

CoroStar™ Assembly Instructions

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CoroStars have a number of benefits:

- Produced from lightweight but strong and durable corrugated plastic (coro) with UV and cold weather resistance to -16f
- Assembles in minutes and can be disassembled just as easily for easy off-season storage
- Compatible most common Christmas lights (lights not included)
- Available in an RGB, individually addressable version (lights not included)
- No gluing, screwing or nailing required for assembly (excludes RGB CoroStars)



Before You Start

CoroStars are a “do it yourself” item and are one part of a kit of items that will be required to complete the assembly of your stars. The following items are needed to complete the assembly:

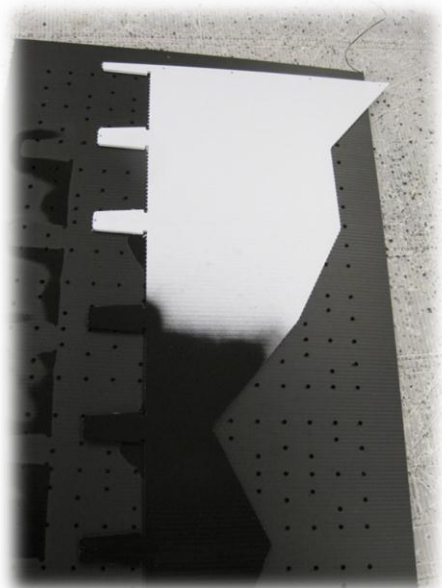
- **Paint** – While CoroStars can be used unpainted, we feel that they generally look best when the exterior of the vertical star (the part above the base) is painted to ensure a clean, sharp star pattern. They can be painted with any color you wish, though darker colors such as green and black tend to work the best at blocking light transmission through the coro.
- **Wire hangers or suspended ceiling wire** – Each CoroStar has four holes that allow you to pass a U shaped wire through them and into the ground. Either standard wire clothes hangers cut in half or suspended ceiling wire from a home center can be used for this purpose. CoroStars have been tested to handle winds above 80 MPH when properly secured to the ground.
- **Lights** – CoroStars are all specifically designed to be used with the following types of lights - 100 count string of incandescent or M5/M6 LED bulbs and/or three C7 bulbs and/or three C9 bulbs .
- **Zip Ties** – Five are required for the tips of the stars and four to attach the CoroStar top together – a total of 90 per order of CoroStars. Zip ties can be ordered from www.McMaster.com – part number 7130K12 (white) or 7130K52 (black), can be purchased from all large hardware stores in

the electrical section or from MonoPrice.com – part number 5783, about .65 cents for 100. The zip tie length is 4” with a width of .1”.

Painting the CoroStar

Painting the CoroStar restricts the light from showing through the outside of the star, ensuring a nice clean, three dimensional star shape. We generally recommend flat black paint as this has the lowest light permeability, does not reflect light from other elements in your display (such as mini trees, arches or megatrees) and it helps the base and body of the star to “disappear” during the show. If you elect to paint your CoroStars, use the instructions listed below for the best results.

1. The inside of the CoroStar should remain white to reflect as much light as possible from the lights mounted in the base of the star. NOTE: We have tested and do not recommend silver paint or aluminum foil on the interior of the star – the white coro has proven to be the most reflective and even surface we have tested.
2. The first step is to identify the outside and inside of the star. The outside of the star is the side **WITHOUT the vertical cuts in it** – only paint the smooth, uncut side of the star top (shown in the photo to the right).
3. We suggest cleaning the surface using standard isophoric alcohol and a towel to clean the surface of the coro to remove any oils or dirt particles that may be present.
4. While not visible to the naked eye, the coro that HolidayCoro.com uses for CoroStars has been corona treated to make paint and inks adhere much easier to the plastic. This means that you can use standard, off the shelf paints and not expensive “plastic” paint.
5. Start by laying out the large flat section on a flat surface without the cuts, facing up. Make sure to follow shaking/mixing instructions on the paint can prior to use. Use short sweeps back and forth over the width without allowing the pain to run. Be sure to also paint the “legs”. If you miss a spot or the coro isn’t completely covered with paint, come back **after** painting the star and touch up.
6. OPTIONAL: If you will be painting your base, be sure to paint both sides for best results.



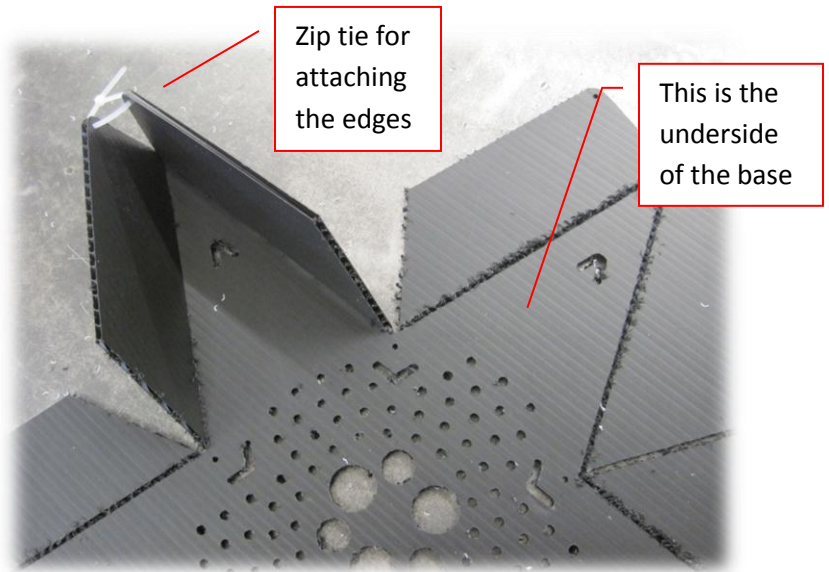
PAINTING TIPS:

- Wait a sufficient time for the paint to dry prior to assembly. You should be able to scratch the painted surface of the coro with your nail without removing the paint.
- When painting with colors other than black, two coats of paint maybe required to prevent any light transmission. Be sure to read the re-coat instructions included with your paint.

Assembling the CoroStar

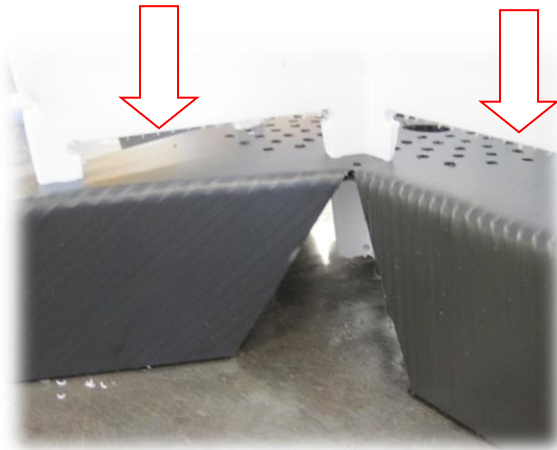
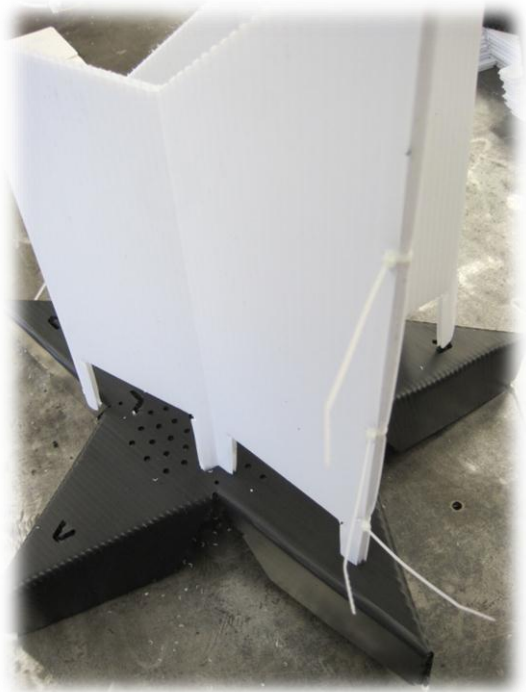
Once the paint on the CoroStars has dried sufficiently, the stars may be assembled.

1. NOTE: Be aware that each width/folds of the star top may vary slightly – usually less than 3/16” of an inch. This is a result of where the coro flutes line up when being manufactured. This in no way affects the final design as allowances are made for this minor difference in size.
2. Start by assembling the base of the star by bending a flap on the star points up until they touch each other as shown in the photo to the right. Be sure that the scored side of the star is the one that is being folded in on itself. Then using a zip tie, push it through the two holes in each side, pulling tight and then trimming off the excess from the zip tie – then complete for each of the 5 star points.



3. To assemble the top of the star, take the painted coro, **the side without the vertical cuts in its face** and bring the two ends together forming a circle with the painted side facing outward. Using the supplied zip ties, insert them through the four small holes along the edge to “stitch” up the coro. Pull the zip ties snugly but not overly tight as to crush the coro.

4. Now insert the CoroStar top into the slots in the base with the cuts in the coro facing inward and the painted coro facing outward. **THE EDGE WITH THE ZIP TIES MUST START AT AN OUTSIDE POINT.** For RGB CoroStars, the top is the point with the rectangular hole. It is normal when inserting the points of the stars into the coro to be stiffer than those on the inside of the star. Only insert each tab into the hole about $\frac{1}{2}$ " and then proceed down to the next slot and insert that leg into the slot and so on, until all the legs are inserted into the slots about $\frac{1}{2}$ " deep.
5. As it is not possible to push the legs through all of the slots at the same time, proceed to push the top into the base, one leg at a time, moving in a clock wise or counter clock wise rotation, about $\frac{1}{2}$ " to $\frac{3}{4}$ " at a time. Keep going around the star until all legs are completely inserted and the



flat bottom edge of the star is flush with the base of the star. It is normal for the legs to be tight in the slots, so it may be necessary to pull on the legs from the bottom of the star to get them to completely "seat" into the slots.

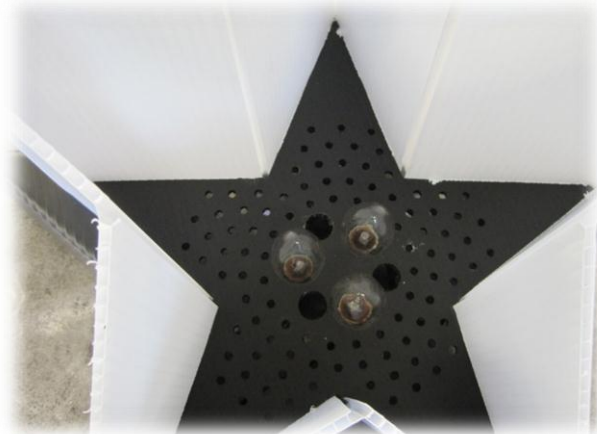
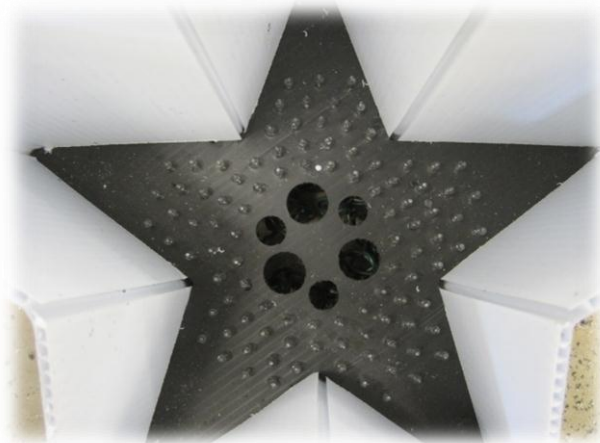
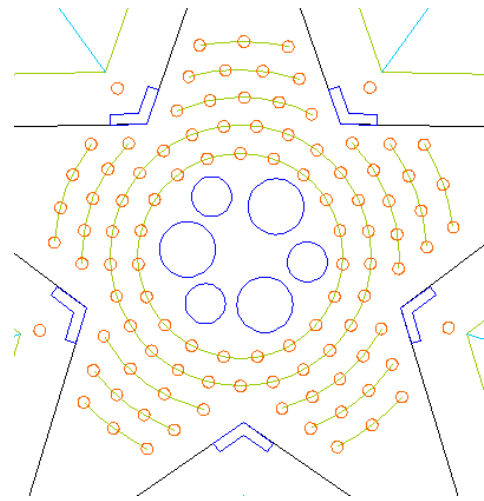
6. Your CoroStar is now assembled and ready for installation of lights (shown below.)



Light Installation

A CoroStar isn't a CoroStar without the lights! The CoroStar is designed to allow the installation of a variety of lights. There are three holes for C7 and C9 bulbs and 100 for MiniLights in the standard version. The MiniLights holes are oriented in a concentric circle pattern as shown in the picture to the right.

- **35, 50, 70 or 100 Count strings of incandescent MiniLights or LED M5/M6 lights** – The base of each CoroStar contains 100 holes for MiniLights which can be populated in a variety of ways:
 - Single color – 35, 50, 70 or 100 bulb count string. Starting toward the center and using the last bulb on the string (the end that usually contains the female plug end), insert the bulb and then moving around in a concentric circle moving outward, insert all the bulbs.
 - Two colors – 35+35 or 50+50 bulb count strings. Starting toward the center, insert the first color string, starting with the last bulb on the end of the string, skip a hole and then populate the next hole. This will result in about half the holes being populated. Repeat the process by filling in the holes with the second color of lights. When completed you will have both colors mixed together in an even and alternating fashion.
- **C7/C9 Bulbs** – Either incandescent or LED C7/C9 bulbs can be used in the CoroStar. In the center of the star base, there are six holes – the smallest of the three for C7 and the larger of the three for C9 bulbs. To install the bulbs, place an empty socket on the underside base of the star and then put the C7/C9 bulb in through the top of the base, screwing it into the socket. This will trap the non-conductive coro between the socket and the base, securing it in a vertical



position. If you will be using a number of CoroStars with C7/C9's – just use “string” with standard 12-18” spacing between the sockets. Then just assemble the stars over the string in your yard. Remove any unused sockets by just pulling them off the cord - you will have perfect spacing between each of the CoroStars.

Securing the CoroStar

The CoroStar is intended for use on flat surfaces, generally on the same plane as your viewing audience. In most cases this means it will be placed on grass or other similar surface.

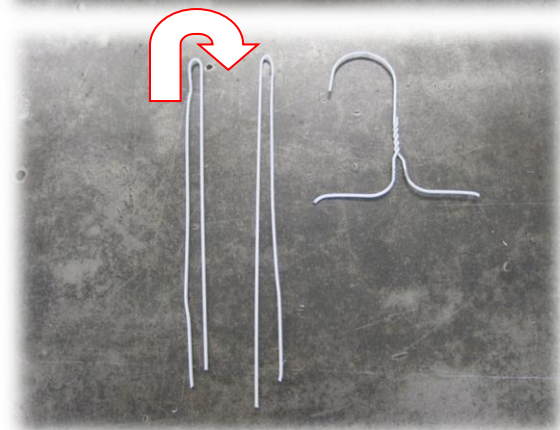
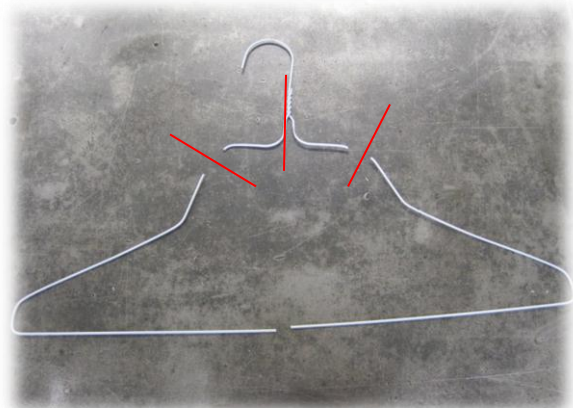
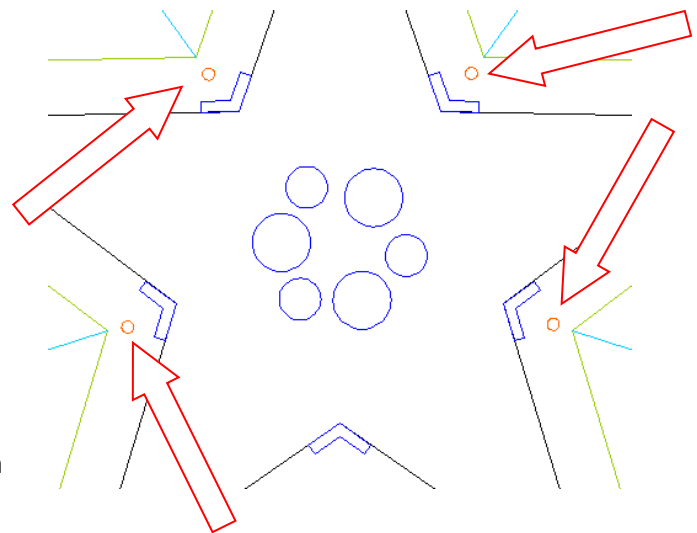
The CoroStar has four holes located around the outside of the top in the base as shown in the picture to the right by the red circles and red arrows. These four holes are used along with wire to secure the CoroStar to the ground.

There are two wires that we recommend to use with the CoroStar to secure it to the ground:

- Coat hangers cut in half to form a “U” shape.
- Drop/suspended ceiling wire bent into a “U” shape. Drop ceiling wire can be found in most major hardware stores.

Using standard, all wire coat hangers (two per star), start by cutting the top portion of the hanger off and then cutting the bottom in the center as shown in the photo to the right. Then bend the ends to form two long “U” shaped wires. These “U” shaped wires are then inserted into the four holes along the outside of

the base as shown to the right.



Hints and Suggestions

The following are a variety of hints and suggestions we have after assembling a fair number of CoroStars ourselves:

- If you are installing MiniLights into your CoroStar, you may find it easier to install them prior to assembling it. Try one before and one after to determine which works best for you.
- If you see a small amount of light escaping from between the top and the base, we recommend using a small amount of electrical, duct tape or a dark caulk along the inside seam on the front section of the star. This is more likely to occur with MiniLights than it is with C7/C9 bulbs.
- If only using C7/C9's in your CoroStar, we recommend covering over the MiniLight holes to prevent light escaping through the holes and under the star.
- An alternative to painting the top prior to assembly is to paint it after it is assembled but before the lights are installed. If you do so, be sure to paint it while hanging upside down and using care to ensure that overspray does not get into the inside of the CoroStar. Another alternative is to place the CoroStar, upside down onto the coro shipping box to ensure that no paint reaches the inside of the CoroStar and then paint.
- Don't discard the shipping box – on its longest side (4ft long), it can be used to prevent overspray when painting your CoroStar tops.
- Want an all-white CoroStar but don't want any light to shine through the top of the star? Just paint the star with black paint and then re-paint with white paint. You'll get complete light blockage but still retain the completely white CoroStar.
- You can get up to three colors out of your CoroStar when using C7/C9 bulbs – just put a single bulb of each color onto separate channels.
- Using just one coat of lighter colors such as yellow and red on the exterior of the star allow the outside of the star to “glow” just slightly for a unique effect.
- To make it easier to find the plugs on your lights, consider running the cord(s) out the side(s) or back of the points in the star, above the zip tie as shown in the photo to the right. This can also help secure them together.
- If you intend to use the CoroStar on a surface other than the ground – such as a roof, make sure that the CoroStar is about 90 degrees vertical to the location your viewing audience will be located. Otherwise the bulbs inside the star may become visible.



RGB CoroStars

RGB CoroStars are a separate variety of the CoroStar available from HoliayCoro.com and feature full RGB colors, individual control of each CoroStar and super quick setup with inexpensive plug-n-play CAT5 cable. The instructions listed below should be used at your own risk. While HolidayCoro.com has tested and used this solution in our own display we cannot foresee all possible issues that could arise. We cannot provide technical support on the configuration, programming or additional wiring of the DMX modules listed below. Be aware that if you are using LOR S2, it will currently (as of Mar 2011) require you to purchase an iDMX-1000 controller to convert the LOR protocol to the DMX protocol used by the controllers in this design. It is rumored that in mid-2011, LOR will be releasing an inexpensive DMX add-on “dongle” to make adding DMX devices to your LOR software significantly less expensively than the current iDMX-1000 method.

The design below works off the idea of a “distributed” controller network. So, unlike a standard 16 channel controller that you then take power from, and over to each element in your display in a centralized style system (hub and spoke) - the decentralized (daisy chain) design below makes the controller an integral part of the CoroStar element itself.

NOTE: The wiring described in this document is for Lynx, Tiger and other similar style DMX networks that use CAT5 Pins 1 & 2 for transmission of the DMX signal. **You MUST be aware of what cables are plugged into what devices as possible permanent damage to your equipment and controllers could occur – if in doubt, please ask for assistance.**

Materials and Tools

Here are the items needed to build ten RGB CoroStars over and above the existing requirements for “standard” mini/C7/C9 CoroStars:

- 4” Zip Ties – These are the same types used to assemble the top and base of the CoroStar. Two zip ties per CoroStar (10 total) will be required to secure the wires to the base of the star. Monoprice.com product #5783. Usually under \$1 per 100.
- CAT5 Punch Down Keystone Jack – Two of these will be required per star for a total of 20. Monoprice.com product #5370. Usually under \$1 per jack. Do NOT use tool-less jacks as they will not work with stranded wire.
 - The above jack will require a punch down tool if you do not already have one. We recommend the Monoprice.com punch down/cutter product #1387. Less than \$20.
 - You will need to remove the sheath of the CAT5 cable and while you can use a standard knife, we HIGHLY recommend



using a stripping tool so that the inside cables are not nicked. Monoprice.com has an excellent stripper, product #3354. Less than \$5.

- OPTIONAL: I prefer to shrink wrap my CAT5 jacks when completed, though this doesn't provide any special water proofing. Monoprice.com product #5853, 30mm, 100ft roll of heat shrink tubing is an excellent deal and can be used on all kinds of other projects also. We also recommend smaller 3/8" shrink wrap for the power and LED wiring.
- CAT5 Cables:
 - 14ft of black, CAT5 cable (other colors can be used though it's easier to hide the cable under the CoroStar using black cable.) Monoprice.com product #2145, less than \$2. This cable will be used under the star and will be cut up into 1ft sections. If you will be building 20 stars, order 24/25ft lengths instead, etc.
 - You will need to purchase ten additional CAT5 cables, for linking the CoroStars together. This maybe 5, 10, 15ft or whatever distance you need between them. We do not recommend over 20ft due to power losses in CAT5 cable. Green for southern areas, white for up north or black for limited nighttime visibility all work good to make the cables disappear in your display.
- Hot glue gun – The hot glue gun is used to attach the LED and DMX modules to the coro and is also used to insulate the wire splices. Hot glue guns can be found at all major retailers.
- Soldering iron and solder - Any type will do. We only recommend soldering joints and not using wire nuts or crimp fasteners.
- Wire cutters/nips for cutting the wire to length.
- Sharp knife for removing the center section of wire sheath.
- Male power plug from any standard extension cord - should be 18ga or better.
- **DMX Module (12 volt)** – You will need 10 DMX modules which can be purchased as part of the RGB CoroStar Kit.



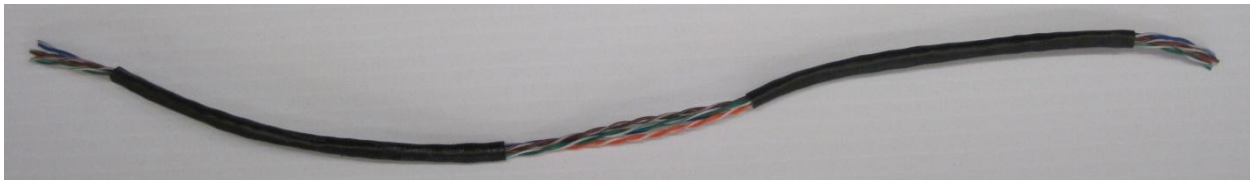
- **DMX Module Programmer** – To program each DMX controller you will need a DMX programmer cable. You can purchase these from HolidayCoro – <http://www.holidaycoro.com/Hardware.asp> item #54. You may also be able to use other RS485 dongles, such as those from Light-o-Rama or d-Light – check our DMX programmer instructions on how – see our Knowledge Base articles.
- **LED Modules (12 volt)** – The RGB CoroStar design is made for a total of three modules per star. These are included in our RGB CoroStar Package.
- **Power Supply (12 volt)** – The power supply that is included with the RGB CoroStar Package is a waterproof power supply that works great with ten CoroStars, each with 3 LED modules.



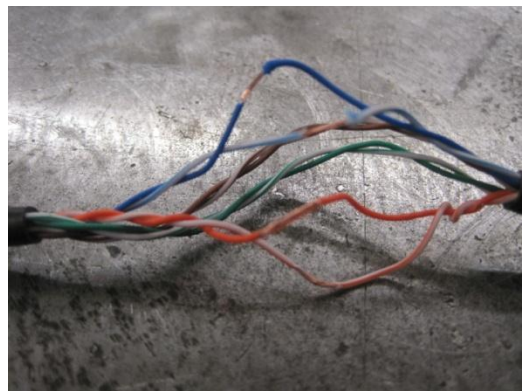
RGB CoroStar Assembly

Generally we have found that it is easier to build and test the entire wiring, controller and LED module assembly while it is not mounted in the CoroStar.

- Cut the 14ft CAT5 cables to 1' lengths, removing the male plug ends. You want to end up with just a single 12" section of CAT5 cable. You will need 10, 1ft sections of cable.



- Using the cable sheath removal tool, cut off the ends of the sheath about 1" from the ends.
- Using the cable sheath removal tool again, cut the sheath about 2" from the center of the cable on both sides. This will allow the center of the sheath to be removed.
- Using a sharp knife, safely cut along the center length of the cable and remove the center cable cover. You should then end up with a cable as shown in the photo shown below.

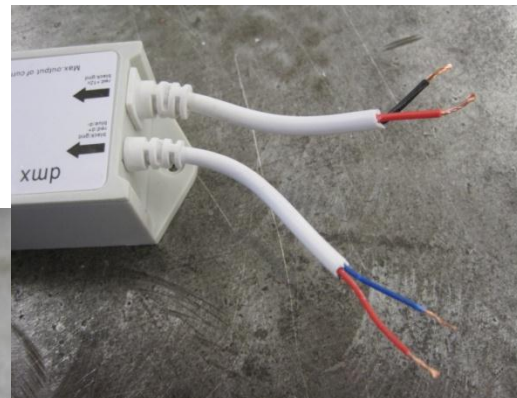


- Now two female CAT5 jacks need to be added to both ends of the 1ft CAT5 cable. Start by using the zip tie included in the package to secure the cable to the connector. Next, untwist the wire pairs and then place them into the slots. Note the wiring pattern as shown in the photo to the right. Using your punch down tool with the cutoff blade, place the blue side of the tool toward the connector, to the inside. Press down hard and it will push the cable into the connector and at the same time cutoff the end of the cable. Repeat for all eight wires. Finish by putting on the two plastic caps that are included in the package, onto the top of the connector (not shown.)

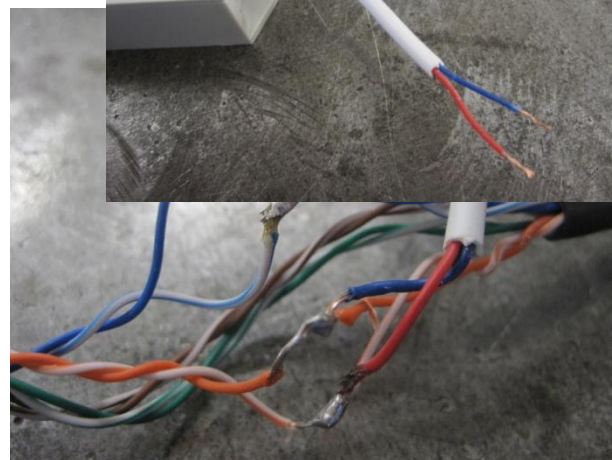


Repeat the same for the other end of the cable. You should now have a double female CAT5 cable.

- Next you will solder the power and data wires to the split in the middle of the CAT5 cable. Start by using a good pair of wire cutters to scrape the insulation off the orange pair of wires without cutting the wire (see photo to the right). You will need to slightly unwind them to create enough space. Next, remove the insulation from one of the blue, brown or green pairs of wires. You want to choose a different color pair (brn, grn, blu) each time so that the connections are evenly spaced between all the stars – this allows each star to only draw power from a specific pair of wires. Next, cut off the wires coming out of the DMX box that are labeled power and signal – they will both be on the same end of the box (as shown in the photo to the right). You want to cut them so that only about 3-4" of wire remains. Strip back the covering on both of the wires to reveal a red/black power wire and a black/red/blue signal wire. Cut off the smaller black wire in the signal cable (the black ground wire is not needed) and then remove about 1/2" of insulation from the tips of all of the wires.



- Next you will wrap the larger red power wire around either the - brown/white, blue/white, or green/white striped wire. This will be your positive power for the module. Next, wrap the larger black power wire around the solid colored blue, brown or green wire – this will be your ground wire for the module. You may find it easier to solder them into place now before attaching the signal wires in the next step.

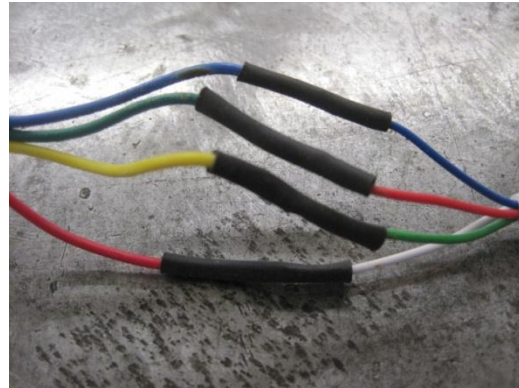


- Next, you will take the blue wire from the DMX module and solder that to the solid orange wire from the CAT5 cable. The red wire

from the DMX module then connects to the orange/white wire. Solder these joints together. Your splice is now complete.

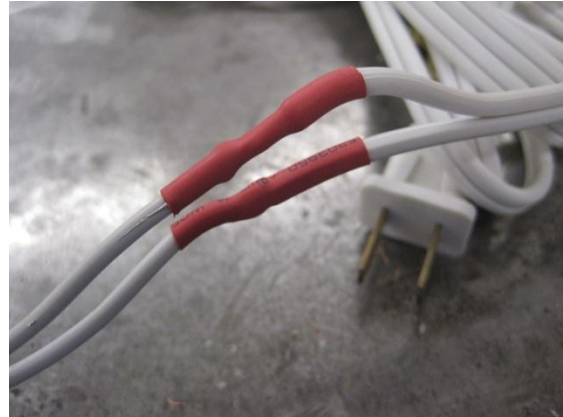
- Now you will solder the LED module to the DMX controller RGB power output. We recommend using small shrink wrap around these four connections. As the wiring colors can vary based on the manufacturer, you will need to determine the proper DMX module to LED module wiring order.

Function	HolidayCoro LED Module	HolidayCoro DMX Module
Common Anode / +	Yellow	White
Red Cathode / -	Red	Red
Green Cathode / -	Green	Green
Blue Cathode / -	Blue	Blue



Building the Power Injector

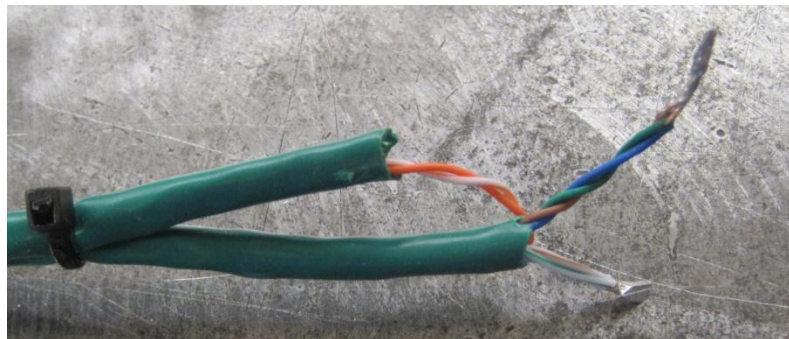
The design used here allows a single CAT5 cable to not only carry the signal (orange wires) but also for the remaining three cables (brown, blue, green) to carry the power for up to 10 CoroStars on a single run. To provide the power for the CoroStars, you will need to make a power injector. This puts power on the three pairs of power wires within the CAT5 but also at the same time it passes the DMX signal through the cable.



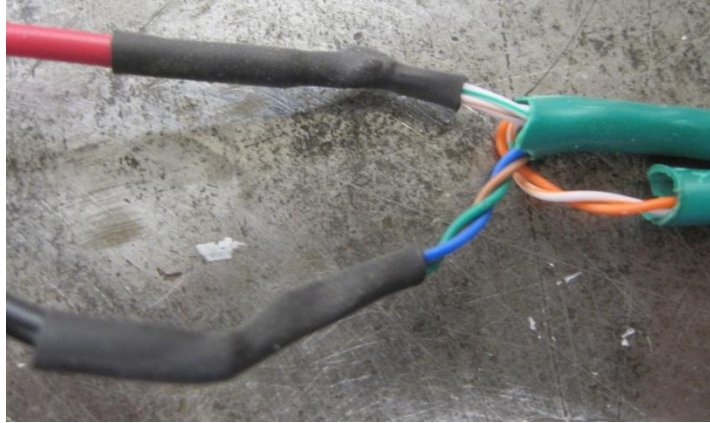
- First solder a standard 120v plug and cable to the end of the sealed power supply. Make sure to use shrink wrap tubing to ensure a safe connection (see photo to right). For the HolidayCoro power supply, the wirings is as follows:

HolidayCoro Power Supply (#55)	Power Cord
Brown Wire / 120v Hot	Smaller blade of plug / smooth wire
Blue Wire / 120v Neutral	Larger blade of plug / ribbed wire
Yellow /Green Wire / Ground	n/a – not connected on non-grounded wires

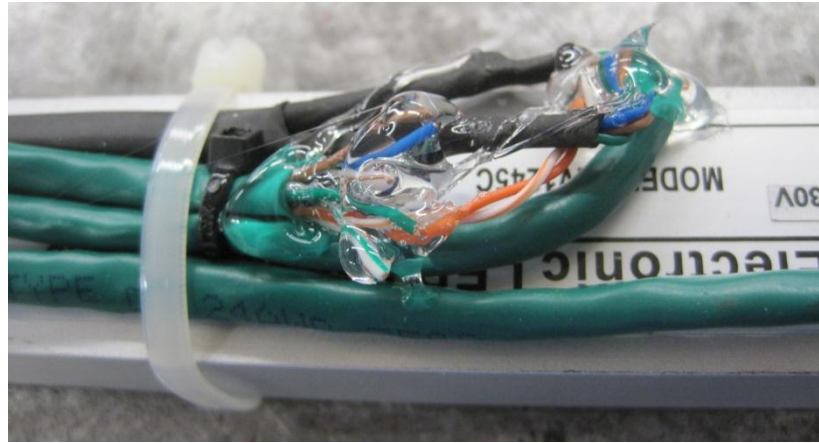
- Take one of the CAT5 cables and about 1ft from one end; remove about 2 inches of the sheath. Without cutting the orange and orange/white wires, cut the other remaining wires in the middle and then strip off about ½ an inch of insulation. Then twist all the solid color wires (green, blue, brown) together and then twist all the striped wires together (green/white, blue/white, brown/white). Apply solder to the ends and the resulting cable should look like that shown in the photo to the right.



- Next, solder the solid color wires (green, blue, brown) to the black negative wire coming from the 12v output side of the power supply. Then solder the remaining white striped wires to the red, positive side of the power supply leads. Cover with shrink wrap as shown in the photo to the right.



- Next, using some larger wire ties, attach the cables to the power supply and then cover the cut off ends of the wires of the short ends of the cable with hot glue. This will prevent shorting in the case where power is injected on the other end of the cable if you have more than 10 RGB CoroStars. See photo above.



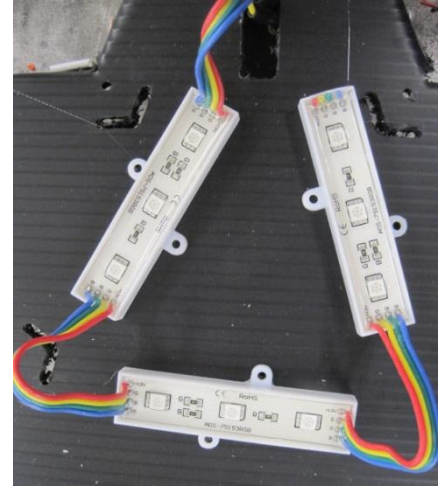
- Your power injector is complete. You may wish to mark one end to make you aware of which “way” the power is being injected. You will plug in the short end of the cable to the stars and this will then provide power to the entire chain of stars until it “hits” another power injector for another 10 stars. Make sure to NEVER plug the powered end of the CAT5 power injector (the short side) into another controller, adapter or dongle.

We now recommend that you test each of your completed assemblies prior to final assembly. While powering up each one, make sure to prevent the solder junction points from touching each other.

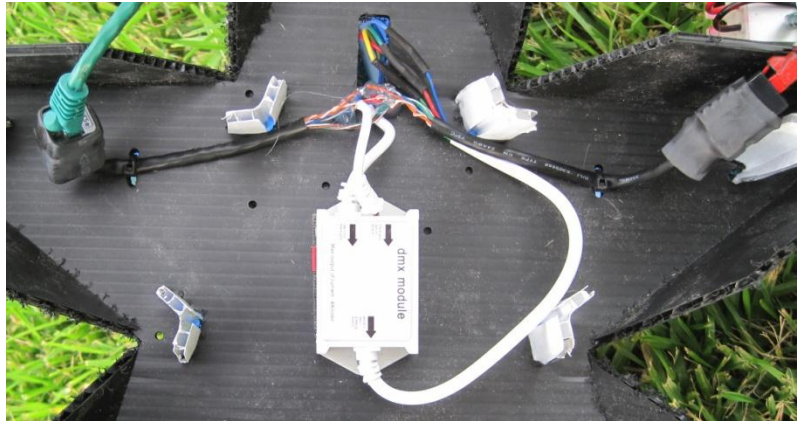
Assembling the CoroStar and Cables

You are now ready to attach the LED modules+DMX modules to the CoroStar to make a complete assembly. At this point you should have already assembled the CoroStar base – we recommend putting the top of the CoroStar on only after all the modules are mounted.

- Start by pushing the three LED modules through the rectangular opening in the bottom, up to the top of the base. Next, using your hot glue gun, apply a small amount of glue to the base of one LED module and then while aligning the holes on the edges of the LED modules with the holes in the coro base, attach the module with a small amount of pressure and hold until the glue cools down and the module adheres to the coro. Repeat the process for each of the three modules taking care not to twist the wires between the modules. The completed modules should be arranged as shown in the photo to the right.



- Turn over the CoroStar base and then apply an amount of hot glue to the bottom of the DMX module, making sure that the side of the module with two wires coming out is pointing toward the rectangular hole (which is the top of the star).



- Now using two 4" zip ties, attach the two female ends of the CAT5 to the underside of the CoroStar on the two opposing points as shown in the photo above. This will prevent the cables from lying directly on the ground and will also serve as a strain relief.
- The next step is to provide insulation of the exposed solder joints where the module was spliced into the CAT5 cable. Carefully separate the wires so there is about a 3/8" gap between each of the solder joints and then using your hot glue gun, apply glue all over the connections, making sure they do not move prior to the glue turning solid.



That's it! Your RGB CoroStar is done. Just use standard CAT5 cables to connect each separate RGB CoroStar starting with the power injector before the first star and you are done! You now have individually addressable stars that can create any color you can imagine.