

AMPLEX

Ampex
disk drives and
subsystems

A tradition of excellence

When Ampex entered the disk memory business in 1970, we were determined that any disk drive or controller which carried our name had to be the best possible within the state of the art. Our quarter-century reputation for excellence in tape and core memory technology was on the line. We assembled a team comprised of the most innovative design engineers in the business. Their first mandate: Design and build a disk system with more

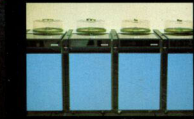
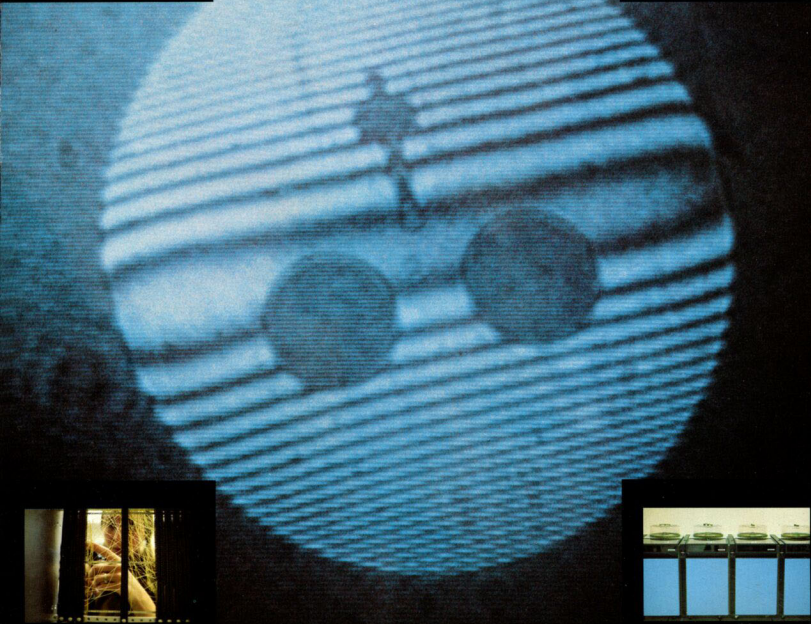
performance and reliability than any other in the industry. The result was Ampex's DS-314 disk system, a plug-to-plug replacement for the IBM 2312 disk drive and 2314 controller. Incorporating the latest advances in disk technology, the DM-312 drive and DC-314 controller set new performance and reliability standards for System/360 and System/370 plug-compatible peripherals. Since then our disk system family has grown, with capacities and speeds suited to

the needs of every End User and OEM.

OEM & End User disk system

For the System/360 and 370 user there is single density DS-314, and double-density DS-324, as well as DS-330, a high capacity, space-saving replacement for IBM 3330 disk systems. For Univac users—Ampex DS-8430, a high performance alternative to Univac disk and drum systems. All these Ampex disk systems are also produced with OEM inter-

faces, and are suited to a variety of computer system applications. Custom interfaces designed to customer specifications are available for all Ampex disk drives. Ampex disk systems are produced in modern manufacturing facilities which include both domestic and overseas plants. We have more than three-quarter million square feet devoted to the production of high-quality disk drives, controllers, and other computer peripherals.



Superior design

Every Ampex disk memory system combines the most advanced technology available with conservative design that ensures unrivalled performance and long-term reliability. For example, we pioneered the use of optical positioning, now generally accepted as an industry standard. Circuit board construction and wire wrap operations are done in-house. It's the best way we know to be sure our exacting specifications are met 100%.

Power supplies are Ampex designed and built, and incorporate single-unit construction for easy maintenance. Checking voltage outputs is easy because all the required voltages in our drives are provided by a single Ampex power supply—not four or five individual units as in some other systems.

Circuit boards in our disk drives are kept small, and only single-connector boards are used. This makes them easier to handle, and eliminates warping and shorting

—sometimes a problem with extremely large boards.

All Ampex disk drives use reliable electromagnetic actuators and photoelectric sensing of a precision optical grating or special pre-recorded disk pack servo tracks for position sensing. Dependable solid-state devices are used wherever feasible instead of mechanical relays. Reliability is further enhanced by the use of proven logic circuits and stringent worst-case design practices.

Quality assurance

Continuous testing is performed at every level, from receiving through production and final assembly to assure optimum performance and reliability in every disk drive and controller produced. Statistical samplings from all incoming components are subjected to rigid mechanical tolerance and electrical testing. Close tolerance components undergo a meticulous piece-by-piece inspection to make sure



they meet Ampex standards.

Circuit boards are dynamically tested under computer control for the correct output levels, rise and fall times, and board functions compared against a standard board. All input pins on the board are exercised, and all output pins are sensed during this test. The interference pattern of each head is checked on a laser interferometer to make sure it has a specified radius curvature of exactly 18.3 feet across the surface.

The surface of each head is precision lapped to the exact curvature and tolerance required, and a profile analysis performed to assure the correct pole protrusion from the head surface. A detailed test record is kept permanently on file for each head produced.

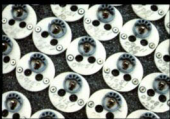
Pitch and roll testing of the head also is performed on a laser tester to assure that the head is properly mounted on the arm assembly. Ampex disk heads are then dynamically tested against

a known standard disk to make sure that read-write and erase circuitry is operating properly, and that the head has the correct output level.

Comprehensive testing

A minimum of eight hours of controller-drive diagnostics are run on each unit following final assembly. Individual disk drives and controllers are subjected to at least 24-hours of burn-in at 125°F to locate potential component failures before final computer testing.

Extensive computer driven tests are run on all drives and controllers using standard IBM or Univac diagnostics as well as special test and checkout diagnostics. In addition, inter-drive compatibility tests are run on all drives for a minimum of three passes to ensure total drive-to-drive compatibility in all systems. Interaction tests also are performed with a full string of drives on each controller. Final quality control testing with IBM or Univac software and diagnostics



is done on an IBM System/370 or Univac 1108 computer. Each Ampex unit receives a minimum of six hours of computer testing before shipment.

Engineering followup

There is a continuing concern with how Ampex disk memory systems operate in the field. A special continuation engineering group keeps a maintenance history for each machine. Failure occurrence patterns noted in the field are relayed to Ampex engineers for immediate

correction. This quick-reaction engineering support assures maximum reliability, performance, and updating in all Ampex disk memory systems.

Ampex service

A worldwide organization of highly trained Ampex customer engineers stands ready to assist with the installation and trouble-free operation of all our disk memory systems. The Ampex field service organization responds quickly—with quality service. They understand the importance

of avoiding down time, and are trained to diagnose and find solutions to customer problems quickly and efficiently. Ampex also offers complete training programs for customer personnel in the operation and maintenance of our equipment.

A-to-Z in memories

In addition to our broad capability in the disk memory field, Ampex also is a major producer of tape, core, and semiconductor memories. We have cross-the-board strength

in every memory technology now in general use in the computer industry. Whether you are an OEM or an End User of computers and peripherals—there's an Ampex core, tape, disk, or semiconductor memory product for you.

