

Tinker Tubes

Personal Lighting Systems

by Dean Collins

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TINKER TUBES—PERSONAL LIGHTING SYSTEMS

PREFACE

Within the photographic industry today many technical problems face the professional and amateur photographer. With the advent of total automation in the camera and lens medium, many of the problems facing the early photographers have been solved. But even with their total electronic automation, the cameras of today still have the same basic function as the cameras of the past and that is to record light. Whether this be existing light, portable flash on camera, tungsten lighting, professional strobes, or a combination of the above, the camera is merely an instrument to record light.

The TINKER-TUBE PERSONAL LIGHTING SYSTEMS discussed in this book are an inexpensive, modular system designed to be a light-weight form of lighting control. The quality of light that can be obtained through these designs can only be equaled by much more expensive, bulky, commercially manufactured products.

We are able to use these light-weight modular structures because we know that light in its pure form will produce heat but not friction to the surfaces that it strikes. Therefore heavy structural metal is not required to produce this soft, quality light. Light will reflect off white paper as efficiently as white steel. The lighting device need only be strong enough to support its own weight.

This concept represents freedom from many of the problems facing today's photographer. Freedom from purchasing thousands of dollars worth of light control devices and most of all freedom to create the kind of photographs YOU want to create with the quality of lighting YOU want to have.

The PERSONAL LIGHTING SYSTEMS are designed to be effective at whatever your degree of photographic sophistication whether that be working in your garage with 500 watt photo-floods, in your studio with 4,000 watt seconds of strobe, or outdoors in direct sun. These systems are designed to give you the freedom to create what you see in your mind and the lighting control devices to record it on film. After all — isn't that why you got into photography in the first place?

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TINKER TUBES—PERSONAL LIGHTING SYSTEMS

DETAILS ABOUT PVC

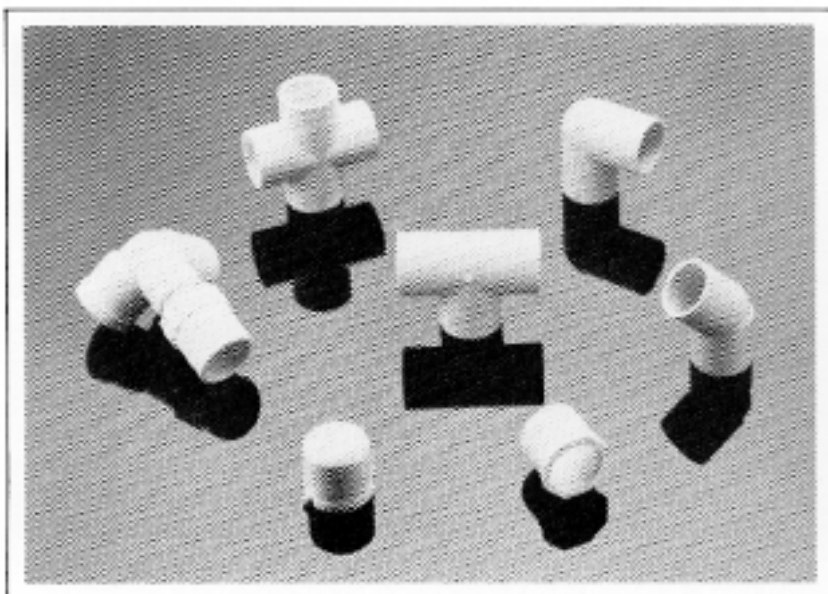
Before beginning actual construction of the designs it is important to take a few paragraphs to describe the different types and sizes of PVC tubing and which applications are best for each.

The two most commonly used types of PVC tubing are Schedule 40 and Class 125. Class 125 has a 1/16" thick wall which can be used for smaller and lighter structures where rigidity and strength are not factors. Because of its thin walls, it is the perfect choice for structures that have to breakdown and travel easily. (In some areas of the United States Class 125 is not readily available. A lightweight PVC with 1/16" thick walls can be substituted. For example Class 200.) Schedule 40 on the other hand with its 1/8" walls, is more practical for structures that need the strength the heavier tubing affords. When we get into the actual construction sections, we will be making recommendations for the best use of Schedule 40 and Class 125.

PVC tubing is available in many different sizes ranging from 1/2" diameter to 2" diameter. For our applications however, we will deal within the range of 1/2" to 1". Again, this is for their ease of breakdown and portability. However 1" PVC should not be ruled out for permanent structures.

Materials prices will vary. We recommend shopping around before making any purchases. If available, wholesale plumbing supply stores are the least expensive for all PVC supplies.

COMMON PVC JOINTS



In this photo you will note; from bottom left and clockwise, a Cap, 3 way Elbow, Cross, 90° Elbow, 45° Elbow, Reducer Bushing, and in the center is a Tee. All of these joints are available in a multiple of sizes and are different for each application.

TOOLS

The necessary tools used in these plans are as follows: a hacksaw, vise, pliers, file, drill and 1/4" bit, scissors, staples, and marking pen. (A table saw can be used with a fine tooth blade. Also there are PVC cutters available, but are rather expensive compared to a hacksaw.)

TINKER TUBES—SYSTEM COMPONENTS

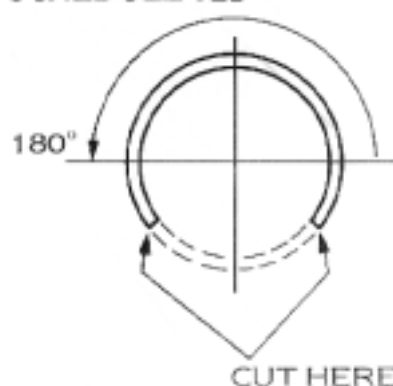
SINGLE CLIP

The single clips are used for clamping fabric or diffusion material (Soft Frost) onto a PVC frame. (Photo 1) These can be fabricated as either a "light duty" clip or as a "heavy duty" clip. It is important to note that the "light duty" clips are made from schedule 125 PVC and are cut from the same size pipe as the frame. "Heavy duty" clips on the other hand are made from schedule 40 PVC and are cut from a piece one size larger than the frame it is being snapped to. (Photo 2) For example, if you need to snap onto a 3/4" piece of PVC, a "light duty" clip would be cut from a 3/4", schedule 125 piece of PVC. If the clip were to be a "heavy duty" clip, it would be cut from a piece of 1" schedule 40 PVC.

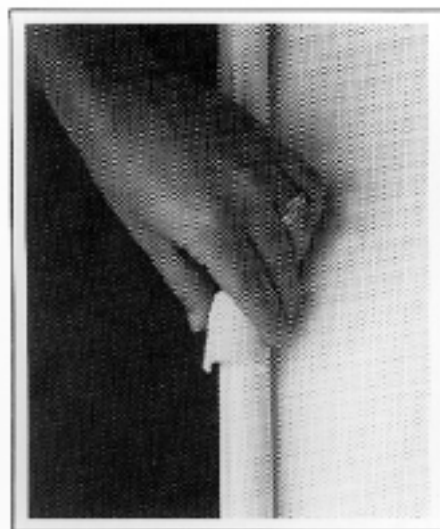
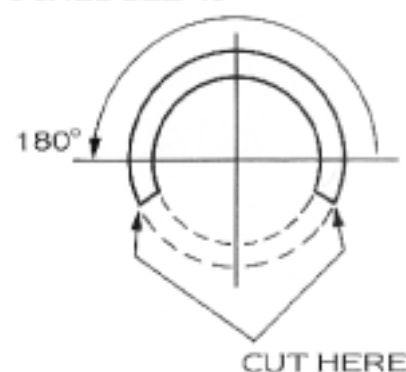
To begin assembly, cut a 1 1/2" to 2" section of the PVC tubing being used. Before going on, see illustrations on right for precise circumference to yield a suitable clip. Next, make two parallel cuts the length of the tube. (Photo 3) As you will discover, the tension of the clip is determined by the distance apart of the two cuts. If the clip is "heavy duty", you will need to file a bevel on the two edges as shown in photo 4. If the clip is "light duty", no further steps are necessary.



SCHEDULE 125



SCHEDULE 40



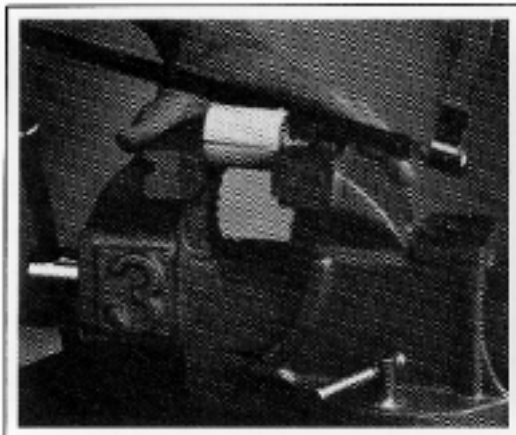
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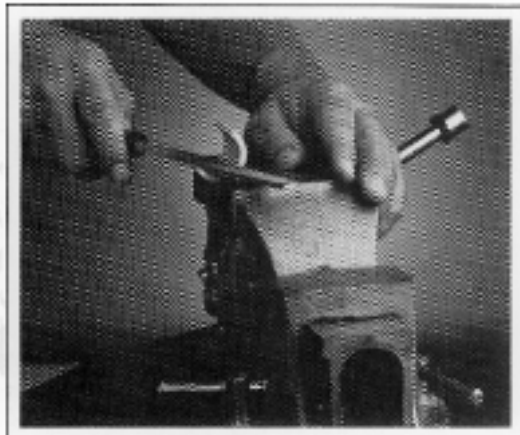
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TINKER TUBES—SYSTEM COMPONENTS

SINGLE CLIP (cont.)



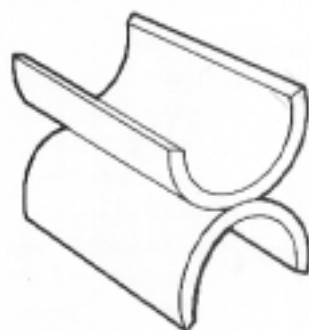
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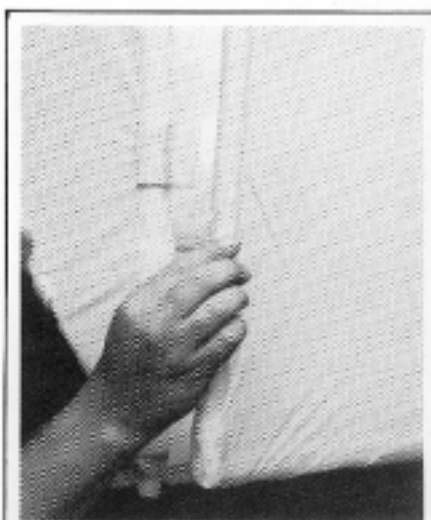
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DOUBLE CLIP

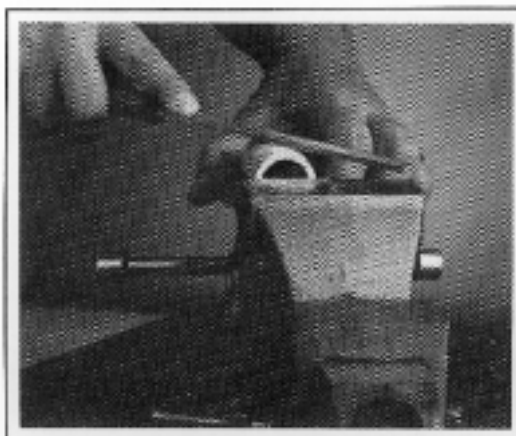
The Double Clip is used to attach two parallel pieces of PVC together. (Photo 5) These two pieces can either be of the same or different sizes. The most common use for the double clip is to attach the diffusion scrim to the front of a light box. The Double Clip is made from two single clips of PVC schedule 40, filed and glued together. Remember, when you are using schedule 40, the clips must be made one size larger than the tube they are to snap onto. For example, if you want to clip a 1/2" diffusion scrim on a 3/4" box, you would need to glue one 3/4" Single Clip to one 1" Single Clip. In order to glue the Single Clips together you must first file the back of each Single Clip so it has a flat edge. (Photo 6) Then, simply glue the two flat edges together with PVC cement as shown in Photo 7.



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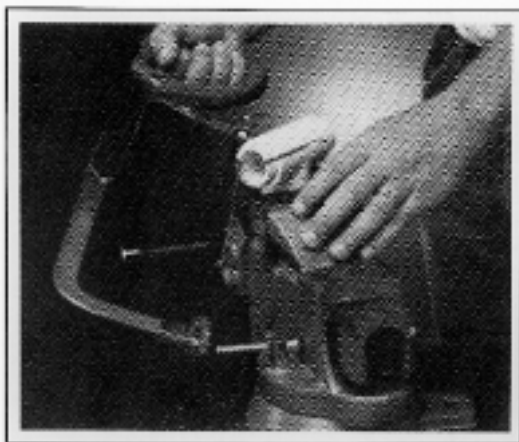
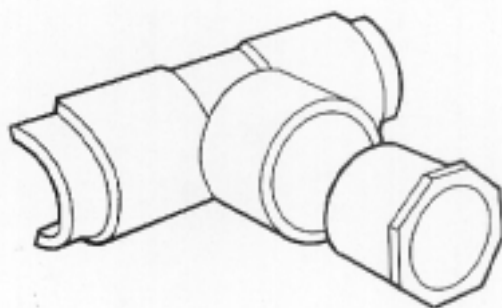
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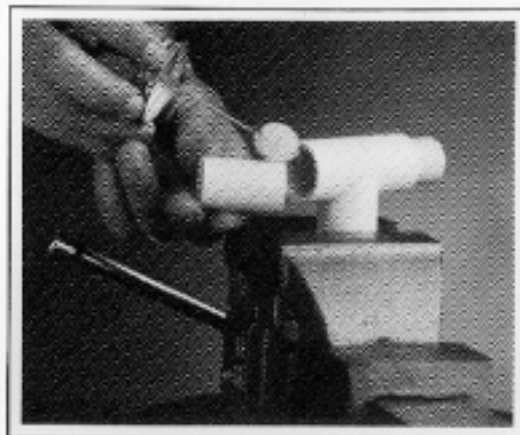
TINKER TUBES—SYSTEM COMPONENTS

SNAP-ON TEE & REDUCER BUSHING

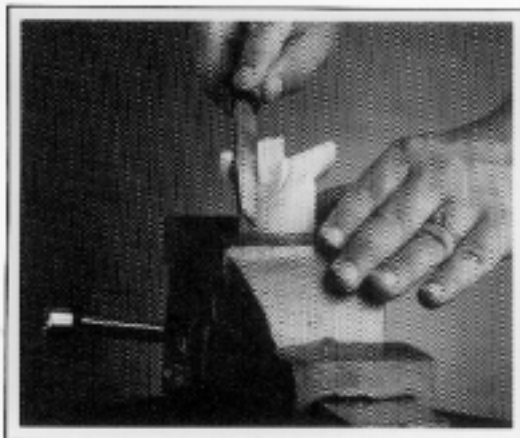
The Snap-on Tee is used to give the ability to connect or disconnect a component from the total piece. An example of this is the way the reflector attaches to the frame in the adjustable light box or the way the legs attach to the Self-Standing Panel. To begin fabrication of a Snap-on Tee, glue a 1" - 1 1/2" section of PVC schedule 40 the same size as the tee into each end of the tee. (Photo 8) Once the glue has dried, you then make two parallel cuts in the tee as described in the Single Clip section. (Photo 9) In order to make the Snap-on Tee easier to connect and disconnect, you then must file and bevel the two cut edges. (Photo 10). Because most tee's needed to manufacture these designs are 1", you will need the Reducer Bushing as shown in this illustration. This reducer bushing converts the 1" tee back to 3/4" for attaching to any 3/4" piece of PVC. Remember, a Snap-on Tee is one size larger than the PVC tubing being snapped onto.



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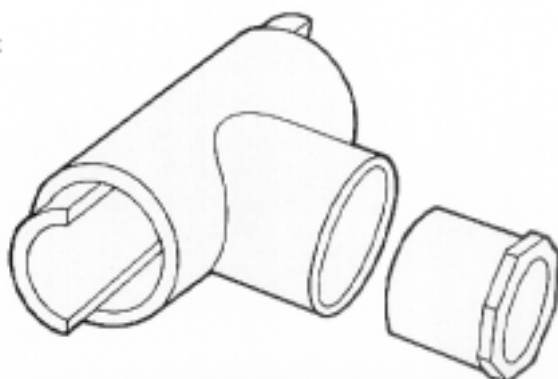


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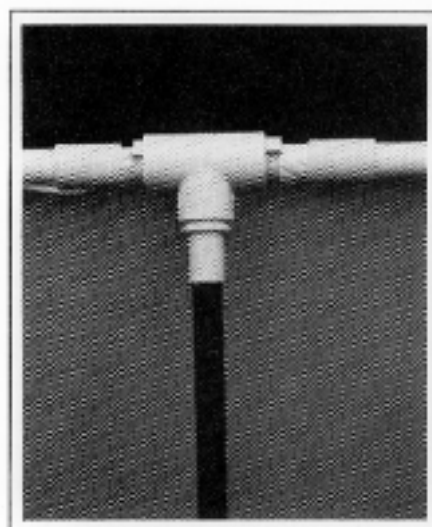
TINKER TUBES—SYSTEM COMPONENTS

SLIP-TEE WITH REDUCER BUSHING

The Slip-Tee is used where a component must be free to move either in a sliding motion or as a pivot point. This can be as in the case of the Adjustable Light Box 16 where the box is held onto the frame with Slip-Tees giving it the freedom to travel on its vertical frame. Another example is the way the lighthouse 20 attaches to the stand and also where it connects to the arms which control its movement frontwards and back. The Slip-Tees in this case represent the fixed portion, and the box pivots horizontally within the Slip-Tees. (Photo 11) To fabricate a Slip-Tee, cut two Single Clips out of schedule 40 PVC and secure one in each end with PVC cement. Note that these must be cut approximately at the 180 degree marks provided for the Single Clips in order for the Slip-Tee to slide easily.

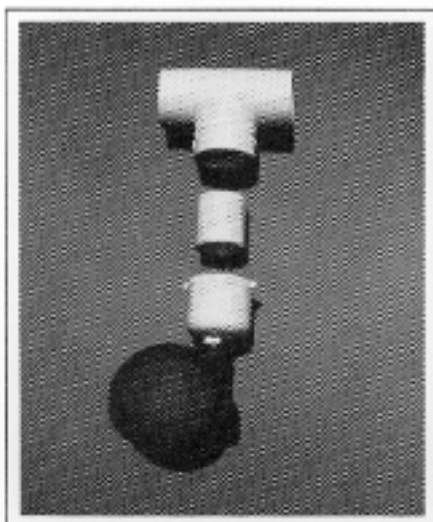


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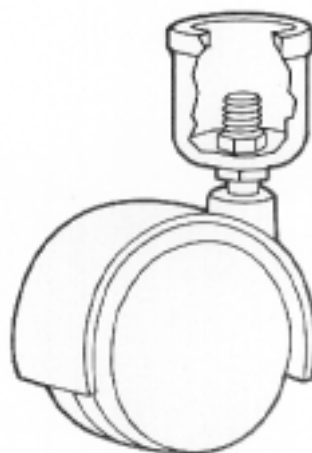


WHEELS

Wheels are installed on all boxes by bolting the wheel assembly to a PVC cap (See illustration) and then slipping the cap onto a 1-1/2" piece of 3/4" PVC. The free end of this 1-1/2" piece is then inserted into a tee or a cross depending on your needs. (See photo 12)



12



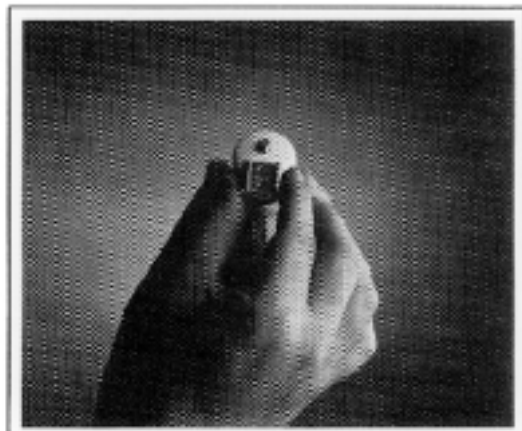
TINKER TUBES—SYSTEM COMPONENTS

FLASH MOUNT

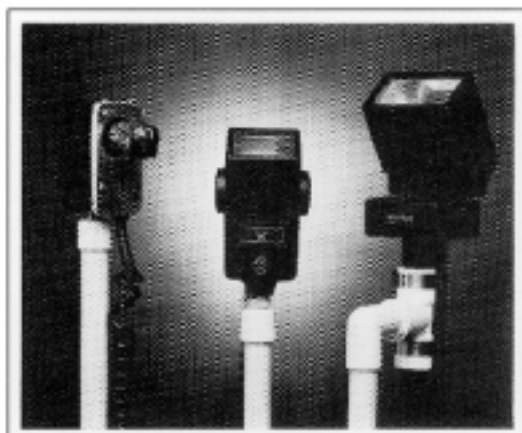
A.) Shoe mount strobes are attached to the light box by way of a PVC cap which has been fitted with an accessory shoe mount available in most camera stores. The only additional hardware needed is a 1/4 x 20 threaded screw. This screw is what attaches the shoe mount to the PVC cap. Begin by drilling a 1/4" hole in the top of the cap and insert the screw. (Photo 13) Then, tighten the screw into the shoe mount accessory that is on the outside of the cap.

B.) Professional strobes are attached in much the same way as the shoe mount strobes. The only difference is that a shoe mount accessory is not needed. The 1/4" x 20 screw is tightened directly into the 1/4" x 20 tap provided on the strobe head. (Photo 14)

C.) "Handlebar" type strobes are mounted to a 1" tee that has been cut in half as shown in photo 14. Two hose clamps are then used to attach the tee directly to the handle of the strobe. The 3/4" reducer bushing can be used to reduce the 1" to 3/4" for attaching to any existing length of 3/4" PVC. (Photo 14)



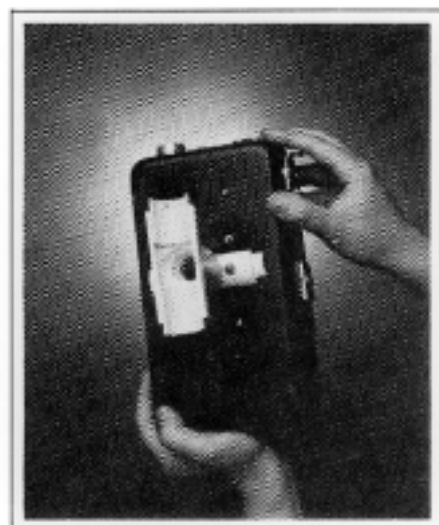
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14

BATTERY PACK MOUNTS

Since each manufacturer of battery packs is different, we will only show how our pack for the Norman 200-B was attached. Since this pack has pre-existing holes, we were able to connect a sectioned 3/4" tee directly into the pack simply by drilling holes in the tee that matched the threaded holes in the pack. The two are then screwed together. Next, we inserted a short length of 3/4", Schedule 40 PVC into the open end of the tee and then slipped the 1" Snap-on Tee over the free end of the 3/4" length.



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TINKER TUBES—SYSTEM COMPONENTS

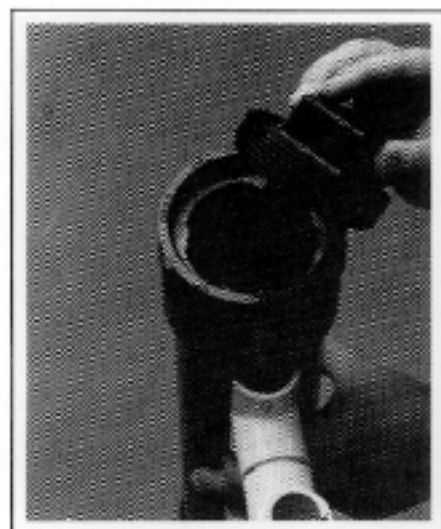
WATER WEIGHT

The Water Weight is used as a counter balance for either the Adjustable Light Box-16, or for the Self Standing Panel when it is used outdoors. The Water Weight is very versatile because it can be filled with water, sand, or cement for use in the studio, but if it is filled with water, it can be drained to take on location and then re-filled upon arrival.

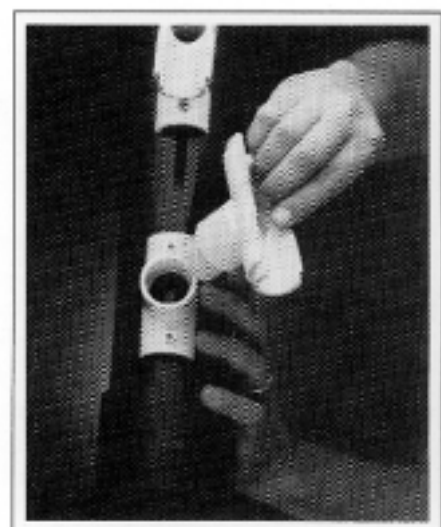
The Water Weight is constructed from a 14" long section of ABS 3" drain or sewer pipe. A cap is then glued on one end and a screw-in, drain inspection cover is glued on the other end.

(Photo 16) Note, a bead of silicon sealer must be run around the inside threads in order to make a watertight seal. After applying the silicon sealer, grease or oil the screw cap where the seat will be and screw the cap into the cover until it seats into the still soft bead of silicon. After approximately one hour, you may unscrew the cap and inspect the seal.

In order to attach the Water Weight to the light box, you will need two 1" Snap-on Tees, 4 wood screws, and two 1" tees that have been sectioned in half as shown in Photo 17. The next step is to drill two holes in the sectioned tees, and two matching holes in the ABS pipe. These holes must be slightly smaller than the diameter of wood screw being used in order to achieve a watertight seal. Dip the wood screws in PVC cement and then tighten them through the sectioned tees while they are still wet. The PVC cement, when dry will form a watertight seal. A 1" section of 1" PVC is then slipped between the sectioned tee, which is now attached to the Water Weight, and the snap-tee to hold the assembly together. (Photo 17) Once this has dried, you can then fill the pipe with water and your Water Weight is complete.



16



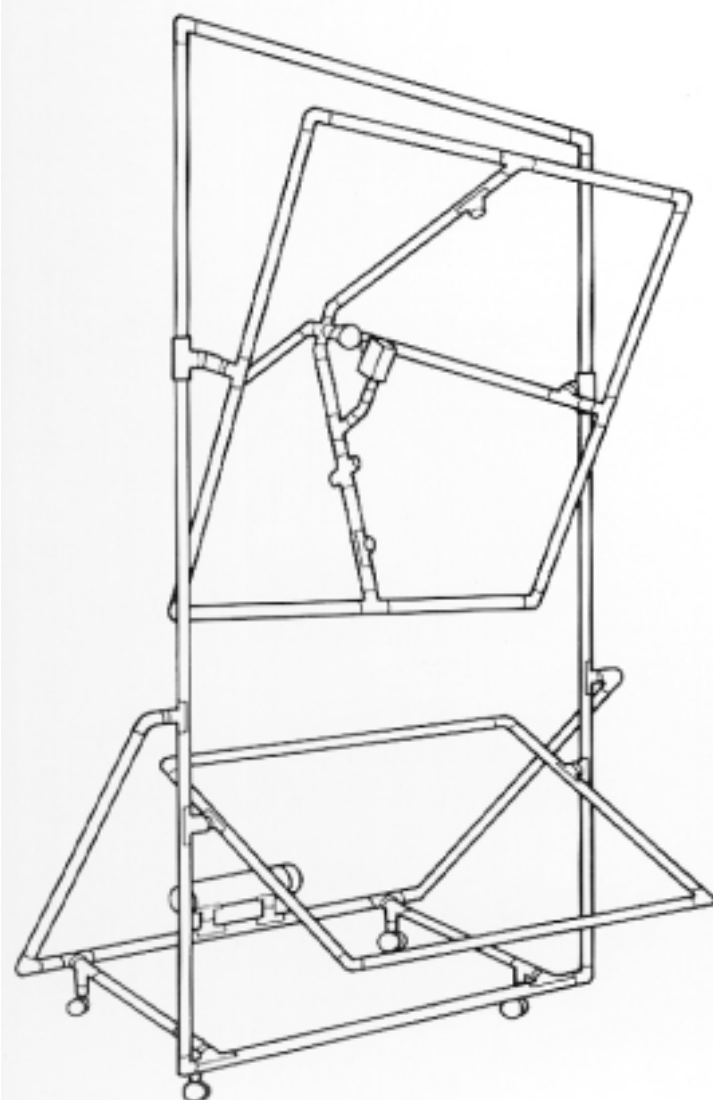
17

ADJUSTABLE LIGHT BOX 16

Fully adjustable —
vertically from 8 ft. to
the floor plus the light
box will pivot to any
desired angle

Snap on a chrome
reflector below the light
box to fill the shadows

Very versatile — easily
will roll anywhere in
your studio



The Adjustable Light Box 16 is a self standing light box with a built-in stand capable of vertical travel from a height of 8 feet to the floor. This gives you the capability of placing the light box over a person or product for front lighting and even under or behind a person or product to achieve back or bottom lighting. The box also has the capability of attaching a reflector directly below the box to control shadows created by the box. This light box is structured to withstand and work with either tungsten, quartz, or strobes whether these be professional or amateur. The light box has contained in it its own pilot light and is extremely adaptable to any shoe mount or "handlebar" mount strobe system. The Adjustable Light Box 16 also has a baffle feature that can be used with extremely efficient surfaces, such as glass and chrome. These subjects can be recorded without a copy of the strobe light in the specular highlight. The design of the Adjustable Light Box 16 is based on new and advanced information about light and the control of its characteristics. The baffle feature is just one example of how this information is being applied. Either with or without the baffle, we think you will find the Adjustable Light Box 16 to be a very versatile tool in your studio. Whether you are a portrait photographer or commercial, the possibilities with the Adjustable Light Box 16 are virtually endless and the only limit is your imagination and creativity.

TOTAL LENGTHS OF 10 ft. PVC TO BUY:

3/4"	Schedule 40	7 lengths
1"	Schedule 40	1 length
3/4"	Schedule 125	3 lengths
1/2"	Schedule 125	4 lengths

The diffusion frame is constructed of four 1/2" Elbows 90° and four 46" lengths of 1/2" PVC 125. After the Soft-Frost is attached with 1/2" "light duty" Single Clips use the 1"-3/4" Double Clips to attach the Diffusion Flat to the front of the light box. (See Double Clip section)

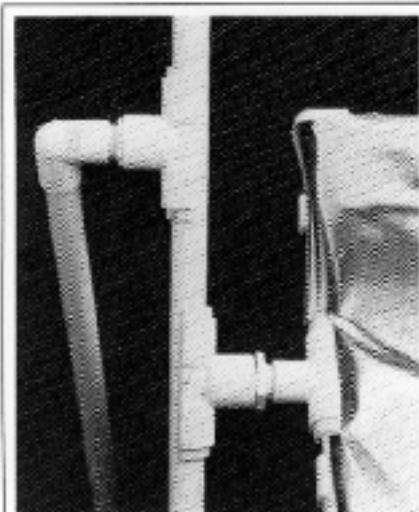
MATERIAL LIST:

QUANTITY			MATERIAL
FRAME	LIGHT BOX	REFLECTOR	DESCRIPTION
8	4		3/4" Elbow 90°
	4	4	1/2" Elbow 90°
4	6		3/4" Tee
		2	3/4" Snap-on Tee
6	3	2	1" Snap-on Tee & Reducer
	1		3/4" Cross
	1		1" Cross with 2 Reducers
	5		3/4" Elbow 45°
	2		1" Elbow 45° & Reducer
	2		1" Slip-Tee
4			3/4" Cap
	8	8	1/2" Single Clips (light duty)
	8		3/4" Single Clips (light duty)
	8		1"-3/4" Double Clips
2			3/4" PVC/40 L = 93 1/2"
2			3/4" PVC/40 L = 51 1/2"
2			3/4" PVC/40 L = 47 1/2"
1			3/4" PVC/40 L = 60 1/2"
2			3/4" PVC/40 L = 32 1/2"
	8		3/4" PVC/125 L = 22"
	1		3/4" PVC/125 L = 29 1/2"
	2		3/4" PVC/125 L = 24 1/2"
	3		3/4" PVC/125 L = 3"
	1		3/4" PVC/125 L = 8"
	1		3/4" PVC/125 L = 12 1/2"
		2	1/2" PVC/125 L = 46"
		2	1/2" PVC/125 L = 34"
	4		1/2" PVC/125 L = 46"
	2		1/2" Elec. Conduit L = 51 1/2"
	2		1/2" Elec. Conduit L = 93 1/2"
1			Water Weight *
4			Wheels *
	1		Flash Mount *
	1		Lightbulb (silverbowl) *
	1		Socket Assembly, AC Wire & Plug
	1		Battery Pack Mount *
	1		Soft Frost 50" x 50" *
	1		White Plastic 54" x 12" *
		1	Chrome Mylar 50" x 38" *

* (See Tinker Tubes/System Components section for materials and instructions)

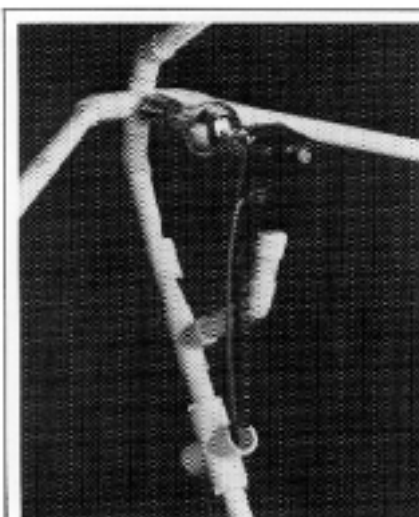
more adjustment. The 1" PVC Cross with 2 Reducer Bushings is glued in the light box frame as a wiring harness to carry all wires out the back of the Light Box 16.

18



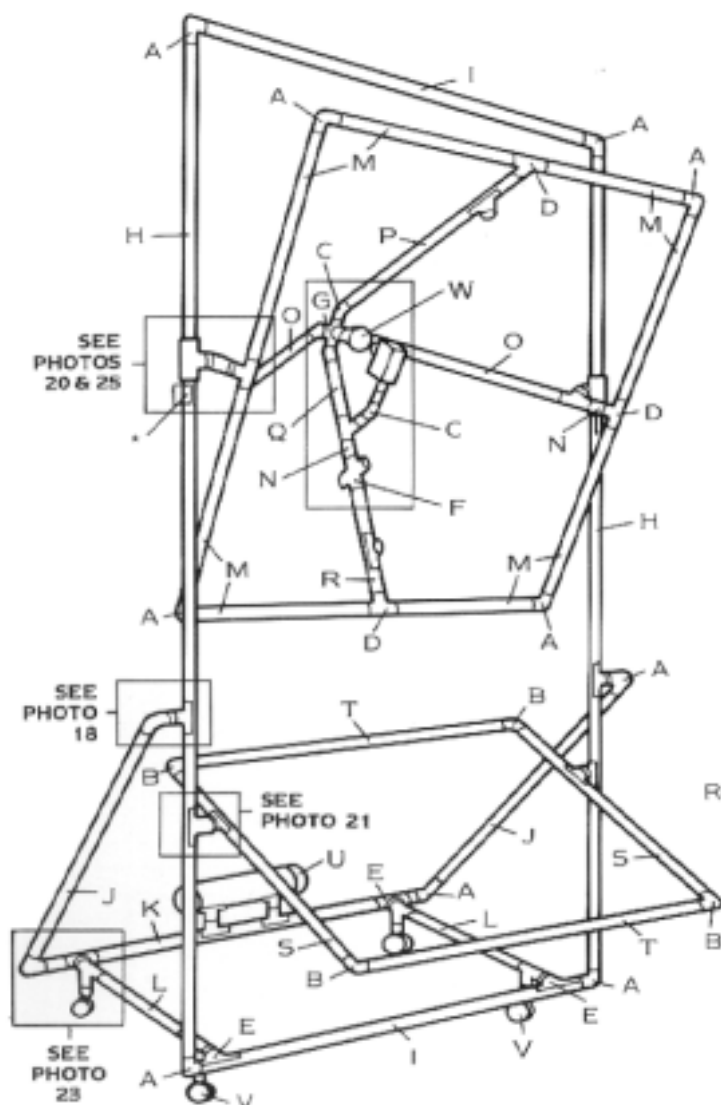
Detail of support (top): a 1" Snap-on Tee with Reducer Bushing. Below the reflector: a 3/4" Snap-on Tee (right) to Reducer Bushing and 1" Snap-on Tee (left).

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DETAIL OF STROBE & MODELING LIGHT ASSEMBLY:

The silver capped light bulb is used for even strobe light dispersion. (100 watt silverbowl light bulb) The light socket assembly is bolted into a hole drilled all the way through the PVC Cross (use a UL approved socket). A 1 1/2" hollow bolt installed on the socket carries the cord, which exits through the back of the PVC Cross and tightens in place with a nut. Depending on your strobe, two lengths of 3/4" PVC are cut to attach strobe mount to a 45° Elbow to the tee already glued in the box structure, or use a Snap-on Tee for

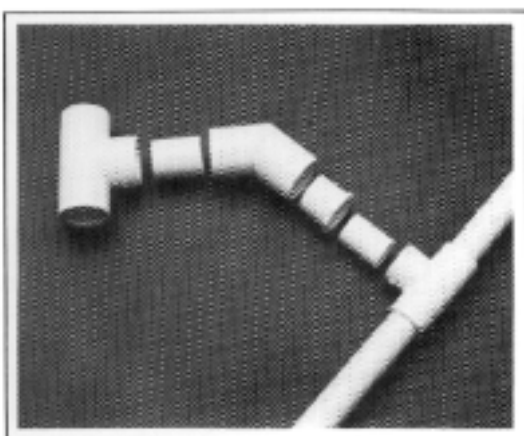


* A Double Clip stops box from slipping down.

LETTER OF REFERENCE	MATERIAL DESCRIPTION
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A	3/4" Elbow 90°
B	1/2" Elbow 90°
C	3/4" Elbow 45°
D	3/4" Tee
E	1" Snap-on Tee & Reducer
F	1" Cross & two Reducers
G	3/4" Cross
H	3/4" PVC/40 L = 93 1/2"
I	3/4" PVC/40 L = 51 1/2"
J	3/4" PVC/40 L = 47 1/2"
K	3/4" PVC/40 L = 60 1/2"
L	3/4" PVC/40 L = 32 1/2"
M	3/4" PVC/125 L = 22"
N	3/4" PVC/125 L = 3"
O	3/4" PVC/125 L = 24 1/2"
P	3/4" PVC/125 L = 29 1/2"
Q	3/4" PVC/125 L = 8"
R	3/4" PVC/125 L = 12 1/2"
S	1/2" PVC/125 L = 34"
T	1/2" PVC/125 L = 46"
U	Water weight
V	Wheel
W	Light bulb & socket assembly

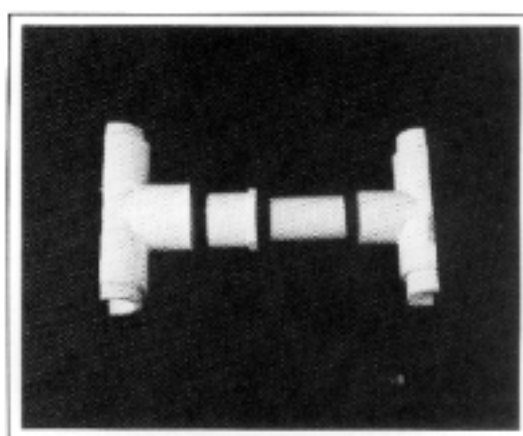
Note: The 1/2" electrical conduit is used for strengthening the main part of the frame (the frame will sway if not used). The lengths used are two at 93 1/2", two at 51 1/2" and are slipped inside the PVC tubing.



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LIGHT BOX SLIP-TEE

From left to right: a 1" Slip-Tee, 1" section of 1" PVC/40, 1" Elbow 45°, 1" to 3/4" Reducer Bushing, 1" section of 3/4" PVC/40 and a 3/4" Tee on the light box. All joints are glued except the Slip-Tee to 1" PVC/40 on left for pivot action.

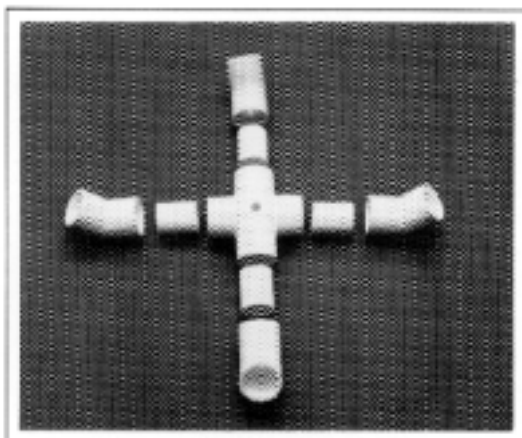


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REFLECTOR SNAP-ON TEES

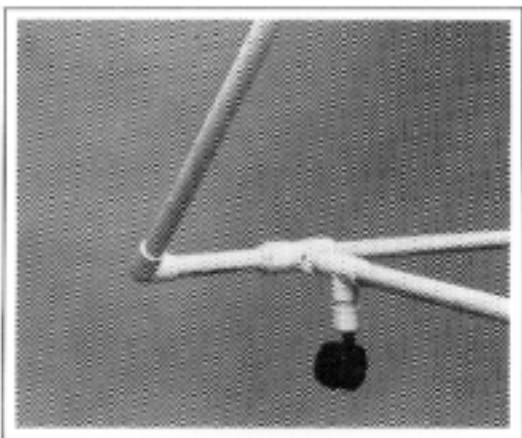
From left to right: a 1" Snap-on Tee on frame, a 1" to 3/4" Reducer Bushing, 1" section of 3/4" PVC/40 and a 3/4" Snap-on Tee on the reflector. None of these joints need glue.

22



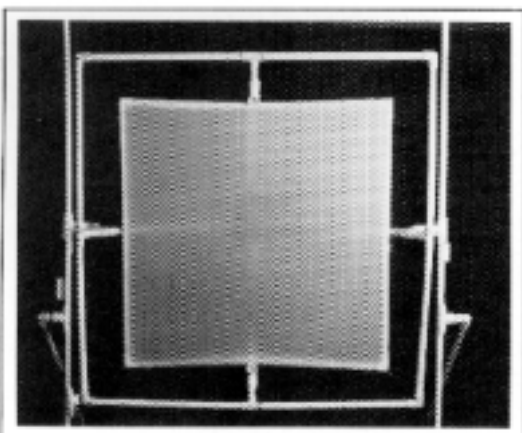
An exploded view of the rear section of the box shows the 3/4" Cross with a 1" section of 3/4" PVC/40 linking it to the four 3/4" Elbows 45°. The hole drilled in the Cross is for the light socket assembly.

23



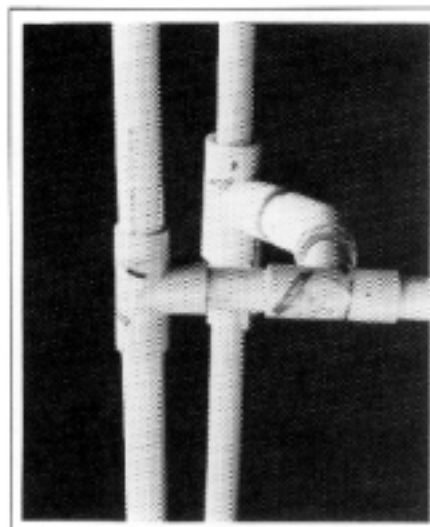
Detail of wheel assembly which attaches to a 3/4" tee adjacent to the 1" Snap-on Tee on the back brace of the frame.

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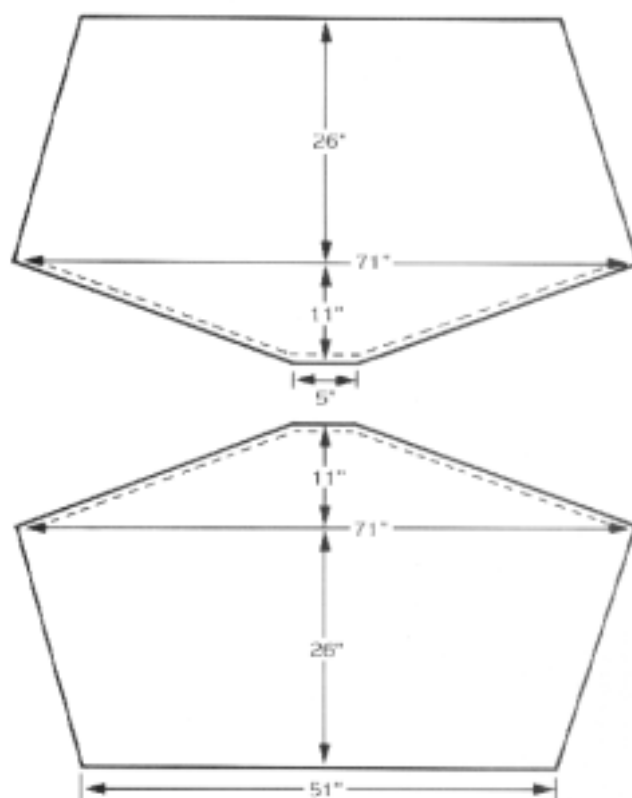


The baffle inside the light box shown here is 38" x 38" and is snapped in place between the two 1" Snap-on Tees on the top and bottom of the center vertical brace. If you make the baffle use four 1/2" Elbows 90° and four lengths of 1/2" PVC/125 cut at 36°.

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View of the Slip-Tee swivel joint which is attached to each side of the box.



The above illustration is the pattern for the white plastic cover. Cut your cover to these dimensions, then staple or glue the 2 dashed edges together shown in the illustration. We found the quick, easy way is use staples, then turn inside out so the staples are on the inside of the box. It is necessary to draw a STRAIGHT LINE for ease in stapling a straight seam. After this is accomplished, stretch the cover over the back of the box. It will be necessary to cut 3 holes as you will discover. The plastic should be stretched and attached before cutting the holes. Plastic will tend to stretch out as you pull it and clip it around the edges. This procedure will help you avoid cutting the 3 holes in the wrong places.

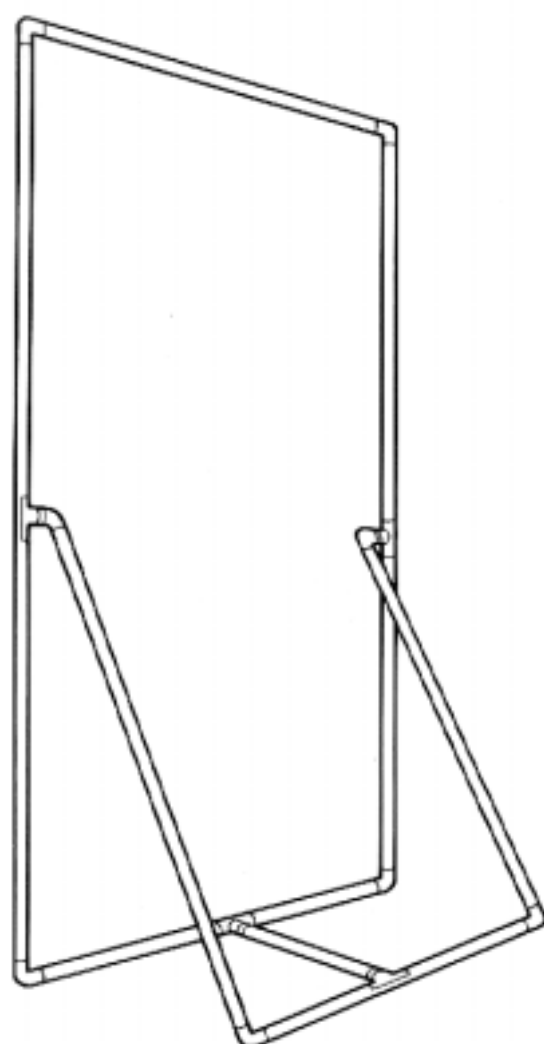
SELF STANDING PANEL

Can be used not only as
a diffusion scrim, but
also as a white panel

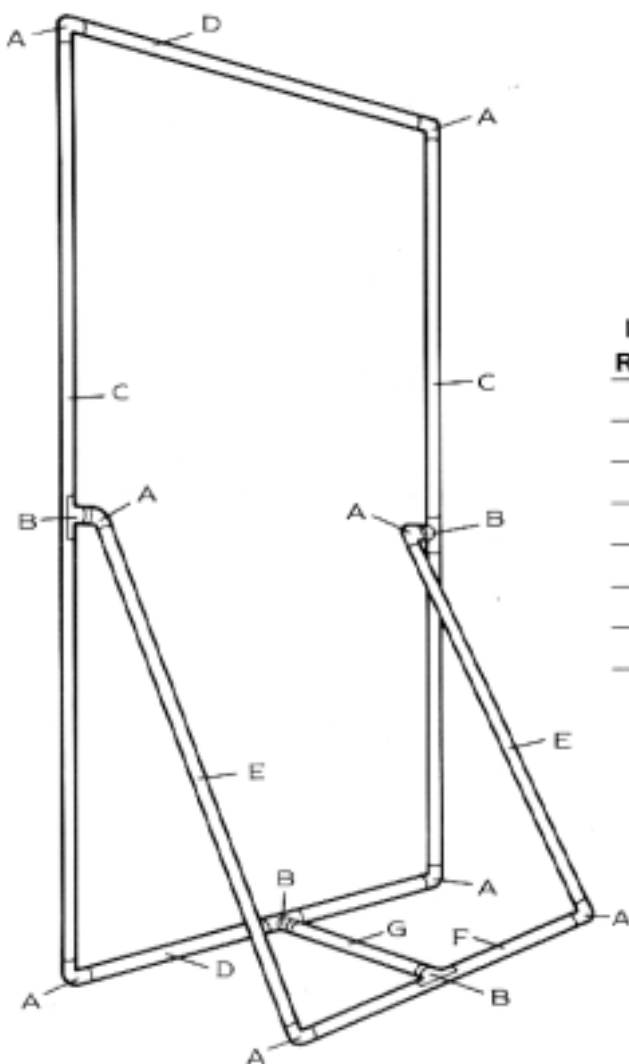
Use this panel
outdoors
for diffusing
direct sun

The Self Standing Panel is without a doubt the most versatile design covered in this book. It's versatility is only limited by the material that is snapped on the front of the panel. By covering the panel with translucent Soft Frost material, the panel in effect becomes a 4' x 7' light source capable of softening the quality of light while lowering specular density and softening shadow edge acuteness. This can be used outside in direct sunlight as a scrim or in the studio between a strobe or tungsten light. White vinyl or white paper can be used to turn this same panel into a full-length fill source. The creation of shadows rather than highlights, which is the basis of the subtractive lighting concept, can be achieved by covering the panel with a black material as opposed to white. It is even possible to clip two panels together in a "V" shape thereby creating a 8' x 7' light source. This light source is created by placing a strobe directly in the center of the "V" allowing it to disperse evenly across the full length of the 8' panel.

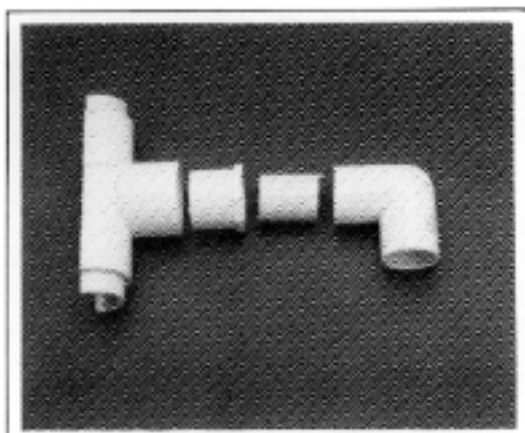
As you can see, the Self Standing Panel will quickly become an integral part of your lighting system and will be one design you keep building because of its many uses.



QUANTITY	DESCRIPTION
14	Single Clips (light duty)
8	3/4" Elbow 90°
4	1" Snap-On Tee & Reducer
2	3/4" PVC/125 L = 81 1/2"
2	3/4" PVC/125 L = 49 1/2"
2	3/4" PVC/125 L = 47"
1	3/4" PVC/125 L = 38"
1	3/4" PVC/125 L = 20"
1	54" x 84" Soft Frost



LETTER OF REFERENCE	MATERIAL DESCRIPTION
A	3/4" Elbow 90°
B	1" Snap-on Tee & Reducer
C	3/4" PVC/125 L = 81 1/2"
D	3/4" PVC/125 L = 49 1/2"
E	3/4" PVC/125 L = 47"
F	3/4" PVC/125 L = 38"
G	3/4" PVC/125 L = 20"

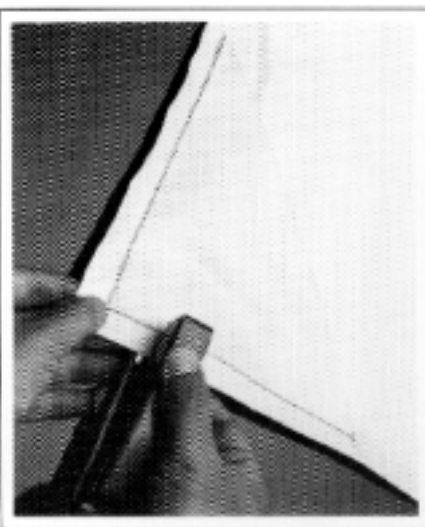


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SUPPORT SNAP-ON ASSEMBLY:

From left to right, a 1" Snap-on Tee, 1" to 3/4" Reducer Bushing, 1" section of 3/4" PVC/40 and a 3/4" Elbow 90°.

27

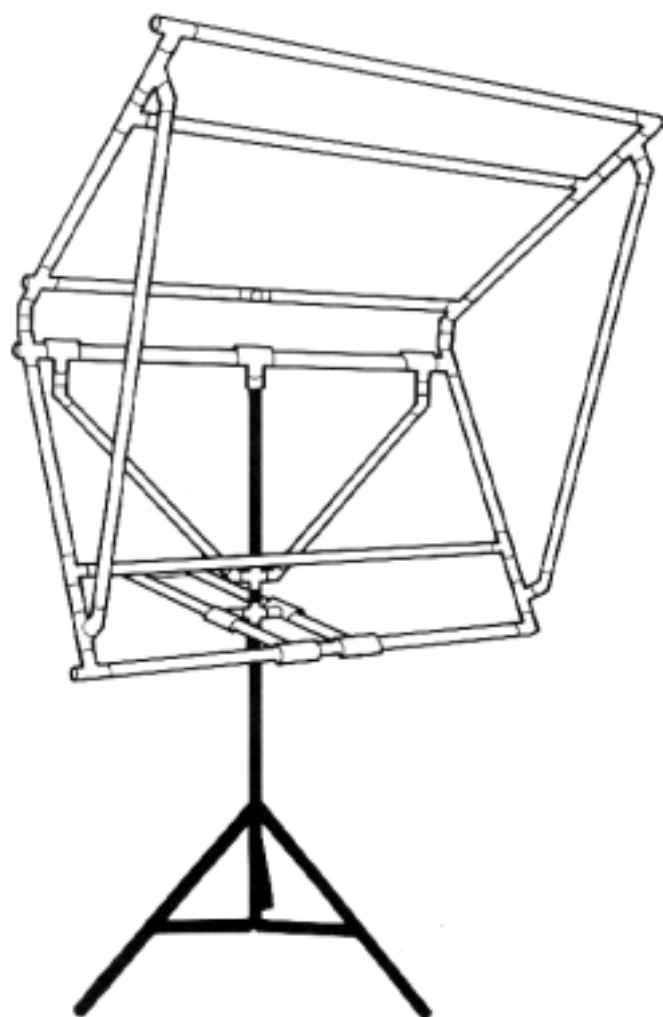


The cover whether it be white plastic or Soft Frost is easy to attach and unattach if the corners are stapled with a small three sided piece of plastic. This provides a pocket for each corner to be slipped over the frame. Turn the seam to the inside of the pocket and slip over the frame.

CONVERTIBLE LIGHTHOUSE 20

Hang this light box on a stand — it has vertical movement and horizontal angle adjustment

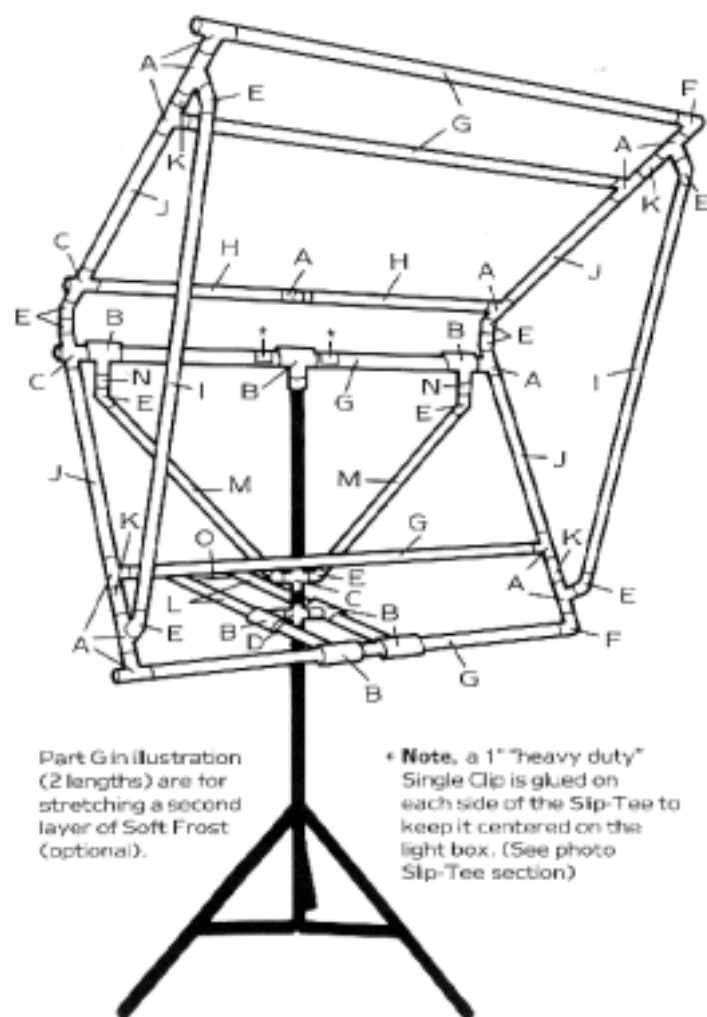
Detach the box from the stand and with attachable wheels, roll it around your studio



In so many photographic situations today the photographer is not so much limited by his lack of creative ability, as the versatility of his lighting systems. The Convertible Light Box 20 is designed to give you as much creativity in your lighting as in your photographs, for example: use tungsten lights or strobe with this design. First, the Convertible Light Box 20 can be used on a light stand for achieving the desired lighting on people or products. Using the light box in this manner will give you the capability of raising and lowering the light stand to achieve vertical travel. The box is hinged at the back to allow for adjusting the horizontal angle of the box. An alternate way to use the Convertible Light Box 20 is to attach wheels and remove it from the stand. This gives you the freedom to roll it around your studio on wheels. This option makes it the perfect choice for children, pets or even products placed on the floor. The back panel snaps on and off quickly and easily for access to the light sources. However you choose to use the Convertible Light Box 20, there is no choice when it comes to its light quality.

QUANTITY		MATERIAL	
LIGHT BOX	STAND SUSPENSION	DESCRIPTION	
13		3/4" Tee	
	7	1" Slip-Tee & Reducer	
2	1	3/4" Cross	
	1	1" Cross & two Reducers	
8	4	3/4" Elbow 45°	
3	2	3/4" Elbow 90°	
5		3/4" PVC/40	L = 48 1/2"
2		3/4" PVC/40	L = 23"
2		3/4" PVC/40	L = 40 1/2"
4		3/4" PVC/40	L = 19"
4		3/4" PVC/40	L = 4"
	2	3/4" PVC/40	L = 32"
	2	3/4" PVC/40	L = 25"
	2	3/4" PVC/40	L = 2"
	1	3/4" PVC/40	L = 5 1/2"
4		1/2" PVC/125	L = 50"
4		1/2" Elbow 90°	
	6	1" Single Clips (heavy duty)	
20		3/4" Single Clips (light duty)	
4		1"-3/4" Double Clips	
1		Soft Frost 54" x 54"	
1		White Plastic 54" x 10"	
2		Ceramic Sockets (UL approv.)	
1		AC Wire & Plug	

In each application where a joint fastens directly into another joint, a 1" section of 3/4" PVC is slipped inside both joints to fasten them together.



Part G in illustration (2 lengths) are for stretching a second layer of Soft Frost (optional).

* Note, a 1" "heavy duty" Single Clip is glued on each side of the Slip-Tee to keep it centered on the light box. (See photo Slip-Tee section)

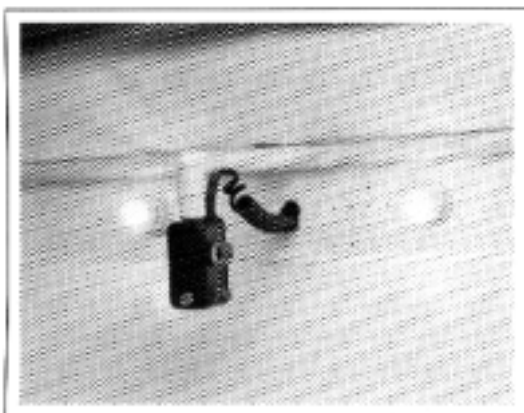
LETTER OF REFERENCE

MATERIAL DESCRIPTION

A	3/4" Tee
B	1" Slip-Tee & Reducer
C	3/4" Cross
D	1" Cross & two Reducers
E	3/4" Elbow 45°
F	3/4" Elbow 90°
G	3/4" PVC/40 L = 48 1/2"
H	3/4" PVC/40 L = 23"
I	3/4" PVC/40 L = 40 1/2"
J	3/4" PVC/40 L = 19"
K	3/4" PVC/40 L = 4"
L	3/4" PVC/40 L = 32"
M	3/4" PVC/40 L = 25"
N	3/4" PVC/40 L = 2"
O	3/4" PVC/40 L = 5 1/2"

Note: The diffusion panel frame is made of four 1/2" PVC/125 L = 50". To attach this panel to the box, make four Double Clips of 1" to 3/4" PVC/40. (See Double Clips)

This lighthouse also can be built to be full length, similar to the Lighthouse 48. The only difference being that the Lighthouse 48 is 72" wide compared to 54" width of this design. To build a full length Lighthouse 20, cut longer lengths of tubing for the 6 parallel pieces of PVC. You will notice the four mounts on the left of this box where the wheels are placed when on the floor. These are attached to four of the six parallel pieces noted above.



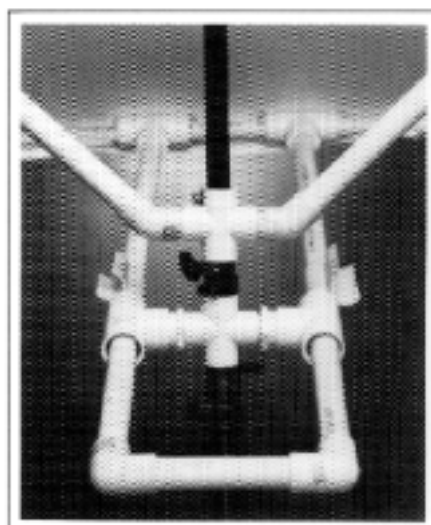
28

The white plastic is stretched over the back of the box in four separate panels. Lay your finished box frame on the white plastic for use as your pattern. The 20 "light duty" Single Clips hold these four sheets of white plastic to the frame.

STROBE AND LIGHT SOCKET MOUNTS

A 7" x 48" piece of peg board is cut for the back of the box. Mounted in it are two ceramic light sockets used for tungsten lighting or for modeling lights. Use UL approved sockets with a 100 watt bulb. A 3/4" Tee glued in the center of the box is the base of the strobe mount. Cut two pieces of PVC/125 and attach a 3/4" Elbow 90° between them as shown. The measurements should be taken for your strobe. Last, a hole is drilled for the exit of the strobe cord.

Note: For details of the 4 peg board mounts, see Lighthouse 48 Photo 30.



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ROCKER ASSEMBLY

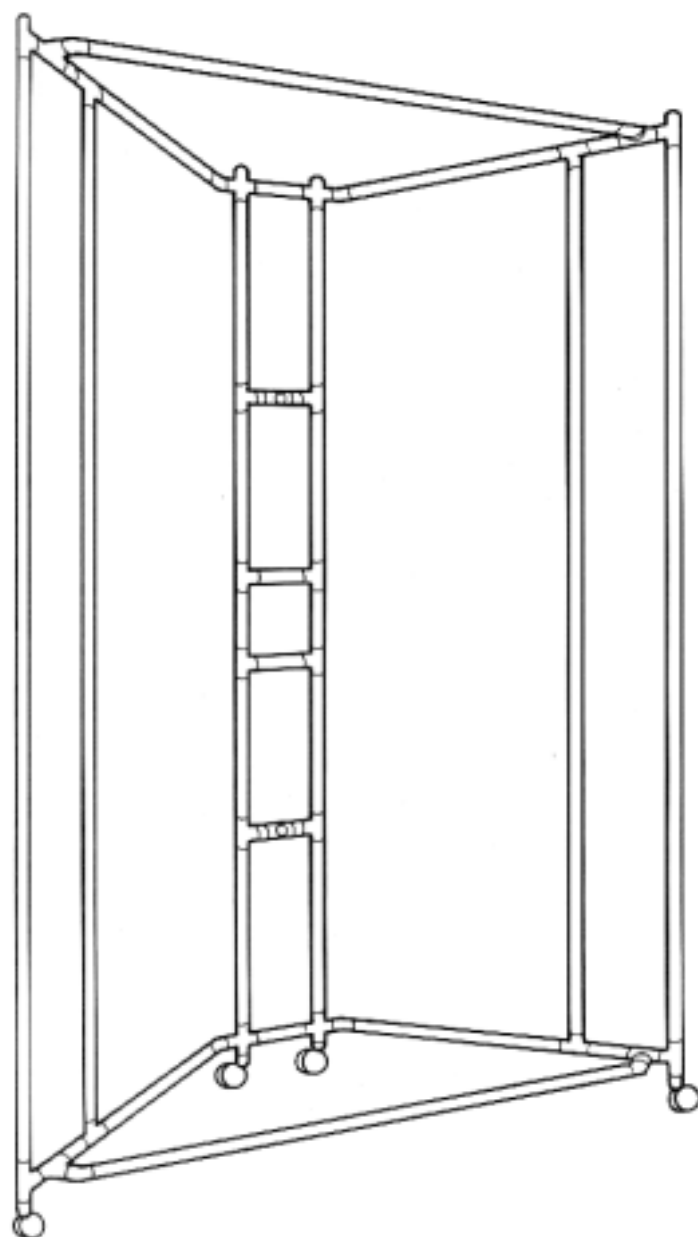
Slip-Tees with Reducer Bushings are used for adjusting the angle of the light box. A Double Clip is used for stop action against the Slip-Tee. The two crosses mounted on the stand are usually 1" on the bottom and 3/4" on the top, depending on your stand. The crosses are not a tight fit, they slip for vertical adjustment.

LIGHTHOUSE 48

This light box is the big brother of all TINKER TUBES—48 sq. ft. of diffusion area

Suspend this box on a pulley system for an overhead light source or roll it on wheels for a vertical light source

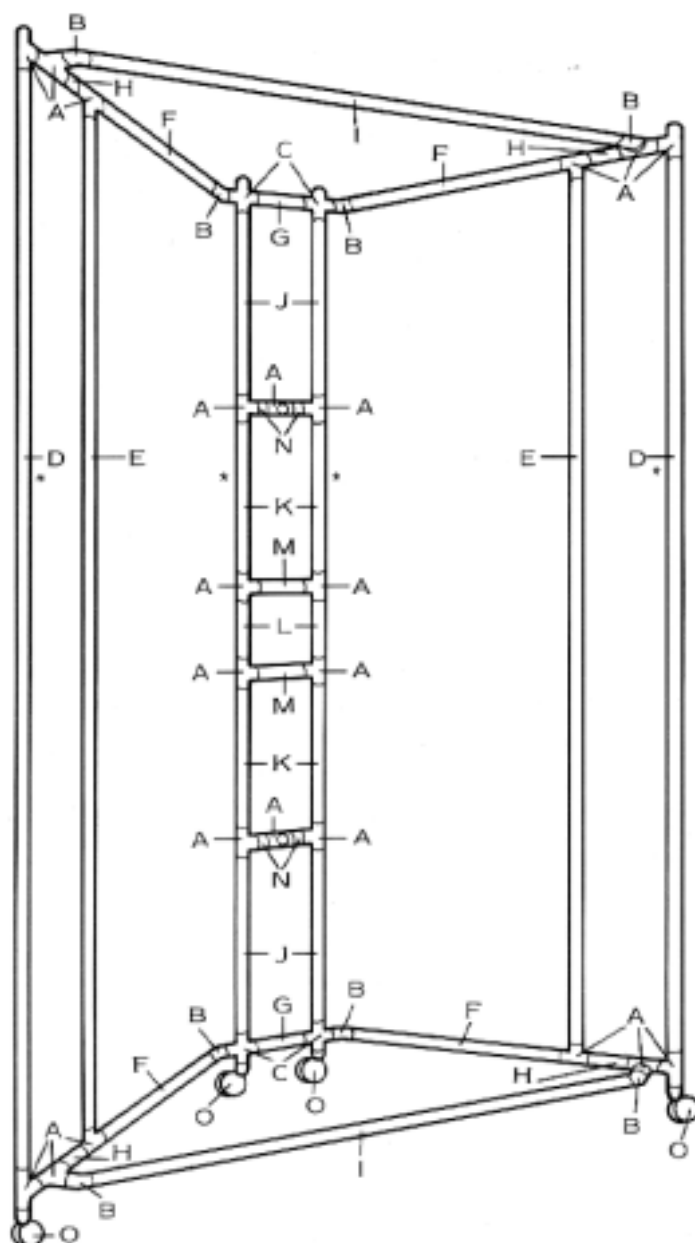
Let us introduce you to the BIG brother of all the PERSONAL LIGHTING SYSTEMS . . . the Lighthouse 48! This box is useful in many different applications ranging from full length fashion to products and even automobiles. The Lighthouse 48 is this versatile because it will either roll around the studio on wheels or it can be suspended from the ceiling by its own pulley system. When it comes to light quality, this is only what you have come to expect from your PERSONAL LIGHTING SYSTEMS! It will handle multiple strobe heads of your choosing or up to six photofloods. So, if a truly LARGE light source is what you are after, then the Lighthouse 48 is the design for you.



QUANTITY	DESCRIPTION
22	3/4" Tees
8	3/4" Elbow 45°
4	3/4" Cross
50	3/4" Single Clips (light duty)
2	3/4" PVC/125 L = 93 1/2"
2	3/4" PVC/40 L = 93 1/2"
4	3/4" PVC/40 L = 25 1/2"
2	3/4" PVC/40 L = 7"
4	3/4" PVC/40 L = 5 1/2"
2	3/4" PVC/40 L = 59"
4	3/4" PVC/125 L = 22"
4	3/4" PVC/125 L = 17 1/2"
2	3/4" PVC/125 L = 8"
2	3/4" PVC/125 L = 7"
4	3/4" PVC/125 L = 2 1/2"
2	Pegboard 11" x 48"
4	Ceramic Sockets (UL approv.)
1	Plug
1	A/C Wire
4	Wheels
1	Soft Frost 72" x 8'
1	White Plastic 54" x 25'
4	1/2" Electric Conduit 79 1/2"

HANG THE LIGHTHOUSE 48

To hang the box from a ceiling, remove the wheels from their position. Notice the identical position points at the top of the box. Drill a 1/4" hole in eight 3/4" caps and secure screw and nut through hole. Place cap assemblies on the frame; four on the top and four on the bottom. For proper suspension of the box use a wire or cable to wrap around the screw, then tighten and suspend.

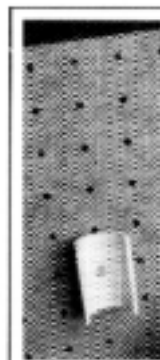


LETTER OF REFERENCE

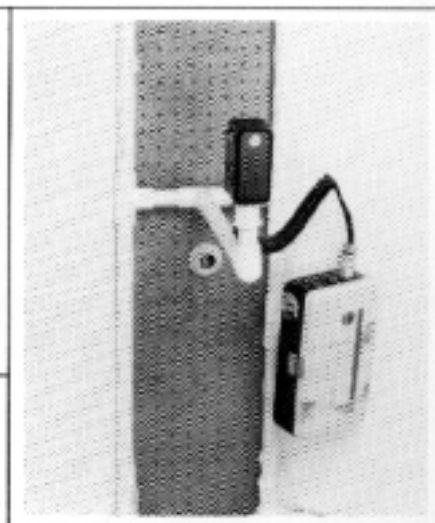
MATERIAL DESCRIPTION

A	3/4" Tee
B	3/4" Elbow 45°
C	3/4" Cross
D	3/4" PVC/125 L = 93 1/2"
E	3/4" PVC/40 L = 93 1/2"
F	3/4" PVC/40 L = 25 1/2"
G	3/4" PVC/40 L = 7"
H	3/4" PVC/40 L = 5 1/2"
I	3/4" PVC/40 L = 59"
J	3/4" PVC/125 L = 22 1/2"
K	3/4" PVC/125 L = 17 1/2"
L	3/4" PVC/125 L = 8"
M	3/4" PVC/125 L = 7"
N	3/4" PVC/125 L = 2 1/2"
O	Wheel Assembly

* The four vertical structural elements noted here are reinforced with 1/2" steel electrical conduit. See material list for specifications.



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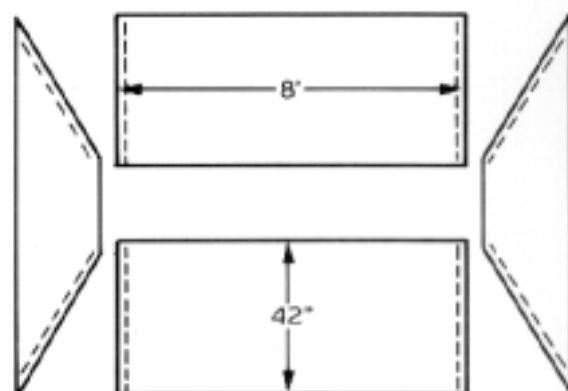
31

The purpose of the two parallel pieces of PVC in the middle of each side of the box are for stretching a second layer of Soft Frost as a baffle. (optional) Part E in illustration.

In each application where a joint fastens directly into another joint, a 1" section of 3/4" PVC is slipped inside both joints to fasten them together.

The cover of this box is four panels of white plastic stapled at the corners of the box. Two white panels are 42" x 8" and two are cut using the end of the box as a pattern. The four edges marked with dashed lines are stapled together in the same manner as a sewing machine stitch. The finished piece is stretched over the frame with the stapled seams on the inside of the box and attached with Single Clips.

The 72" x 8" Soft Frost diffusion material is attached to the front of the frame with Single Clips.



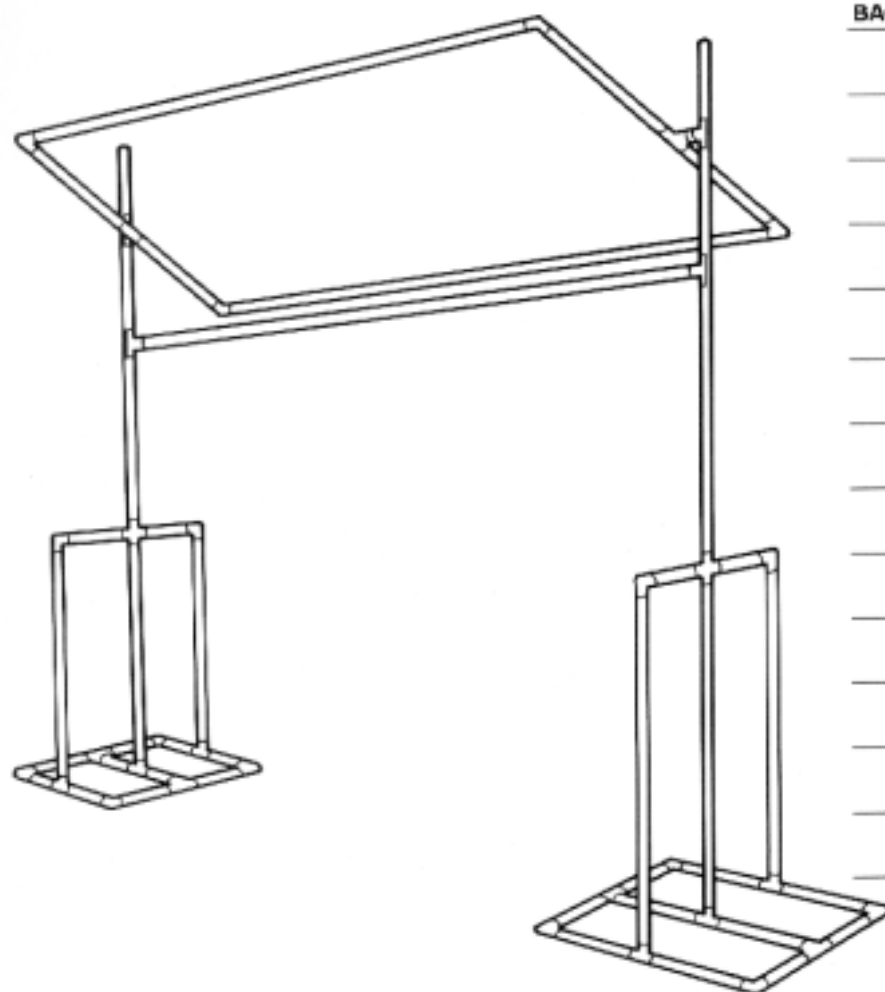
BACKGROUND & SEPARATION PANEL

Multipurpose stands —
they support the
background and
separation panel or any
other suspension needs

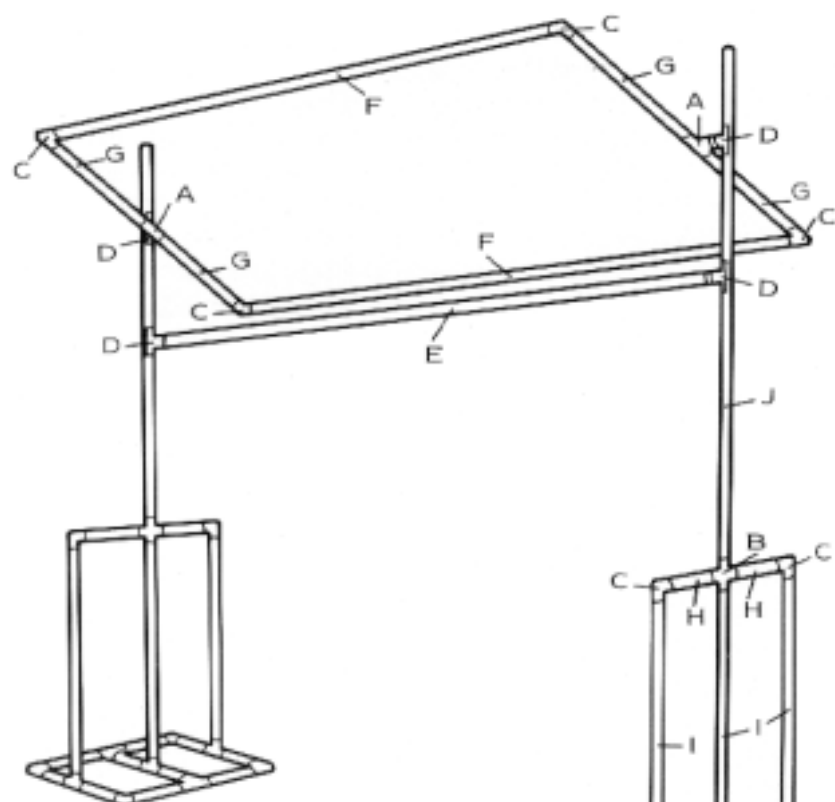
The Separation Panel
produces highlights that
separate dark tones on
the subject from
dark backgrounds

If you have ever received a print back from the lab only to find that your highlight has missed the hair and possibly the whole subject, then you will appreciate what the combination Separation Panel/Background Stand can do for you. The Background Stands will serve as both a means to hold up your background and also as a means to support the Separation Panel. With the modular approach of these background stands it is very easy to change from one color of seamless paper to another or from seamless paper to a canvas background. The double benefit of these stands comes when you attach the 4' x 9' Separation Panel directly above the background portion. Like all other designs in this book, you can, of course use either tungsten or strobes to illuminate your Separation Panel and the added benefit is that your light source is completely hidden by the background paper. You literally "can't miss" with this combination as part of the PERSONAL LIGHTING SYSTEM.

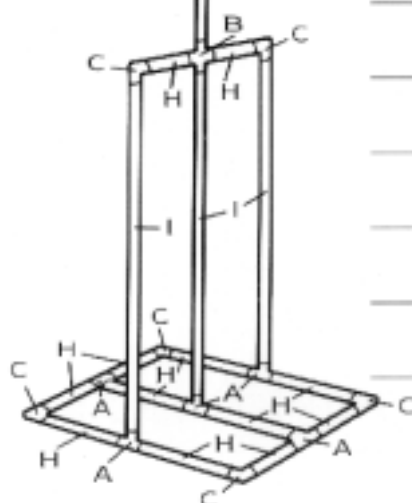
MATERIAL LIST:



QUANTITY		DESCRIPTION
HAIRPANEL & BACKGROUND	STANDS	MATERIALS
20		3/4" Single Clips/light duty
2	10	3/4" Tee
	2	3/4" Cross
4	12	3/4" Elbow 90°
4		1" Snap-on Tee & Reducer
1		3/4" PVC/125 L = 109"
2		3/4" PVC/125 L = 105"
4		3/4" PVC/125 L = 23 1/2"
	24	3/4" PVC/40 L = 12 1/2"
	6	3/4" PVC/40 L = 38"
	2	3/4" PVC/40 L = 60"
1		White Plastic 54" x 110"
4	2	Electrical Conduit (10')

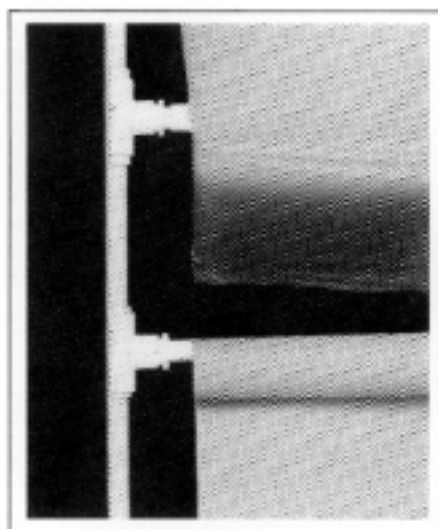


Note: A 1/2" steel electrical conduit is used to strengthen PVC under stress. Cut Conduit for all four sides of the hair panel and insert in the tubing. The Background support also should have conduit inside for support. The vertical center post on each stand needs conduit to the height of the tubing.



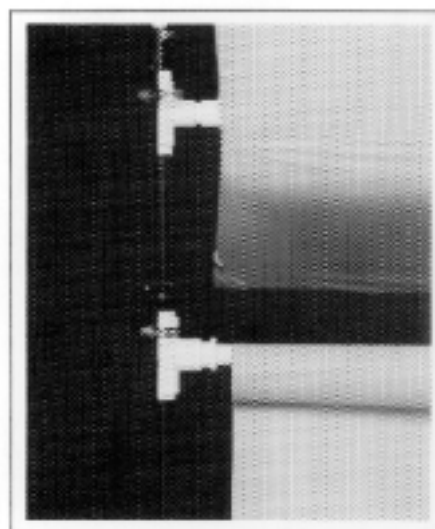
LETTER OF REFERENCE	DESCRIPTION
A	3/4" Tee
B	3/4" Cross
C	3/4" Elbow 90°
D	1" Snap-on Tee & Reducer
E	3/4" PVC/125 L = 109"
F	3/4" PVC/125 L = 105"
G	3/4" PVC/125 L = 23 1/2"
H	3/4" PVC/40 L = 12 1/2"
I	3/4" PVC/40 L = 38"
J	3/4" PVC/40 L = 60"
K	White Plastic 54" x 110"

The Separation Panel which is set at an angle toward the subject is illuminated by a light source placed behind the background aimed up to illuminate the panel. If using a portable strobe that has no modeling light, use a 60 watt light bulb. This will give you, the photographer, an idea of how the separation light will look and give you the option of adjustment.



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The Separation Panel and Background rod are snapped in place with 1" Snap-on Tees and Reducer Bushings used for adapting to 3/4" PVC tubing.



33

Light stands are another possibility for suspending the Background and Separation Panel. Here we used a Snap-on Tee with a hose clamp to secure the tee from vertical slip. Choose tees to fit around your stands.

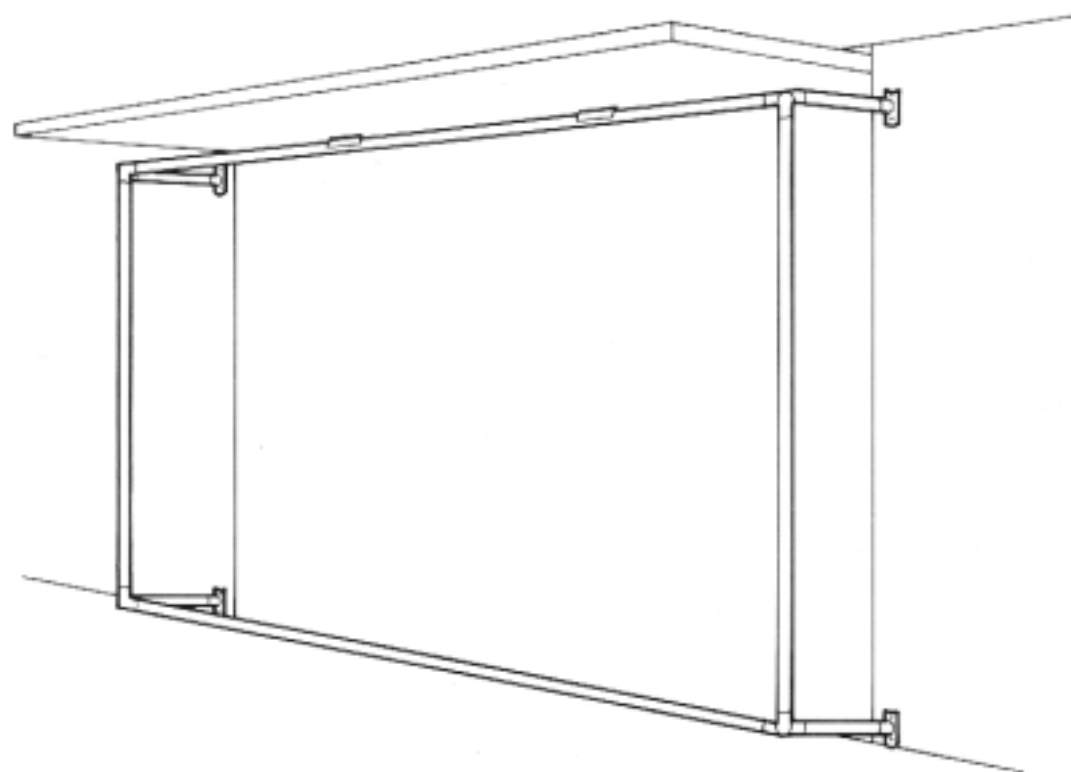
GARAGE DOOR WINDOW LIGHT

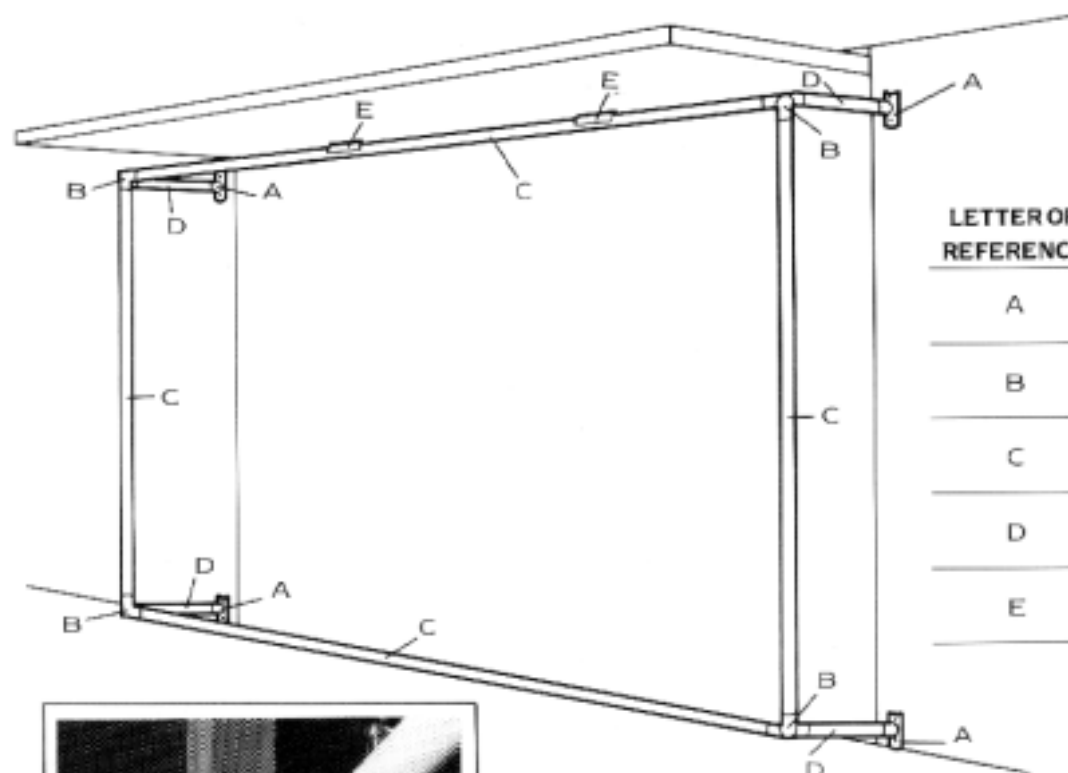
Applications in both
portraiture and commercial
— best utilized during
the daylight!

Designed to give the most
natural quality light —
over 60 sq. ft.
diffusion area

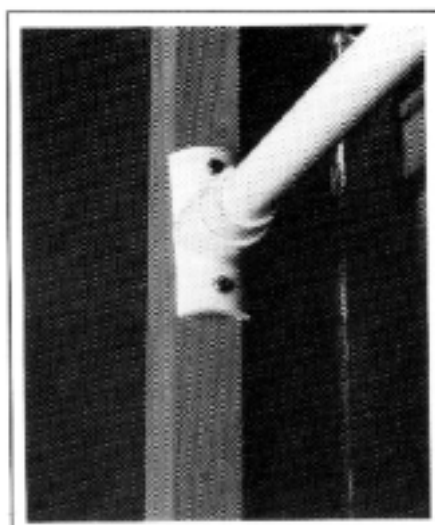
The Garage Door/Window Light is designed to be a permanent adaptation to your garage door frame. By means of attaching the support structures to the door frame, you have the capability of quickly and easily snapping it both in and out of place. Just be sure it's "out" and not "in" before driving your car into the garage! Also this system is designed to work at its optimum during the daylight hours. The Garage Door/Window Light is designed to give the most natural quality of light as it will take even direct sunlight and diffuse it before it strikes the subject. The applications in both portraiture and commercial are many and by experimentation you will quickly learn to love the quality of light you can obtain with the Garage Door/Window Light.

MATERIAL LIST:	QUANTITY	DESCRIPTION
	4	3/4" Tee
	4	3/4" Three Way Elbow
	25	3/4" Single Clip (light duty)
	2	3/4" Single Clip (heavy duty)
	4	3/4" PVC/40 L = 10'
	4	3/4" PVC/40 L = 24"
	8	Wood Screws L = 2"
	1	Roll 72" Soft Frost
	1	2' x 18' Black Plastic





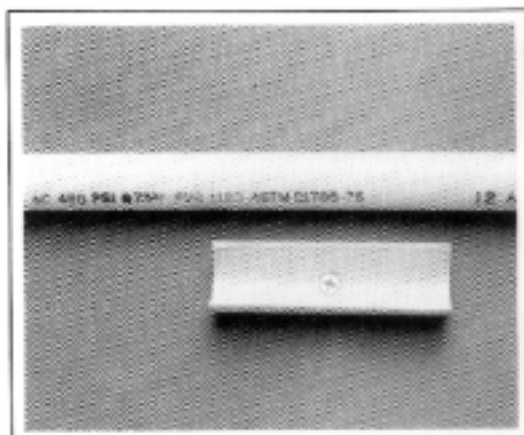
LETTER OF REFERENCE	DESCRIPTION
A	3/4" Tee
B	3/4" Three Way Elbow
C	3/4" PVC/40 10' cut to size
D	3/4" PVC/40 L = 24"
E	1" Single Clip (heavy duty)



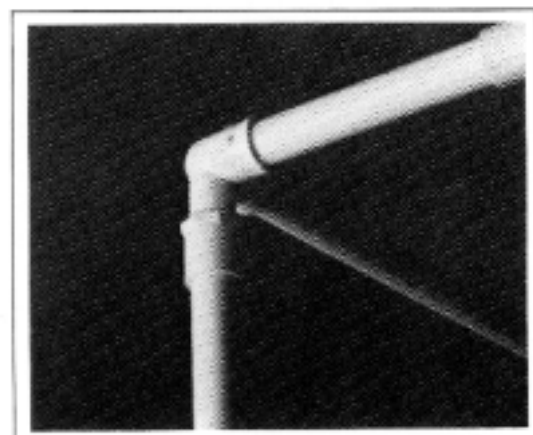
34

The tee is cut in half as shown. Drill two holes and tighten with wood screws.

35



To secure the top member from sagging, a 1" Schedule 40 Single Clip about 4" long is attached to the garage door with a wood screw. The hole drilled through the clip must be counter sunk for the screw to fit flush inside the Single Clip.



36

Detail section of the top left corner showing the 3 way Elbow. Black plastic on the left side panel is wrapped around the vertical tube and Soft Frost on the right of the vertical tube is wrapped on top of the black plastic. Single Clips (light duty) hold the two in place.



Note: If your garage door is taller than 72" as was ours, it is necessary to glue with PVC glue or other plastic glue, a strip of black plastic on the bottom edge of the Soft Frost.

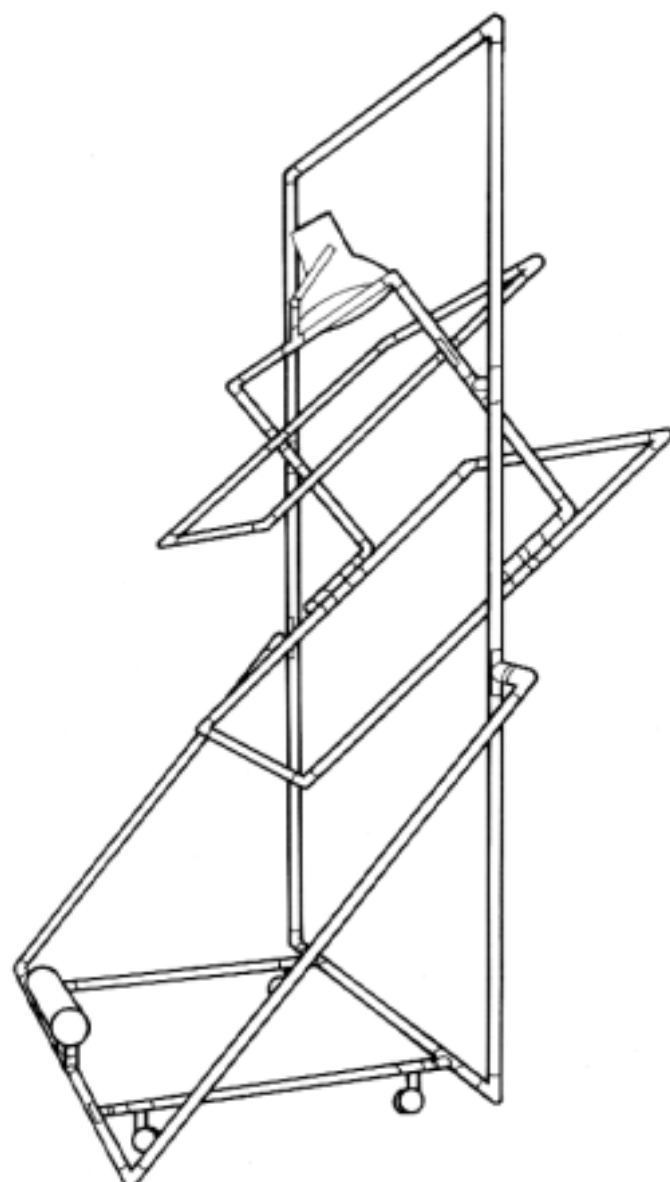
DUAL SCRIM

Most useful for dealing with highly efficient surfaces such as glass, chrome and Plexiglas

You will now have complete control over the specular density and specular edge acuteness in any situation

The Dual Scrim is based on the same concept as the Adjustable Light Box 16 with one added feature. This added feature is the capability of focusing the specular highlights (shiny areas). By simply adjusting the top panel you can either focus or further diffuse your main light source. This alone gives you the freedom of controlling the intensity of the specular highlight. This design is most useful when dealing with highly efficient surfaces such as glass, chrome or even Plexiglas. With the Dual Scrim you now have complete control of the specular density in any given situation. The Dual Scrim can be supported in different ways: either on a pair of Stands or it conveniently fits into the frame of the Adjustable Light Box 16. By far one of the least expensive products you can construct to be a part of your PERSONAL LIGHTING SYSTEM.

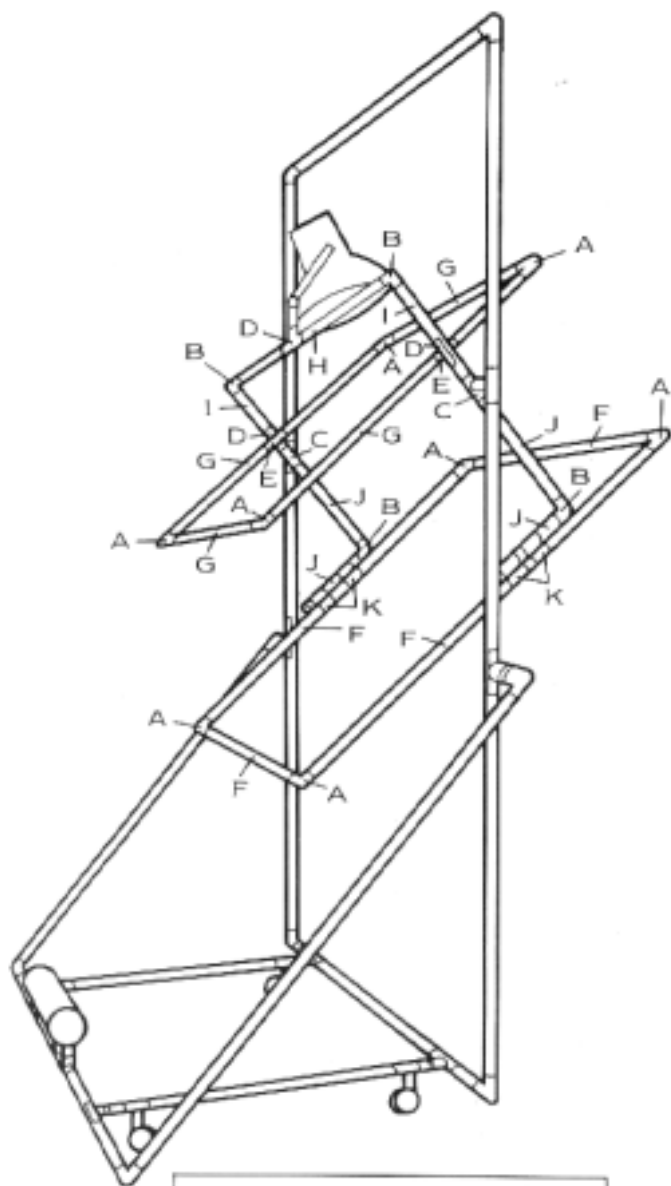
The Dual Scrim illustrated here is inside the Adjustable Light Box 16 frame. The plans included here apply only to the two diffusion panels and the structural framework holding them. This design can also be supported with two stands as illustrated in these plans.



MATERIAL LIST:

QUANTITY	DESCRIPTION	
8	1/2" Elbow 90°	
4	3/4" Elbow 90°	
2	3/4" Tee	
3	1" Snap-on Tee & Reducer	
2	3/4" Snap-on Tee	
4	1/2" PVC/125	L = 46"
4	1/2" PVC/125	L = 36"
1	3/4" PVC/40	L = 45 1/2"
2	3/4" PVC/40	L = 21"
4	3/4" PVC/40	L = 12"
18	1/2" Single Clip (light duty)	
4	1" - 3/4" Double Clip	

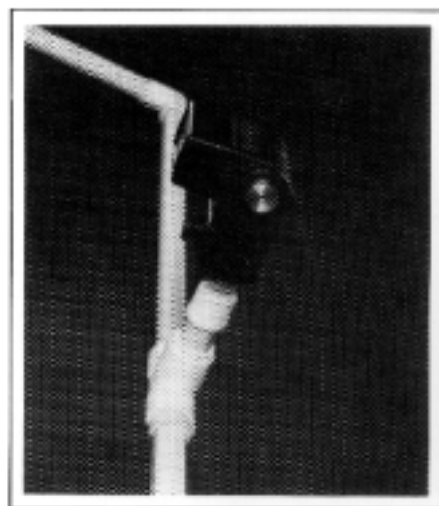
The 48" diffusion flat and 38" diffusion baffle on the Adjustable Light Box 16 are interchangeable with the diffusion flats of the Dual Scrim. If you have the Adjustable Light Box 16, your diffusion panels fit the Dual Scrim perfectly.



LETTER REFERENCE	DESCRIPTION
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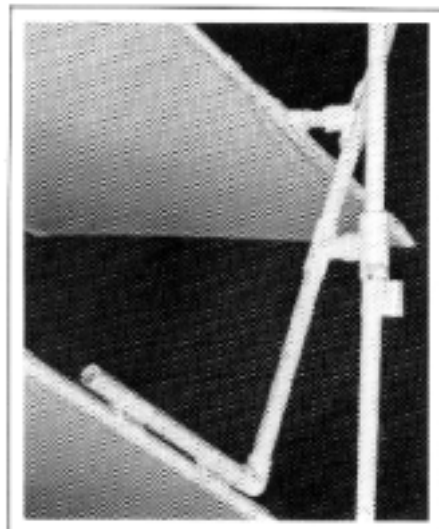
A	1/2" Elbow 90°
B	3/4" Elbow 90°
C	3/4" Tee
D	1" Snap-on Tee & Reducer
E	3/4" Snap-on Tee
F	1/2" PVC/125 L = 46"
G	1/2" PVC/125 L = 36"
H	3/4" PVC/40 L = 45 1/2"
I	3/4" PVC/40 L = 21"
J	3/4" PVC/40 L = 12"
K	1" - 3/4" Double Clip

37



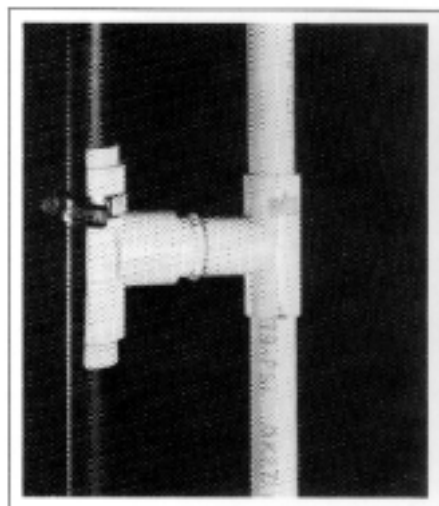
The light source is attached to the top horizontal member of PVC with a 1" Snap-on Tee and Reducer. A section of 3/4" PVC/40 slips between the Snap-on Tee and the cap on which the light source is mounted.

38



The Dual Scrim can attach into the Adjustable Light Box 16 with the existing Slip-Tees on the box. The Slip-Tees have a Reducer and section of 3/4" PVC/40 connecting it to the 3/4" tee glued on each side of the Dual Scrim. These are the pivot points where the Dual Scrim can turn to any angle.

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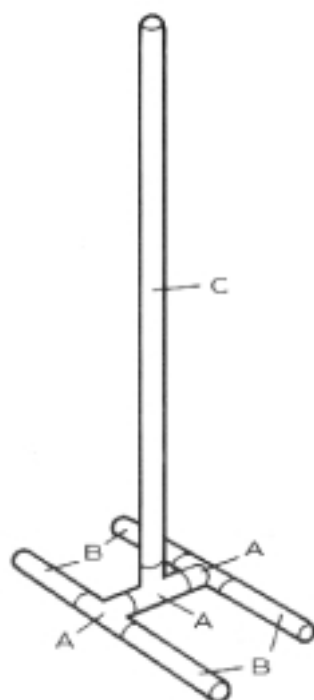


The Dual Scrim can be attached to a stand with a 1" Snap-on Tee and Reducer. A hose clamp secures the Snap-on Tee to the stand. Two stands are necessary, one on each side of the Dual Scrim.

LIGHT STAND

Gives the capability of
hiding your background
light behind the subject

Capable of lowering a
light source to the floor
or raising it to at
least six feet

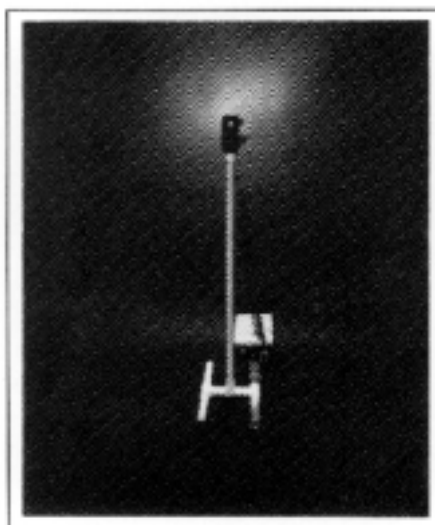


MATERIAL LIST:

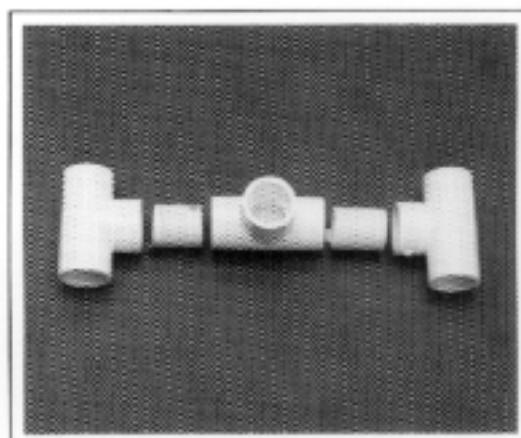
QUANTITY	LETTER OF REFERENCE	DESCRIPTION
3	A	3/4" Tee
4	B	PVC/125 L = 6"
1	C	PVC/125 L = Any length

Example of
Background
Burst effect
using the PVC
Light Stand.

40



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A 1" sleeve of 3/4" PVC/125 is
glued into each side of the tee in
the center of the stand. The two
tees on each side are glued to the
remaining end of the sleeve in the
center tee.

BACKGROUND WALL MOUNT

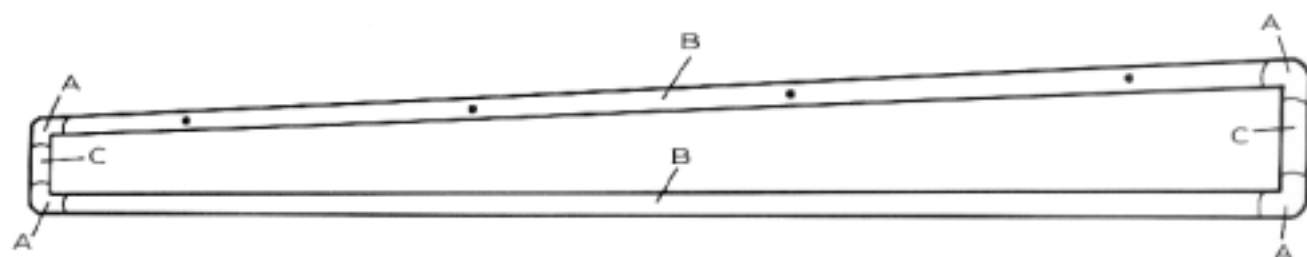
An inexpensive system for quickly changing from one background to another

Easily installed and can transform your garage to display any background

The Background Wall Mount is an easy solution for quick background changes. It is an inexpensive system for changing from one background color to another and is easy to install.

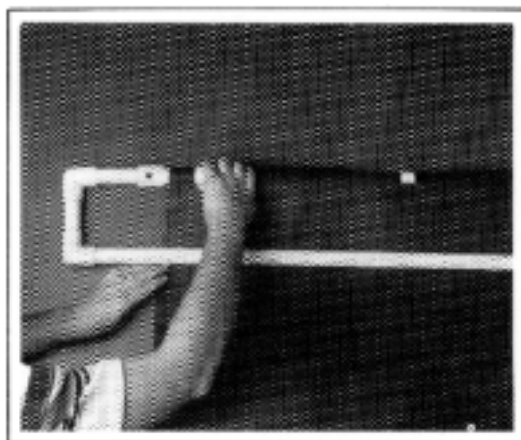
To use the Background Wall Mount, place the roll of background paper on the floor and pull up the loose end, tuck the loose end under the bottom tube and over the top tube. Snap about four Single Clips over the end of the paper and the top tube.

This system is perfect for changing from high key to low key; leave one background up and clip the second background over the first. This design is also great for posing the subject against the wall. As you can see, there are endless opportunities with the Background Wall Mount.



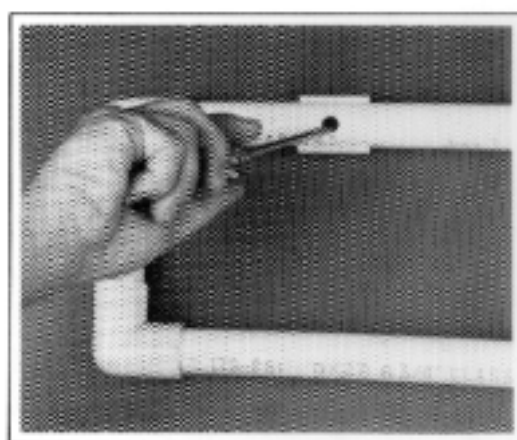
MATERIAL LIST:	LETTER OF REFERENCE		
	QUANTITY	DESCRIPTION	
	4	A	3/4" Elbow 90°
	2	B	PVC/125 L = 109"
	2	C	PVC/125 L = 4"
	10	D	Single Clips (Light duty)
	4	E	Wood Screws L = 2"

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Single Clips hold the background paper in place.

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Place screw holes to align with the studs in your wall. Behind each hole is a single clip used to shim the tubing out at the same thickness as the 90° Elbows on each corner of the structure.