LAB#07

NAME : ABDULLAH ZUNORAIN

REG NO : 19JZELE0338

SUBJECT : DATA COMMUNICATION(LAB)

SUBMITTED TO :   DR. UZAIR GILLANI

SECTION : A

DEPT : ELECTRICAL COMM

CAMPUS : JALOZAI

Simulation of Line Encoding Schemes in Matlab (Part II)

OBJECTIVES OF THE LAB

In this lab, we will cover the following topics:

- Implement Manchester encoding scheme

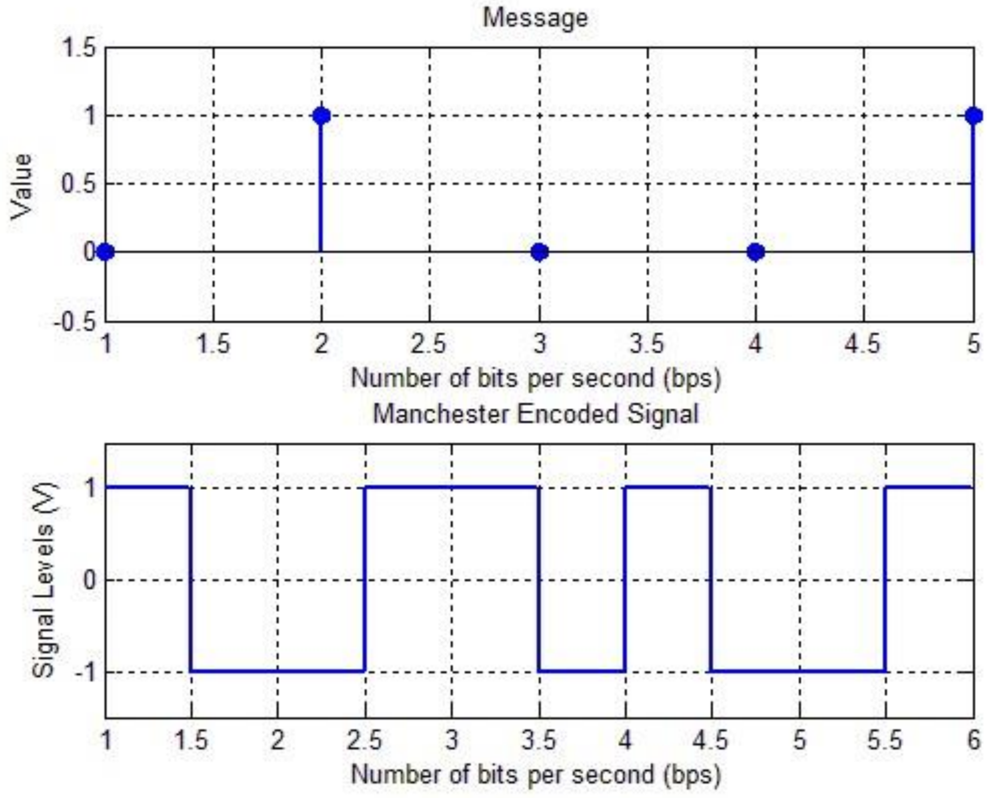
5.1 IMPLEMENTING MANCHESTER ENCODING IN MATLAB

Manchester is a Biphase encoding technique. It uses transition at the middle of each bit period. The mid-bit transition serves as a clocking mechanism and also a data: **low–to–high** transition represents **binary-1**, and **high–to–low** transition represents **binary-0**.

Matlab Code for Manchester Encoding:

```
function [signal,tim] = manchester(message)

% original message message
= [0 1 0 0 1];
% message with redundant information
data = zeros(1,4*length(message));
data(1:4:end) = message;

% index representing original message in 'data' vector
i = 1:length(message); n =
1.49:length(message)+0.49;

% index representing redundant information in 'data' vector
l = 1.50:length(message)+0.50; j =
1.99:length(message)+0.99;

% generating 'time' vector by concatenating indices i &
% j to represent 'data' vector tim
= [];
for(k = 1:length(message))
   tim = [tim i(k) n(k) l(k) j(k)]; end

% generating digital signal
signal = []; N =
length(data); for(t =
1:4:N)    if(data(t)==1)
signal(t:t+1) = -1;
signal(t+2:t+3) = 1;
  else %if(data(t)==0)
    signal(t:t+1) = 1;
    signal(t+2:t+3) = -1;
  end
end

% displaying digital signal & message
figure(1);
subplot(211);
```

```
stem(message, 'filled', 'linewidth', 2);
title('Message');
xlabel('Number of bits per second (bps)');
ylabel('Value');
axis([1 length(message) -0.5 1.5]); grid
on;

subplot(212) ;
plot(tim,signal,'linewidth',2);
title('Manchester Encoded Signal');
xlabel('Number of bits per second (bps)');
ylabel('Signal Levels (V)'); axis tight;
axis([1 length(message)+1 -1.5 1.5]);
grid on;
```



---------------------------------------TASK#01--------------------------------------

Write matlab code that converts the following message bits into Manchester signal:

Message = [0 1 0 0 1 1 0 0 0 1 1]

ANS:

CODING OF THE TASK:

```
% original message
message = [0 1 0 0 1 1 0 0 0 1 1];
% message with redundant information
data = zeros(1,4*length(message));
data(1:4:end) = message;
% index representing original message in 'data' vector
i = 1:length(message);
n = 1.49:length(message)+0.49;
% index representing redundant information in 'data' vector
l = 1.50:length(message)+0.50;
j = 1.99:length(message)+0.99;
% generating 'time' vector by concatenating indices i &
% j to represent 'data' vector
tim = [];
for(k = 1:length(message))
   tim = [tim i(k) n(k) l(k) j(k)];
end
% generating digital signal
signal = [];
```

```
N = length(data);
for(t = 1:4:N)
  if(data(t)==1)
 signal(t:t+1) = -1;
 signal(t+2:t+3) = 1;
   else %if(data(t)==0)
signal(t:t+1) = 1;
signal(t+2:t+3) = -1;
   end
 end
% displaying digital signal & message
figure(1);
subplot(211);
stem(message, 'filled', 'linewidth', 2); title('Message');
xlabel('Number of bits per second (bps)');
ylabel('Value');
axis([1 length(message) -0.5 1.5]);
grid on;
subplot(212) ;
plot(tim,signal,'linewidth',2);
title('Manchester Encoded Signal');
xlabel('Number of bits per second (bps)');
ylabel('Signal Levels (V)');
axis tight;
axis([1 length(message)+1 -1.5 1.5]);
grid on;
```

RESULT OF THE CODING:

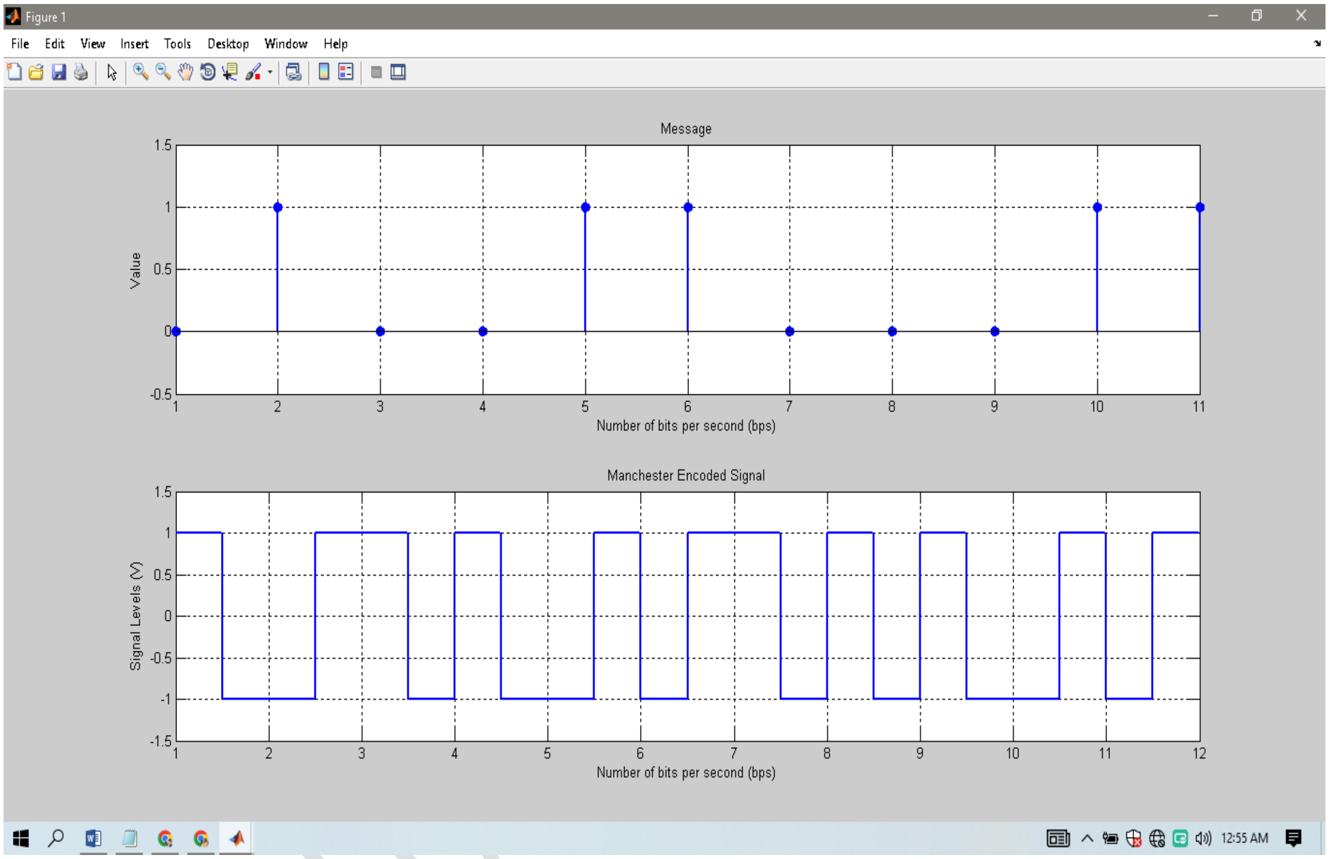


Figure 1
File
Edit
View
Insert
Tools
Desktop
Window
Help
Message
Value
1.5
1
0.5
0
-0.5
1
2
3
4
5
6
7
8
9
10
11
Number of bits per second (bps)
Manchester Encoded Signal
Signal Levels (V)
1.5
1
0.5
0
-0.5
-1
-1.5
1
2
3
4
5
6
7
8
9
10
11
12
Number of bits per second (bps)
12:55 AM