Mega (M) means one million (1,000,000).

Kilo (k) means one thousand (1,000).

Milli (m) means one-thousandth (1⁄1,000).

Micro (µ) means one-millionth (1⁄1,000,000).

Kilo is one of the most extensively used conversion factors. It explains the use of prefixes with basic units of measurement. Kilo means 1,000, and when used with volts, is expressed as kilovolt, meaning 1,000 volts. The symbol for kilo is the letter "k." Thus, 1,000 volts is one kilovolt or 1 kV. Conversely, one volt would equal one-thousandth of a kV, or 1⁄1,000 kV. This could also be written 0.001 kV.

Similarly, the word "milli" means one-thousandth, and thus, 1 millivolt equals one-thousandth (1⁄1000) of a volt. *Figure 12-5* contains a complete list of the multiples used to express electrical quantities, together with the prefixes and symbols used to represent each number.

Static Electricity

Electricity is often described as being either static or dynamic. The difference between the two is based simply on whether the electrons are at rest (static) or in motion (dynamic). Static electricity is a buildup of an electrical charge on the surface of an object. It is considered "static" due to the fact that there is no current flowing as in alternate current (AC) or direct current (DC) electricity. Static electricity is usually caused when non-conductive materials, such as rubber, plastic, or glass, are rubbed together causing a transfer of electrons, which results in an imbalance of charges between the two materials. The fact that there is an imbalance of charges between the two materials means that the objects will exhibit an attractive or repulsive force.

Number	Prefix	Symbol
1,000,000,000,000	tera	t
1,000,000,000	giga	g
1,000,000	mega	M
1,000	kilo	k
100	hecto	h
10	deka	dk
0.1	deci	d
0.01	centi	c
0.001	milli	m
0.000001	micro	µ
0.000000001	nano	n
0.000000000001	pico	p

Figure 12-5. *Prefixes and symbols for multiples of basic quantities.*

Attractive and Repulsive Forces

One of the most fundamental laws of static electricity, as well as magnetics, deals with attraction and repulsion. Like charges repel each other and unlike charges attract each other. All electrons possess a negative charge and as such repel each other. Similarly, all protons possess a positive charge and as such repel each other. Electrons (negative) and protons (positive) are opposite in their charge and attract each other.

For example, if two pith balls are suspended, as shown in *Figure 12-6*, and each ball is touched with the charged glass rod, some of the charge from the rod is transferred to the balls. The balls now have similar charges and, consequently, repel each other as shown in part B of *Figure 12-6*. If a plastic rod is rubbed with fur, it becomes negatively charged and the fur is positively charged. By touching each ball with these differently charged sources, the balls obtain opposite charges and attract each other as shown in part C of *Figure 12-6*.

Although most objects become charged with static electricity by means of friction, a charged substance can also influence objects near it by contact. *[Figure 12-7]* If a positively-charged rod touches an uncharged metal bar, it draws electrons from the uncharged bar to the point of contact. Some electrons enter the rod, leaving the metal bar with a deficiency of electrons (positively charged) and making the rod less positive than it was or, perhaps, even neutralizing its charge completely.

A method of charging a metal bar by induction is demonstrated in *Figure 12-8*. A positively-charged rod is brought near, but does not touch, an uncharged metal bar. Electrons in the metal bar are attracted to the end of the bar nearest the positively-charged rod, leaving a deficiency of electrons at the opposite end of the bar. If this positively-charged end is touched by a neutral object, electrons will flow into the metal bar and neutralize the charge. The metal bar is left with an overall excess of electrons.

Electrostatic Field

A field of force exists around a charged body. This field is an electrostatic field (sometimes called a dielectric field) and is represented by lines extending in all directions from the charged body and terminating where there is an equal and opposite charge.

To explain the action of an electrostatic field, lines are used to represent the direction and intensity of the electric field of force. As illustrated in *Figure 12-9*, the intensity of the field is indicated by the number of lines per unit area, and the direction is shown by arrowheads on the lines pointing in the direction in which a small test charge would move (or tend to move) if acted upon by the field of force.