designed so that whenever external power is applied, or the starter is activated, the avionics bus is isolated from the airplane's electrical system automatically. This prevents potential power spikes from harming the avionics during engine start or when an external power source is hooked up to the airplane.

CIRCUIT PROTECTION

When scientists first began experimenting with electricity, there was a need for a weak link in the system to protect both the scientist and the test equipment from being electrocuted. Initially, somewhere along the circuit there was an open wire, generally undersized and uninsulated. Since an overload causes an increase in the wire temperature, the undersized wire would melt before the rest of the system. This weak, or fusible, link was eventually shortened to the name fuse.

The Fuse

The primary purpose of a fuse in an aircraft is to protect the system wiring. The secondary purpose is to protect a given appliance. In the modern fuse, higher-than-normal current heats up the fusible element until it reaches its melting point, then the fuse blows. The blown fuse is simply pulled out and replaced with a new one, and it is always a good idea to keep an extra set of replaceable fuses in the aircraft. In choosing a replacement fuse, it is important to consider three specifications: current rating, voltage rating, and fusing characteristics.

Current Rating

Current rating is the amount of current a fuse will handle before it melts. What is perhaps not so obvious is the effect that ambient temperature has on that rating. Since any given fuse will melt at some specific, predetermined temperature, it stands to reason that however that temperature is achieved, the fuse will melt. While it is unlikely that the ambient temperature will ever reach the fuse-melting temperature without the presence of a fire, any temperature increase will increase the rate of failure. The reason for this is that during periods of high ambient temperature (such as on hot days), the fuse starts out at a higher temperature before the current is ever applied to it. Therefore, at an ambient temperature of approximately 80 degrees F, the fuse ampere rating should be 25% higher than the normal operating current of the circuit.

Voltage Rating

Perhaps most confusing of all is the voltage rating. If you look at a fuse you will find one of the following voltages stamped on it: 32, 125, or 250 volts. These ratings indicate the maximum voltage for which the fuse is usable. If the fuse has no rating, you may assume it is 32 volts. The 32-volt fuse is usable for all aircraft DC systems (14 or 28 volt). The 125-volt rating could be used for 14 or 28 VDC, or 115 VAC, and so on. Therefore, fuses should be rated equal to, or greater than, the voltage of the circuit or equipment.