Stretch
HARVEST

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NSA FARMBOY Note #1

SUBJECT: TRACTOR Tape Block Size and Efficiency

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TRACTOR Tape Specifications of interest to the programmers are:

Maximum information rate	141,000 words/second
Information transfer time	7 microseconds/word
Tape speed	235 inches/second
Information density	600 words/inch
Tape length	1800 feet
Maximum tape capacity	12.9 million words
Inter-record gap	1.25 inches
Start time	5 milliseconds
Stop time	5 milliseconds
Rewind time (high speed)	55 seconds
Rewind time (low speed)	91 seconds

From the specifications we can calculate:

1. Effective block time, which is the time from issuing a tape
   read until the information has been read. (Start time plus
   data read time)

2. Efficiency, which is data read time divided by effective
   block time.

3. Maximum tape capacity.

4. Maximum number of blocks.

5. Time to read one reel of tape assuming tape comes to complete
   stop at end of block.

The inclosed list tabulates these results for block sizes from
100 words to 10,000 words.

A graph is included which shows the relationship of block size to
number of blocks, and number of words on tape.

Interpretation of these figures is left to the programmer.

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Incl

TRACTOR TAPE PARAMETERS
V. S. BLOCK SIZE

Block Size	Block Time	Efficiency	Tape Capacity Words	Number of Blocks	Time to Read Tape	Block Size
Words	Millisec	Percent	Million		Seconds	Words
100	5.70	12.2	1.57	15,700	168	100
250	6.75	25.9	3.34	13,360	157	250
500	8.5	41.1	5.30	10,600	143	500
750	10.25	51.2	6.60	8,800	134	750
1,000	12.0	58.3	7.52	7,520	127	1,000
1,500	15.5	67.7	8.73	5,820	119	1,500
2,000	19.0	73.6	9.49	4,745	113	2,000
3,000	26.0	80.7	10.41	3,470	107	3,000
4,000	33.0	84.8	10.93	2,732	104	4,000
5,000	40.0	87.5	11.28	2,256	102	5,000
6,000	47.0	89.3	11.52	1,920	100	6,000
8,000	61.0	91.8	11.84	1,480	97	8,000
10,000	75.0	93.3	12.03	1,203	96	10,000
∞	?	100%	12.9	1	91	∞

BLOCK SIZE IN WORDS

WORDS PER TAPE (MILLIONS)

BLOCKS PER TAPE (THOUSANDS)