire and the Positive lead wire from the battery holder. No wires should be left over.
4. After testing fitting the operation of the reed switch and magnet, permanently attach the reed switch to the inside of the body behind where the magnet will be located when the door is closed and where it works the best with the magnet.

Place 4 AAA batteries into the holder, and verify that everything works by opening the flip open door.

The audio on/off switch can be left free floating, as you will only use it to turn the sound on or off while the rear panel is removed. You can then just position it free of anything around it.

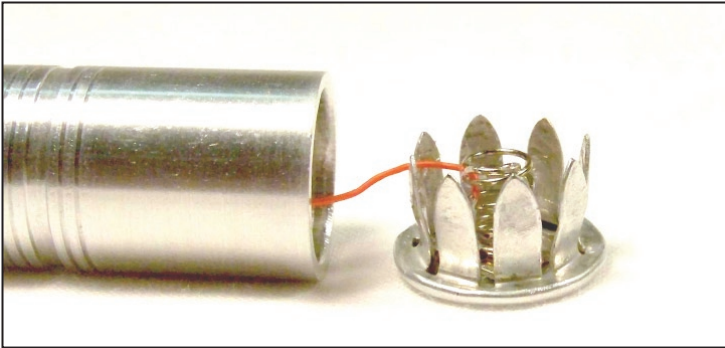
Position the speaker inside the tricorder so the rear panel can be installed without any interference. The best place for the speaker may be along the tricorder wall, next to the scanner cut out on the rear access panel. But be sure that the speaker is located on the OPPOSITE side of the tricorder from the reed switch so the speaker magnet does not interfere with the reed switch magnet.

Test the sound quality of the chosen speaker location before gluing it into place permanently with hot glue.

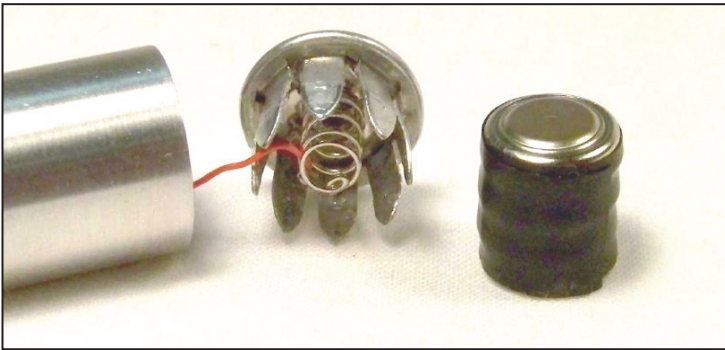
Finally, place the battery holder inside, but do NOT glue it in place. It should fit snugly in place once you close up the back panel with the provided screws from the kit.

Now continue on to the scanner circuit installation and assembly.

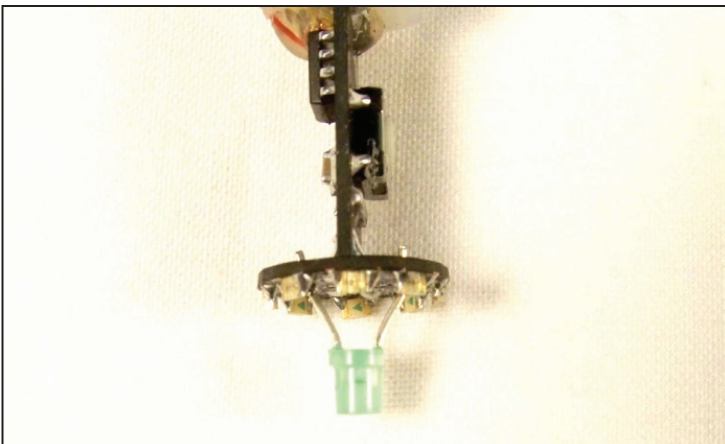
SCANNER ASSEMBLY:



Step 5: Take the scanner plug from the tricorder prop kit and straighten all the prongs. You will also need to bend them outward a bit so it will still provide holding tension against the inside wall of the scanner body. Then attach the contact spring inside the plug and flat against the bottom using a drop of hot glue or resin.

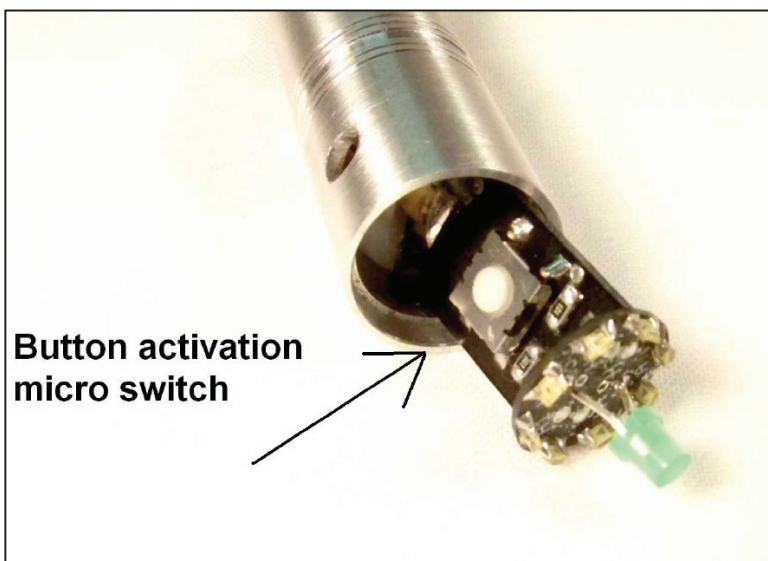


Step 6: Next, wrap the four LR 1130 batteries together tightly with electricians tape, with all batteries facing the same direction. Space is limited inside the scanner, so only go around the batteries one or two times max. *Wrapping the batteries is necessary so they do not touch the scanner body.*

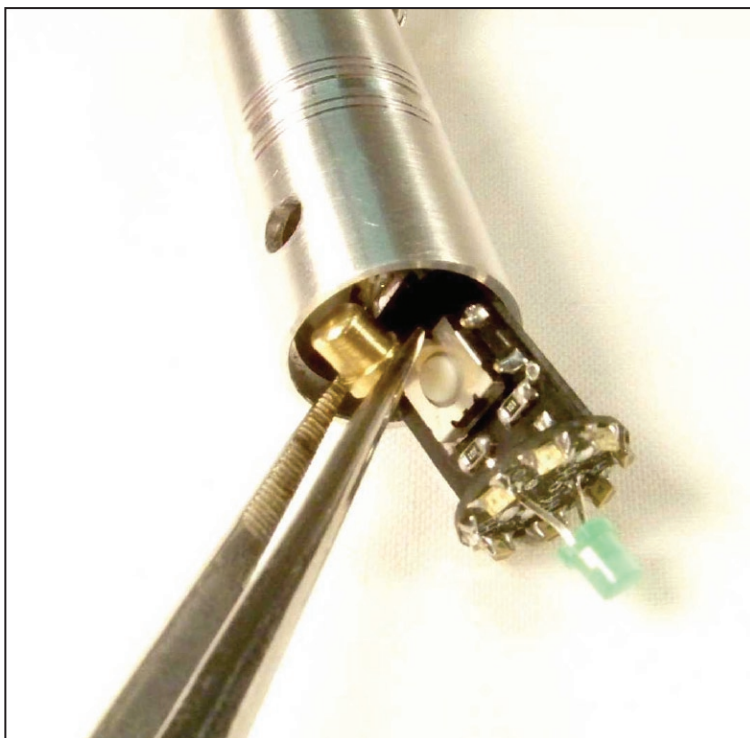


Step 7: The top green LED on the scanner has a round tip. It can be left that way, or if you like – you can carefully file it down flat, using a small file and then finishing it off with some fine wet/dry sandpaper.

Be careful not to go down too far on the LED body.

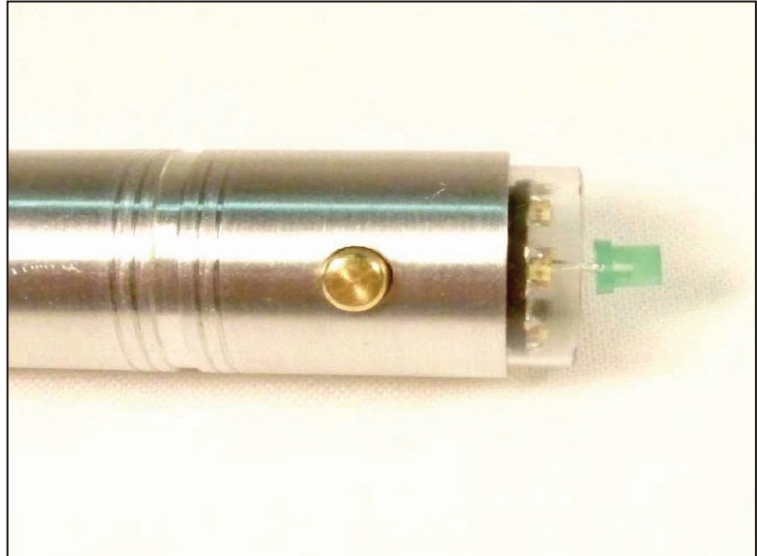


Step 8: Insert the scanner circuit by gently pushing it up through the scanner body until the circuit comes out through the top. Position the circuit so that the micro switch is facing the hole in the body for the activation button, while angling the circuit away from it and leaving space to insert the button.



Step 9: Next, using a small tweezers, carefully install the brass button (provided with the prop kit), going past the switch and dropping the button into the hole with the flange on the inside.

The button should fit loosely in the hole and move freely. If it does not, you may need to widen the hole in the scanner body a bit so that it does.



Step 10: With the button in place, carefully slide the circuit back down into the scanner body so the switch is directly behind the button. Ensure that the button works properly with the switch. You should feel the “click” of the switch every time the button is pushed.

Refer to the prop kit assembly instructions for further assembly.



Step 11: Once the scanner assembly is complete, install the battery roll into the body of the scanner, with the NEGATIVE end in first and facing UP against the brass contact of the circuit module.

Then carefully insert the POSITIVE plug/spring into the scanner, surrounding the batteries as you push it in (see the photo on the left above).

Shown on the right is how the scanner should look like completely assembled.

Congratulations! You have now completed and own a beautiful prop replica of a Mark X Medical Tricorder from *Star Trek*! Taken care of properly, it will bring you years of enjoyment....enjoy!