AT&T INNOVATION BRIEFS

This issue's Innovation Briefs include a new item, called "Patents To Build On," which calls attention to AT&T patents that may have commercial potential. Those wishing further information, or AT&T readers who would like to contribute future items, are encouraged to contact the Technical Journal editor.

Adaptive Bandwidth Allocation for ATM Networks

Broadband networks based on asynchronous transfer mode (ATM) protocols are currently being designed for simultaneous support of a wide variety of services, including interactive and distributed audio, video, and data communications. A key issue in the management and control of such networks is how to allocate the available bandwidth fairly among competing users, whose individual requirements can vary greatly over time, and which can unpredictably jump from nonexistent to something that's quite large — and then back again — all in a short time. Bandwidth allocation is made even more difficult by the relatively long delays in receiving information about congestion at distant points in the network, and by the necessarily limited processing capabilities of each ATM switch. AT&T Bell Laboratories researchers have now come up with an efficient and effective adaptive algorithm for allocating the network bandwidth fairly among users, based on such limited feedback about the current state of the network. The algorithm is effective with switches using either the first-come-first-served service discipline, or the round-robin discipline, or even a combination of the two. It also can handle a wide range of types of fairness, from individual customer guarantees to "best efforts" service. The new method provides ATM switches with the ability to adjust rapidly to the changing bandwidth needs of users in a fair and consistent way, allowing disparate types of users and services to be accommodated smoothly and efficiently.

Nonconducting Shield Protects Optical Cable from Lightning
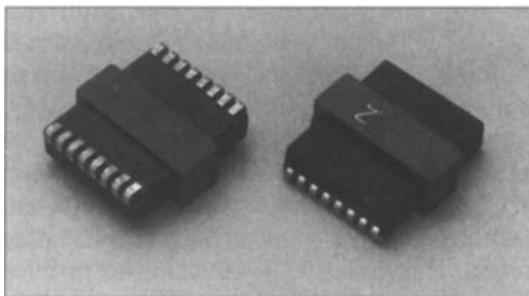
Whenever underground fiber-optic cable is damaged, thousands of people may be inconvenienced, at best. At worst, they can be lost as customers. The AT&T Network Cable Systems division's Atlanta Works, where optical cable is manufactured, armors some specialized cables with a metal shield to protect them against damage from gophers, which are obsessive chewers. In addition to keeping gophers at bay, the metal shield makes the cable easy to locate. But the metal's conductivity wreaks havoc if the cable is struck by lightening. For use in regions especially prone to lightening, the Atlanta Works also produces optical cable reinforced entirely with a tough, nonconducting plastic shield.

Surface-Mount Transformers for Power-Conversion Products

In a significant advance for AT&T power-conversion technology, flex circuit and transfer-molding technologies have been recently adapted for use in the construction of electronic transformers. With the support of Bell Laboratories researchers, AT&T Power Systems, a unit of AT&T Microelectronics, has implemented these technologies in power transformers of up to 150 watts. The result is a low-profile transformer (with a footprint of 1.1 inch by 1.2 inch, and a 3/8-inch thickness) that's highly efficient — both electrically and thermally. The technologies allow the components to be small and light enough for compatibility with existing pick-and-place surface-mount manufacturing equipment. In addition to a dramatic reduction in size, the new components' capacitance, inductance, and resistance can be readily controlled. This is crucial to the development of new, high-efficiency, electronic power processing circuits. The transformers have been designed into a new family of high-density board-mounted power modules, now available from AT&T Power Systems, for input voltages of up to 72 volts dc and output voltages ranging from 2 volts dc to 28 volts dc.

Bottom and top views of a new, high performance, surface-mount transformer from AT&T Power Systems.

Patent To Build On

Dynamic Graphical Analysis of Network Data

In a particular realization of this invention, a computer is programmed to display, in map form, data associated with respective nodes. Operation of the mapping facility is initiated in response to the user entering an appropriate command. Specifically, the computer displays a plurality of symbols representing respective nodes. The symbols are connected to one another by a displayed link, formed from two half-line segments each. The segments indicate the direction and level of data associated with each respective symbol. In addition, tools are provided for controlling the parameters used in the display of the symbols and links. Inventors: R. A. Becker, S. G. Eick, E. O. Miller, and A. R. Wilks. (US Patent No. 5,136,690)