

## Electromagnetic Pulse:

# EMP And Your Equipment

*Staying with lower-tech rather than high-tech products makes it easier to assure that some of today's lifestyle would survive . . .*

By Carl E. Krupp



Artist's conception of a LANDSAT spacecraft in flight. If a nuclear device disguised as a satellite exploded over the U.S. at an altitude of from 150 to 300 miles, the EMP would cover much of the country (courtesy of NASA).

**E**MP, electromagnetic pulse, is the enormous radio spectrum energy given off whenever an atomic weapon is detonated.

In ground and low air bursts, the pulse is limited to an area similar to the destruction area of the device, so it is not considered as a special threat, but if the device is exploded in near space, EMP can cause widespread electronic failure. For example, if a device disguised as a weather satellite exploded over the center of the continental United States, and at an altitude of 150 to 300 miles, the EMP would cover much of the country. Since it is well known that both the USSR and the U.S. have such satellites in orbit, the possibility of such an EMP attack is not remote.

For the last 30 years the military has been considering ways to "harden" their equipment so it would be less affected by EMP. Often this is done by using fiber optics instead of electrical circuits and copper wire, because the wire acts as an antenna to pick up the pulse, whereas the light traveling down the fiber optic is unaffected. Combined with proper shielding, almost any circuit can be hardened to withstand the near-miss of an atomic device.

But how about us? Could we also keep at least some of our equipment working after an EMP strike even though commercial power would be severely damaged? The answer is clearly yes, but only with some effort.

**Automobiles**—Those little black boxes that have been responsible for such wonderful gas mileage in the family car are full of semiconductors that will cook with the first EMP strike. In order for a car to continue to operate you must choose an earlier model with points and condensers, but even that is a little uncertain, because a very near EMP strike might still fry the ignition coil.

The real answer is a fully mechanical diesel engine, available in a host of vehicles, such as the Volkswagens, GMC, Ford and Chevy trucks. The key question to ask the service manager, not salesman, is, "Does this vehicle have *any* electronics?" If the answer is "Yes, but . . ." forget that model vehicle! By the way, if you feel you need an excuse for the question, tell them you are putting a very large radio transmitter into the car. Several manufacturers will not honor their warranty on the car if a transmitter larger than just 5 watts is installed in the car—that's how sensitive the electronics have become. Imagine an electromagnetic pulse in tens of thousands of watts range, and the damage it could do!

You might wonder why the federal government is not concerned with the auto industry building cars that are sure to stop in the event of nuclear war.

For some reason, they are interested only in keeping the commercial long-distance trucks and their military vehicles on the road. They realize that the vast majority of trucks are diesel and would run just fine. Their own military hardware is either diesel or hardened ignition gas . . . so they also would run.

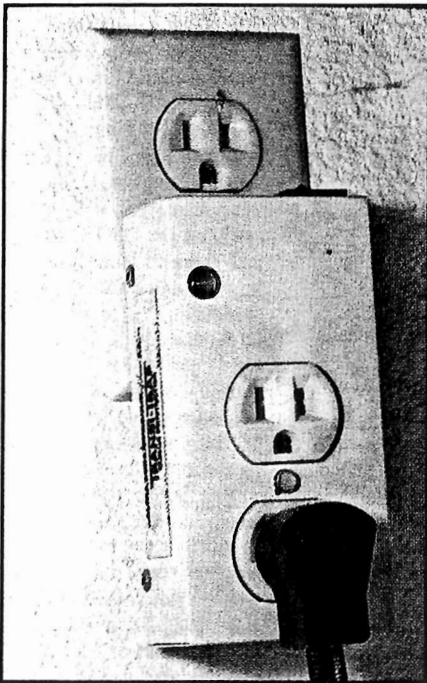
Perhaps they realize that it would be better for them if civilian cars didn't run, so they could get them off the road and out of their way!

**Radios**—Since EMP acts like a giant, super-powerful radio pulse, it stands to reason that it would destroy radios, which it does, but only if it gets to them, principally through long wire antennas. The key, then, is either to disconnect the antenna when not needed or to put a protective device on the antenna similar to those used for lightning protection, but operating much more quickly so that it would also protect the radio from EMP. Such a device is offered by Alpha Delta Communications, Dept. ASG, P.O. Box 571, Centerville, OH 45459, telephone (513) 435-4772. Called the Transi-Trap

model R-T, useable on transmitters with power of up to 200 watts, and selling for \$29.95 plus \$2 shipping, the device is a high-speed lightning arrester that will divert an EMP strike to ground before it can damage the radio. A smaller model for small transmitters or receivers is the model L-T, selling for \$19.95 plus \$2 shipping. So far as we can tell, this is the only company offering this basically military hardware to the general public, though most of their advertising is aimed at Ham radio operators looking for better protection for their equipment from near lightning strikes.

Small, battery-operated portable radios with built-in antennas, along with high frequency radios with antennas shorter than 18 inches, are relatively safe and can be made fully safe by storing them in shielded containers, such as metal ammo cans, or in underground rooms such as root cellars, deep basements or fallout shelters.

**Freezers, Well Pumps, Other 110-Volt Equipment**—Most appliances that have



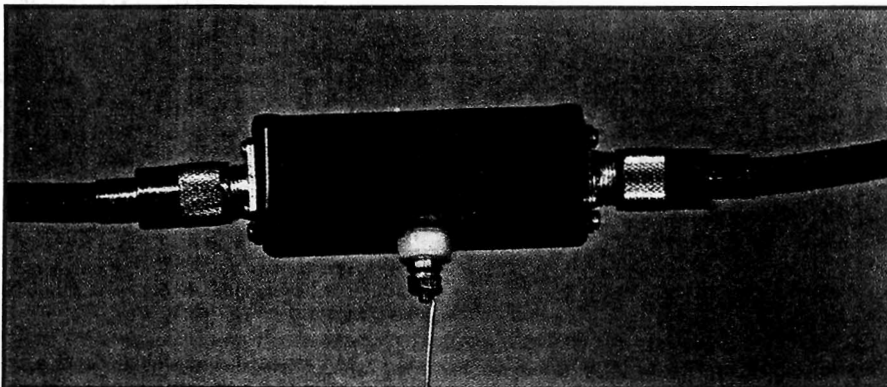
Protection from EMP is provided to commercially powered appliances by the Alpha Delta ACTT AC Transi-Trap.

motors share one feature, they plug into commercial power. For them, the danger is that the pulse would travel down the power line, which acts as a giant antenna, and destroy the motor with a several-thousand-volt, several-thousand-ampere surge. Alpha Delta offers a surge protector that is fast enough to handle EMP strikes, not just the normally slower surges that computer owners have always had to filter out of their power lines. Known as the model ACTT AC Transi-Trap, it sells for \$29.95 plus \$2 shipping.

For fuller security, it would help if the power line coming into your home were buried, as it is likely that the surge would break down the underground wire and short to ground even before entering the house. By placing ACTT direct plug-in protectors in the wall outlets of critical equipment you can almost guarantee that the equipment will survive. Once you have a list of important items, you probably will find you need only a couple of ACTTs to protect your key equipment. Our radios, freezers and well pump—all commercially powered—were protected for under \$200.

**Computers**—We live in the computer age, but would lose 95 percent of them with the first EMP strike! Only military and specially hardened computers would survive. That alone is reason enough for you to harden yours. A Transi-Trap ACTT on the power line will protect it from the incoming surge. Shielding the computer, itself, will protect the components, which are very sensitive to EMP. Unfortunately, we also live in the age of plastic, which offers no shielding at all. Keeping the computer in a steel case would offer a measure of protection, except when you had it out for use.

The only real answer is to shield the room area, such as a basement or shelter. In the case of a basement, all that is needed is to staple copper wire to the ceiling above and solder a heavy bus wire to each copper screen and fasten the bus wire to a ground rod. Make sure that all windows are also shielded with grounded screen. If the computer can be located totally underground, such as in a shelter, then only the incoming commercial power must be filtered to fully protect the unit.



Antenna leads can be protected from EMP by the Alpha Delta Transi-Trap R-T.

**Tractors and Rototillers**—Like cars, most have electronic ignition and would stop running at the first pulse. But the good news is that there are some models of almost all manufacturers that still have points and condenser ignition, and they will run unless very close to a strike. If you are not sure whether your equipment has electronic ignition, ask the servicing dealer. If you are buying something new, they will almost always hype electronic ignition. Choose points and condenser instead and be safer! Of course, a diesel tractor would be a perfect solution.

**Generators**—If EMP strikes, commercial power would be terminated. That enormous pulse will fry all the control computers and many power transformers, including the one near your home. It would take years to restore full electric power, even if the power industry had enough spare transformers, which they don't. Naturally, without commercial power, life as we know it would be a long time returning to normal. For the short term, a small power plant of your own would allow some transition time until you have to do without almost all electricity.

Here again, there are power plants available that do not use electronic ignition and that stay with standard rotating field generators without fancy electronic control circuits. Stay with these and you will have the power you counted on.

**Solar Power**—While the panels, themselves, would survive, only protected battery chargers that are plugged into commercial power will survive, and if they don't, they would burst the batteries, destroying the system. One answer is to go straight solar, leaving off the common commercial power back-up charger so often used. The other weak link is the inverter used to take the battery output and convert it to 110-volt or 220-volt power. If possible, avoid this step and use the current directly from the battery, keeping all wiring short and buried if possible. If this is not possible, shield the inverter and filter all incoming and outgoing leads with Transi-Trap units. This may seem like a lot of trouble, but what use is a back-up power source if it will fail at the same time commercial power is going to fail!

**Looking To The Future**—When shopping for a new appliance or some electric-powered equipment, look at it with an eye to protecting it from EMP. Those fully electronic cameras, so popular today, would surely fail with the first pulse. A camera that doesn't require a battery would at least take a picture until all remaining stocks of film are so irradiated that they won't make an image.

In general, staying with lower-tech, rather than high-tech products, makes it easier to assure that some of today's style and stored information would survive.