



Power Supply Unit

In electronics terminology, power processing is the use of circuitry to change electric power from one form to another. A spacecraft, for example, usually derives its electric power from solar cells. This is "unregulated" direct current (dc) power which must be processed, converted to regulated, or steady, dc voltage for

powering the spacecraft's instruments. In the early days of space flight, power processing switcher converters were heavy, cumbersome and inefficient devices. Over years of research, lighter switchers were developed, but they were still not highly efficient—until 1979, when California Institute of Technology scientists made an important breakthrough in research sponsored by Lewis Research Center.

The result was the Cuk DC to DC Switching Converter, developed by CalTech Professors Slobodan Cuk and R.D. Middlebrook. The converter changes unsuitable dc voltage into one or more voltages suitable for powering electronic equipment; it can also be used in converting dc current to ac and vice versa. Named one of the 100 most significant technical advances of 1979, the Cuk converter is expected to find wide applicability in a great range of electrically-powered systems because it is more efficient than previous conversion devices, simpler, smaller, lighter, cheaper and highly reliable.

The first application of the technology is in the Compucorp 685 word/data processor pictured at left; the processor is manufactured by Compucorp, Santa Monica, California. The converter, or switcher, is shown above.

NASA waived title rights to the technology to CalTech. CalTech granted an exclusive license to the inventors, Drs. Cuk and Middlebrook, who, in turn, transferred their rights to a company they founded called TESLAcO, Pasadena, California. TESLAcO sublicenses the converter design and related technology to companies making power supplies for use in their own products.

