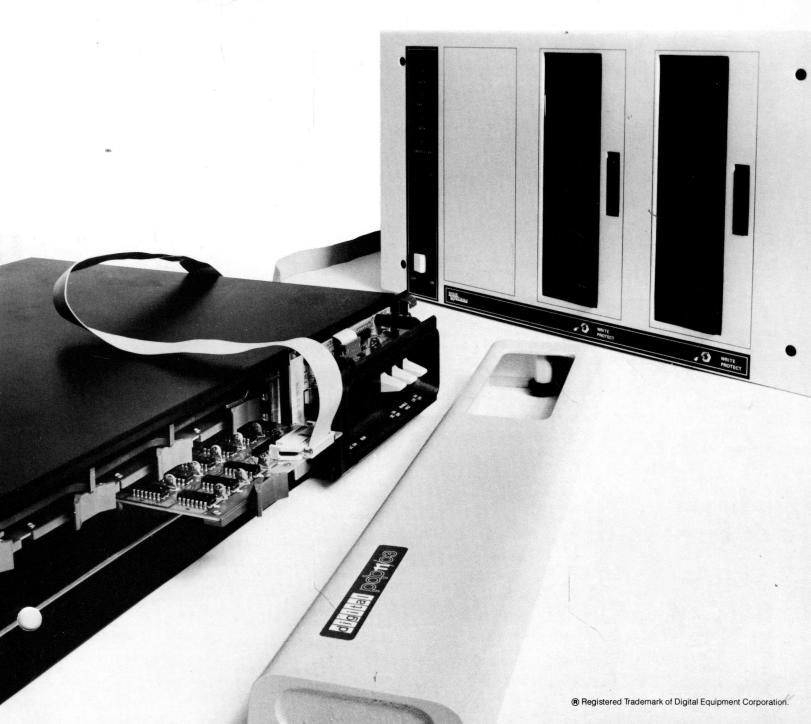
# The DSD-210 Floppy Disk System is totally compatible with any DEC® minicomputer.



# Total DEC compatibility, and more.

The DSD 210 floppy disk system is 100% compatible with all DEC® PDP®-8, PDP®-11 and LSI-11 systems. And it's head and shoulders above its only competition, DEC's RX01.

The DSD 210 costs you less, you can have it sooner, and it provides you with more useful features.

Compare them side by side and decide for yourself which gives you better value.

	<b>DSD 210</b>	DEC RX01
PDP-8, PDP-11, LSI-11 hardware, instruction set, and media compatible	YES	YES
Software compatible with all DEC operating systems	YES	YES
IBM 3740 Format	YES	YES
Write protect switches	YES	NO
Automatic head unload	YES	YES
Ceramic read/write head	YES	YES
Holds 256,256 bytes per diskette	YES	YES
Diskette formatting capability	YES	NO
Drives per controller	1, 2 ,or 3	1 or 2
Interchangeable 50/60 Hz operation	YES	NO
Digital phase-lock-loop data separation circuit	YES	YES
Front panel activity LED lights	YES	NO
Front panel system status indicators	YES	NO
Modular construction	COMPLETE	PARTIAL
Self-testing microcode	EXTENSIVE	MINIMAL
Field-proven Shugart drives	YES	NO
Delivery time	WEEKS	MONTHS



#### Short delivery simplifies your buying projections.

You don't have to project your configuration mix six months to a year in advance.

# Interface cards eliminate unnecessary cabling by plugging directly into the computer chassis.

Our PDP-11 card plugs into any small peripheral controller slot; our LSI-11 card plugs into any QBus slot; and our PDP-8 card plugs into any Omnibus® slot.

## IBM 3740 formatting capability lets you format diskettes in any standard IBM sector interleaving scheme.

Allows optimum sector interleaving and eliminates the need for interleaving in software.

### Self-testing microcode and front panel indicators guard against undetected errors.

The self-testing microcode confirms the correct operation of the formatter/controller as well as many drive functions. If an error occurs, front panel indicators aid in its quick diagnosis and correction.

#### Microprocessor controller minimizes external interconnections.

Eliminates a major source of computer system problems.

#### Complete documentation and necessary hardware comes with every system.

You get a general product description, software manual, complete schematic, a parts list crossindexed to the vendor's part number so you can buy spares direct; one diskette for each drive; diagnostic paper tapes; diagnostic and formatting program and bootstrap program in source and binary forms; a power cord; and the appropriate interface card.

## Digital phase-lock-loop data separator assures accurate data retrieval.

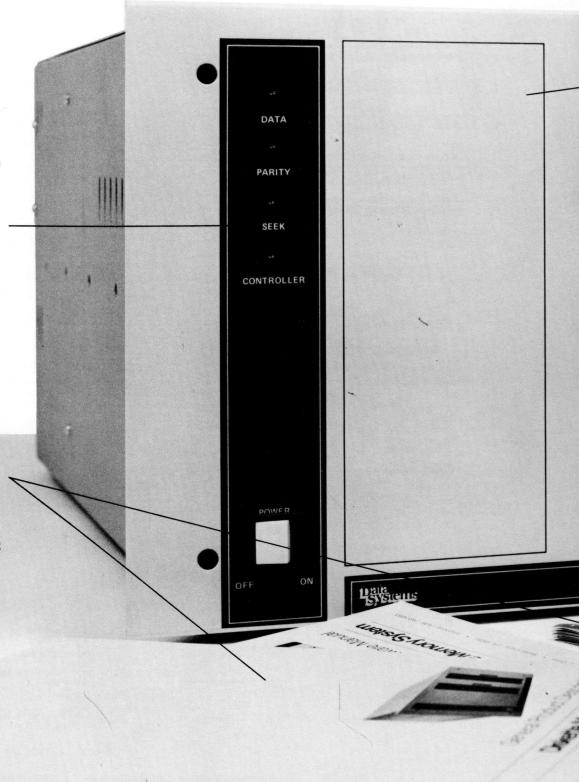
A 20 MHz clock keeps the system completely stable.

#### Automatic head unload reduces disk/head wear.

The head unloads automatically if there is no operation pending. It automatically reloads when there is data to be written or read.

## Low cost conversion kit changes unit between 50 and 60 Hz operation.

You can order systems at 60 Hz for local checkout and then switch them to 50 Hz for shipment.



#### PC board legends identify each device for easier troubleshooting.

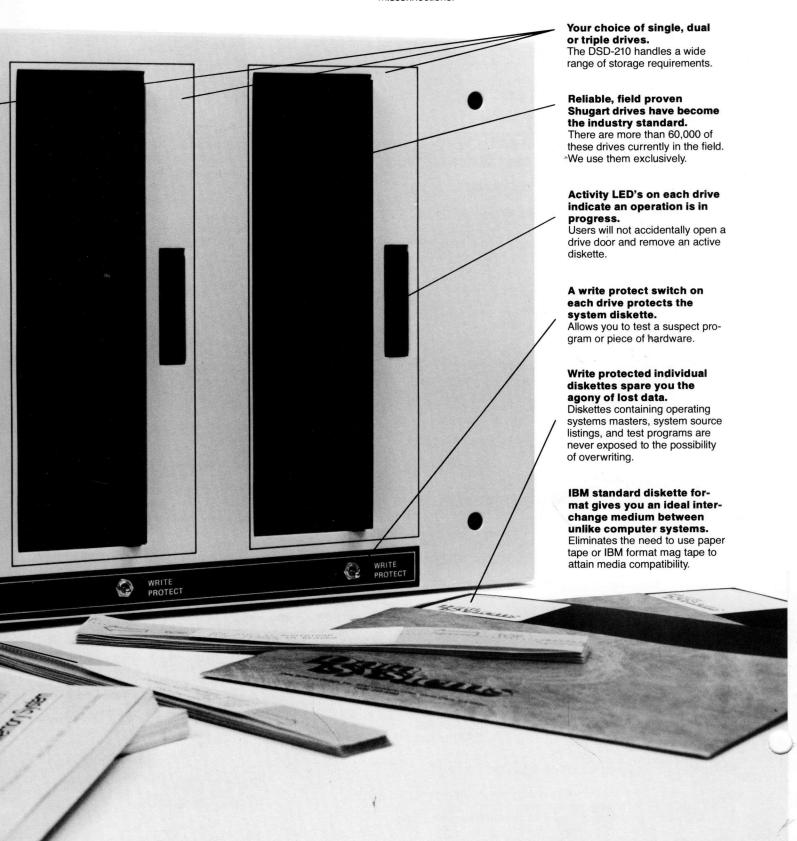
You get a quick association between a device on a schematic and a device on a PC board.

#### Switches on the controller board assign logical unit numbers to the physical units to aid in diagnosing disk drive related problems.

You can reassign or deassign the logical unit number of a faulty drive to isolate a drive error.

#### Completely modular construction lets even semitechnical users swap modules with only the simplest of tools.

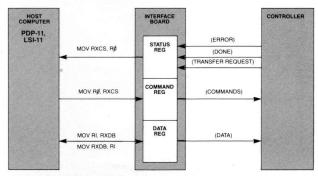
There are no soldered connections between major modules. All connectors and connections are keyed to eliminate guesswork or misconnections.



## Software

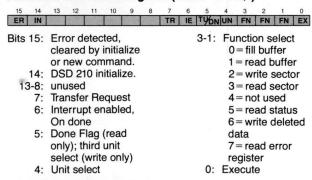
These I/O instructions access the DSD 210. They are identical to those used for the DEC RX01.

#### PDP-11 and LSI-11



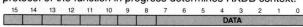
### DSD 210-11 and DSD 210-L11 Peripheral Device Register Definitions.

#### Command and Status Register (RXCS=17717Ø)

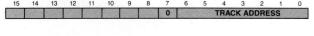


#### Data Buffer Register (RXDB=177172) RXDB—Data Buffer

The RXCB may represent one of four controller registers. The protocol of the function in progress determines RXDB context.



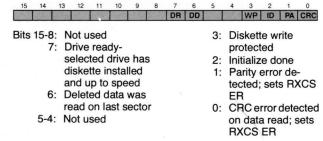
#### **RXTA—Track Address**



#### RXSA—Sector Address



#### **RXES**—Error and Status

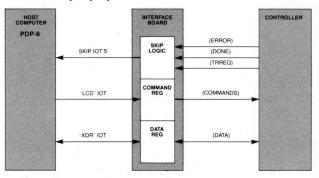


#### Interrupts

The DSD 210 interrupts on priority level 5 to LØC 264. Format function.

To format, specify a write operation to sector number 152<sub>8</sub> of the track to be formatted. 26 sector numbers pass through the RXDB in sequence to specify the sector interleaving pattern.

#### PDP-8/A,/E,/F,/M



#### **DSD 210-8 IOT Definitions.**

675Ø-Not Used

6751 LCD—Load Command Register; Clear AC.

MM 8B TU UN	FN FN FN
Bits 0-3: not used 4: Maint. mode 5: 1=8 bit mode	1 = read buffer 2 = write sector 3 = read sector
0=12 bit mode 6: Third unit select 7: Unit select 8-10: Function select 0 = fill buffer with 64 12-bit words or 128 bytes.	4 = not used 5 = read status 6 = write deleted data 7 = read error register 11: not used

#### 6752-XDR—Transfer Data Register



When the controller is done, the XDR instruction can be used to transfer the RXES from the interface register to the AC.

0	1	2	3	4	5	6	7	8	9	10	11	
				DR	DD			WP	ID	PA	CRC	
Bits	0-3:	un	use	d						8:	Diskette write	
	4:	Dr	ive	read	y, se	-					protected	
		lec	ted	driv	e ha	S				9:	Initialize done.	
		dis	ket	te ins	stalle	ed			1	10:	Parity error	
				o to s							detected; sets	
	5:	De	lete	ed da	ata w	as					RXCS ER.	
		rea	ad c	n las	st se	ctor			1	1:	CRC error detecte	d
,	6-7:	no	t us	ed							on data read; sets	

**6753-STRF**—Skip on transfer request; clear flag. (An XDR instruction is requested.)

6754-SERF-Skip on error flag set; clear flag.

6755-SDNR—Skip on done flag set; clear flag.

6756-INTR—Enable or disable disk interrupts.

AC-11=1 enables interrupts on flag set.

AC-11=0 disable interrupts.

6757-INIT - Initialize the DSD-210 controller and interface.

# **Specifications**

Storage Medium	Type: IBM Diskette or Certified Equivalent					
0.01 <b>.19</b> 0041.4	Number of Tracks: 77 Tracks Per Inch: 48					
	Track Width: .3048 mm (.012 in)					
	Track-To-Track Spacing: .508 mm (.020 in)					
Recording Technology:	Recording Mode: Double Frequency					
,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	Bit Density (Inner Track): 3200 bpi					
	Bit Transfer Rate: 250K bits per second					
	Read/Write Head: Ceramic					
Maximum Capacity (Unformatted):	Drive: 3.2 megabits					
	Track: 41.7 kilobits					
Maximum Capacity (Formatted):	Drive: 256,256 Bytes					
	System: 768,768 Bytes					
Disk Speed:	Rotational Speed: 360 RPM ±2%					
-	Rotational Time: 166 ms					
	Average Latency: 83 ms					
Head Positioning (Access) Time:	Head Positioning: 8 ms track-to-track					
	Head Loading Time: 40 ms					
Environmental Characteristics:	Operating Temperature: 15.5°C (60°F) to 32°C (90°F)					
	Maximum Rate of Change: 15°F per hour					
	Relative Humidity: 20% to 80% at 29.4°C (85°F)					
	Storage Temperature: -40°C (-40°F) to 51.6°C (125°F)					
Power Requirements (Dual Drive):	AC Voltage (Standard): 115 VAC, 60 Hz@ 2.5 Amps					
•	AC Voltage (Optional): 115 VAC, 60 Hz, or 230 VAC, 60 Hz, or 230 VAC, 50 Hz					
	230 VAC, 60 Hz, or 230 VAC, 50 Hz					
Physical Characteristics:	Height: 266.7 mm (10.5 in)					
	Width: 431.8 mm (17 in)					
	Depth: 571.5 mm (22.5 in)					
	Weight (dual drive): 24.5 kgs (54 lbs)					

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