

**MFE**

TECHNICAL DATA

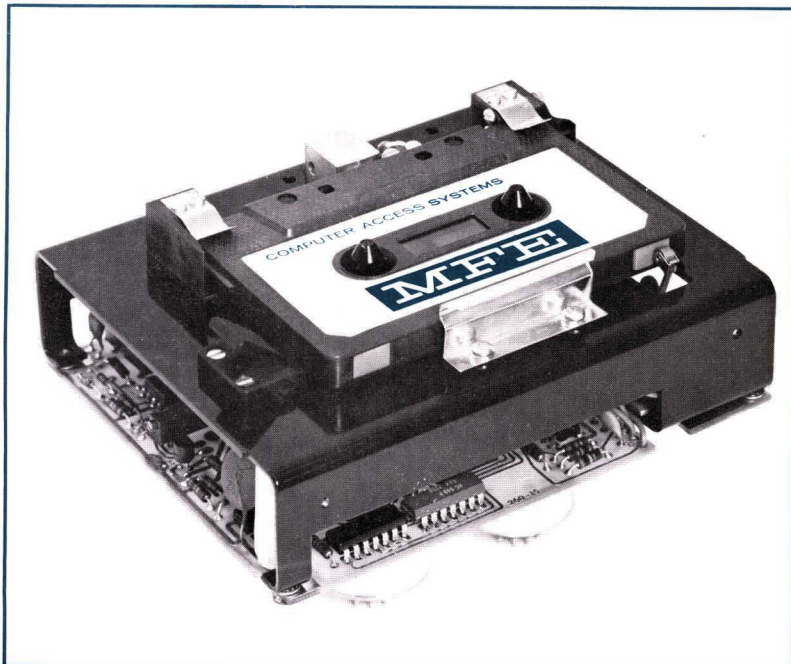
MODEL  
260

# HIGH RELIABILITY DIGITAL CASSETTE TAPE TRANSPORT PERFORMANCE

The MFE Computer Access Systems Model 260 C-DRIVE\* is a reel-to-reel digital cassette tape transport specifically designed for OEM applications.

**Low cost** tape system without a single performance sacrifice. This is possible because of the unique motor-tach technique of tape speed control and the use of integrated circuits throughout to maximize the flexibility while minimizing costs and size.

**High reliability**—there are only two moving parts in a Model 260 C-DRIVE, the two DC motor-tachs. This design eliminated capstans, solenoids, pinch rollers, clutches, belts, pulleys, or other mechanical paraphernalia which are inherently poor in performance and reliability. Under 100% operation, the Model 260 C-DRIVE has an MTBF of greater than 3000 hours. The time to repair is less than one half hour.



**Guaranteed cassette interchangeability** from transport to transport. All critical components in each transport, such as the motors, recording heads and precision cassette locating blocks are secured to the same steel plate. Because the head does not move at any time, the same head to tape relationship is maintained every time a tape is loaded, transport to transport. The tape speed variation from transport to transport is less than  $\pm 1\%$ .

**Small size**—Although the standard Model 260 C-DRIVE includes all the read/write and motion control electronics, the entire package is only 4-3/8" x 5-1/2" x 3-1/4" and weighs two pounds.

**Realistic Supply Voltages**—The 260 C-DRIVE is designed to be used with nominal  $\pm 12V$ , +5 volt supplies.

**Maintenance Free**—by eliminating moving parts, maintenance is also eliminated. Occasional cleaning of the heads is all that is required to keep the 260 C-DRIVE in perfect operating condition.

**High performance**—The 260 C-DRIVE is fully bi-directional, operates in a continuous or incremental mode, records data on a single track, phase encoded with densities up to 800 BPI, has a data transfer rate up to 9600 bits/second, and is easily interfaced using DTL or TTL logic.

Short term bit-to-bit "jitter" is less than  $\pm 5\%$  at 10 inches per second. Read and write tape speeds may be specified between 10 and 20 inches per second. The maximum start time of the 260 C-DRIVE is 60 milliseconds at 10 inches per second. Stop time is 30 msec. Two to three times the storage capacity of constant spindle speed transports is provided by the 260-C-DRIVE.

\*Registered

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## SPECIFICATIONS

<b>CASSETTE</b>	Any cassette which meets the ANSI, ECMA or ISO standard.
<b>MODES OF OPERATION</b>	Continuous or incremental. (Maximum Incremental Rate, 10 increments per second). Record Forward, Read Forward, Record Reverse, Read Reverse, Fast Forward, Fast Reverse.
<b>RECORDING DENSITY</b>	Any bit density from 50 to 800 bits per inch (BPI)
<b>DATA TRANSFER RATE</b>	Up to 9600 Bits per Second
<b>RECORDING METHOD</b>	Single track, bit serial phase encoded – Bi-phase-LEVEL or Bi-phase-MARK
<b>TAPE SPEED</b>	Slow speed set to customer requirements between 10 to 20 inches per second (set at factory). Fast speed, rewind or search 40 inches per second.
<b>SPEED CONTROL</b>	Short Term bit-to-bit "jitter" < $\pm 5\%$ . Long Term speed variation between transports < $\pm 1\%$
<b>START/STOP TIME</b>	Start—60 milliseconds maximum at 10 inches per second. Stop—30 milliseconds at 10 inches per second.
<b>POWER REQUIREMENTS</b>	+12V @ 1 amp maximum, -12V @ 300 mA maximum, +5V @ 100 mA maximum
<b>CONTROLS</b>	True 0 to +.5 VDC, false +3 to +5 VDC, DTL or TTL interface
<b>CONTROL FUNCTIONS</b>	1) Forward, 2) Reverse, 3) Fast/Slow, 4) Read/Write
<b>STATUS INDICATIONS</b>	1) End of tape, 2) Beginning of tape, 3) Cassette loaded—ready, 4) Busy—tape is in motion, 5) Write enable, 6) Warning of low tape supply, 7) Leader sensor
<b>DATA INPUT LINE</b>	Write data
<b>DATA OUTPUT LINES</b>	Data (+) indicates a flux charge on tape which was written toward the erase level. Data (-) indicates a flux change on tape which was written away from the erase level.
<b>PHYSICAL</b>	1) Size: 4-3/8" long X 5-1/2" wide X 3-3/4" high (without cover); 2) Weight: Two pounds (without cover)
<b>OPTIONS</b>	Dual gap read after write head, Biphas encoder/decoder, Special cover or paint finish,
<b>ENVIRONMENTAL</b>	+50°F to +120° F operating; -30° F to 160

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KEEWAYDIN DRIVE • SALEM, NEW HAMPSHIRE 03079  
TEL. 603-893-1921 • TWX 710-366-1887 • TELEX 94-7477



**MFE**PRICE LISTDIGITAL CASSETTE TAPE TRANSPORTS

<u>Model 250 (Standard)</u>	<u>1-9</u>	<u>10-24</u>	<u>25-49</u>	<u>50-99</u>	<u>100-199</u>
Tape transport complete with motion control circuitry, read and write electronics, read after write recording head, optical end of tape sensor and cassette ejector.	\$525	\$450	\$400	\$350	\$325
The model 250 may be ordered with Amphenol connector 223-1233 which uses Amphenol mating connector 223-1133 or with 3M Scotchflex ribbon cable connector 3429-2002 which uses mating connector 3399-000. Please specify on purchase order.					
<u>Model 250R (Read only) Option #101</u>					
Identical to Model 250 <u>without writing capability</u>	\$500	\$435	\$390	\$340	\$320
<u>Model 250W (Write only) Option #102</u>					
Identical to Model 250 <u>without read capability</u>	\$505	\$430	\$385	\$335	\$315
<u>Model 250 Encoder/Decoder Options*</u>					
#103 Bi-Ø-Mark	\$ 70	\$ 60	\$ 50	\$ 45	\$ 40
#104 Bi-Ø-Level	\$ 70	\$ 60	\$ 50	\$ 45	\$ 40
#105 Bi-Ø-Clock	\$100	\$ 80	\$ 70	\$ 60	\$ 50

<u>Model DC-30 Digital Cassettes</u>	<u>1-9</u>	<u>10-99</u>	<u>100-249</u>	<u>250-499</u>	<u>500-999</u>
Computer grade 100% certified cassettes with pre-recorded timing track for use with Model 250 tape transports.	\$8.50	\$8.00	\$7.50	\$7.25	\$7.00

\* Encoder/decoder boards available for use with Amphenol Connector 223-1233 only.

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Model 260 (Standard)

	<u>1-9</u>	<u>10-24</u>	<u>25-49</u>	<u>50-99</u>	<u>100-199</u>
Tape transport complete with motion control, read and write electronics, read/write recording head, optical end of tape sensor and cassette ejector. Read/write speed may be factory set between 10 ips and 20 ips. Please specify on purchase order. Rewind and search speed is 40 ips.	\$600	\$525	\$475	\$450	\$425

Model 260R (Read only) Option #201

Identical to Model 260 <u>without writing</u> capability.	\$575	\$505	\$460	\$440	\$415
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Model 260W (Write only) Option #202

Identical to Model 260 <u>without reading</u> capability.	\$570	\$500	\$455	\$435	\$410
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Model 260 RAW Option #203

Identical to Model 260 with read after write recording head for data verification while writing.	\$690	\$610	\$555	\$525	\$495
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Model 260 Encoder/Decoder

Option #204 Bi-phase-level	\$ 70	\$ 60	\$ 50	\$ 45	\$ 40
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	<u>1-9</u>	<u>10-99</u>	<u>100-249</u>	<u>250-499</u>	<u>500-999</u>
Model DC-30L Digital Cassettes Computer grade 100% certified cassettes for use with Model 260.	\$8.50	\$8.00	\$7.50	\$7.25	\$7.00

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	<u>1-9</u>	<u>10-24</u>	<u>25-49</u>	<u>50-99</u>	<u>100-199</u>
Options (for both Model 250 and Model 260)					
#301 Enclosure with dust cover	\$60	\$50	\$45	\$40	\$35
#302 Mating connector and pins	\$ 8	\$ 8	\$ 8	\$ 8	\$ 8
#303 3' Interface cable	\$25	\$22	\$20	\$18	\$16
#304 Special Enclosure and/or paint		----	factory quote	----	
#305 Special voltages or power supply		----	factory quote	----	

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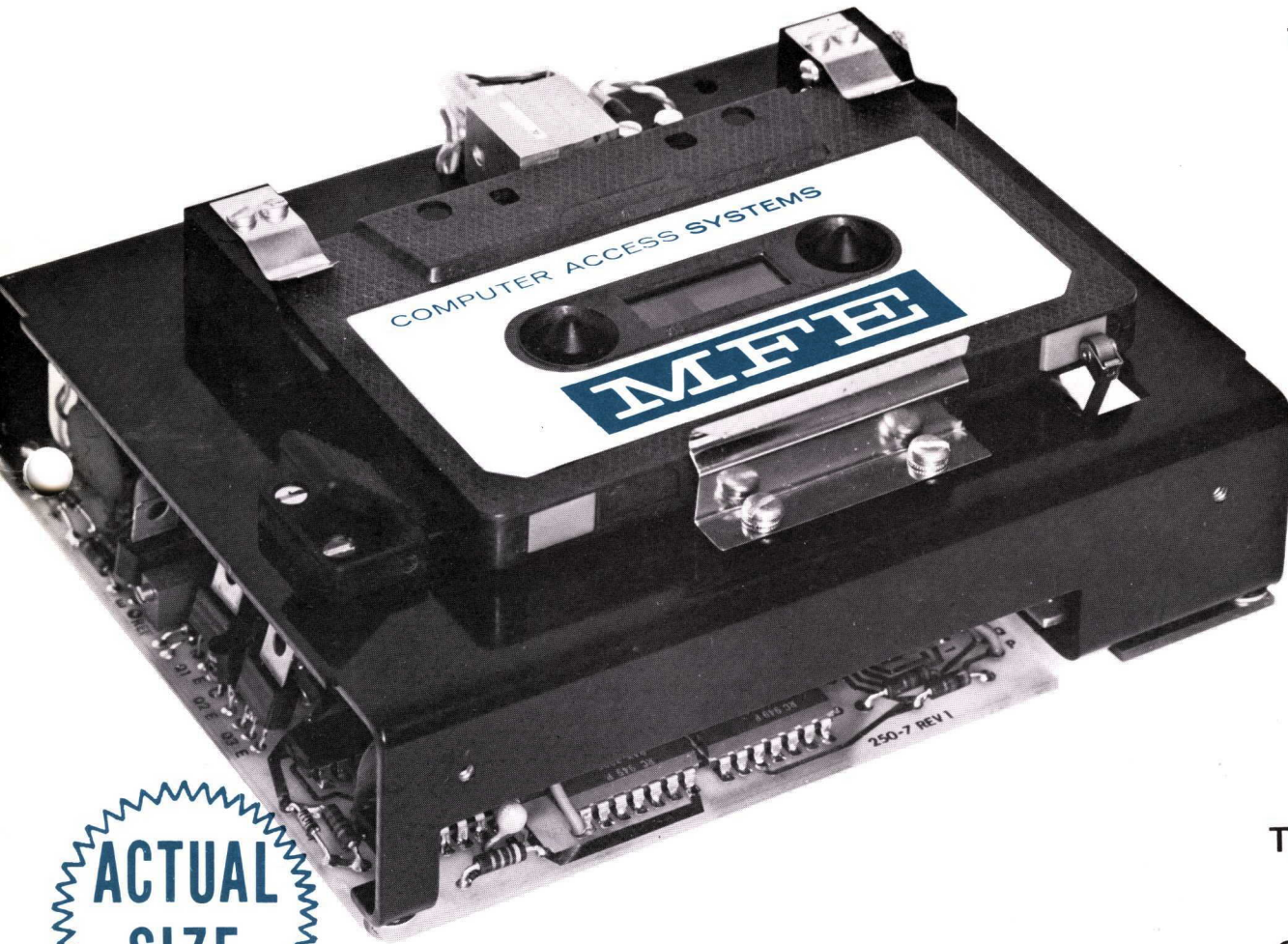
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**MFE**

TECHNICAL DATA

MODEL  
250

**HIGH RELIABILITY**  
**DIGITAL CASSETTE TAPE TRANSPORT**  
**LOW COST**



**TWO MOVING  
PARTS**

**15,000 HOUR  
MTBF**

**UNIQUELY  
SIMPLE**

**LOW  
POWER**

**CONSTANT  
TAPE SPEED**

**CONSTANT  
TAPE TENSION**

**GUARANTEED  
CASSETTE INTERCHANGEABILITY**

**EASILY INTERFACED TO DTL OR TTL LOGIC**

**LOW ERROR RATE LESS THAN 1 in 10<sup>7</sup> BITS**

**ACTUAL  
SIZE**

REPRESENTED BY  
**THE THORSON COMPANY**  
*Engineering Representatives*  
2443 ASH STREET  
PALO ALTO, CALIFORNIA 94306  
DA 1-2414

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## DESCRIPTION

The MFE Computer Access Systems' Model 250 C-Drive\* is the ultimate in simplicity. The mechanics are gone — all that is left is performance. Only two moving parts — the reel motors (something has to move the tape). The Model 250 has achieved the highest RELIABILITY and PERFORMANCE in the SMALLEST SIZE at the LOWEST COST possible. A unique tape handling technique which offers CONSTANT TAPE SPEED as well as CONSTANT TAPE TENSION, guarantees positive but gentle tape handling even under the most severe start/stop operation. Maintenance — there is none — just clean the head occasionally. INTERCHANGEABILITY — guaranteed. FLEXIBILITY — the Model 250 is easily interfaced using DTL or TTL logic. All electronics necessary for reading, writing and tape motion control are contained on a single printed circuit board, yet the 250 requires only  $\pm 5$  volt supplies and dissipates less than 3.5 watts. MTBF is 15,000 hours and MTTR is less than thirty minutes. Add to this an error rate of less than 1 in  $10^7$  bits and it's obvious why the Model 250 is the best value on the market today. The standard Model 250 C-Drive includes all electronics for tape motion control, read/write circuitry, read after write recording head, optical end of tape warning system, and cassette ejector.

**TWO MOVING PARTS** The MFE Computer Access Systems' Model 250 C-Drive represents a breakthrough in digital cassette tape transport design. There are no capstans, solenoids, pinch rollers, clutches, belts, pulleys or other mechanical elements to lower performance and reliability. This, plus the use of integrated circuits throughout provides maximum dependability and performance at minimum cost.

**SMALL SIZE** Although the standard Model 250 C-Drive includes all the electronics required for writing, reading and tape motion control, the entire package is only  $4\frac{1}{2}$  inches wide by  $5\frac{1}{2}$  inches long by  $2\frac{1}{2}$  inches high, and weighs less than two pounds. Three transports will mount side by side in a standard 19 inch rack.

**CASSETTE INTERCHANGEABILITY** All precision hardware in each transport — motors, recording head and cassette locators — are secured to a single steel plate. Because there are no capstans, the cassette is "front loaded" into the head (the head never moves), and the same precise head to tape relationship is maintained every time a tape is loaded on every single tape transport. This guarantees cassette interchangeability from transport to transport.

**RELIABILITY** By eliminating moving parts, maintenance is eliminated. Occasional cleaning of the recording head is all that is required to keep the 250 C-Drive in perfect operating condition. Under continuous 100% operation, the 250 has an MTBF of greater than 15,000 hours. The time to repair is less than thirty minutes.

**PERFORMANCE** The Model 250's unique tape handling system results in constant tape speed, low bit-to-bit jitter ( $\pm 3\%$ ), and extremely gentle tape treatment even under the most severe start and stop operating conditions.

The user can choose any tape speed from 10 to 40 inches per second (IPS), and any recording density from 50 to 800 bits per inch (BPI) without factory modification or adjustment. For complex applications, any bit rate may be selected by simply changing the tape speed. This allows data to be collected at low speed and transmitted over communication lines at high speed. The 250 C-Drive is fully bi-directional and operates in a continuous or incremental mode. Character blocking can be arranged to fit application needs.

The Model 250 is designed to use nominal  $\pm 5$  volt power supplies; however the C-Drive can be operated with a single 10 or 12 volt power supply. This, plus its compact size and light weight, makes the Model 250 C-Drive ideal for battery, mobile or unattended operations.

## OPTIONS

### Head Configurations:

- Read Only
- Write Only

### Bi-Phase Encoder/Decoder

- Bi-Phase — MARK
- Bi-Phase — LEVEL
- Bi-Phase — CLOCK

- Tape Speeds—down to 2 IPS (5.73 cm/s)
- Recording Densities greater than 800 BPI

- Cover and Dust Door
- Special Cover
- Special Paint (Logos, etc.)

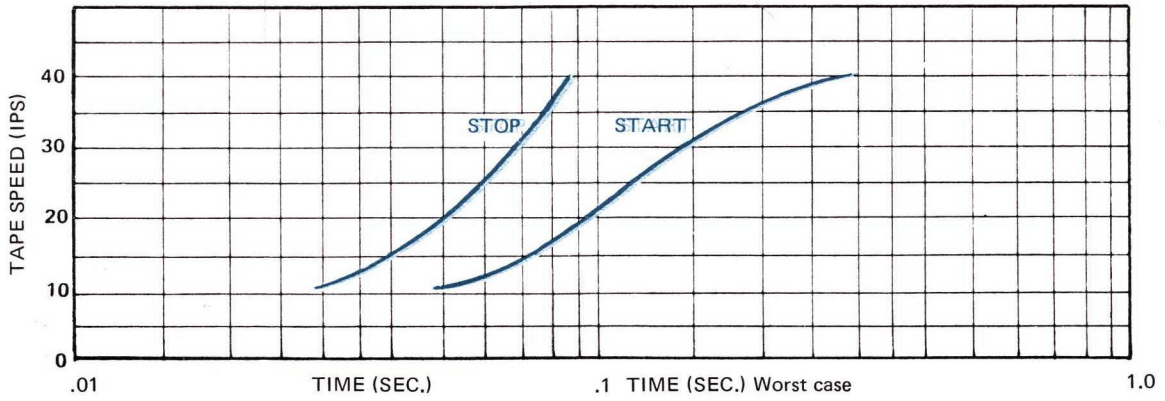
### Special Voltages and Connectors

- Special Power Supply
- Connector Cable
- Special Voltages
- Special Connectors

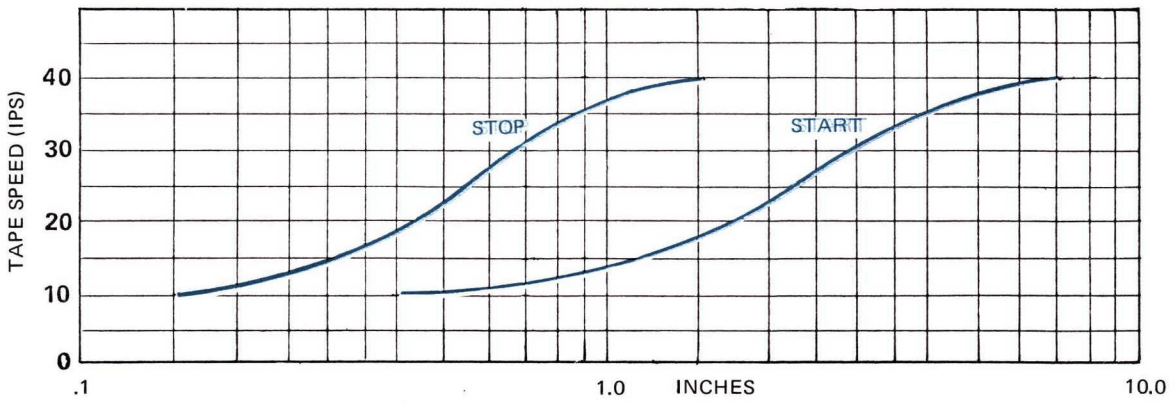
\*Registered

# DYNAMIC PERFORMANCE CHARACTERISTICS

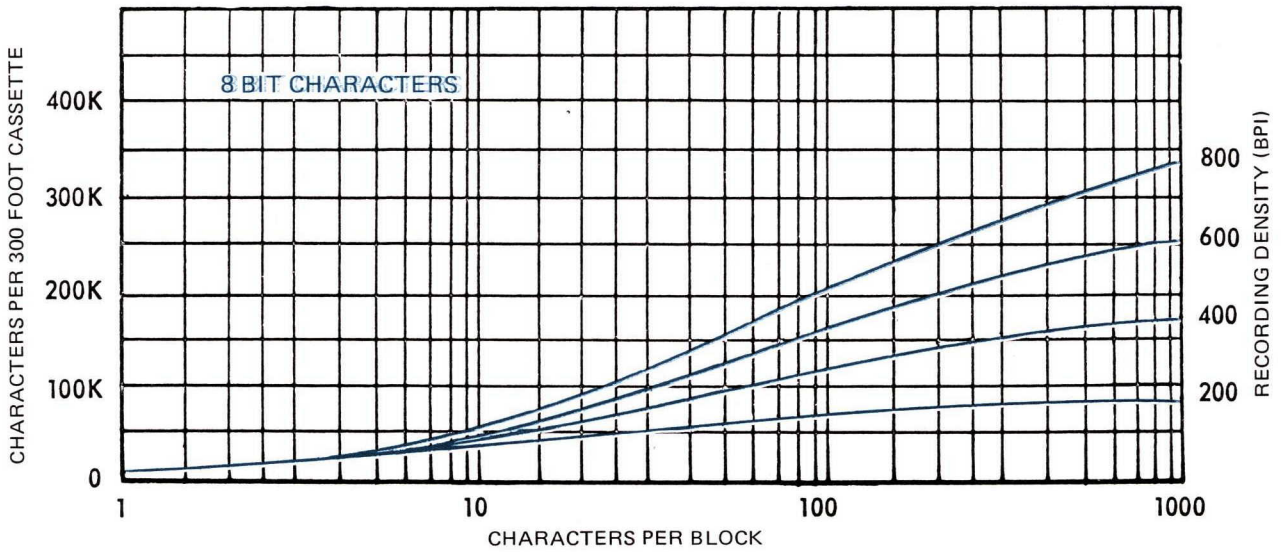
Start/Stop Time vs Tape Speed



Stop/Start Distance vs Tape Speed



# CASSETTE STORAGE CAPACITY





## SPECIFICATIONS

<b>CASSETTE</b>	Any cassette which conforms to the ANSI, ECMA, or ISO standard — leaderless and with a 1600 FCI clock track on track #2.			
<b>MODES OF OPERATION</b>	Continuous Incremental (30 increments per second maximum)			
<b>RECORDING DENSITY</b>	50 to 800 Bits Per Inch			
<b>DATA TRANSFER RATE</b>	Up to 9600 Bits Per Second			
<b>RECORDING METHOD</b>	Single track, bit serial, phase encoded			
<b>TAPE SPEED</b>	Electronically adjustable by user to any speed (infinite resolution) from 10 inches per second to 40 inches per second (25.4 centimeters per second to 101.6 centimeters per second). (Lower speed options available.)			
<b>SPEED CONTROL</b>	Long term speed variation (end to end) $< \pm 1\%$ Short term speed variation (bit to bit "jitter") $< \pm 3\%$			
<b>INTER-RECORD GAP</b>	0.7 inches minimum at 10 inches per second (ANSI Standard) (1.78 centimeters minimum at 25.4 centimeters per second)			
<b>CASSETTE STORAGE CAPACITY</b>	2.88 x 10 <sup>6</sup> bits per cassette maximum — Refer to chart previous page			
<b>POWER REQUIREMENTS</b>		Running Current	Peak Current	Regulation
	Voltage			
	Logic +5V	200 MA	250 MA	$\pm 5\%$
	Amplifiers -5V	130 MA*	150 MA*	$\pm 5\%$
	Servo +5V	350 MA	500 MA	$\pm 5\%$
	*250 MA for units equipped with optical EOT/BOT option.			
<b>START/STOP PERFORMANCE</b>	Speed: Inches per second (Centimeters per second)	10 (25.4)	20 (50.8)	
	Start (milliseconds)	50	100	
	Stop (milliseconds)	30	60	
	(Start time defined as the time from no tape motion to within the short term speed specification.) (Stop time defined as the time from full speed until tape motion stops.) Refer to charts on previous page.			
<b>INTERFACE</b>	DTL or TTL interface			
<b>INTERFACE LINES TO MODEL 250</b>	Forward Go Reverse Go Speed Control One Shot Reset Data Input Lines (2) Power Lines (2)			
<b>INTERFACE LINES FROM MODEL 250</b>	Data Output Lines (3) Speed Control Clock Track Cassette Loaded Write Permit End of Tape/Beginning of Tape Busy			
<b>DIMENSIONS</b>	With cover — Length 5.92" x Width 4.85" x Height 3.12" (15.04cm x 12.32cm x 7.92cm) Without cover — Length 5.46" x Width 4.39" x Height 1.60" (13.87cm x 11.15cm x 4.05cm)			
<b>WEIGHT</b>	With cover — 2 lb. (907 g.) Without cover — 1 lb. 7 oz. (652 g.)			
<b>ENVIRONMENT</b>	Operating: +50° to 120° Farenheit (10° to 49° Centigrade) with 10% to 90% Relative Humidity (no condensation) Storage: 30° to 160° Farenheit (-34° to 71° Centigrade) with protection from dust and moisture			
<b>MOUNTING</b>	Vertical or Horizontal			

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