Substations convert high voltage electricity to lower voltage electricity. They can also be used to regulate or distribute electricity on a grid. Our kit is based on a substation found along the C.M. & St.P. Ry., also known as the Milwaukee Road. It provided regulated electrical power to the catenary lines on the railroad. It can be used for many other applications as well, many large industries would require a substation.

Thank you for purchasing this kit. Please read these instructions completely before beginning and take your time. Allow parts to dry after painting or gluing and do not try to build this in one night.

Parts are labeled in the instructions inside parentheses. Many parts have engraved details on them. Be sure that these are facing out when gluing the parts together. It is easy to install these backwards by mistake.

Practice gluing the acrylic together if you have never done it before.

If by chance a part is missing or broken, please write us indicating the kit name and part number and we will send you a replacement.

Please note that parts of the kit have been painted gray in the assembly photos so that new parts can easily be seen and identified. This is only for ease of identifying parts and seeing them clearly in the photos. We recommend gluing all parts together prior to painting unless otherwise noted. Pre-production models were used in these instructions, your parts may vary slightly.

You will need the following items to assemble your model: Sharp hobby knife, file, small drill bits, pin vice, paint (see “Painting Your Model”), paint brushes, glue (see “Gluing Acrylic”), modeling putty.
**Gluing Acrylic**

Always glue acrylic in a well-ventilated area, and read the glue manufacturer’s label for instructions.

We recommend using Scalecoat brand “Probond”, “Tenax-7R”, Plastruct brand “Bondene Solvent Cement” or “Plastic Weld Cement”. Most hobby shops carry these products. Or they may be ordered directly from the manufacturer.

Acrylic must be glued together using a solvent that will melt the two edges and literally fuse them together. To do this, place the two pieces to be joined together and run a bead of solvent down the edge. Capillary action will suck the solvent into the joint and after several seconds the pieces will be fused. After only a few minutes the pieces will be strong enough to work with. The bond will be completely dry within twenty-four hours using the above-mentioned products. Solvent can be dispensed two ways.

Typically the solvent comes in a small bottle with a brush in the lid. The brush allows you to dispense a drop or two of solvent at a time.

You may want to use a polyethylene bottle or syringe with a blunt needle dispenser. This allows larger amounts of solvent to be dispensed quickly and cleanly. Be sure the bottle you are using is approved for the solvent you are using or you may melt through it. These bottles may be purchased from CMR.

**Super Glue**

*Cyanoacrylate (CA) Super Glue*

Parts that are not plastic or are painted prior to gluing must be glued together using a non solvent based glue. This means the parts are held together by the glue and not the process of fusing or welding them together with solvent. For this we recommend using CA where noted in the instructions.

**Craft Glue**

Some parts are easier to glue using craft glue such as “Sobo”. We use craft glue to stick previously painted parts together when we want a little working time.
Note on Tabs

Sometimes it is necessary to sand or file the tabs slightly in order to get them to seat themselves into the slots. This is due to slight variations in acrylic thickness. If the tabs are not fitting into the slots properly, you may need to file them back at an angle to fit properly.

Note on Castings

Castings will need to be cleaned up with fine sand paper or a small jewelers file. Wash thoroughly prior to painting.

Preparing Your Model for Painting

We recommend lightly sanding all parts to remove the raised edge created during the laser cutting process. In order to hide the seams we recommend using “hobbyist putty” such as Green Squadron modeling putty. Do this in a very well-ventilated area. Apply the putty over the seams and allow to dry overnight. Once the putty has dried, place a sheet of fine sandpaper on a flat surface and sand smooth. You may need to apply a second coat of putty and sand again.

Painting Your Model

After building each unit we primed our building with Krylon Ruddy Brown spray paint.

For our building paint scheme, we used acrylic hobby paints which are available in most hobby stores.

We painted the building brick color. To create the mortar between the bricks the building units were then laid flat with a wall facing up and a concrete wash (water and 15% paint) was applied and allowed to dry. The unit was then rotated to the next wall and the process was repeated, and so on.

The concrete base was painted a concrete color.

Prior to installing the windows the building was air brushed with a grimy black to create a weathered look.

The window frames were painted flat black with spray paint (do not spray the adhesive backing).

The roof was painted black.

The insulator assemblies were primed, painted black and then detail painted by hand. The insulators were painted green and then dry brushed with a lighter green to highlight the edges and details.
Window Frames, Glass and Shades

There are printed window shades included with your kit. These are designed to be laminated with the acrylic window glazing and window frames prior to installing in your model. The printed window shades are numbered to correspond with the window frame parts. The window glass may have a protective brown paper on it that should be removed prior to installing.

Paint the window frames black, do not spray the back side with the adhesive crack and peel on it. You can leave the frames attached to the parts sheet so they do not blow away if you are spraying them. When dry, trim the window frames from their sheet and peel the adhesive backing. Adhere the window frame to the corresponding clear acrylic glazing part.

It is recommended to lightly spray the back of the printed window shade pages with a sealer such as matte spray or lacquer. This will keep the paper from buckling due to humidity changes later.

Lightly spray glue the window shade pages on the printed side with spray mount and apply the windows to them glazing side down. Press in place. You will need to do this fairly quickly as the glue will dry in two or three minutes. We used 3M Spray Mount part number 6065 which is available at craft and office supply stores.

Trim the windows from the paper and set aside for later.

See Figure 1.

Figure 1
Assembly

Begin by taking the base (A) and laying it flat on your work surface with the engraved part number facing up. Insert the slots of wall (1) onto the tabs on the long side of part (A) and glue in place. Next, insert the slots of wall (2) onto the tabs on the short side of part (A) and glue in place. The two walls should meet and be glued at the corner. See Figure 2 for orientation.

Next insert the slots of the other wall (2) onto the tabs on the short side of part (A) and glue in place. Then, insert the slots of wall (3) onto the tabs on the long side of part (A) and glue in place to form a box. Make sure to glue all the corners together. See Figure 3.

Glue the top (A) onto the assembly with the engraved part number facing up. Check that all the tabs and slots are seated properly. Sand or file the edges of the walls at the corners so that they are perfectly flush. See Figure 3.

Glue the side walls (4) onto the sides of the building assembly overtop of walls (2). The smaller wall openings are at the top, the walls are symmetrical left to right. They should be perfectly flush on either side. Once they are dry check that they do not extend beyond the rest of the walls. If they do sand or file them flush. See Figure 4.
Glue wall (5) onto the building assembly overtop of wall (1). Glue wall (6) onto the building assembly overtop of wall (3).

The walls should be perfectly flush on either side at the corners. Once they are dry check that they do not extend beyond the rest of the walls. If they do sand or file them flush. See Figure 5.

Lay the base (B) flat on your work surface with the engraved part number facing up. Insert the slots on the bottom of walls (7), (8) and (9) onto the tabs on part (B) and glue in place.

Note that these parts also have tabs on one side that will fit into slots on part (6) on the assembly you have previously built.

Glue the top (B) onto the assembly with the engraved part number facing up. Check that all the tabs and slots are seated properly and that all the walls are square and flush. Sand or file off any overhang so the corners are perfectly flush.

Check that the tabs on the open side of the assembly you just built fit easily into the slots in part (6) of the previous assembly you built but do not glue together at this time. See Figure 6.

Glue the side walls (10) and (12) onto the assembly. They should be perfectly flush on each side. If they extend at all beyond the front you should sand or file the edges back so they are perfectly square.

Glue the front wall (11) in place. Check that everything is square and flush. Now glue the assembly to the main building using the tabs and slots for alignment. See Figure 7.
There are two types of trim.

Parts (S11) are engraved to represent bricks and attach midway up the building.

Parts (S12) are smooth and attach around the base to create a stepped out concrete base.

Attach the adhesive backed trim to the building. Remove the crack and peel backing. Using the engraved lines on the building for placement press in place. Trim off any excess. Work your way around the building. When you are done carefully sand off any overhangs and soften the corners. You may want to add a touch of CA to the corners to strengthen the adhesive bond.

See Figure 8, 9 & 10.

Figure 8

Figure 9

Figure 10
Build the office.

Do not attach the office to the building, you will need to install the windows in it prior to attaching it to the building.

Glue parts (15), (16) and (17) around the base (13). Make sure the parts are flush and square. Glue the roof in three courses of brick down from the top. Note that the roof will extend beyond the side walls to fit into the wall opening when installed on the building. See Figure 11.

The office can fit in any of the window openings. You will need to trim the styrene base trim (S12) from the building to allow for the office to fit. Test fit it on the building and make sure the roof is above the window opening so that the window will be completely hidden.

Attach the adhesive backed base trim material (S12) to the office. Trim out the door threshold with a hobby knife. See Figure 12.

Paint your model.

The building walls are now complete and the structure should be primed and painted. See the instruction section “Painting Your Model” on page 4 for details on painting and weathering your building.

You should also paint and assemble all the windows. See “Window Frames, Glass and Shades” on page 5.

Figure 13 shows you what your model should look like at this point. Note that not all the windows are shown.
Install the windows and roofs.

Install the window assemblies behind the appropriate wall openings. Use Super Glue (CA) to attach the window frames to the walls. Make sure to dry fit all the windows prior to gluing them in place.

You will need to glue the front window (S9) in the office before gluing the side window (S8) and the door (S10) in place. All the other windows should fit without any issues.

Paint the roofs (18) and (19) black. Glue (19) in place and leave (18) loose for later.

Roof Insulators

There are three different types of insulators included in your kit.

Insulator Style #1 has a hole in the bottom of it that you will need to ream out to accept a .060 styrene rod. Use a .060 drill bit in a pin vice to do this. See Figure 15. You will need six of these.

Insulator Style #2 has a small post on the bottom that will fit into the holes in the base assemblies. You will need 16 of these.

Insulator Style #3 consists of three small insulators on a strip. You will need three sets of three.

Clean up the insulator castings. You will need to drill out a small hole in the top of each one of style #1 and #2 to accept a .040 rod or piece of wire. See Figure 16.
There are three roof insulator and one wall insulator assemblies. Each one is slightly different. The first two roof insulator assemblies are almost identical and so will be covered together.

Glue the long leg (25) along the long section of part (20). Glue the short legs (24) x 6 along the short sections. Make sure the cross bracing direction flips on each leg to form an “X” pattern. See Figure 17.

Trim three pieces of .060 styrene to 1" in length. Glue one of the insulators with a hole in the bottom of it to each piece of styrene and then glue the assembly to the base as shown. You can build extra angled supports with the .040 styrene to keep them straight. See Figure 17.

Glue six of the insulators with the post on the bottoms to the holes in the base (20). Be sure the hole in the top of each insulator is aligned with the opposite insulator. Insert a 7/8" piece of .040 styrene between the insulators as shown. See Figure 17.

Repeat with the other insulator assembly using part (21) instead of part (20). See Figure 18.
Now build the third insulator assembly.

Glue the leg (26) x 3 to part (22).

Glue four of the insulators with the post on the bottoms to the holes in the base (22). Be sure the hole in the top of each insulator is aligned with the opposite insulator. Insert a 1 7/8" piece of .040 styrene between the insulators as shown.

![Figure 19](image)

Build the wall insulator assembly.

Glue the three insulator castings to part (23) as shown.

![Figure 20](image)

Prime and paint the insulator assemblies as described in the “Painting Your Model” section of the instructions found on page 4.

Paint the ladder (27) in preparation for final assembly.
Final assembly of the building.

At this point you have all the components of the building assembled and can put them together to finish your model. You should have the walls painted and weathered with the window frames, glazing and shades installed. The office should be assembled in the same manner. The lower roof should be installed and the upper roof should be primed and painted. The insulators should be assembled painted and ready to install.

Glue the insulator assemblies onto the upper roof as shown using craft glue or CA. Glue the roof to the building. Glue the ladder (27) in place. See Figure 21.

Glue the office in place making sure it is perfectly square. Use the brick pattern on the main building as a guide. Glue the wall insulator in place above the office as shown. See Figure 22.

Paint the name plaque (S13) concrete color and attach over the office. See Figure 22.

Glue the two drain scuppers (28) to the sides of the building. Build and install the down spouts using .060 styrene rod. See Figure 23.

Your building is finished and ready to install on your layout. You may add lights and other details. We thank you for purchasing this kit from CMR and hope that you have enjoyed building it. Be sure to see our other kits at www.cmrtrain.com.
Adhesive backed Styrene parts

(S1) x2  (S2) x2  (S3) x2
(S4) x2  (S5)     (S6) x2  (S13)
(S7)     (S8)     (S9)     (S10)
(S11) x6  (S12) x6

1/16” Acrylic parts

(18)  (19)  (20)  (21)
(22)
(24) x12  (25) x2  (26) x3  (27)

3D parts

Style #1 x6  Style #2 x16  Style #3 x3