



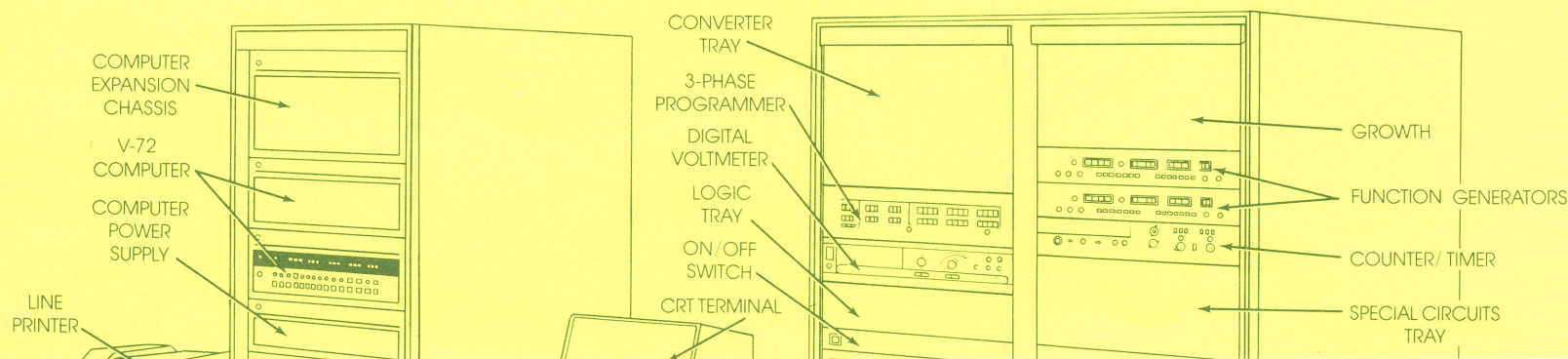




SPERRY  
Automatic Test Equipment

Model 9000





# Sperry's ATE. It meets the test.

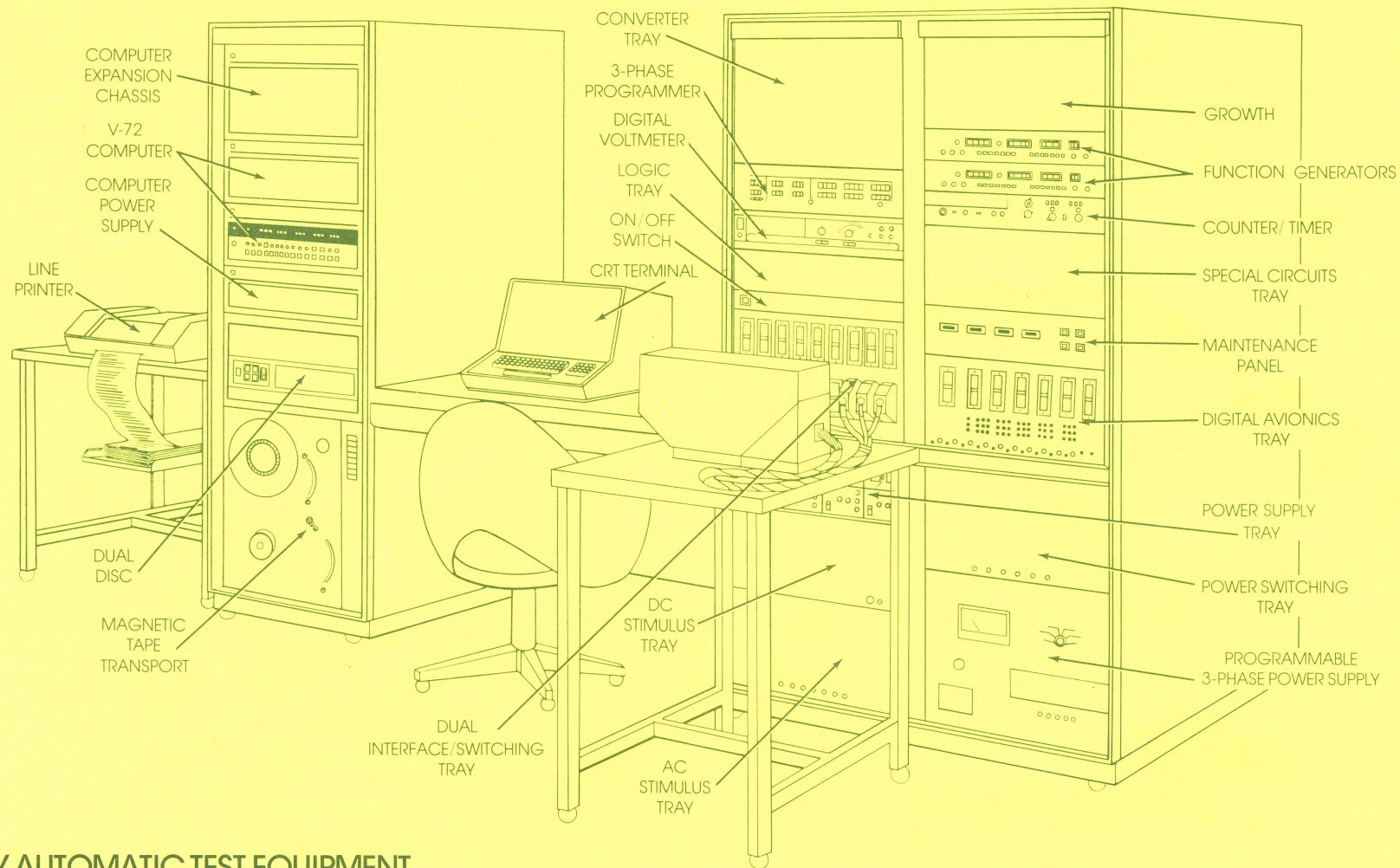
The general-purpose Sperry ATE tests a wide range of sophisticated analog, digital and pneumatic equipment. A time and cost-effective machine, it is designed on a building block concept for add-on capability as test requirements change or expand. In one rugged, versatile package, Sperry's ATE is not only a complete test operations center; it has total capability for on-site test program generation from English or ARINC 416 ATLAS specifications.

The Model 9000 incorporates the full spectrum of features required for developing, editing and operating test programs on complex arrays of avionics, including complete digital testing and compiling

capacity. The low-priced Mini can be expanded to the 9000 by adding trays and peripherals. Both models are backed by Sperry's comprehensive software library, available on a variety of storage devices—disc, magnetic tape or punched tape.

Sperry ATE readout options include instant display at operator's CRT terminal, high speed line printer, thermal printer or Teletype. The Sperry Air Data Test Set, when added to either model, provides a full range of pitot-static pressures and true linear altitude rates under computer control or as a stand-alone station. The entire ATE system is backed by Sperry's worldwide product support network.





**SPERRY AUTOMATIC TEST EQUIPMENT**



## SPERRY AUTOMATIC TEST EQUIPMENT P/N 4027560

Sperry's newest ATE system, Model 9000, contains complete capability for writing, compiling and executing test programs. Its V-72 computer system (16,000-word memory), disc, high-speed line printer, magnetic tape and CRT terminal also comprise a self-contained data processing facility. Several operators will use this capability for transcription (to IBM format) and printout of digital flight data and maintenance recorder tapes.

Test programs in ARINC ATLAS language are written and compiled using the ATE computer and disc storage. The system executive software allows ATLAS program entry and editing via a second CRT terminal while a test program is being executed. Test program segments are normally read into the computer from the dual disc system and executed. Redundancy between dual disc and magnetic tape systems allows program entry by either system in addition to loading of new programs onto the disc from magnetic tape.

Test results are logged on the line printer at 200 lpm., and may also be recorded on disc for later analysis or printout.

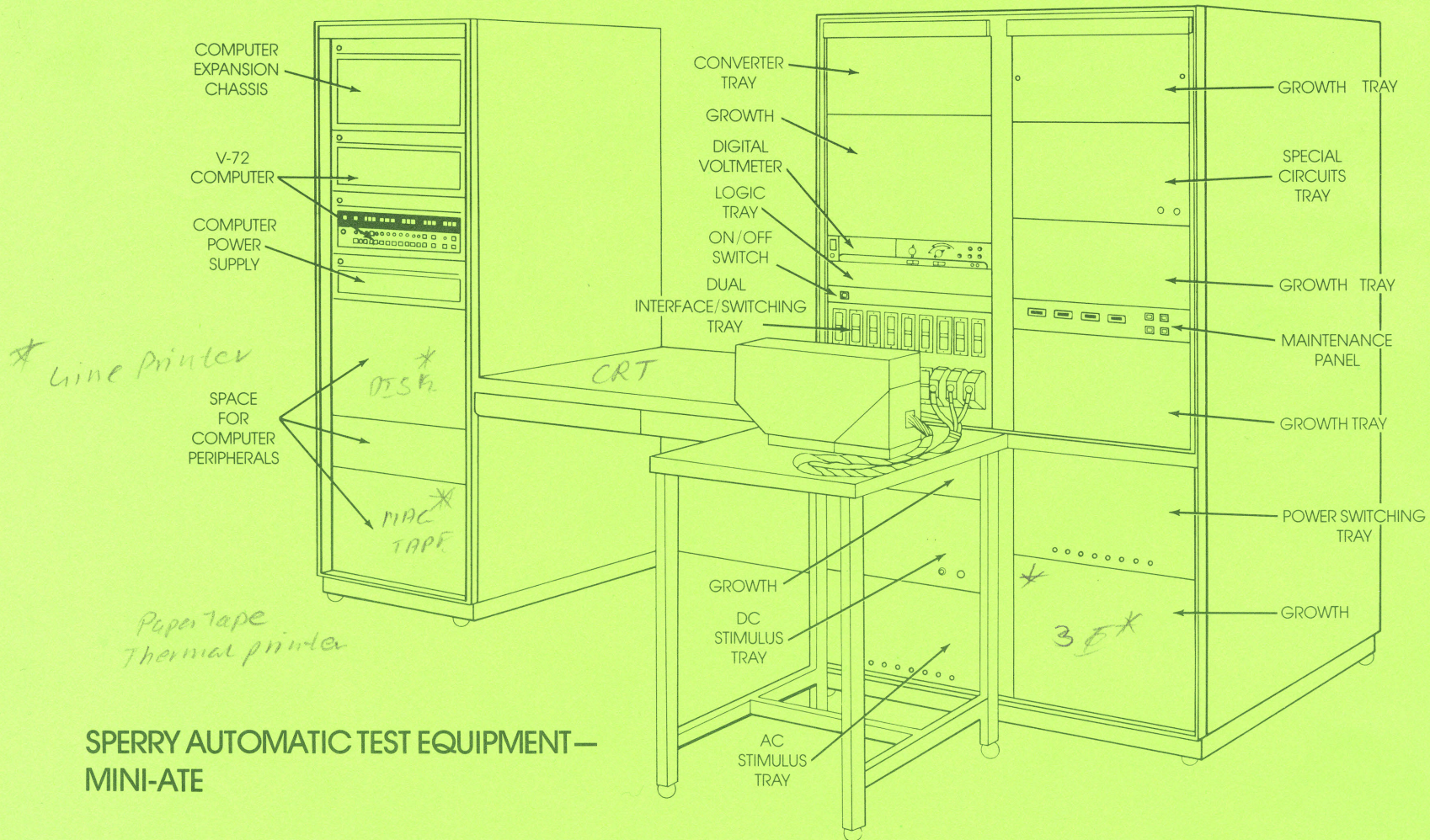
Primary operator interface is the CRT terminal with keyboard. This terminal displays a 2000-character data page which can be completely changed by the computer in two seconds. Test results and operator cues are displayed here during testing, and it also provides a high speed edit function for program editing and debugging.

The Model 9000 contains a full range of programmable devices for automatic testing:

- Six programmable 400 Hz stimuli.
- Eight programmable dc stimuli.
- Five programmable dc power supplies.
- Programmable 3 phase ac power supply.  
(independent amplitude, frequency, phase programming)
- Digital-to-synchro converters (2 each, 14 bits).
- 225 measurement addresses.
- 62 measurement modes.
- Digital Multimeter
- Universal counter/timer/dvm.
- Phase sensitive measurement @ 400 Hz.
- 164 general purpose relays.
- Function generation (sine, square, triangle to 5 MHz).
- Suppressed carrier modulation.
- Complete test point access to UUT interface.
- ARINC 561, 568, 573 and 575 serial digital data buses.
- ASCII bus organization.
- 64-bit TTL-compatible parallel input/output (dc to 2 MHz).
- 128-bit TTL-compatible serial inputs (dc to 2 MHz).
- 16 kilobits of semiconductor buffer storage.

The station software is organized for maximum efficiency in program debugging and UUT fault isolation; three modes of operation are provided: automatic, semiautomatic and manual.





**SPERRY AUTOMATIC TEST EQUIPMENT—  
MINI-ATE**



## SPERRY AUTOMATIC TEST EQUIPMENT— MINI-ATE

The Mini-ATE system is designed for users who require a comprehensive array of analog facilities, selected digital capability, and ample computing power for program debugging and execution. It is modularly expandable to the Model 9000 configuration.

Test programs in machine code are stored on magnetic tape, punched tape or disc (user option), read into the 16K computer memory, and executed. Test results are logged on a line printer (200 lpm.), thermal printer (30 cps), or KSR-35 Teletype.

Primary operator interface is the CRT terminal with keyboard. This terminal displays a 2000-character data page which can be completely changed by the computer in two seconds. Test results and operator cues are displayed here during testing, and it also provides a high speed edit function for program editing and debugging.

The Mini-ATE contains a full range of programmable devices to accomplish analog avionics testing, plus selected digital ca-

pability for the most commonly used industry standards. The following are provided:

- Six programmable 400 Hz stimuli.
- Eight programmable dc stimuli.
- Programmable dc power supply.
- 225 measurement addresses.
- 62 measurement modes.
- Digital multimeter.
- Phase sensitive measurement @ 400 Hz.
- 157 general-purpose relays.
- Suppressed carrier modulation.
- ARINC 561 and 575 serial digital data buses.
- Dual interface /switching tray.
- ASCII bus organization.

The station software provides three modes of operation: automatic, semiautomatic, and manual. These three modes are organized for filter testing, troubleshooting, and program debugging. Sperry's resident software routines provide an extremely efficient low level programming language, backed up by an ATLAS compiler which operates in the Univac 1108 computer.



## PERIPHERALS AND OPTIONS FOR MINI-ATE.

A versatile array of peripherals and optional equipment allows the user to specify the system configuration best suited to his operating environment and objectives. All of these items are accompanied by the appropriate user software packages.

**Dual disc pack**—contains one fixed and one removable disc cartridge, each with 1.12-million words capacity.\*

**Thermal printer**—provides medium speed operator interface and hard copy printout.

**KSR-35 Teletype**—most widely used peripheral for minicomputer applications.

**Punched Tape System**—loads programs through 300 character/sec. tape reader; punches tape at 60 characters/sec.

**Magnetic tape system**—nine-track, 1600 bpi, phase-encoded (IBM-compatible). Used for test program entry and/or disc loading.\*

**Digital plotter/printer**—provides complete digital plotting at 2.2 inches per second, printing at 1000 lines/min. Useful for graphic presentation of flight recorder data.

**Line printer**—200 lines per minute, full 132-column width. Prints up to six copies simultaneously. Recommended where hard copy of all test results is needed.\*

\*This configuration is required for ATLAS compiling.



For full digital capability and special requirements, a full line of add-on instruments and interface hardware is available.

**Digital Avionics Tray**—this tray contains the basic digital test capability of the system, as well as all digital interfaces. Includes the following hardware.

- ARINC 568 and 573 serial data buses.
- 64-bit TTL-compatible parallel output (dc-2MHz).
- 128-bit TTL-compatible parallel input (dc-2MHz).
- 16 kilobits semiconductor buffer storage.

**Function Generator**—programmable sine, square and triangle waves, .001 Hz to 5MHz, with programmable amplitude and dc offset. Provides suppressed carrier modulation of external carrier.

**Counter/Timer/DVM**—measures frequency to 50 MHz, time interval, time interval average, period, and period average. Self-contained DVM provides precise control and measurement of trigger levels, also serves as quick confidence test for main DVM.

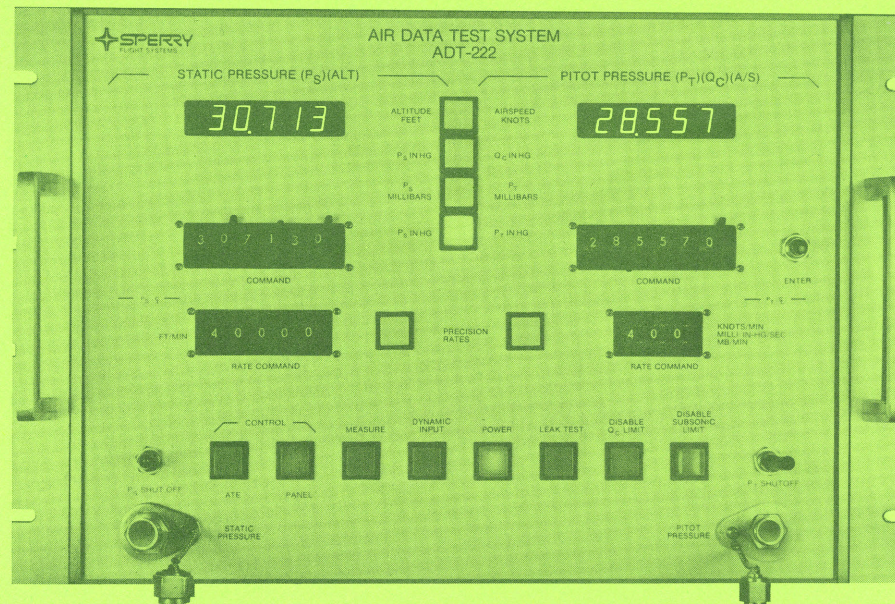
**Special Circuits Tray expansion**—adds digital/synchro converter, synchro/digital converter, four programmable dc power supplies.

**Programmable ac power supply**—a 1500 VA 3 phase supply which is programmable in frequency, amplitude, (each phase independently), and phase.

**230 VAC Power Supply package**—allows operation of the station from 230V. Operators with 50 Hz power should order ATE 4027560-903.

**Air Data Test Set**—provides complete high speed pneumatic test capability when used in conjunction with the Model 902 Mini-ATE. Also operates as a stand-alone tester in manual mode.





## SPERRY AIR DATA TEST SYSTEM

The Sperry Air Data Test System (ADT-222) offers the avionics industry a new standard of stability, ruggedness, and programming speed. The sensor used is the Sperry vibrating diaphragm pressure sensor, a direct pressure-to-frequency converter. A self-contained digital processor converts the sensor output to engineering units (inches of mercury, millibars, feet, knots) for front-panel display and comparison with the commanded pressure (from ATE or front panel). The error signal is used to control a servo-valve which regulates the pitot or static pressure being supplied to the unit under test.

For automatic testing, the ADT-222 is connected to the Model 9000 or Mini-ATE, and receives com-

mands from and supplies pressure data to the ATE; all communication is effected via an eight-bit ASCII data bus. The ADT-222 processor protects against programming errors which call for negative or supersonic  $q_c$  values (these protection features are controlled by front-panel switches on the ADT-222).

As a stand-alone manual test set pressure, altitude or airspeed commands are entered via thumbwheel switches on the ADT-222 front panel. A unique feature provided by the self-contained digital processor is the ability to enter altitude rate and airspeed rate commands with 1% and 2% accuracies, respectively. A sine wave pressure output (to 1.5 Hz) can also be generated by an external reference voltage.







## SOFTWARE LIBRARY

### DC-10

Pafam Display Unit	Honeywell
Pafam Display Electronics Unit	Honeywell
Pafam Computer	Honeywell
Air Data Computer	Honeywell
Flight Data Acquisition Unit	Hamilton Standard
Flight Data Entry Panel	Hamilton Standard
Flight Data Recorder	Hamilton Standard
Flight Data Acquisition Unit	Teledyne
Flight Data Recorder	Teledyne
Performance & Maintenance Recorder	Teledyne
Pitch Computer	Bendix
Roll Computer	Bendix
Yaw Computer	Bendix
APT	Bendix
MALU	Bendix
FMA	Bendix
Temp Zone Controller	Garrett
Pack Temp Controller	Garrett
Pneumatic Control	Garrett
AC Bus Control	Westinghouse
Compass Coupler	Sperry
Autothrottle/Speed Control	Sperry
ELF/FL Programmer	Sperry
AMSU	Sperry
Vertical Gyro Base	Sperry
Thrust Rating Computer	Sperry
Thrust Rating Computer Cards	Sperry
Ground Proximity Warning Computer	Sunstrand
Cabin Aural Warning Unit	Actron
Cabin Pressure Controller	Airesearch
Accessory Power Unit Controller	Airesearch
Antiskid Control	Goodyear

### 747/747SP

Pitch Computer	Sperry
Roll Computer	Sperry
Flight Controller	Sperry
Monitor and Logic Unit	Sperry
Auto. Stab. Trim Unit	Sperry
Landing Coupler	Sperry
Compass Coupler	Sperry
Zone Temp Controller	Hamilton Standard
Pack Temp Controller	Hamilton Standard
Yaw Damper	Bendix
Autothrottle	Bendix
C. A. D. C.	Bendix
Fuel Flow	EDC
Cabin Pressure Controller	Hamilton Standard

### L-1011

Air Data Computer	Sperry
Inst. Comparison Monitor	Sperry
Vertical Gyro Base	Sperry
Compass Coupler	Sperry
Flight Data Acquisition Unit	Teledyne
Flight Data Recorder	Teledyne
Pitch Computer	Collins
Roll Computer	Collins
Yaw Computer	Collins
Trim Aug. Computer	Collins
Speed Control Computer	Collins
FCES Computer	Collins
Zone Temp Controller	Hamilton Standard
Pack Temp. Controller	Hamilton Standard
Temp Control Test Module	Hamilton Standard
Cabin Pressure Controller	Hamilton Standard
APU Electronics Control	Hamilton Standard



## 727

Pitch Computer	Sperry
Roll Computer	Sperry
Yaw Damper Coupler	Sperry
Air Data Computer	Sperry
Air Data Computer	Honeywell
Altitude Select Controller	Sperry
Control Panel	Sperry
Pressure Controller	Hamilton Standard
Flight Director Computer (Z-5)	Sperry
Flight Director Roll Channel (Z-14)	Sperry
Flight Director Pitch Channel (Z-14)	Sperry
Inst. Comparator Monitor	Sperry
Compass Coupler	Sperry
Inst. Amplifier Rack	Sperry
Flight Director Computer (Z-15)	Sperry

## 737

Pitch Computer	Sperry
Roll Computer	Sperry
Yaw Damper Coupler	Sperry
Mach Trim Coupler	Sperry
Air Data Computer	Honeywell
Altitude Select Controller	Sperry
Pressure Controller	Hamilton Standard
Compass System Rack	Sperry
Flight Director Computer (Z-5)	Sperry
Flight Director Roll Channel (Z-14)	Sperry
Flight Director Pitch Channel (Z-14)	Sperry
Inst. Comparator Monitor	Sperry
Inst. Amplifier Rack	Sperry

## 707

Mach Trim Coupler	Bendix
Yaw Damper Coupler	Bendix
PB-20 Amplifier Computer	Bendix

## DC-9

Pitch Axis Computer	Sperry
Roll Axis Computer	Sperry
Air Data Computer	Sperry
Stab. Aug. Computer	Sperry
Altitude Preselect Coupler	Sperry
Flight Director Computer (Z-5)	Sperry
Flight Director Roll Channel (Z-14)	Sperry
Flight Director Pitch Channel (Z-14)	Sperry
Inst. Comparator Monitor	Sperry
Inst. Amplifier Rack	Sperry

## DC-8

Pitch Channel Computer	Sperry
Roll Channel Computer	Sperry
Yaw Channel Computer	Sperry
Altitude Preselect Coupler	Sperry
Air Data Computer	Sperry
Flight Control Computer	Sperry
Flight Director Computer (Z-5)	Sperry
Flight Director Roll Channel (Z-14)	Sperry
Flight Director Pitch Channel (Z-14)	Sperry
Inst. Comparator Monitor	Sperry
Inst. Amplifier Rack	Sperry

This is a partial list of software developed for Boeing, Douglas and Lockheed airplane avionics. Additional applications will be made available upon request.





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