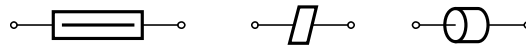


## 2. Creating schematic symbols

### 2.1. Ferrite bead



A *ferrite bead* is a common component that can be found on printed circuits, and can have several shapes, mainly a simple piece of wire surrounded by a cylinder of ferromagnetic material (whence the name), or an SMD component looking like a ceramic capacitor. The default *Miscellaneous devices* library of Altium does not provide a symbol for ferrite beads. There are several possible symbols for ferrite beads; the most common are:

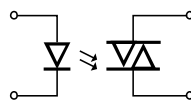


Create a schematic library where you will place the symbols for the components you create and draw a symbol for a ferrite bead. Its default designator should be `FB?`. You can leave it without a footprint for now.

### 2.2. Phototriac



A *phototriac* (also called *opto-triac*) is a component used to switch alternating current (AC) loads while keeping complete electrical isolation between the load (which might be powered by dangerous voltages) and the control electronics. It is composed by an LED mounted in the same enclosure as a *triac*, which can thus be triggered by the light emitted by the LED while ensuring electrical insulation. A schematic symbol for a phototriac might look like this:



Create a *phototriac* symbol in your schematic library. Phototriacs are generally packaged as integrated circuits, the default designator could therefore be `U?`. Leave the symbol without an associated footprint for now, we will add one later.

### 2.3. Microcontroller



Create a schematic symbol for the PIC16F1824 microcontroller in its QFN version. As it is an integrated circuit, its default designator should be `U?`. Note that the pins have a number of different functions. Therefore, to keep the schematics readable, it is advised to only indicate the main ones (e.g., RA0/AN0/TX) rather than all the possible ones (e.g., RA0/AN0/CPS0/C1IN+/VREF-/DACOUT/TX/...). There is no universal answer about what functions are the most important. For instance, GPIO (RA0 in the example), analog inputs (AN0) and UART (TX) are often widely used on microcontrollers, but might not be relevant for all projects.

### 2.4. Pin mapping



Make a copy of the phototriac symbol you created in exercise 2.2, and name it AQH3213A. Add the SOIC127P600-8AM footprint to it. As schematic pin designators of this symbol do not correspond to matching physical pins of the chip, use the *Pin Map* function (available in the *Add Footprint* window) to match the schematic designators with the physical ones of the real component. You will have to check the datasheet of the AQH3213A to determine the mapping.