The only new component was a microprocessor control system. The control system developed in this project was a modification of a patented control system originally developed by Friedrich Air Conditioning and Refrigeration Systems to supply twin compressor systems.

Standard supermarket refrigeration systems employ paired compressors of equal size, which operate intermittently. Considerable energy consumption is involved in the initiation of the cycle. A compressor train composed of units of unequal size can more closely match the demand and can avoid energy losses associated with the cycling of larger compressors. In the unequal design, two to six compressors of unequal horsepowers are controlled by an integrated circuit and software. This system is a replacement for a pair of 25 hp compressors.

There are several ways that the multiple uneven capacity parallel compressors with microprocessor control can save money for a supermarket:

- computer controlled cycles can be optimized for the demand patterns of an individual store;
- a wider range of defrost cycles is made possible by a microprocessor; and
- maintaining suction pressure within a narrow band extends compressor life by reducing the frequency of cycling.

Laboratory testing estimated that the system with R-12 refrigerants consumes 16.6% less than the same system operating with mechanical control and ambient subcooling. In tests with R-502 refrigerants, the energy savings was only 4.3% (Toscano, Walker, and Tetreault, 1983).

A minimal increase in first costs is associated with this technology, and this has promoted adoption. The payback period is two years in larger stores (with 60,000 or more sq. ft.) and three years in medium-sized stores (with 45,000-60,000 sq. ft.).