July 30, 1957

MEMO TO: Mr. H. K. Wild

SUBJECT: Maximum Data Rate for I/O Units — Project 7000

REFERENCE: Exchange Memo No. 20

In reference memo it is stated that the maximum data rate for units serviced by the Basic Exchange is 15 usec. per 8 bit byte. Without byte converters each character on 729 tape is equivalent to an 8 bit byte — two of the bits being zero. Thus, four 8 bit bytes are needed to handle 24 bits of data (4 characters.) With byte converters, three 8 bit bytes handle 24 bits of data but an extra cycle is required by the converter. Thus, with or without the converter, 4 characters are handled in the same time; i. e., they are handled at the rate of 15 usec per character.

But $$\frac{10^6 \text{ usec.}}{\frac{15 \text{ usec.}}{\text{char.}}} = 66667 \frac{\text{char.}}{\text{sec.}}$$; i. e.,

15 usec/char, is equivalent to 66667 char. /sec. Thus, if 15,000 char. /sec. is defined as 1X speed, then 15 usec/char is equivalent to:

$$\frac{66667}{15000} = 4.4\text{X speed.}$$

At present, two programs are aimed at producing tapes in the speed range 4. 4X to 20X. One of these is the 729 III program which has the stated goal of hitting the 4X to 6X range; the other is that of the Tractor committee, which is trying to find a low speed version of 100X tape, a version in the 10X to 20X range.

Will you please explain how these units and the others in the future that may operate in the 4. 4X to 20X range will be serviced by exchanges?

Will the High Speed Exchange cover the 100X speed only, or will it cover the range from 20X to 100X?

Will there be speed ranges less than 100X in which I/O units cannot be serviced?

Jack C. Gibson

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JCG/jv
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