## Capacitor Codes

Capacitors are labeled in a wide variety of different ways, but this handout lists the most common markings on capacitors and what they mean.

**Electrolytic and Tantalum** capacitors often have the capacitance (in uF) and voltage (maximum allowed voltage) printed on them in human-readable form. The capacitance will usually be followed by the letters "uF" to indicate measurement in microfarads, but the voltage may or may not be followed by a V. These capacitors are also often polarized, and typically have a + or a - printed on the case next to one lead (the - may be rotated 90 degrees from the horizontal). Non-polar electrolytics do exist, and often have the letters "NP" printed on them.

**Ceramic, Polyester, Metallized Film, and other low-capacitance capacitors** are often marked using a different system. Commonly the capacitor will have one or two numbers printed on it. Here are explanations of the most common cases:

- Only one number, which is one or two digits long:

  The capacitance is this number of picoFarads (pF).

- Only one number, three digits long:

  If we call the digits ABC, the capacitance is given by the formula ($AB * 10^C$) pF. For example, a capacitor that reads 224 is $22 * 10^4$ pF = 220,000 pF = 220 nF = 0.22 uF.
  (side note: I believe valid values for C are from 0 to 5 only)

- Only one number, three digits long, followed by a letter:

  Same capacitance as in the previous case, but the letter indicates a tolerance:

| | | |
|---|---|---|
| D = +/- 0.5 pF | F = +/- 1% | G = +/- 2% |
| H = +/- 3% | J = +/- 5% | K = +/- 10% |
| M = +/- 20% | P = +100% / -0% | Z = +80% / -20% |

- Two numbers, one of them followed by a letter:

  The number followed by a letter indicates the capacitance and tolerance of the cap, as in the previous case. The other number is the rated voltage (in volts). For example, a capacitor that reads:

  104J
  630

  Is a 100,000 pF (= 0.1 uF) +/-5% capacitor rated to 630 Volts.

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