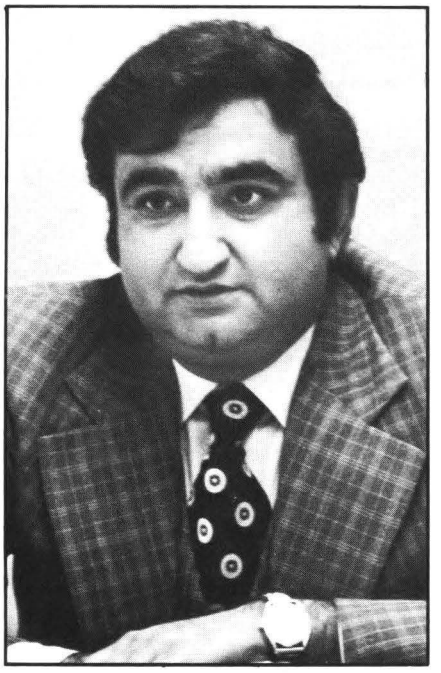
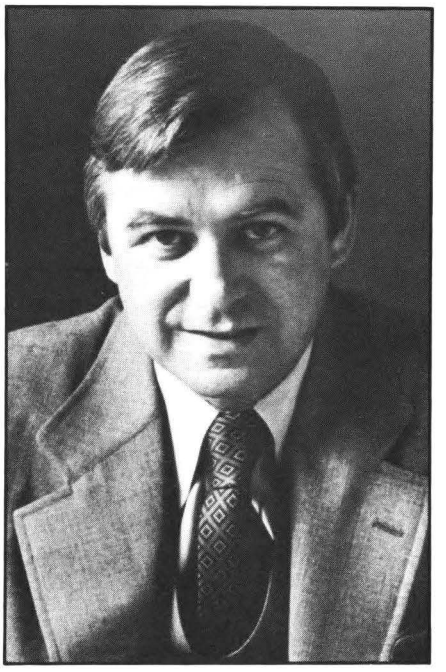


Tandon: *"Shugart's head is a copy of our design."*



Sanders: *"The Bi-Compliant head is definitely a Shugart design."*

Shugart, Tandon spar over head-license issue

Talks between Shugart Associates and Tandon Magnetics Corp. concerning manufacturing licenses for Tandon's double-sided read/write head assembly for floppy-disk drives remain at a stalemate. Despite the impasse, some industry observers feel strongly that the two companies may come to terms by mid-year.

Meanwhile, Shugart is distributing evaluation versions of a 5¼-in. double-sided minifloppy drive equipped with its newly announced "Bi-Compliant" head assembly—a move sparking rumblings from Tandon that Shugart's new design may be in direct violation of a year-old Tandon patent.

At issue is a head assembly that has proven to be both reliable and manufacturable in large quantities. It comprises a fixed "button" head that reads and writes data on one side of a floppy disk and a gimballed slider mounted onto a spring-loaded pivot arm that reads and writes data on the other side. The completed assembly, resembling a small desk-top stapler, is mounted onto a carriage way and tied to a lead screw or band positioner.

In most drives the assembly is driven across the diskette's data tracks by a stepper motor. The button head is mounted firmly to the carriage itself; the gimballed head reads and writes data on the upper surface of the diskette, while serving as a loading pad to push the diskette down onto the lower head.

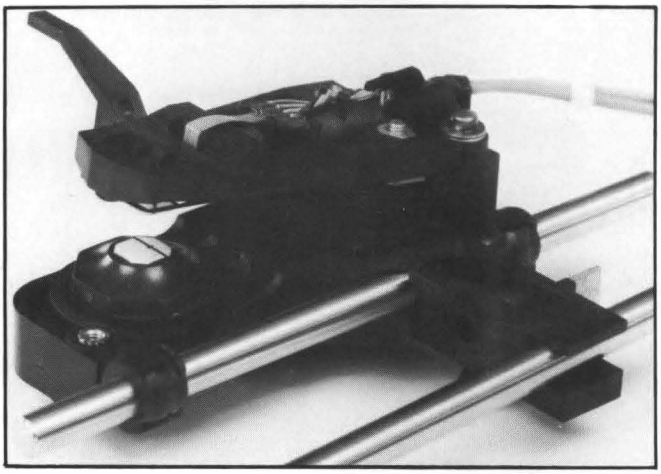
Compounding the controversy between Shugart, the Xerox subsidiary in Sunnyvale, Calif., and Tandon, the Chatsworth, Calif., components and peripherals house, is the explosive demand for low-cost, high-capacity rotating memories, particularly by builders of microcomputer-based small-business and word-processing systems. In the face of this demand, however, many floppy-disk drive makers have been unable to follow through on promised deliveries of large quantities of reliable drives.

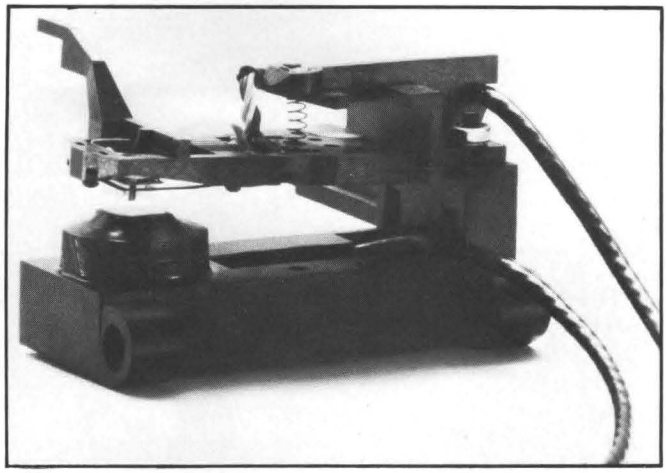
Problems with read/write heads have been the source of much of this difficulty, and Shugart's are no exception. The firm's first double-sided drives were originally designed using what some call the "clothespin" head assembly, a variation of an IBM design.

Shugart's SA450 (5¼-in.) and SA850 (8-in.) double-sided drives originally incorporated two gimballed heads—one fixed on the carriage, the other mounted on a pivot arm—similar to the Tandon design. Shugart found that building small quantities of these drives was painless. But when it came to filling the large-scale orders that followed the introduction of its double-sided hardware several years ago, manufacturing problems quickly arose. "We could easily put together 20 to 30 drives a day," recalls Ferrell Sanders, marketing vice president at Shugart. "It was something else, though, when we tried to ship thousands per day."

In addition to manufacturing problems, Shugart's clothespin head posed its own operating constraints. "When the heads loaded, you had two pieces of ceramic banging together," Sanders recalls. "If we increased pressure to get better compliance between the heads and the media, diskette wear went up. If we reduced pressure to control wear, we ended up with data-handling problems."

Last summer, Sanders adds,





At the center *of the controversy: Does Shugart Associates' "Bi-Compliant" head assembly, left, violate patents on Tandon Magnetics Corp.'s read/write head assembly, right, for floppy-disk drives?*

Shugart chose the Bi-Compliant design and moved to phase out earlier clothespin head assemblies. One of the first drives to incorporate the new head may have been the SA450 demonstrated at a computer exhibition in London. At the same time came word of talks between the two companies, aimed at negotiating for Shugart an agreement that would permit it to build Tandon's head in-house. [*Mini-Micro Systems* had erroneously reported that a licensing agreement between the two had already been signed (MMS, December, 1979, p. 19).]

According to a number of sources, these talks are now "dead in the water." Exactly why they broke down has not been made public. They appear tempered, however, by events associated with an abortive attempt by Shugart two years ago to buy out Sirjang Lal "Jugi" Tandon's company. At the time, Tandon's head patent was still pending, and as part of the negotiations, claims one source, Shugart engineers were given acces to Tandon's manufacturing technology.

Talks between the companies eventually sputtered out, only to be reopened in the summer of last year when Shugart sought a license for the now patented Tandon component. These discussions dragged through December, at which point Shugart demonstrated its Bi-Compliant head. That reportedly angered Tandon, who promptly suspended negotiations.

Other sources, however, blame Tandon for the slow pace of negotiations and the lack of an agreement. "Shugart is trying to sort out who it is dealing with," says one source close to the negotiations. "Meanwhile, Jugi doesn't know whether he's giving away the family jewels or whether he's making a super deal."

Sources at Tandon see their own company pride as a major issue. "We want credibility for our design," says one insider. "We want Shugart to recognize that what they call their Bi-Compliant head is really a Tandon head." Shugart, however, appears unwilling to make that move. Shugart's Sanders says the Bi-Compliant head is definitely a Shugart design, although he concedes that, from an external point of view, they appear similar. There are differences, he stresses, although he would not state what they were, citing competitive reasons.

Jugi Tandon is more vocal about the two designs. "Shugart's Bi-Compliant head is a carbon copy of our own design," he states flatly. "All Shugart has done is put its name on it." Tandon says his patent supports his claim, and at first glance, the patent would appear to cover a lot of real estate. A summary of the head assembly describes it as "a device for effecting data recording and reproduction operations with each of the two sides of a pliant, nonrigid magnetic recording element (employing) a fixed transducer on one side and a resilient element supporting a movable transducer on the other." Changes in specifications, such as those suggested by Sanders, don't alter the validity of his patent, Tandon claims. For example, it is reported that Shugart's design uses a straddle erase, while Tandon's incorporates a tunnel erase feature.

For the moment, though, Tandon has not taken any legal steps to enforce his claim against Shugart, but he does not preclude this. Many industry sources report that Tandon is holding back for a good reason: "The front-end costs of such a suit would be very high," notes one hardware executive. "It would be 85 Xerox (Shugart's parent) lawyers against Tandon's small staff. He could easily lose out even if he wins in court."

Others claim that Tandon's patent won't hold up if seriously challenged, a notion Tandon dismisses out of hand. Many persist in questioning the patent's validity and point out that, so far, Tandon has not enforced the patent against any other makers of double-sided

read/write head assemblies incorporating one fixed and one movable head, or against any of their customers. Tandon shrugs this off, too, noting that his firm has sent letters to a number of companies, informing them of his patent (MMS, July, 1979, p. 16). He says an extended law suit would not be in the industry's best interest.

Tandon also feels that his real protection will lie with his manufacturing personnel, not his legal staff. As he sees it, Tandon Magnetics is prepared to outproduce Shugart, regardless of the outcome of negotiations. "We are way ahead of them when it comes to delivering volume quantities of these drives," he says, referring to shipments of his company's year-old TM-100 5¼-in. single- and double-sided drives.

Right now, he says, hardware is being produced at the rate of 8000 units a month—three-quarters of which are double-sided drives. Shugart, on the other hand, is only now revving up its double-sided 5¼-in. production lines. But once production gets rolling, Sanders says, large numbers of SA450s will be stamped out. By the end of the year, he says, production should hit 500 units a day.

Shugart's 8-in. SA850 will continue to be offered with the older clothespin head initially, Sanders adds, while the Bi-Compliant design is phased in. Sanders expects this to be completed in July. Shugart's total production capability for floppy-disk drives is staggering. Last year the company shipped 250,000 5¼-in. single-sided drives. This year, company sources report, more than 500,000 have been shipped so far.

Despite the differences between Shugart and Tandon, many observers feel that an agreement over the question of the Bi-Compliant head will be hammered out very soon. Sanders has no comment on any aspect of the negotiations, but Jugi Tandon now seems somewhat optimistic about the final resolution. "Shugart has never said that they do not want to negotiate this issue," he says. "They are a responsible company, and we will solve this problem." —*John Trifari*