

POWER LOSS PROTECTION FOR MENTOR BASE RADIOS

This application note pertains to the use of an uninterruptible power supply (UPS) with Mentor base station radios. Since all Mentor base station radios require the application of 110VAC line power to operate, the reliability and condition of this power source has a considerable impact on the performance characteristics of the base radio.

In the event of a power loss of primary line power, the uninterruptible power supply (UPS) contains an internal battery, which is converted to 115VAC line power, and is connected to the load, or in this case the Mentor radio, to provide operating power during the time there is no primary power. If the period of time primary power is lost happens to be short, and battery power has not yet been depleted, then the UPS will automatically stop powering the load (or the Mentor radio) and start charging the battery upon restoration of primary power. However, if the interval of time primary power is lost exceeds the time interval that the backup power can provide power, then the backup power supply system fails and the critical equipment stops functioning.

The length of time between the loss of primary power and the reapplication of primary power is the time required by the backup power supply system. The cost of a back up power system is directly related to this time interval. Normally, the longer a backup power supply system can provide this required backup power, the higher the cost. As the power required (in watts) of the load goes up, the time interval of the available backup power supply goes down. For example, a 25 watt transmitter will last only a fraction of the time that a 5 watt transmitter will with the same backup power supply because there is a higher demand from the load.

There are many types of backup power systems available. The most inexpensive will only hold power for a few seconds and are identified more by the name of surge suppressors than UPS's. Backup power supply systems that have an internal battery and can provide continuous power for time intervals from several minutes up to about one hour are the normal UPS. The longest interval backup power supplies are those that have a backup gasoline powered motor/generator combination.

Just as there is a tradeoff between cost and backup power supply interval, there is also a tradeoff of response time. Surge suppressors have the fastest response time and can deliver very short duration power very quickly. Since the supply energy is stored in capacitors, the typical response times in these units can be as fast as a few microseconds. For larger UPS power supplies that can provide power for upwards of an hour or two, the response time is typically around 1-5 milliseconds. This is normally adequate for the transfer of power to units with built in power supplies so there is no recognizable loss of power. For the largest capacity backup power supplies like a motor generator, there is the longest delay. They must startup a motor and let it's corresponding generator stabilize it's output power before it can transfer the backup power to the load, so there is a considerable time delay between the loss of primary power and the application of backup power. This type of backup power supply can have a delay of several seconds to several minutes. For most critical applications, such as aviation base station radios, some of all three may be required.

Mentor radio sells a UPS style of backup power supply that can handle the backup power demand of a transmitting M15-25 for up to 45 minutes. (Assuming a 30% duty cycle)