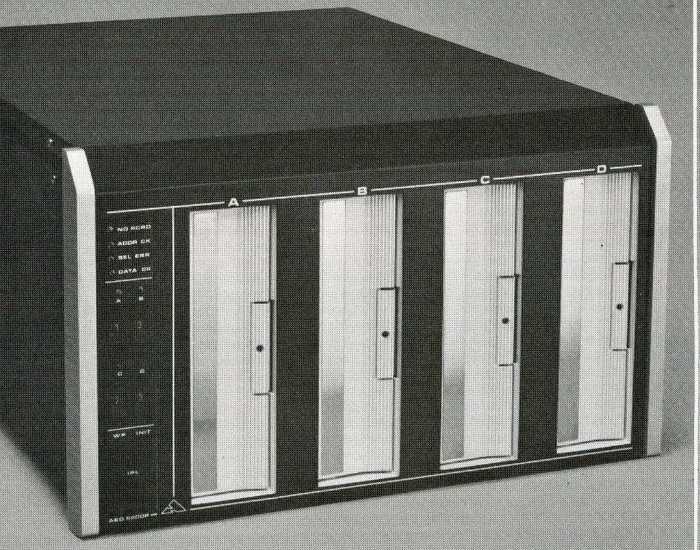
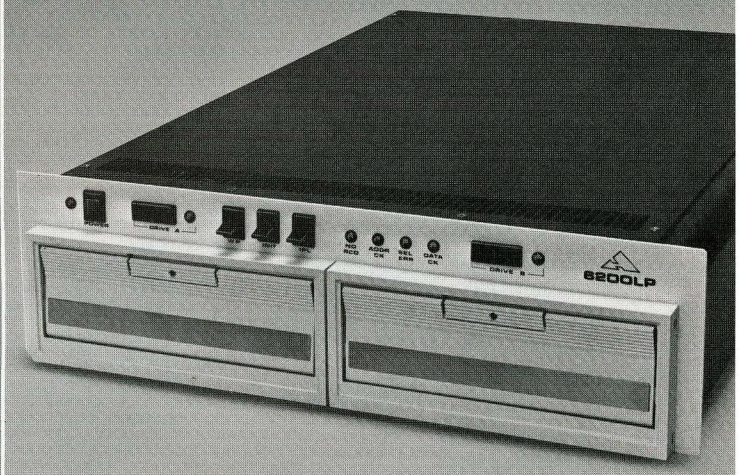
AED 6200 Series

Double density, two sided floppy disk subsystems

AED 6200P
single head, four drives



AED 6200LP
single head, two drives



AED 6200LS
single head, two drives

AED 6200LD & 6200LD/2
dual head, four drives

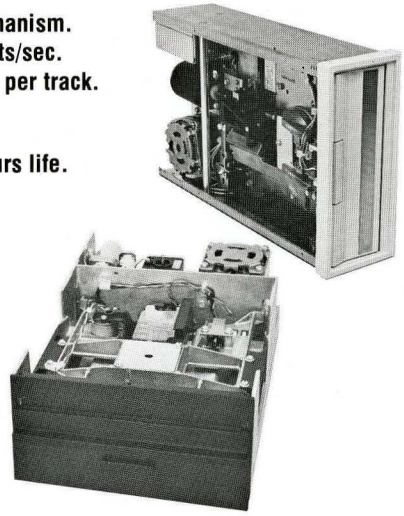
Diskettes

- Diskettes are the type used with the IBM 3740 and 3600.
- 77 tracks per diskette.
- From 1 to 210 sectors per track (programmable).
- From 20,400 bytes to 2 bytes per sector (programmable).
- Up to 785,400 bytes per diskette side.
- Both sides of diskettes usable.
- Soft errors—10^{-9}.
- Hard errors—10^{-12}.
- Life—over 5×10^6 passes per track.

The AED Diskette is the type used with the IBM 3740 and 3600 data systems; however, the data is stored at twice (double) the denisty of the IBM data. By doubling the density, over twice the storage capacity per diskette is achieved compared to the IBM 3740 and 3600. Diskettes are protected in accordance with ANSI recommendations. Programs and data may be stored on both sides of the diskette, thereby more than quadrupling the storage capacity compared to the IBM formatted diskettes. Each AED Diskette is certfied to be free from defects and obtaining the diskette from AED assures the user that the data is properly stored and reliably preserved. The AED 6200 System warranty assumes that AED certified diskettes only are used.

Single & Dual Head Drives

- Ferrite ceramic head.
- Independent seek mechanism.
- Transfer rate—500K bits/sec.
- Access—3, 8 or 11 ms per track.
- Latency—167 ms per revolution.
- Head Life—20,000 hours life.
- MTBF—10,000 hours.
- MTTR—.5 hour.
- Both 60 and 50 Hz drive motors available

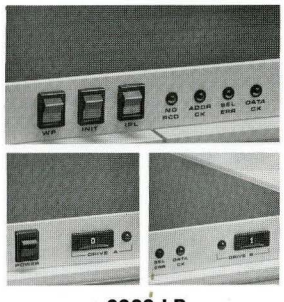


The AED 6200 single head drive reads and writes double-density data on IBM type diskette media. Closing the spring-loaded front door panel engages the floppy disk and the drive mechanism which rotates the media at a constant 360 rpm. A DC stepper motor drives a precision lead screw which positions the read-write head at 8 or 11 milliseconds per track. MFM recorded data is transferred between the head and the media in bit serial form at 500,000 data bits per second. For additional long life, the drive has a ferrite ceramic READ/WRITE head. Up to 4 completely independent floppy disk drives fit in a single AED 6200P cabinet. Up to 2 drives fit in a 6200LP or 6200LS cabinet. The user may flip the diskette over in order to store additional data on the reverse side.

The AED 6200 dual-head floppy disk drive utilizes the same type of IBM 3741 diskette media as the single head drive, except that this drive has one head on each side of the media to directly transfer up to 1,261,568 bytes of data. A stepper motor simultaneously positions both heads across 77 cylinders at 3 milliseconds/cylinder. The drive motors are available in any of four combinations of 115 or 230 Volts AC and 50 or 60 Hertz. Horizontal orientation provides easy access for mounting and demounting the diskettes.

Control Panels

- Status Indicators Aid Diagnostics.
- Selectable Drive Addresses.
- Initialize Under Programmable Format Control.
- IPL for Quick Restarts.
- Write Protect Drive 0 Diskette.



6200 LP

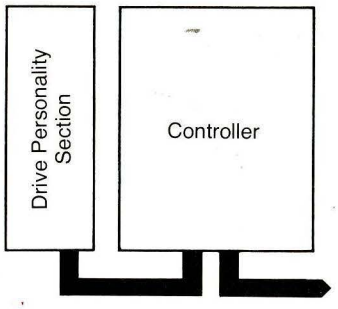
6200 P

6200 LS and 6200 LD

These panels combine control functions with status indicators. One Light Emitting Diode (LED) with each unit select switch indicates which drive was last accessed and also that the DC power supply is functioning. The unit select switches permit drive A, B, C, and D to be designated units 0, 1, 2, or 3 on a mutually exclusive basis. The status indicators are never on except when the operator or the hardware has caused an error. The INIT switch permits the Formatter to accept the INITIALIZE command from the host system and allows address marks to be written on the disk. Lifting the WP switch protects Drive "0" from any WRITE function. An attempted WRITE into protected Drive "0" will cause a Write Protect Error.

The IPL switch, which must be activated by hand, automatically selects Drive 0, moves the head to Track 00 and waits for Sector 00. The drive then reads Sector 00 to verify address and data. When verification is complete the data moves through the DMA interface into computer memory. The computer then has the intelligence necessary to request more data in order to complete the bootstrapping operation.

Formatter & Drive Electronics



- **Double Density MFM Recording.**
- **Programmable Formatter.**
- **Format compatible with all Minicomputer Operating Systems.**
- **Separate Drive Electronics.**
- **Two Byte CRC.**
- **Read Before Write Address Verification.**

The AED 6200 Formatter electronics and four-drive electronics modules are on two printed circuit boards. The Formatter is under program control of the host CPU, thus permitting diskettes to be initialized appropriate to the application. For example, the host operating system can reside on a diskette with 16 sectors per track, (256 16-bit words per record) while data can reside in other drives which contain diskettes with unlike formats. The Formatter also includes the Cyclical Redundancy Check (CRC) circuit, clocking, and the Initial Program Load (IPL) circuit. The Drive Board contains independent electronics for Drives A, B. C, and D. Address verification is performed by the Drive Electronics after the respective head has reached the appropriate track and sector, but prior to data transfer.

Formatter

To calculate maximum number of sectors per track or maximum number of bytes per sector;

$$S = \text{Sectors per track} = \frac{10{,}259}{N+44.5} \qquad \text{or } N = \text{bytes per sector} = \frac{10{,}259 - 44.5S}{S}$$

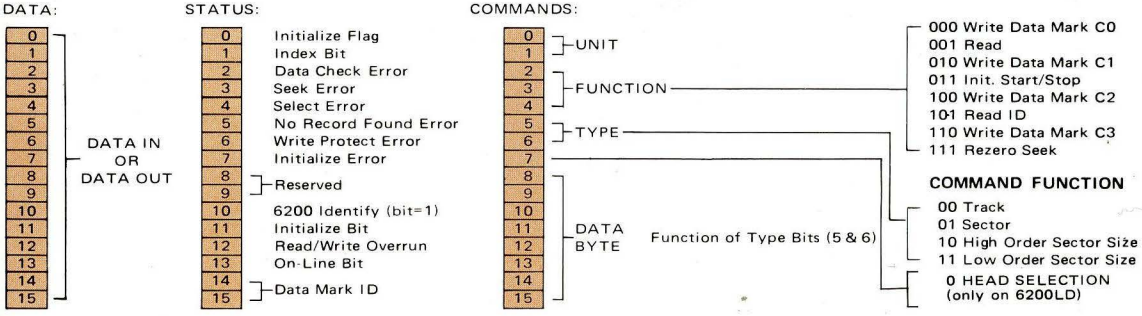
An expanded formula equation must be used for formats with greater than 313 bytes per sector.

EXAMPLE FOR AED 6200LD with dual head and double density*

Sectors/track (typical)	1	2	4	8	16	32	55	210
Bytes/Sector	20,400	10,000	4,920	2,048	1,024	512	256	4
Bytes/side	785,400	770,000	757,680	630,784	630,784	630,784	502,075	32,340
Bytes/diskette	1,570,800	1,540,000	1,515,360	1,261,568	1,261,568	1,261,568	1,004,160	64,680

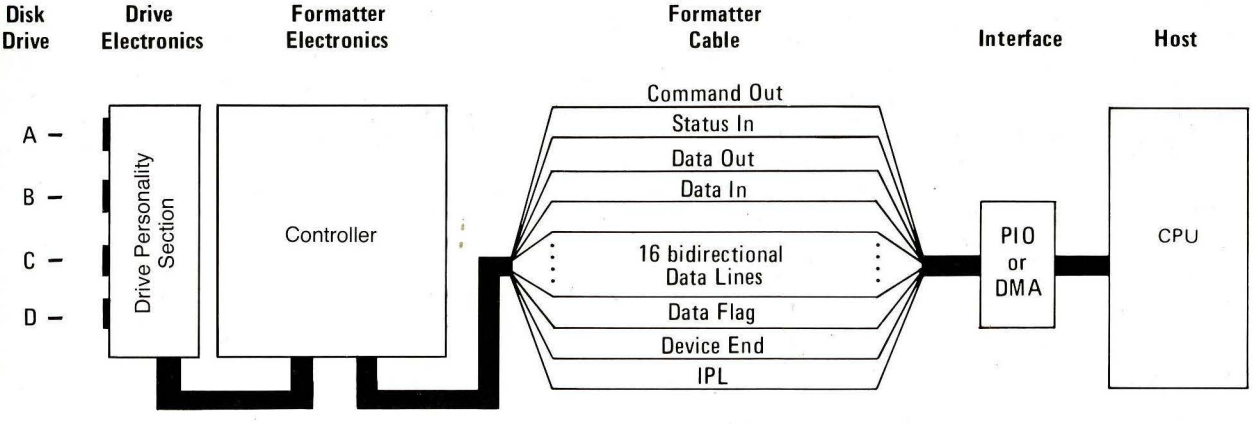
NOTE: The AED 6200 with a single head and double density would provide half the number of bytes shown.

REGISTERS



Software Drivers are also available for the AED 6200 Series

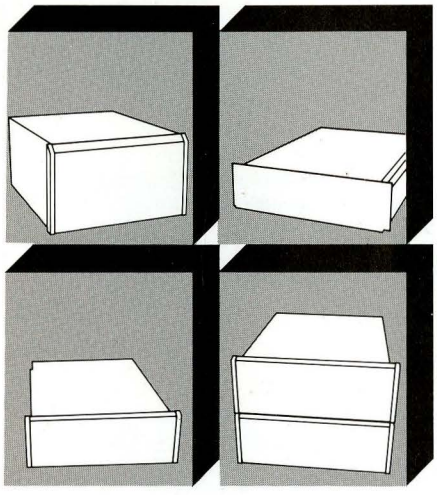
Interfacing

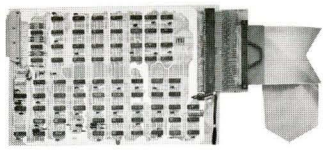


Formatter Cable – 23 signals

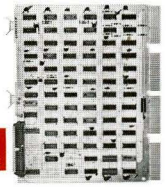
AED provides interfaces for all popular minicomputers

Types of interfaces:—
DMA—Direct Memory Access
PIO—Programmed Input Output
MUX—Multiplexer Channel
SELCH—Selector Channel
B.I.C.—Burst Interlace Control

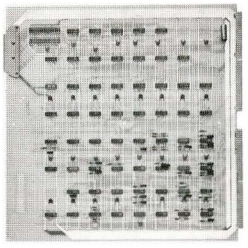




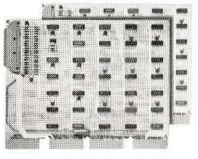
PDP-11
(DMA)
Unibus®



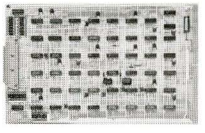
PDP-11/03
(DMA)
LSI-11



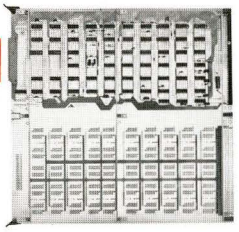
NOVA/Eclipse
(DMA)



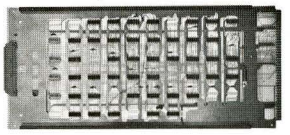
PDP-8E
(P10 & DMA)



Varian 620
V73
(B.I.C.)



Interdata
70's, 7/16,
7/32 & 8/32
(MUX or SELCH)



Alpha-16

Kit

Your Own
Interface

Other Interfaces
The user can obtain sufficient information from AED to design an interface or, if the quantities warrant the design, AED will develop special interfaces for customers.

Specifications

	AED 6200LD or LS		AED 6200LP		AED 6200P			
DRIVES	**A**	**B**	**A**	**B**	**A**	**B**	**C**	**D**
VOLTAGE (AC):	Either 110-130 or 220-260		Either 110-130 or 220-260		Either 110-130 or 220-260			
AMPERES @ 115V AC:	2.0	2.3	2.0	2.3	2.0	2.3	2.7	3.0
@ 230V AC:	1.0	1.2	1.0	1.2	1.0	1.2	1.4	1.5
LINE FREQUENCY	Either 50 or 60 Hz ±0.1%		Same		Same			
WEIGHT:	46 lbs 21 kg	60 lbs 27 kgs	42 lbs 19 kg	56 lbs 25 kg	46 lbs 21 kg	60 lbs 27 kg	75 lbs 34 kg	89 lbs 40 kg
CABINET SIZE:	7″H x 16.8″W x 22″D 17.83cmH x 42.7cmW x 55.9cmD		5.25″H x 17.7″W x 25.0″D 13.3cmH x 45.0cmW x 63.5cmD		10.5″H x 16.8″W x 21.6″D 26.7cmH x 42.7cmW x 54.8cmD			

OPERATING LIMITS: TEMPERATURE: 50°F-100°F (10°C-38°C) ALTITUDE: −500 ft. to 10,000 ft. (−152m to 3048m)
RELATIVE HUMIDITY LIMITS: 20% to 80% with a maximum wet bulb temperature at 78°F (25°C)

Options

Drive electronics and formatter logic are included in the basic AED 6200LD, LP, LS or P; however, sufficient power and space are available to add up to four floppy disk drives—A, B, C & D in the AED 6200P cabinet. The AED 6200LP & LS cabinets will also receive Drives A and B. The AED 6200LD/2 provides mounting space, address switches and status indicators for drives C and D, and receives its logic from the AED 6200LD cabinet.

AED Diskettes

One diagnostic diskette is provided with the AED 6200 Series if AED provides the interface. Additional diskettes, including the protective envelopes, may be ordered from AED on an economical annual purchase agreement. Specially formatted diskettes (1 or 2 sides) are also available in sufficient quantities.

Chassis Slides

The basic AED cabinets are equipped with rubber feet for table top mounting. The optional chassis slides include mounting hardware and a set of slides for mounting the AED cabinet in a RETMA Standard Rack with front-to-back mounting bars on 24 inch (61 cm) centers. Deeper racks or DEC racks require chassis slide extenders which are included with the slides.

Interface

Direct Memory Access, Programmed Input/Output, Burst Interlace Controller, and Multiplexer/Selector Channel Interfaces for various computers, microprocessors, intelligent terminals, and programmable calculators are available for the AED 6200 Series.

Interface Kit

The user may wish to design the interface. An AED 6200 Series Interface Kit is available and includes power cables, a 6 ft. (183 cm) formatter cable, connectors, and a printed circuit board 8¼ in. × 12¼ in. (21 cm × 31 cm) which fits into the AED 6200 cabinets. The user can add IC sockets and pins, then wirewrap the interconnections.

Special Interface Cables

Interfaces which plug into the host computer are provided with a 6 ft. (183 cm) Formatter Bus Cable. Longer formatter cables are available at extra cost. For those interfaces which mount inside the AED cabinets, special computer cables, such as the UNIBUS®, are available at extra cost.

Extender Cables

An Extender Cable is available for servicing the drive outside the AED cabinet. Signal and DC power lines and connectors are included with this cable.

SOFTWARE

Each AED 6200 System provided with an AED Interface, includes a Floppy Disk with Diagnostics. Documentation, including program listings and instructions for use are included. Software Drivers, compatible with computer manufacturers' Operating Systems, are available at extra cost for a variety of computers.

WARRANTY & SERVICE

The AED 6200 Series and Options are guaranteed to be free from defects in workmanship, materials or design for a period of 90 days from date of invoice. During this warranty period the buyer ships the malfunctioning part or system to Advanced Electronics Design, Inc. freight collect. We repair it and return it to the buyer freight collect. AED-paid freight costs apply only to the 48 contiguous states and Canada. Outside this area round-trip freight costs are paid by the buyer.

TERMS

Subject to prior credit approval, AED invoices must be paid within 30 days of issue. Invoices are issued on the same day or next working day following shipment. If prior credit approval is lacking, terms will be payment in advance, COD or irrevocable letter of credit. Quantity discounts require a fully released, acknowledged purchase order, or mutually signed quantity discount agreement. Bill-back and termination, or rescheduling penalties are shown on the quantity discount agreement.

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COMPUTER PERIPHERALS DIVISION

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