Communication Theory and Systems

Project II – Part B

Khaled Ebrahim 201800029

Mohamed Khalil 201801898

Ibrahim Hamada 201800739

Sohaila Zaki 201800998

The following test cases have been fed input through a MATLAB function included in the project folder titled “init.m” and the calculations to create the line codes were done in the MATLAB functions:

1- unipNRZ.m
2- pRZ.m
3- AMI.m
4- SP.m

Functions for Unipolar return-to-zero coding and Polar non-return-to-zero coding have also been included and implemented in the program through the files:

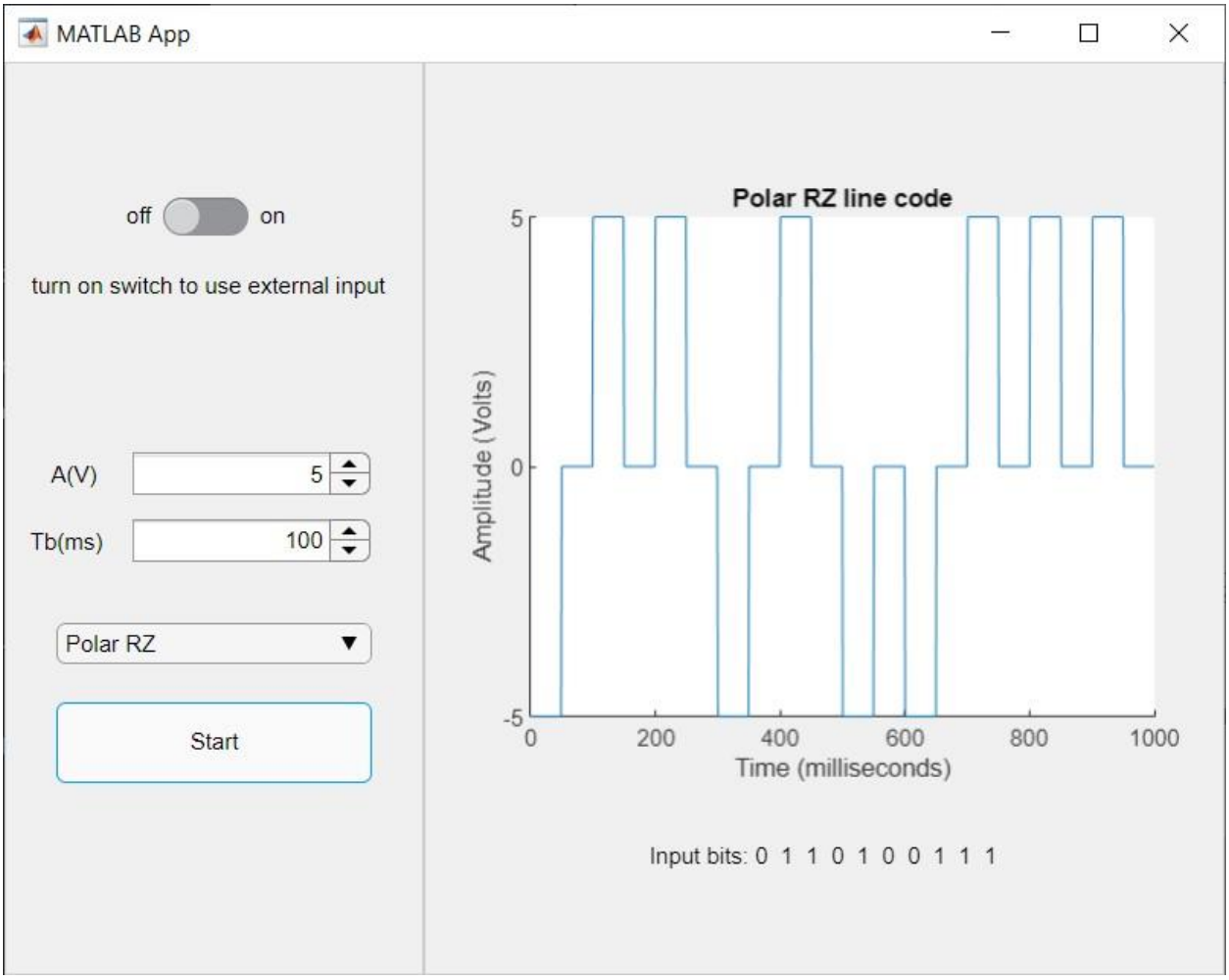
1- unipRZ,m
2- pNRZ.m

To use another test case please edit the init.m file or flip the switch in the GUI and then proceed to enter the path of your “.mat” file of your choice.

1- **Unipolar Non-Return-to Zero**

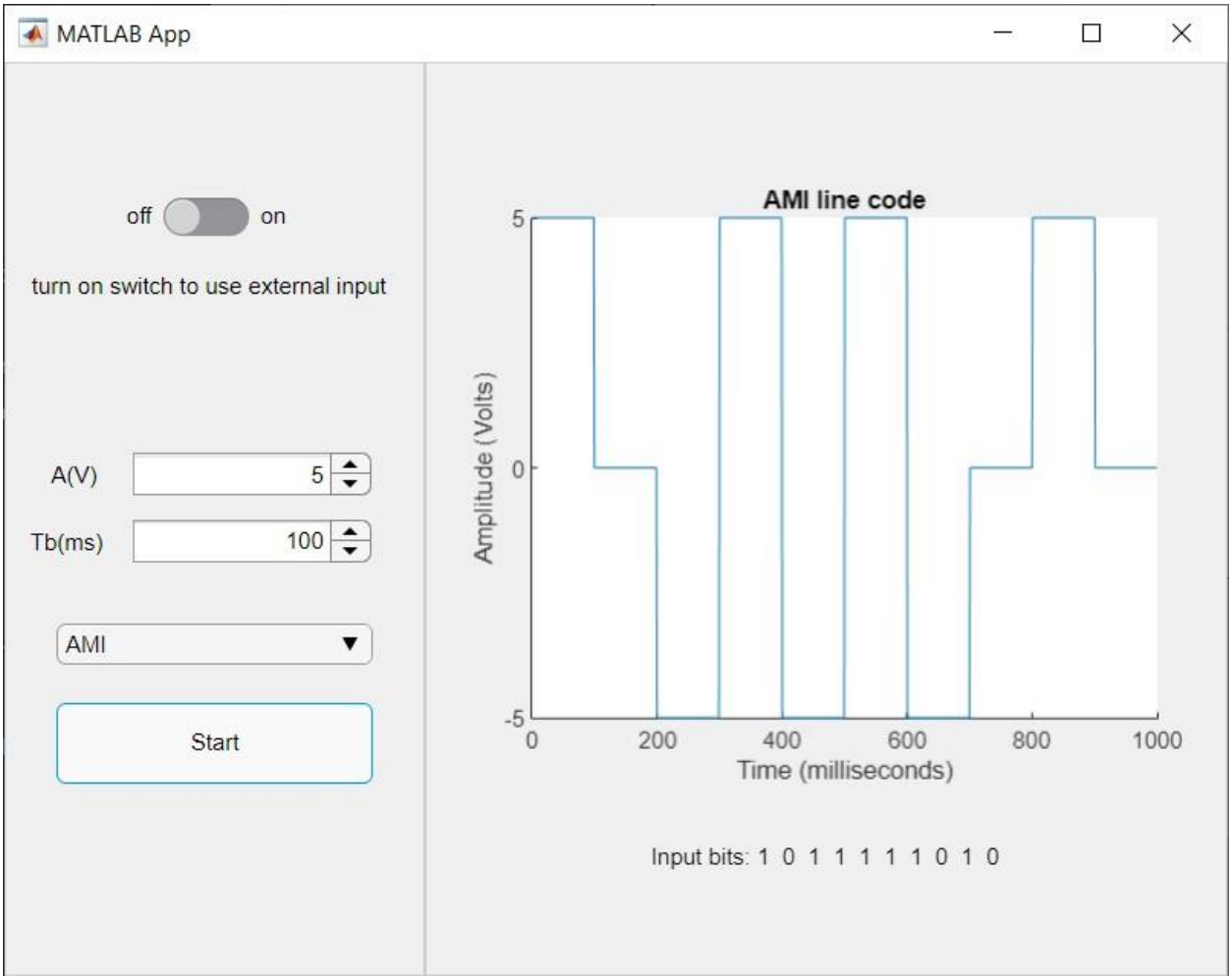
The amplitude varies between 5 Volts (when input is 1) and 0 Volts (when input is zero) and follows according to the input bits shown below the figure, spanning 1000 milliseconds which is equal to 10 times the input "Tb" value. This proves to be more evidence that the representation is accurate since 10 bits require 10 times Tb.

2- **Polar Return-to-Zero**



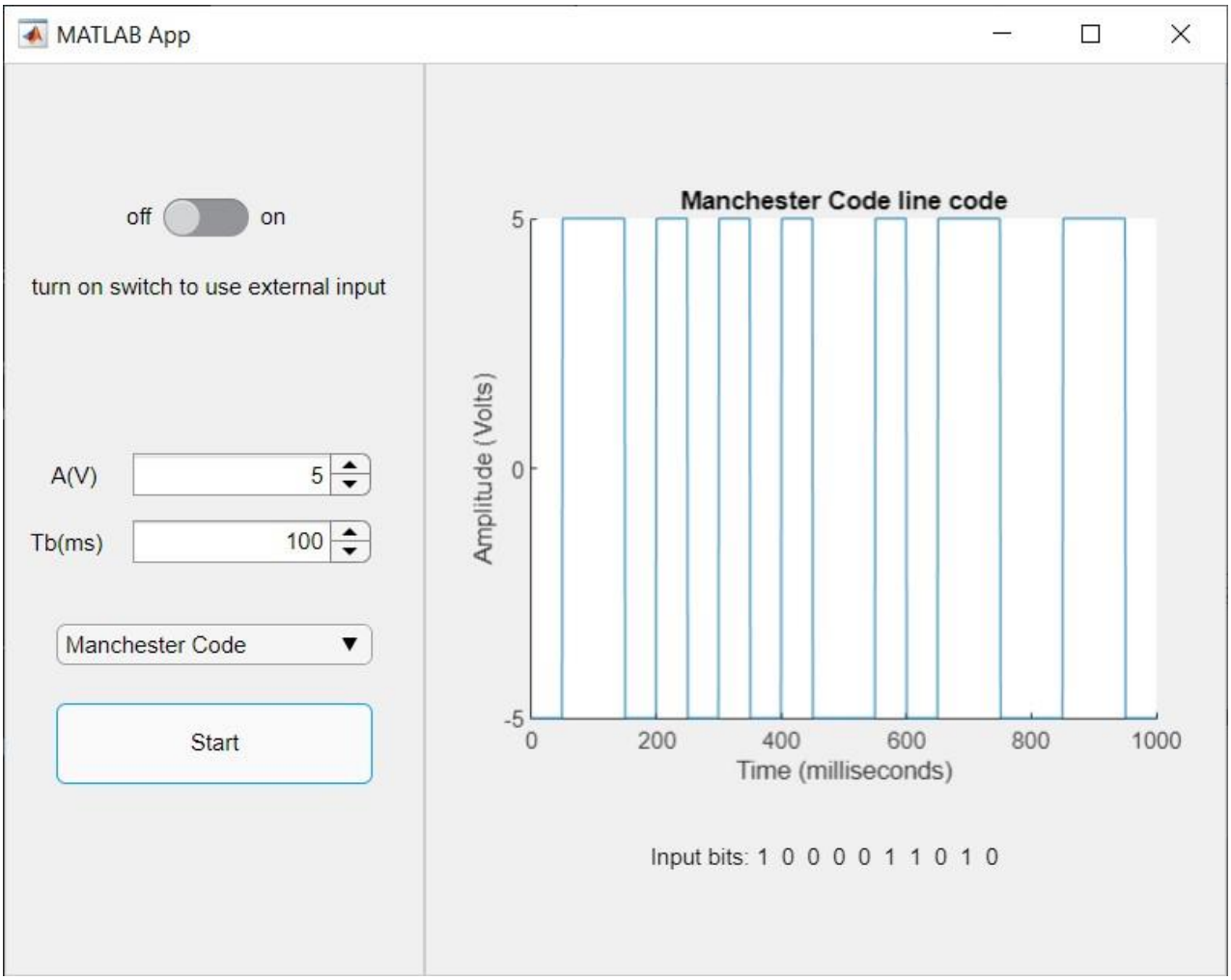
The amplitude varies between 5 Volts (when input is 1) and -5 Volts (When input is zero), and the value of each bit is sustained only for half the duration of Tb, after which the value of the amplitude returns to zero. The entire bit stream of 10 bits is translated into a line code that spans 1000 milliseconds, which is 10 times the value of "Tb", ensuring the representation is, in fact, accurate.

3- **Alternate Mark Inversion**



The amplitude varies between 5 and -5 Volts which alternate on each occurrence of the value "1" in the bit stream to both denote that same value. The value "0" is denoted by 0 Volts. The voltages denoting the values last for the entirety of the Tb time and the entire message lasts for 1000 milliseconds, which is 10 times Tb.

4- **Split-Phase Code (Manchester Code)**



The amplitude varies between 5 and -5 Volts in which the value "1" is denoted by -5 Volts for the first half of its duration "Tb" and 5 Volts for the second half of its duration. The value "0" is denoted by 5 Volts for the first half of its duration "Tb" and -5 Volts for the second half of its duration. The entire message lasts for 1000 milliseconds, which is 10 times Tb, proving the line code representation to be accurate.