W04 Feb 05 (D1) Tune duration versus RAM size

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These questions are presented under the following assumptions:

- They may be selected to be part of the final exam
- Responses must be posted by the students (not me)
- I will call your attention to any mistakes or wrong content posted in response

Consider a sequence of ASCII codes representing musical notes that need to be stored in memory with the objective of controlling the frequency of a square wave output. The UART, the RAM block, and the programmable waveform generator, are all part of the datapath of the corresponding FSMD, which is represented below. The behaviour of the circuit may be described as follows:

- The output will remain at logic '0' until a rising edge is detected in the "Play" input
- Once the "Play" input is activated, the square wave output starts with a frequency defined by the content of the first RAM position
- After 0.5 sec. the frequency of the square wave changes to the value defined by the second RAM position
- This process repeats itself up to the last code received through the RS232 port, and afterwards the output will revert to logic '0'
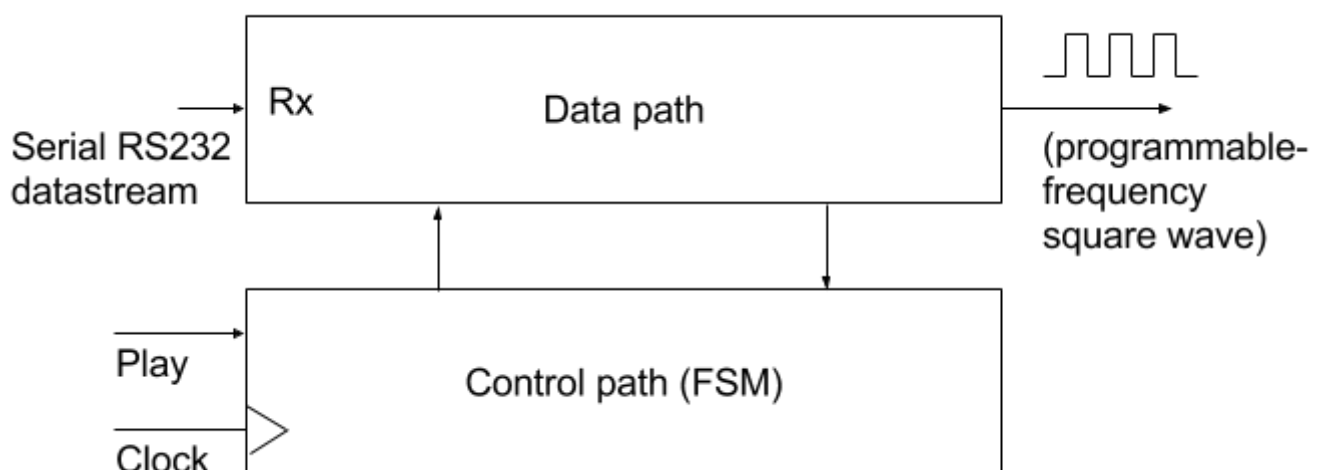
1. What will the maximum duration of a tune if the RAM block comprises 1 Kbyte?

2. How can we know if the byte currently received is the first byte of a new sequence, or an additional byte of an on-going sequence? How can we know if the byte currently received is the last one in a sequence?