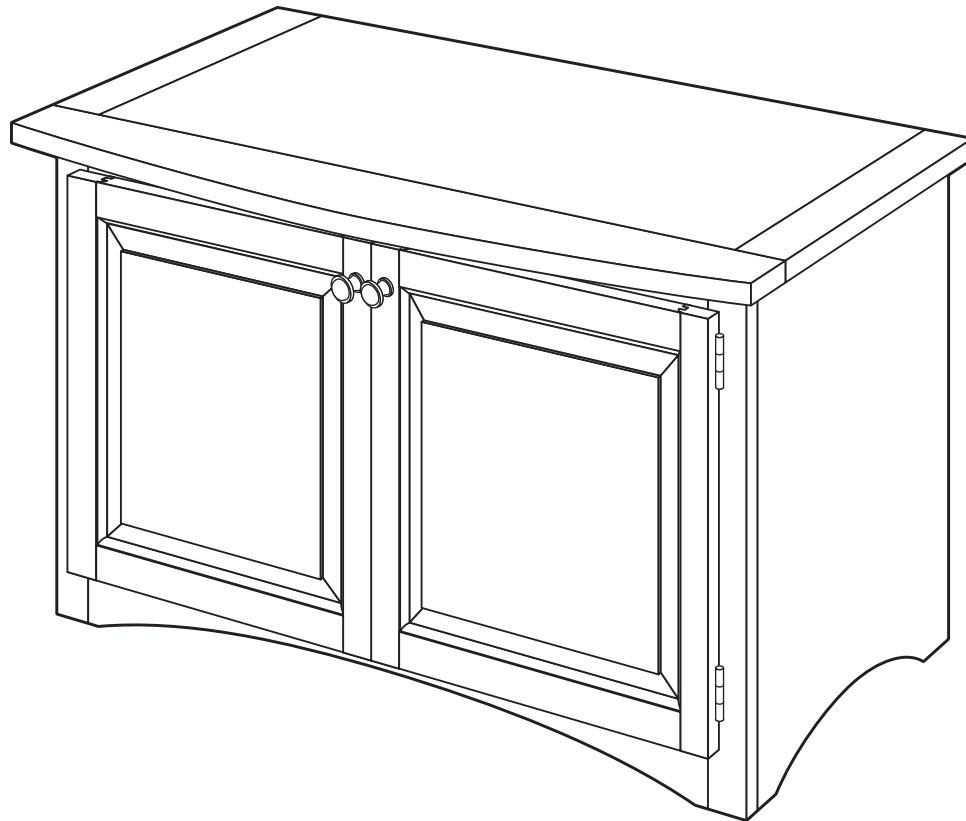




WOODWORKS: ADVANCED PROJECT 2008-2009
TV STAND



For advanced woodworkers, this project is a great exercise in typical cabinet construction. The case, face-frame, doors and drawer are great small-scale samples of how kitchen cabinets and many other kinds of freestanding cabinets are typically built. So once you learn these techniques, you'll be able to apply them to many other kinds of projects involving casework. Besides the basics of making dead-accurate panel cuts, rabbets and dados on the table saw, this project also requires precision drilling, radius cuts, and making and installing drawers, face-frames and doors with solid-wood panels. And when it's all done, you'll learn more about applying and using stains and finishes to protect the wood and keep it looking beautiful.

TOOLS REQUIRED**Hand Tools**

Bar clamps
Wood or rubber mallet

Power Tools

Table saw
Band saw or jigsaw
Jointer
Biscuit joiner
Shaper or table-mounted router
Table-mounted belt sander
Random-orbit sander

Miscellaneous

- Pencil
- Tape measure
- Safety glasses
- Carpenter's glue
- 120-, 150- and 220-grit sandpaper
- Clean, lint-free cloths
- Respirator
- Gloves for finishing
- Mineral spirits (for oil-based stains and finishes)
- Water-filled metal container with tight-fitting lid (for oil-based stains and finishes)
- Minwax® Wood Finish™ Stain Brush or other good quality, natural-bristle brush (for oil-based stains and finishes)

SHOPPING LIST**Wood Recommendation:** Oak**Alternate wood:** Maple

3/4" red oak plywood, 1/2 sheet

1x6 red oak, 18 lineal feet

1/4" birch or maple plywood, 1/2 sheet

Hardware

1-1/4" pocket screws, 8

14" full-extension drawer glides, 2

1/2" overlay partial wrap face-frame hinges, 2 pair

CUTTING LIST

Overall dimensions:

Item	Description	Size & Quantity	Material
A	Case sides	14-1/4" x 18", 2 pcs.	3/4" plywood
B	Case bottom	14" x 29", 1 pc.	3/4" plywood
C	Case rails	4" x 29", 2pcs.	3/4" plywood
D	Face-frame rail, top	1-1/2" x 27", 1 pc.	red oak
E	Face-frame rail, bottom	2-1/2" x 27", 1 pc.	red oak
F	Face-frame stiles	1-1/2" x 18", 1 pc.	red oak
G	Door rails	1-1/2" x 11-11/16", 4 pcs.	red oak
H	Door stiles	1-1/2" x 15", 4 pcs.	red oak
I	Door panels	11-9/16" x 12-5/8", 2 pcs.	red oak
J	Top	14" x 28", 1 pc.	3/4" plywood
K	End bands	2" x 14", 2 pcs.	red oak
L	Front band	4" x 32", 1 pc.	red oak
M	Adjustable shelf	13" x 28-3/8", 1 pc.	3/4" plywood
N	Shelf band	3/4" x 28-3/8", 1 pc.	red oak
O	Filler strip	2" x 14", 2 pcs.	red oak
P	Drawer sides	3" x 14", 2 pcs.	red oak
Q	Drawer front and back	3" x 25-1/8", 2 pcs.	red oak
R	Drawer bottom	12-3/4" x 25-3/8", 1 pc.	1/4" plywood
S	Cabinet back		1/4" plywood

WOOD FINISHING PRODUCTS**Recommended Finish**

Prep: Minwax® Pre-Stain Wood Conditioner
Stain: Minwax® Wood Finish™ English Chestnut
Finish: Minwax® Fast-Drying Polyurethane semi-gloss or
Minwax® Clear Brushing Lacquer semi-gloss

Alternate Finish

Prep: Minwax® Pre-Stain Wood Conditioner
Finish: Minwax® Polyshades® Classic Black or
Honey Pine

BEFORE YOU BEGIN

Good craftsmanship begins and ends with good work habits, so make the following steps part of your routine workshop practice. If you have any doubts or questions about how to proceed with a project, always discuss them with your shop instructor.

- Carefully and fully review plans and instructions before putting a tool to the project lumber.
- Work sensibly and safely. Wear safety goggles when doing work that creates flying chips and sawdust; wear the appropriate respirator whenever making sawdust or working with thinners or other solvents.
- At the end of every work session, clean up your shop area and put away all portable tools.

CUTTING AND ASSEMBLY PROCEDURE

1. Before cutting the plywood components, lay out all the pieces on a scaled sketch in order to minimize waste. When you have the puzzle figured out, cut all the plywood pieces—A, B, C, J, M—to their finished size.
2. Set up a dado head in the table saw. Cut the rabbet at the top of each side (A) and the dado near the bottom. Both are 3/4" wide x 1/4" deep. The bottom of the dado is 1-3/4" from the bottom edge of the plywood (Fig. 1).
3. Cut a 3/8"-wide x 1/4"-deep rabbet along the rear edges of A, B and C to receive the back.
4. Drill the adjustable shelf holes inside the case, located 1" apart as shown in Figure 1.
5. Lay out, cut and sand the curve in the bottom of the case sides. Use the template in Grid 3. The curve starts 2" in from the back, 1-1/4" in from the front and is 1-3/4" high.
6. After sanding the interior faces of the case pieces, glue and assemble the case, making sure it's perfectly square after all the clamps are in place.
7. Rough-cut face-frame pieces—D, E, F—and then mill them to their finished size. A jointer can both work the pieces down to their required sizes while also making all edges smooth and dead-square.
8. Drill screw pockets in the ends of the face-frame rails, D and E. Cut the curve in the bottom of the lower rail, using the template shown in Grid 2. The curve originates 1/2" in from the ends and is 1-3/4" high.
9. Assemble the face-frame with glue and pocket screws. Then glue and clamp the assembled face-frame to the front of the case.
10. Cut the plywood for the top—J—to the correct length, but leave it at least 1" too wide. Cut the end bands—K—about an inch longer than their required dimension. Prep them and the field top for joining by cutting slots for three biscuits on each end. Also cut three slots into the front edge and into the front band (L).
11. Glue the end bands to the top. The end bands can project past only one edge, but both bands must be short of the other edge so there is one straight edge to go against the rip fence in the next step.
12. Allow the end band glue to dry. Set the rip fence on the table saw to a dimension greater than the finished depth of the top, but small enough to cut through both end bands and the edge of the top. Rip the top.
13. Set the rip fence to the finished width of the top. Put the edge cut in the previous step against the fence and make the final cut. This will make the end bands perfectly flush with the front and back edges of the top.
14. Cut the front band—L—to finished length, but leave it wider than the finished width.
15. Lay out, cut and sand the curve in the front band, using the template in Grid 1. The front band is 4" wide at the center, 2" wide at each end.
16. Cut biscuit slots into the straight edge of the front band, aligned with the slots cut into the front edge of the top. Cut slots into the front ends of each end band (K) and corresponding slots into straight edge of L. Glue and clamp the front band to the top. Allow glue to dry.
17. Sand the bands and top to create a perfectly smooth surface, while being very careful not to oversand; it's easy to sand through the thin plywood veneer.
18. Round over the top and bottom corners of the top with router fitted with a 1/4" roundover bit.
19. Carefully measure the opening in the face-frame and calculate the door rail and stile sizes. The doors should be 1" taller than the opening. Plan for a gap of 3/32" between the two doors.
20. Cut the door rails and stiles—G and H—to size and machine them for door joinery. Start by cutting 9/32"-wide x 3/8"-deep grooves along the centers of the inside edges to receive the panels. The best way to center a groove is to run the piece over a dado head, flip the piece end for end and run it through again. Use scrap to get the proper setup of the table saw fence and dado height.
21. Cut 9/32" x 11/32" tongues into the ends of the rails. The best way to center the tongues is to run both sides of the pieces over the dado head set at a height that produces a 9/32"-thick tongue. Use scrap to make test cuts and finalize the height of the dado head.
22. Cut the material for the door panels and join them with biscuits and glue.
23. Dry assemble the door frames and carefully measure the inside opening. Add 1/2" to both dimensions to get the finished size of the panels.
24. Cut the panels to size. Then raise the panels by running the edges through a router or shaper table fitted with a panel-raising cutter. The cuts should produce panel edges that are no more than 1/4" thick. Test how they fit into the grooves of the door-frame pieces. When the panels are right, finish-sand them.

25. Glue the door frames together. Be very careful not to get any glue on the panels, which would limit their ability to “float.” It’s best to stain the panels before the door is assembled.

26. Cut a piece of plywood for the adjustable shelf, M. At this stage it should be 1" too wide and too long. Also cut the shelf band—N—to the correct width, but leave it about 1" too long.

27. Prep the shelf and band for biscuit joining then glue the band to the front edge. The band should project past both ends of the plywood. Allow the glue to dry.

28. With the band set against the rip fence, cut the shelf to finished width.

29. Crosscut one end of the shelf square, cutting through both the band and the shelf. Then cut the shelf to finished length.

30. Machine filler strips—P—to go against the inside of the case behind the face-frame to receive the drawer glides. The face of the filler strips must be flush with the inside edge of the face-frame stiles. Glue the filler strips in place.

31. Cut the drawer sides—Q—to their finished width and length. Cut the front and back—R—to width but leave them a little long.

32. Cut 1/4"-deep x 3/4"-wide rabbets across the ends of the sides, on the inside faces.

33. Calculate the length of the drawer front and back. Follow the instructions that came with your drawer slides. Typically, the finished drawer can be up to 1-1/16" smaller than the opening it is fitting into.

34. Cut the front and back pieces to the finished length. Cut a 1/4" slot in all four drawer pieces to receive the bottom, as shown in Figure 2.

35. Dry assemble the drawer sides, front and back, and measure the inside dimensions. Add 7/16" to both dimensions to determine the size of the drawer bottom, S. Cut the bottom to size.

36. Sand the interior faces of all drawer parts. Glue the drawer together, being very careful that it’s perfectly square when clamped.

37. Follow the manufacturer’s instructions and screw the drawer slides to the case and drawer. Assure the drawer operates properly. Adjust as needed. Then remove the slides from both the case and drawer in preparation for finishing.

38. Screw the top to the case. The top should be even with the back and centered left and right.

39. Fasten the hinges to the doors. Locate the bottom hinge so it doesn’t interfere with the drawer slides.

40. Fasten the hinges to the face-frame. Adjust as needed so the doors operate properly. Drill the doors for pulls. Before finishing, remove the hinges.

41. Cut and install the back—T—with glue and 4d finish nails.

STAINING AND FINISHING

Woodworker’s Tip: *Though you may be tempted to cut short your sanding, preparation and application time, don’t do it. These tasks are very important steps in obtaining a high-quality finish. Remember, it is the finish, just as much as the fit and smoothness of the parts that will have great bearing on how people judge your craftsmanship. To ensure an excellent result, follow the steps listed in this section and also the instructions the finish manufacturer puts on its products.*

FINISHING TIPS

- Test the stains and finishes you are planning to use on scraps of wood. On the back of the scrap, mark the stain/finish combination and the type of wood. Allow all samples to dry thoroughly before making your final finish selection. Save your samples for quick reference on future projects.
- All stains and finishes must be allowed to dry thoroughly between coats. Remember that drying times can vary due to humidity and other climatic conditions.
- If you have some leftover stain or finish, wipe the can rim so that stain or finish in the rim won’t dry out and prevent the lid from forming a tight seal.
- Brushes used for oil-based finishes must be cleaned with mineral spirits.

42. Finish-sand any remaining rough spots with 220-grit paper. Dust off the piece and wipe it carefully with a clean, lint-free cloth lightly dampened with mineral spirits.

Recommended Finish

43. Apply the Minwax® Wood Finish™ you’ve chosen using a natural-bristle brush and a clean, lint-free cloth following the directions on the can. The brush will help you get the stain into the inside corners. Allow the Wood Finish™ to set for about 5 to 15 minutes, then wipe off any excess. To achieve a deeper color, you may apply a second coat after 4-6 hours, repeating the application directions for the first coat. Allow the stain to dry for 24 hours before applying the protective clear finish. Choose either Minwax® Fast-Drying Polyurethane or Minwax® Clear Brushing Lacquer but not both.

Woodworker’s Tip: *When wiping off stain, make certain that your last wipe with the cloth goes with the grain of the wood. This way, any stain you might miss during wipe-off will be visually minimized by the wood grain.*

Applying Fast-Drying Polyurethane

44. Apply Minwax® Fast-Drying Polyurethane following the directions on the can. Use a good quality, natural-bristle brush. Allow the first coat to dry overnight.

45. The next day, sand all surfaces lightly with 220-grit or finer sandpaper using with-the-grain strokes. Dust off and wipe all surfaces with a cloth lightly dampened with mineral spirits. Apply a second coat of polyurethane and set the piece aside to cure overnight.

46. The following day, sand all surfaces lightly with 220-grit sandpaper. Dust off and wipe the piece with a cloth lightly dampened with mineral spirits and apply the third and final coat of polyurethane.

Applying Clear Brushing Lacquer

47. Stir Minwax® Clear Brushing Lacquer well before and during use to rotate the product from the bottom to the top of the can. NEVER SHAKE.

48. Apply a coat of lacquer using a high-quality natural- or synthetic-bristle brush. Apply sufficient lacquer to seal open joints, edges and end grain.

49. Let the first coat dry at least 2 hours, then apply a second coat.

50. Apply a third coat, repeating the steps above for each coat. Apply a fourth coat, if desired.

51. After the final coat, allow at least 24 hours before using.

Alternate Finish

52. Apply Minwax® Polyshades® following the directions on the can. Use a good quality, natural-bristle brush suitable for use with polyurethane. Stir the can contents thoroughly before starting and periodically repeat stirring during your work session. Allow the first coat to dry overnight.

53. The next day, sand all surfaces lightly with 220-grit sandpaper or very fine (000) steel wool using with-the-grain strokes. Dust off and wipe all surfaces with a cloth dampened with mineral spirits. Apply a second coat of Polyshades® and set the rack aside to cure overnight. To achieve a deeper color, you may apply a third coat after 4-6 hours, repeating the application directions. Allow the finish to cure for several days before using the stand.

Woodworker's Tip: *If you achieve the desired color on the first or second coats of Polyshades®, apply a clear coat of Minwax® Fast-Drying Polyurethane or Minwax® Wipe-On Poly for added protection.*

54. When the staining and finishing is complete and the topcoat is cured, install the doors, knobs and drawer.

PRODUCT SAFETY

For your safety and the safety of those you work with, always read the safety warnings, which manufacturers print on their labels, and follow them to the letter.

WARNING! Removal of old paint by sanding, scraping or other means may generate dust or fumes that contain lead. Exposure to lead dust or fumes may cause brain damage or other adverse health effects, especially in children or pregnant women. Controlling exposure to lead or other hazardous substances requires the use of proper protective equipment, such as properly fitted respirator (NIOSH approved) and proper containment and cleanup. For more information, call the National Lead Information Center at 1-800-424-LEAD (in U.S.) or contact your local health authority.

DANGER: Rags, steel wool, other waste soaked with oil-based stains and clear finishes, and sanding residue may spontaneously catch fire if improperly discarded. Immediately place rags, steel wool, other waste soaked with this product, and sanding residue in a sealed, water-filled metal container. Dispose of in accordance with local fire regulations.

When using oil-based wood finishing products:

CAUTIONS: CONTAINS ALIPHATIC HYDROCARBONS.

Contents are **COMBUSTIBLE**. Keep away from heat and open flame.

VAPOR HARMFUL. Use only with adequate ventilation. To avoid over-exposure, open windows and doors or use other means to ensure fresh air entry during application and drying. If you experience eye watering, headaches, or dizziness, increase fresh air, or wear respiratory protection (NIOSH approved), or leave the area. Avoid contact with eyes and skin. Wash hands after using. Keep container closed when not in use. Do not transfer contents to other containers for storage.

FIRST AID: In case of eye contact, flush thoroughly with large amounts of water for 15 minutes and get medical attention. For skin contact, wash thoroughly with soap and water. In case of respiratory difficulty, provide fresh air and call physician. If swallowed, call Poison Control Center, hospital emergency room, or physician immediately.

DELAYED EFFECTS FROM LONG-TERM OVEREXPOSURE.

Contains solvents which can cause permanent brain and nervous system damage. Intentional misuse by deliberately concentrating and inhaling contents may be harmful or fatal.

WARNING: This product contains a chemical known to the State of California to cause cancer and birth defects or other reproductive harm. **DO NOT TAKE INTERNALLY. KEEP OUT OF REACH OF CHILDREN.** CONFORMS TO ASTM D-4326. Contact a physician for more health information.

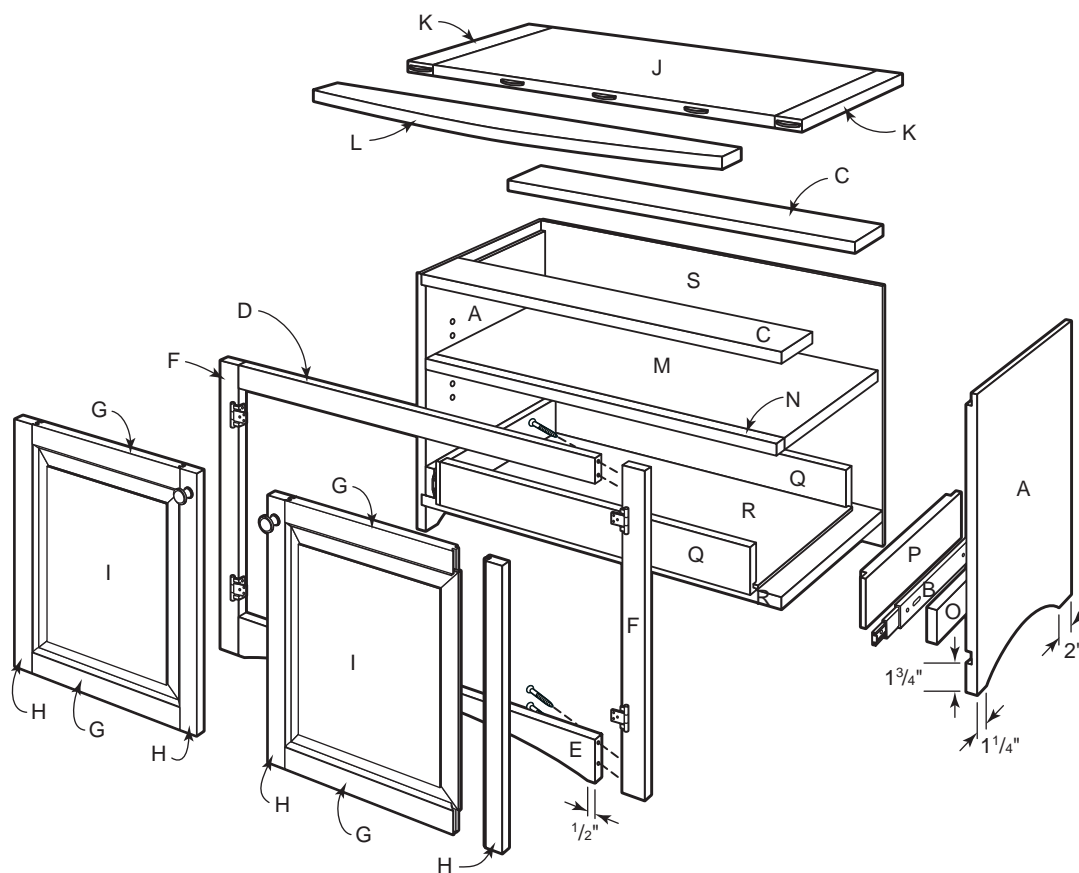
When using water-based wood finishing products:

CAUTIONS: Use Only With Adequate Ventilation. To avoid overexposure, open windows and doors or use other means to ensure fresh air entry during application and drying. If you experience eye watering, headaches, or dizziness, increase fresh air, or wear respiratory protection (NIOSH approved), or leave the area. Avoid contact with eyes and skin. Wash hands after using. Keep container closed when not in use. Do not transfer contents to other containers for storage.

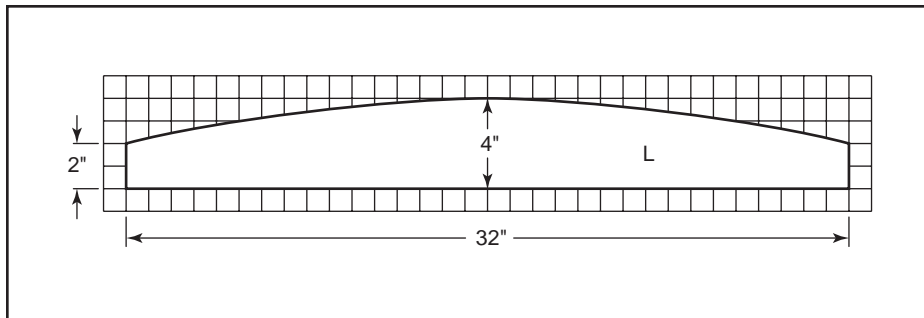
FIRST AID: In case of eye contact, flush thoroughly with large amounts of water. Get medical attention if irritation persists. If swallowed, get medical attention immediately.

WARNING: This product contains a chemical known to the State of California to cause cancer and birth defects or other reproductive harm. **DO NOT TAKE INTERNALLY. KEEP OUT OF REACH OF CHILDREN.** CONFORMS TO ASTM D-4326. Contact a physician for more health information.

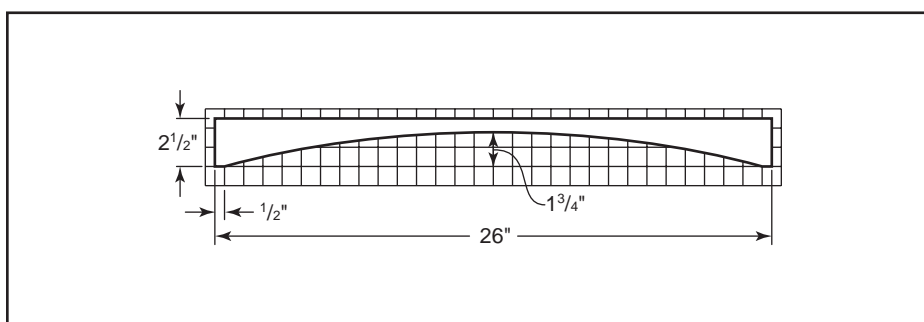
FIG 1.



GRID 1.



GRID 2.



GRID 3.

