

BUILDING AN EXTENDED OVEN FOR HEAT CURING ANTIQUE CAST IRON HAND PLANE JAPANING



The procedures outlined here make use of two BLACK+DECKER TO3250XSB 8-Slice Extra Wide Convection Countertop Toaster Ovens to produce an oven capable of accepting up to a 24" No. 8 cast iron bench plane for heat curing japanning. This project described here assumes a moderate degree of skill in working sheet metal, Dremel tools and electrical connections. It assumes you will responsibly utilize safety equipment while performing the tasks to avoid injury. It involves cutting, bending, and joining sheet metal which will be sharp. It involved cutting quartz with could shatter. Some of the cutting operations may produce dust that is dangerous and requires appropriate safety measures.

The electrical modifications have not been evaluated or approved by anyone qualified to ensure safety. I highly suggest you have a certified electrician evaluate your modifications to ensure you oven will operate safely. You assume all risk if you choose to follow any of my design.



In addition to a protective eyewear, particulate mask, masking tape, and felt tip marker, you will need the following tools and materials (the pop rivet tool has been eliminated from this build):



BLACK+DECKER TO3250XSB 8-Slice Extra Wide Convection Countertop Toaster Oven, Includes Bake Pan, Broil Rack & Toasting Rack, Stainless Steel/Black
by BLACK+DECKER

★★★★☆ 3,068 ratings

Amazon's Choice for "black and decker 8 slice toaster"

Price: **\$70.27** ✓prime & FREE Returns

Get \$100 off instantly: Pay \$0.00 \$70.27 upon approval for the Amazon Prime Rewards Visa Card. No annual fee.

Available at a lower price from [other sellers](#), potentially without free Prime shipping.

- Extra-Wide Interior - Specially engineered to fit most 9"x13" pans with handles, 8 slices of bread, or a 12" pizza. Internal dimensions are approximately 16.5"x12.5"x9.5"; Maximum Temperature: 450 Degrees
- Fits Most Oven Pans - Use the pans you already have! This spacious oven fits most standard 9"x13" oven pans with handles. That means you can go from straight from oven to table. Plus, the included baking/broiling pan fits perfectly, making it easy to insert and remove food. Toasting rack also included.
- Convection Heating - The powerful convection fan circulates warm air throughout the oven for fast, even baking. Other functions include: baking, broiling, toasting, and keeping food warm. Dedicated Toast Timer - Get perfect toast every time using the dedicated toast timer. It allows for predictable shade selection with every use.
- Temperatures in the oven will be lower than your set point. This is due to advanced heating elements used in this oven. Temperature dial settings have been calibrated to provide expected results for most recipes taking into account the advanced heating elements.
- 60-minute Timer - The 60-minute precision timer features stay-on functionality for longer baking tasks. Dedicated precision toast timer. 3 rack positions for improved cooking flexibility



ThermoPro TP-17 Dual Probe Digital Cooking Meat Thermometer Large LCD Backlight Food Grill Thermometer with Timer Mode for Smoker Kitchen Oven BBQ, Silver
by ThermoPro

★★★★☆ 4,749 ratings

Amazon's Choice for "meat thermometer oven safe leave in"

Price: **\$26.99** ✓prime & FREE Returns

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Available at a lower price from [other sellers](#), potentially without free Prime shipping.

- Although the sensor probe is rigidly produced, after a long-time period of use, a few amount units could experience incorrect temperature readings problem caused by careless or improper use. We will provide you a brand-new sensor probe, free of charge!
- DUAL probe grill thermometer makes it easy to monitor temperatures of two pieces of meat or grill temperature without swapping probes or using different devices! Includes USDA preset temperatures and can also adjust set temperature manually.
- Backlit and large LCD BBQ thermometer displays both food /oven/grill/smoker temps and timer for the most intuitive experience when cooking at night outdoors. Flip-out counter top stand and magnetic back allow the meat thermometer to be placed anywhere within the kitchen or grill environments.
- Oven thermometer with step-down probe design retrieves temperature precisely and quickly, alerting you of temp changes in seconds; 40" stainless steel mesh cables rated for 716°F connects thermometer to base, which is located outside of oven/grill/smoker.
- ThermoPro food thermometer with a temperature range of 14°F to 572°F (-10°C to 300°C) and high accuracy of ±1.8°F (±1°C), can display both Fahrenheit and Celsius readings.



Dremel 426 Fiberglass Reinforced Cut-Off Wheels 1-1/4" Dia., .045" Thick



by Dremel
 ★★★★★ 215 ratings
 Amazon's Choice for "dremel 426"

Price: \$10.66 ✓prime FREE One-Day & FREE Returns

Get \$100 off instantly: Pay \$0.00 \$10.66 upon approval for the Amazon Prime Store Card. No annual fee.

Available at a lower price from other sellers, potentially without free Prime shipping.

5 Diamond Wheels Lapidary Discs Cutting Saw fits Dremel



by Generic
 ★★★★★ 5 ratings

Price: \$4.83 & FREE Shipping

Not eligible for Amazon Prime.

- This is a new set of 5 diamond coated cutting wheels and mandrel
- They can be used with a Dremel tool
- Longevity is assured as the diamond particles are electroplated onto the surface of the metal
- These are all medium grit for cutting or sanding stones and glass
- Each cutting wheel measures approximately 3/4" (19 mm) in diameter

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 Just ask, "Alexa, what are the benefits of eating broccoli?" Learn more about what you can do with Alexa

AIRIC Bullet Connectors Male/Female Kits 100pcs 22-16AWG Wire Connectors Red PVC Insulated Copper Core Quick Splice Bullet Butt Terminals



by AIRIC
 ★★★★★ 62 ratings | 5 answered questions

Price: \$8.59 (30.86 / 10 Items) ✓prime FREE One-Day & FREE Returns

Coupon Save an extra 5% when you apply this coupon. Details

Thank you for being a Prime member. Get \$70 off instantly: Pay \$0.00 upon approval for the Amazon Prime Rev Visa Card. No annual fee.

Size: 22-16 AWG

Color: Red

Number of Items: 100

- AIRIC Crimp Terminals: 100% Brand new high quality insulated crimp terminals connectors, 22-16 AWG
- Material: Tin-Plated Brass + PVC with Built-in extra copper sleeve
- Features: Flared copper sleeve isn't only for easy cable insertion, but also provides a fully connected and reliable connection. Also, can endure strong crimping
- Package Included: 50pcs male bullet connectors and 50pcs female bullet connectors
- High Quality: UL Approved

PROCEDURES

I will refer to the two ovens as the “Dedicated Oven”, the oven that will receive the extension, and the “Donor Oven”, the oven that will be cannibalized for the extension. Pay attention to these terms as any confusion will likely end in failure.

SAVE EVERY SCREW, PANEL, WIRE, PART YOU REMOVE. ALMOST EVERY PIECE WILL BE REUSED FROM THE DONOR OVEN DURING THE BUILD.

PHASE 1 - DISASSEMBLING THE DONOR OVEN AND GAINING SKILLS

We will begin by working on the donor oven. You will become gain experience in overcoming difficult tasks such as the outer shell locking tabs, removing stainless trim pieces, accessing the inner nichrome heating element, and cutting sheet metal with the Dremel. These procedures on the donor oven are more tolerate of mistakes. The dedicated oven procedures that come later will require these skills to avoid failure. Let’s get started with the **DONOR OVEN**.

- A. Unplug oven. If the oven was still plugged in, you may not be qualified to attempt the remaining tasks.
- B. Remove the wire baking rack and drip tray.
- C. Tape plug and cord to back of oven above rear bulge to remain clear when oven is resting on the back.
- D. Remove all front trim screws. Most of the screws are Phillips head, but you may encounter Torx screws of the same size. These Phillips head and Torx screws are interchangeable and do not need to be reinstalled in any specific location.
- E. Tape glass door to the trim to prevent it from falling open.
- F. Remove all black exterior shell screws.
- G. Remove rubber stoppers in oven feet.
- H. Remove screws hidden by rubber stoppers and remove feet. Keep these screws with the feet, they are different size. Reinstall the rubber stopper into the feet to prevent loss. They are larger than all the other oven screws and must be used to secure the feet again.
- I. Using small flat screwdriver carefully pry black shell away from front stainless trip along the non-control panel side of oven. Insert a large flat screwdriver as soon as gap is created by small screwdriver.
- J. Using large flat screwdriver continue to pry black outer shell away from front stainless trim. The retaining tab midway up the side is a locking tab. Using two large flat screwdrivers continue to pry black outer shell away from stainless trim by twisting the screwdrivers inserted between the two pieces near the midway locking tab. Take care not to deform the stainless trim piece. The center of the locking tab will bend back under the force and eventually release the tab.
- K. Repeat process for right side of oven.
- L. Working along the edge to the upper corners continue to pry the black outer shell away from stainless trim. The tabs nearest the corners on each side and nearest the corners along the top are also locking tabs. Use the same technique with two large flat screwdrivers to separate the pieces.
- M. Remove the outer black shell.
- N. Locate the small screws holding the trim around the glass door to the trim around the control panel. There should be one at the top and one at the bottom. Remove and separate the two

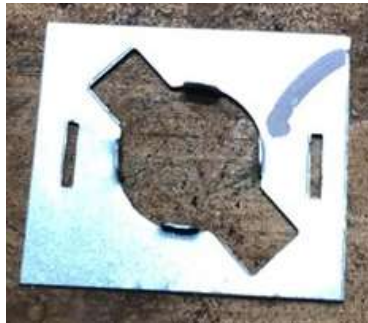
pieces of trim freeing the glass door. Place the glass door in a safe place for reuse should you break the dedicated oven door during the build. The door trim pieces will be reused, take care not to bend them. Remove them completely from the donor oven and store for reuse.

- O. We will now remove the control panel and associated wiring before working to remove the heating elements. Cut the wires leading to the **control panel side** of all four heating elements near the ceramic insulators. You do not need to leave any excess wire on the heating element. DO NOT try to cut through the spade connectors.
- P. Leaving the heating elements in place, you can now remove the control panel and transformer from the donor oven. I recommend saving them should anything fail on the completed oven, but they will not be reused in the build.
- Q. Remove the screws holding the convection fan. Remove the fan.

PHASE 2 - DISASSEMBLING THE DONOR OVEN HEATING ELEMENTS

There are two pair of heating elements, upper and lower. The heating elements consists of a coiled nichrome wire approximately 18 gauge inside a quartz tube. The nichrome element is secured inside the quartz sleeve by a ceramic insulator on each end. The quartz sleeve fits inside the ceramic insulators. On the non-control panel side of the oven the upper elements are electrically joined into a circuit by a 14-gauge wire welded to the spade connectors protruding through the ceramic insulators. The lower element is the same but, flexible fiberglass insulation tubing covers this wire. The right side of the heating elements near the control panel are connected by flexible copper wiring to the transformer. The upper heating element pair will be removed as a unit for reuse. The lower heating element pair will be removed as a unit for reuse.

- A. On the **NON-CONTROL PANEL SIDE**, identify how the upper heating elements are held in place by 1"x 1½" sheet metal pieces known as rotation lock plates. The rotation lock plate is held in place by two small bent over tabs on the outside of the oven. Straighten the 2 small metal tabs holding the upper heating element rotation lock plates to the inner wall of the oven. **DO NOT CUT THE METAL BAR LINKING THE TWO ELEMENTS. These will remain in place for the entire build.**



- B. On the **CONTROL PANEL SIDE** of the oven, cut the wires to the two upper heating elements close to the spade mount where the wire is welded in place. You do not need any additional wire attached to the heating element. **DO NOT CUT THE SOLID WIRE BAR ON THE NON-CONTROL PANEL SIDE OF THE HEATING ELEMENTS.** The non-control panel side of the heating elements must stay joined together with this metal bar.
- C. On the **CONTROL PANEL SIDE**, straighten the 2 small metal tabs holding the rotation lock plates to the inner wall of the oven. Slide the rotation lock plates off the metal tabs freeing them from the oven and remove the rotation lock plates completely.
- D. We will now partially remove the upper heating elements through the non-control panel side of the oven. Rotate the ceramic insulators allowing them to slide through the interior wall of the oven while removing the entire upper heating element assembly out of the oven on the non-control panel side, it is helpful to grasp the metal bar on the non-control panel side joining the two elements for this. **DO NOT DAMAGE THE QUARTZ SLEEVES.**
- E. Place the upper heating element assembly in a safe place for reuse.
- F. Repeat for the lower element.
- G. You should now have just the interior donor oven box.

BUILDING THE EXTENSION BOX FROM THE DONOR OVEN

PHASE 3 – CUTTING THE DONOR OVEN EXTENSION BOX DOWN TO SIZE

- A. Measure along the back of the donor oven panel 12" from the non-control panel side and draw a vertical line. (It may be easier to mark the cut at the top and bottom of this piece, then use masking tape to follow the contour of the back, connecting the lines to guide your cut.)
- B. Extend this line along the top of the donor oven (You can place a square against the back of the oven to extend the line on the top, as the back of the oven is square and perpendicular to the cut line. On the bottom of the donar oven, measure 16" from the left edge.
- C. Cut all pieces along the marked lines (It may be easier to cut the parts if you disassemble the parts).
- D. Reassemble the top/side, rear, and floor of the extension oven. Use a straight edge along the bottom rear and top rear edges to ensure the extension box is square to the dedicated oven.



- E. You now have the extension box top and back piece and the extension box floor ready to attach to the dedicated oven.
- F. Place all the parts of the donor oven in a safe place for later. We will now begin modifying the dedicated oven.

DEDICATED OVEN MODIFICATIONS

PHASE 4 - MODIFY DEDICATED OVEN EXTERIOR SHELL TO RECEIVE EXTENSION

In this procedure we will modify the outer shell of the dedicated oven to accept the extension oven on the non-control panel side of the dedicated oven. We will open the left inner wall of the dedicated oven to allow large hand planes to extend from the dedicated oven into the extension oven.



- A. Unplug oven and tape plug and cord to back of oven above rear bulge to remain clear when oven is resting on the back.
- B. Remove all front trim screws. There may be Phillips head and Torx screws. These screws are the same size and may be replaced in any hole when reassembling.
- C. Tape glass door closed.
- D. Remove all black exterior shell screws.
- E. Remove rubber stoppers in oven feet.
- F. Remove screws hidden by rubber stoppers and remove feet. Keep these screws with the feet, they are different size. Reinstall the rubber stopper into the feet to prevent loss. They are larger than all the other oven screws and must be used to secure the feet again.
- G. Using small flat screwdriver carefully pry black shell away from front stainless trip along the non-control panel side of oven. Insert a large flat screwdriver as soon as gap is created by small screwdriver.
- H. Using large flat screwdriver continue to pry black outer shell away from front stainless trim. The retaining tab midway up the side is a locking tab. Using two large flat screwdrivers continue to pry black outer shell away from stainless trim by twisting the screwdrivers inserted between the two pieces near the midway locking tab. Take care not to deform the stainless trim piece. The center of the locking tab will bend back under the force and eventually release the tab.
- I. Repeat process for right side of oven.
- J. Working along the edge to the upper corners continue to pry the black outer shell away from stainless trim. The tabs nearest the corners on each side and nearest the corners along the top are also locking tabs. Use the same technique with two large flat screwdrivers to separate the pieces.
- K. Remove the outer black shell.

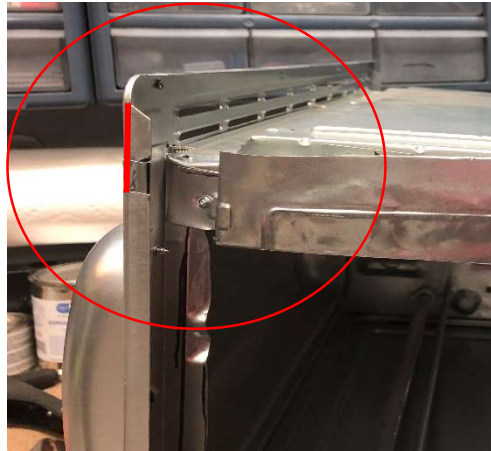
- L. Using metal sheers or a Dremel rotary metal cutting disk, cut the **NON-CONTROL PANEL** side of the black outer shell off along top corner just where the corner begins to bend. This should leave 21 ½' long black outer shell remaining on dedicated oven.



- M. Using the Dremel metal cutting disk cut a slot 1/2" from non-control panel side of black outer shell from front to back. This slot will be used to insert a tab from the new extension shell to tie the two shell together. Do not cut into the small lip along the back used to attach the shell to the oven. Do not cut the tab at the front of the shell that inserts under the stainless trim to secure the shell. You should now have a dedicated oven missing the non-control panel side of the outer shell.



- N. Remove the flange on the back upper left corner of the dedicated oven, circled in red below left (the photo shows a notch cut out of the flange, but the flange should be removed from the bottom of the notch shown all the way up, as indicated by the vertical red line).



- O. Remove the extensions of the dedicated oven sides that project above the top, cutting along the profile of the top (indicated by the two angular red cut lines below. Your oven will not yet have the opening depicted).



PHASE 5 - MODIFY DEDICATED OVEN INTERIOR WALL TO RECEIVE EXTENSION.

- A. Working on the exterior of the non-control panel side of the dedicated oven, layout and mark the opening in the interior wall of the oven where it will be joined to the extension. The opening will consist of two vertical cuts and one horizontal cut at the midline. Flaps will be created that will be folded outwards creating the opening between the dedicated oven and the extension.
- B. Measure down 3/4" from the center of the upper ceramic insulators. Draw a horizontal line on the outside of the interior wall. This will be the upper fold line for the flap that will cover the electrical connections between the dedicated oven and the extension.



- C. Install the baking rack in the lower rack position of the oven. Note the stamping on the non-control panel side of the interior wall where the backing rack is supported. Draw a horizontal line on the inside of the interior wall level with the top of the baking rack when installed in the lowest position. This will be the fold line for the lower flap that will cover the electrical connections between the dedicated oven and the extension. The fold must form a ledge for the rack to sit on. (ignore the rack in the extension, it has been eliminated from this build)



- D. Measure halfway between the upper- and lower-fold lines. Draw a horizontal line. This will be the horizontal cut line for the interior opening. The resulting flaps will be folded outwards from the interior becoming the covers for the new electrical connections between the dedicated oven and the extension oven heating elements.
- E. Draw a vertical line on the outside of the interior wall approximately 1" from where the left wall meets the back wall. This will be the rear vertical cut line and will leave about 1" of the original interior wall as a stiffener.
- F. Draw a vertical line 1" from the center of the front upper and lower ceramic insulators towards the front wall of the oven. This will be the front vertical cut line and will leave about 1" of the original interior wall as a stiffener.
- G. The opening should measure about 5" wide x 8 ½" tall
- H. Using a Dremel rotary metal cutting disk cut the two vertical lines. Then cut the one horizontal line in the middle.
- I. Relocate the glass door retractor spring just below where the lower flap will be bent. Ensure the spring will not contact the heating element connectors. The spring can be attached to the back wall of the oven using one of the screws removed from the donor oven by bending the hook 90° (in red circle below).



PHASE 6 - MODIFYING DEDICATED OVEN HEATING ELEMENTS

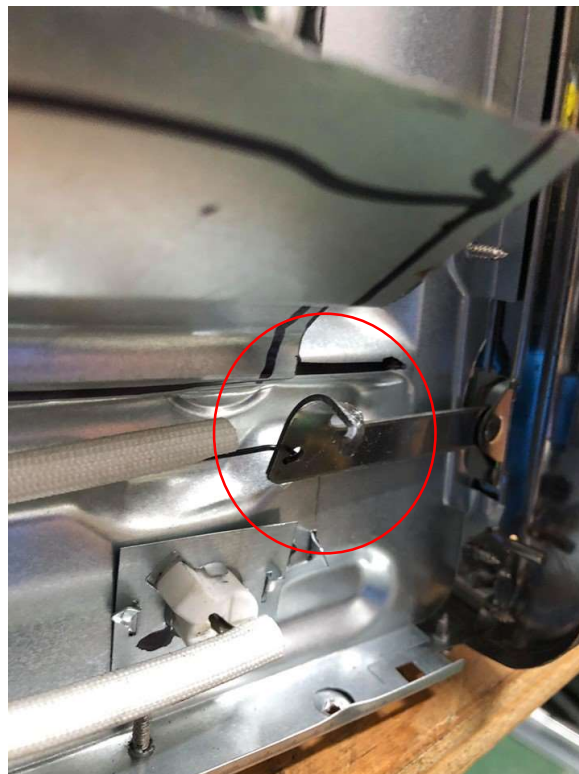
The two upper heating elements are joined on the **non-control panel side** by a metal bar welded to the spade connections extending through the ceramic insulators to complete the electrical circuit on the end of the heating elements. This is the same for the lower two heating elements. In this procedure we will remove this circuit bar, the ceramic insulators and the spade connectors leaving the nichrome heating wire inside the quartz sleeves exposed out the left end of the quartz sleeves and prepare the elements to be joined to the elements of the extension oven using male and female crimp disconnects. You must be able to connect and disconnect the elements from the dedicated oven and the extension to assemble the final oven and for any maintenance.

- A. The **non-control panel side** of the two upper heating elements are connected with a heavy wire bar. Using the Dremel, carefully cut the spade connector between the ceramic insulator and the wire bar. Be careful not to apply force to the ceramic insulator and quartz sleeve. You will need to be able to slide the ceramic insulator off the elements.
- B. On the **non-control panel side**, identify how the upper heating elements are held in place by 1" SQUARE sheet metal pieces known as rotation lock plates. The rotation lock plate is held in place by two small bent over tabs on the outside of the oven. Straighten the 2 small metal tabs holding the upper heating element rotation lock plates to the inner wall of the oven.
- C. One at a time, rotate the ceramic insulators and the rotation lock plate so the insulator can be pulled away from the quartz sleeve by stretching the nichrome wire running through the inside of the quartz sleeves.
- D. Pull the ceramic insulator stretching the nichrome wire until you can cut the nichrome wire where it is crimped into the spade connector. **DO NOT LET THE NICHROME WIRE RETRACT INTO THE QUARTZ SLEEVE.**
- E. Ensure you have stretched the nichrome wire enough, so it does not fully retract into the quartz sleeve. You must be able to attach the new fitting to the nichrome wire. Secure the quartz sleeve and nichrome heating element so they do not fall into interior of dedicated oven. You may tape them to the element guards inside the dedicated oven.
- F. Repeat for the other upper heating element.
- G. Repeat for the lower heating elements.
- H. Examine the original spade connectors and observe how the nichrome wire is doubled up inside the crimp fitting. We will duplicate this for the new connectors.
- I. Straighten enough of the nichrome wire to extend through the ceramic insulator and be attached to a new crimp connector outside of the ceramic insulator. You need matching male/female connectors to attach the dedicated oven heating elements to the extension box element. Spade connectors or bullet connectors will work. The connector will be crimped onto the nichrome wire on the outside of the ceramic insulator unlike the original connection. I suggest you have enough nichrome wire to be able to double it up inside the new crimp connector as you observed on the original space connector.
- J. Run the straightened nichrome wire through the ceramic insulator and through the rotation lock plate of the rear upper heating element.
- K. Reinstall the ceramic insulator into the non-control panel side interior wall ensuring the quartz element is properly seated in the ceramic insulator.

- L. Secure the ceramic insulator and quartz sleeve in place by reinstalling the rotation lock plate into the non-control panel side of the dedicated oven. Bend over the two small locking tabs to secure the heating element assembly into place.
- M. Remove the vinyl insulation from 4 male 22-18 AWG Vinyl insulated female bullet butt connectors.



- N. Attach the male disconnect to the nichrome wire extending out of the ceramic insulator as close to the ceramic insulator as possible.
- O. You should now have a dedicated oven with a 5" x 8 1/2" opening on the non-control panel side with heating elements terminating in female disconnects awaiting the addition of the extension elements.
- P. Finish the non-control panel side box opening by bending the flaps outward along the marked bend lines using care to ensure the baking rack will sit properly in the lowest position. Ensure the flaps have adequate clearance from the ceramic insulators and the lower flap does not interfere with the door spring.
- Q. The door catch located at the lower left of the glass door will catch on the flap when closing. Bend the door catch over 90° to clear the flap and still function (in red circle below).



- R. Place the dedicated oven in a safe place along with all the associated parts until later.

PHASE 7 – ATTACHING THE EXTENSION BOX TO THE DEDICATED OVEN

- A. Slide the extension box onto the dedicated oven. The extension goes on the outside of the dedicated oven. You may have to remove screws near the joint to allow the two ovens to slide together. These can be reinserted later.
- B. Slide the assembly over the dedicated oven ensuring the internal width of the dedicated oven with the extension is at least 25" long (so that a No. 8 plane will fit inside). Ensure the box is square by placing a straight edge along the rear upper and lower joints.
- C. Drill and screw the extension side/top piece to the dedicated oven (red arrows below).



- D. Drill and screw the extension rear wall to the dedicated oven by drilling 5 holes through the extension box rear wall and dedicated oven rear wall and attach with 5 screws (red arrows below).



- E. At this point you should have a dedicated oven with an extension box lacking a front inner wall. The extended oven should still be lacking any of the black outer shell (below)



- F. Using the remaining piece of the floor of the donor oven, fashion a panel to fit into the front of the extension. Leave the new front panel $1\frac{1}{2}$ " to 2" too wide. Bend the left edge of the new front panel 90° to form a $\frac{1}{2}$ " to 1" lip facing outward that will be screwed into the non-control panel side of the extension box. (below in red circles on left. You want to be able to insert screws in a flap of the front panel to secure it to the non-control panel side. The profile cut on this panel is not necessary. Install just in front of the oven rack bulges on the non-control panel side, further forward than the panel illustrated here).
- G. Bend the right side 90° to form a lip facing outward to attach to the dedicated oven remaining right wall. You may have to remove some of the new front panel flap to clear your heating element protection flap covering the lower elements. This front panel does not have to be a perfect fit. Leave room along the bottom for the drip tray to slide in (you will cut down the donor oven drip tray to fit the extension)
- H. Leave this new front panel uninstalled for the next phase of construction.

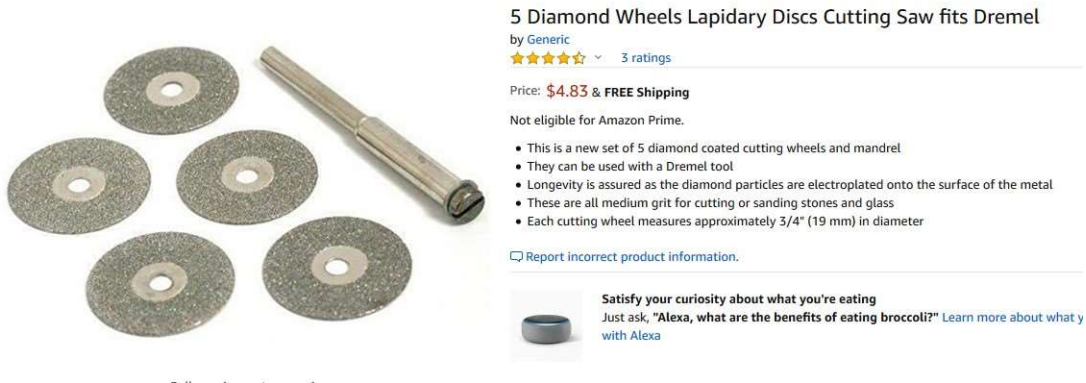
PHASE 8 – INSTALLING EXTENSION BOX HEATING ELEMENTS

At this point you will want to bend the flaps of the dedicated oven slightly out of the way allowing your access to the ends of the dedicated oven heating element ends. Once you establish where the electrical connections between the ceramic insulators will be in step C below, you may want to trip the flaps to they will provide protection from contacting the exposed connections, but not be too large. Also, if you want to reinstall the heating element guards that run parallel to the elements, you will need to cut tabs in the flaps to fold down for the guards to attach to. This is no required but will protect the quartz elements from dropping a plane on them. Or you can modify the donor baking rack to fit the extension also protecting the heating elements. Again, not required for function and a lot of work.

- A. Working on one of the upper heating elements from the donor oven, on the **control panel side (the side without the solid bar)** pull the ceramic insulator away from the quartz sleeve stretching the nichrome wire far enough to cut the nichrome wire. It is OK for the wire to retract into the quartz sleeve. The quartz sleeve will be removed.
- B. Slide the quartz sleeve off the nichrome heating element.
- C. Remove the spade connector from the ceramic insulator. Discard the spade connector.
- D. Repeat for all four extension box heating elements.
- E. You should have 4 quartz sleeves separate from the elements.
- F. You should have 4 loose ceramic insulators.
- G. You should have an upper heating element joined by a wire bar with ceramic insulators on the bar side and the nichrome wire element attached.
- H. You should have a lower heating element joined by an insulated wire bar with ceramic insulators on the insulated bar side and the nichrome wire element attached.
- I. Install one of the loose ceramic insulators into the upper rear opening on the non-control panel side of the extension box and temporarily secure using the rotating lock plate (Don't bend over the tabs, you will be removing these again).
- J. Connect the female bullet electrical fitting to be used for the extension to the corresponding fittings in the upper rear element of the dedicated oven element. This connector is not attached to any nichrome wire yet, this is just for measuring the distance between the ceramic insulators in the extension box for the quartz sleeves.
- K. Side a loose ceramic insulator onto the female bullet electrical fitting to be used for the extension to the corresponding fittings in the upper rear element of the dedicated oven element. You should now be able to measure the distance between the ceramic insulators to determine the length of the upper rear quartz sleeve. **REMEMBER TO ACCOUNT FOR THE QUARTZ THAT WILL FIT INSIDE THE INSULATORS. THIS IS A CRITICAL MEASUREMENT.** The quartz sleeve must be held in place by the ceramic insulators when the final heating element is installed. If it is too long, the element will not fit into the extension box. If it is too short the quartz sleeve will fall onto the nichrome wire and damage the element.
- L. Repeat this for all 4 elements. Each may vary slightly in length. Double check your measurements.
- M. Cutting the quartz sleeves. You must ensure each quartz sleeve is properly cut for each element and that the quartz sleeves are not mixed up and placed on the wrong element for the final

assembly to fit in the extension box. Label the sleeves and the position they fit in the extension oven using a sharpie. You can write directly on the ceramic sleeve.

- N. PRACTICE CUTTING A QUARTZ SLEEVE. The quartz sleeves are long enough to make the shortened sleeves for the extension oven using just two sleeves. This allows you two sleeves as spares should you make any errors. Make a practice a cut on one end of one sleeve. Wrap one end of a quartz sleeve in masking tape and mark off ½” from the end all the way around the sleeve. While wearing safety glasses and a particulate mask, etch the cut line lightly using the diamond wheel on the Dremel tool (see picture below). This will control any cracking and help ensure the sleeve breaks along the line if it should fracture during cutting. On the second pass around the sleeve, you can allow the diamond wheel to penetrate all the way through the wall of the quartz sleeve. Keep this sleeve as a spare.
- O. CUTTING THE ACTUAL QUARTZ SLEEVES. Measure from the fiberglass tape end and mark out the lengths of two extension oven quartz sleeves on one of the quartz sleeves. Label the sleeve so you know where it goes in the extension oven. Wrap the quartz sleeve in masking tape at the cut points and extend the mark all the way around the sleeve. While wearing safety glasses and a particulate mask, etch the cut line lightly using the diamond wheel on the Dremel tool (see picture below). This will control any cracking and help ensure the sleeve breaks along the line if it should fracture during cutting. On the second pass around the sleeve, you can allow the diamond wheel to penetrate all the way through the wall of the quartz sleeve.



- P. Confirm the fit of the quartz sleeves and adjust, as necessary.
- Q. MEASURING THE NICHROME WIRES. Install the lower heating element assembly, minus the quartz sleeves, by threading the nichrome wires through the non-control panel side wall of the extension. Temporarily secure the element assembly using the rotating lock plates.
- R. Align each nichrome wire with the crimp fitting still attached to the heating element of the dedicated oven. Mark to length.
- S. Remove the lower heating element assembly from the extension box.
- T. Cut the nichrome wire 1” shorter than your mark. We will stretch the nichrome wire to fit. This reduces the heating capacity of the element and helps balance the heat in the extension box with the dedicated oven. (The extension box tends to run hotter than the dedicated oven. We want balanced temperatures.)
- U. Repeat this for all the upper heating element assembly.

- V. Straighten about 1" of the cut end of the nichrome wire so you can thread it through a ceramic insulator and attach a butt connector, but DO NOT ATTACH THE CONNECTOR YET.
- W. One at a time, slide the correct quartz sleeve onto the corresponding nichrome element. You will have to stretch the nichrome wire to reach through the ceramic insulator.
- X. Once you have the quartz sleeve seated on into the ceramic insulators on both ends, slide the female bullet butt connector over the end of the wire and crimp firmly. The nichrome wire must be firmly held in place by the crimp.
- Y. Repeat for all four elements. You now have a completed extension box upper and lower heating element assembly with ceramic insulators at each end and female bullet connectors ready to attach to the dedicated oven male bullet butt connectors.
- Z. Feed the lower heating element assembly through the non-control panel side of the extension box and connect the electrical connections to the dedicated oven elements.
- AA. Secure the extension box rotation lock plates. Repeat for the upper element assembly.
- BB. Test oven to ensure all heating elements are functioning.

PHASE 9 – REASSEMBLING THE NEW EXTENDED OVEN OUTER SHELL

- A. I suggest you add 1" of unfaced fiberglass insulation to the top of the dedicated oven at this helps compensate for the voltage loss caused by extending the heating elements into the donor oven. The insulation is placed on top of the dedicated oven inner box and then covered with the black outer shell.
- B. After insulating only the top of the dedicated oven, reattach the black outer shell. Slide the shell on over the lower right end of the oven then slide the outer shell forward to engage the trim tabs. Ensure all the tabs are aligned with the slots before seating the shell to avoid bending the tabs over. It may be easier to work along the control panel tabs first then along the top.
- C. Secure the stainless-steel trim around the glass door of the dedicated oven.
- D. Secure all the screws along the underside and back of the black outer shell of the dedicated oven.
- E. Reattach feet to the underside of the control panel end of the dedicated oven.
- F. Working on the black outer shell of the donor oven, cut off the control panel side of the outer shell leaving as much of the top of the shell as possible.
- G. Test fit the donor oven black outer shell onto the non-control panel side of the extended oven. Mark the length of the top $\frac{1}{2}$ "- $\frac{3}{4}$ " longer than the slot in the dedicated oven black outer shell top. This tab will be inserted into the slot cut earlier.
- H. Mark and cut the front and back edge of the extended oven black outer shell tab so it will slide into the existing slot in the donor oven outer shell.
- I. Do not install the extended black outer shell yet. Final installation will occur after Phase 7 where the stainless-steel trip is cut and installed.

PHASE 10 – FITTING THE STAINLESS-STEEL TRIM AROUND THE EXTENDED BOX

- A. Disassemble the donor oven front stainless-steel trim by removing the screw in the corners of the trim pieces. **Save these screws as they are unique to the trim and will be reused.**
- B. Install the vertical non-control panel stainless-steel trim piece on the extension box using the two screws along the inside front edge.
- C. Measure the upper stainless-steel trim piece to overlap the dedicated oven upper trim by approximately 1". Cut the extended box upper trim piece ensuring there will be approximately 1" overlap on the dedicated oven trim. Set this aside while you measure and cut the bottom trim in the following steps.
- D. Repeat this step for the lower extension box stainless-steel trim piece ensuring the trim will overlap past the rounded end of the dedicated oven at least as far as the glass door line.
- E. Remove the non-control side stainless-steel trim and reattach the newly cut upper and lower trim pieces using the original screws.
- F. Temporarily reinstall the extended box stainless-steel trim piece that now covers the upper, side and lower parts of the extension box.
- G. Trim the lower trim piece to fit around the door and leave enough overlap to secure with a screw from below.
- H. Secure the extended box upper trim to the dedicated oven trim using a screw. If you prefer the two pieces can be joined by the slot and tab method used on the black outer shell for a cleaner look, I will leave that process up to you and your newfound skills.
- I. Secure the entire trim piece to the extended box.
- J. Install the extension box black outer shell being careful to insure the stainless-steel trim tabs are inserted into the corresponding slots in the outer shell. Secure the outer shell with all the screws.

PHASE 11 – INSTALLING THE TEMPERATURE PROBES

- A. Attach one probe from the Digital Cooking Meat Thermometer to the underside of the dedicated oven rack using wire (solid copper 18 gage or heavier is fine).
- B. Install the grate and route the probe wire along the underside of the grate, through the opening between the main oven and the extension box and out the front opening of the extension box.
- C. Attach the other probe from the Digital Cooking Meat Thermometer to the interior left side wall of the extension box using the small tab already mounted to the left wall. Route the probe wire out the front opening of the extension box.
- D. Ensure you identify each probe by labeling the end that plugs into the display.



PHASE 12 – BUILDING THE SECONDARY FRONT WALL FOR THE EXTENSION BOX

- A. Measure the front opening of the extension box. Add 5/8" to top, bottom and left side of the measurement.
- B. Using the extra drip tray from the donor oven, cut out the new extension box front interior wall. Fold the left, top and bottom sides of the cut interior wall to 90° to form locations to secure the panel to the existing extension box using screws. It will be necessary to put short diagonal cuts where the folds meet at the corners.



- C. Ensure the lips of the new panel to not extend beyond the interior edge of the trim (the final outer panel will rest against this edge).
- D. Ensure the digital Cooking Meat Thermometer probe wires are routed under the new interior panel without applying pressure to the wires (it may be necessary to cut a notch in the panel).
- E. Secure the new extension box interior panel to the oven using screw with the probe connections outside the panel.

PHASE 13 – FABRICATING THE INSTALLING THE FINAL BLACK OUTER SHELL FRONT PANEL FOR THE EXTENSION BOX

- A. Measure the opening just inside the extension box stainless-steel trim.
- B. Using the remaining piece of the donor over black outer shell that fit the control panel side, cut a panel to fit inside the stainless-steel trim that till lie against the flat section of the trim.
- C. Either route the probe wires between the black panel and the trim or drill a hole large enough for the probe wires and connectors to fit through approximately 1 ½” to the right of center of the panel. The Digital Cooking Meat Thermometer readout will be secured to this panel using the magnet provided.
- D. Install the black front panel using screw along the top and bottom of the panel.



Your oven is now complete. Test the oven while monitoring it closely for any electrical issues and temperature. The extension box typically heats faster than the main oven, but both should hold a final temperature withing 5^of of each other.