

Cells and Cell Libraries



PROJECT EXERCISE

This project exercise provides step-by-step instructions for creating the design shown in Figure P11-1. The intent is to guide you in creating and using cells.



Notes: The dimensions included in several figures in this project are presented only as an aid to completing the design. They are *not* to be drawn.

As you complete each step in the project procedures, place a check mark by the step to help you keep up with where you are in the project.

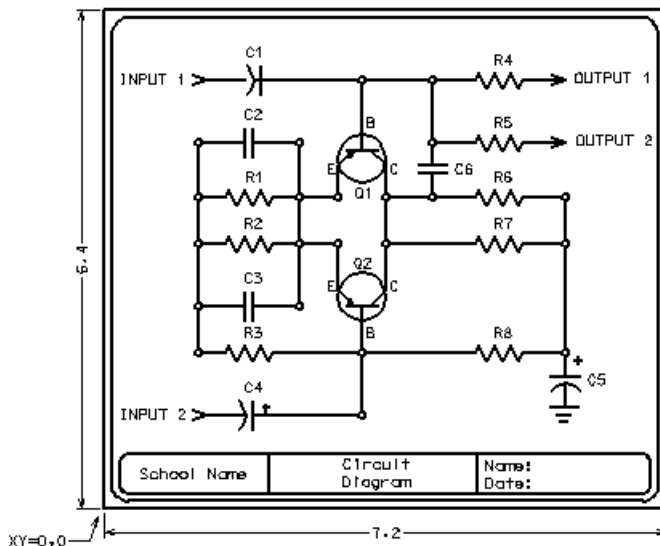


Figure P11-1 Completed Project design

PREPARE THE DESIGN FILE

This procedure starts MicroStation, creates a design file, and enters the initial settings.

STEP 1: Invoke MicroStation using the normal technique for the operating system on your workstation.

STEP 2: Create a new design file named CHI I.DGN using the 2dEnglishGeneral.dgn seed file.

In the Design File dialog box set the:

- ▶ Working units **Master Unit** and **Sub Unit** to “Inches.”
- ▶ The **Grid Master** to 0.1, the **Grid Reference** to 10, and the **Grid Lock** to ON.

STEP 3: Select **Settings > Level > Manager** to open the Level Manager settings box and create the following levels:

- ▶ Name=Cells, Color=White(0), Style=0, Weight=1, Display ON
- ▶ Name=Border, Color=Blue (1), Style=0, Weight=1, Display ON
- ▶ Name=Object, Color=Green(2), Style=0, Weight=1, Display ON

STEP 4: Double-click the **Cells** level to make it the Active Level.

STEP 5: On the Attributes tool bar, select the **By Level** option for **Active Color**, **Active Style**, and **Active Weight**.

STEP 6: Select **File > Save Settings**.

CREATE THE ARROWHEAD CELL

This procedure creates the arrowhead shown in Figure P11–2, creates a cell library, and creates a cell from a copy of the arrowhead.

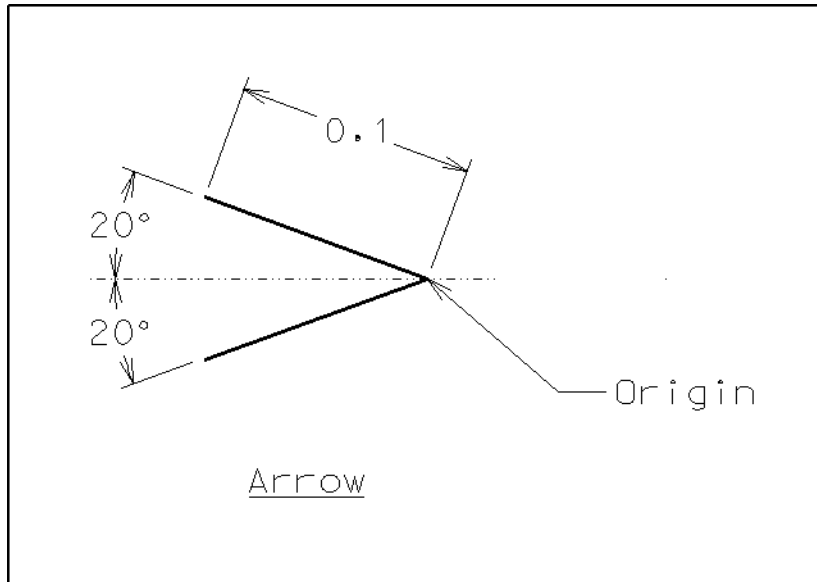


Figure P11-2 Arrowhead cell

STEP 1: Align a view window to display an area about 1 inch by 1 inch.

STEP 2: Invoke the Place Line tool and, in the tool settings box, set the Length to 0.1 inch, the Angle to 160, and turn the Length and Angle check boxes ON.

MicroStation prompts:

Place Line > Enter first point

Place a data point to place the 0.1-inch line at 160 degrees rotation.

Place Line > Enter first point

In the Tool Settings window, change the Angle to 200 degrees and place a line that is snapped to the right end of the previous line.

Place Line > Enter first point

Click the Reset button, and, in the Tool Settings window, turn the Length and Angle check boxes OFF.

STEP 3: Place a Fence Block around the two lines that form the arrowhead.

STEP 4: Invoke the Define Cell Origin tool from the Task Navigator (active task set to Cells).

MicroStation prompts:

Define Cell Origin > Define origin

Place a data point on the arrow's point, as shown in Figure P11-2.

STEP 5: Select **Element > Cells** to open the Cell Library box, as shown in Figure P11–3.

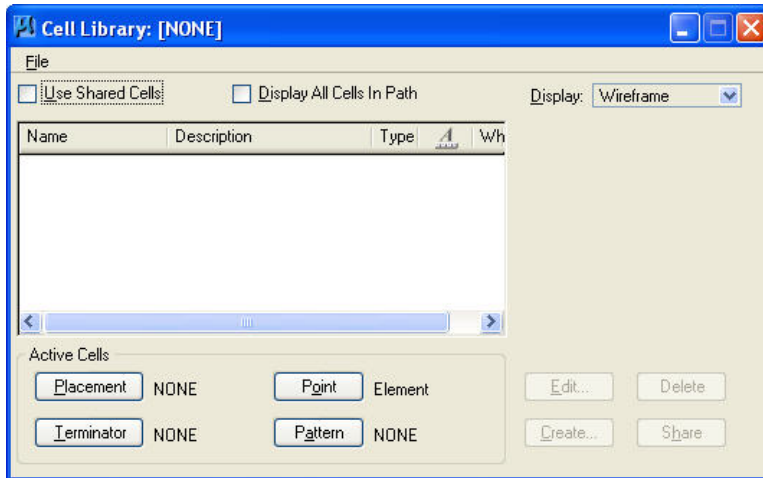


Figure P11–3 Cell Library box

STEP 6: In the Cell Library box, select the **File > New** to open the Create Cell Library dialog box.

STEP 7: In the Create Cell Library dialog box's Files window, key-in the file name **PROJ11** in the **File name** field, and click **OK** to create and attach the cell library.

STEP 8: In the Cell Library box, click **Create** to open the Create New Cell dialog box.

STEP 9: In the Create New Cell dialog box, do the following:

- ▶ In the Name text field, key-in “Arrowhead.”
- ▶ In the Description text field, key-in “Origin point on front point of arrow.”
- ▶ From the menu, select the **Point** option.
- ▶ Click **Create** to create the cell.

STEP 10: Delete the two lines and remove the fence.

CREATE ADDITIONAL CELLS

This procedure draws the objects shown in Figure P11–4 and creates cells from them.



Note: Draw only the electronic symbols shown in Figure P11–4. Do *not* place the text or dimensions. The text and dimensions are shown only as an aid to creating the symbols.

STEP 1: Draw the resistor symbol (upper left object).

- STEP 2:** Create a cell from the resistor elements:
- Place a Fence Block around the resistor.
 - Define a cell origin at the left end of the resistor, as indicated in Figure P11-4.
 - Create a Point cell named “Resistor” and described as “Resistor Symbol.”
- STEP 3:** Delete the resistor elements from the design file, and update the view.
- STEP 4:** Draw all elements in the PNP transistor symbol (bottom row, right symbol), except the arrowhead.
- STEP 5:** To place the arrowhead in the PNP transistor symbol, invoke the Place Active Line Terminator tool and in the tool settings box, key-in **arrowhead** in the **Terminator** field and **1** in the **Scale** field.

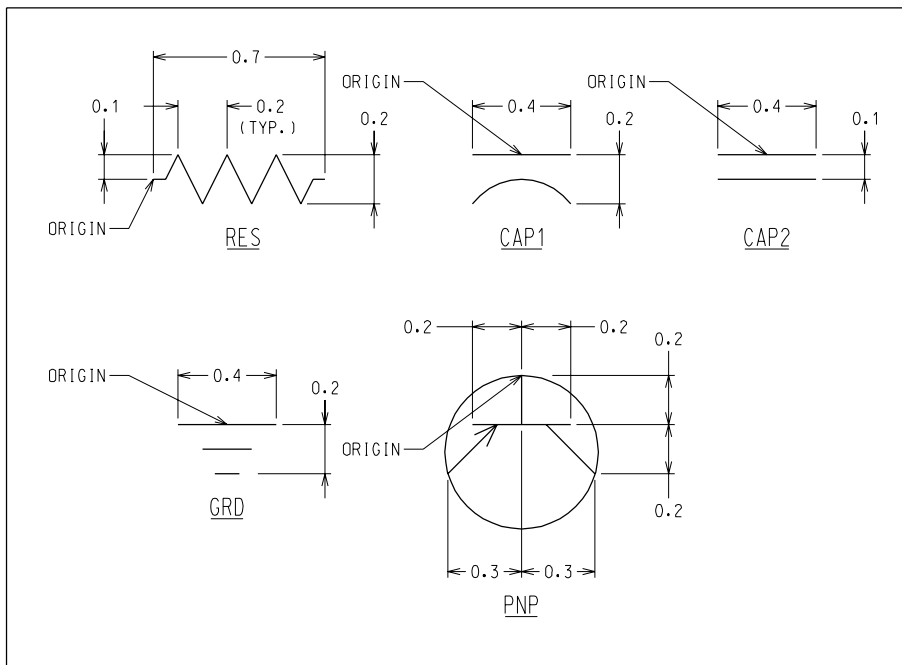


Figure P11-4 Electronic symbols

MicroStation prompts:

Place Active Line Terminator > Identify element

Identify the line close to the endpoint of the line where you want to place the arrow.

Place Active Line Terminator > Accept/Reject (Select next input)

Click the Data button in space to place the arrowhead on the line.

STEP 6: Create a point cell from the transistor elements using “PNP” as the cell name and “PNP Transistor symbol” for the description.

STEP 7: Draw and create point cells of the other three electronic symbols shown in Figure P11–4. Place the origin at the location indicated in the figure, and use the underlined text for the cell names. Here are the names and descriptions of each cell:

- ▶ CAPI, Capacitor symbol 1
- ▶ CAP2, Capacitor symbol 2
- ▶ GRD, Ground symbol

STEP 8: Delete all elements from the design file.

CREATE THE CIRCUIT DIAGRAM

This procedure uses the electronic symbol cells to create the diagram shown in Figure P11–1.

STEP 1: With Figure P11–1 as a guide, draw the border and title block.

- ▶ Replace “SCHOOL NAME” with your school or company name, or make up a name.
- ▶ Place your name to the right of “NAME.”
- ▶ Place today’s date to the right of “DATE.”

STEP 2: Set up the view window:

- ▶ Fit the view.
- ▶ Set the **Active Level** to **Border**.

STEP 3: Select File > Save Settings.



Note: The following steps place a transistor symbol cell and draw outward from the transistor. There are several equally productive ways to draw the diagram.

STEP 4: Invoke the Place Active Cell tool in the Tool Settings window, key-in **pn**p in the **Active Cell** edit field, **0** in the **Active Angle** edit field, and **1** in the **X Scale** and **Y Scale** edit fields. Turn the **Relative** and **Interactive** OFF.

MicroStation prompts:

Place Active Cell > Enter cell origin

Place a data point to place the cell approximately at the same location as shown for the top PNP transistor symbol in Figure P11–1.

Place Active Cell > Enter cell origin

Click the Reset button to terminate the tool sequence.

STEP 5: Use the Mirror tool with the **Mirror About Horizontal** option selected and the **Make Copy** check box turned ON to create a mirror image copy of the just-placed PNP cell below the original, as shown in Figure P11-5.

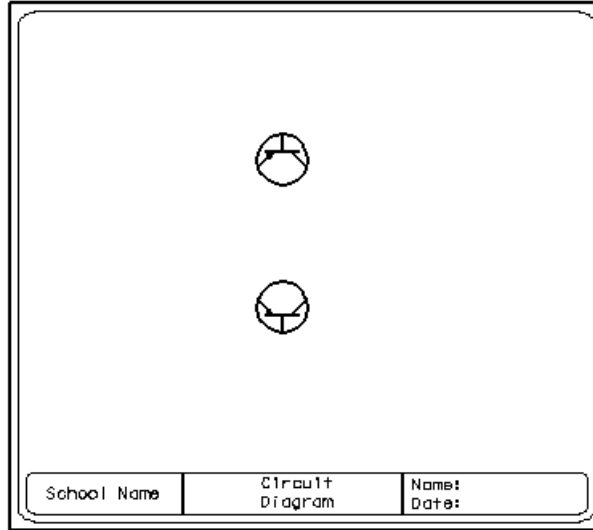


Figure P11-5 Two copies of the PNP cell

STEP 6: Continue drawing lines and placing cells by referring to Figure P11-1.



Note: Most of the CAP1 and CAP2 cells must be placed rotated. To rotate them, key-in **270** (or **-90**) in the Tool Setting window's **Active Angle** field before placing the cell.

STEP 7: Place circles on the line intersections with the Place Circle tool set to the **By Center Method** and the **Radius** field set to 0.05.

STEP 8: Remove the lines from inside the intersection circles with the IntelliTrim tool's **Advanced Mode**. Use the circles as the Cutting Elements.

STEP 9: Select **File > Save Settings**.

DRAWING EXERCISES 11-1 THROUGH 11-5

Use the following table to set up the design files for all Chapter 11 exercises.

| SETTING | VALUE |
|----------------|--|
| Seed File | seed2d.dgn |
| Working Units | Master Unit=Inches, Sub Unit=Inches |
| Grid | Grid Master = 0.1, Grid Reference = 10, Grid Lock ON |

Exercises 11-1 through 11-3

Create the piping flowsheet symbols shown in Figure E11-1, and make each into a cell. Use the cells to create the flow diagrams in Exercises 11-1 through 11-3.

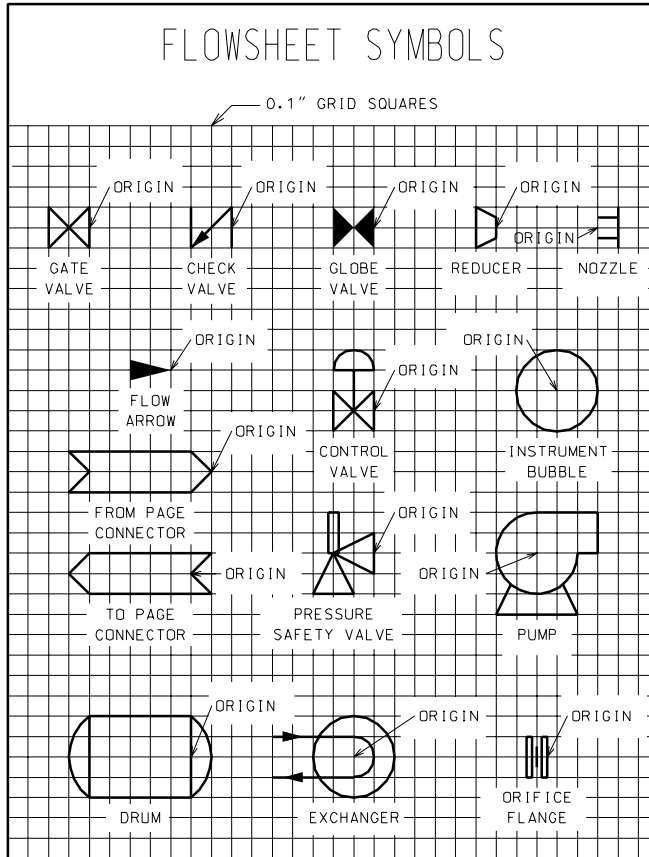
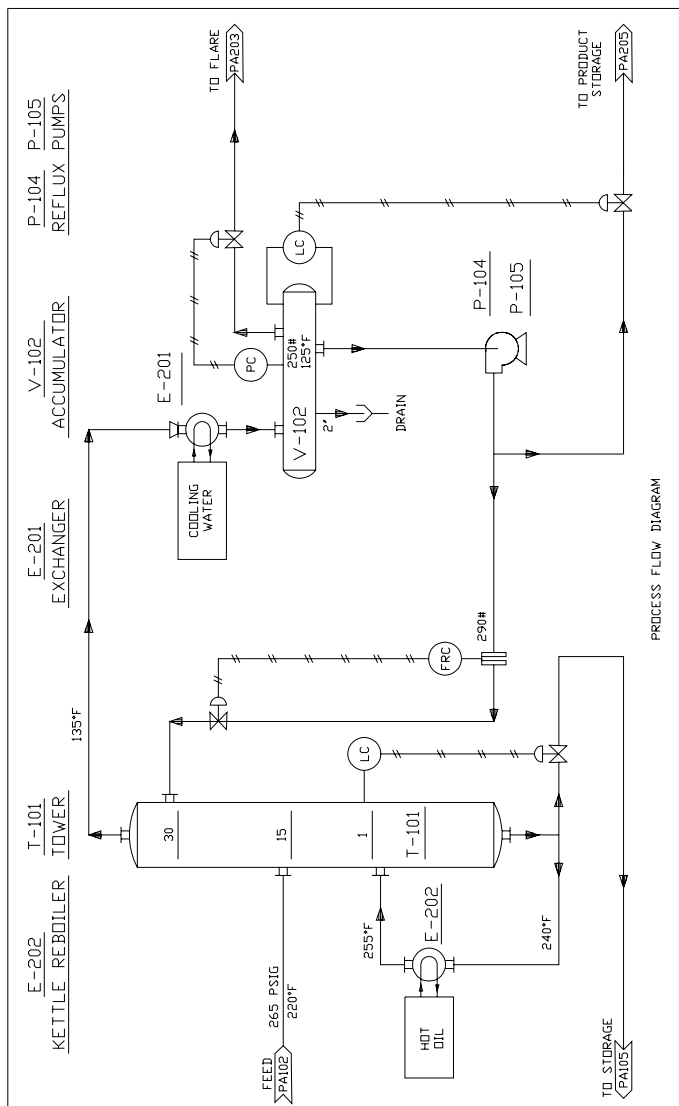


Figure E11-1 Piping flowsheet symbols

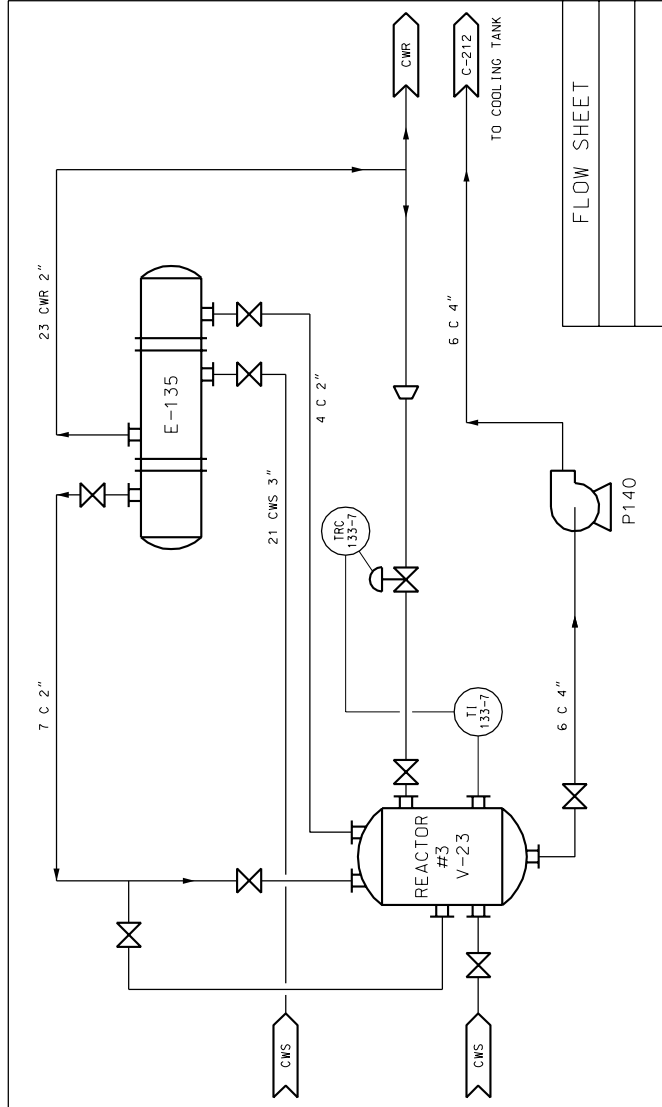
Exercise 11-1

PROCESS FLOW DIAGRAM

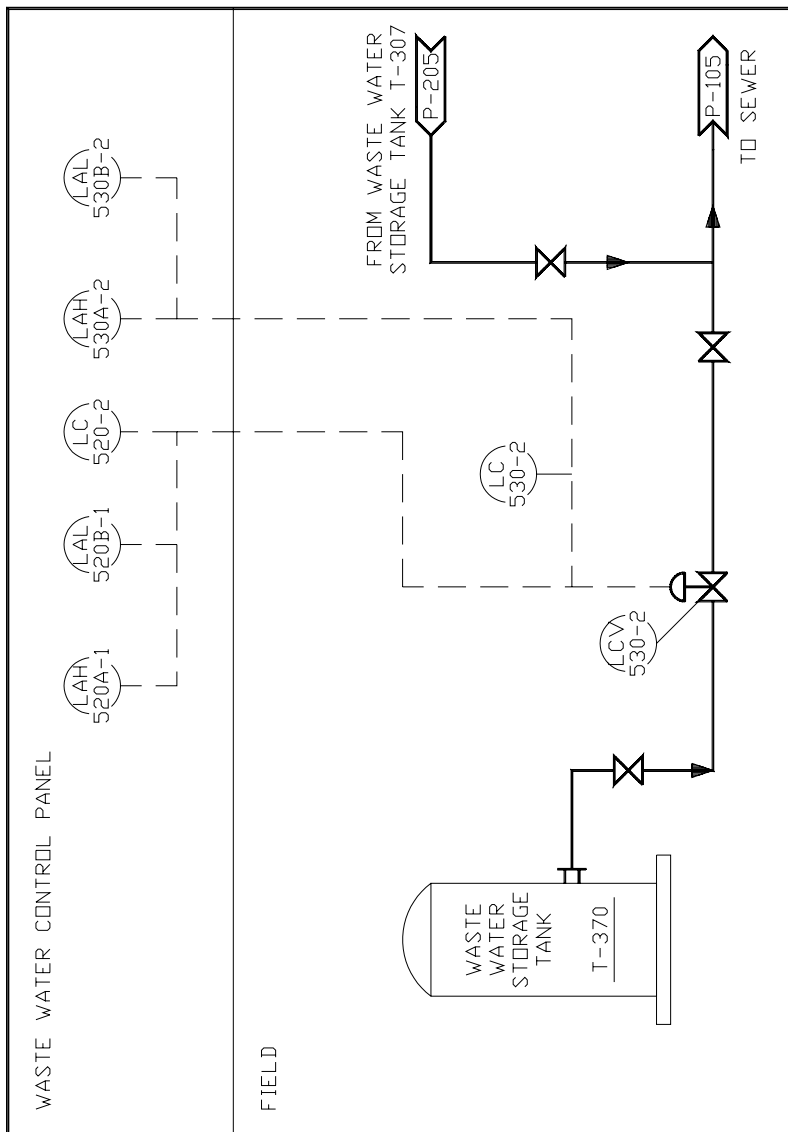


Exercise 11-2

REACTOR AND EXCHANGER FLOW DIAGRAM



Exercise 11-3
WASTEWATER CONTROL PANEL



Exercises 11-4 and 11-5

Create the electrical symbols shown in Figure E11-2, and make each into a cell. Use the cells to create the diagrams in Exercises 11-4 and 11-5.

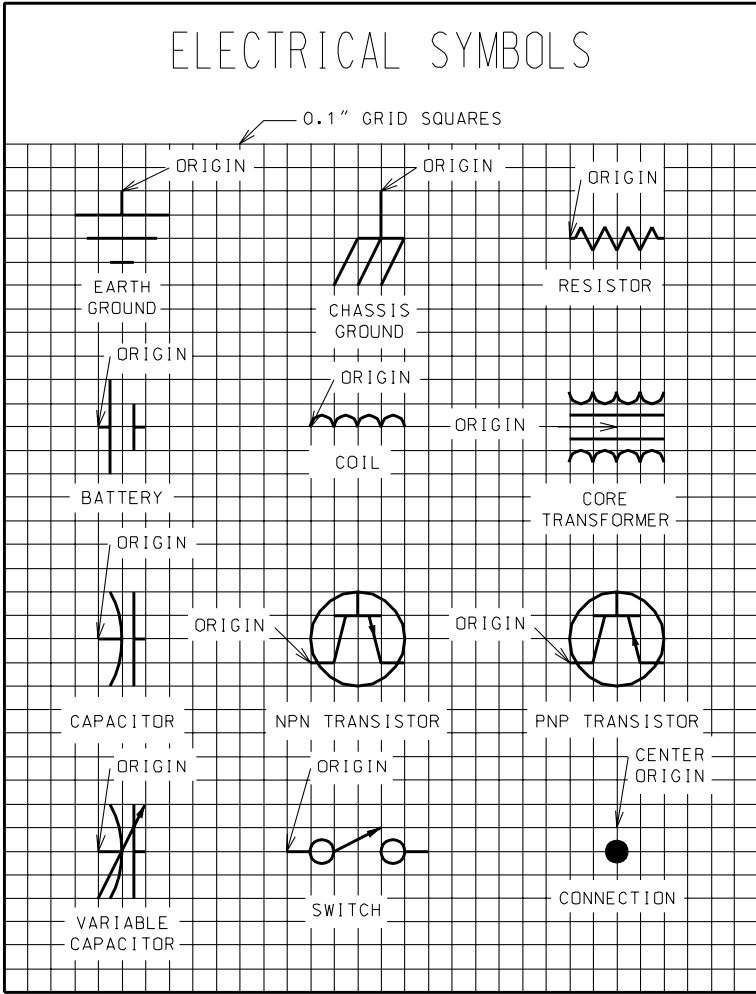
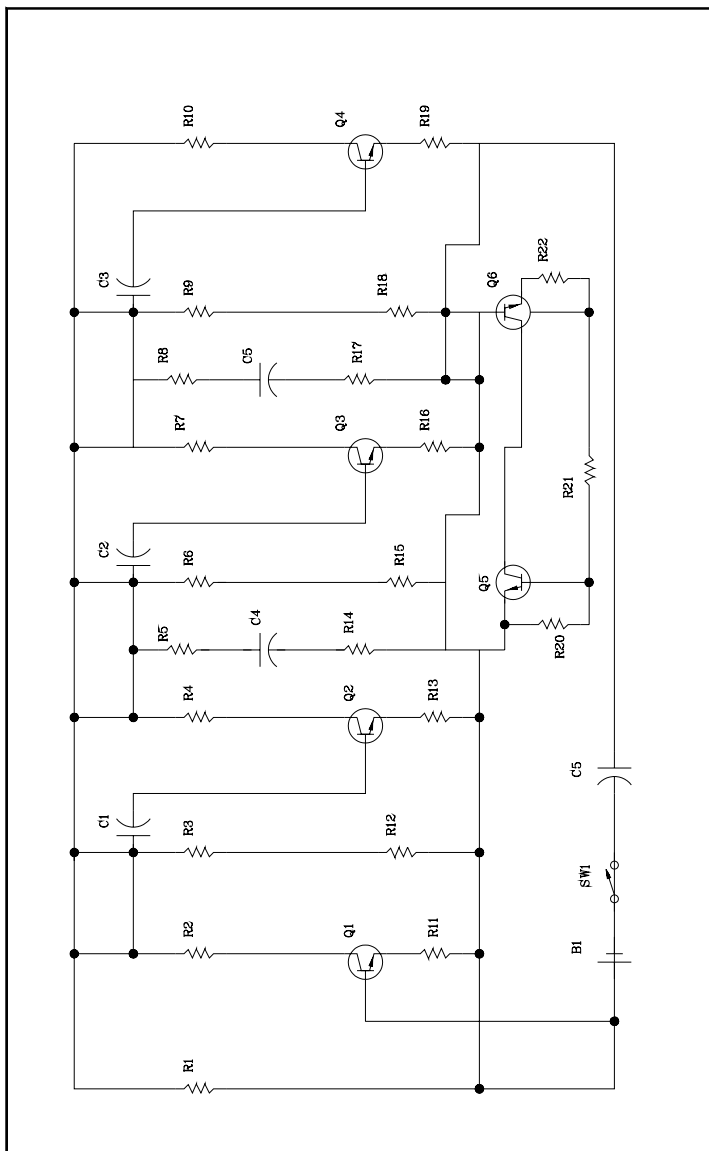
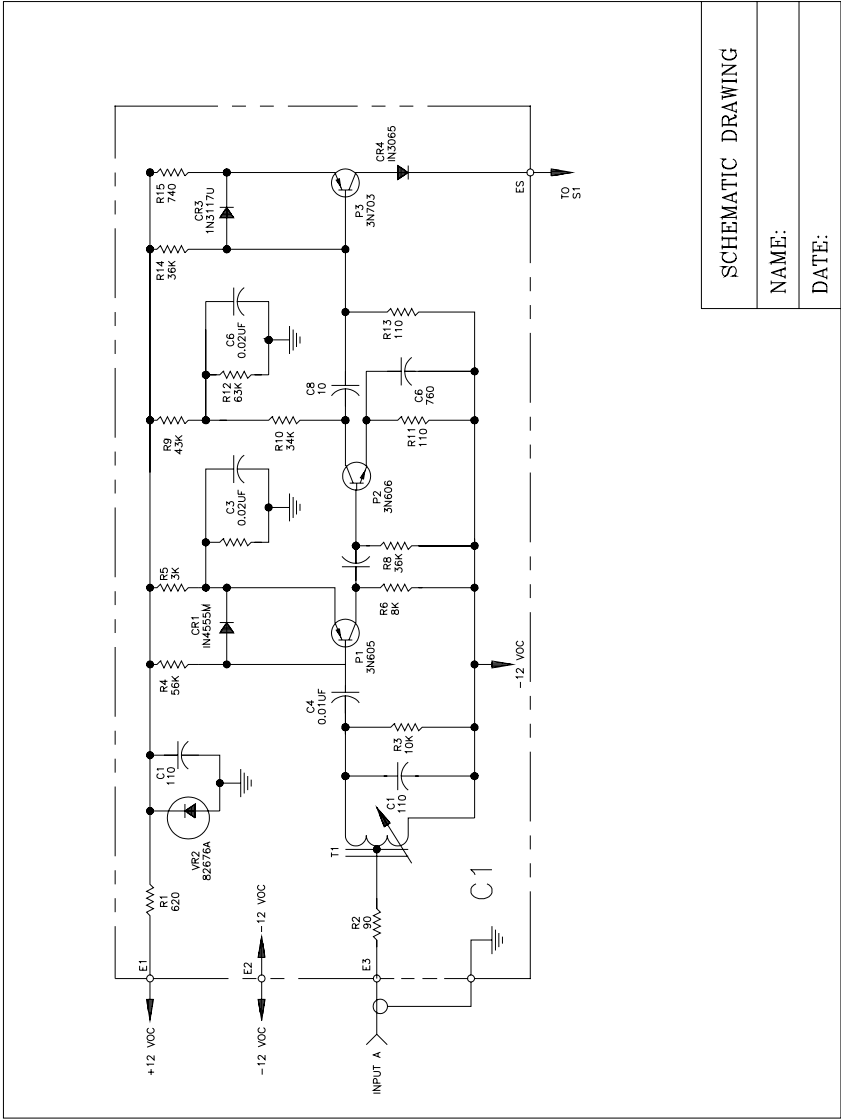


Figure E11-2 Electrical symbols

Exercise 11-4
ELECTRICAL DIAGRAM



Exercise 11-5
ELECTRICAL DIAGRAM



| |
|-------------------|
| SCHEMATIC DRAWING |
| NAME: |
| DATE: |