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1) Plot voltage vs. time of the Tx line in RS-232 for sending this text: "Z#" (without the quotation marks, with a capital "Z"). Assume ±12 V signal voltages, 53 kbaud, eight data bits, and one stop bit. Be sure to label your axes properly.

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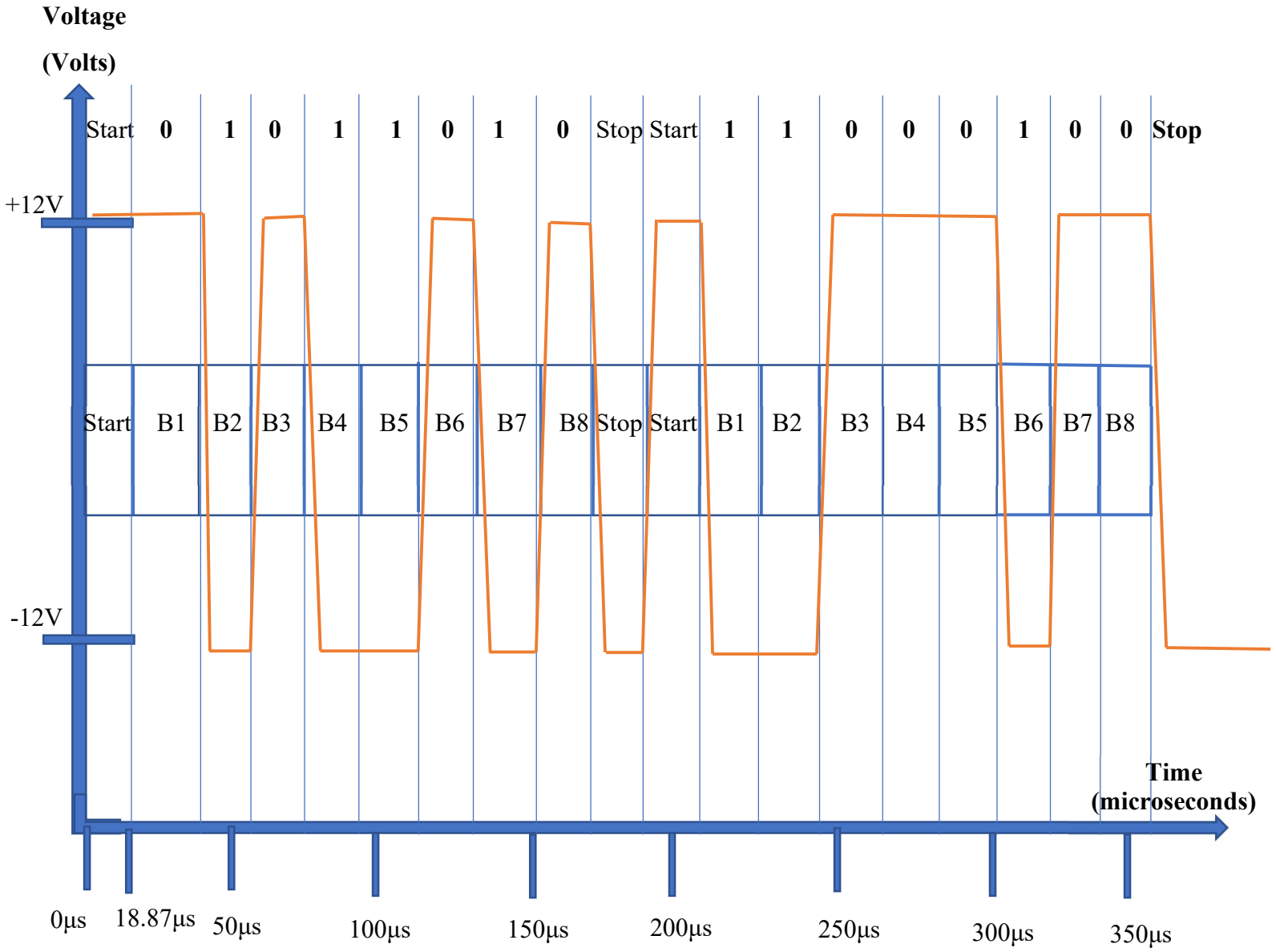
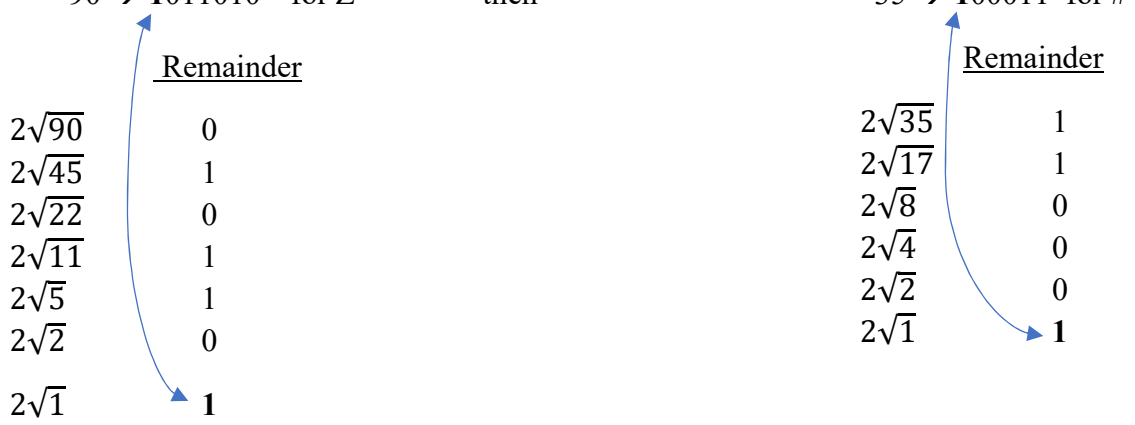


Below we see the snip of the ASCII table for the transmission of: Z#

Dec	Hx	Oct	Html	Chr
35	23	043	#	#
90	5A	132	Z	Z

Because the signal will be interpreted as 1's and 0's we must convert the "Dec" column to binary.

First 90 → **1**011010 for Z then 35 → **1**00011 for #



Because we are transmitting two 8 bit words, the complete transmission including 0 for START and 1 for STOP will be: 00101101010001000111

Here the bits that signal Z and # are black and the bits that signal START and STOP are red

Also note that even though that the above 20 bits is the message we will be sending, the order of the black (data) bits will be reversed, because in RS-232 the Least significant bit is transmitted first. This is why the label on the plot reads: 00101101010110001001

Because the standard for transmitting RS-232 signals are negative true this will be illustrated on the graph as 0 being approximately 12V and 1 being -12V.

Baud is defined as pulses per second. Because the problem statement outlines 53kbaud that tells me we have $\frac{53000\ pulses}{1\ second} \times \frac{53000\ pulse}{53000\ pulses} = \frac{1pulse}{1/53000} = \frac{1pu}{\approx 18.868\mu s}$ So every bit width is

approximately 18.868 micro seconds even though the axis also has markers every 50 micro seconds