# The Unity Way Church Sound Desk

## I. Introduction

This document will attempt to show and explain the thoughts that went into the construction of the sound desk at Unity Way Church. The desk was designed for our Allen-Heath GL3300-832D sound console and the other outboard gear we own. I did not include every dimension. This would have been very difficult and I probably would have made a mistake, causing you to miscut some of your materials. I have included the important dimensions and will discuss how to determine the rest of the process to fit your console and needs.

## II. Our Design

This desk was designed using a 19 inch rack as the standard unit for each module. To insure the fit of all the electronic components, the 19 inch measurement was stretched to 19 1/8 inches, allowing for minor misalignments. Our desk is 3 racks wide, which leaves a rather tight leg space. Although I can get both of legs in it comfortably, I find that this puts me too close to the console and thus I tend to move the chair back. I usually end up with one leg in the leg area and one out. If you want, you can widen the leg space and use spacer blocks on the ends of the middle upper rack space. I have also included a couple of sketches of 4, 5 and 6 rack desks. You can adapt these as you wish to fit your needs. The calculations are the same.

To determine the height of the desk, we used 16 rack units, (one rack unit is 1 3/4 inches). We also used 4 inch casters, which are about 5 inches high overall. This gives a surface height of about 34 inches and puts the surface of the console at 37 inches, which is comfortable when using a stool, tall chair or standing.

The upper racks are three units high. I thought about taller upper racks, but after mocking it up, found that I couldn't see over the top comfortably. I hated giving up that space, but it turns out that it hasn't been a problem. We fit three compressors, two effects units, a CD recorder and a CD player in the upper racks without any problems.

The lower rack forms the right leg pedestal. We put it on the right because all of our sound team is right handed. The left pedestal is filled with drawers, but is made to the same dimensions as the right pedestal so that the drawers can be removed and replaced with rack rails if we need the rack space. We also sized the vertical measurement of the drawers in rack units, so they can be removed and replaced with rails one at a time if we want. The back of the rack pedestal was routed out, leaving about 3 inches around the edge for strength, allowing us to route the cables to the equipment mounted there. It is a bit of a reach, so be sure you have someone on the team that has long arms!

The main part of the desk was constructed out of black melamine coated particle board. Although not very strong by itself, once built into boxes and braced, it is very strong. The panel at the back of the pedestals runs the full length of the desk and is screwed to the side panels. The inner pedestal sides are screwed to the back panel and the desk surface. Use a good blade specially made for working with laminates. Standard blades can cause a lot of chip outs, which will look bad later. I used the Forrest Duraline AT blade on ours. Freud makes good blades too.

The one thing I would have changed on our desk would have been to add a stiffener in the leg space, which is shown on the plans. This makes a very rigid assembly. All exposed edges of melamine particle board were covered with solid wood strips 3/8" wide x 3/4" tall, secured with glue and pin nails.

We used a good grade of 3/4 inch plywood for the bottom of the pedestal sections and fastened on four casters under each pedestal. This plywood is let into dadoes on each side and back of the pedestal to provide a supporting ledge, and then screwed to the sides and back. The plywood carries the entire weight of the desk, about 500-600 lbs total.

On our desk, the two bays resulted in 8 casters total. If you are going to make a larger desk, adjust things accordingly. We used good, urethane casters that won't take a set from sitting in one place all the time, and had a load rating of 150 pounds each. This gives a total of 1200 pounds of load capacity – plenty for this application. The desk rolls easily, even on our industrial carpeted floor.

All of the melamine parts were connected with 1/4 inch deep dado joints, cut with a router, then glued and fastened with 7x50 mm Confirmat screws. You can order them from McFeeley's: www.mcfeeleys.com. You will also need the correct bit to drill the multi-dimensioned holes. It is also available from McFeeley's. It is possible to use drywall screws, but the Confirmat fasteners make a much stronger joint and are worth the cost difference. We used a couple of hundred fasteners on our desk. Fasteners that show on exposed surfaces were covered with stick-on circular melamine covers. You can get them at stores that supply the cabinet building industry.

The melamine carcass is wrapped in decorative panels on the two sides and back that hide the fasteners. The rear of the cabinet wrapper forms the doors that open to provide access to the cabling, power, etc. We used 270 degree overlay hinges so that the door can be opened until it is along the sides of the desk to get them out of the way. The hinges were from Rockler hardware (Part Number 15455): www.rockler.com. NOTE: These are not Euro style hinges. Euro or Blum style hinges are not strong enough to hold up the doors, which are quite wide and fairly heavy. If you can't get the overlay hinges, use piano hinges.

The wrapper was constructed of solid wood for the rails and styles, and matching1/4 inch plywood for the panels. We used oak to match our other furnishings. The wrapper pieces are 1/2 inch larger in each dimension than the melamine carcass after the melamine edges were covered with solid wood. This gives a pleasing edge detail and forms a lip around the top so things don't roll off. The only really tricky part about the wrapper is making the angled pieces. You could make yours at 90 degree angles instead, but it would make the desk look blocky. The wrapper panels are screwed onto the melamine carcass with #10 x 1 1/4 inch flathead sheet metal screws. They hold better than regular wood screws.

We used standard raised panel router bits to make the rails and styles of the wrapper, and then glued everything up. Because the plywood panels don't expand and shrink with humidity changes, you can glue the plywood panels in the grooves. This forms panels that are very strong, so you won't have to worry about the rear doors sagging. The rear doors were glued up as one panel and then cut apart. The 1/8 inch of material used by the width of the saw cut will give you the right spacing between the doors.

We used a couple of 1/2 inch diameter rare earth magnets, magnet cups and magnet keepers from Rockler to hold the doors closed. The magnets are located along the top shelf of the desk. A small tab of wood at the bottom of one door keeps them in alignment vertically.

Sand all of the exposed wood surfaces to 220 grit, making sure to remove all planer marks. While finishing the desk, use synthetic wool pads between coats to smooth and level the surface.

We finished the desk with a one-step stain and varnish finish. BIG mistake! HUGE! There is a lot of surface on this thing and it was hard to get a consistent finish. I recommend that you use separate stain and finish. Use at least a couple of coats of clear to give the desk some durability. If you have spray finishing equipment, use it.

It took us about 100 man hours to complete the desk. It was a lot of fun and fellowship. During glue-up, we had three people, which helped a lot. The desk is big and melamine is heavy, so more than one person is essential. You might want to think about gloves during cutting and glue-up of the melamine. The edges are sharp. Our desk has several permanent DNA samples imbedded in it.

## III. Designing Your Desk

The first thing you have to do is measure your sound console. Use actual measurements in case any the dimensions on the vendors diagram are incorrect. You will need the width, depth, overall height, height at the front of the desk and height at the meter bridge base.

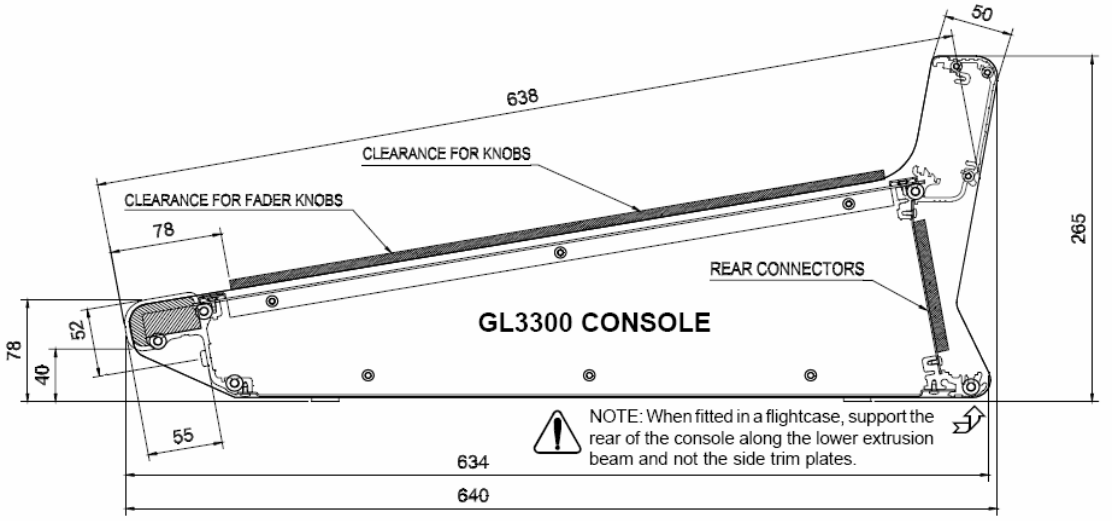
To determine the depth of the work surface, add 6 inches to the depth of your console to allow for connectors in the back and some space in the front. The overall depth of the desk is 6 more inches, giving room for cable routing, power strips, etc.

To determine the width of the desk, divide the width of your console by 19 7/8 inches and round up to the next whole number. This is the number of rack bays that is necessary to accommodate your console and still keep the rack schema. Final calculations are shown in the example below.

The height from the desk support surface to the bottom of the upper rack spaces is determined by the overall height of your console while sitting on its feet. Add 1/2 inch to this value to leave enough space to slip the cover on the console.

The vertical dimension of the front of your console, plus 1 inch, is the measurement for the start of the slope of the side of the cabinet. Slope the side up to meet just below the rack spaces, at an angle that you find pleasing. I tried to make ours follow the slope of our GL3300 console.

Here is how the dimensions of the console were used to figure the dimensions of the melamine carcass:




**UNPACKED MEASUREMENTS in mm (inches)**

| | WIDTH | DEPTH | HEIGHT | WEIGHT in Kg (lbs) |
|---|---|---|---|---|
| **GL3300- 816** | 771 (30) | 634 (25) | 176 (7) | 21 (46) |
| **GL3300M- 824** | 1026 (40) | 640 (25) | 265 (10) | 33 (73) |
| **GL3300M- 832** | 1281 (50) | 640 (25) | 265 (10) | 42 (93) |
| **GL3300M- 840** | 1536 (60) | 640 (25) | 265 (10) | 51 (112) |
| **GL3300 Expander** | 255 (10) | 640 (25) | 176 (7) | 8 (18) |
| **RPSD2** | 482 (19) | 145 (6) | 45 (2) | 2.5 (6) |
| **RPS9 PSU** | 482 (19) | 135 (5) | 96 (4) | 6 (13) |
| **RPS11 PSU** | 482 (19) | 232 (9) | 133 (5) | 10 (22) |

From the manufacturer's diagram, we get:

| | |
|---|---|
| Overall height: | 10 1/2 inches (Notice the mistake in the table? 265/25.4=10.43) |
| Front height: | 3 inches |
| Overall depth: | 25 1/4 inches |
| Overall width: | 50 1/2 inches |

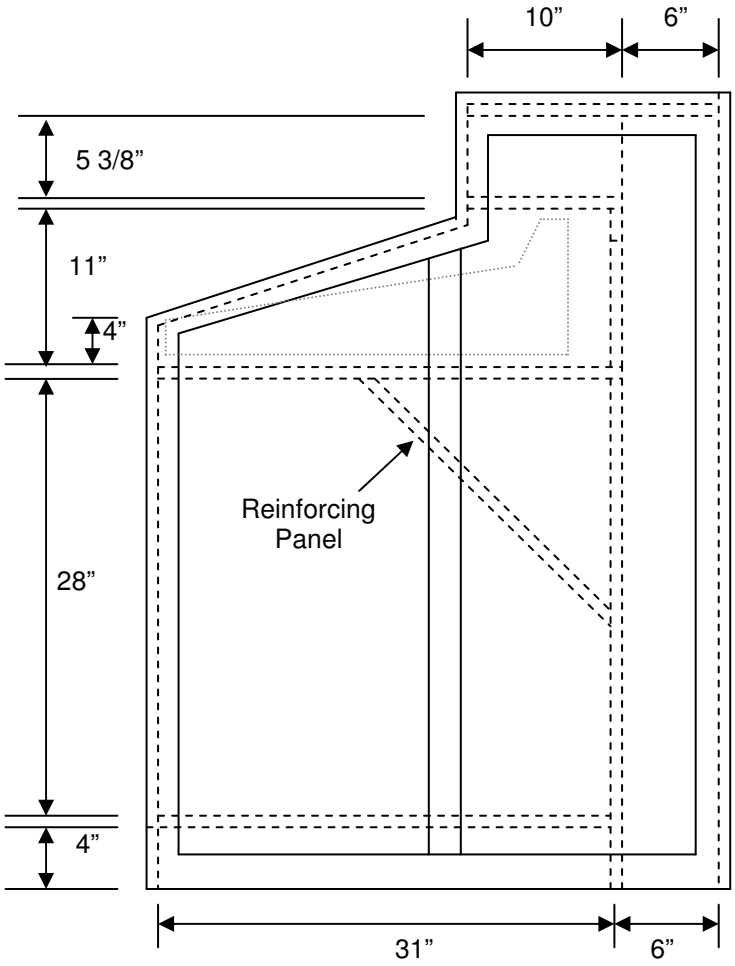
Now we can calculate:

Depth of desk surface = 25 1/4” + 6” = 31 1/4”, round to 31”.
Height from desk surface to bottom of upper racks = 10 1/2” + 1/2” = 11”
Width of desk = 50 1/2” ÷ 19 7/8” = 2.5, round up to 3 bays.
= (19 1/8” x 3) + (2 x 3/4”) = 58 7/8”

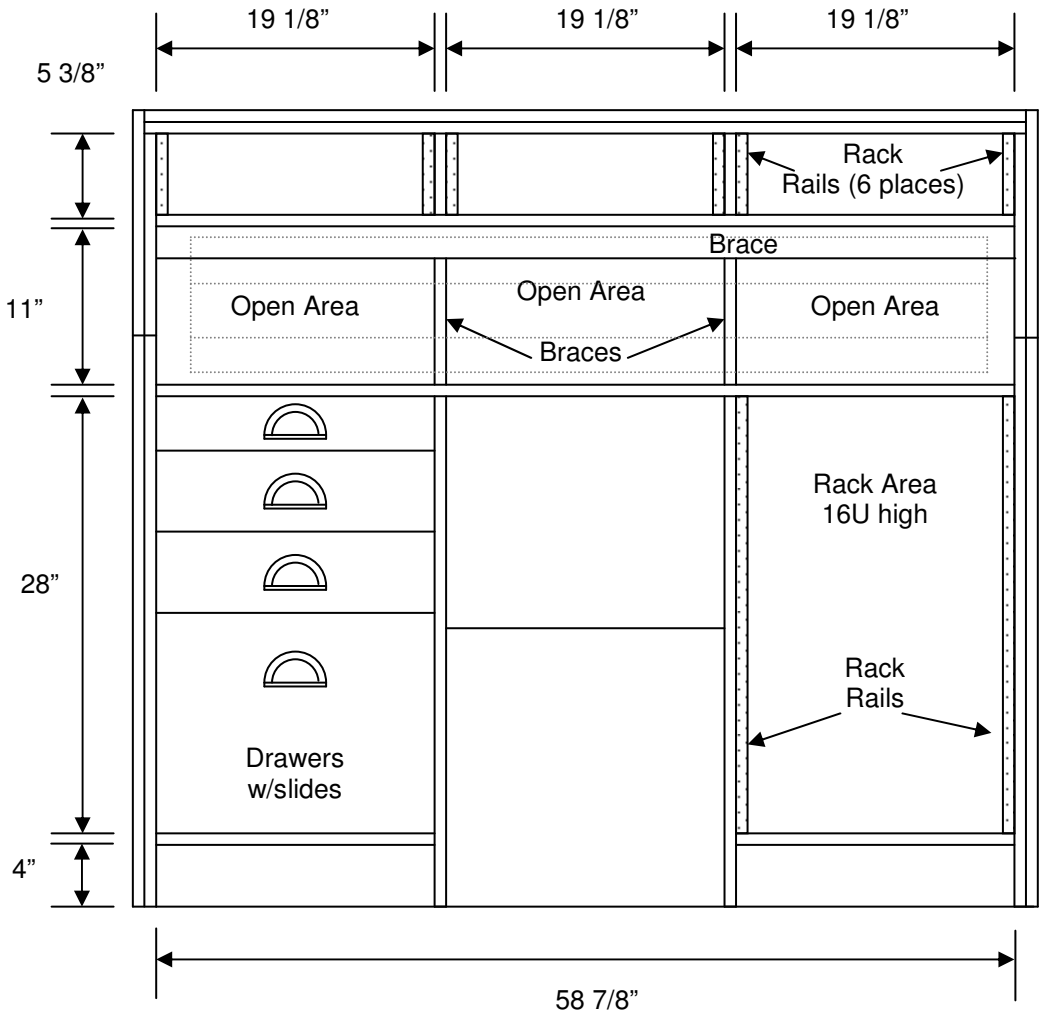
Remember to add 1/2 inch to each dimension that will be housed in a dado joint.

Add to this list the depth of your deepest rack mount equipment that will be mounted in the upper racks. We settled on a 10 inch rack depth.

From these measurements, we can figure out the basic dimensions of the cabinet. Notice that all of the dimensions are for the internal melamine carcass, not the outside decorative wrapper.




Side View




Front View

From these dimensions, you can easily determine the rest. I suggest you make a parts list, and then check it again to be sure you have it right. It took us about 4 sheets of melamine, two sheets of 1/4 inch plywood, 25 board feet of oak and scraps of misc. wood to make this desk. We purchased the rack rails from our local supplier.

One last topic: Power distribution. We considered many options, from the super simple to the ridiculous. The things we wanted were enough outlets to handle all of the equipment, ability to handle many wall wart power supplies without them falling out or coming loose, and to be able to turn the system on and off with one switch. What we finally came up with was getting a couple of long plug strips and then mounting them on 1/2 inch plywood spacers. Doing this allowed us to easily tie-wrap the wall warts to the strips. Each strip had a dozen outlets spaced far enough apart so that nothing interfered. An APC power module at the top of the equipment rack provided an easy way to turn the system on and off.

Hope this has helped you develop ideas for your sound system. Here are more drawings with more detail and a couple showing wider systems to give you something to think about.

Be blessed!

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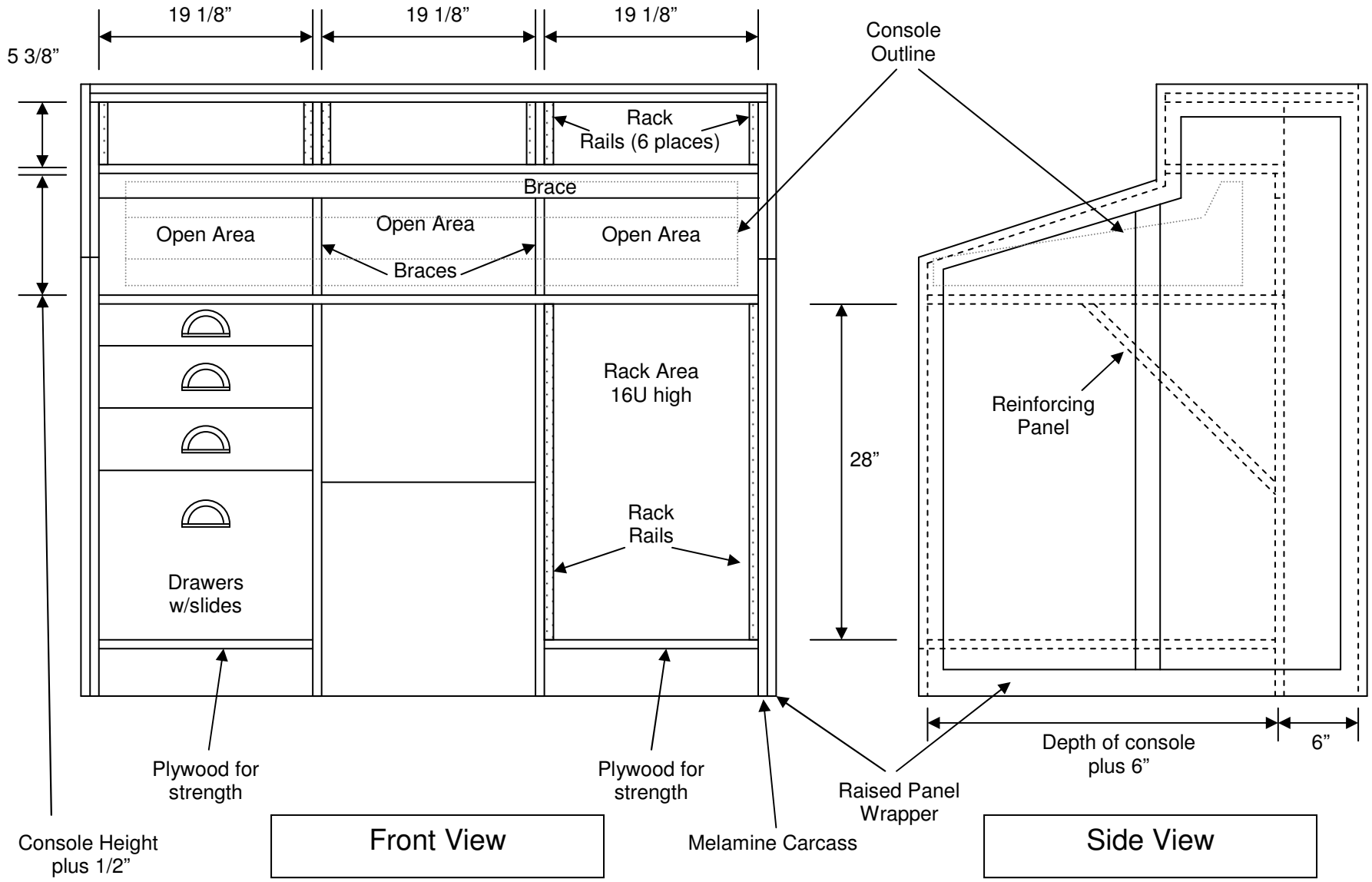
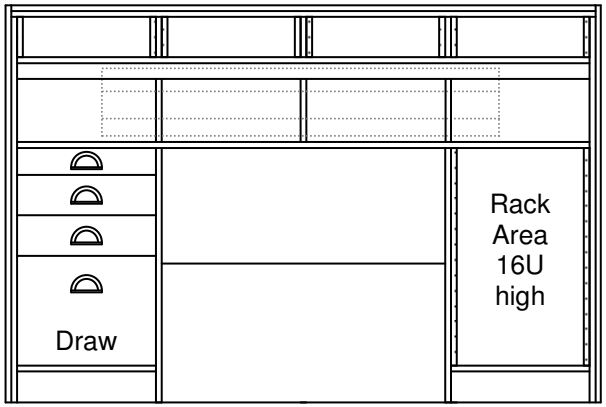


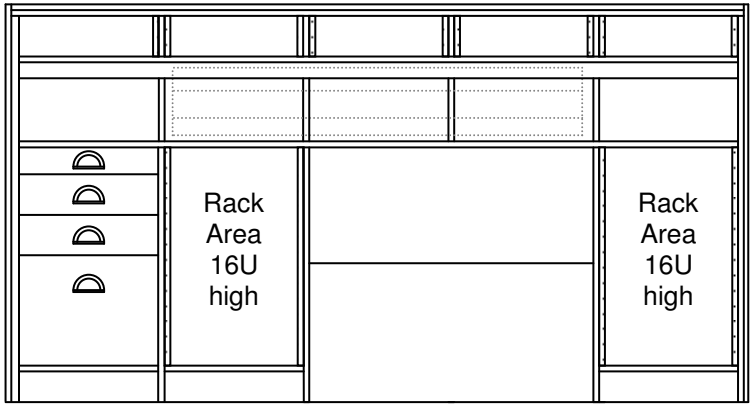

NOTES:

Scale: Approx. 1” = 1’

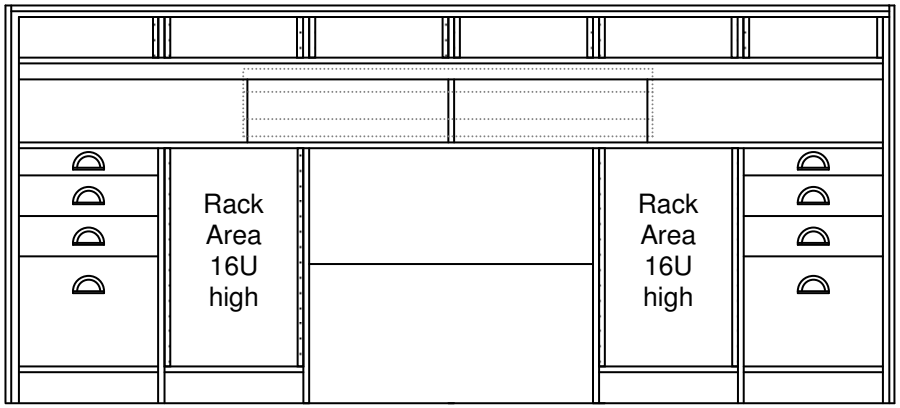
1. Inner case constructed with Melamine coated particle board.
2. All melamine case joints dadoed, glued and screwed with 7x50mm Confirmat fasteners or #8x2” drywall screws.
3. Exposed edges of melamine trimmed with solid wood.




4 Racks Wide




5 Racks Wide




6 Racks Wide

## Some More Options