

The \$10 Jerky Maker

Ver 2.0



Lex Rooker

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Health & Safety Warning

The Jerky drier described in this document does not comply with FDA, USDA, or FSIS regulations or local health codes.

Dehydrating meat products does not reduce the health risks associated with meat contaminated with Salmonella and/or E. coli O157H7.

The design of this Jerky Maker has not been reviewed, tested, or approved by any official testing body or Government agency.

The Author of this document makes no warranty of any kind, expressed or implied, regarding the safety of this device or the suitability of its use for any purpose whatsoever.

Anyone building and/or using the Jerky Maker described in this document is doing so at their own risk.

How This Project Came to Be

I love jerky. Not that pressed, formed, sugar soaked stuff in the plastic bags that you buy at the convenience store or supermarket. I mean the real thing. Raw dried meat, simply seasoned with a little salt, pepper, and maybe some garlic powder or a bit of crushed red pepper to give it some authority.

There was a time when you could purchase good jerky, but not any more. Today it is illegal to sell jerky unless it has been raised to a temperature of 160 deg. for “health” reasons. The FDA has mandated that the meat used for jerky must be cooked to a state of “well done” before it is dried. Unfortunately this turns something that was once a basic highly nutritious food source for Native Americans, Trappers, Prospectors, and Explorers into not much more than flavored shoe leather.

I grew up in farm country and we made jerky every summer. We cut and seasoned our meat and then pinned the thin strips to the clothes line in the hot summer sun to let it dry. The whole process was a family affair with mom sternly warning us that “that stuff better be off the line come wash day or there’ll be heck to pay!” It took about 4 or 5 days before the jerky was ready, but to a 10 year old that was an eternity.

This project came about from my desire to turn back the clock and create the jerky that I grew up loving. No soy sauce, no sugar, no genuine artificial Smoke Flavoring, and no preservatives other than a bit of salt. I wanted to dry the meat at a low temperature (under 120 F.) like we did when I was a kid, but we are not allowed to have a clothes line where I live lest the neighbors complain.

I looked at all the commercial food dehydrators and they seemed to be rather limited – toys really. They used little trays that would hold 5 or 6 strips of meat, they were noisy little affairs with their fans and fancy thermostats, and boy were they expensive. I wanted something quiet, efficient, and inexpensive – no I wanted it CHEAP. I wanted to make enough jerky at one time to last a couple of weeks. Nothing I found even came close to what I wanted, so I set to work to build my own. The simple dehydrator described in this manual is the result. Some of the major features are:

- It can be built by anyone who can use a screwdriver, pliers, and a pair of scissors – no power tools are needed.
- The heat source is a standard 100 watt incandescent light bulb available at just about any store for a couple of dollars.
- Though it only takes up one square foot of floor space it will easily dry 8 or more pounds of meat at one time.
- As long as it is used in an area where the daytime temperature averages between 65 and 90 deg F. it will safely and efficiently dry the jerky without cooking it.
- The cost to build this wonderful device is between \$10 and \$15 – quite a bargain.
- These plans are distributed free of charge and the .pdf file may be freely copied and reposted as long as the information is not altered without my consent and no fee of any kind is charged to view, download, or copy.

Over the years I’ve taught co-workers, Boy Scouts, Church Youth Groups, and countless others how to build this simple dehydrator and make some of the best jerky you ever tasted. If I’ve piqued your interest turn the page and let’s get started.

\$10 Jerky Drier Instructions

Box Assembly

Material List

	12"x12"x12" Shipping Box These come in a 3 pack but only 1 is needed	3 pk	Staples	SKU 617931	\$5.49
	½" Schedule 40 PVC pipe 15" long	2ea	Home Depot	SKU 253-755	\$0.74

Misc

Heavy Duty 2" wide packing tape
12" ruler or yardstick
Sharp knife

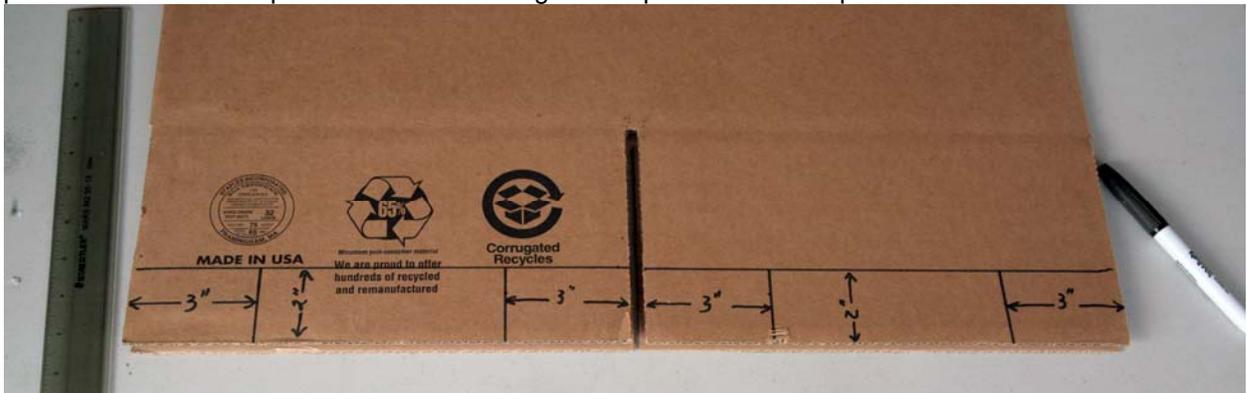
Pencil or marker
Kitchen Shears or heavy duty scissors

The parts list suggests a box from Staples, but any box of the same dimensions is fine. I've even used a very heavy duty box from U-Haul. Start by laying the box flat on a table. Do not fold any of the flaps until told to do so. Orient the box so that the flaps are at the top and bottom.

1. On the bottom set of flaps, using a pencil or marker draw a line 2" up from the bottom edge.



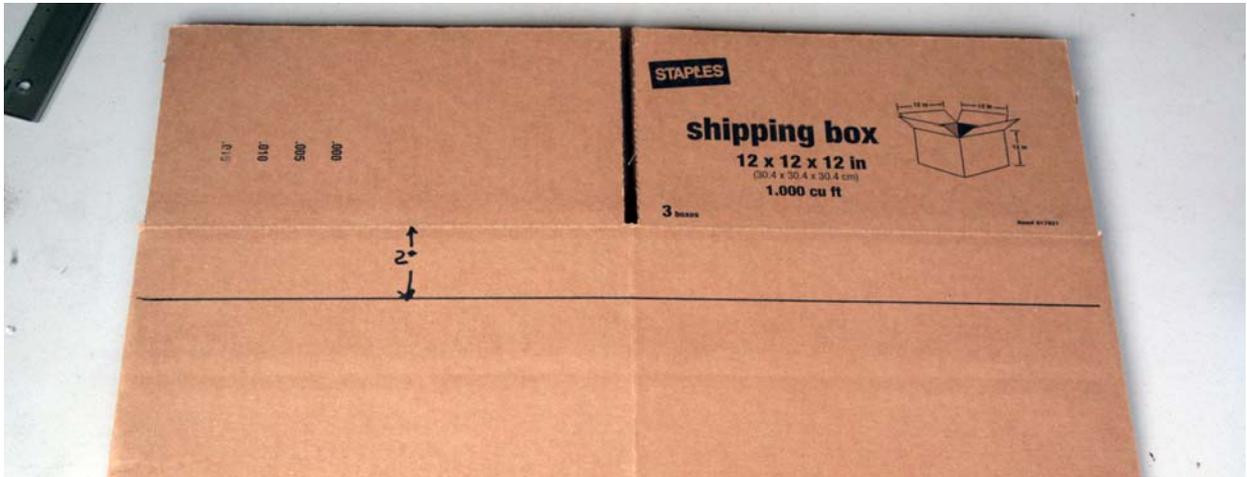
2. Measure in 3" along the bottom from each corner of the box and draw a vertical line as shown in the photo below. This will partition the bottom edge into 3 parts on each flap.



3. Cut out the 6" wide section in the center between the 3" corners. Since all sides of the box are the same size, you can leave the box folded flat and use the markings on one side to cut through both sets of flaps. See photo below.



4. Move to the top set of flaps. Draw a line 2" below the point where the flaps fold. Turn the box over and do the same on the other side.



5. Open the box and fold the top flaps to the center of the box like you are closing it to help hold the box square. Using a strip of 2" wide heavy duty packaging tape about 8" long, tape all four corners of the bottom flaps as shown in the photo below. The bottom flaps will act as the legs of the jerky drier.



6. After all 4 corners have been taped along the vertical corners of the box, cut a 9" or 10" length of 2" wide tape and wrap it around the 3" corners trying to maintain about the same amount of excess tape on each end as shown below.



7. Fold the loose ends of the tape over the edges and press to the back side of the 3" legs. This will reinforce the corners so that it will support a significant amount of weight. Repeat step 6 and 7 until all 4 corners have been reinforced.



8. At the top of the box, use a length of the ½” PVC pipe to mark a circle just below the 2” line that you drew in step 4, and as close to the edge of the box as possible.



9. Mark both edges of the side of the box then turn the box to the side opposite the one you just marked and mark the same circles on this side also. Then cut out the circles, staying inside each circle. You should end up with 4 holes in the box, two on the front and two on the back that are directly across from each other.



10. Push the two 15" lengths of PVC pipe through the holes you just cut in the above step. Make sure that there is an equal amount of excess pipe sticking out of each side of the box. These will be used to support the skewers that hold the jerky as it dries.



11. Close all 4 flaps of the box. Use the 4" electrical box as a template to draw a 4" diameter circle in the center on top of the box as shown in the two photos below. Using a sharp knife, cut out the circle on the top flaps you just marked.





12. Now close the top flaps again and use the circle you just cut to mark and cut the inner flaps.



13. This completes the construction of the box.



The Heat Source Assembly

Any low temperature heat source will work, however, it is convenient to use a regular incandescent light bulb as a heat source. A 100 watt light bulb is the best choice for this size of drier if it is to be used indoors or when the daytime temperatures are averaging between 65 and 90 deg F.

It is best if the light bulb used as the heat source is horizontal rather than vertical. This will leave more clearance between the drying meat and the heat source so that the meat that is hanging directly over the bulb is not cooked. The easiest way to do this is to use a "Trouble Light" or "Work Light". These are available for around \$10 from Home Depot, Lowes, or just about any hardware or automotive supply store.



If you choose to use a Work Light like the one shown, try to find one with a metal cage and reflector rather than plastic. It will stand up better. Also, make sure that it is designed for incandescent light bulbs and not Florescent lamps. You want the heat generated by the hot filament in the incandescent bulb. If you've chosen this option, and you've completed the box assembly in the previous section you can go directly to the instructions for preparing your meat.

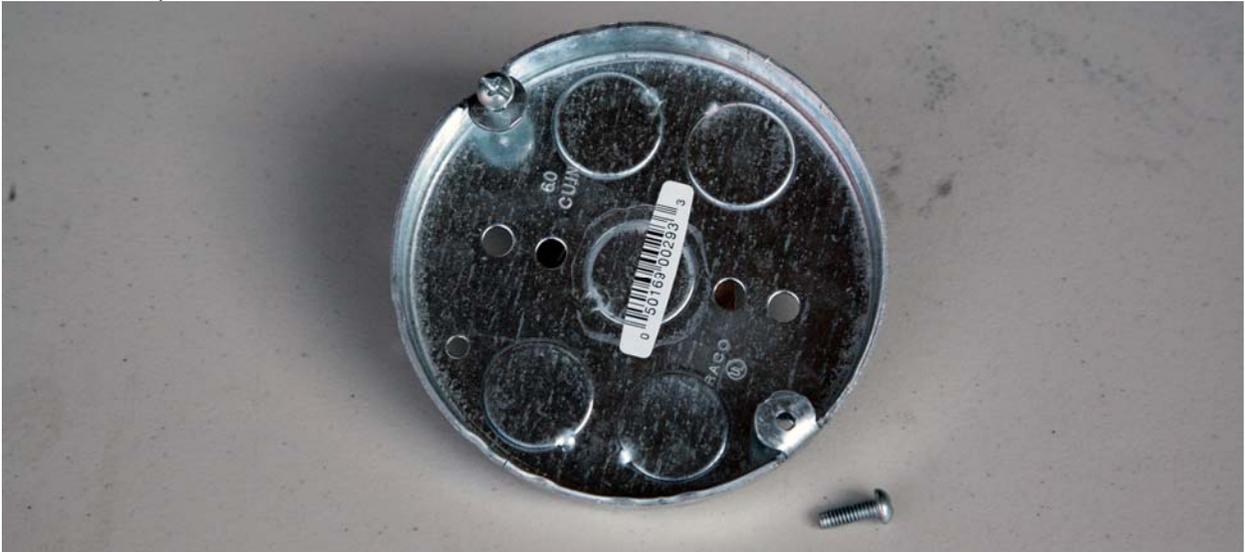
If you can't find a Trouble or Work Light like the one shown above, or you are feeling adventurous you can make your own heat source from off the shelf parts available from Home Depot or Lowes hardware centers.

The following instructions will show you how to build an inexpensive heat source from off the shelf parts. Everything should go together with simple tools like a screw driver, pliers, and scissors. The necessary holes are already drilled in the parts when you purchase them so no power tools will be necessary.

Material List

	<p>Leviton Lampholder #9875 (Porcelain) Or #8829-CW4 (Plastic)</p>	<p>1 ea</p>	<p>Home Depot</p>	<p>SKU 225-035</p>	<p>\$1.49</p>
	<p>4" Pancake Electrical Box RADCO #8293</p>	<p>1 ea</p>	<p>Home Depot</p>	<p>SKU 315-427</p>	<p>\$1.97</p>
	<p>4"x4" Frame Anchor Corner Angle Simpson Strong Tie #A44</p>	<p>1ea</p>	<p>Home Depot</p>	<p>SKU 251-439</p>	<p>\$1.86</p>
	<p>6 ft 2 wire Extension Cord 16 or 18 Gauge</p>	<p>1ea</p>	<p>Home Depot</p>	<p>SKU 144-983</p>	<p>\$1.24</p>
	<p>8-32 machine screw nuts</p>	<p>1pk</p>	<p>Home Depot</p>		<p>\$0.98</p>
	<p>100 Watt or 150 Watt Incandescent Light Bulb (Do not use a compact florescent!)</p>	<p>1ea</p>	<p>Any Market</p>		

1. Begin by removing the two short 8-32 screws from the “ears” or tabs of the Pancake Electrical box as shown in the photo below.



2. Insert the two 8-32 screws you removed in the above step through the two diagonal holes in the A44 Metal Corner Anchor that are closest together. If you measure with a ruler, one set of holes will be just under 2" apart (these are the ones you want), and the others will be about 2 ½ " apart. The screws will be a snug fit but you should be able to screw them in using a screwdriver.



3. Place the "Pancake" Electrical box over the two screws that you inserted in the bracket in step 1 above aligning the screws with existing holes in the pancake electrical box. Secure the electrical box to the bracket with two 8-32 nuts. Tighten securely.



4. Take the electrical extension cord, and using kitchen shears or heavy scissors, cut off the receptacle end of the cord as shown in the photo below. Using a pre-made electrical cord is much less expensive than purchasing a separate plug and wire, and it saves the hassle of putting them together.



5. Insert the cut end of the electrical cord through one of the mounting screw holes on the front of the lamp holder and make a simple knot in the end of the cord so that the cord cannot be pulled back out of the hole. Leave a about a 4" length of cord from the knot to the end of the cord as shown in the photo below.



6. Unzip the two wires of the cord back to the knot. Strip about 1" of insulation from each of the wires and twist the ends of the wires tightly to keep the strands of small wire from unraveling.



7. Examine the plug end of the cord. You may see that one of the blades of the plug is wider than the other. The wide blade is the ground. If you examine the cord closely you will see that one side of the cord has ridges on it and the other side is smooth. Determine which side, (ridged or smooth), is on the same side as the wide blade of the plug.



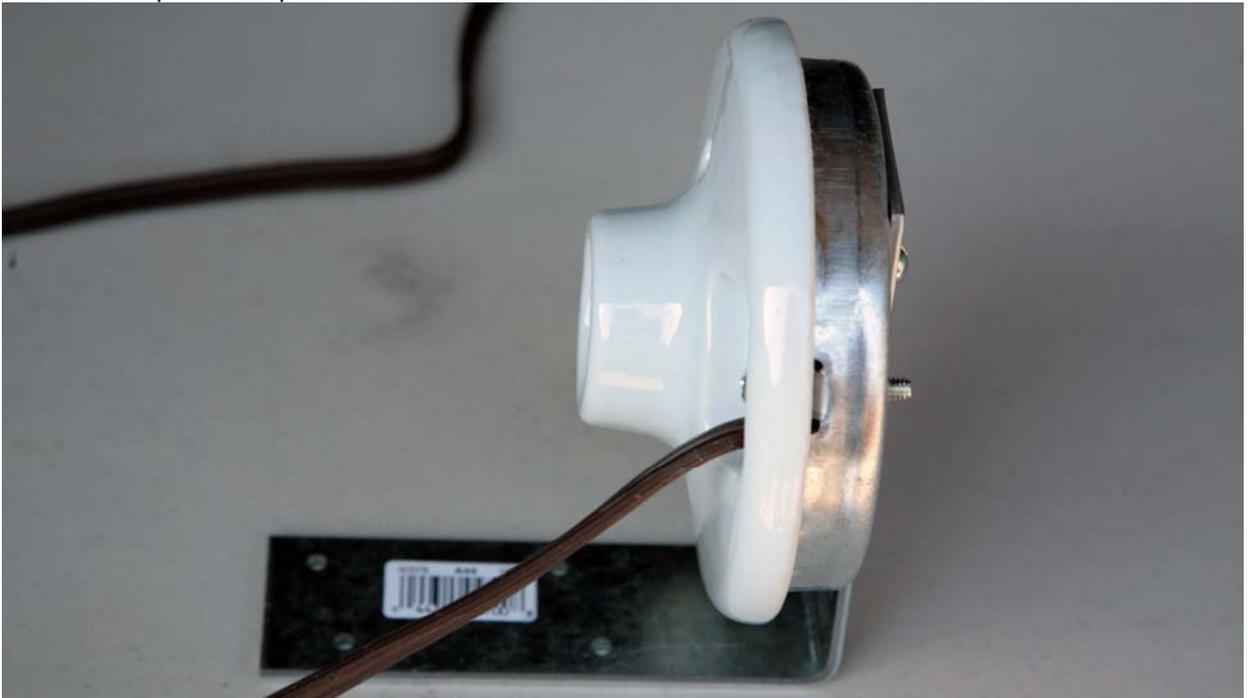
8. Now secure the wire that is on the same side as the wide blade of the plug under the silver screw on the bottom of the lamp holder. Then secure the wire that is on the same side as the narrow blade of the plug under the gold screw on the bottom of the lamp holder. Don't worry, if you mix the wires up the lamp will still work just fine. The rather fiddly step of identifying the different wires just assures that the wires are connected as suggested by the National Electrical Code.



9. Mount the lamp holder to the pancake electrical box using the long 8-32 screws supplied with the lamp holder. Make sure that the knot you tied in the electrical cord is inside the box and not pinched between the edge of the box and the lamp holder. Make sure the screws are snug but do not over tighten as this could crack the lamp holder.



10. The completed lamp holder should look like this.



11. Now screw in a 100 watt light bulb and your heat source is ready to go.



12. As an option, if the long screws used to mount the lamp holder to the electrical box protrude beyond the back of the electrical box, you can put 8-32 nuts on them to give a more finished look. This completes the heater assembly.



Preparing The Meat

I use Eye of Round roast when I make jerky. It has very little fat so there is almost no waste. It is also relatively inexpensive at under \$3 per pound. I purchase it a Costco but you can get it from any butcher shop or market meat department.

I've found that simple spices are the best. I use Garlic Powder, Salt, and Black Pepper. If I want it spicy I'll add crushed red peppers. The photo below shows everything necessary for preparing the meat.



You will also need eight 12" Metal or Bamboo Skewers. If you choose bamboo make sure to get the heavy duty ones as each skewer must support about one pound of meat.



1. Prepare the seasoning mixture by measuring out equal parts of Salt, Black Pepper, and Garlic Powder. Put into a large salt shaker and mix well. One Tablespoon each should be plenty for 8 to 10 lbs of meat which is the maximum capacity of this dryer. Then set aside.



2. Unwrap the meat and place on the cutting board.



3. Trim the fat from the meat as shown below.



4. Cut each piece in half length wise.



5. Place cut-side-down on the cutting board and cut into slices a little less than ¼" thick.



6. Lay the slices out on the cutting board.



7. Sprinkle seasoning lightly over the meat then turn the slices over and season the other side. Don't over do it or the jerky will be too salty. Remember that you are seasoning both sides of the meat and the strips are thin so a light dusting is all you need.



8. String the meat on the skewers. 10 or 11 pieces will fit nicely on 12" skewers so that the meat will hang but not stick together.



9. If you have very short pieces of meat they can be hung directly on a skewer or if you're tight on space they can be hooked together with a toothpick and then hung on a skewer.



10. Place your heat source on a cookie sheet, foil, or newspaper to catch any drips. I'm using a 12"x18" commercial style 1/2 sheet baking pan which works well for the size box we are using.



11. Place your box assembly over the heat source which should be centered in the bottom of the box.



12. Now hang your skewers of meat between the PVC pipe supports.



13. Continue hanging meat until the box is full or you run out of meat. Try to keep the meat slices from sticking together. It is OK if the edges touch here and there, but it's best if the warm air is free to circulate freely around every piece. This is a very efficient way to make jerky. The amount of meat shown below is about 8 lbs. You could probably squeeze in another pound without much problem.



14. Close the box and put a small weight on the top to keep it closed. In the picture below I'm using a paper clip to hold the upper and lower flaps together to keep the box closed rather than a weight. The Jerky will take 48 to 72 hours to dry depending on how thick the meat was cut and how many pounds of meat you are drying. Thinner slices will dry faster. Drying fewer pounds of meat at a time will also speed up the process somewhat.



Finished Jerky



Drying Fruits and Herbs in the \$10 Jerky Maker

The \$10 Jerky Maker was designed specifically to dry strips of meat efficiently. This design is not optimum for drying products that require trays like fruits and herbs, however, it can be adapted to this service for a small cost. The trade-off is that items must be dried in batches. All the trays must be loaded into the dryer at one time, and then the full drying cycle completed before the next batch of material can be dried. This is because there is no easy access to remove the individual trays. Once they are placed in the dryer you can't remove a lower tray without first removing the trays above it which is not difficult but rather inconvenient. If you plan on drying a lot of fruits and vegetables I recommend that you purchase a quality commercial dehydrator like the Excalibur. It is fairly expensive, however it is top quality and designed specifically to use trays efficiently. If you only need to use trays occasionally then modifying your \$10 Jerky Maker is a viable solution.

Also, total capacity of the dryer is relatively small when using trays, as the dimensions of the trays are only 11 1/2" x 11 1/2". You can probably squeeze 5 trays in without too much difficulty, but I usually use 4 with a bit wider spacing between the trays as my wife likes to dry herbs which are rather "fluffy" compared to slices of fruit which are better behaved and lie flat. With 4 trays you should be able to easily dry 4 to 5 baskets of strawberries at one time.

The efficiency of the dryer when using trays is not compromised. The only real drawback is the poor accessibility of individual trays. Food is dried at a low temperature, and this assures that maximum nutritional value is retained.

Below are instructions for adding trays to your Jerky Maker. There may be a more flexible approach, but my goal was to keep costs to a minimum, and construction requiring no power tools and minimal skills. If you built the original \$10 Jerky Maker then you'll have no problem with this modification.

Moving between drying with trays and making jerky is also easy. When using trays just add the lower PVC pipes needed to support the trays and when making jerky just remove all the lower PVC supports as they add no value and could potentially be in the way.

Material List

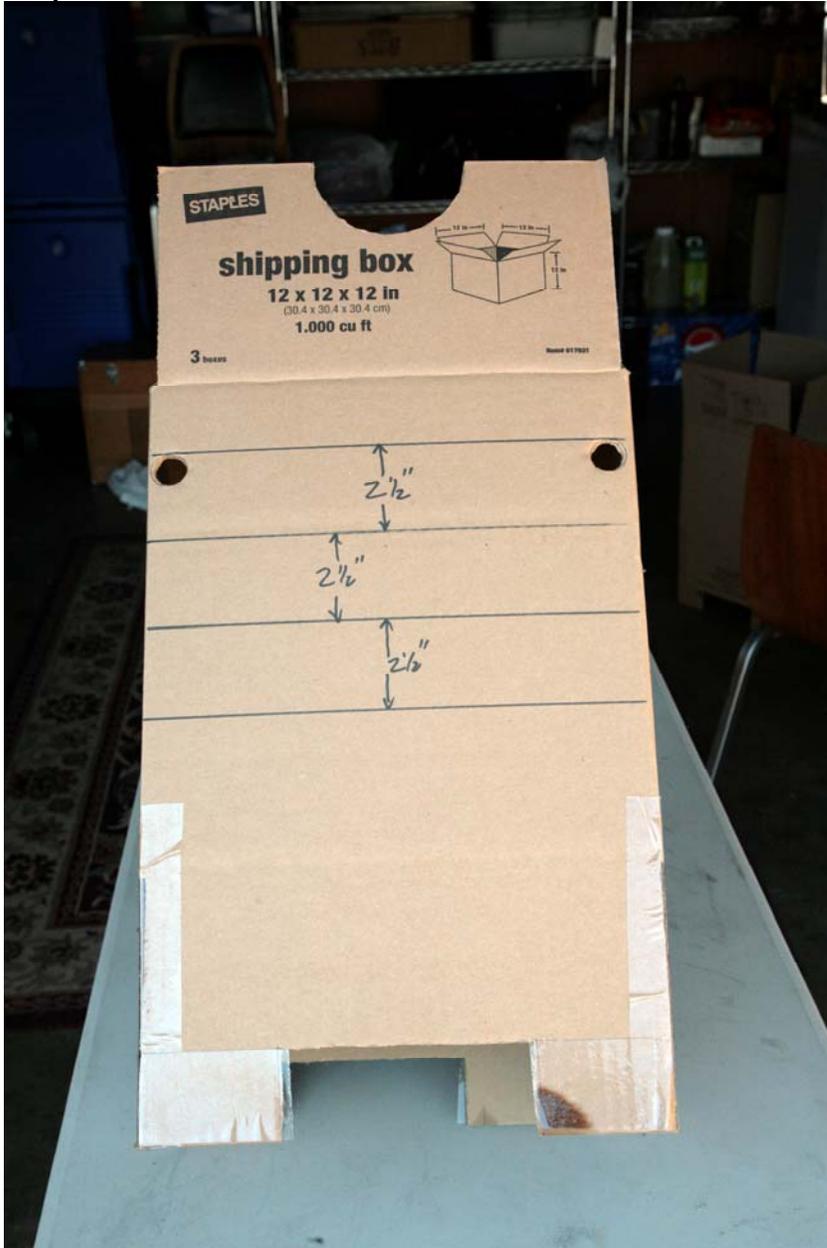
	11 1/2" x 11 1/2" Aluminum Framed Fiber Glass Window Screens	4 ea	Hardware Store	Custom made	
	1/2" Schedule 40 PVC pipe 15" long.	6 ea	Home Depot		\$1.81

The window screens can be ordered from many full service neighborhood hardware stores like ACE or True Value. You can also assemble them yourself from kits available at Lowes or Home Depot, but this will require a metal cutting saw and a bit of skill. I've also seen small local companies like "The Screen Guys" who do nothing but make window screens.

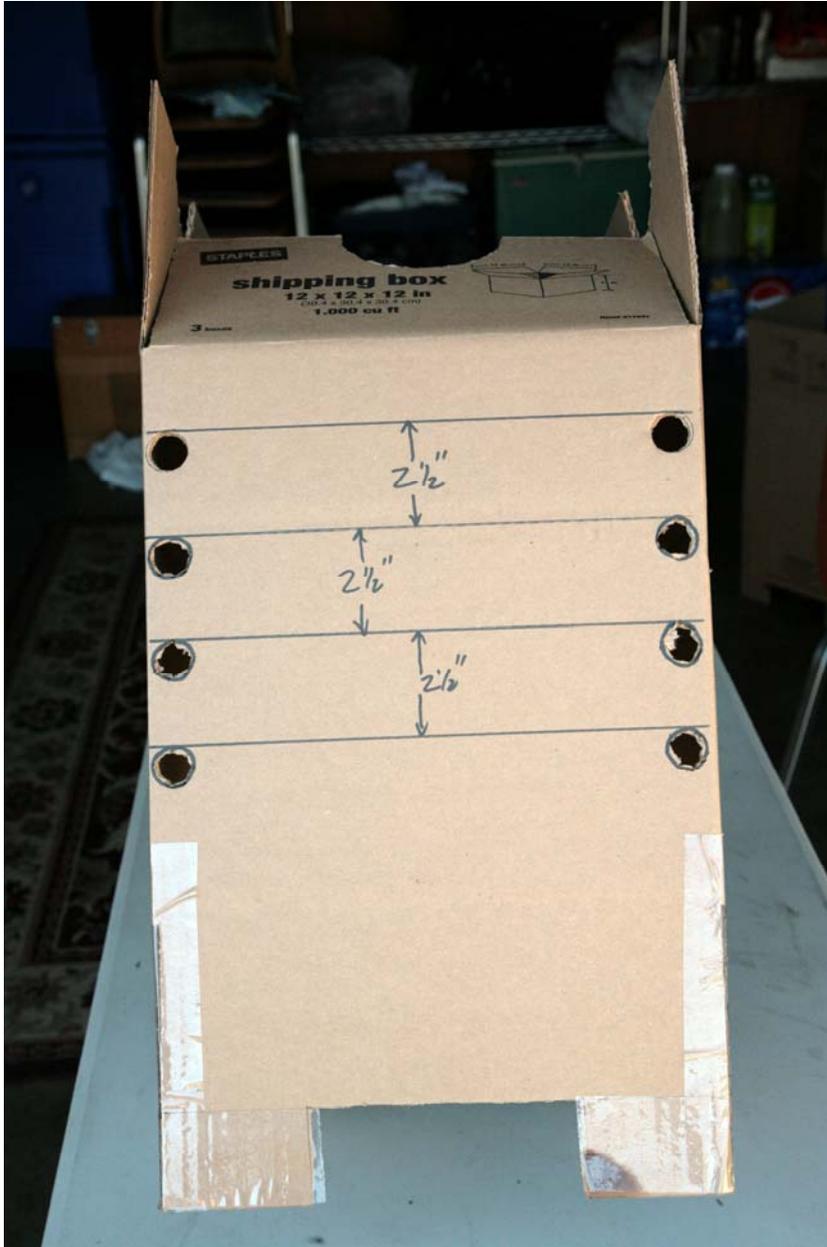
The 6 pieces of PVC pipe can be cut from full 10 ft length which will save a few cents over buying the shorter pieces recommended in the original construction manual.

Assembly

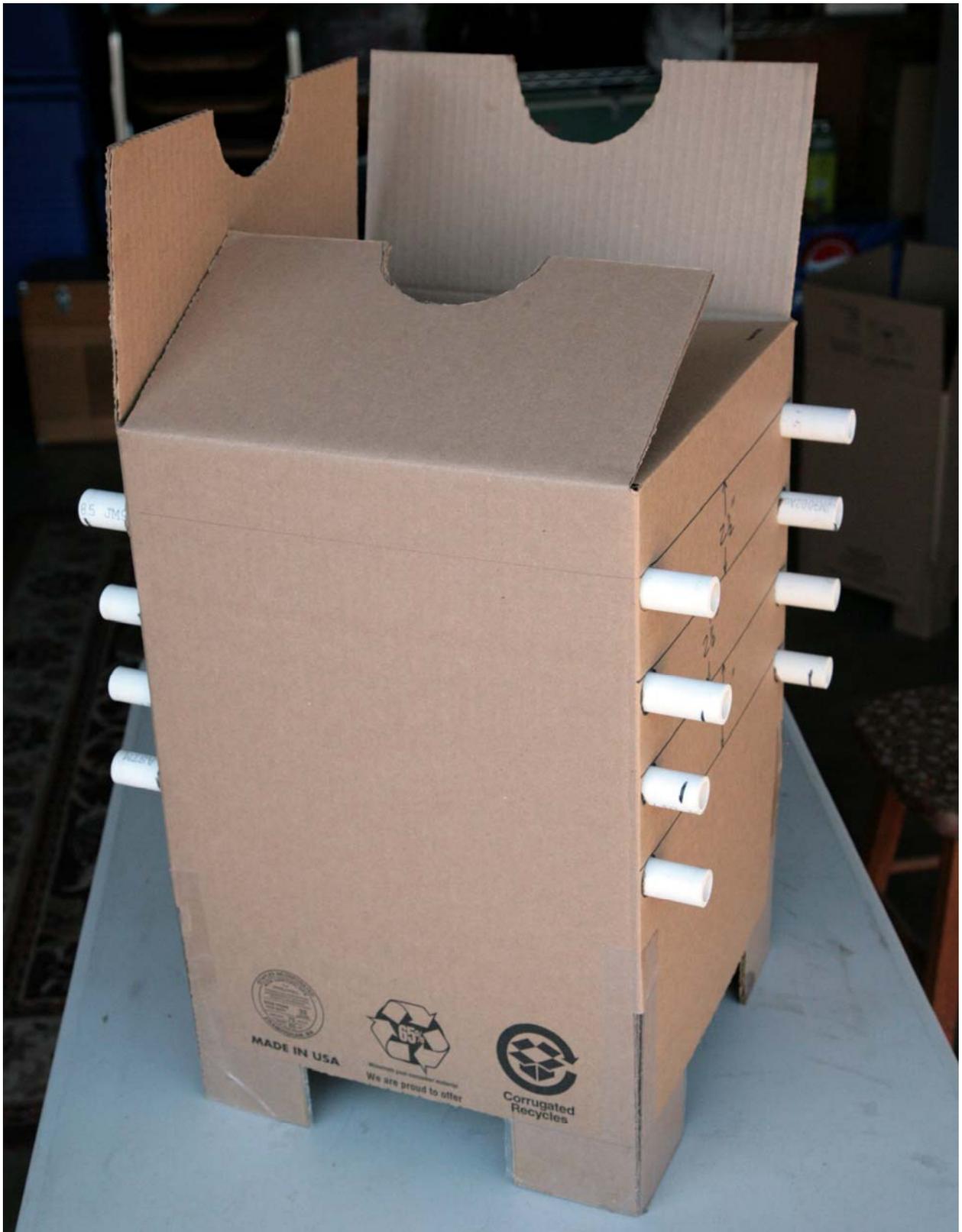
1. Start with a fully assembled \$10 Jerky Maker and remove the PVC pipes.
2. On **both** sides of the box where the original PVC pipes extended through, measure down 2 ½" from the top line used to locate the position of the original PVC pipes and draw a second set of lines, 2 ½" below the second set of lines draw a third set of lines, and 2 ½" inches below the third set of lines draw a fourth set of lines. These lines will be used to locate the position of the additional PVC pipes used to support the trays. You could use 2" spacing to allow for 5 trays but I wouldn't go any less than 2". Also you don't want the bottom trays to close to the heat source. The distance from the very bottom of the box to the lowest line you draw should be no less than 8 or 9 inches.



3. Just as you did when locating and marking the holes for the original PVC pipe supports use a length of $\frac{1}{2}$ " PVC pipe to mark a circle just below each of the 3 new lines you drew in step 2, and as close to the edges of the box as possible. The newly marked holes should be on the same sides of the box and directly below the existing holes. Then cut out the circles, staying inside each circle. You should end up with 12 **new** holes in the box, 6 on the front and 6 on the back that are directly across from each other just like the original holes at the top of the box.



4. . Push the six 15" lengths of PVC pipe through the holes you just cut in the above step and reinstall the original PVC pipes that you previously removed in step one above. Make sure that there is an equal amount of excess pipe sticking out of each side of the box. All of these new pipes will be used to support the trays.



5. Wash and dry the screens using dish washing detergent and hot water to remove any oil or dirt and set aside to dry.



6. Slice fruit like peaches, apples, and pineapple in to slices no thicker than $\frac{1}{4}$ ". Small items like blueberries and cranberries dry quickly if cut in half. Strawberries can be sliced or cut into quarters. Things like apricots can be cut in half but are rather thick so will take several days to dry completely.



7. Arrange the sliced fruit on the trays as close together as possible while still leaving some space to allow the warm air to rise up through the tray. Make sure the fruit slices are only 1 layer deep. If you are drying herbs, arrange them about 1/2" deep over the entire tray. There is usually plenty of space between the stems and leaves to allow the warm air to pass through.



8. To load the dryer, remove all but the lowest set of PVC pipes and then set a tray on these lowest supports.



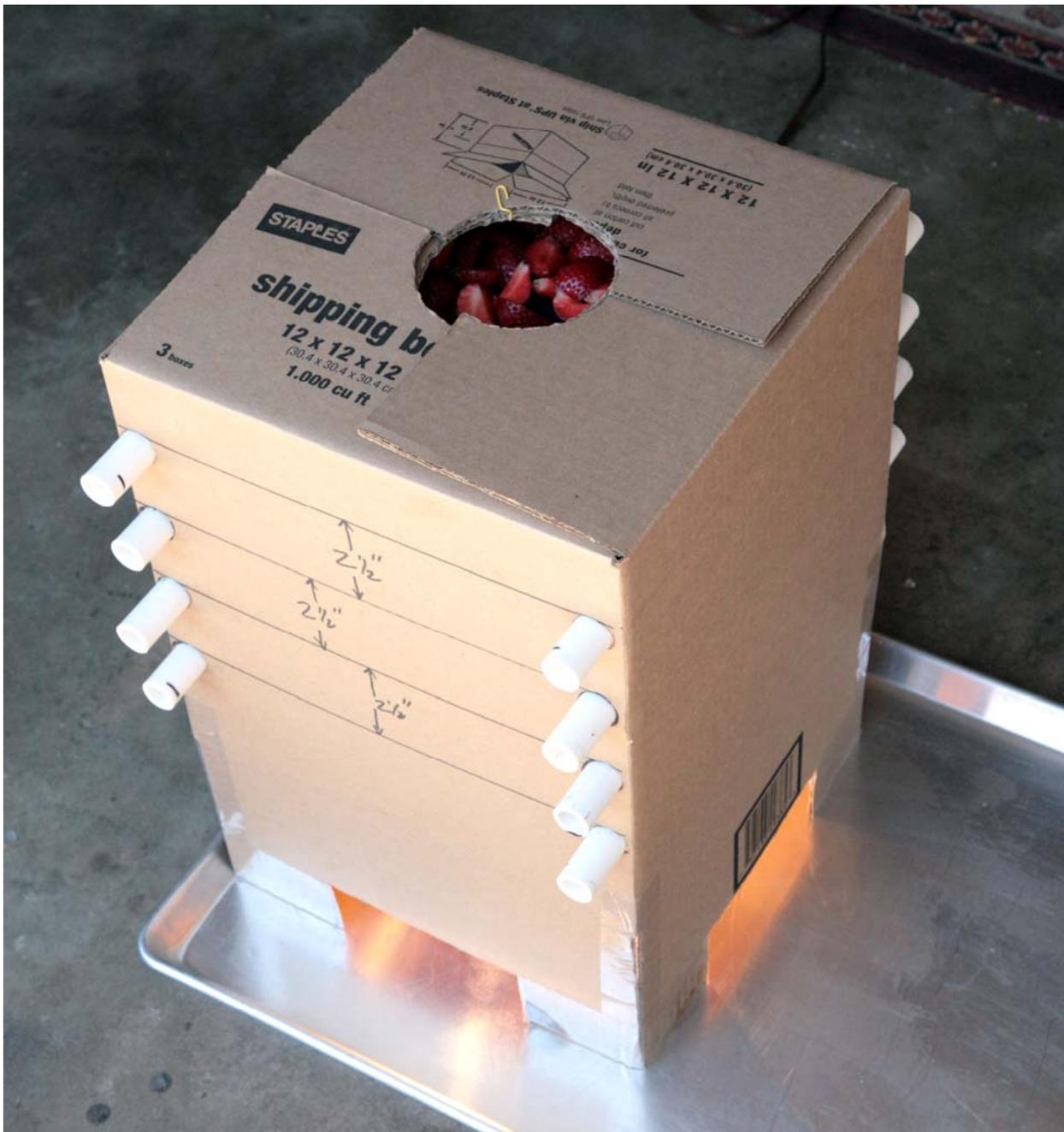
9. Then install the next level of PVC supports and add the next tray.



10. Continue until all pipes and trays are installed. Put trays with thicker items on the lower levels and thinner smaller items on the upper trays.



11. Close the top of the box and turn on the heat source. Allow the dryer to run until the material on the top tray is dry. Then remove the trays by reversing the order you used to install them. If some items didn't dry thoroughly enough then just return them to the dryer until they are done.



Examples of Dried Fruits



Blueberries on the left, Strawberries on the right.

How It Works

Cool air is pulled into the bottom of the box. The air is gently warmed by the light bulb and will rise up through the meat. The heated air will evaporate the moisture from the meat and carry it out the top of the box.

The air flow is very gentle and if you use a 100 watt light bulb the temperature inside the box will be about 20 deg F. warmer than the temperature outside the box. As an example, if the room temperature is 75 deg F then the temperature inside the box will be about 95 deg F. The temperature outside the box can rise to 95 deg and the internal temperature of the box will rise to 115 deg F. which is still low enough that the meat will dry rather than cook. If you dry the meat at temperatures over 120 deg F., it will start to cook and the texture and flavor will change, and quality will suffer.

If you use a 150 watt bulb you will get about a 30 deg temperature rise from ambient. Remember, you want the jerky to dry between 90 deg and 115 deg for best nutrition and taste, but a couple of hours over 120 deg on an exceptionally hot day will not hurt things. It's the overall average high temp for the time of year that determines which wattage bulb you should use. If you use it inside a climate controlled area like the kitchen then it's easy. If your drier is relegated to the garage then the seasonal temps come into play.

A general rule of thumb is to use a 100 watt light bulb when the daytime temperatures where the box is located are consistently above 80 degrees and use a 150 watt light bulb when daytime temperatures where the box is located are consistently below 80 degrees. It's OK for the nighttime temperatures to drop well below these values. It's the average high temperature you reach during the day that you care about.

If you measure the temperature of the air coming out of the top of the box it will be much lower than stated above – especially when the meat is fresh and full of moisture. This is because heat is removed from the air as it evaporates the moisture from the meat. As the meat dries, there will be less moisture to evaporate and the temperature of the air exiting the top of the box will slowly rise and reach its maximum when the meat is fully dry.

The box can be used over and over many times before it will need to be replaced. If you stop making jerky just store the heat source and the PVC pipes and you can make a new box when the spirit moves you to start production again.

I've always preferred a simple dry seasoning mix and that is what is used here. It always tastes wonderful and I find that I never really tire of the flavor. This is also the best approach if the jerky is to be used to make pemmican. Since pemmican is usually used as the primary source of nutrition while backpacking, you want a simple flavor that you will look forward to eating every day. I've tried the soy sauce and brown sugar recipes, but find that they are often a bit overpowering – OK for snack now and then, but not something you can eat day-in and day-out with relish. Jerky recipes abound on the internet. I encourage you to experiment and find what you like best.

I hope you get as much enjoyment from building and using this simple dehydrator as I have over the years. If you find any errors, or have comments or suggestions, I can be reached by e-mail at

lex_rooker@yahoo.com.

April 28, 2008

Lex W Rooker

ADDENDUM

May 1, 2008

Several people have mentioned that their local hardware store doesn't carry Leviton Lamp Holders. They carry Cooper Lighting or some other brand instead, and these other brands don't have the "keyhole" mounting slots that provide a space next to the mounting screw for the cord to exit the front of the lamp holder.

Most lamp holders of the design used in this project are designed to be mounted to either a 4" electrical box or a 3 1/2" or even a 3" electrical box and therefore have additional mounting holes that can be used in the same way that the keyhole slot we used.

These extra mounting holes are usually covered by a thin layer of plastic or ceramic that can be punched out using a screwdriver or other appropriately sized blunt object. An example of an extra hole can be clearly seen in the photo of step 5 of the lamp assembly process. In this case we have the keyhole slot that we can use so we didn't need to use this extra hole though you could if you wanted too. Just make sure there are no sharp edges left after you remove the material that covers this mounting hole. Then push the extension cord through the extra mounting hole (be sure to use the one closest to the center where the light bulb screws in, as you'll be using the outer ones to mount it to the 4" electrical box) and continue with step 5 in the lamp assembly process.