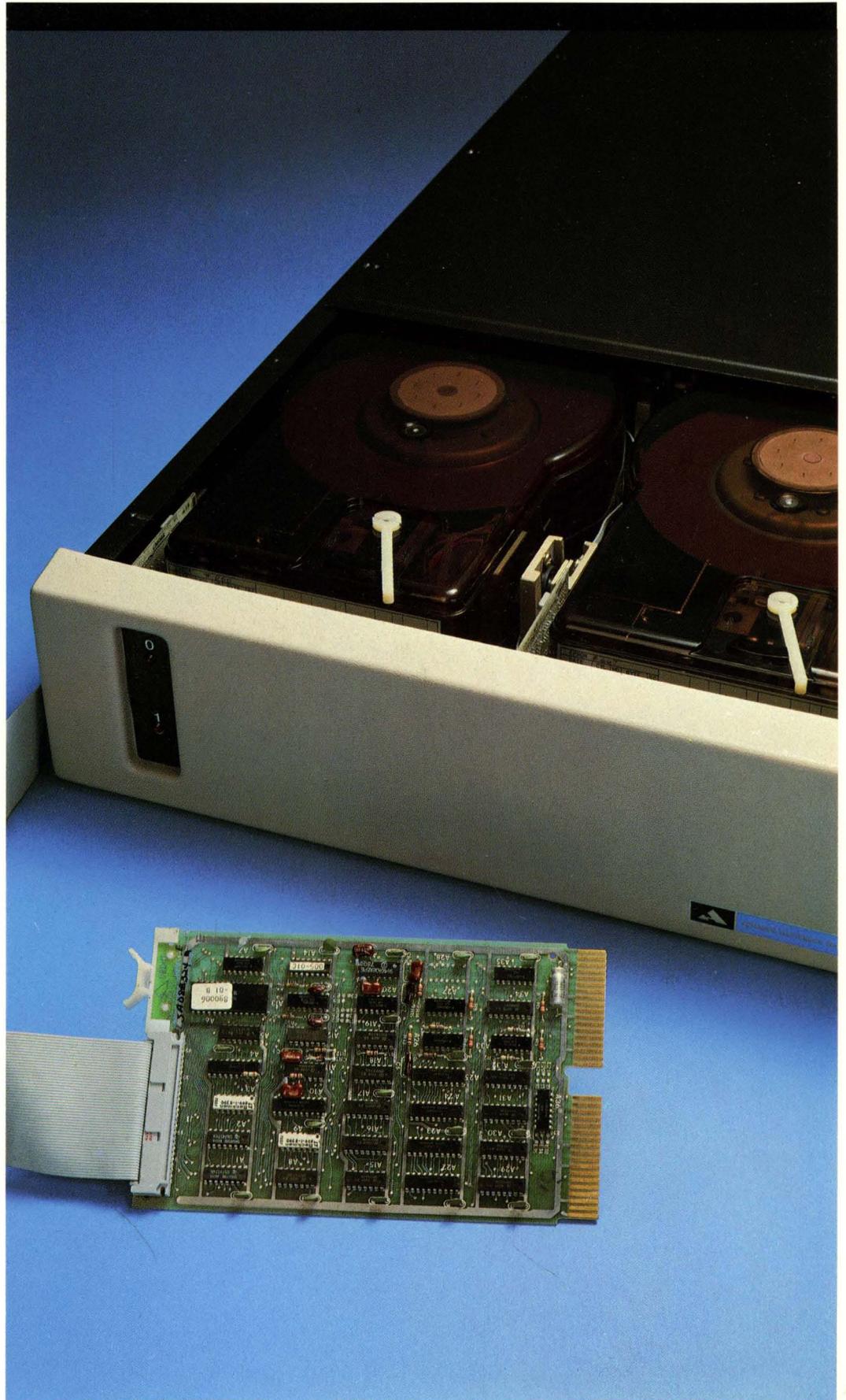
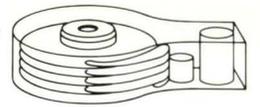


WINC08

RL02 emulation
utilizing 8"
Winchester
technology



 **ADVANCED
ELECTRONICS
DESIGN, INC.**

Advanced Electronics Design's WINC08 controller provides DEC users with a cost-effective, software-compatible method of adding new, 8-inch Winchester technology storage to their PDP-11 or LSI-11 computer systems.

The WINC08 accommodates two 8-inch Winchester drives providing a total system capacity of up-to-41.6 megabytes (formatted). With a usable storage capacity of 10.4 or 20.8 megabytes per drive, disk storage is directly equivalent to that of one, or two, RL02 drives. In addition, the firmware residing in the WINC™ controller emulates the RL02. This combination of direct storage capacity equivalence and firmware emulation assures complete software transparency with both the DEC RT-11 and RSX-11M, RL02 device drivers.

The WINC08 Controller is available from AED as an extremely compact, 5¼-inch high rack-mountable package. Enclosed in a DEC 'look-a-like' cabinet, this package comprises two 8-inch Winchester drives (standard), or if preferred, a combination of one Winchester drive and one 8-inch floppy disk drive. This makes the WINC08 Controller especially attractive for the DEC user, where application requirements call for large capacity disk storage together with small physical size.

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WINC08 PROVIDES ECONOMICAL WINCHESTER CAPABILITY FOR BOTH PDP-11 AND LSI-11 USERS

The WINC08 is unique in its utilization of dual 8-inch Winchester drives to emulate DEC's RL02 drives. Because the Winchester drives feature in a sealed Head Disk Assembly module, they are impervious to contamination from the external environment. This precludes head crashes normally caused by dirt and dust particles.

Operating in a sealed environment also allows greater head-to-disk surface proximity than could be achieved by previous technologies. This proximity directly contributes to both higher data-bit and track densities, giving users a more cost effective storage solution.

Additionally, the Winchester drives utilize a special low-mass head, aerodynamically designed to fly on an air bearing 19-20 micro-inches above the disk surface with a loading force of just 10 grams. While the disk remains idle, or during start/stop, the low-mass head rests on a lubricated landing zone. During shipment of this drive unit, a unique head locking mechanism secures the head-actuator assembly.

The combination of a fixed media plus the elimination of intricate head load/unload devices provided by Winchester technology, greatly reduces the need for the type of mechanical complexity associated with removable media. These factors also contribute to the increased reliability of your disk system while eliminating the need for expensive preventive maintenance.

ADVANCED MICROPROCESSOR ARCHITECTURE IMPROVES SYSTEM RELIABILITY BY REDUCING COMPONENT COUNT

The WINC08 Controller is a state sequential machine based on a bipolar microprocessor. The design of the controller emphasizes functional efficiency by utilizing a horizontally structured microprocessor architecture. Maximizing the microprocessor's functionality in this way minimizes the amount of hardware support logic required on the controller board. Minimum support logic means fewer components. Fewer components mean greater system reliability.

THE WINC08 IS COMPLETELY SOFTWARE TRANSPARENT TO YOUR DEC SYSTEM

Because the WINC08 Controller is functionally equivalent to the DEC RL02 it is completely DEC software transparent, allowing you to run either RT-11 or RSX-11M without the need or concern for software modifications.

This software transparency is achieved by two fundamental WINC design features:

- 1) The WINC firmware has been designed specifically to emulate the RL02 disk system.
- 2) The dual 8-inch Winchester drives controlled by the WINC08 have RL02-compatible formats with individual capacities of either 10.4 megabytes or 20.8 megabytes per drive (11.7 or 23 per drive, unformatted).

Depending on your choice of drive configuration, the formatted capacities are equal to one or two RL02 drives and allow maximum storage utilization of the dual 8-inch Winchester drives.

The WINC08 also offers the PDP-11 or LSI-11 user the extra versatility to expand his system to a total storage capacity of 41.6 megabytes—equal to, and software compatible with, a fully-expanded DEC RL02 system having four

disk drives. (The AED package occupies just 5½ inches of rack height whereas the DEC RL02 equivalent would occupy 42 inches of rack height.)

COMPACT 5¼" HIGH PACKAGE PROVIDES BOTH RL02 AND RX02 EMULATION

The WINC08 is available from AED in a 5¼-inch high enclosure appropriate for either rack mounting or table top application. The enclosure is a self-contained unit accommodating the WINC08 Controller and either one or two 8-inch Winchester drives. An alternative configuration, for LSI-11 users only, allows the substitution of the second 8-inch Winchester with an 8-inch floppy disk drive. This floppy disk drive, when attached to the AED FLEX-02 Controller, provides emulation of the RX02 with the added benefit that its dual head allows storage on both sides of a diskette for a total storage capacity of 1 megabyte per diskette. Thus in a single 5¼-inch high package you can achieve emulation of both the RL02 and RX02.

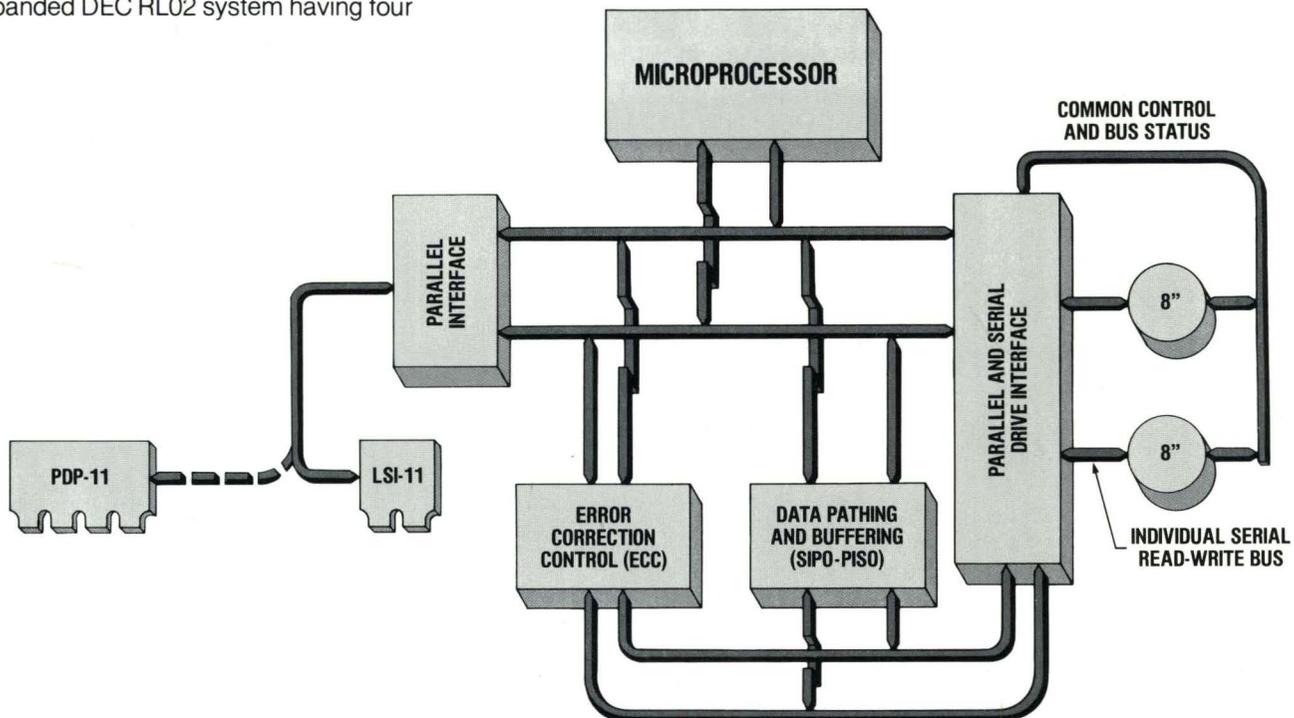
WINC08's SELF-DIAGNOSTIC CAPABILITY REDUCES NEED FOR FIELD MAINTENANCE

The WINC firmware supports a unique diagnostic self-test capability. This diagnostic self-test feature checks for the proper operation of all major function blocks of the controller, in system, and is invoked each time the host CPU issues a bus INIT (RESET). Should an error be detected, the appropriate status code will be instantly displayed by the controller's on-board LED array, indicating which function block has failed.

In addition, the implementation of the WINC08 design minimizes both the unit component count and system interconnections. In consequence, the inherent reliability of your total disk system is improved.

90-DAY WARRANTY

All AED computer peripherals carry a 90-day warranty against defects due to workmanship and design. Within the 48 contiguous States and Canada, the customer sends the malfunctioning unit freight collect; AED repairs it at no cost to the customer and returns it freight collect. Outside this area the customer pays the round-trip freight costs.



WINC08 FUNCTIONAL BLOCK DIAGRAM

System Specifications

General

Design	Microprocessor based, utilizing high-speed bipolar technology.
Software	Transparent with standard RL02 software drivers.
Buffer Memory	256 byte buffer provides intermediate storage of disk data.
Error Correction	24 bit Error Correction Code appended to data field of each sector. Allows correction of errors 5 bits in length.
Maintainability	Self-test diagnostic, 8 bit LED display for assistance in fault isolation.

LSI-11 Interface

Device Address	774400 ₈ standard
Interrupt Vector	160 ₈ standard
Interrupt Priority	Level 5, fixed
Card Size	Dual width card, compatible with any standard Q-Bus card slot.

PDP-11 Interface

Device Address	774400 ₈ standard; user selectable from 760,000 thru 777,770
Vector Interrupt	160 ₈ standard; user selectable from 000 thru 374 ₈
Interrupt Priority	Level 5 standard; use selectable from 4 thru 7
Card Size	Quad width card, compatible with standard UNIBUS [®] SPC Slot.

Environmental

Temperature	
Operating	41° thru 113° F (5° thru 45° C)
Non-Operating	-40° thru 140° F (-40° thru 60° C)
Humidity	20% thru 80% R/H
Altitude	10,000 ft. (3000m) or below.

Chassis

Size	5.25" H x 17.62" W x 26.5" L
Weight: Single drive	40 lbs.
Dual drive	55 lbs.

Power

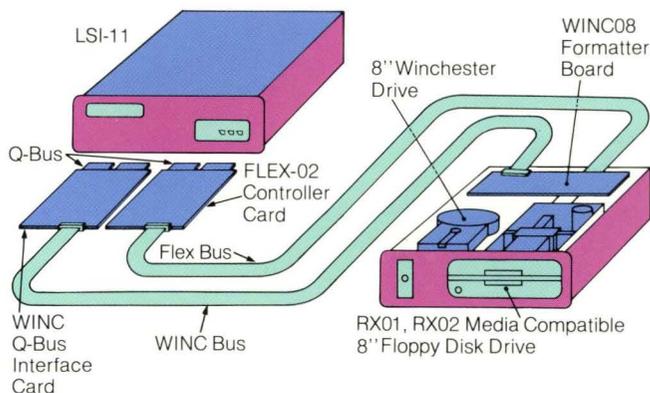
(maximum consumption)	System Configuration	
<i>Input Voltage Range</i>	<i>Single Drive</i>	<i>Dual Drive</i>
105 thru 125 VAC	157 watts	248 watts
50 thru 60 Hz, Single Phase	1.19 Amps	1.83 Amps
210 thru 230 VAC	78.5 watts	124 watts
50 thru 60 Hz, Single Phase	0.60 Amps	0.92 Amps

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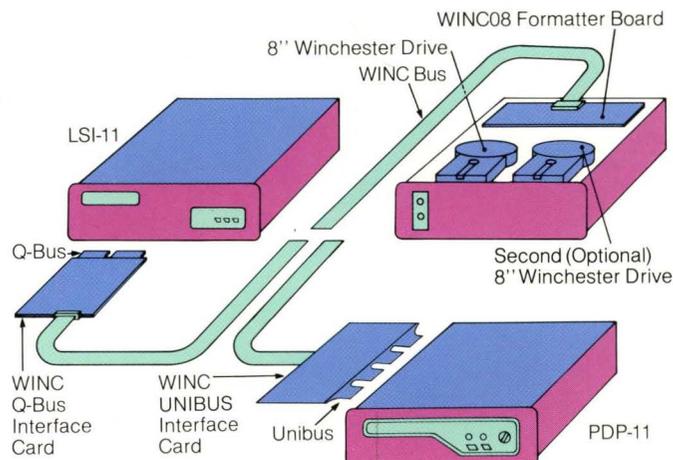
Drive Characteristics

	11.7 Mbyte drive	23.4 Mbyte drive
Total Formatted Capacity	10.4 Mbyte	20.8 Mbyte
Mapping Emulation	1 ea. RL02	2 ea. RL02
Number of Platters	2	4
Number of Heads:		
R/W	4	8
clock	1	1
Number of Cylinders	244	244
Tracks/Cylinder	4	8
Sectors/Track	42	42
Bytes/Sector	256	256
Recording Density	6100BPI	6100BPI
Recording Method	MFM	MFM
Transfer Rate	593 KB/s	593 KB/s
Track Density	195 TPI	195 TPI
Rotational speed	2964 RPM	2964 RPM
Average Rotational Latency	10.1 MS	10.1 MS
Positioning Time:		
minimum	30 MS	30 MS
average	70 MS	70 MS
maximum	140 MS	140 MS

For LSI-11 Users



For PDP-11 or LSI-11 Users



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