THE DEC® COMPATIBLE WINCHESTER/FLOPPY DISK **SYSTEM** 



- An eight-inch winchester and an eight-inch floppy disk in a single compact package.
- Winchester emulates the popular DEC RL01 and floppy emulates the DEC RX02
- for DEC system software compatibility.

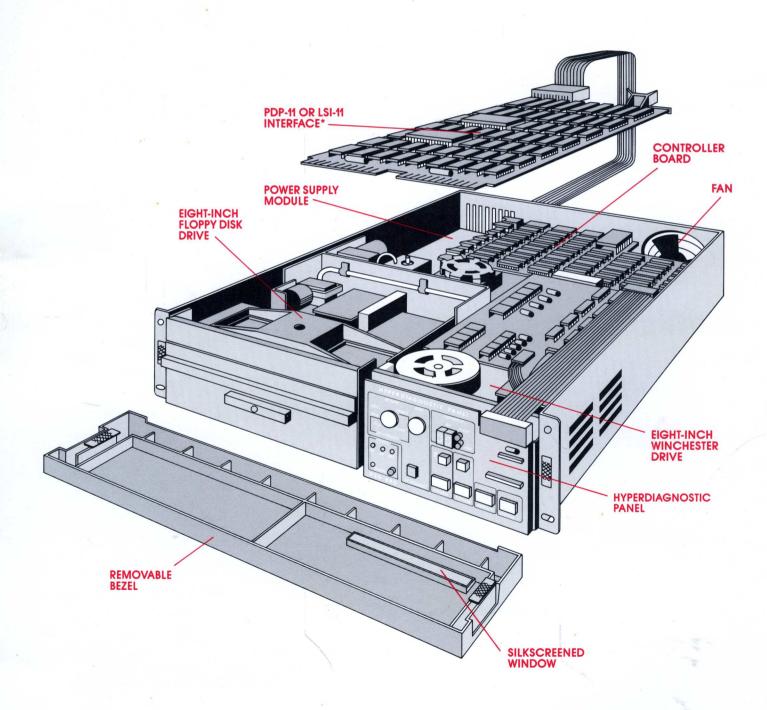
   Powerful on-board diagnostic capability and modular construction provide low downtime and low maintenance costs.
- An innovative product for applications requiring compact disk storage.

# THE DSD 880: AN RL01 AND AN RX02 IN A 51/4-INCH PACKAGE

For those DEC users who need more capacity and speed than an RX02 and whose application does not require a dual RL01–DSD provides the intelligent alternative for disk storage needs; THE DSD 880.

In a single compact package, the DSD 880 includes an eight-inch winchester disk drive and an eight-inch floppy disk drive. The winchester drive emulates an RL01 (5.2 Mbytes

formatted capacity expandable to 7.8 Mbytes formatted capacity) and the floppy disk drive emulates an RX02 (up to 1 Mbyte formatted capacity). The DSD 880 comes with the choice of either a dual-wide LSI-11 interface board that fits in any Q-bus slot, or a quad-wide PDP®-11 interface board that fits in any Small Peripheral Controller (SPC) slot.



### **DSD 880 HIGHLIGHTS**

RL01 and RX02 compatibility

usable with standard DEC software

Single dual-wide interface for LSI-11

• plugs into any Q-bus backplane

Single auad-wide interface for PDP-11

plugs into any Small Peripheral Controller (SPC) slot

7.8 Mbytes of winchester disk storage and 1 Mbyte of floppy disk storage

• two random-access devices in a single package

Compact 51/4-inch package

minimizes rack space requirements and packaging costs

usable in desk top application

Built in bootstrap for RL01 and RX02

- eliminates the need for REV-11 or BDV-11 card on LSI-11 systems
   DEC double-density and IBM 3740 single-density diskette
   formats
- allows convenient data interchange with other DEC systems

Easy-access "Hyperdiagnostic" Panel

- simplifies selection of operating modes, off-line utilities and maintenance functions
- provides comprehensive error reporting

Off-line backup capability

easy to use for full winchester disk backups

Exclusive DSD "Hyperdiagnostics" provide off-line self diagnostic capability

- eliminates the need for a computer on incoming testing and exercising
- minimizes downtime and maintenance costs by enabling rapid detection of faulty modules

Diskette formatting capability

allows users to recover magnetically damaged diskettes

Full LSI-11/23 support

 multiple level interrupt capability and 18-bit DMA addressing provide flexibility in system configuration

### WHY WINCHESTER?

Fixed media winchester disk drives were first introduced by IBM with the announcement of the IBM 3350 winchester disk drive in 1976. This winchester technology has greatly increased the reliability and storage capacity of fixed disk drives, while simultaneously reducing the cost.

In winchester drives, the entire read/write head and disk system is enclosed in a carefully filtered environment with an extremely low level of contamination. When not in operation, the low mass heads rest on the lubricated disk surface. As the disk spins up to operating speed, the heads literally "take off" and "fly" at a very low height above the disk surface—typically on the order of 19 micro-inches. When the disk rotation slows down, the heads simply "land" on the disk surface. The lubrication on the disk allows heads to take off and land without any damage to the heads or the disk, and without loss of data.

The head loading force in the new winchester drives is on the order of only 10 grams, very much lower than the 350 gram loading typical of older disk technology. The low-head loading force in combination with the low mass heads allow the air bearing to be very compliant, in contrast to earlier disk technology. The "air bearing" is the layer of air between the flying head and the disk surface. The extremely low level of contamination and the compliant air bearing are the primary reasons for the inherent reliability of winchester technology.

Furthermore, the very low head flying height enables high bit and track densities, hence greatly increasing the relative storage capacity of winchester drives.

Finally, the simplicity of a fixed disk design coupled with the absence of a complicated head loading mechanism greatly reduces the cost of winchester drives, while adding to the reliability.

### WHY FLOPPY DISKS?

Winchester drives are fixed disk drives, and they must normally be used in combination with a removable media device. The floppy disk drive is the best choice for lower capacity winchester disk drives:

- Floppy disks are industry standard and may be used for data interchange with other DEC and non-DEC systems. They are convenient to handle and inexpensive to mail.
- DEC distributes operating system software and diagnostics on floppies, and hence these kits may be obtained directly from DEC. Floppies may be used for system bootstrapping, and also to load DEC diagnostics.
- Floppies can be used for archival storage. They are readily available, inexpensive, and do not require much storage space.
- The floppy disk drive offers a second random-access device in the DSD 880 system.
- And finally, floppies are conveniently used for backing up files from the winchester drive using simple incremental backup procedures.

# WHY INCREMENTAL BACKUP?

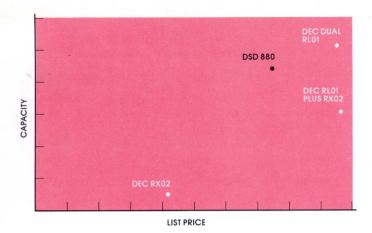
Users may conveniently copy files from the winchester onto diskettes as a method of backing up their work. These files may then be used to restore the system in the event of a data loss on the winchester drive.

Incremental backup schemes may be used in order to minimize the number of backups that a user needs to initiate. In such schemes, only the files changed during a particular shift are backed up at the end of that shift. Periodically, say once a week, the entire contents of the winchester disk are

backed up. In the event of a data loss, both the last full backup of the winchester drive and all subsequent file change backups must be used to restore the system.

A single double-sided/double-density diskette has a capacity of at least 1900 blocks. Even in a typical four- or five-user environment, changed files in a single shift will rarely require more than 1900 blocks to backup the changes. Hence, file changes in any shift may normally be backed up on a single diskette.

# WHY THE DSD 880?



The DSD 880 is an intelligent alternative for DEC users requiring capacity between the RX02 and the dual RL01.

## COMPARE THE ADVANTAGES OF THE DSD 880 VERSUS THE DUAL RL01:

### Lower Cost of Ownership\*

- Lower price
- Cost savings through elimination of expensive DEC bootstrap options
  - -The DSD 880 provides a hardware bootstrap on the interface board
- Lower service and maintenance costs and low equipment downtime
  - -DSD Priority Service Contract coverage is more
  - economical than DEC Service Contract coverage
    -On board "Hyperdiagnostics" allow rapid detection of faulty modules. DSD Customer Service typically provides replacements in 24 hours.
- Inherent reliability of winchester disk technology
- Lower freight costs due to lower bulk and weight -60 pounds for the DSD 880 vs. 150 pounds for the dual RL01
  - -1.3 cubic feet for the DSD 880 vs 5.2 cubic feet for the dual RL01
- Lower media costs
  - -Industry standard diskettes used on the DSD 880 are less expensive than the custom RL01 cartridges from DEC

### Lower Rack Costs and Space Requirements

- The low profile of the DSD 880 eliminates substantial rack space requirements
  - -The DSD 880 has a 51/4-inch panel height vs. 21 inches for the dual RL01. In some cases, this may eliminate the need for an additional rack altogether—thus saving substantial cost.
- The 880 is usable in applications where space requirements are at a premium
  - -Example: intelligent terminal applications using the VT-103

### **Easier Integration Into Systems**

- The DSD 880's LSI-11 interface requires only a single dual slot in any LSI-11 backplane. In contrast, the DEC RLV11 system requires three quad slots (two for the RLV11 controller/interface modules and one for the BDV11 bootstrap card). Furthermore, the RLV11 requires the specially wired H9273A backplane—considerably limiting user system flexibility.
- The DSD 880's LSI-11 interface board supports multiple level interrupt capability (for the RL01/RL02 emulation on the
  - -Greater user flexibility in configuring the system is allowed. The RLV11 does not support multiple level interrupts and the priority is backplane-position dependent.
- The DSD 880's PDP-11 interface board is guad wide and may be mounted in any SPC slot (vs. a hex wide interface board on the RL11).

### Industry Standard Interchange Medium

- The DSD 880 uses industry standard and DEC compatible diskettes. These allow data interchange with other DEC and non-DEC floppy based systems. The RL01 cartridge is only DEC compatible.
- Diskettes are readily available.



The DSD 880 with a DEC VT-103.

## COMPARISON OF DSD 880 AND DEC DISK DRIVES

	RX02 & RL01	DUAL RL01	DUAL RL02	DSD 880
CAPACITY	5.2MB + 1MB	10.4MB	20.8MB	7.8MB + 1MB
SIZE (VERTICAL RACK SPACE REQUIRED)	21 Inches	21 Inches	21 Inches	5¼ Inches
LSI-11 BACKPLANE REQUIREMENT	2 Quad Slots and 1 Dual Slot (Special backplane required)	2 Quad Slots (Special backplane required)	2 Quad Slots (Special backplane required)	1 Dual Slot (Usable with Any backplane)
LSI-M BOOTSTRAP REQUIREMENT	BDV-11 (1 Quad Slot)	BDV-11 (1 Quad Slot)	BDV-11 (1 Quad Slot)	NONE
INDUSTRY COMPATIBLE INTERCHANGE MEDIA	YES	NO	NO	YES
RELATIVE PRICE	MEDIUM	MEDIUM	HIGH	LOW
STANDALONE MAINTENANCE FUNCTIONS	NO	NO	NO	YES

# TYPICAL SYSTEM BACKPLANE REQUIREMENTS

The following illustrates the flexibility and savings in LSI-11 backplane requirements possible with the DSD 880:

### Usable LSI-11 Backplanes

Backplane	RLV11	DSD 880
H9270 H9273A H9281 DDV11-B VT 103 Non-DEC Supplied	No Yes No No No	Yes Yes Yes Yes Yes

### Typical LSI-11 System Using RLV11

RLV11 and H9273A

	TREVITATION (					
	Slot A	Slot B	Slot C	Slot D		
		W1	W2	W3		
Row 1	11/2	3	Not U	able*		
Row 2	DLV1	1-J	Not U	able*		
Row 3	32 K Me	mory	Not U	sable*		
Row 4	32 K Me	mory	Not U	sable*		
Row 5	.09500380000000000	RLV11	M 80 13	SECURIORISM SECURIORISM		
Row 6	.00000000000000000000000000000000000000	RLV11	M 80 14			
Row 7	ACCOMPANIES DE LA COMPANIE DE LA COM	BD	V11			
Row 8		Availa	dble**			
Row 9		Availa	ble**			

<sup>\*</sup>Slots C and D in the specially wired H9273A backplane do not carry LSI-11 bus signals. They are wired for "+5V" and ground. Hence, dual wide cards cannot be used with these slots.

NOTE: If the DSD 880 is used with this backplane, four slots would be available for four additional options.

### Typical LSI-11 Systems Using DSD 880

DSD 880 and H9270

	Slot A	Slot B	Slot C	Slot D
Row1	11/2	3	DL\	/11 J
Row 2	32 K Memory		32 K Memory	
Row 3	DSD 880		Available*	
Row 4	Availal	ble*	l Avail	able*

<sup>\*</sup>These slots can be used with any dual-wide options. Row 4 can also be used for a single quad wide option.

#### DSD 880 and H9281-AA

	Slot A	Slot B		
Row1	11./	23		
Row 2	DLV11 J			
Row 3	32 K Memory			
Row 4	DSD 880			

<sup>\*\*</sup>These slots are available for two additional options—either dual wide or quad wide.

# DESIGNED FOR FRIENDLY HUMAN INT AND LOW MAINTENANCE COSTS

### DESIGN PHILOSOPHY

The design emphasis in the DSD 880 reflects our concern for real user needs. The DSD 880 is designed to be easy to operate, to provide high reliability, and to be easy to service and maintain. These factors contribute to low cost of ownership and high system productivity.

### **DSD 880 "HYPERDIAGNOSTIC" PANEL**

The DSD 880 is equipped with an easy-access "Hyperdiagnostic" Panel to allow easy control of system operation. This "Hyperdiagnostic" Panel is normally hidden by the removable plastic bezel.

The "Hyperdiagnostic" Panel is equipped with the following:

• Two eight-position rotary switches—one to set the "mode" of operation, and one to set the "class" of operation.

 An "execute" button to activate the function selected by the rotary switches.

 Two seven-segment displays coupled with two LEDs that are used to indicate the status of the DSD 880 system.

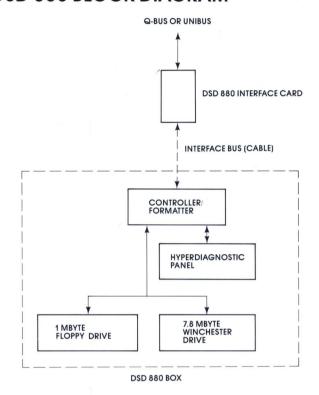
 Write protect switches for the floppy disk drive and winchester disk.

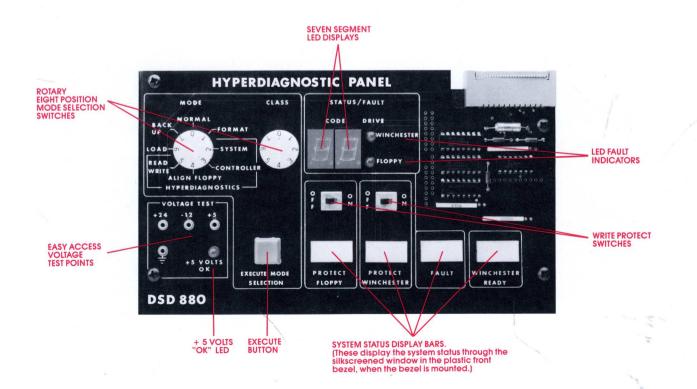
 Four system status indicators which are used to display system status through the silkscreened window on the front bezel.

 Easy-access voltage test points and an LED "+5 Volts OK" indicator.

Operation of the DSD 880 is controlled by setting the desired "mode" and "class" on the two rotary switches, and then depressing the execute button to activate these settings.

### **DSD 880 BLOCK DIAGRAM**





# ERFACE, TROUBLE FREE OPERATION

### **SOFTWARE DIAGNOSTICS:**

Every DSD 880 is shipped with a diskette containing programs for exercising and verifying the correct operation of the system. These programs are executed by the host computer, and are especially useful for incoming quality control tests, system exercising and burn in.

The programs can either be bootstrapped into memory directly and used in stand-alone mode, or can be exercised under the RT-11 operating system. Both hard copy and video display terminals are supported. Unattended testing is facilitated by provision of a circular buffer which automatically stores terminal output.

### **DSD "HYPERDIAGNOSTICS":**

The DSD 880 is also equipped with a library of micro-programmed routines—"Hyperdiagnostics"—which complement the software diagnostics described above. Hyperdiagnostics can be used to test the DSD 880 system completely independent of any host computer. Implementation of "Hyperdiagnostics" is greatly facilitated by the DSD 880 "Hyperdiagnostic" panel.

DSD "Hyperdiagnostics" may be used for two main purposes:

To rapidly and easily detect faulty modules. Quick

replacement minimizes downtime.

 To set up incoming test procedures not requiring a host processor.

### **DSD 880 "HYPERDIAGNOSTICS"**

System Tests: General Exercisers	In these tests the system is continually cycled through a sequence of operations to ensure correct operation of the various modules.
Single Pass Exercisers	Are similar to "General Exercisers," but are cycled only once through the sequence of operations.
Controller Tests: Switch and LED Tests	May be used to verify proper operation of all switches and LEDs on the "Hyperdiagnostic" Panel.
Other Controller Tests	Are used to ensure correct operation of the various circuits in the controller.
Floppy Tests	Are used to ensure proper operation of the floppy disk drive.
Read/Write Tests	Are used to verify operation of all read/ write circuits, head actuator mechanisms, heads, etc.

### **POWER UP SELF TESTS:**

Every time the DSD 880 is turned on, a separate microprogrammed self-test routine is executed to verify the correct functioning of the controller. These tests do not delay system initialization, and are transparent to the user during the system power up sequence.

### **BOOTSTRAP DIAGNOSTICS:**

The built-in bootstrap on the DSD 880 LSI-11 and PDP-11 interface boards contains firmware to automatically perform diagnostics verifying correct operation of the controller, interface and processor memory.

### **OFF LINE UTILITIES:**

The DSD 880 provides some functions that can be performed without the need for a host processor.

The "FORMAT" function allows off-line formatting of diskettes in either DEC/IBM single density (IBM 3740) format or DEC double density format.

"BACKUP" and "LOAD" functions enable off-line image copying from the winchester onto diskettes, or vice-versa. The DSD 880 provides prompting codes via the seven-segment LEDs to help the user through the sequence of steps in these operations. When winchester backup is performed in this mode, each diskette is identified with a unique code. This enables diskettes to be reloaded in any order during a subsequent load operation.

# OTHER FEATURES

Additional features of the DSD 880 are:

Keyed connectors and cable clamps

A five minute time out on the floppy drive to prolong the life
of the floppy drive and diskettes. Floppy drive automatically turns off if it is not accessed for more than five minutes.
The drive powers on automatically if accessed
subsequently.

 The two fuses and the +5 Volt adjustment potentiometer are accessible through the rear chassis wall.

# SOFTWARE: EMPHASIS ON DEC COMPATIBILITY

### SOFTWARE CONSIDERATIONS

#### **RL01/RL02 Emulation**

The DSD 880 can be set to operate in either the "normal" or "extended" mode using the appropriate switch settings on the "hyperdiagnostic" panel.

• In the normal mode the winchester emulates an RL01 and

has a formatted capacity of 5.2 Mbytes.

In the extended mode the winchester emulates a 7.8 Mbyte

In the normal mode, the DSD 880 is fully DEC system software compatible.

The full set of operating RL01 commands may be used with the DSD 880 in either the "normal" or "extended" modes of operation.

#### **RX02 Emulation**

The DSD 880 uses a double-sided/double-density flexible disk drive. This drive emulates a single drive RX02 and is compatible with the following soft sectored diskettes:

single-sided/single-density (IBM 3740) — 256 Kbyte single-sided/DEC double-density — 512 Kbyte double-sided/single-density (IBM 3740) — 512 Kbyte double-sided/DEC double-density — 1 Mbyte **FORMATTED** DISKETTE

Double-sided operation may be activated by following the simple procedures outlined in the DSD 880 User's Guide.

The full set of DEC RX02 commands is usable with the DSD 880 in either the normal RX02 or "extended" RX02 mode.

### OPERATING THE DSD 880 UNDER RT-11

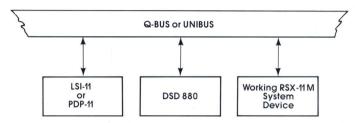
Loading of the DSD 880 with RT-11 software is a simple matter. as DEC distributes this software on diskettes.

In single-sided RX02 operating mode, the floppy disk is totally DEC compatible and no modifications to DEC software are needed.

Similarly, in "normal" mode the winchester drive is totally compatible with DEC software and no changes to DEC software are needed.

### OPERATING THE DSD 880 UNDER RSX-11M

DEC does not distribute RSX-11M on floppies. Hence, to load the DSD 880 with the RSX-11M system, the following procedure may be employed:



- DSD 880 is hooked up to a system with the system device on which the RSX-11M system is resident.
- The RSX-11M system is copied file by file from the system device to the DSD 880 winchester drive.
- An image copy of the RSX-11M system on the DSD 880 winchester is made onto diskettes, using the off line "BACKUP" function on the DSD 880.
- This set of diskettes may then be used to load the RSX-11M system onto the DSD 880 winchester at any time using the off line "LOAD" function.

# Summary of DSD 880 Operation Under DEC Operating Systems (RT-11 Version 3B, RT-11 Version 4.0, RSX-11 M Version 3.2)

Floppy Disk	Winchester Disk
Fully DEC compatible in single-	Fully DEC compatible in
sided RX02 mode	"normal" mode
• 512 Kbytes (formatted)	• emulates 5.2 Mbyte RL01
Modification required* to activate double-sided RX02 operation  • 1 Mbyte (formatted)	Modification required* to operate in "extended" mode ● emulates 7.8 Mbyte RL02
DEC handler for RX02 is	DEC handler for RL01/RL02 is
DYDRV.MAC (RSX-11M, V 3.2)	DLDRV.MAC (RSX-11M, V 3.2)
DY.MAC (RT-11 V 3B, RT-11 V 4.0)	DL.MAC (RT-11 V 3B, RT-11 V 4.0)

<sup>\*</sup>Follow the simple modification procedures outlined in the DSD User's

### SYSTEM BOOTSTRAPPING

A 512-byte hardware bootstrap is built into the DSD 880's LSI-11 and PDP-11 interfaces.

The DSD 880 system can bootstrap either off the winchester disk drive, or the floppy disk drive.

For LSI-11 systems the DSD 880 system can be bootstrapped in either power up mode 1 or power up mode 2. In power up mode 1, the processor enters console ODT immediately on power up. The user may select the bootstrap device by entering the appropriate starting address at the console. For example, bootstrapping on the winchester may be initiated by entering "773000G". Entering "773020G" initiates bootstrap on the floppy.

In power up mode 2, the power up sequence for the LSI-11/23 differs slightly from the earlier LSI-11 and LSI-11/2 processors. In the case of the LSI-11 and LSI-11/2 processors, the Program Counter is automatically set at 773000 on power up. In the standard configuration, the DSD 880 will hence automatically attempt to bootstrap on the winchester. If the winchester is not bootable, the system halts. The user can force bootstrapping on the floppy by entering the appropriate starting address at the console.

In the case of the LSI-II/23 processor, however, the contents of the Program Counter are user programmable in power up mode 2. Hence, the DSD 880 system can be set to bootstrap automatically on either the winchester or the floppy.

For PDP-11 systems, DEC provides a program (console monitor emulator) that is normally resident in memory with a starting address of 773000. Hence, the DSD 880 is shipped with the bootstrap base address at 771000. Users wishing to have automatic bootstrap capability under standalone operation must then reposition the DEC console emulator in memory at a different starting address. The DSD 880 bootstrap base address can then be set at 773000.

# DSD 880 INTERFACE JUMPER SELECTABLE BOOTSTRAP PROGRAMS AND DEVICE ADDRESSES

Bootstrap Offset	Typical Bootstrap Base Address*		Bootstrap Device	Device Address*	
	PDP-11	LSI-11			
+ 0 + 10 + 20 + 30 + 36	771000 771010 771020 771030 771036	773000 773010 773020 773030 773036	WINCHESTER WINCHESTER FLOPPY FLOPPY User De	774400 774410 777170 777150 fined**	

<sup>\*</sup>For other jumper selectable bootstrap base address and device address options see the DSD 880 detailed specifications in this data sheet.

### ON LINE BACKUP

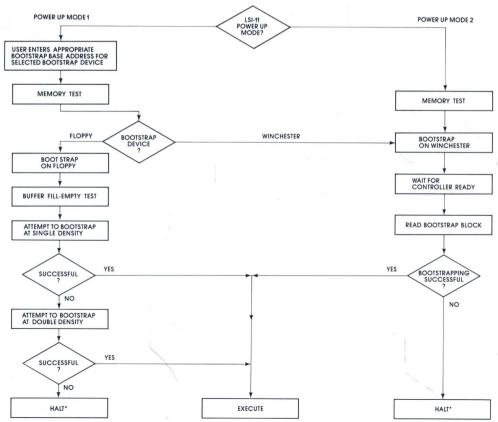
For the DSD 880, file backups onto single diskettes may be carried out using utilities available under RT-11 (COPY) and RSX-11M (BRU).

For example, if all files to be backed up will fit on one diskette, and a new initialized diskette is being used, the following single command may be used under RT-11:

COPY/NEWFILES A DLØ: A DYØ:

Backup command sequences under RT-11 and RSX-11M are clearly documented in the DSD 880 User's Manual

### **DSD 880 BOOTSTRAP FLOW CHART**



<sup>\*</sup>Execute appropriate error halt or loop

<sup>\*\*</sup>Bootstrap device specified by loading location '0' with the device address.

# **DSD 880 SPECIFICATIONS**

	WINCHESTER DRIVE  NORMAL EXTENDED  MODE MODE		FLOPPY DRIVE				
			SINGLE-SIDED MODE		DOUBLE-SIDED MODE		
GENERAL							
Mode switch selectable?		/es		N		-11 00000	
Emulates	Full RL01	RL02 See DSD 880	RX	02	'Extende See DS		
Modifications to DEC	None	User's Manual	No	ne	User's N		
operating system software		users Manag			Single an		
Diskettes used			Single		sid	ed	
			single density	double density	single density	double density	
Formatted capacity	5.2 Mbytes	7.8 Mbytes	256 Kbytes	512 Kbytes	up to 512 Kbytes	up to 1 Mbyte	
DATA ORGANIZATION						PINE N	
Recording format			IBM 3740	DEC RX02	IBM 3740	DEC RX02	
Recording technique	N	<b>AFM</b>	Double Frequency	DEC Modified MFM	Double Frequency	DEC Modified MFM	
Bytes/Sector		256	128	256	128	256	
Data Integrity	Header CF	RC/Data CRC		Header CRO	C/Data CRC		
Bad Track Management		assignment is an analysis					
SPEEDS							
Access Times:	47 millisecs	70 millisecs		17.4 mi	llisecs		
Average* Maximum*	107 millisecs	150 millisecs			llisecs		
Track-to-Track*		illisecs			llisecs		
Head load time					llisecs		
Head switching time	20 microsecs		100 microsecs				
Start/Stop time	5 seconds for disk to reach			2 seconds for diskette rotational			
	95% of no	speed stabilization					
		es max. for stabilization					
Naminal retational speed				360 rpr	n ± 2%		
Nominal rotational speed Average latency	3125 rpm ± 3% 9.6 millisecs			83 millisecs			
Data transfer rates:							
Within a track	142.2 Kbytes/second 106.0 Kbytes/second 4 microsec/word plus				s/second		
Across entire disk			18 Kbytes/second 4 microsec/word plus				
Burst rate			And the little is a second of the little is		erhead		
Data transfer length	DMA overhead 5.1 Kwords max 64 Kwords max in normal mode in extended mode		- Divizione da				
LSI-11 INTERFACE							
Backplane requirement	C	One dual wide Q-bus sl	ot in any Q-bus b	ackplane			
Device addresses:					170		
Standard Alternate**		4400 4420, 774370			150, 777140		
Allemale	//4410,//	4420, / /40/0		,,,,,,,,,,			
Built-in bootstrap							
start addresses: Standard		,	73000				
Alternate**			75000, 766000				
			ote below)				
Interrupt vector:					4.4		
Standard Alternate**		160 320, 330			64 04, 314		
	130,1			-17.3			
PDP-11 INTERFACE Backplane requirement	1 auad wide Si	mall Peripheral Contro	oller (SPC) slot in a	ny Unibus back	plane		
Device address options		0-777770			-777770		
Standard	at 10 (octal) increments 774400		at 10 (octal) increments 777170				
Jidiladia							
Bootstrap base address			777000				
options		at 1000 (og	(a) increments				
Standard			71000 ote below)				
				000 774 -144-	otal) ingramant		
Interrupt vector options	1 11111-774 at 4 (	octal) increments		UUU-//4 at 4 (0	ctal) increments		

<sup>\*</sup>Including head setting

NOTE: The bootstrap device is specified by the bootstrap offset selected by the user:

### **Bootstrap Offset**

+ 0 +10

**Bootstrap Device** 

winchester winchester floppy

floppy user defined (user loads location "0" with device address)

<sup>\*\*</sup>Jumper Selectable

### **ENVIRONMENTAL SPECIFICATIONS**

TEMPERATURE

Operating:

Chassis

**Diskettes** 

Diskette Maximum Rate of Change

Non-Operating:

Chassis

**Diskettes** 

HUMIDITY

Chassis

Diskettes

ALTITUDE

Chassis (Operating)

5°C to 40°C (41°F to 104°F) 10°C to 51°C (50°F to 125°F)

(15°F per hour)

-40°C to 66°C (-40°F to 150°F)

-40°C to 51°C (-40°F to 125°F)

10% to 78%

(non-condensing)

8% to 80% (with a maximum wet bulb temperature of 25.5°C (78°F))

6000 foot maximum

### **POWER**

Input Voltage:

Chassis Power Consumption (Maximum)

Busy

**Starting Current:** 

**Heat Dissipation** 

(BTU/HR) Chassis

Fuse Ratings (All SLO-BLO)

100 VAC or 120 VAC ± 10% 220 VAC or 240 VAC ± 10%

50 Hz ± 1 Hz 60 Hz ± 1 Hz

120V/60Hz 6 A 6 A

220V/50Hz 3 A 3 A

28 A MAX @ 115 VAC 14 A MAX @ 230 VAC

Normal 1055

Maximum 1175

Main 4A @ 120 VAC 2A @ 220 VAC

Winchester 2A @ 120 VAC 1A @ 220 VAC

### INTERFACE

**Power Consumption** (+ 5V)

Nominal Maximum

(BTU/HR) Nominal Maximum

LSI-11 (Q-bus) 2.5A 3 A

PDP-11 (Unibus) TBA TBA

43 52

### **CHASSIS**

-Chassis

**Heat Dissipation** 

-Shipping Carton

Weight

ChassisSystem Packed for Shipping

Mounting — Rack Slides

5.25"H x 17.6"W x 23.75"D (13.3CM x 44.7CM x 60.3CM) 12.5"H x 24.5"W x 30.0"D (31.75CM x 62.2CM x 76.2CM)

56.5 LBS. (25.7 KG) 80 LBS. (36.3 KG)

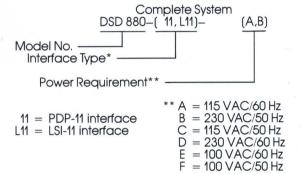
Fits in standard DEC rack

# **THE DSD 880**

### ORDERING INFORMATION

Orders for Data Systems Design products can be placed with either your local sales representative or with Data Systems Design directly. In either case, purchase orders should be issued to Data Systems Design, Inc. Confirming copies are required before shipments are made.

#### **Part Numbers**



Additional Interfaces

Additional LSI-11 interface (for LSI-11, DSD 880-8832

LSI-11/2, LSI-11/23) Additional PDP-11 interface (for PDP-11/ DSD 880-8830

04 through 11/70)

**Options** DSD 3740-DSK Certified single-sided diskettes (box of

Cértified double-sided diskettes (box of **DSD 3742-DSK** 

DSD S120-DSK

Analog alignment diskette DSD 880 Documentation Package DSD 880-11-DOC

including User's Manual and diagnostic diskette

### DSD 880 PACKAGE

A complete DSD 880 system includes the following:

- 880 controller/formatter
- 880 LSI-11 or PDP-11 interface
- Chassis
- Chassis Slides
- "Hyperdiagnostic" panel
- Power Supply
- Diagnostic Diskette
- One eight inch Winchester drive
- One double sided/double density floppy disk drive
- Interface Cable
- **Power Cord**
- Complete Documentation

### SERVICE AND WARRANTY POLICY

Each DSD 880 is protected by a 90-day limited warranty. In the event of a malfunction, a phone call to DSD will dispatch a replacement module to domestic U.S. customers—usually within 24 hours. "Priority Service Contract" coverage is available at a nominal fee if the warranty protection is desired beyond 90 days.

# **ADDRESSES**

### **CORPORATE HEADQUARTERS**

Data Systems Design, Inc. 2241 Lundy Avenue San Jose, CA 95131 (408) 946-5800 TWX: 910-338-0249

### **WESTERN REGION SALES**

Data Systems Design, Inc. 2560 Mission College Blvd., Suite 108 Santa Clara, CA 95050 (408) 727-3163

### **EASTERN REGION SALES**

Data Systems Design, Inc. 51 Morgan Drive Norwood, MA 02062 (617) 769-7620 TWX: 710-336-0120

INTERNATIONAL SALES: Australia, Melbourne (03) 543-2077, Sydney (02) 848-8533; Canada (416) 625-1907; Denmark 01/83 34 00; Finland 90/88 50 11; France 03/956 81 42; Israel 03/298783; Italy 02/4047648; Japan, Osaka (06) 323-1707, Tokyo (03) 345-1411; Netherlands 020/45 87 55; New Zealand 4/693-008; Norway 02/78 94 60; Sweden 08/38 03 70; Switzerland 01/730 48 48; United Kingdom 01/207-1717; West Germany and Austria (089) 1204-0.

The data and description in this data sheet is based on the best information available at the time of publication. While every effort has been made to make it reliable, DSD assumes no liability for errors and ommissions. DSD also reserves the right to make changes to its products without notice.