STAR CEILING INSTALLATION GUIDE

V1.7

Custom Harness Installations

Acoustic Panel Systems Installations

Twinkle Effect Installations

Shooting Star Installations

Custom Harness System Installation tips

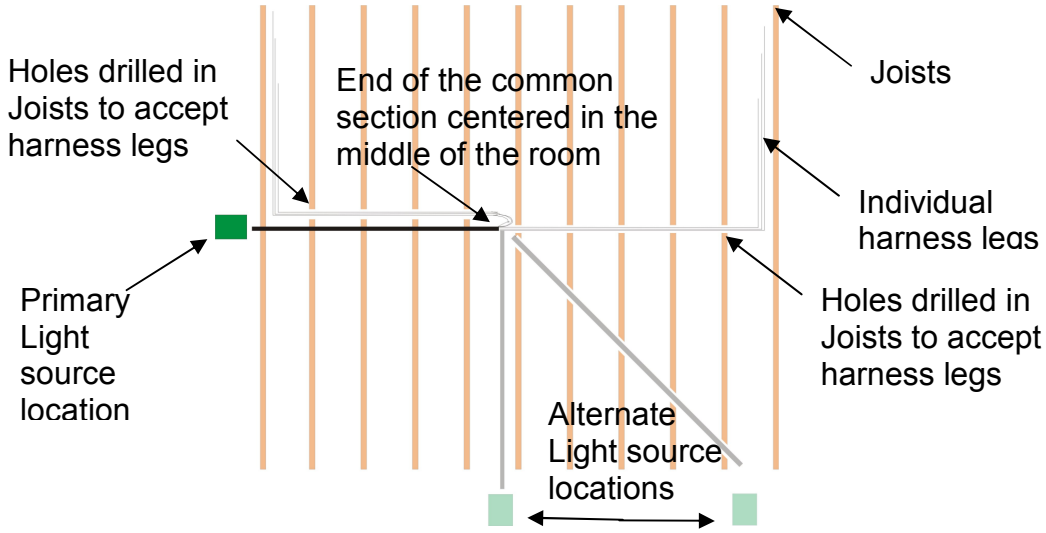
The following information is provided as a guide. While every attempt was made to be complete and practical, individual installers may depart from these guidelines and have very successful results. Conversely, an installer might follow every step, and still have installation problems. FTI assumes no responsibility for the product's application or fitness for use .

INSTALLATION WITH NO CRAWL SPACE…the hardest star ceiling installation there is….

NOTE: It is assumed the drywall has not been installed. Typical drywall sequence starts with the ceiling then moves to the walls. IF drywall is already installed, it should be removed, which may necessitate destruction of the existing ceiling or removal of the drywall covering the walls. An alternative to removal, is application of furring strips to the joists, and addition of another layer of drywall or panels. ***The Acoustic panel System May also be used that directly mounts to the existing drywall.***

When installing a star ceiling in a new home, (or a remodel), on a level other than the top floor (no attic or crawl space access) first locate the light source storage area, making sure it is open or ventilated to keep the light source cool. Then install the wiring for the light source outlet.

Locate the end of the common section of harness in the center of the room, and drill appropriate sized holes through the joists to route the common end of the harness back to the light source location. The harness is designed to provide ample length to locate the lightsource in a convenient, easy to reach area of a closet or custom storage space.



As an alternative, you may also choose to install 1x2 furring strips perpendicular to the joists…doing so eliminates the need for drilling, but reduces the ceiling height a minimum of 1.25" (.75" furring thickness and /375" drywall thickness)

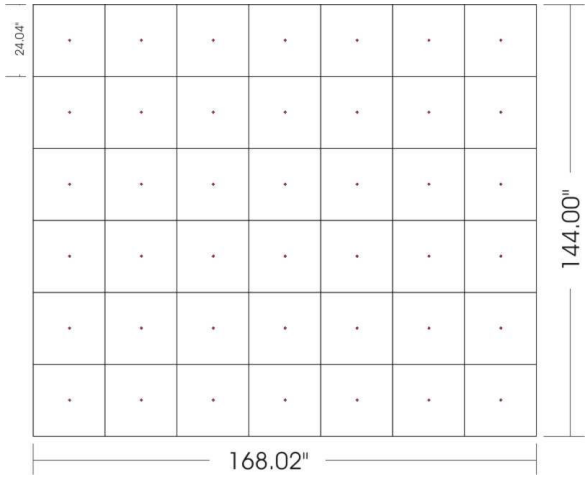
As you can see… it doesn't really matter where the light source is located (see examples of alternative light source locations above.) However, it is very important to locate the end of the harness' common section in the center of the room.

Starting from the end of the common section, drill additional holes through the joists to route individual harness legs. These legs will eventually connect to star bundles which have already mounted in the drywall. As you might notice, the holes drilled in each direction should be large enough to accept half of the total harness legs. We suggest a hole size equal to the size used to route the common section.

PLANNING TO MOUNT STAR BUNDLES IN DRYWALL

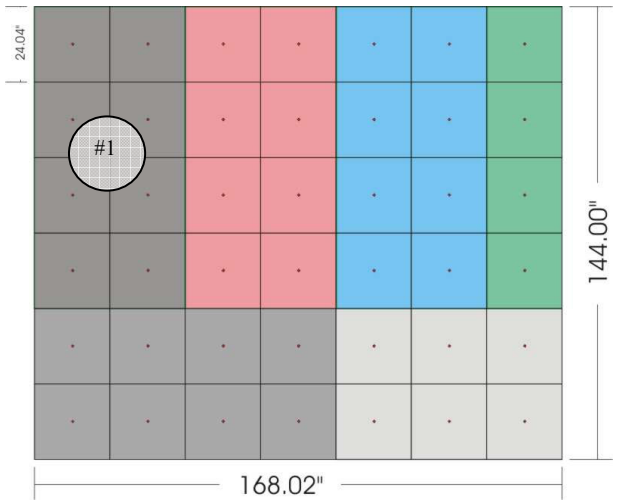
To make this effort as efficient and quick as possible make a plan as follows:

Draw a layout of the room in 2x2 ft grids. (Each fiber bundle covers a 2x2 area): For illustration purposes, let's assume the room size is 12'x 14'



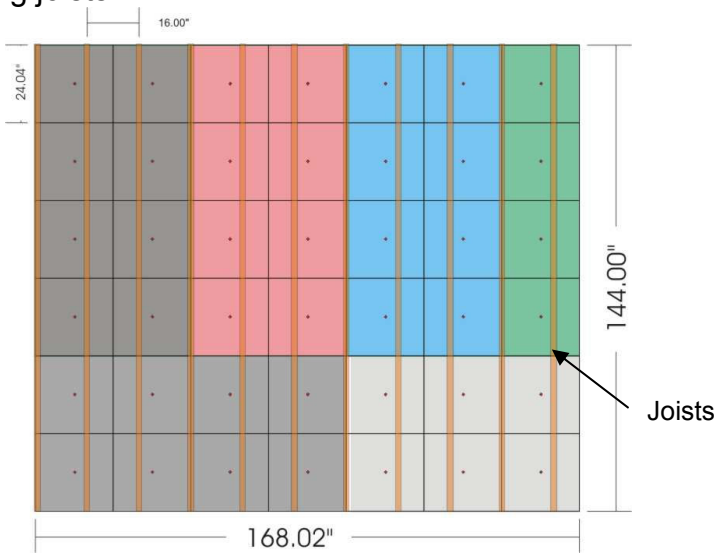
In the illustration above, the red dots show the center of the 2x2 square. This is also the ideal location of the star bundle input. (More on that in a bit)

Next, sketch the ceiling drywall placement in the room…(For now, ignore the circle with #1):



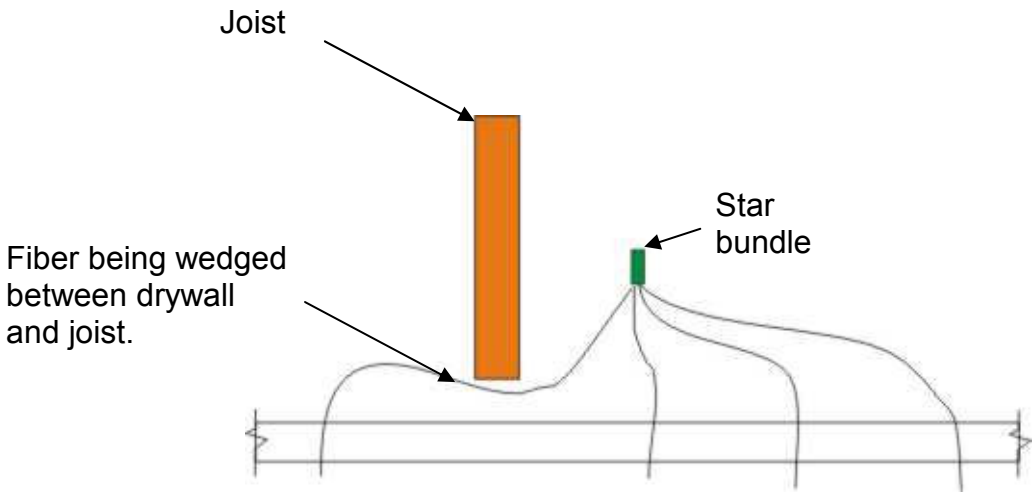
In the above illustration, we assume the drywall size is 4'x8'. We'll use 4 full sheets (indicated by different colors), and two partial sheets (Light gray and green)

Next, draw in the ceiling joists:



This is the minimum required plan. At this time, you may also decide to lay out the star pattern. If you do so, remember to resist being symmetrical or balanced… be random and abstract for the most realistic result, but stay within the pre-selected star density (i.e. 2,3,4, or 5 stars per sq foot)

In the example above, the joist spacing is 16" on center. As you can see, no red dots are covered by joists, (which is good) but every 2x2 square is bisected by a joist at some location (this is bad). Some fibers (depending on star density and placement) will end up being wedged between the joist and drywall (see next illustration)

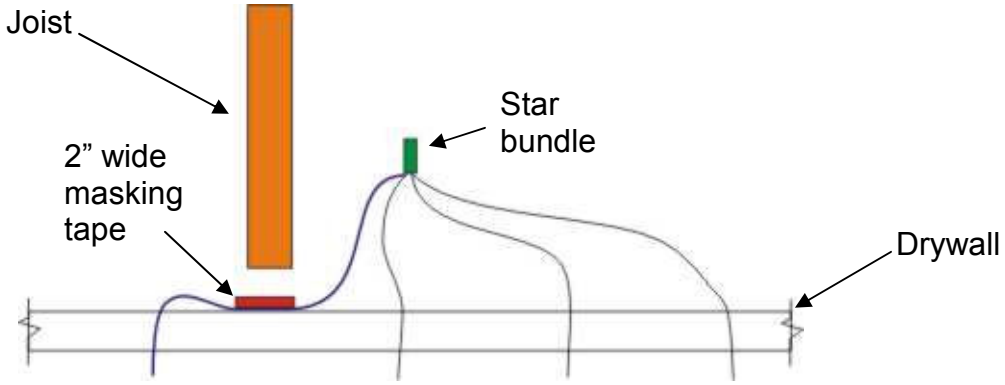


If a fiber is wedged, it can withstand the pressure (it's plastic) when squeezed flat between the drywall and joist, but it will not survive a drywall screw or nail. The following steps help prevent this problem..

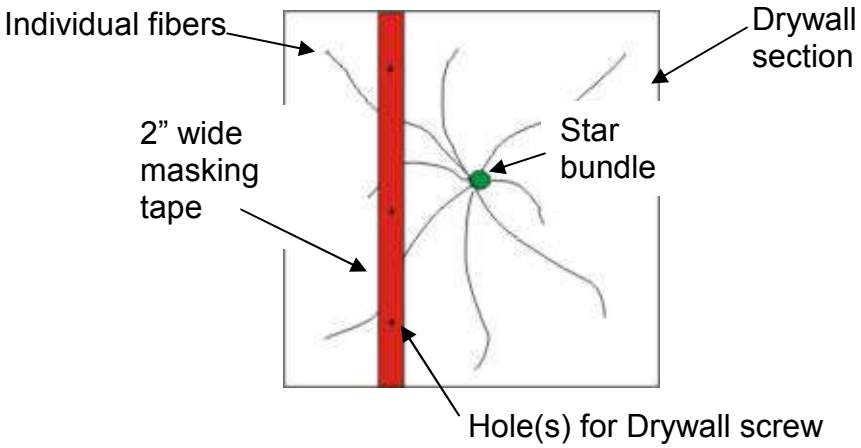
MOUNTING THE STAR BUNDLES

Start with a drywall section located on the perimeter of the room. (let's use the dark gray full sheet, labeled with a circled #1 in the previous illustration). While the drywall is on saw horses at ground level, use the layout grid to mark the location of joists on the drywall. Using the developed star location plan (If you took the extra time to create one) pre-drill, and load the star bundles (using proper drill bit, drill from the back side, and mark each hole with red marker to easily locate), (8 star bundles to a 4x8 sheet, 10 star bundles to a 4x10 sheet).

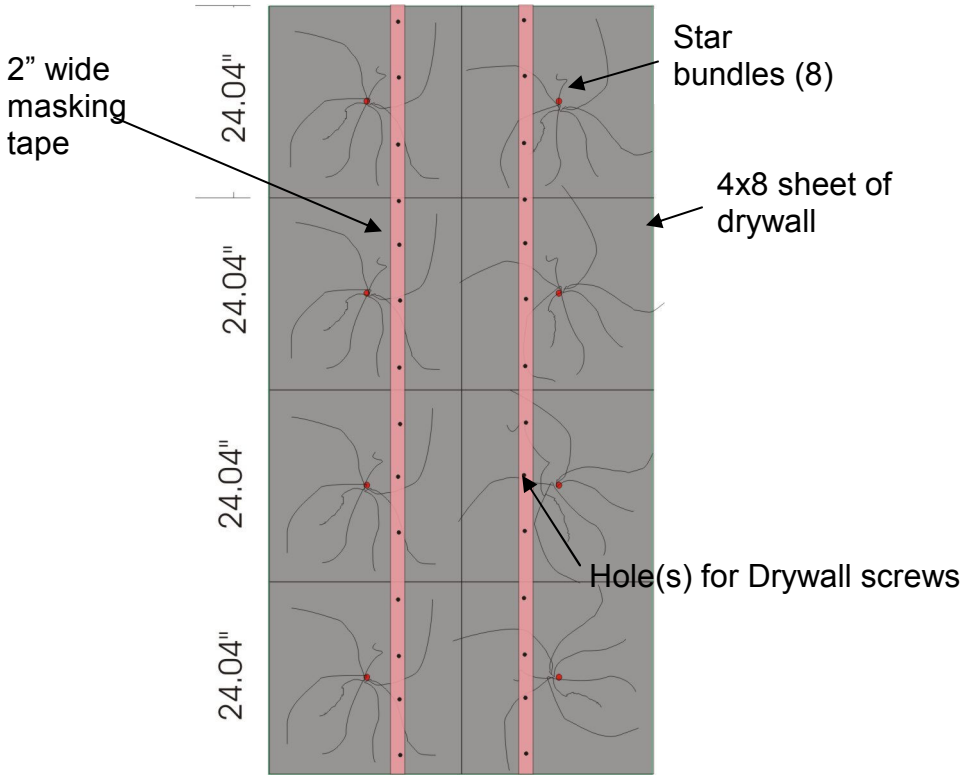
Be sure not to install a star where the drywall contacts the joist, and remember to use two different drill bits (.020 and .030) for each of the fiber diameters in a star bundle {50/50 split}) Make sure at least 6" of fiber sticks through the drywall. After the holes are drilled and star bundles are installed, use 2" wide masking tape to hold the fibers secure to the drywall where they cross over joist location(s). See illustration below:



After the fibers are secured with tape, pre-drill location holes for drywall screws, taking care not to drill into the fibers, which can be seen through the tape. (see the next illustration)

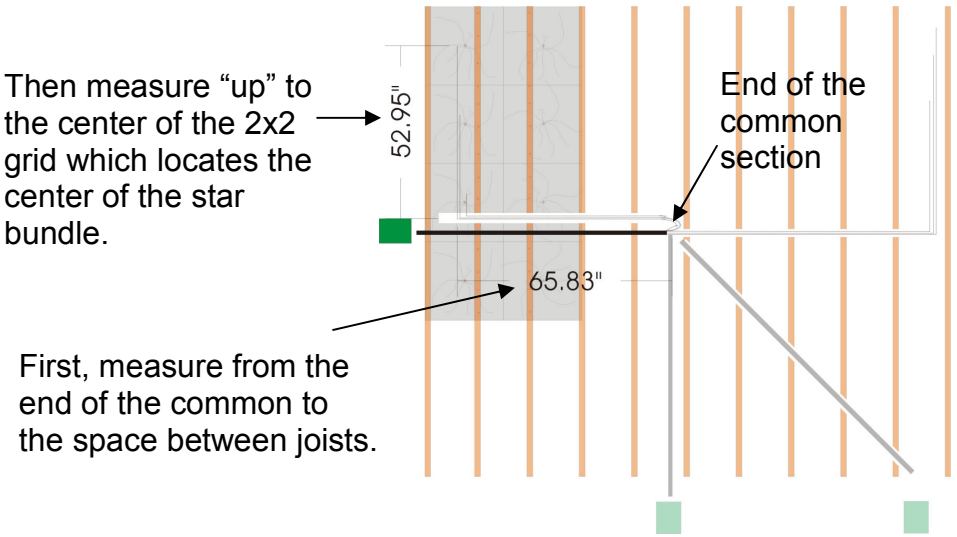


When completed, there will be 8 star bundles loaded in a sheet of 4’ x 8’ drywall. The fibers crossing joist locations will be taped down, and predrilled holes for drywall screws will be in place (see below).



ROUTING THE HARNESS LEGS

Route the first 8 individual harness legs through the joists. Measure the distance from the end of the common to the furthest star bundle by first measuring the distance to the appropriate joist space, then “up” to the star bundle. (see below)



Add two feet to this measurement, then select a harness leg closest to this measurement. In the above illustration, the measurement total is 53” + 66” + 24” = 143” Each harness leg is marked to help define it’s length. Use the chart in the back of this guide to help make your selection. As you might notice, harness legs are provided in two foot increments, so the appropriate selection for this example is 12’ (144”). Be sure to use the chart designed for joist installations.

Now, raise the drywall within 24-36” of the ceiling, resting it on scaffolding or dead man supports.

In some cases, there is sufficient harness length to make the star bundle and harness leg connections while the drywall panel is still on the sawhorses, but at the very least, there should be sufficient extra harness length (2-3 feet) to connect the star bundles to the individual harness legs while on the lift. Push the input into the harness boot about half way… there is no need to force the connection…. As a matter of fact, pushing the input too far into the boot may cause some of the stars to be dim. If this occurs, just pull the connection apart and reinsert. Once connection is made use masking tape to tape down the star bundle and harness leg on either side of the connection to secure.

APPLY THE DRYWALL TAPE AND MUD

Take care and patch the screw heads as usual.

During the mud feathering process, if a hanging fiber interferes with feathering a joint, try avoiding it, or hold the fiber at right angles to the joint and try troweling right over the fiber… then allow the fibers to fall free from the mud. When the first coat is done, sand or sponge off the resulting bump, and patch the indent left by the fiber. Repeat until feathering is complete. Cover the final fiber marks as you would cover a screw or nail

hole. This step could be very tedious, so plan your star layout carefully. Instead of sanding, you may consider sponging the joint to feather it.

Paint the ceiling; Spraying is preferred. If you are using a roller, roll right over the fibers, but minimize rolling, as repeated bends may fracture the fibers. Then trim the fiber end(s) with scissors or knife, and push back the extra length of fiber into the ceiling, leaving a bit (.125 - .250") extended. The job is complete.

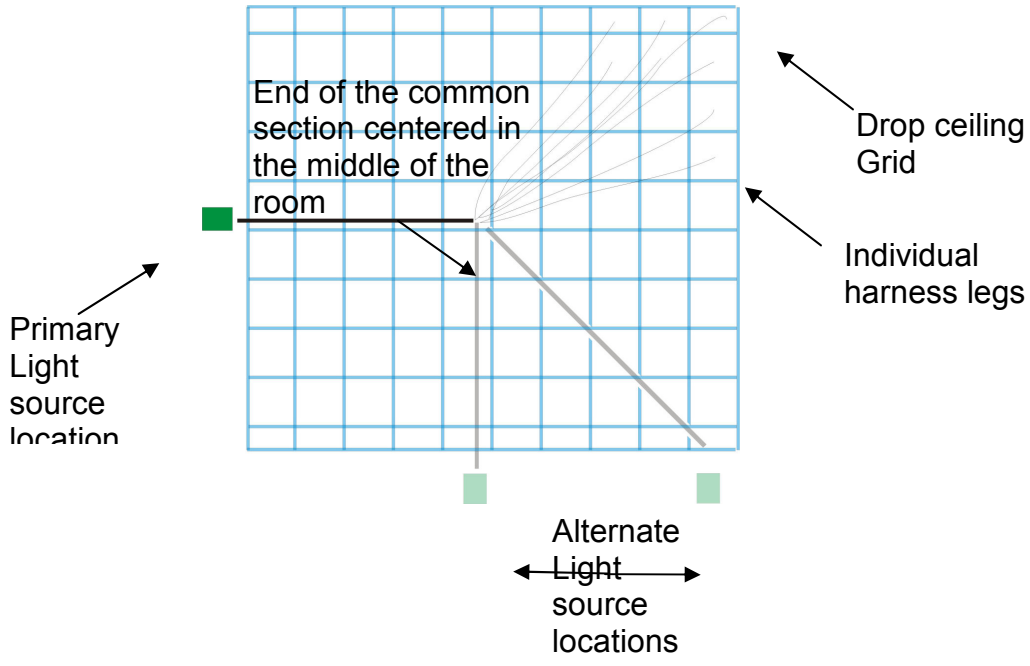
Of course, if you can hang the ceiling before the carpenters lay the sub floor for the room above (or the room has a crawl space above it), connecting the harness is much easier. You might also choose to eliminate all the prep work, hang the ceiling, then drill and install the star bundles from above…(but you'll deal with the fiber being pinched by the sub floor later). It might also help if you worked with smaller (4x4) sheets….but of course, doing so increases the number of joints…try to avoid this.

DROP CEILINGS; THE EASY APPROACH

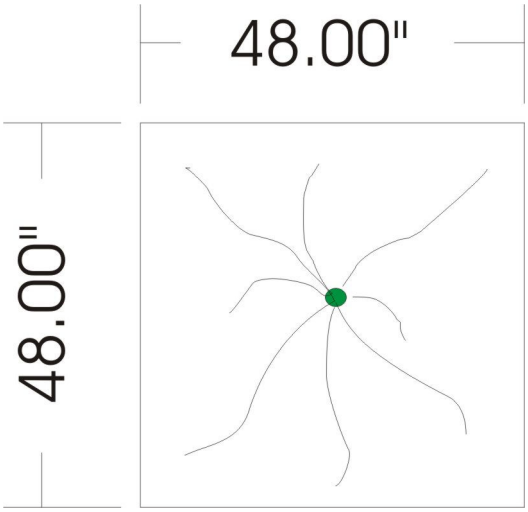
The simplest installation is in a drop ceiling… design the ceiling using a panel with a multiple of 4 sq ft… i.e. 2x2, 2x4 or 4x4

Locate the light source storage area, making sure it is open or ventilated to keep the lightsource cool. Then install the wiring for the light source outlet. The harness is designed to provide ample length to locate the lightsource in a convenient, easy to reach area of a closet or custom storage space.

Locate the end of the common section of harness in the center of the room, and route the common end of the harness back to the light source location. The harness will lay on the grid initially. As the installation progresses, panels will be installed, eventually supporting the harness.



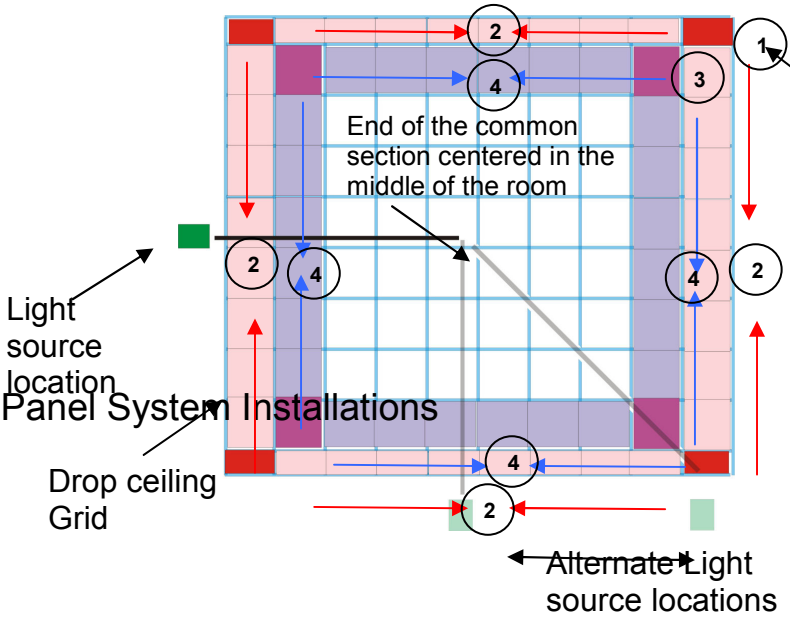
For purposes of illustrating an example, the grid above is 2x2’ squares. Working from the corners of the room first, then completing the perimeter, load the star bundles in the panels, working on a table. Remember to use two different drill bits; .020 and .030 for each of the fiber diameters in a star bundle {50/50 split}).



2’x2’ Ceiling panel with star bundle installed. Use .020 and .030 drill bits to install the fibers.

Slip the panel into the ceiling grid.
Measure the direct distance from the end of the common to the star bundle you just installed, then select a harness leg closest to this measurement. Each leg is color-coded to help define its length.
Use the chart in the back of this guide to help make your selection. Be sure to use the chart designed for drop ceiling installations.
Uncoil the selected extension leg, thread it through the grid, raise the panel and attach the harness to the star bundle. Push the input into the harness boot about half way… there is no need to force the connection…. As a matter of fact, pushing the input too far into the boot may cause some of the stars to be dim. If this occurs, just pull the connection apart and reinsert.

Continue in this manner, installing the corners first, then the remainder of each “perimeter”, working from the corners toward the center, until all tiles are installed.

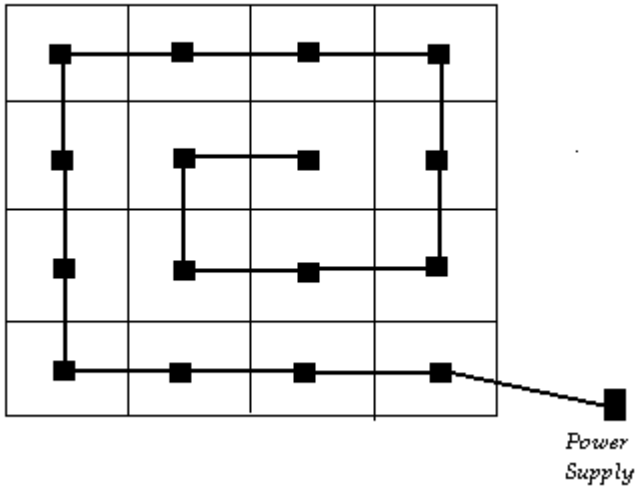


Start installing the tiles at the perimeter corners (1), working towards the center (2). After the outer perimeter is complete, start the next “perimeter” (Purple corners with blue perimeter) in the same way (3&4).

Drop Ceilings: Drop ceiling installations of the FTI pre-populated Acoustic Panel System are quite simple, in that there are no special tools required, and all panels will already be populated with the customer's requested star density, ready to drop into the tracking.

Please ensure that a standard 110V outlet is available within 5 feet of the first panel to be installed.

The Acoustic Panel System works like a daisy chain. The 5V power supply (which can power (15) 2' x 4' panels, or (30) 2' x 2' connected panels) will plug into the outlet, and the DC power plug from the power supply will insert directly into the LED box, located in the pocket of the panel. Each LED box has a DC power plug. As each panel is installed, connect the DC power plug from one panel into the DC power plug receptacle of the embedded LED box in the next panel. Work from the perimeter of the space inward, following a spiral path (shown below). Continue this process until all the panels are installed.

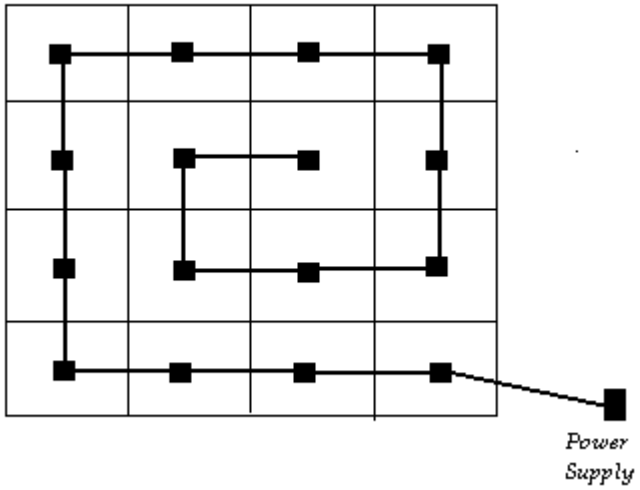


(Note: The power supply does not need to be located in the corner of the room, it can be on any side of the room, and even in the center of the room above the ceiling. This is to simply show the pattern which panels should be daisy-chained)

When the panels are received, you will notice that the fibers extend (up to 12") out of the face of the panel. This allows users the freedom to determine the length at which the fibers, or stars will be hanging down from the finished face of the ceiling. It is FTI's recommendation that fibers should protrude no further than ¼" from the face of the panel.

Clip the fibers to final length with a pair of side or wire cutters. This will terminate the end of the fibers (the part that provides the starlight) with a clean cut for optimal light transmission.

Non-Drop Ceiling (With Existing Drywall or Bare Joists): Installation of the Acoustic Panel System in existing drywall or on bare joists will take slightly more effort. As mentioned in the Drop Ceiling Installation, make sure to arrange the panels so that installation can be done using a spiral method. *If you are installing a shooting star, please see the Shooting Star Installation (Acoustic Panels and Custom System in Drywall) portion for a different method, and then revert back here for mounting and general installation information!*



There exists one step extra to install each panel in this type of installation. Since there is obviously no grid in which to rest the panels, the panels should be fastened to the existing drywall or the bare joists (rare). This is done by utilizing the Rotofast Mounting Anchor System (included with Acoustic Panel System).

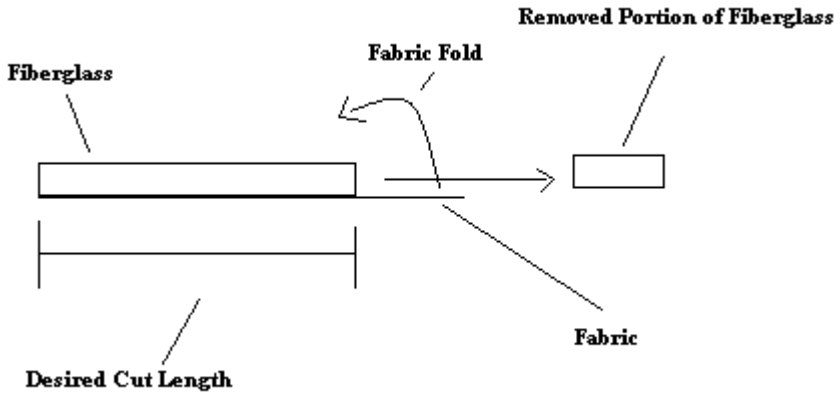
Click here to see how to apply the Rotofast Mounting Anchors

It is FTI's recommendation that a Rotofast Mounting Anchor be placed in each corner of each panel for maximum stability. For bare joist installations (rare), mounting anchors will not always be located in the corner of each panel. However, regardless of size (2' x 2' or 2' x 4' or custom) make sure the 4 anchors are distributed evenly over the area of the panel. FAILURE TO DISTRIBUTE THE ANCHORS EVENLY will cause unsatisfactory weight distribution on the panel, and could cause panel deformation.

Plan to use an outlet within 5 feet of the center of the starting panel to connect the power supply into the back of the first panel, and ensure that the DC power cord from the first panel is taken out and free before fastening the panel to the ceiling. After the first panel is installed and fastened to the ceiling. Apply the Rotofast anchors to the second panel, mark location, and insert the DC power plug from the first panel into the back of the second panel while ensuring that the second panel's DC cord is free for insertion into the third panel. These steps repeat for the installation of all panels, following the spiral method to the end. As the final panel installs, there is no need for the final panels power cord to be taken out and free, as the connection is terminated and there are no more panels to link.

Cutting Panels to Size and Adjusting for Lighting: Usually, 2' x 2' or 2' x 4' panels will be more cost effective than having custom size panels made to fit the exact measurements of the ceiling or altered to accommodate can lighting or vents. When a standard panel size requires trimming, alterations should be done prior to installing the anchor mounts or dropping panels into tracking (for drop ceilings). Fibers integrated in the trimmed section of the panel should be removed from the trimmed section, and left lying on top of the remaining panel (you can re-insert these into the panel if you choose, but it is not necessary.

For drop ceilings where the tracking will not accommodate a full 2' x 2' or 2' x 4' standard panel, cut through the fiberglass material down to the face of the fabric. As always, measure first to ensure the trimmed panel will rest securely in the drop ceiling tracking. Take care not to puncture the fabric with the utility knife, as you will wrap the remaining fabric around to the back of the panel and tape it down (See below).



Cut outs for can lighting or vents will require you to cut through the fiberglass down to the face of the fabric again. AS before, measure carefully, cut and remove the fiberglass, leaving the fabric in place. If cutting out for a can light, make pie shaped cuts in the circle of fabric. Then peel back like a banana and wrap around opening. When cutting out a rectangle, make a V cut at the each end of the rectangle. Then join the apex of both V cuts with a cut. Peel the fabric back and wrap around the opening.

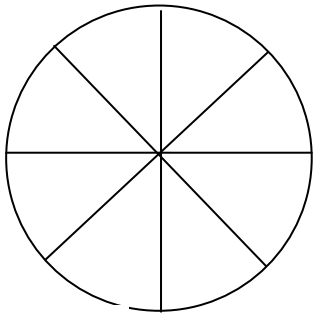


Figure 1

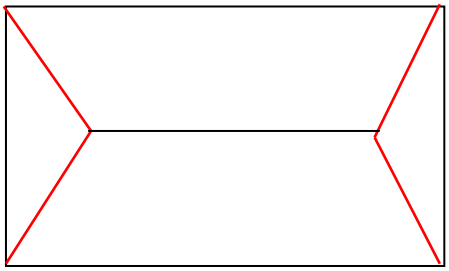
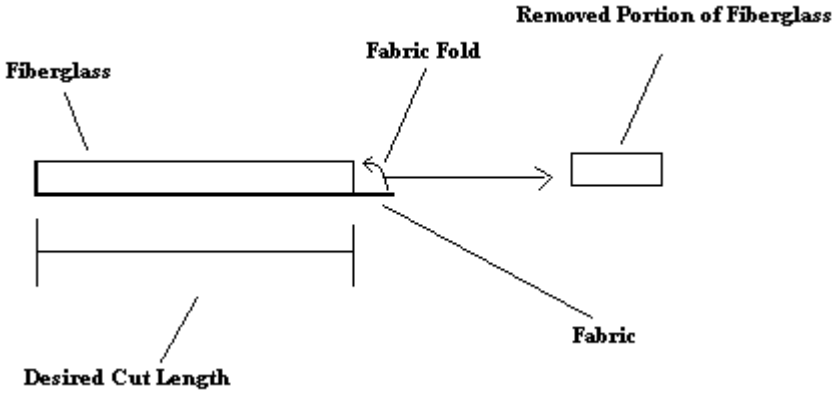


Figure 2

FIG 1. Pie shaped wedges in an opening for a can light.
FIG 2. V shaped cuts in an opening for a vent

IF the cutout location interferes with the LED enclosure, rotate the panel until you have clearance to make the cut(s).

For existing ceilings or bare joist (rare) installations, please refrain from applying the mounting anchors before altering the panel. As always, measure first to ensure that where you will be cutting the panel, will still allow for it to rest flush against the finishing wall (room perimeter). Before cutting, peel back the fabric to the perimeters of the backside of the panel, exposing the bare fiberglass. A cut should be administered through the fiberglass material down to the face of the fabric. Take care not to puncture the fabric with the utility knife, as you will want to wrap the fabric back around to the top of the cut side of the panel, and epoxy or tape it in place. This will keep the bare fiberglass from the cut edge from being exposed to the wall, and thus out of view (See below).

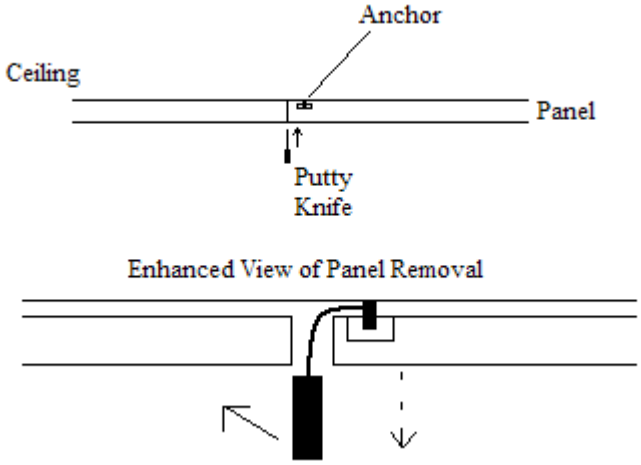


The mounting clips can now be administered to the panel and regular installation can resume.

Replacing LED Boxes Within the Panels

In some circumstances, whether it be from voltage spike, power supply failure, or LED failure, there may come a time during the life of the panel system where one or more of the embedded LED light sources may fail to produce light, thus denying the embedded fiber optic lines the light needed to produce the stars on the front side of the panel. In these circumstances, it is necessary to replace the defunct LED box(es). The following will take you through the proper procedure to effectively replace the boxes to where the fibers will not need to be removed; merely the box(es).

Removing the Panel From the Ceiling (if necessary): When removing the panel, it is important to remember the anchor position in the corners of the panels. This is the point where they will need to be detached from the ceiling; the mounts in the panel will need to be separated from the drywall anchors. Since the panels will most likely be directly up against another panel or a wall, the most common way to disengage the panel from the drywall anchor is with 1 or 2, 2 inch putty knives. The flexible nature of the putty knife will allow you to get into the tight spots to the corner anchors (see figure below). Apply pressure in an upward fashion and back to work the drywall anchor out of the panel mount.



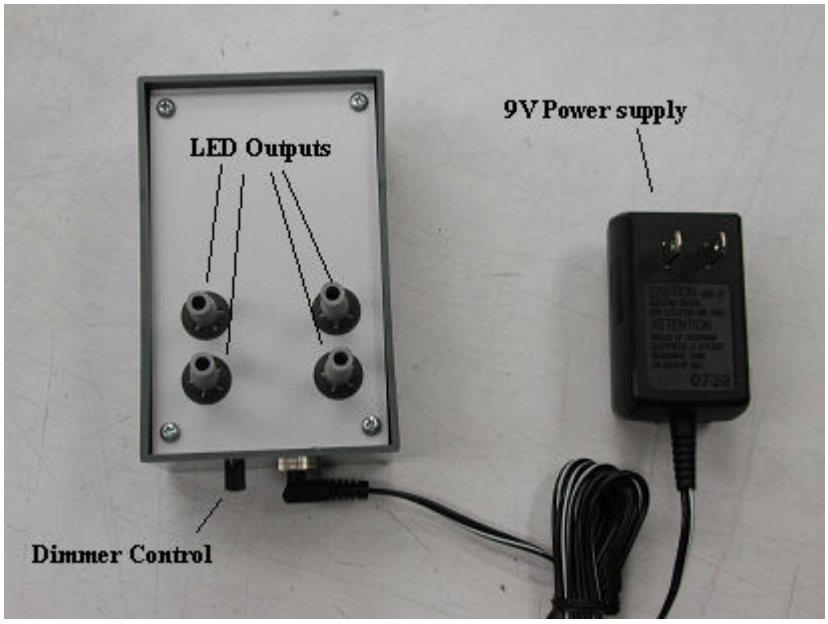
Removing the LED Box From the Panel: Once the panel is removed from the ceiling, you will see the LED box(es) exposed, cover side (with screws) up. Remove the set screws, and remove the cover from the stationary box(es). Once the cover is removed you will notice that the fiber optic bundle is coupled to the LED with a grey silicone boot. Use the putty knife to get underneath the box(es) in the panel pocket to allow the box(es) to become mobile. CAREFULLY remove the boot from the fiber bundle so as not to shift the positions of the fibers in the panel; this may cause fibers to lift back up into the panel from the surface, and thereby losing stars from the face of the panel. Once the fiber bundle is detached from the LED, disconnect any other connection to or from the box(es), and remove it for return to FTI.

Replacing the LED Box and Re-Connecting the Fiber Bundle: Once the repair or replacement box(es) have returned from FTI, you will need to make sure that the top of the box(es) is off, so you can align the box(es) as they were when you removed them. It is important that the new box(es) be mobile to re-connect the fiber bundle to the LED, so do not epoxy the new box(es) in place at this point. Once you have the new box(es) lined up so that the fiber bundle can re-connect to the LED, be gentle while inserting the fiber bundle back into the grey LED silicone boot so as not to pull the fiber from their position in the panel. The connection will be tight, so

maneuver the box(es) and not the fiber bundle to get the desired connection, for the same reason outlined previously. When the connection is made place the top back on the box(es) and tighten the set screws in place. When the top is secured, epoxy (with standard super glue or silicone; ensure that whichever epoxy is used is not hot.) the box(es) back into position cover (and screw) side up in case future repairs need to be made. Place a weight on the top of the box(es) to ensure proper fixing of box(es) in position. Re-attach any connections that were disengaged from the old box(es). Reconnect the power supply to the chain to ensure that the new box(es) are functioning properly. Once the new box(es) are confirmed to be working properly, disconnect the power supply. Once again clip in the panels, as aligned previously into the drywall anchors, and re connect the power supply.

Twinkle Installations

Twinkle Installation (Custom Harness System in Drywall): The twinkle unit will be and independent lightsource and system separate from the main Illuminator and harness system. Locate the LED twinkle controller near the main lightsource, or in a different location with a standard outlet near the ceiling. The twinkle controller will have 4 LED outputs with gray connectors on each one for coupling to each twinkle harness (See image below).



After the star bundles are installed into the drywall panel, and before lifting and fastening the drywall to the joists, drill a few random holes into the panel to accommodate the twinkle harness fibers. It is FTI's recommendation that fibers from one LED output harness should not be placed around the same location of the ceiling. This will cause a blinking effect in these portions of the ceiling. Rather, in each panel of drywall, a couple fibers from each LED output harness should be installed randomly, drawing from each twinkle harness, so as not to group fibers too densely together from a single harness. One recommendation for planning the placement for the twinkle fibers is to create a grid drawing of the ceiling before installation. In the drawing, grid the ceiling into partitions of the amount of drywall panels that will be hung to form the ceiling. Assign a

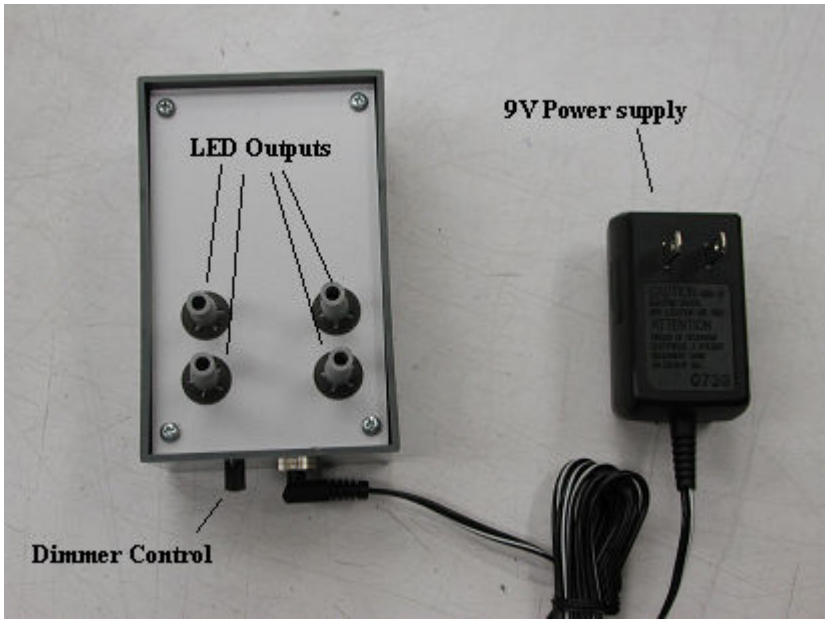
number (1-4) for each of the twinkle harnesses, and on the grid drawing of the ceiling, indicate with the twinkle harness number (1-4) where each twinkle fiber will be located. There are 20 twinkle fibers per harness, and a total of 80 for the entire twinkle system. Again, they should be spaced accordingly, so as not to group too many 1s, 2s, 3s, or 4s in the same area of the ceiling (See diagram below for example).

1	2	1	3	2	1	4	2	1	3
4	3	4	2		3			4	2
2		1		4		4	1	3	4
1	3	2	4	3	2	1	3	4	2
2	4			1		4		3	1
3	1	2	4	3	2		2		3
2	4	3		1		3	1	4	1
		1	2		2	1	4	3	2
3	1	4		3		3		1	4
4	2	3	4	1	4	2	1	3	2

Each square represents a 2' x 2' Area

Like installing the star bundles, drill or poke a hole into each panel for the designated locations, and feed the fiber through, pulling the fiber a few feet through the panel. Twinkle bundles will be either 25 feet long or 50 feet long depending upon ceiling specifications, so there will likely be excess fiber from the twinkle harness.

Twinkle Installation (Custom Harness System in Drop Ceiling): Like the twinkle installation for drywall ceilings, the twinkle unit will be and independent lightsource and system separate from the main Illuminator and harness system. Locate the LED twinkle controller near the main lightsource, or in a different location with a standard outlet near the ceiling. The twinkle controller will have 4 LED outputs with gray connectors on each one for coupling to each twinkle harness (See image below).



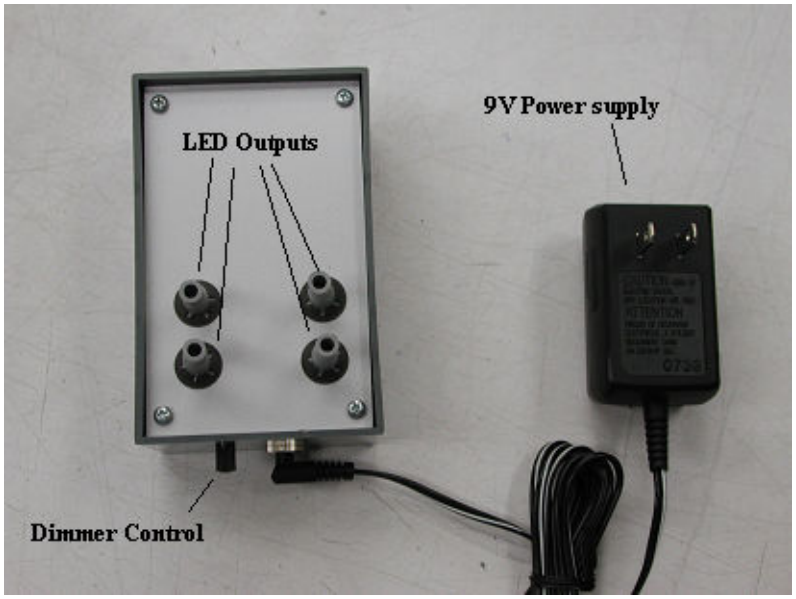
One recommendation for planning the placement for the twinkle fibers is to create a grid drawing of the ceiling before installation. In the drawing, grid the ceiling into partitions of the amount of drop ceiling panels that will be hung into the track of the ceiling. Assign a number (1-4) for each of the twinkle harnesses, and on the grid drawing of the ceiling, indicate with the twinkle harness number (1-4) where each twinkle fiber will be located. There are 20 twinkle fibers per harness, and a total of 80 for the entire twinkle system. Again, they should be spaced accordingly, so as not to group too many 1s, 2s, 3s, or 4s in the same area of the ceiling (See diagram below for example).

1	2	1	3	2	1	4	2	1	3
4	3	4	2		3			4	2
2		1		4		4	1	3	4
1	3	2	4	3	2	1	3	4	2
2	4			1		4		3	1
3	1	2	4	3	2		2		3
2	4	3		1		3	1	4	1
		1	2		2	1	4	3	2
3	1	4		3		3		1	4
4	2	3	4	1	4	2	1	3	2

Each square represents a 2' x 2' Area

Like installing the star bundles, drill or poke a hole into each panel for the designated locations, and feed the fiber through, pulling the fiber a few feet through the panel. Twinkle bundles will be either 25 feet long or 50 feet long depending upon ceiling specifications, so there will likely be excess fiber from the twinkle harness; leave some slack of each twinkle fiber above the ceiling before clipping the twinkle fibers back, in case there need to be future adjustments of the fiber (new paint job, new panel etc.).

<u>Twinkle Installation (Acoustic Panel System for Existing Ceilings):</u> The twinkle unit will be and independent lightsource and system separate from the main power supply. Locate the LED twinkle controller near, or on the same outlet as the main power supply, or in a different location with a standard outlet near the ceiling. The twinkle controller will have 4 LED outputs with gray connectors on each one for coupling to each twinkle harness (See image below).



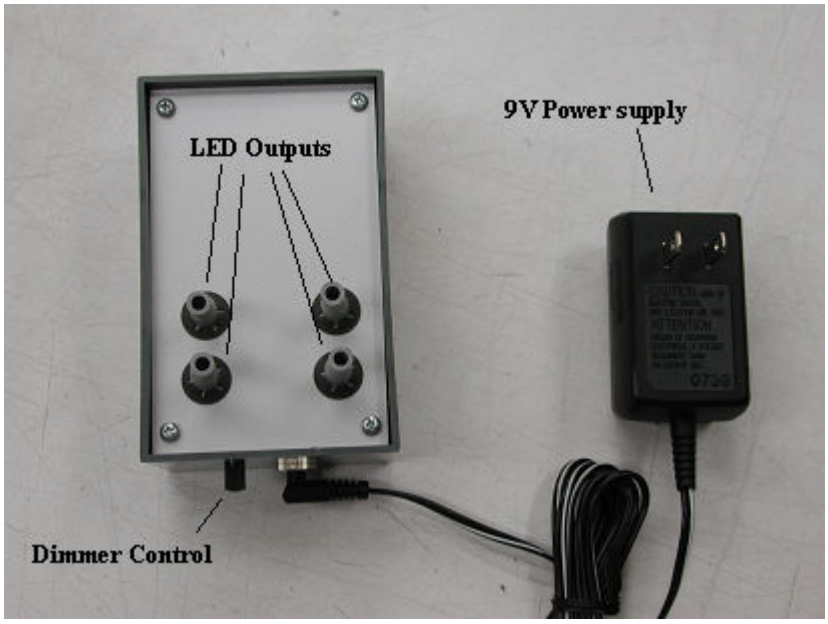
After the Rotofast mounting clips are installed into the acoustic panel, and before lifting and snapping the panels into place on the existing ceiling, poke a few random holes into the panel to accommodate the twinkle harness fibers. It is FTI's recommendation that fibers from one LED output harness should not be placed around the same location of the ceiling. This will cause a blinking effect in these portions of the ceiling. Rather, in each panel of drywall, a couple fibers from each LED output harness should be installed randomly, drawing from each twinkle harness, so as not to group fibers too densely together from a single harness. One recommendation for planning the placement for the twinkle fibers is to create a grid drawing of the ceiling before installation. In the drawing, grid the ceiling into partitions of the amount of drywall panels that will be hung to form the ceiling. Assign a number (1-4) for each of the twinkle harnesses, and on the grid drawing of the ceiling, indicate with the twinkle harness number (1-4) where each twinkle fiber will be located. There are 20 twinkle fibers per harness, and a total of 80 for the entire twinkle system. Again, they should be spaced accordingly, so as not to group too many 1s, 2s, 3s, or 4s in the same area of the ceiling (See diagram below for example).

1	2	1	3	2	1	4	2	1	3
4	3	4	2		3			4	2
2		1		4		4	1	3	4
1	3	2	4	3	2	1	3	4	2
2	4			1		4		3	1
3	1	2	4	3	2		2		3
2	4	3		1		3	1	4	1
		1	2		2	1	4	3	2
3	1	4		3		3		1	4
4	2	3	4	1	4	2	1	3	2

Each square represents a 2' x 2' Area

Poke a hole into each panel for the designated locations, and feed the fiber through, pulling the fiber a few feet through the panel. Twinkle bundles will be either 25 feet long or 50 feet long depending upon ceiling specifications, so there will likely be excess fiber from the twinkle harness. This is why the twinkle fibers should be pulled through the face of the panel, leaving a little slack above the ceiling in case of any future manipulations. The twinkle fibers will be able to run flush between the panel and the existing ceiling, as well as flush between the joists and the panel.

Twinkle Installation (Acoustic Panel System in Drop Ceiling): Like the twinkle installation for existing ceilings, the twinkle unit will be and independent lightsource and system separate from the main power supply. Locate the LED twinkle controller near, or on the same outlet as the main power supply, or in a different location with a standard outlet near the ceiling. The twinkle controller will have 4 LED outputs with gray connectors on each one for coupling to each twinkle harness (See image below).



One recommendation for planning the placement for the twinkle fibers is to create a grid drawing of the ceiling before installation. In the drawing, grid the ceiling into partitions of the amount of drop ceiling panels that will be hung into the track of the ceiling. Assign a number (1-4) for each of the twinkle harnesses, and on the grid drawing of the ceiling, indicate with the twinkle harness number (1-4) where each twinkle fiber will be located. There are 20 twinkle fibers per harness, and a total of 80 for the entire twinkle system. Again, they should be spaced accordingly, so as not to group too many 1s, 2s, 3s, or 4s in the same area of the ceiling (See diagram below for example).

1	2	1	3	2	1	4	2	1	3
4	3	4	2		3			4	2
2		1		4		4	1	3	4
1	3	2	4	3	2	1	3	4	2
2	4			1		4		3	1
3	1	2	4	3	2		2		3
2	4	3		1		3	1	4	1
		1	2		2	1	4	3	2
3	1	4		3		3		1	4
4	2	3	4	1	4	2	1	3	2

Each square represents a 2' x 2' Area

Poke a hole into each panel for the designated locations, and feed the fiber through, pulling the fiber a few feet through the panel. Twinkle bundles will be either 25 feet long or 50 feet long depending upon ceiling specifications, so there will likely be excess fiber from the twinkle harness; leave some slack of each twinkle fiber above the ceiling before clipping the twinkle fibers back, in case there need to be future adjustments of the fiber (new paint job, new panel etc.).

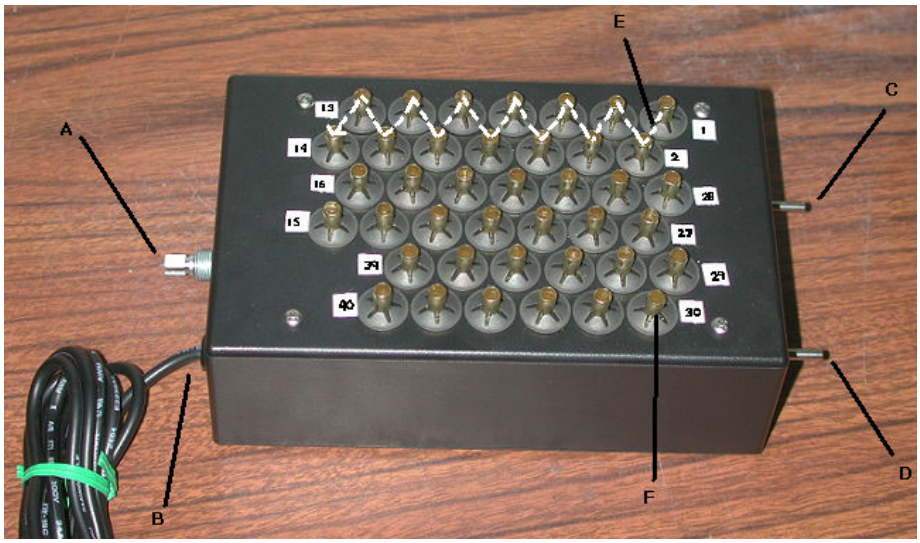
Shooting Star Installations

Shooting Star Installation (Drop Ceilings; Acoustic and Custom Systems): Installing the shooting star effect in a drop ceiling of any kind can be done after the panels are already dropped into the ceiling (while it does require that the panels, to be used, be removed when installing the fibers). The best effect of constant direction can be achieved by drawing a line in tape (masking tape or painters tape for best result) across the ceiling in the path you wish the shooting star to travel. When the tape is in place, you are ready to poke the holes for your shooting star, which will have 40 points. There are several ways to plot out the course of these points, here are two of the most common, and it is, ultimately, the users decision as to which approach to take;

1.) Measure the length of the tape across the ceiling, divide by 40, and then drill or poke a hole every resultant distance to that calculation.

2.) Taper the last fibers of the shooting star. Place the first 30-35 points equal distance from each other, and the last 5-10 fibers an increasingly shorter distance from each other until the last fiber. This should give the effect of a shooting star curving over the horizon.

The following below outlines the layout of the box and controls:



Key:
A- Dimmer Control
B- Power Supply 9V Wall Wart
C- Speed Control of Firing LEDs
D- Delay Control of Effect (15 seconds to 11minutes)
E- Path LEDs Will Light
F- LED Outputs

Notes:
- Controls turned all the way to the user's left when looking directly at them, are at their lowest settings. I.E. Delay will be 15 seconds, Speed will be at it's slowest, Dimmer will make the LEDs their dimmest.
- Inversely, controls turned all the way to the user's right when looking directly at them, are at their highest settings. I.E. Delay will be 11 minutes, Speed will be at it's highest (not recommended), Dimmer will make the LEDs their brightest.
    - Settings should all be tested to find the appropriate balance required by the user.
    - Numbers next to each LED Output indicate the number in which that specific LED will fire in one cycle.

Plug each Shooting Star Strand (not shown) onto each LED Output. This can be done one at a time while you are installing each end of fiber into the ceiling, or all Shooting Star Strands can be connected to the LED Outputs simultaneously, and then run out into their respective sequence holes in the ceiling. It is recommended that one strand be installed to the box and in the ceiling at a time, so as not to cause confusion with tangled fibers or improper order. To begin, begin with the hole furthest from the unit, if this is planned to be fiber #1, install fiber #1, #2 etc. to #40. The last fiber installed should be closest to the unit for convenience sake only. When installing fibers into the panels, pull fiber most of the way through the face of the panel, but be sure to leave some slack above the ceiling for any future manipulations.

Shooting Star Installation (Acoustic Panels and Custom System in Drywall): Installation of the shooting star in drywall and acoustic panels is slightly more difficult than shooting star installation in a drop ceiling scenario since the path of the shooting star cannot be all mapped out after the ceiling is in place. It will take careful planning and measuring to ensure the accuracy of the effect. To begin, plot out on paper (creating a grid of the ceiling involving the panels or drywall sheets) the path the shooting star will take across the ceiling. Mark out, on the paper, where the 40 points of the shooting star will run. There are several ways to plot out the course of

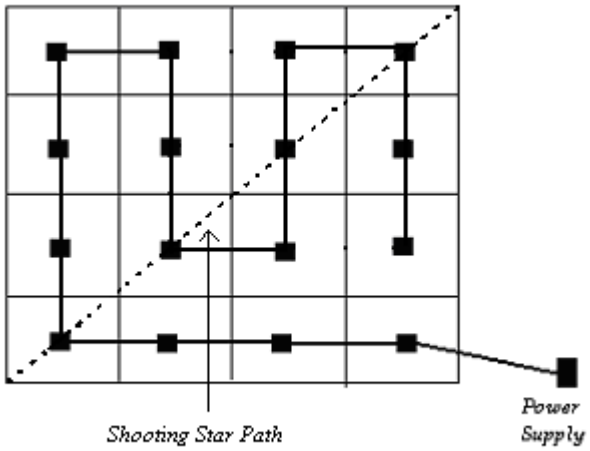
these points, here are two of the most common, and it is, ultimately, the users decision as to which approach to take;

1.) Measure the length of the tape across the ceiling, divide by 40, and then drill or poke a hole every resultant distance to that calculation.

2.) Taper the last fibers of the shooting star. Place the first 30-35 points equal distance from each other, and the last 5-10 fibers an increasingly shorter distance from each other until the last fiber. This should give the effect of a shooting star curving over the horizon.

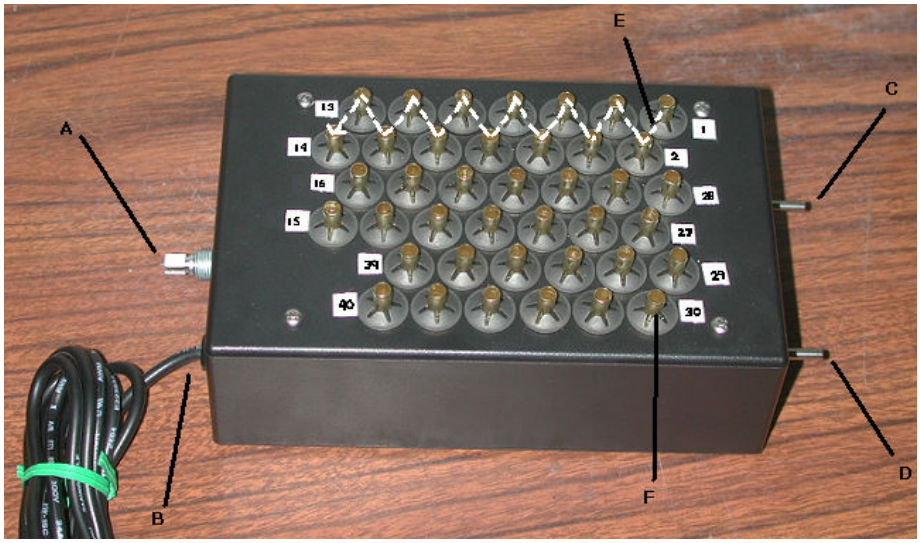
Acoustic Panels

For the acoustic panels, general installation will take on a new approach from the spiral method (See Diagram Below).



As you can see, this will allow you to install the shooting star from start to finish with out interrupting the chain of numbers for the shooting star fibers. Take the first panel, tape (masking or painters tape) down the direction the shooting star will take across the first panel as indicated on the drawing. This will allow you to follow it with tape on the second panel with shooting star fibers in it when you are ready to install. Using the method above for installing the Acoustic Panel System, you will notice that you will be able to follow the shooting star 1-40 fibers directly throughout the installation. Ensure that you maintain the consistency of your numbering for the 40 shooting star points as you progress in your installation, as it will be difficult and time consuming to alter them afterward.

The diagram below outlines the layout of the box and controls:



Key:
A- Dimmer Control
B- Power Supply 9V Wall Wart
C- Speed Control of Firing LEDs
D- Delay Control of Effect (15 seconds to 11minutes)
E- Path LEDs Will Light
F- LED Outputs

Notes:
- Controls turned all the way to the user's left when looking directly at them, are at their lowest settings. I.E. Delay will be 15 seconds, Speed will be at it's slowest, Dimmer will make the LEDs their dimmest.
- Inversely, controls turned all the way to the user's right when looking directly at them, are at their highest settings. I.E. Delay will be 11 minutes, Speed will be at it's highest (not recommended), Dimmer will make the LEDs their brightest.
- Settings should all be tested to find the appropriate balance required by the user.
- Numbers next to each LED Output indicate the number in which that specific LED will fire in one cycle.

Plug each Shooting Star Strand (not shown) onto each LED Output. This can be done one at a time while you are installing each end of fiber into the ceiling, or all Shooting Star Strands can be connected to the LED Outputs simultaneously, and then run out into their respective sequence holes in the ceiling. It is recommended that one strand be installed to the box and in the ceiling at a time, so as not to cause confusion with tangled fibers or improper order. When installing fibers into the panels, pull fiber most of the way through the face of the panel, but be sure to leave some slack above the ceiling for any future manipulations. Snap the panel into place and continue on with the installation. The next panel with shooting star fibers in it should match up with the tape of the corresponding one before it to ensure the consistency of the effect.

Custom Harness Systems - Drywall

For installation in drywall on an existing ceiling, see the shooting star installation for drop ceilings for instruction.

For new construction shooting star installation in drywall, take the first panel, mark out in pencil, following a ruler, the direction the shooting star will take across the first panel as indicated on the drawing. This will allow you to follow it with tape on the second panel with shooting star fibers in it when you are ready to install. Using the method above for installing the Acoustic Panel System, you will notice that you will be able to follow the shooting star 1-40 fibers directly

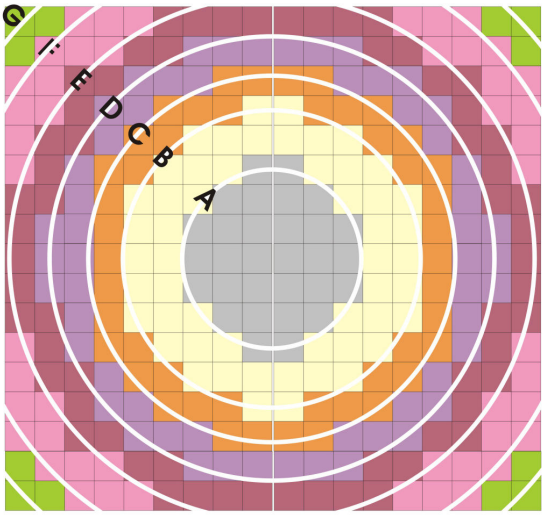
throughout the installation. Ensure that you maintain the consistency of your numbering for the 40 shooting star points as you progress in your installation, as it will be difficult and time consuming to alter them afterward.

Plug each Shooting Star Strand (not shown) onto each LED Output. This can be done one at a time while you are installing each end of fiber into the ceiling, or all Shooting Star Strands can be connected to the LED Outputs simultaneously, and then run out into their respective sequence holes in the ceiling. It is recommended that one strand be installed to the box and in the ceiling at a time, so as not to cause confusion with tangled fibers or improper order. When installing fibers into the panels, pull fiber most of the way through the face of each drywall sheet, but be sure to leave some slack above the ceiling for any future manipulations. Attach the drywall sheet into place on the joists and continue on with the installation. The next drywall sheet with shooting star fibers in it should match up with the pencil marking of the corresponding one before it to ensure the consistency of the effect.

Small Area LED Driven Kits

Small Area LED Driven Kits should follow the same instruction set as the Custom Harness System to begin the installation manual. With the exception of the 24 square foot kit, each LED Driver will have two individual harnesses leaving the box. This is merely to ensure that the light and fibers are evenly distributed, and can be accommodated by the LED receptacles. Installation should not be affected by this characteristic.

DROP CEILING HARNESS LENGTHS



- -24’ Harness leg length
- -21’ Harness leg length
- -18’ Harness leg length
- -16’ Harness leg length
- -13’ Harness leg length
- -11’ Harness leg length
- - 7’ Harness leg length

JOIST CEILING HARNESS LENGTHS

34	-34’ Harness leg length
32	-32’ Harness leg length
30	-30’ Harness leg length
28	-28’ Harness leg length
26	-26’ Harness leg length
24	-24’ Harness leg length
22	-22’ Harness leg length
20	-20’ Harness leg length
18	-18’ Harness leg length
16	-16’ Harness leg length
14	-14’ Harness leg length
12	-12’ Harness leg length
10	-10’ Harness leg length
8	- 8’ Harness leg length
6	- 6’ Harness leg length
4	- 4’ Harness leg length

Star bundle specifications

P/N	Stars sq/ft	#of fibers in bundle	Tail length	.75mm	.5mm
FTISC17182	0.5	2	24"	1	1
FTISC17183	1	4	24"	2	2
FTISC17184	2	8	24"	4	4
FTISC17185	3	12	24"	6	6
FTISC17186	4	16	24"	8	8
FTISC17187	5	20	24"	10	10

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