WINCHESTER BACK-UP

The here and now of ¼"

cartridge tape drives

DATA ELECTRONICS
DEI INC.®
CALL (714) 452-7840
OR TELEX 69-7118
10150 SORRENTO VALLEY ROAD
SAN DIEGO, CALIFORNIA 92121

WINCHESTER BACKUP

THE HERE-AND-NOW
¼-INCH CARTRIDGE TAPE DRIVE

PRESENTED BY DATA ELECTRONICS INC.
SAN DIEGO, CALIFORNIA

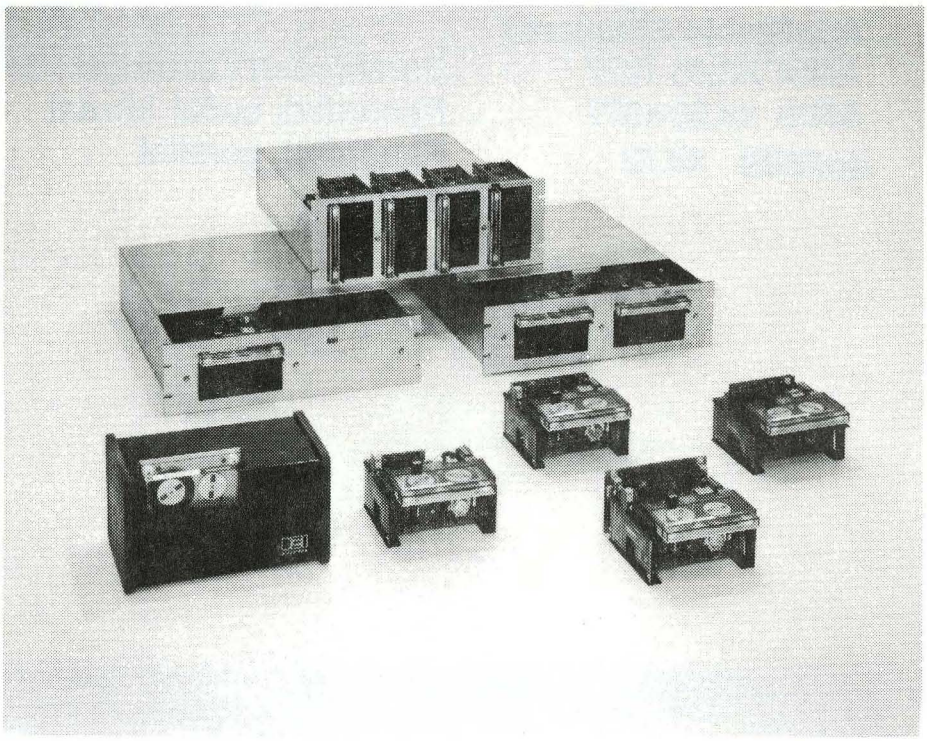
308711A 11/80

BACKGROUND

DC-300A DATA CARTRIDGE INTRODUCED BY 3-M in 1972

APPLICATIONS

- Data Logging
- Telecommunications
- Geophysical exploration
- Military



DATA ELECTRONICS, INC.

Cartridge Tape Drives

CHARACTERISTICS 1972-1976

- 1600 BPI
- 300 ft. Tape Cartridge
- 2.88 MByte Capacity
- 48 K Bit/Sec Transfer Rate

- STEADY GROWTH MARKET

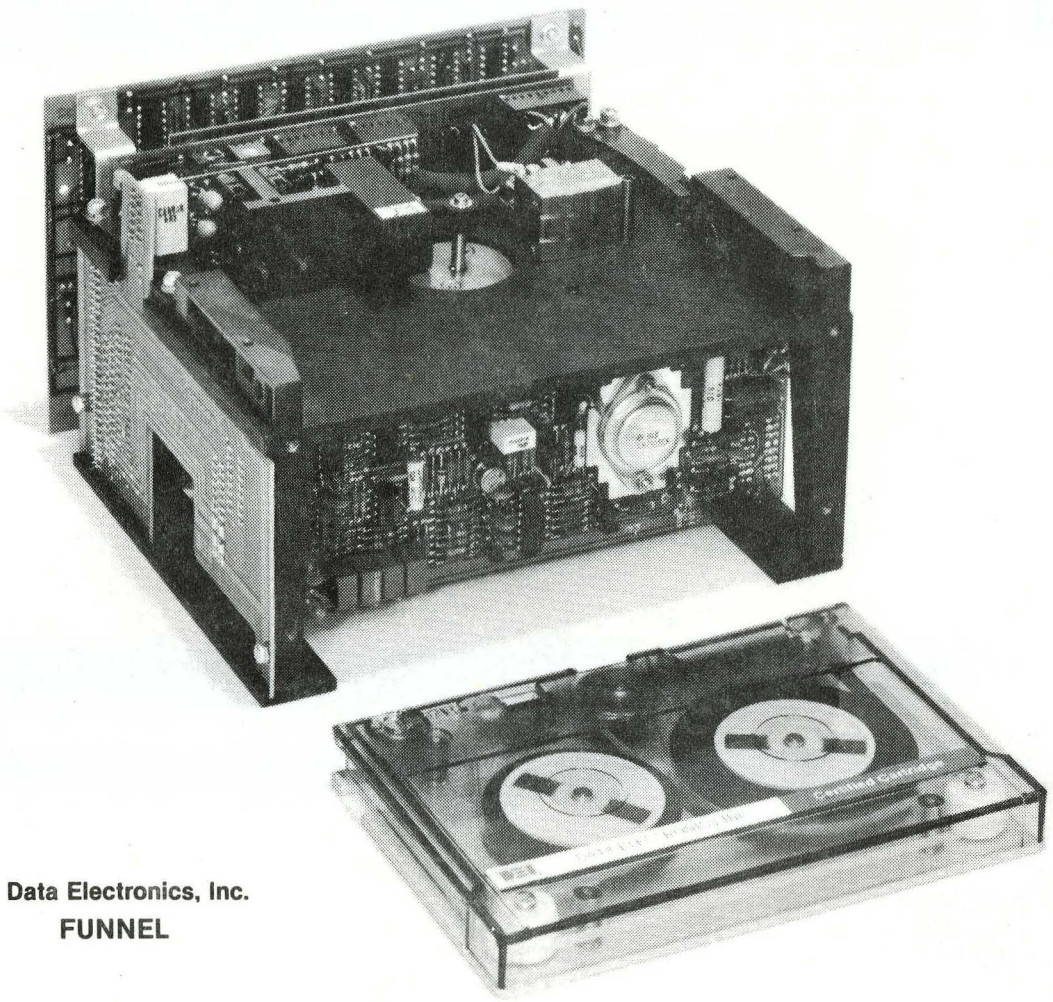
- APPROXIMATELY 100,000 DRIVES IN FIELD

Applicable Standards

ANSI X3.55-1977	Unrecorded Cartridge
ANSI X3.56-1977	Recorded, serial format
dpANSI x3.72	Recorded, parallel format

NEW DEVELOPMENTS

- 6400 BPI - High Density Recording
- 450 Ft. Tape Cartridge
- 17.5 MByte Capacity
- 192 KBit/Sec Transfer Rate

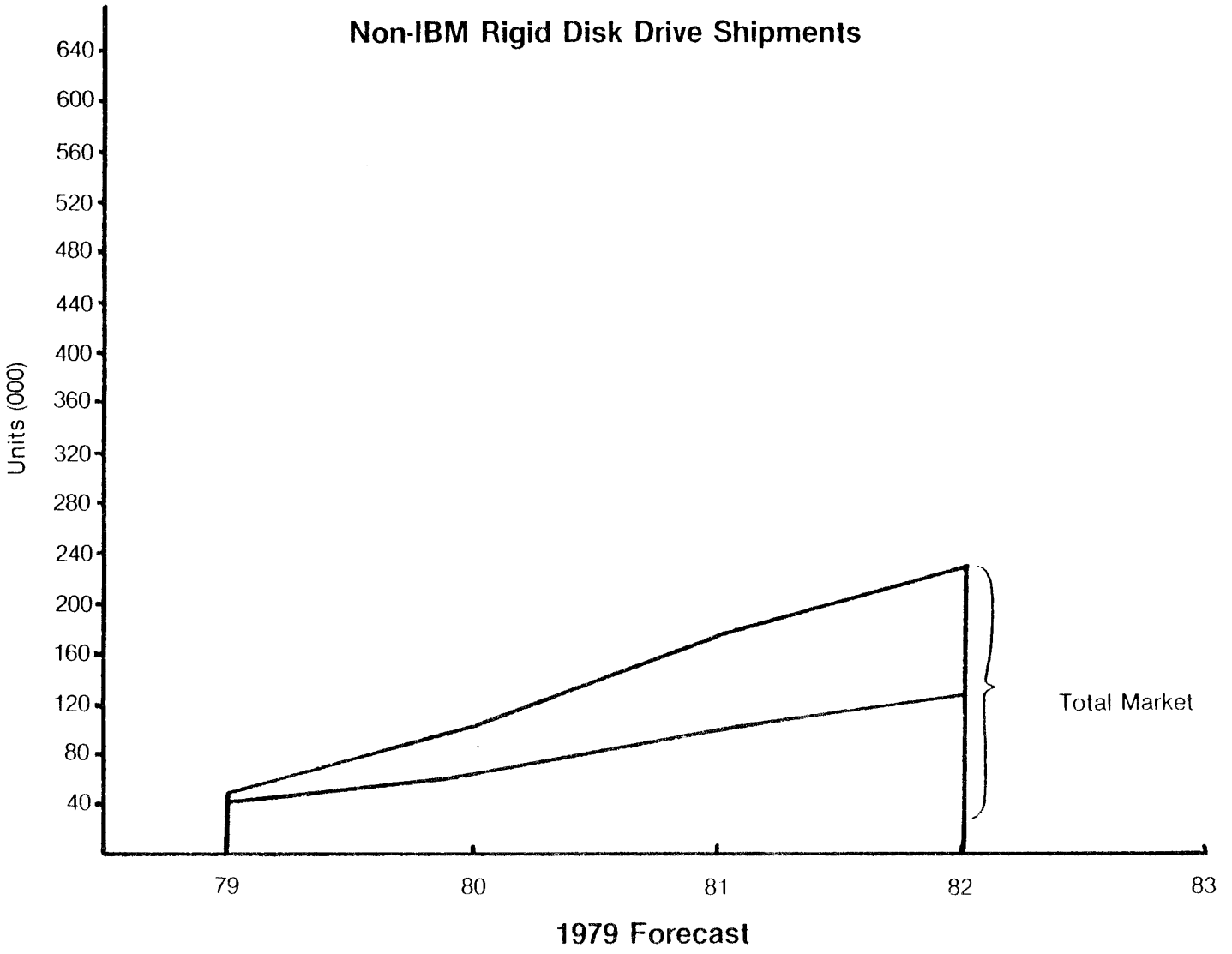


Data Electronics, Inc.
FUNNEL

RESULTS...

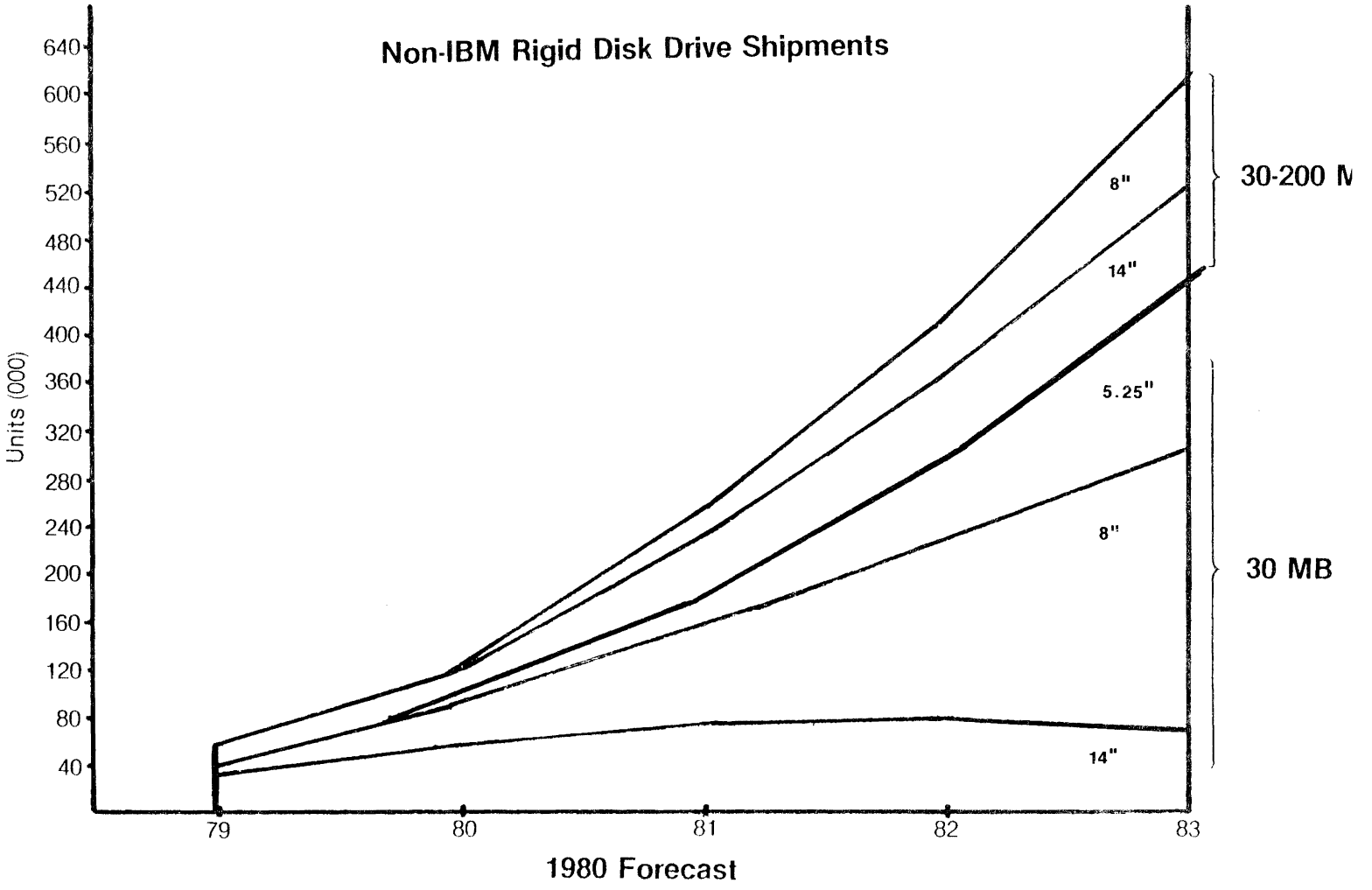
A PERFECT FIT FOR AN EMERGING NEW EXCITING MARKET PLACE

WINCHESTER DISK BACK-UP



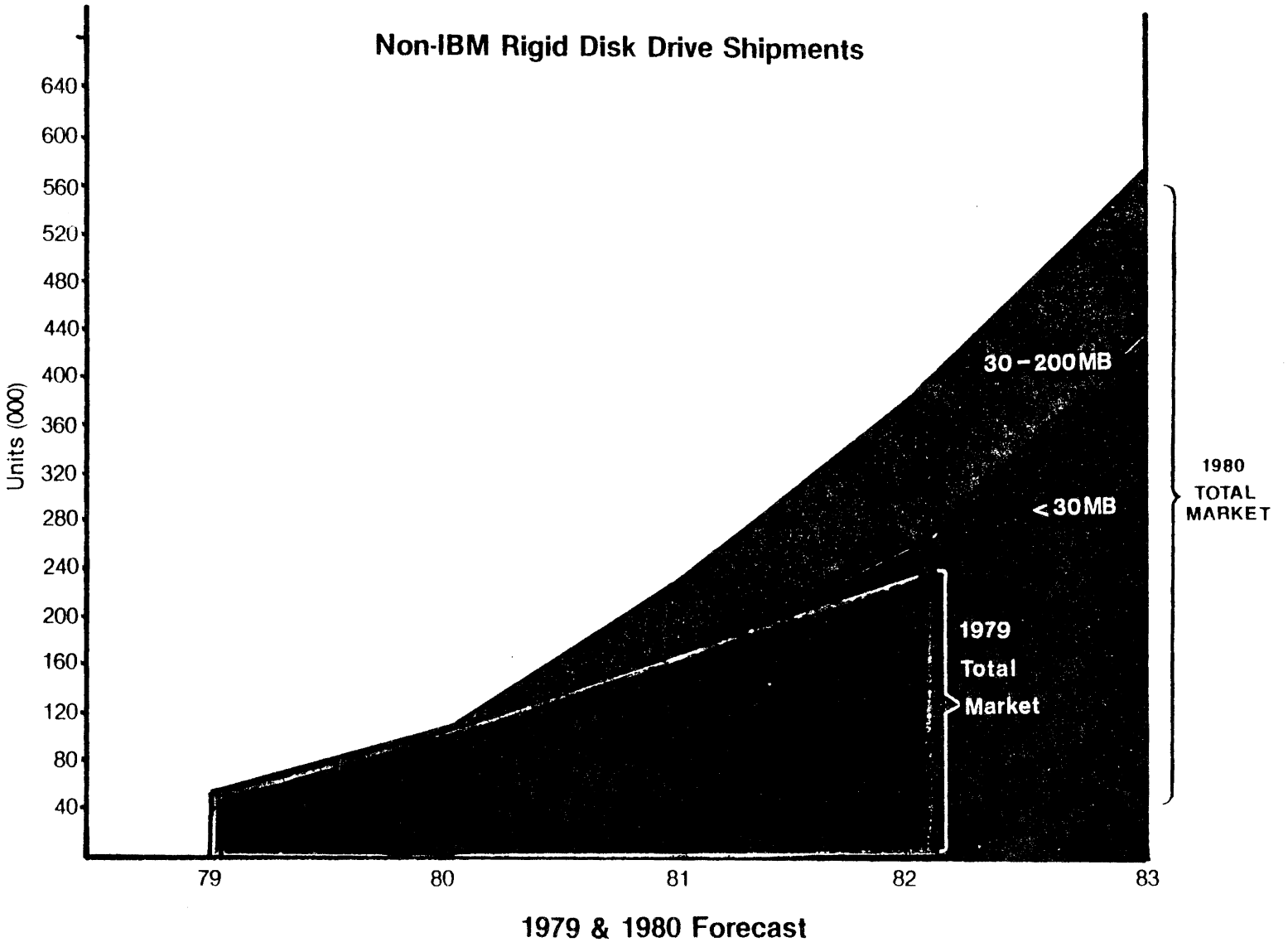
Source: Disk Trend Reports

Three-year Forecast of Non-IBM Rigid Disk Drive Shipments published in 1979.



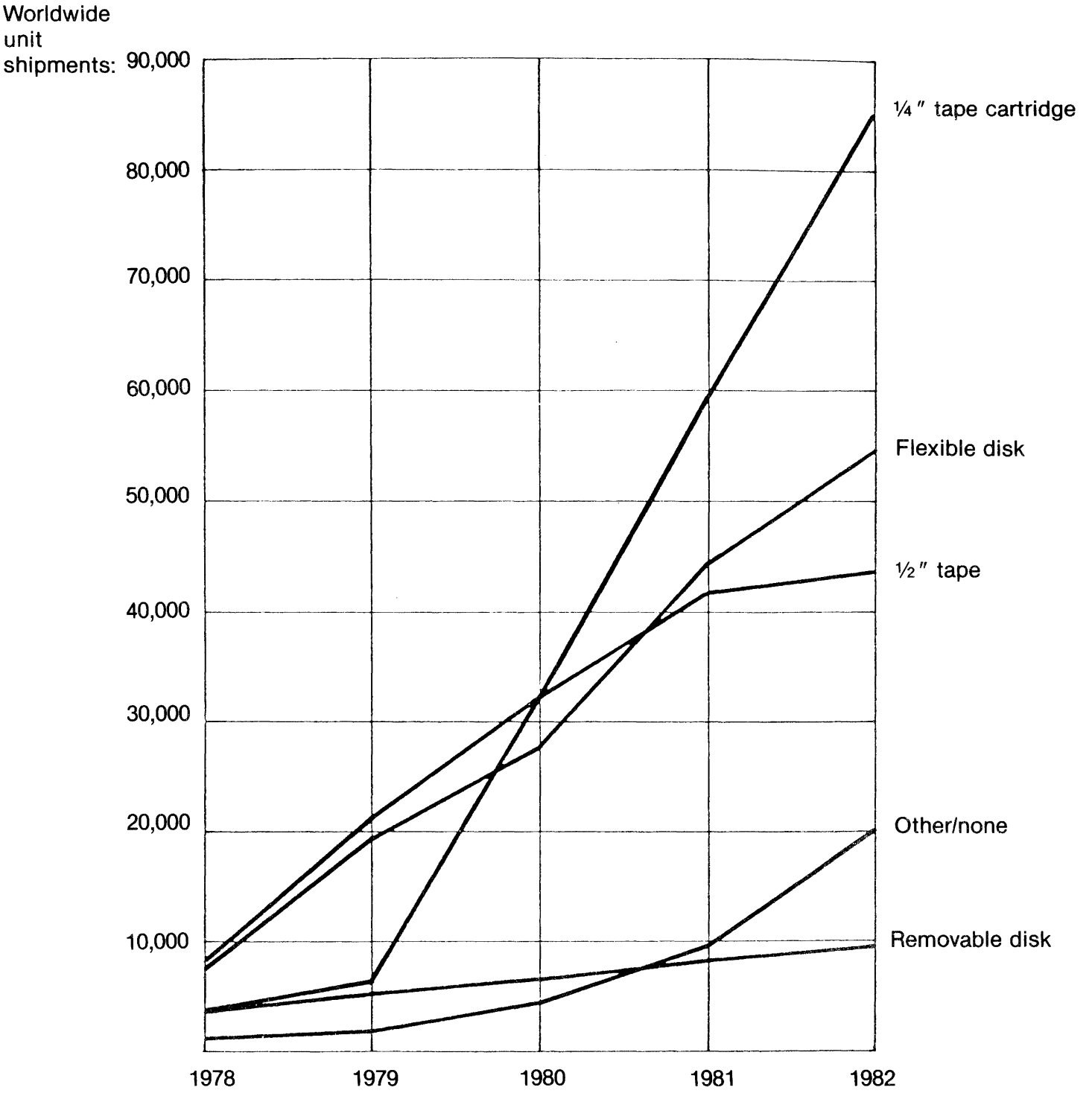
Source: Disk Trend Reports

Breakdown of 1980 Three-Year Forecast by Disk Size



Source: Disk Trend Reports

1980 Three-year Forecast Overlaid on 1979 Forecast (P. 6) to Illustrate Dramatic Increase in 1981-1983 Timeframe.



Credit: James Porter Author of Disk Trend Reports

Projected backup requirements for non-IBM systems using fixed disk drives
Based on shipments of systems using fixed disk drives less than 200 MB

WINCHESTER BACK-UP

CRITERIA	CHARACTERISTICS DESIRED
CAPACITY:	5 - 80 MByte
BACKUP TIME:	2 min. to 15 min.
SIZE:	Same or less than 8" Floppy
ERROR RATES:	Same as disk
COSTS:	½ to ⅓ cost of disk
ENVIRONMENT:	Low-skilled operator
RELIABILITY:	Greater than disk
INTERFACE:	Simple, convenient
MEDIA:	Low cost, multi-sourced

Note: These were derived through independent market research.

START/STOP ¼" DRIVE

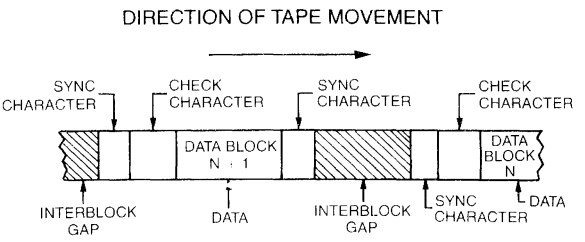
FEATURES

- True tape peripheral
- File search capability
- File management capability
- Track Addressing
- Traditional tape interface

25,000 in use

START / STOP CARTRIDGE TAPE DRIVE

- **CHARACTERISTICS**
  - 6400 BPI
  - 17.5 MBytes (UP TO 68 MBYTES @ 3M VERSION
  - 30 ips Read/Write
  - 90 ips Search & Rewind
  - 192 KBit/Sec Transfer rate
  - 4 Track Serial

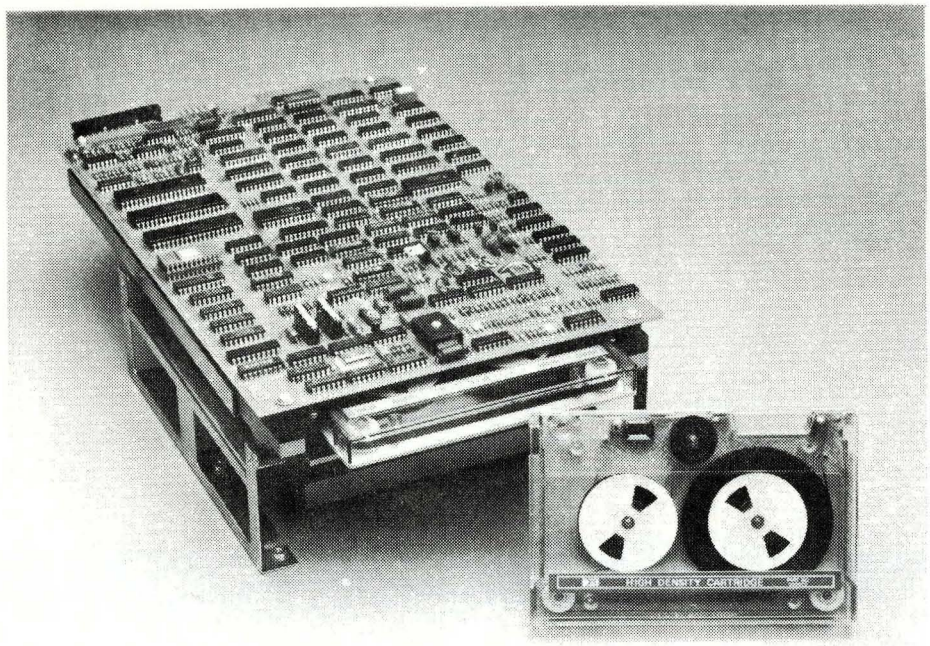


DATA FORMAT

FOR INCREMENTAL RECORDING MODE

STREAMING ¼" CARTRIDGE TAPE DRIVE

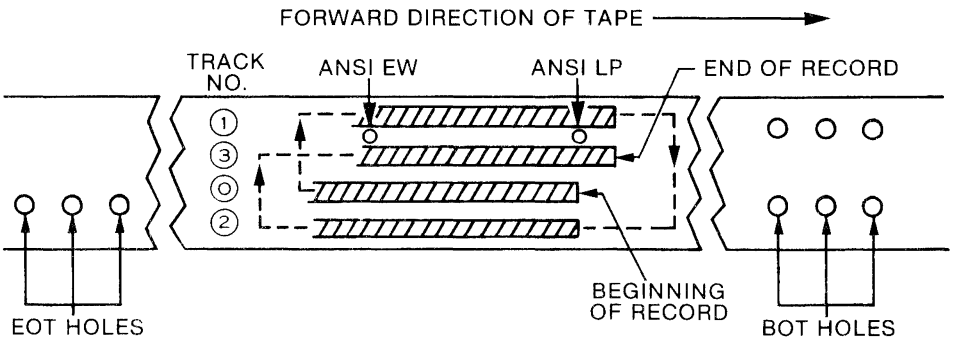
- Faster back-up — 5 MByte/min
- Increased transfer rate
- Increased capacity
- Compressed data format
- Invisible error rates
- Size of 8" Floppy
- Simplified interface
- Lower installed cost



DATA ELECTRONICS, INC.

STREAMER

SERPENTINE RECORDED TRACK FORMAT



STREAMING ¼" CARTRIDGE TAPE DRIVE

- **INCLUDES**
  - Double buffering
  - Code conversion ⇄
  - Formatting ⇄
  - Error Detection/Correction

INTERNAL MEMORY BUFFER

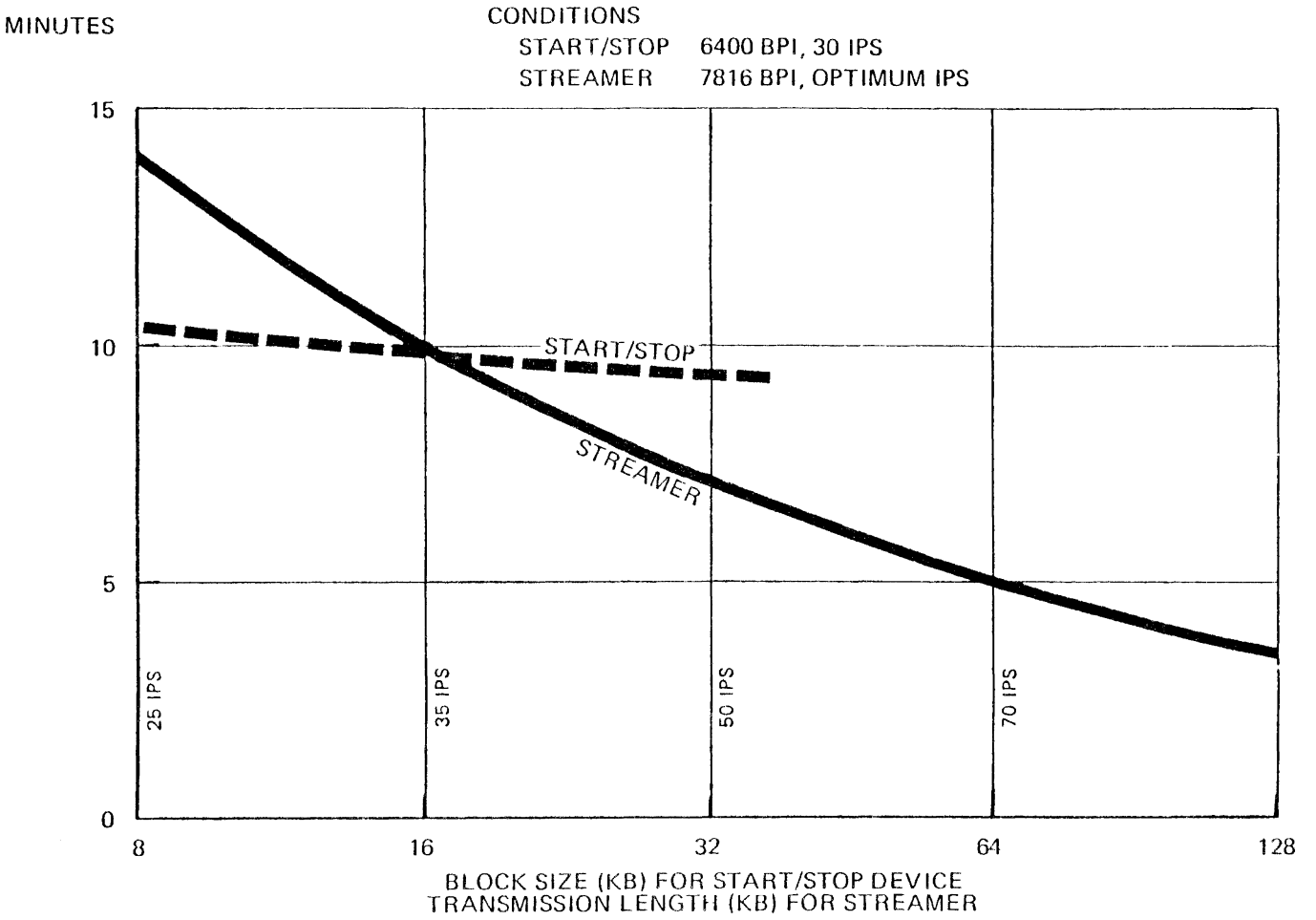
STREAMING ¼" CARTRIDGE TAPE DRIVE

- **WHAT IS STREAMING?**

  Utilization of all available tape by eliminating the traditional starting and stopping in interrecord gaps.
  A compressed data format

MINIMUM DATA TRANSFER TIMES, NOT INCLUDING REWIND

FOR 10 MB TO QUARTER-INCH CARTRIDGE DRIVES

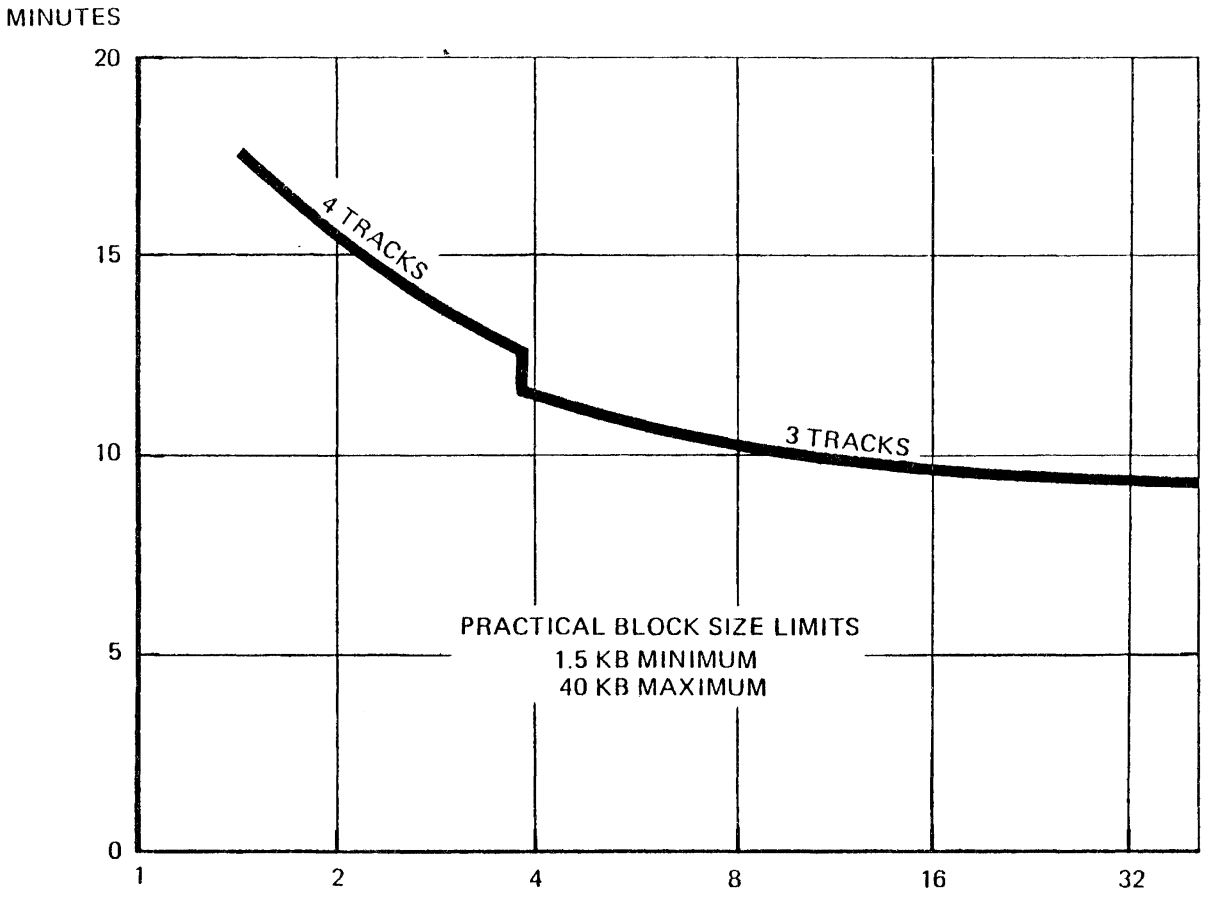


DATA SOURCE: Freeman Reports

TIME TO TRANSFER 10 MB TO QUARTER-INCH START/STOP TAPE DRIVE

FOR VARYING BLOCK SIZES

(ASSUMES 6400 BPI, 30 IPS (24 KBS), 450-FOOT CARTRIDGE,
NO REWRITES, NON-SERPENTINE RECORDING)



DATA SOURCE: Freeman Reports

To maintain streaming operation, the Streamer must transfer data at nearly 90k bytes/sec; a slower transfer rate causes the drive to start and stop repeatedly, making the process slower than a standard cartridge-based approach. A 90k bytes/sec rate implies about 11 μsec of processing time per byte. Not even the new 16-bit μPs can move data this rapidly — especially while handling handshakes and monitoring status lines — without the aid of direct-memory-access (DMA) circuitry. Additionally, the new Winchester discs are hard pressed to maintain this transfer rate while allowing for sector seeks and track-to-track head movements. Thus, only with DMA hardware can a μP hope to provide data rapidly enough for the Streamer. And the disc also needs DMA transfers in order to keep the tape streaming.

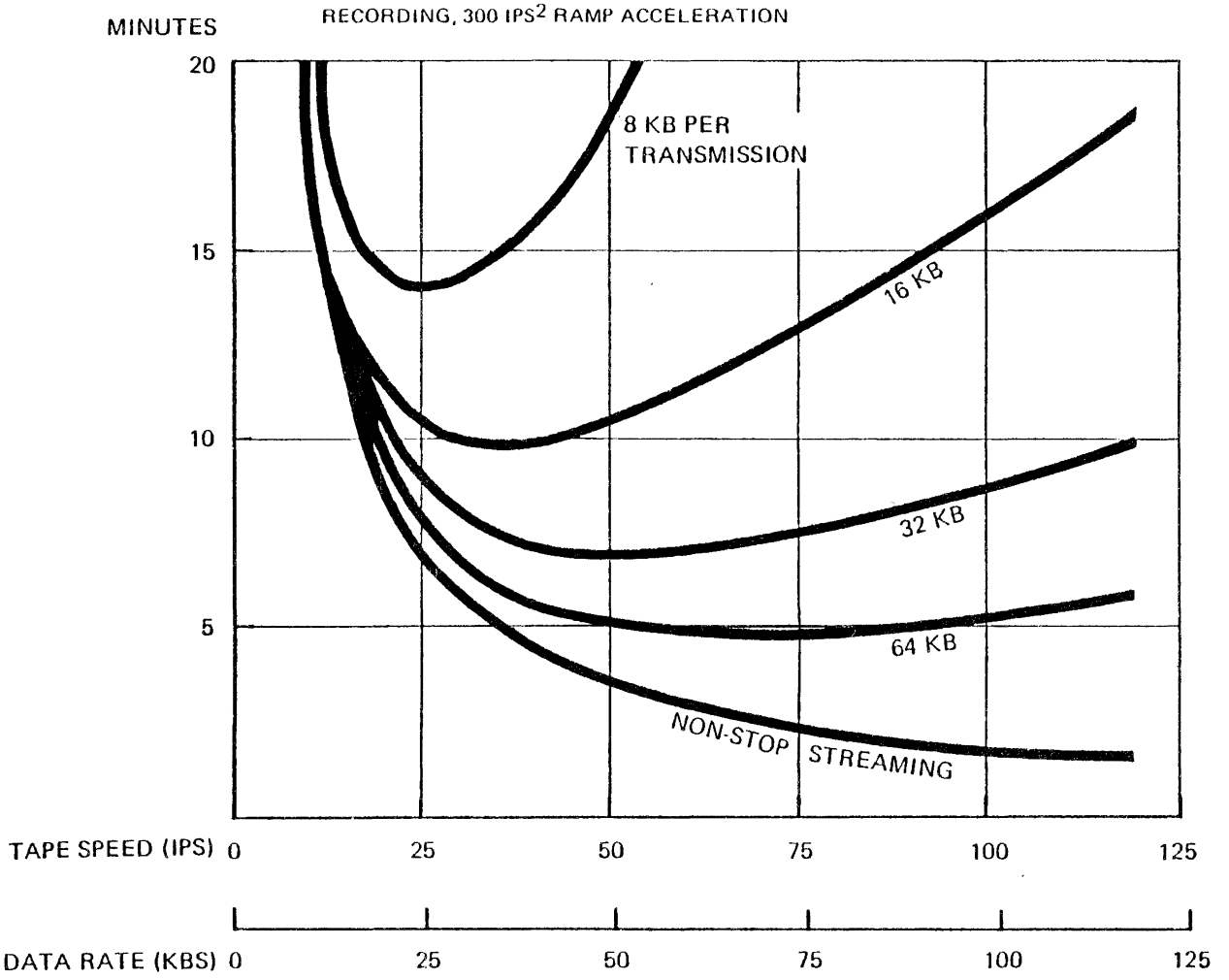
Taking these problems into account, DEI now markets a Streamer that operates at 30 ips (see **box,** "Two streaming-speed options"). At this speed, the disc and host have a chance of keeping up with the Streamer. As a result, even though the transfer rate is only one-third as fast, the Streamer never has to stop, thereby speeding the backup operation.

Robert Grappel, Consultant
and **Jack Hemenway,** Consulting Editor

TIME TO TRANSFER 10 MB TO QUARTER-INCH STREAMER TAPE DRIVE

FOR VARYING TRANSMISSION LENGTHS

ASSUMES 7816 BPI, FEW REWRITES, SERPENTINE RECORDING, 300 IPS^2 RAMP ACCELERATION



DATA SOURCE: Freeman Reports

CURRENTLY AVAILABLE INTERFACES:

TYPE OF DRIVE

Start/Stop	Streaming
u Nova, Nova, MULTIBUS	LSI-11
RS232, S-100	S-100
Pertec FT 8000	PDP-11
Ohio Scientific C2/C3	MULTIBUS
LSI-11, Q-Bus	
PDP-11	
TI-990	

FUTURE TRENDS

VARIABLES

- Bit density
- Number of tracks
- Tape length
- Tape speed
- Costs

The future of this product is not at all limited by technology, but only by the creativity and capability of who designs, manufacturers, and uses 1/4-inch Cartridge Magnetic Tape Drives.