Animated Character and Sign Assembly Instructions

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The following instructions provide the details necessary to build the majority of our talking/animated characters and the majority of our signs. Some of those items include the Talking Santa and Mrs. Claus (#10 & #83), Talking Reindeer (#11 & #40), Clapping Hands (#91), Talking Pumpkin (#17), Dancing Skeleton (#20), Logo, Text (non-radio) Signs (#6, #15, #77) among others.

While each sign or character differs slightly in the patterns, all the designs are based off similar designs for building and mounting them. If you should have any questions that are not answered in this document, please feel free to contact us for additional assistance through our Call Us/Email Us link on our website at www.HolidayCoro.com.
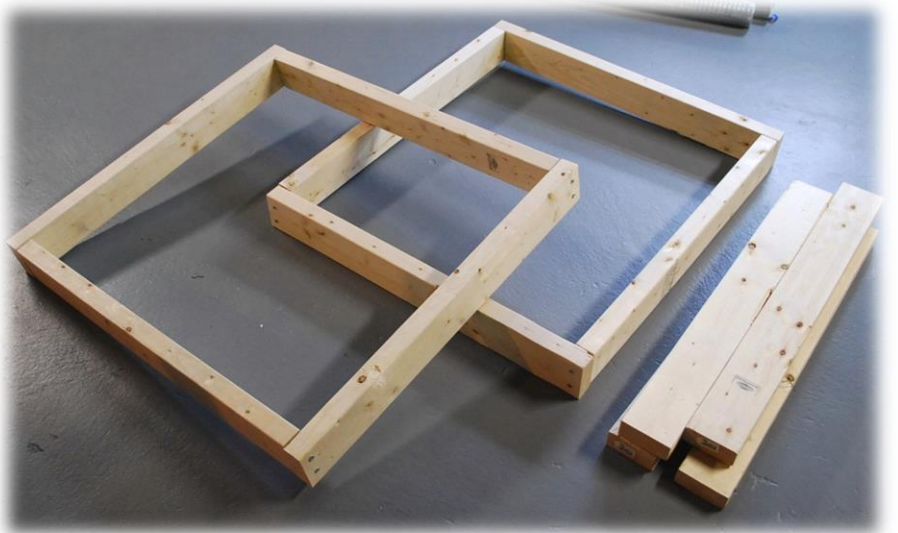
Building the Frame

Coro, while a very strong and durable material, needs support in larger designs to be able to withstand wind events. To allow for an inexpensive and easy to build frame, nearly all the items listed above (excluding 18"x 24" signs) are designed with a 1.5" border around the sign that does not contain any bulbs. This border allows for a 2x4 (which have a nominal dimensions of 1.5" x 3.5"), which can be picked up at any "big box" hardware store, to be turned on its side and used for mounting. Using this mounting method, it will create a 3.5" gap behind the coro face of the sign which will then allow for the sign to be mounted flush against a wall or fence or be mounted on the ground with stakes or other appropriate mounting methods. The spacing also allows easy horizontal storage and where you have multiples of the same design, to stack them on top of each other.

The following are steps to build a standard 2x4 frame:

1. **Frame** - Determine the overall outside dimensions for the coro sign. For example, it may be 46" wide by 46" tall like our taking Santa sign. Since a standard 2x4 comes in 8ft lengths, you will need to purchase two 2x4's since you will be able to get two sides out of each section of the single 2x4. Some designs may be longer and require different measurements, though no side should ever be more than a single 8ft length of the lumber. The 2x4 material can be standard, non-pressure treated lumber or you can use pressure treated lumber – this just depends on if you expect it to have long periods of exposure to water. In most cases, non-pressure treated lumber is fine due to the short time periods that the sign will be in the elements.

   To build the frame, start by measuring one side of the sign, as in our example, that would 46" long. Now cut two 46" long 2x4's from the 8ft long 2x4. Next, measure the top of the sign, as in our example that would be 46" long again. Take that measurement (46") and subtract 3" (the width of the two sides of the 2x4's) to end up with an overall size of 43" – now cut two 43" long 2x4's from the second 8ft 2x4. You are now ready to assemble the frame – place the smaller (43") length of 2x4 for the top and bottom inside the longer 46" length of 2x4. We recommend dry fitting the boards over the back of the coro sign to start with to ensure that your measurements are correct and that none of the wood obstructs any bulb holes. Using screws or

nails, attach the long boards on the side to the smaller boards on the top and bottom – usually 2 screws or nails is sufficient. The end result should look like the frame shown in the photo above. Your frame is now complete and ready to have the coro mounted onto it.
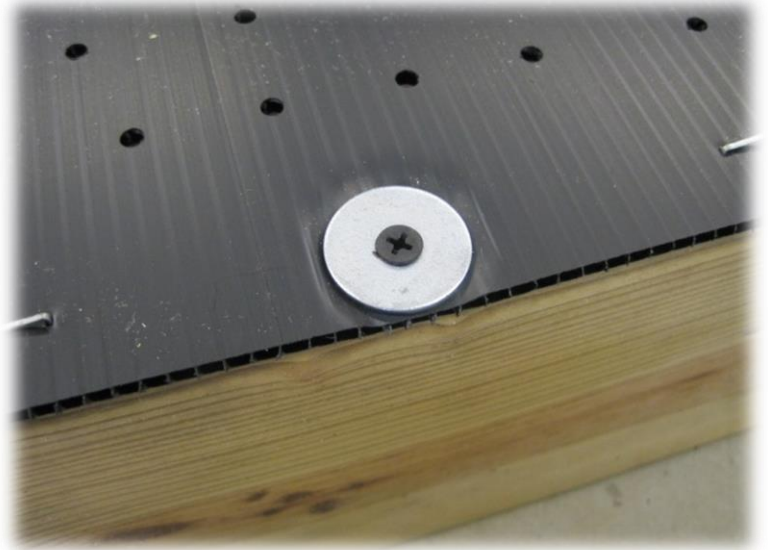
2. **Mounting the Coro** – The first thing to be aware of prior to mounting the coro onto the frame is which side is front and which is back. The backside of the coro, the side where the bulbs are inserted from and where the base of the lights and wire are has one or both of the following characteristics:

    * Has drawing in marker, indicating the path of the bulbs
    * Has a cut on the face of one side of the coro where the coro was hinged for shipping purposes (the non-cut side should be facing to the front.)
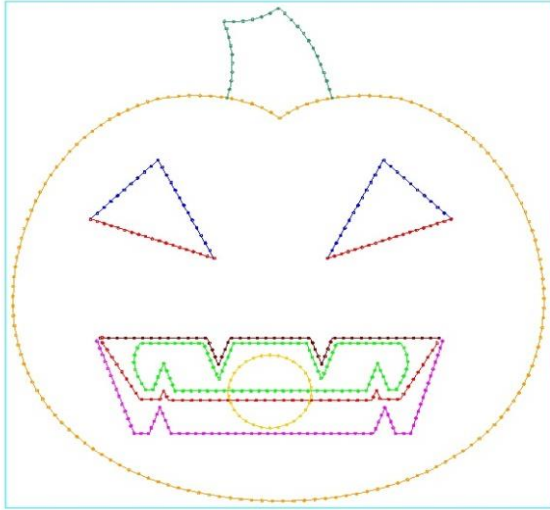
    Making sure that your coro back is facing the same side as the wood frame, you can now proceed with attaching the coro to the wood frame.

    There are two methods you can use to mount your coro to the wood frame – staples/screws or washers:
    a. **Screws and Washers** – We do not recommend just using standard screws to attach the coro to the frame as they have the potential to pull out. We recommend ~1” long drywall screws with a 1/4” ID x 1” OD “fender washer”.

    The drywall screw will be used to hold the fender washer down and the fender washer will spread the load over a larger area than just using the screw alone. Generally, we recommend placing a screw and fender washer ever 12” to 18” around the frame – depending on the design, you may see pre-drilled holes for these screws around the border. Snug down the washer until it just starts crushing the coro. See the photo to the right for a sample.

    b. **Staples** – If using staples to secure the coro to the frame, **do not use household staples** – they are not strong enough to hold the coro in place. We recommend staples with at least a 1/2” crown and 1/2" long legs. Place evenly spaced staples every 6” to 12” around the frame while making sure to align the crown (the top) of the stable perpendicular to the “grain” or flute in the coro – do no put the staple going in the same direction as the grain of the coro.
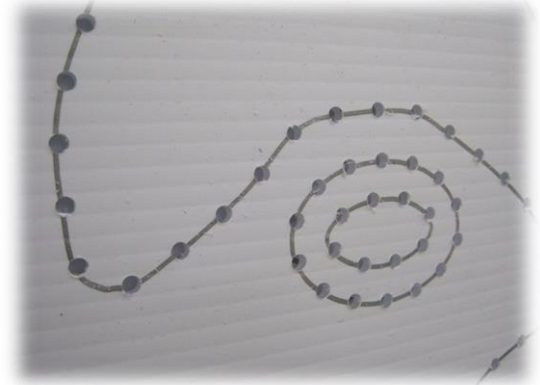
Installing the Bulbs

All our signs have a specific number of light bulbs that can be placed into each sign. You can find this information on our website (www.HolidayCoro.com) in the product description section. We recommend making note of this information so that you can order the correct number of light bulbs for your sign. You can use nearly all incandescent "mini-lights" or M5 or M6 LED lights currently on the market in our designs. **The color of the lights you select is up to you – the colors indicated in the drawings on our website are only for representation of different channels and not a direct indication of the bulb colors you should use in your design.**

For a majority of our designs, we first mark the back side of the coro with a paint marker to indicate the pattern to make it much easier to determine which hole is for which string of lights. We recommend using the HolidayCoro.com website drawing printout (sample photo above) along with the markings on the backside (photo to right) of the coro to make it completely clear as to where the bulbs are to be placed for each area/channel.

It is usually best to plan out the path the lights will follow when inserted into the coro to ensure the most efficient path is taken. Factors to be aware of are:

- Which sections will be always lit and which sections will be controlled to create animation (depending on design.) For example, if you had a talking Santa you would need a minimum of three channels – one channel for bulbs that all remain on (beard, hat, cheeks, eyes, etc), one for the mouth open and one for the mouth closed. You could of course put his eyes on separate channels for even more control – the number of channels you use is up to you and of course you could use only one channel for the entire sign if you didn't need animation in your sign.
- Plan out your path for the strings of lights before you start. Planning your path might mean you need to skip from a continuous line out to another part of the design that is on the same color and channel and then back to the continuous line. When jumping around in the design, you may have extra bulbs that cannot be inserted into a hole (85 holes with 100 count light string), if so, just leave these bulbs on the back of the sign. You can then later either place black out caps/electrical tape if your coro is white or if your coro is black, no blackout is required of the bulbs – just secure them to the back of the sign. Generally when we design a sign, we take into account that you may need to jump around in the design to fill in all the holes and may have unused bulbs – that is why you may see a section that lists 92 bulbs instead of an even 100 bulbs.
- Determine where you want your plugs to come together. We recommend putting in your lights starting with the end of your string (which often has a female plug) and working towards the common point where you want your male plug ends to come together. This has several advantages - first it means that if there are extra bulbs in the string, they will be on the male end of the string which will allow you more distance if you need it to reach the controller. Second, it will also mean that if you have a large number of left over bulbs toward the male end of the string from several different channels, you will be able to black them out altogether. Third, it will prevent you from having sections of lights hanging at the end of the string which will pull on the other bulbs in the coro.
- Where possible, we recommend plugging your lights into an extension cord while you are installing them into the sign. This helps to show where "touchy" bulbs maybe located, preventing any need to remove the bulbs later for troubleshooting.

Now that you have the necessary lights for the design, you have your installation path and your sign is mounted to the frame you can start inserting lights. Lights should be inserted from the back side (the side with the wood frame and the outline scribing), through the holes in the coro until the base of the bulb rests on the back of the coro and the bulb protrudes out the coro on the front.
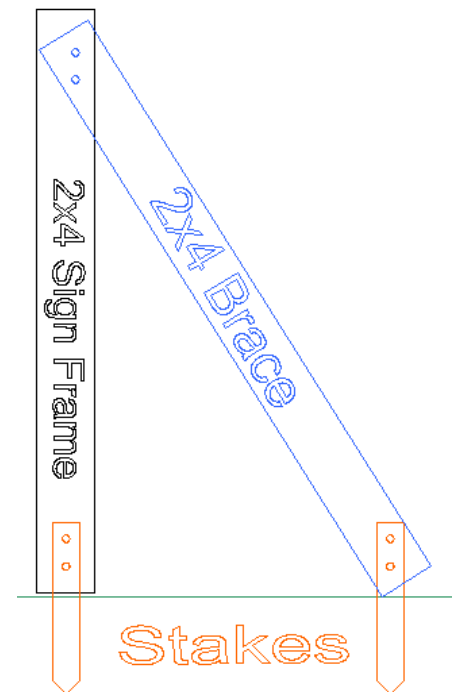
Once all the bulbs have been installed into the sign, we recommend the following:

- Label each male plug with a section of duct tape and a marker indicating the channel #, function (i.e. – mouth open, mouth closed) and bulb color. This will aid in making your connections to your controller and troubleshooting easier.
- If you have any locations where the male plug that is much further than the other male plugs used in the sign, we recommend making a short "jumper" from standard SPT1/SPT2 cable and a male and female plug. This will make it easier to have all the plugs in a single location when hooking up the controller.
- Bring all the male plugs together and zip tie them all to each other, about 4" from the end.
- Where possible, attach via zip tie or other methods, the male plugs to the frame as a strain relief.
- If you have large quantity of unused bulbs and you need to cover them near the male ends of the plugs, we recommend cutting a section out of a black plastic trash bag and then wrapping them using zip ties and the trash bag.
- If your sign uses all or most of the channels on your controller and you are not mounting the sign to a flat surface, you may consider screwing the controller directly to the back of the frame to make it easier to setup. This way you will already have all the channels connected and will only need to supply power and a network connection to the controller.

Mounting the Sign in Your Display

Due to the large variety of ways in which our signs are used, we can't provide a single method that will work for every situation. Listed below are two methods used by our other customers that you may find useful:

- **Ground Mounting** – To mount the sign directly on the ground, start by placing the sign on the ground and while another person holds the sign, pound stakes (length and material depending on your local conditions) on each side of the frame. Then using screws or other suitable fasteners attach the stakes to the vertical sides. Next, attach a section of 2x4 to one or both sides of the outside of the frame at the top with screws, make sure to leave an angle of about 45 to 60 degrees toward the back of the sign. Then, using another stake, attach the angled 2x4 to the ground. See the example shown in the photo to the right.
- **Flat Surface Mounting** – If you plan to mount the frame directly to a fence, roof, wall or other flat surface, we recommend first starting by drilling a sufficient number of holes around the frame just larger than the screw you intend to use. So, if the head of the screw is 5/16" in diameter and the length of the screw is 3", drill a 1/2" hole about 1.5" deep. Then using a drill driver, run the screw through the remaining wood into the base material you are attaching the sign to.

Thanks for purchasing HolidayCoro products!