

# THE IMI 7710 DISK DRIVE

The IMI 7710 is 11 megabytes of cost effective, fixed disk memory. Using Winchester technology, the 7710 is engineered into a configuration the size of a floppy disk drive.

Applications for this versatile system exist throughout the entire field of mini and micro computer data storage, especially in word processing and small business systems.

## Technology

The 7710 drive uses "Winchester" type heads characterized by the low mass, lightly-loaded slider. The Winchester head is designed to take off and land on the disk surface, virtually eliminating head crashing, and totally eliminating the mechanical paraphernalia necessary to load and unload the head to and from the disk.

The recirculating air system within the sealed cover provides the contamination-free environment necessary for the low-flying heads.

The miniature voice coil actuator, directed by a feedback loop from a single servo surface on the underside of the lowest disk, reliably positions the read/write heads at the desired location. The servo surface has factory prerecorded servo tracks. With a patented DC spindle motor, the 7710 is ideal for international use.

## General

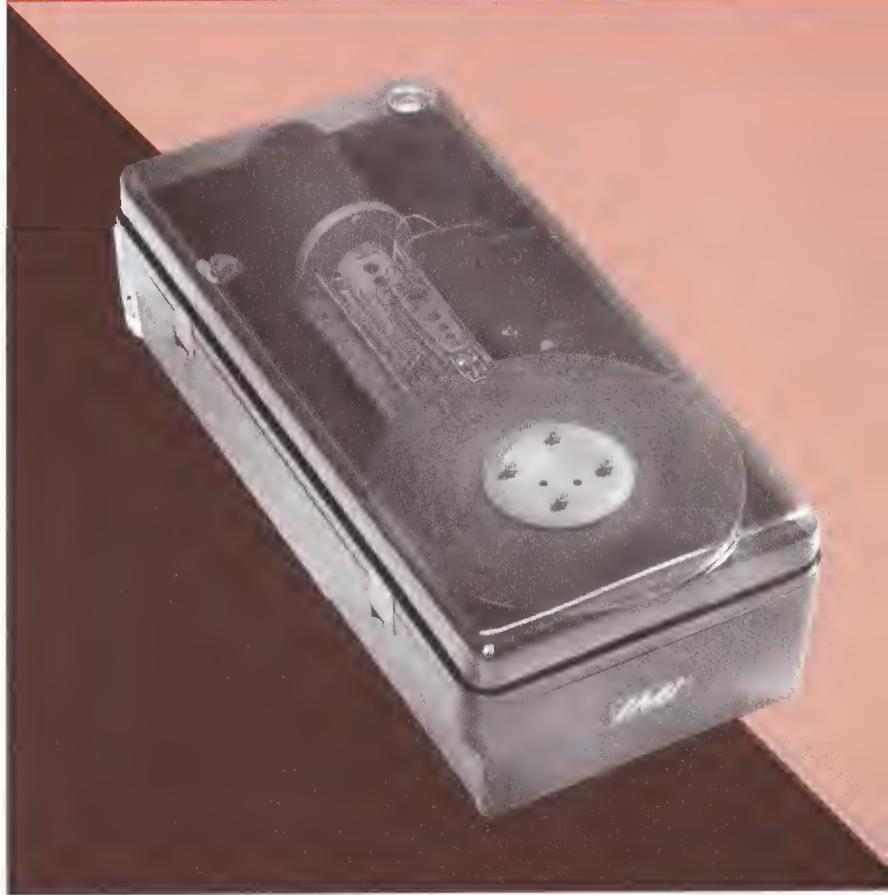
The 7710 drive is a fixed disk, self-contained environment, miniature storage device of approximately 11 megabyte capacity. The drive uses readily available components and incorporates the "Winchester" recording technique.

All components and subassemblies are mounted on a lightweight, high-strength base molded of fiberglass-reinforced polyester having thermal properties closely paralleling those of aluminum.

The two 200 millimeter-diameter disks, read/write heads and actuator all operate in a contamination-free environment provided by a closed-loop, filtered-air system. Because the drive is impervious to the external environment, its reliability is greatly enhanced.

Read/write, servo control and interface circuitry is contained on three 7.5 x 10.5-inch printed circuit boards installed within the base molding.

In height and width the unit is virtually interchangeable with any standard size "floppy disk" drive. With a length of 19 inches, it may be rack/slide mounted vertically or horizontally or placed on a table top.



## Specifications

### Physical Configuration

Height	5.50 in./13.97 cm
Width	8.57 in./21.76 cm
Depth	19.25 in./48.89 cm
Weight	22 lbs/9.98 Kg

### Recording Characteristics and Data

Recording Capacity	11 megabytes
Data Tracks per Surface	350
Track Density	300 T.P.I.
Recording Density	5868 B.P.I.
Disk Speed	3600 R.P.M. $\pm 1\%$
Transfer Rate	648 K bytes/sec.
Minimum Access Time	10 ms
Average Access Time	50 ms
Maximum Access Time	100 ms
Latency Time (Avg.)	8.3 ms
Servo System	Full track following

### Power

The drive requires D.C. power only:  
+24 volts,  $\pm 12$  volts,  $\pm 5$  volts  
Power Consumption: 100 watts

### Environment

The drive will operate within the following temperatures:  
10°C-50°C (50°F-120°F)  
Relative Humidity: 20% to 80% (non-condensing)

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MEMORIES,  
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10381 Bandy Drive, Cupertino, CA 95014  
(408) 446-9779, TWX: 910-338-7347

# IMI 7710

## INTERFACE CONNECTIONS

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### Signal Interface

The single interface cable communicates control, status, timing, clock and data between the controller and up to 16 drives. The 25 signal line bus connection is implemented using a 34 conductor flat cable which is readily daisy-chained to multiple drives.

HOST CONTROLLER CONNECTOR PIN	Signal Connections SIGNAL LINE	7710 DISK DRIVE CONNECTOR PIN
01	GROUND	01
02	GROUND	02
03	SPARE	03
04	SPARE	04
05	-SEL UNIT ADDR 3	05
06	-SEL UNIT ADDR 2	06
07	+R/W DATA	07
08	-R/W DATA	08
09	-SEL UNIT ADDR 1	09
10	-SEL UNIT ADDR 0	10
11	+SYS CLOCK	11
12	-SYS CLOCK	12
13	GROUND	13
14	GROUND	14
15	-SECTOR	15
16	-INDEX	16
17	-SEEK COMPLETE	17
18	-FAULT	18
19	-CMD STROBE	19
20	-CMD R/W	20
21	-CMD SELECT 0	21
22	-CMD SELECT 1	22
23	SPARE	23
24	SPARE	24
25	-CMD ACK	25
26	SPARE	26
27	-CMD BUS 6	27
28	-CMD BUS 7	28
29	-CMD BUS 4	29
30	-CMD BUS 5	30
31	-CMD BUS 2	31
32	-CMD BUS 3	32
33	-CMD BUS 0	33
34	-CMD BUS 1	34

Interface Connector AMP P/N 88550-1 or equivalent. Interface Cable (50 feet max.) SPECTRA STRIP P/N 4550240-34 or equivalent.

### Command and Status Table

	CMD BYTE	CMD R/W	CMD SEL 1	CMD SEL 0	CMD BUS 7	CMD BUS 6	CMD BUS 5	CMD BUS 4	CMD BUS 3	CMD BUS 2	CMD BUS 1	CMD BUS 0
DRIVE COMMANDS	0	0	0	0	US 3	US 2	US 1	US 0	HSA 1	HSA 0	CAR 9	CAR 8
	1	0	0	1	CAR 7	CAR 6	CAR 5	CAR 4	CAR 3	CAR 2	CAR 1	CAR 0
	2	0	1	0	Servo Offset Reverse	Servo Offset Forward			Diagnostic		Read Gate	Write Gate
	3	0	1	1							Rezero	Fault Clear
DRIVE STATUS	4	1	0	0	Speed Error	Illegal Addr.	R/W Fault	Servo Error	Re-Zeroing	Seeking	On Cyl.	Unit Ready
	5	1	0	1	Guard Band			Write Prot'd.	PLO Error	POR		R/W Unsafe
	6	1	1	0	PAR 7	PAR 6	PAR 5	PAR 4	PAR 3	PAR 2	PAR 1	PAR 0
	7	1	1	1	UA 3	UA 2	UA 1	UA 0	HAR 1	HAR 0	PAR 9	PAR 8

#### Notes:

- US 0-3 = Unit Select
- CAR 0-9 = Cylinder Address Register
- HSA 0-1 = Head Select Address
- HAR 0-1 = Head Address Register
- PAR 0-9 = Present (Cyl.) Address Register
- UA 0-3 = Drive's preassigned unit select address
- Space = Unused Bit (normally at logical zero)
- Negative True Logic:  
Logical 1 = 0 to 0.7 V  
Logical 0 = 2.4 to 5.0 V

### Power Interface

The following dc power must be provided to the drive:

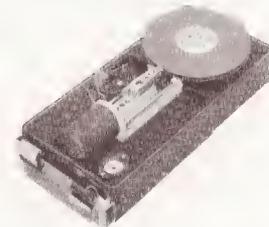
+ 5.0 Vdc	± 5%	@	4.0A max.
+12.0 Vdc	± 5%	@	0.5A max.
-12.0 Vdc	± 5%	@	0.5A max.
- 5.0 Vdc	± 5%	@	3.0A max.
+24.0 Vdc	±10%	@	4.0A max. (peak starting) 2.0A typical running

### Power Connector Wire Assignment

10	+5 V
9	+5 V
8	GROUND
7	GROUND
6	+12 V
5	-12 V
4	-5 V
3	N/C
2	+24 V RETURN
1	+24 V

### Power Cable Connection

A 10 conductor power cable connector is attached to the corresponding jack on the back panel of the 7710 drive. The recommended connector housing is AMP P/N 1-640431-0. Numbers 18-20 AWG standard wire is recommended for the power cable.



### Command Bus

The COMMAND BUS is an 8 bit bidirectional bus (identified as CMD BUS 0-CMD BUS 7) that carries commands to the drive from the controller. This bus is open-collector TTL compatible with provision to attach a terminator on the last drive to allow stringing of multiple drives. Bus direction is controlled by the controller. The meaning of each bit in this bus depends upon the state of 3 other lines: CMD R/W; CMD SELECT 0; and CMD SELECT 1 which define the 8 command bytes (CMD BYTE). 4 command bytes (CMD BYTE 0-3) are for drive commands and 4 command bytes (CMD BYTES 4-7) are for drive status. Up to 32 bits of command and 32 bits of status can be transferred between the drive and the controller using these lines. The drive ignores the state of the COMMAND BUS except when CMD STROBE is active. After CMD STROBE has gone active, the CMD ACK line is set to an active level.

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**IMI 7740**

**IMI**

## **High performance 8-inch Winchester Disk Drive.**

**7000 Series**

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### **Key features and benefits**

- 41.9 Mbytes unformatted capacity
- Reliable Winchester head and media technology
- High Performance – 50 ms average access time
- Microprocessor control
- 75 watts power dissipation
- Brushless, direct coupled D.C. drive motor
- Data separation standard
- Optional ANSI interface
- Self-test capability
- No scheduled maintenance
- Dual interface connections simplify daisy-chain systems.
- To minimize possible resonances, the linear voice coil actuator has short head arms and a heavy-duty, ball bearing supported carriage.
- To eliminate head skew, the heads intersect all tracks on the same radius.
- All electronics are mounted on three PCBs that plug directly into a back panel and are cooled with forced air.
- The electronics cage is housed within the base and is easily removed. Extended for easy access, the cage is fully operational for servicing.
- Highly dimensional and temperature stable, the base is made of special fiberglass reinforced polyester that provides vibration dampening.
- The base provides for all structural, housing, and mounting needs. All major assemblies are mounted directly into the base, so that assembly is easy and accurate.
- Automatic carriage and spindle locks reduce the possibility of damaging the head or disk during shipping or handling. Upon power down, the heads move to a landing zone where they are restrained.



## IMI 7740 Specifications

<b>Performance</b>	Capacity (unformatted)	Drive	41.9 Mbytes
		Per surface	8.38 Mbytes
		Per track	10,800 bytes
	Transfer rate		648 Kbytes/per second
	Access time	Track-to-track	6 ms
		Average	50 ms
Maximum		95 ms	
Average latency		8.3 ms	
<b>Functional</b>	Rotational speed		3,600 rpm
	Recording density		6,200 bpi
	Track density		600 tpi
	Cylinders		776
	Data Recording surfaces		5
	Heads per surface		1
	Disks		3
	Error rates:	Soft	1 in 10 <sup>10</sup> bits
		Hard	1 in 10 <sup>12</sup> bits
Seek		1 in 10 <sup>6</sup> seeks	
<b>Power</b>	DC only		+5.0 VDC, ±5%, 2.0 amps max
			+12.0 VDC, ±5%, 0.25 amps max
			-12.0 VDC, ±5%, 0.4 amps max
			-5.0 VDC, ±5%, 2.5 amps max
			+24.0 VDC, ±10%, 2.5 amps typical, 8 amps peak starting
			Power consumption 75 watts
<b>Environmental</b>	Temperature		50°F to 122°F (10°C to 50°C)
	Relative humidity		10% to 80%
	Temperature variation		18°F (10°C)/hr.
			45°F (25°C) max. variation within temp. range
<b>Physical</b>	Altitude		10,000 ft (3050 m)
	Height		5.50 in (13.97 cm)
	Width		8.57 in (21.76 cm)
	Depth		19.25 in (48.89 cm)
	Weight		22 lbs (9.98 kg)
<b>Interface</b>	ANSI, IMI.		
<b>Optional Built-in Controller</b>	An optional built-in controller provides disc formatting, sector buffering, defect mapping, high level read/write commands with implied seek and selectable logical sector sizes. The interface is a simple 8-bit parallel command/data bus with 6 control lines.		
<b>Simple Installation</b>	The 7740 may be installed either on its side or on its base.		



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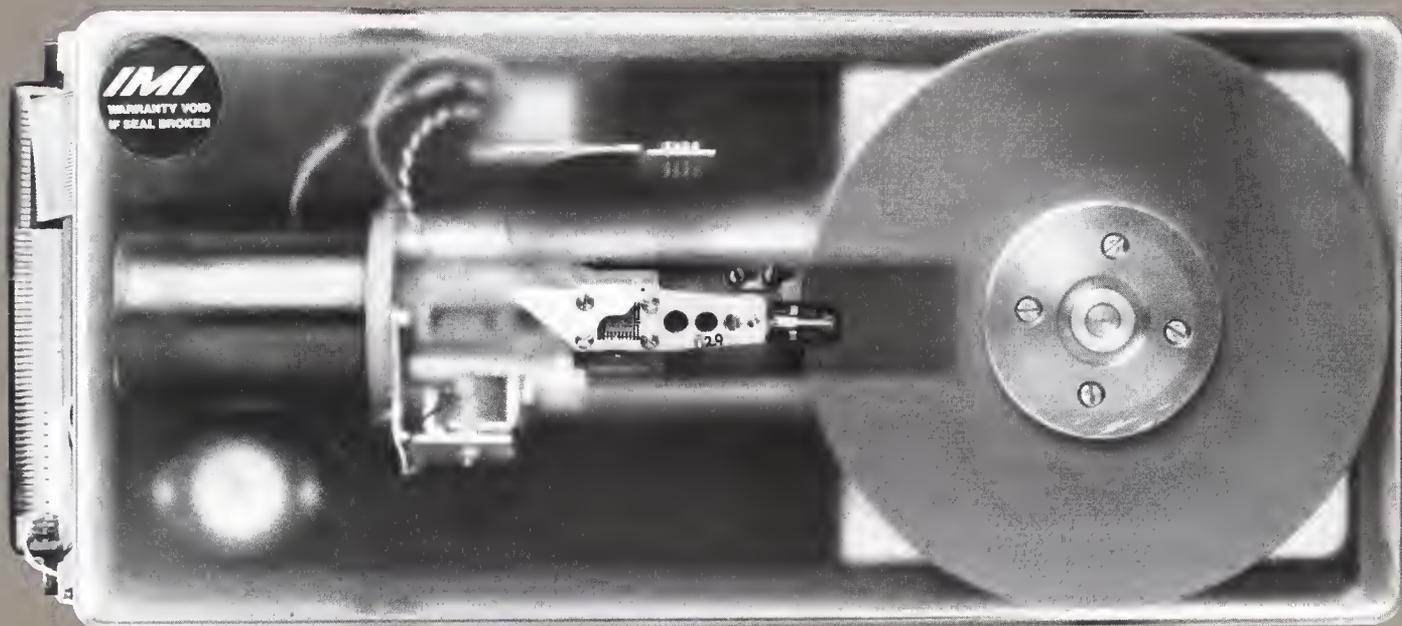
# IMI 7710 & 7720

## High performance 8-inch Winchester Disk Drives.

## 7000 Series

### Key features and benefits

- 12.5 and 20.9 Mbyte unformatted capacities
- Reliable Winchester head and media technology
- High Performance – 35 ms average access time
- Microprocessor control
- 75 watts power dissipation
- Brushless, direct coupled D.C. drive motor
- Data separation standard
- Optional ANSI interface with 7000A series
- Self-test capability
- No scheduled maintenance
- Dual interface connections simplify daisy-chain systems.
- To minimize possible resonances, the linear voice coil actuator has short head arms and a heavy-duty, ball bearing supported carriage.
- To eliminate head skew, the heads intersect all tracks on the same radius.
- All electronics are mounted on three PCBs that plug directly into a back panel and are cooled with forced air.
- The electronics cage is housed within the base and is easily removed. Extended for easy access, the cage is fully operational for servicing.
- Highly dimensional and temperature stable, the base is made of special fiberglass reinforced polyester that provides vibration dampening.
- The base provides for all structural, housing, and mounting needs. All major assemblies are mounted directly into the base, so that assembly is easy and accurate.
- Automatic carriage and spindle locks reduce the possibility of damaging the head or disk during shipping or handling. Upon power down, the heads move to a landing zone where they are restrained.



## IMI 7710 & 7720 Specifications

		7710	7720	
<b>Performance</b>	Capacity (unformatted)	Drive	12.57 Mbytes	20.95 Mbytes
		Per surface	4.19 Mbytes	4.19 Mbytes
		Per track	10,800 bytes	10,800 bytes
	Transfer rate		648 Kbytes/per second	648 Kbytes/per second
	Access time	Track-to-track	6 ms	6 ms
		Average	35 ms	35 ms
		Maximum	65 ms	65 ms
Average latency		8.3 ms	8.3 ms	
<b>Functional</b>	Rotational speed		3,600 rpm	3,600 rpm
	Recording density		6,200 bpi	6,200 bpi
	Track density		300 tpi	300 tpi
	Cylinders		388	388
	Data recording surfaces		3	5
	Heads per surface		1	1
	Disks		2	3
	Error rates:	Soft	1 in 10 <sup>10</sup> bits	1 in 10 <sup>10</sup> bits
		Hard	1 in 10 <sup>12</sup> bits	1 in 10 <sup>12</sup> bits
Seek		1 in 10 <sup>6</sup> seeks	1 in 10 <sup>6</sup> seeks	
<b>Power</b>	DC only		+5.0 VDC, ±5%, 2.0 amps max	
			+12.0 VDC, ±5%, 0.25 amps max	
			-12.0 VDC, ±5%, 0.4 amps max	
			-5.0 VDC, ±5%, 2.5 amps max	
			+24.0 VDC, ±10%, 2.5 amps typical, 8 amps peak starting.	
			Power consumption 75 watts	
<b>Environmental</b>	Temperature		50°F to 122°F (10°C to 50°C)	
	Relative humidity		10% to 80%	
	Temperature variation		18°F (10°C)/hr	
	Altitude		10,000 ft (3050 m)	
<b>Physical</b>	Height		5.50 in (13.97 cm)	
	Width		8.57 in (21.76 cm)	
	Depth		19.25 in (48.89 cm)	
	Weight		22 lbs (9.98 kg)	
<b>Interface</b>	ANSI, IMI.			
<b>Optional Built-in Controller</b>	An optional built-in controller provides disc formatting, sector buffering, defect mapping, high level read/write commands with implied seek and selectable logical sector sizes. The interface is a simple 8-bit parallel command/data bus with 6 control lines.			
<b>Simple Installation</b>	The 7710 and 7720 may be installed either on its side or on its base.			



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