
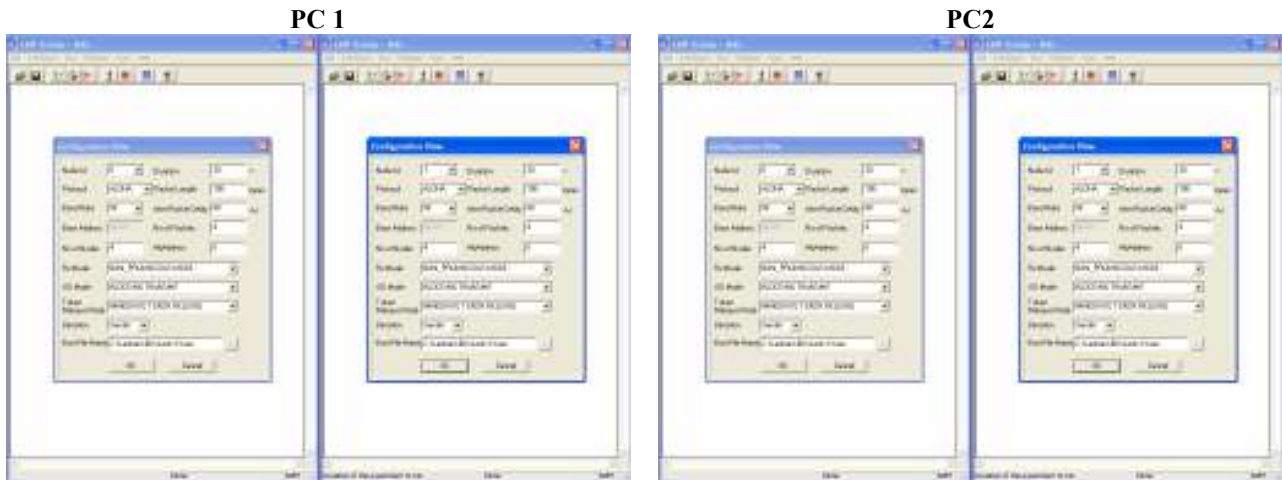


# BENCHMARK

## Experiment 1 – MAC ALOHA

- Click on the “MAC Experiment” icon twice from the desktop on both PCs.
- Click the Configuration  button in the window in both the Pc's.



Setting the Configuration Menu:

PC 1	PC2
<ul style="list-style-type: none"><li>Node id: “0” on config menu 1 and “1” on config menu 2</li><li>Protocol = set all to “ALOHA”</li><li>Baud Rate = 8Kbps (At both the config menu and NEU)</li><li>Duration = 30sec</li><li>Packet Length = 100</li><li>IPD = 40msec</li><li>Bit Delay = 0 (At NEU)</li><li>Direction = Sender</li></ul>	<ul style="list-style-type: none"><li>Node id: “0” on config menu 1 and “1” on config menu 2</li><li>Protocol = set all to “ALOHA”</li><li>Baud Rate = 8Kbps (At both the config menu and NEU)</li><li>Duration = 30sec</li><li>Packet Length = 100</li><li>IPD = 40msec</li><li>Bit Delay = 0 (At NEU)</li><li>Direction = Sender</li></ul>

Note: All the nodes have to be configured as “sender”.

# BENCHMARK

c. Calculate IPD as mentioned below

1. **Inter Packet delay ( IPD)**

This parameter is calculated using the formula

$$G=(N*P)/(C*ta).$$

----- **Equation A**


G is the offered load to the network, whose value ranges from 0.1 to 4.

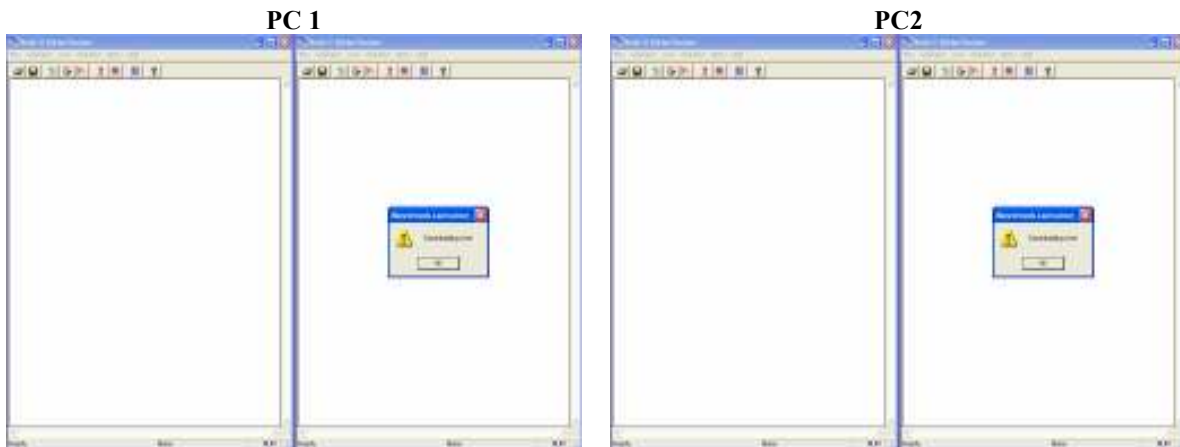
N is the number of nodes participating in the network. For example, let us say that 4 nodes (using 2 computers)

P is the packet length usually it takes the value 100



C is the data rate normally set as 8kbs, which is selected in the NEU.

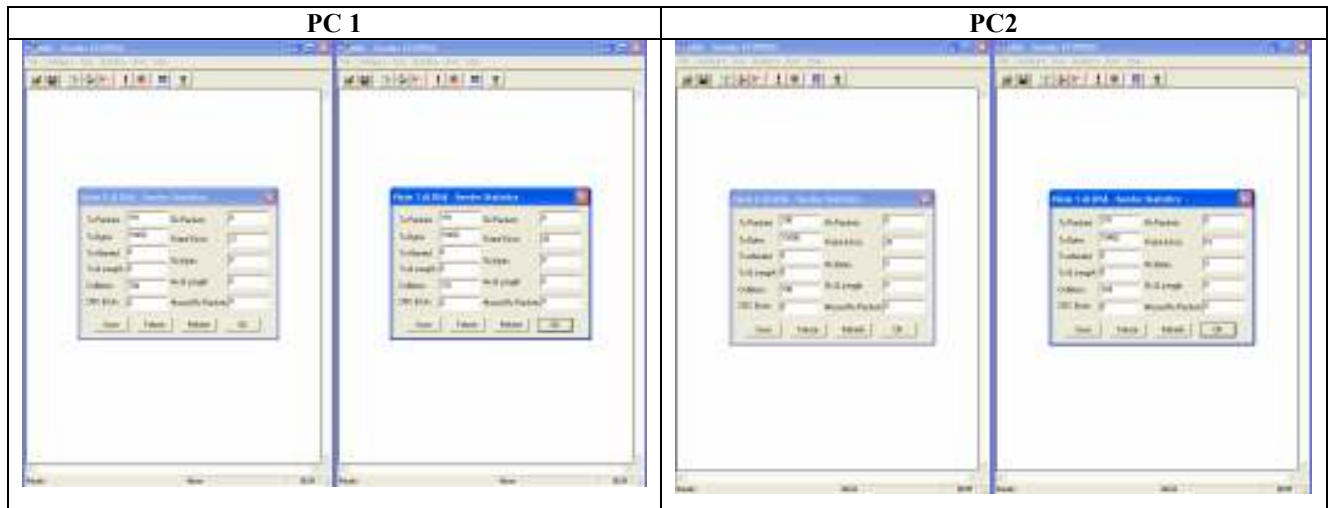
So, lets assume  $G = 1$  and substitute the above mentioned parameters in the **Equation A** which leads to  $Ta$  as 40milliseconds. And substitute the same in the configuration view.

d. Select the “OK” button and Download the driver to the NIU using the BOOT  button command. Booting from any one of the applications is enough.



# BENCHMARK

- e. Run the experiment by clicking the  RUN-Start from each application.
- f. View the statistics window  for results, only Tx. Packets & Collision Count are taken for calculation in MAC experiments.



- g. Save or note down the reading when the experiment says that it has stopped after the specified duration.
- h. Repeat the above steps from “a” to “f” and take the readings by choosing a range of “G” and calculate the Inter packet Delay as mentioned in ALOHA experiment and plot the graph between Throughput Vs G.
- i. Compare the results for various packet length, various number of nodes and data rate.

# BENCHMARK

## **Calculation of the throughput from the readings:**

Successfully transmitted packet by a node = Tx Packets - Collision Count

$$X = (\{\text{Sum of Successfully Tx packet in all 4 nodes} * \text{Packet Length} * 8\} / \text{Duration of Experiment} * 8\text{kbps.})$$

Find throughput as above from the readings taken by varying the ta.

## **Calculation of Offered Load - Practical**

$$G = (\{\text{sum of Transmitted packets in all 4 nodes} * \text{Packet Length} * 8\} / \text{Duration of Experiment} * 8\text{kbps.})$$

## **Calculation of Theoretical Throughput**

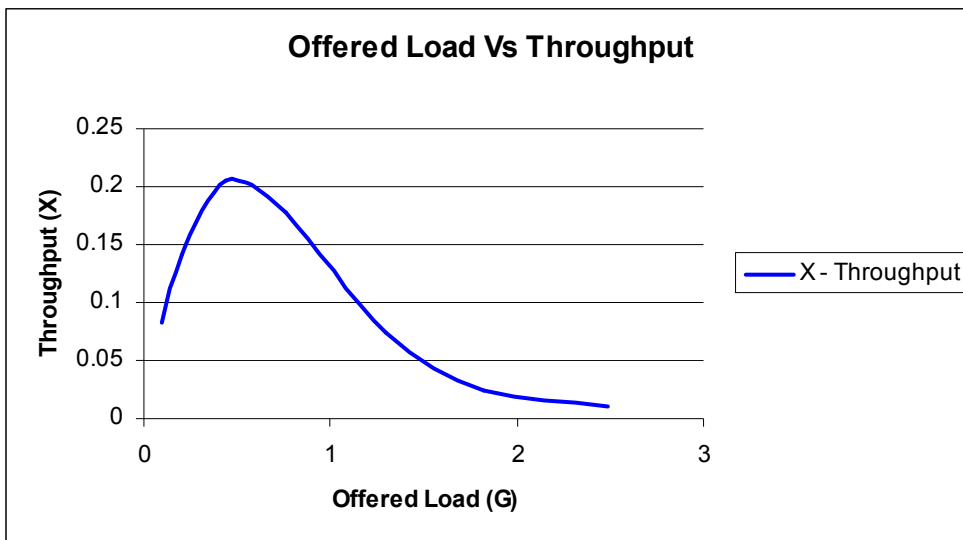
$$X = Ge^{-2G}$$

Substitute the “G” value which was used to calculate inter packet delay “Ta” in the above mentioned equation and calculate the Theoretical X and compare the same with the practical X.

# BENCHMARK


## Results

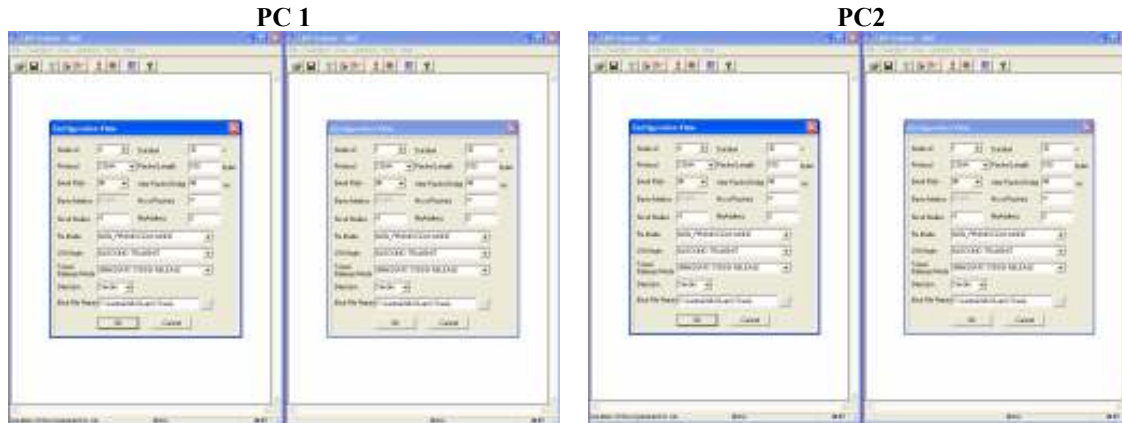
IPD	Tx Node1	Tx Node 2	Tx Node 3	Tx Node 4	G - Offered Load	X – Throughput
4000	23	19	25	16	0.101	0.083
2000	36	35	38	33	0.2	0.142
800	54	48	43	60	0.444	0.205
400	52	41	39	45	0.766	0.177
200	18	26	11	19	1.293	0.074
100	10	1	4	10	1.82	0.025
40	4	0	0	6	2.484	0.01



# BENCHMARK

## Experiment 2 – MAC CSMA



- Click on the “MAC Experiment” icon twice from the desktop on both PCs.
- Click the Configuration  button in the window in both the Pc’s.




Setting the Configuration Menu:

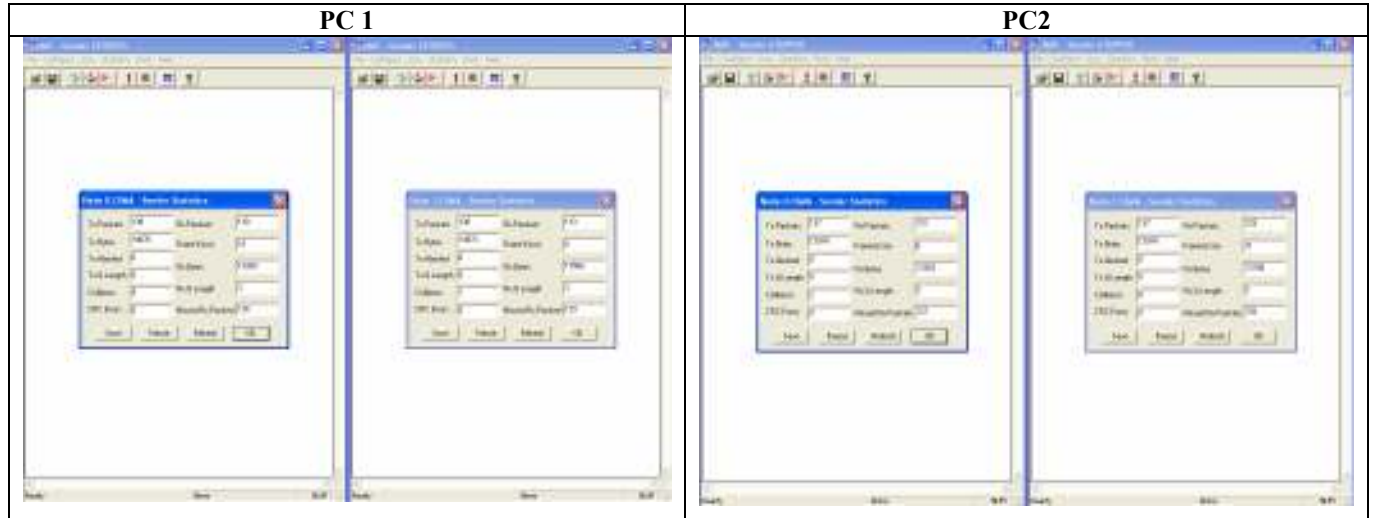
PC 1	PC2
<ul style="list-style-type: none"> <li>Node id: “0” on config menu 1 and “1” on config menu 2</li> <li>Protocol = set all to “CSMA”</li> <li>Baud Rate = 8Kbps (At both the config menu and NEU)</li> <li>Duration = 30sec</li> <li>Packet Length = 100</li> <li>IPD = 40msec</li> <li>Bit Delay = 1(At NEU)</li> <li>Direction = Sender</li> </ul>	<ul style="list-style-type: none"> <li>Node id: “0” on config menu 1 and “1” on config menu 2</li> <li>Protocol = set all to “CSMA”</li> <li>Baud Rate = 8Kbps (At both the config menu and NEU)</li> <li>Duration = 30sec</li> <li>Packet Length = 100</li> <li>IPD = 40msec</li> <li>Bit Delay = 1(At NEU)</li> <li>Direction = Sender</li> </ul>

Note: All the nodes have to be configured as “sender”.

- Calculate the Inter packet delay as explained earlier
- Download the driver to the NIU using the BOOT  button command. Booting from any one of the applications is enough.
- Run the experiment by  clicking the RUN-Start from each application.

# BENCHMARK

f. View the statistics window  for results, only Tx. Packets & Collision Count is taken into account for calculation in MAC experiments.



g) Save or note down the reading when the experiment says that it has stopped after the specified duration.

h) Repeat the above steps from “a” to “g” and take the readings by choosing a range of “G”. Plot the graph between Throughput Vs G.

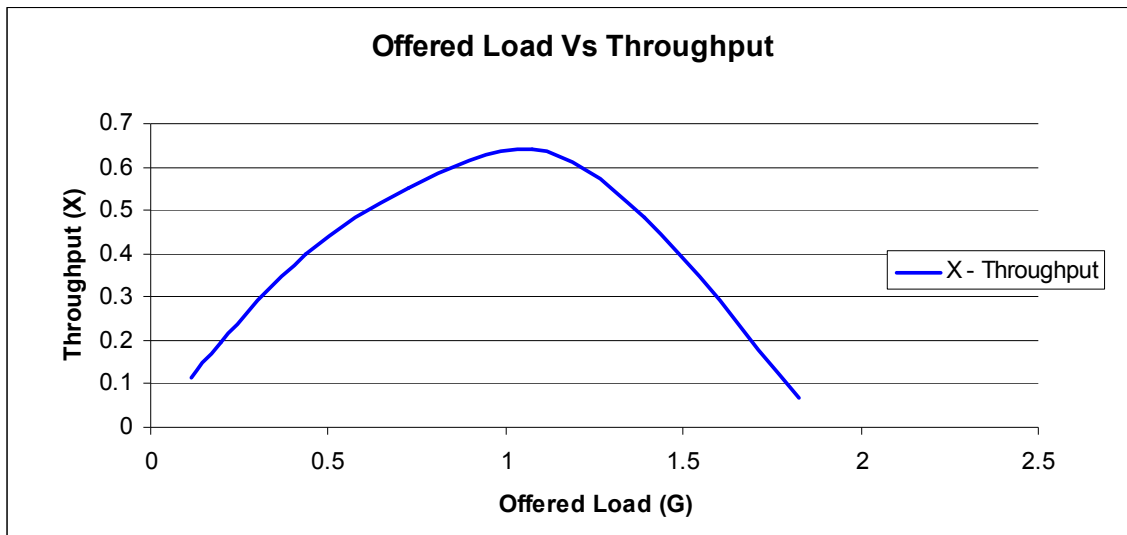
i) Now, increase the bit delay in steps up to the maximum. In each case, measure  $X$  versus  $G$ . Plot all the curves on a single graph and compare them.

j) Compare the Offered Load versus Throughput for various value of “N” – No of Nodes, “P” – Packet Length & “C” – Data rate.

## Results

IPD	Tx Node1	Tx Node 2	Tx Node 3	Tx Node 4	G - Offered Load	X – Throughput
4000	29	28	29	28	0.116	0.114
2000	49	50	49	49	0.197	0.197
800	107	93	99	101	0.436	0.4
400	151	124	134	144	0.725	0.553
200	166	156	155	165	1.076	0.642
100	137	103	126	116	1.388	0.482
40	12	12	7	37	1.824	0.068

# BENCHMARK



Note: The practical X can be calculated as per the equation given in the ALOHA experiment. The theoretical X can be calculated by using the following equation


$$X - \text{Theoretical} = \frac{G(1+G+aG(1+G+aG/2))e^{-G(1+2a)}}{G(1+2a)-(1-e^{-aG})+(1+aG)e^{-G(1+a)}}$$

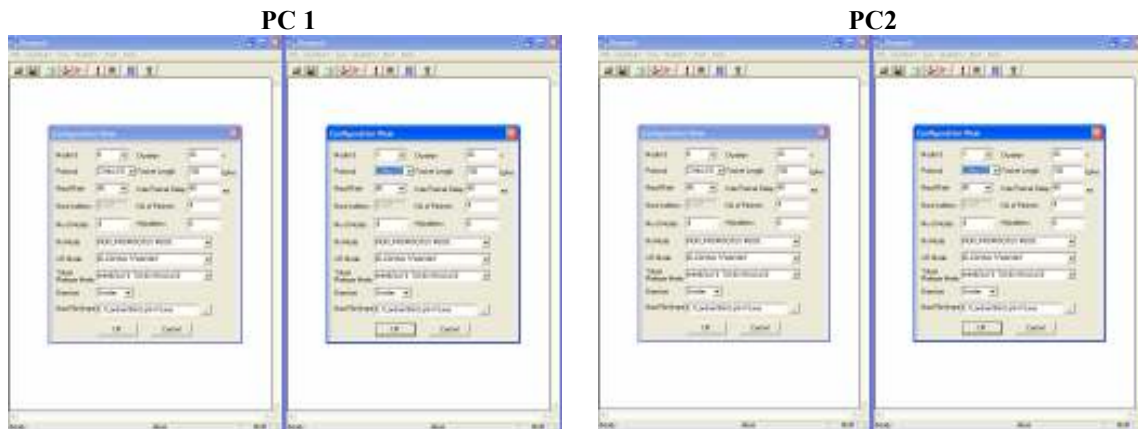
$$a = (\text{bit delay} * N)/P$$



# BENCHMARK

## Experiment 3 – MAC CSMA/CD


- Click on the “MAC Experiment” icon twice from the desktop on both PCs.
- Click the Configuration  button in the window in both the Pc’s.





Setting the Configuration Menu:

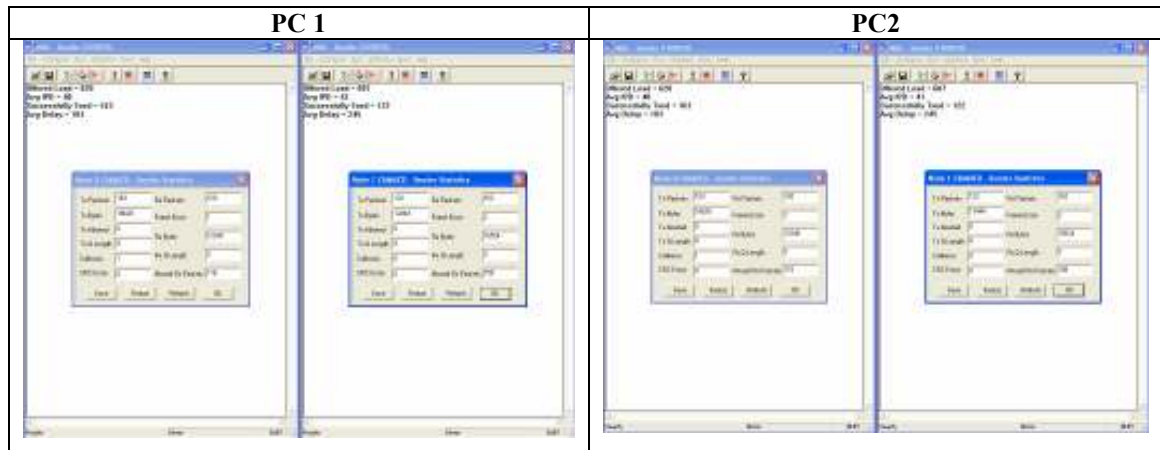
PC 1	PC2
<ul style="list-style-type: none"> <li>Node id: “0” on config menu 1 and “1” on config menu 2</li> <li>Protocol = set all to “CSMA/CD”</li> <li>Baud Rate = 8Kbps (At both the config menu and NEU)</li> <li>Duration = 30sec</li> <li>Packet Length = 100</li> <li>Bit Delay = 1 (At NEU)</li> <li>Direction = Sender</li> </ul>	<ul style="list-style-type: none"> <li>Node id: “0” on config menu 1 and “1” on config menu 2</li> <li>Protocol = set all to “CSMA/CD”</li> <li>Baud Rate = 8Kbps (At both the config menu and NEU)</li> <li>Duration = 30sec</li> <li>Packet Length = 100</li> <li>Bit Delay = 1 (At NEU)</li> <li>Direction = Sender</li> </ul>

Note: All the nodes have to be configured as “sender”.

- Calculate the IPD as mentioned in Aloha experiment.
- Download the driver to the NIU using the BOOT  button command. Booting from any one of the applications is enough.

# BENCHMARK

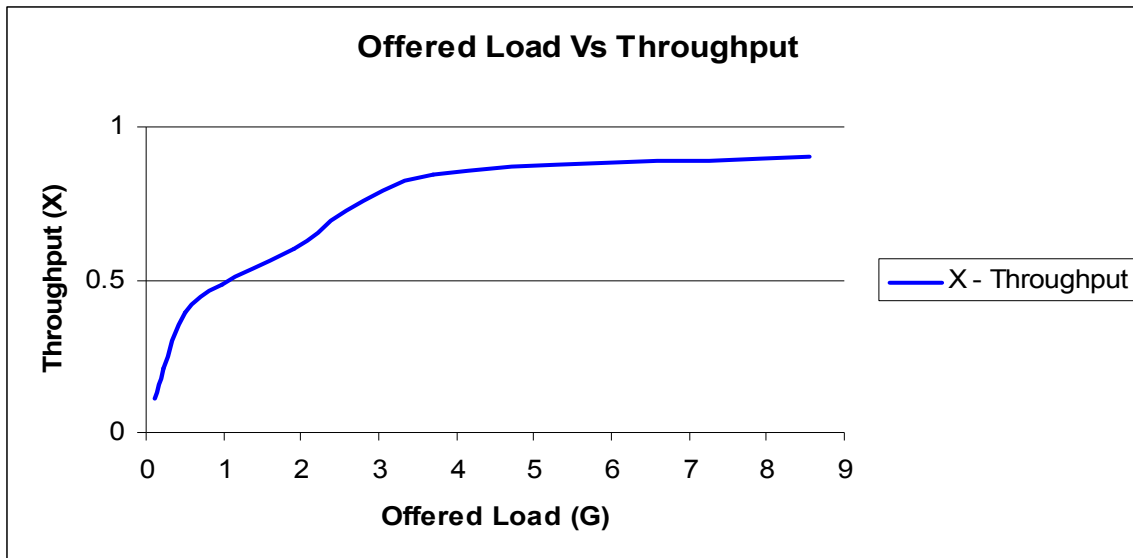
- e. Run the experiment by clicking the RUN-Start 
- f. View the statistics window  for results, only Tx .Packets & Collision Count are taken for calculation in MAC experiments.



- g. Save or note down the reading when the experiment says that it has stopped after the specified duration.
- h. Repeat the above steps from “a” to “g” and take the readings by choosing a range of “G”. Plot the graph between Throughput Vs G.
- i. Compare the Offered Load versus Throughput for various value of “N” – No of Nodes, “P” – Packet Length & “C” – Data rate.

# BENCHMARK

IPD	Tx Node1	Tx Node 2	Tx Node 3	Tx Node 4	G - Offered Load	X - Throughput	Avg Delay D	Log (D)
4000	28	32	31	23	0.115	0.114	3669.75	8.21
2000	56	47	55	52	0.219	0.21	1929.25	7.56
800	100	100	90	102	0.509	0.392	1020	6.93
400	115	144	88	135	0.974	0.482	855.5	6.75
200	31	88	249	236	1.902	0.604	1115.25	7.02
100	16	18	393	416	3.711	0.843	1086.5	6.99
40	495	406	0	0	8.564	0.901	135.25	4.91



## Calculation of Practical X

$$X = (\{\text{sum of Transmitted packets in all 4 nodes} * \text{Packet Length} * 8\} / \text{Duration of Experiment} * 8\text{kbps.})$$

Note: The Collision Count is not taken into account for throughput calculation.


## Calculation of Practical G

$$G = (\{\text{sum of Offered Load in all 4 nodes} * \text{Packet Length} * 8\} / \text{Duration of Experiment} * 8\text{kbps.})$$

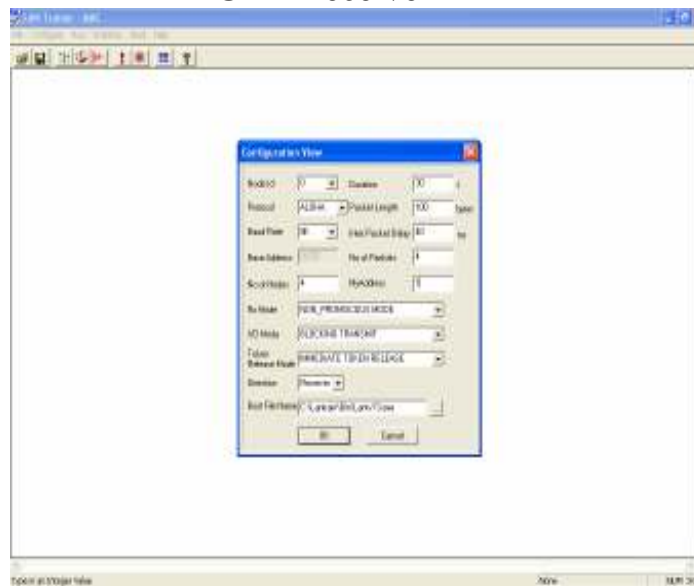
# BENCHMARK

## Experiment 4 – CSMACA - DCF

## Steps to Configure Receiver

- Click on the “CSMACA” icon from the desktop on one PC.
- Click the Configuration  button.

## PC1 – Receiver



## Setting the Configuration Menu

PC 1 – Receiver
<ul style="list-style-type: none"> <li>▪ Node id: “0” on config menu</li> <li>▪ Protocol = set all to “ALOHA”</li> <li>▪ Baud Rate = 8Kbps (At both the config menu and NEU)</li> <li>▪ Duration = 30sec</li> <li>▪ Packet Length = 100</li> <li>▪ Bit Delay = 0(at NEU)</li> <li>▪ Direction = Receiver</li> <li>▪ Set the topology to BUS in NEU</li> </ul>

- c. Set the “Inter Packet Delay”(i.e.400msec)

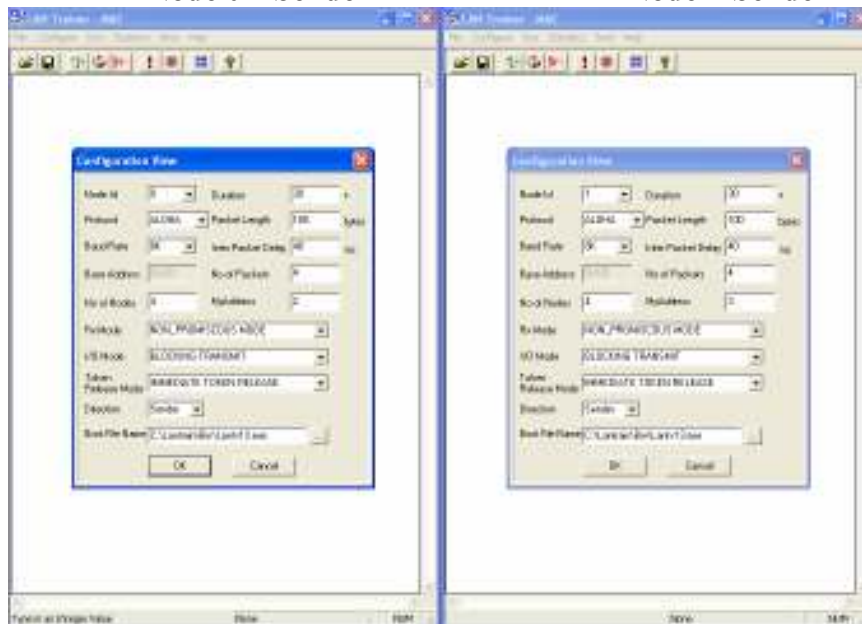
# BENCHMARK

## Steps to Configure the Client Nodes

- d. Click on the “CSMACA” icon from the desktop on the second Pc
- e. Click the Configuration  button in the window in the second Pc

**Node 0 – Sender**

**Node1- Sender**



## Setting up of Configuration Menu

### **PC 1 – Sender**

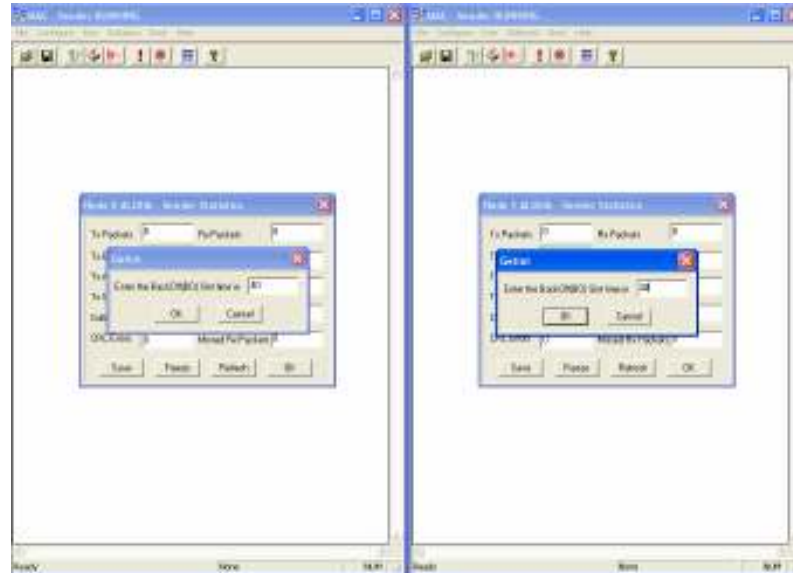
- Node id: “0” on config menu 1 and “1” on config menu 2
- Protocol = set all to “ALOHA”
- Baud Rate = 8Kbps (At both the config menu and NEU)
- Duration = 30sec
- Packet Length = 1000
- My Address = “2” and “3” respectively
- Bit Delay = 0(at NEU)
- Direction = Sender

- f. Set the “Inter Packet Delay”(i.e.400msec)
- g. Download the NIU Driver by pressing the BOOT button and Click the RUN Start Button in the Access point Node first

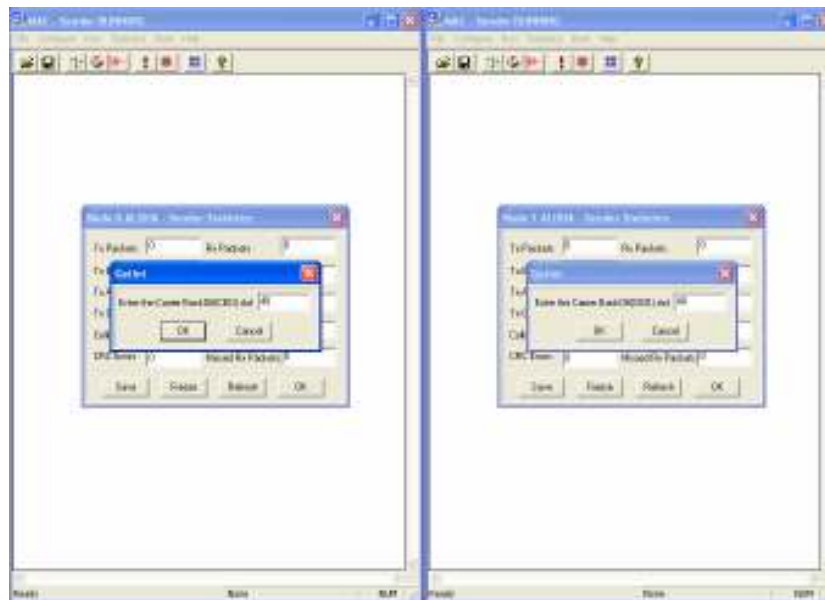
# BENCHMARK

Follow the same procedure in the Client nodes, once the RUN start button is pressed the following windows appear

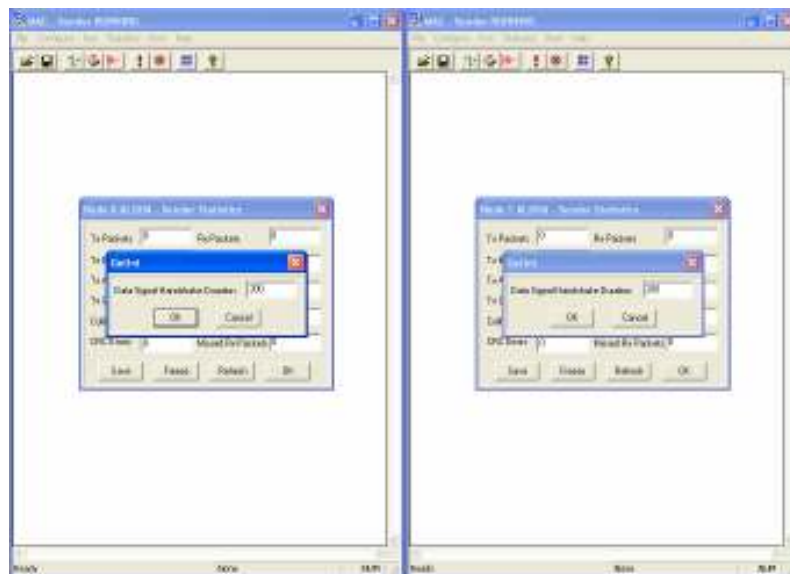
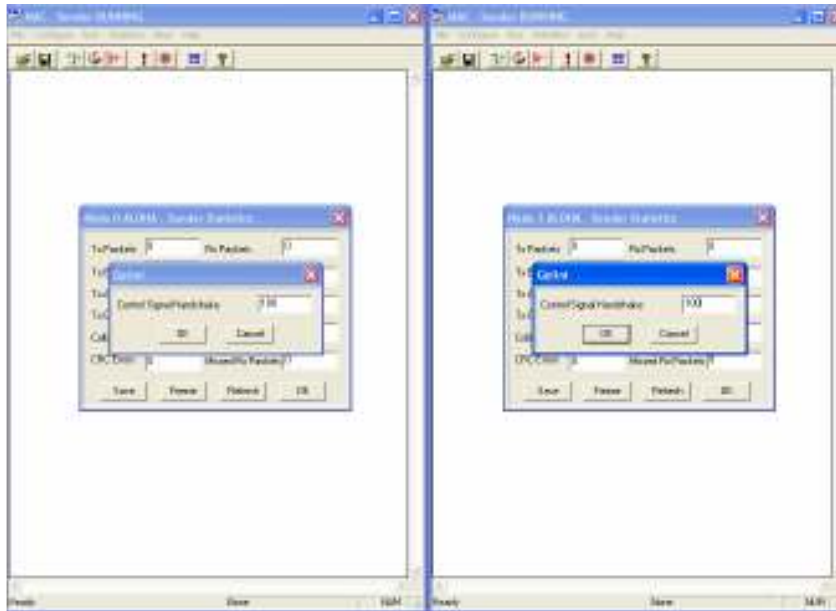
Node0 – Sender



Node1 - Sender



# BENCHMARK



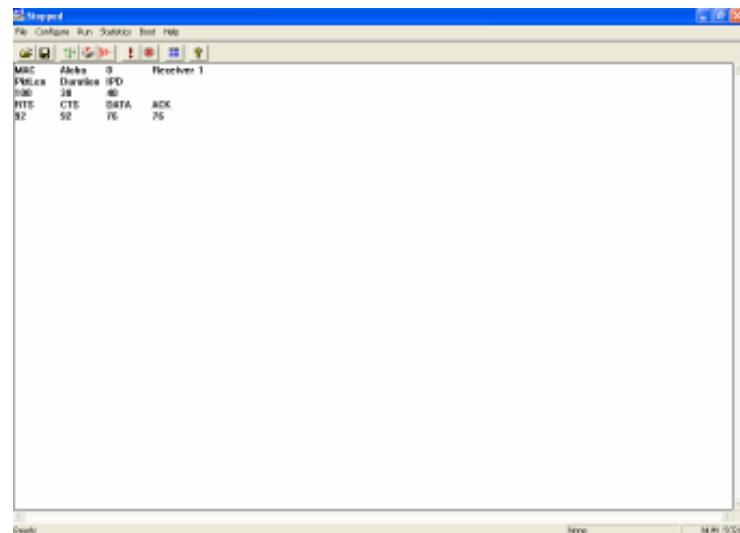
# BENCHMARK

## Results

After the 30 Seconds, both the sender nodes stop transmitting and the following screen appears



Once the Sender stops, press the OK button in the receiver Node and Press the stop Button and the following screen appears





## Calculation of Throughput for CSMACA


$$X = (\{\text{sum of ACK counts in all sender nodes} * \text{Packet Length} * 8\} / \text{Duration of Experiment} * 8\text{kbps.})$$

## Calculation of Offered Load for CSMACA

$$X = (\{\text{No of G count in all sender nodes} * \text{Packet Length} * 8\} / \text{Duration of Experiment} * 8\text{kbps.})$$

## Experiment 5 – TOKEN BUS

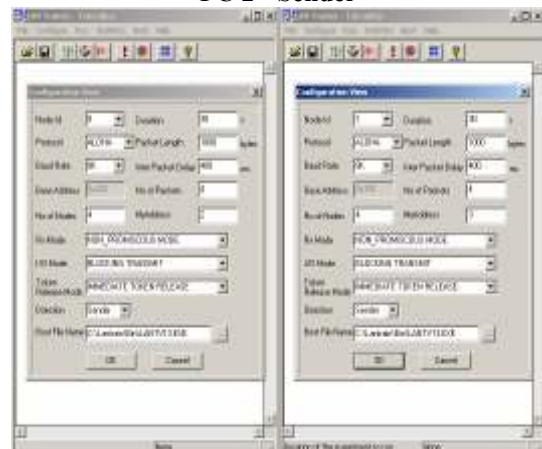
**Aim:** Implement a token-passing access method for a bus LAN.

- Click on the “Token Bus” icon twice from the desktop on both PCs.
- Click the Configuration  button in the window in both the Pc’s.

PC 1 – Sender



PC 2 - Sender



# BENCHMARK

Setting the Configuration Menu:

PC 1 - Sender	PC 2 - Receiver
<ul style="list-style-type: none"> <li>Node id: "0" on config menu 1 and "1" on config menu 2</li> <li>Protocol = set all to "ALOHA"</li> <li>Baud Rate = 8Kbps (At both the config menu and NEU)</li> <li>Duration = 30sec</li> <li>Packet Length = 1000</li> <li>MyAddress = "0" for menu 1 and "1" on menu 2</li> <li>Bit Delay = 0(at NEU)</li> <li>Direction = Sender</li> </ul>	<ul style="list-style-type: none"> <li>Node id: "0" on config menu 1 and "1" on config menu 2</li> <li>Protocol = set all to "ALOHA"</li> <li>Baud Rate = 8Kbps (At both the config menu and NEU)</li> <li>Duration = 30sec</li> <li>Packet Length = 1000</li> <li>MyAddress = "2" on menu 1 and "3" on menu 2</li> <li>Bit Delay = 0 (at NEU)</li> <li>Direction = Sender</li> </ul>

**Note 1:** If you connect two PC's and configure four nodes then the "My Address" has to be set to as 0 to 3 in all four nodes, if you connect three PCs and configure two nodes in each PC then set the "My Address" has to be set as 0 to 5 in all six nodes.

**Note2:** For this Experiment all the nodes should be in sender mode and run the node which has the lowest priority value of "My address first" (Start from "4")

**Note3:** No of Nodes has to be set as 4 when two PCs are connected and 6 when three PCs are connected.

c. Calculate the Inter Packet Delay as explained earlier.

d. Download the driver to the NIU using the BOOT  button command for both PCs.

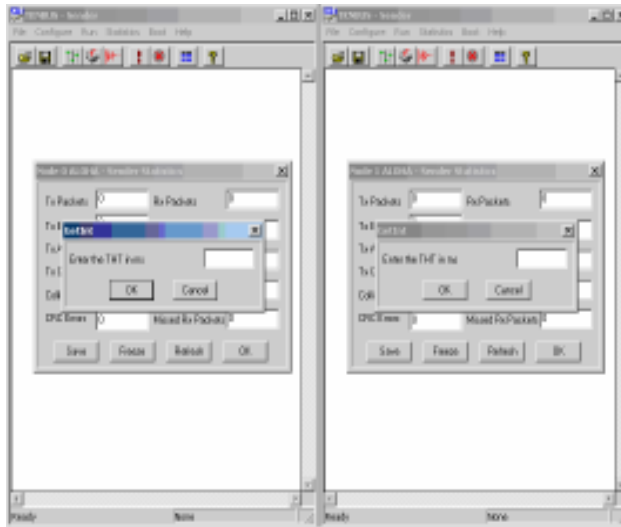
e. Run the experiment by clicking the RUN-Start  from each application. Run the all the experiments at the same time.

**Note:** While you do this THT window pops up, enter the THT time in all nodes and press the OK button first in the node which has highest value of My address.

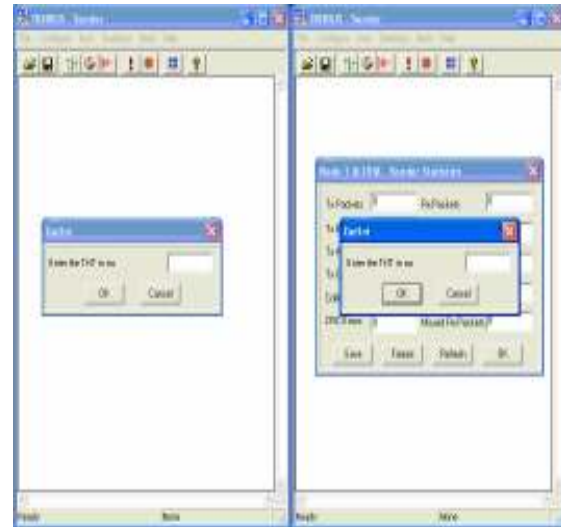
e. Set the Token Holding Time (THT) (i.e.10000)


## BENCHMARK

PC 1 – Sender

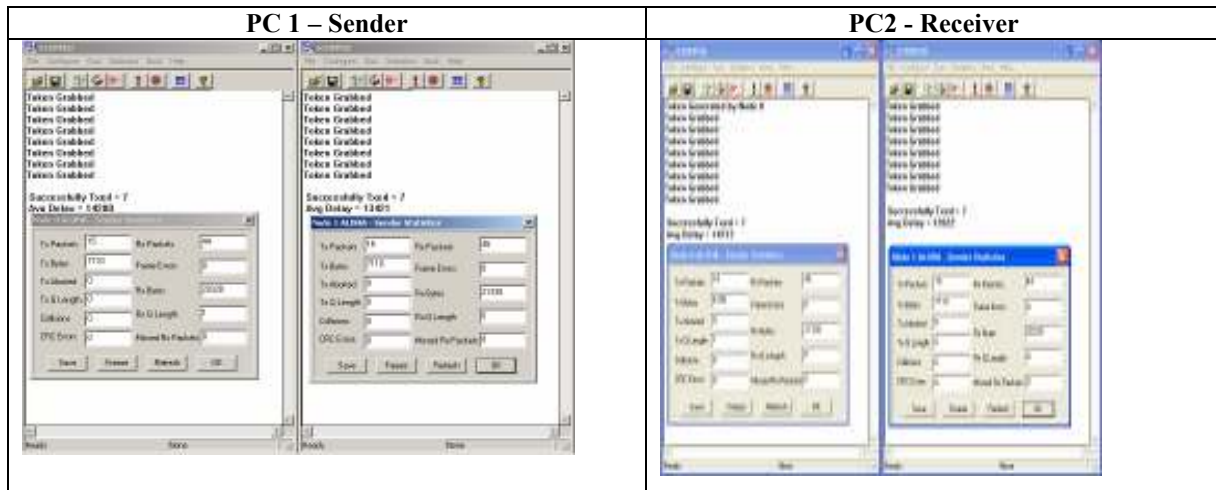


### PC 2 - Sender



- f. View the statistics window  for results.


# BENCHMARK

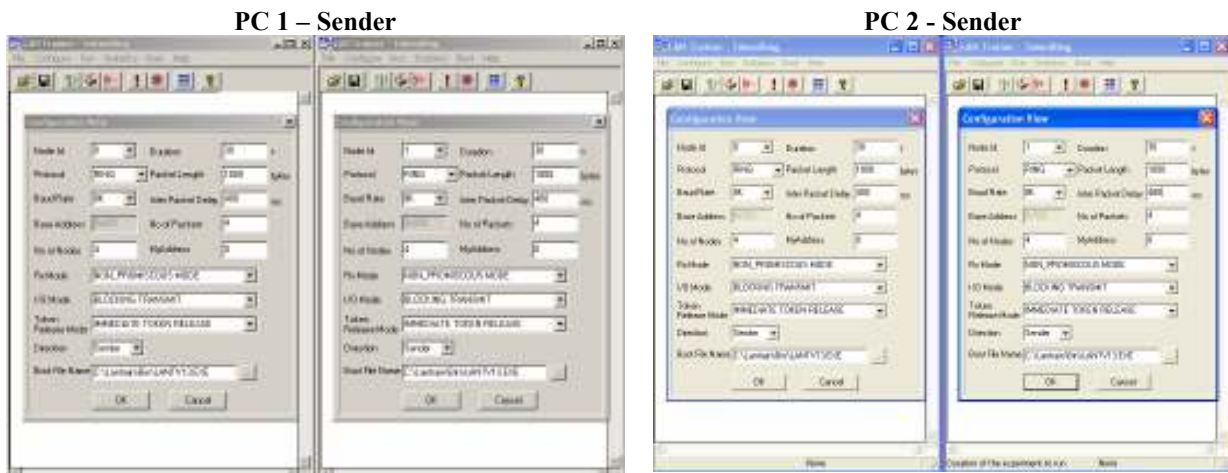


- g. Save or note down the reading when the experiment says that it has stopped after the specified duration.
- h. Repeat from the above steps from “a” to “h” and take the readings by changing the Inter Packet Delay (IPD) from 3200, 1600, 800, 610, 400, 200 & 100.
- i. Plot the Offered Load G Vs Throughput X, Plot Throughput Vs Average Delay.
- j. Repeat the Experiment for various THT and plot the graph
- k. Repeat the steps “a” to “d”, while running the experiment set the BER to  $10^{-2}$  in the NEU or try to stop one of the nodes and observe the behavior and explain the same.

Note: The G & Throughput equations for Token Bus are same as that of the Aloha protocol.



## Experiment 6 – TOKEN RING

- Click on the “Token Ring” icon twice from the desktop on both PCs.
- Click the Configuration  button in the window in both the Pc’s.



Setting the Configuration Menu:

PC 1 – Sender	PC 2 - Receiver
<ul style="list-style-type: none"> <li>Node id: “0” on config menu 1 and “1” on config menu 2</li> <li>Protocol = set all to “RING”</li> <li>Baud Rate = 8Kbps (At both the config menu and NEU)</li> <li>Duration = 30sec</li> <li>Packet Length = 1000</li> <li>Bit Delay = 0(at NEU)</li> <li>Direction = Sender</li> <li>Set the topology to RING in NEU</li> </ul>	<ul style="list-style-type: none"> <li>Node id: “0” on config menu 1 and “1” on config menu 2</li> <li>Protocol = set all to “RING”</li> <li>Baud Rate = 8Kbps (At both the config menu and NEU)</li> <li>Duration = 30sec</li> <li>Packet Length = 1000</li> <li>Bit Delay = 0(at NEU)</li> <li>Direction = Sender</li> <li>Set the topology to RING in NEU</li> </ul>

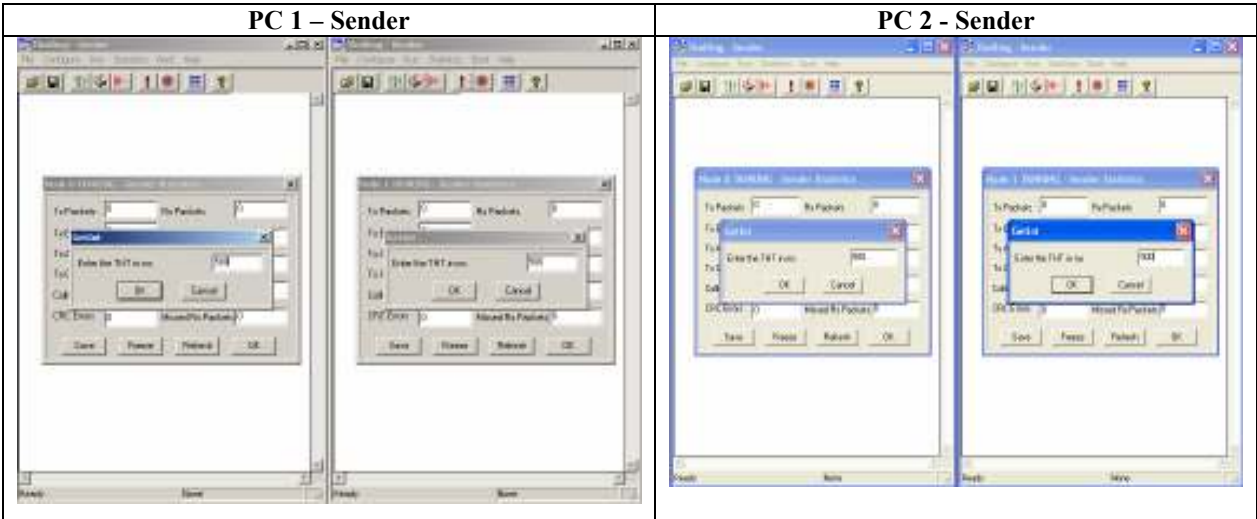
- Set the “Inter Packet Delay”(i.e.400msec)
- Download the driver to the NIU using the BOOT  button command for both PCs.
- Run the experiment by clicking the RUN-Start  from each application. Run the


# BENCHMARK

all the experiments at the same time.

**Note:** While you do this it will ask for THT value, enter the THT time in all nodes and press the OK button.

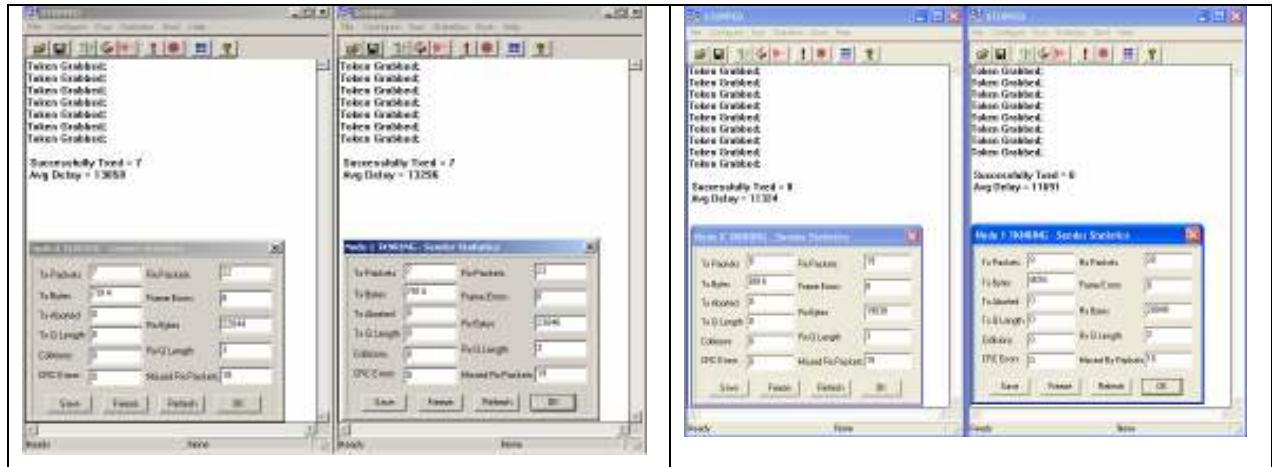
- f. Set the Token Holding Time (THT) (i.e.500msec)



- g. View the statistics window  for results.

PC 1 – Sender	PC2 - Receiver
---------------	----------------

# BENCHMARK



- h. Save or note down the reading when the experiment says that it has stopped after the specified duration.
- i. Repeat from the above steps from “a” to “h” and take the readings by changing the Inter Packet Delay (IPD) from 3200, 1600, 800, 610, 400, 200 & 100.
- j. Repeat the Experiment for Various THT and plot the same. Compare the results with token bus and CSMACD. Plot the Throughput Vs Delay graph for all the three protocols and explain the result.
- k. Repeat the steps “a” to “f”, while running the experiment stop one of the nodes and observe the behavior.

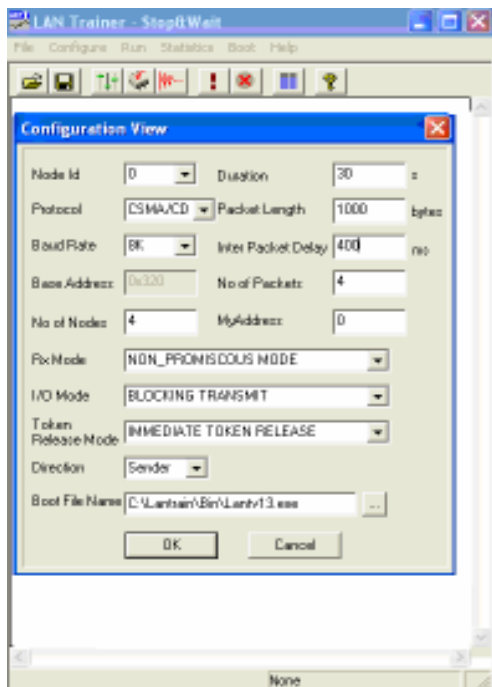
Note: The G & Throughput equations for Token Bus are same as that of the Aloha protocol.

# BENCHMARK

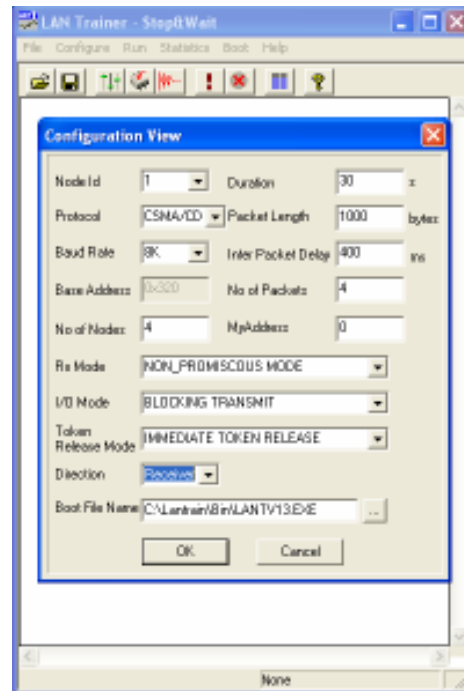
## Experiment 7 – STOP & WAIT

- Click on the “Stop & Wait” icon from the desktop on both PCs.
- Click the Configuration  button in the window in both the Pc’s.

PC 1 – Sender





PC 2 - Receiver



Setting the Configuration Menu:

PC 1 – Sender	PC 2 - Receiver
<ul style="list-style-type: none"> <li>Node id: “0” on config menu</li> <li>Protocol = set all to “CSMA/CD”</li> <li>Baud Rate = 8Kbps (At both the config menu and NEU)</li> <li>Duration = 30sec</li> <li>Packet Length = 1000</li> <li>Bit Delay = 0(at NEU)</li> <li>Direction = Sender</li> </ul>	<ul style="list-style-type: none"> <li>Node id: “1” on config menu</li> <li>Protocol = set all to “CSMA/CD”</li> <li>Baud Rate = 8Kbps (At both the config menu and NEU)</li> <li>Duration = 30sec</li> <li>Packet Length = 1000</li> <li>Bit Delay = 0(at NEU)</li> <li>Direction = Receiver</li> </ul>

- Set the “Inter Packet Delay” to 400msecs
- Download the driver to the NIU using the BOOT  button command for both PCs.
- Run the experiment by clicking the RUN-Start  from each application.



# BENCHMARK

- f. Run the receiver node first & then the Sender node. While you run the Sender node it will ask for timeout value
- g. Set the Timeout Value to 1500

**PC 1 - Sender**



**PC 2 - Receiver**



**PC 1 - Sender**



**PC 2 - Receiver**

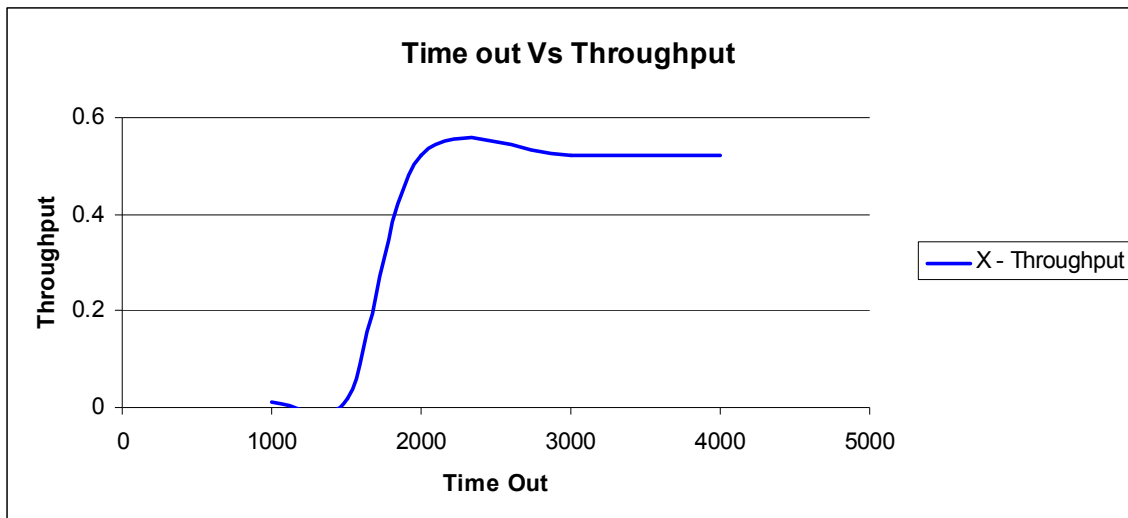


- h. Note down the no of successfully Transmitted Packets & Retransmission Count.
- i. Repeat the above steps for various time out values and draw a graph between timeout Value & Throughput. Find the optimum timeout value from the plot
- j. Explain why the throughput is less compared to CSMA/CD protocol.

# BENCHMARK

## Results

Data Packet Length	1000			
Data Rate 'C'	8000			
Expt Duration (ms)	100			
Ack Packet Length	10			
Time out (ms)	Received Data Packets by Receiver	Acknowledgements Received by Sender	Successfully Transmitted	X - Throughput
1000	6	5	1	0.01
1500	5	5	2	0.02
2000	53	53	52	0.52
3000	53	53	52	0.52
4000	53	53	52	0.52



## Calculation of Throughput

# BENCHMARK

$$X = \frac{\{\text{Successfully Transmitted Packets} * \text{Packet Length} * 8\}}{\{\text{Data Rate} * \text{Duration of Experiment}\}}$$

## Experiment 8 – STOP & WAIT WITH BER

- k. Set the BER to  $10^{-2}$  in the NEU
- l. Follow the above mentioned Procedure for running the experiment.
- m. Set the Timeout value as 3000msec in the sender window.



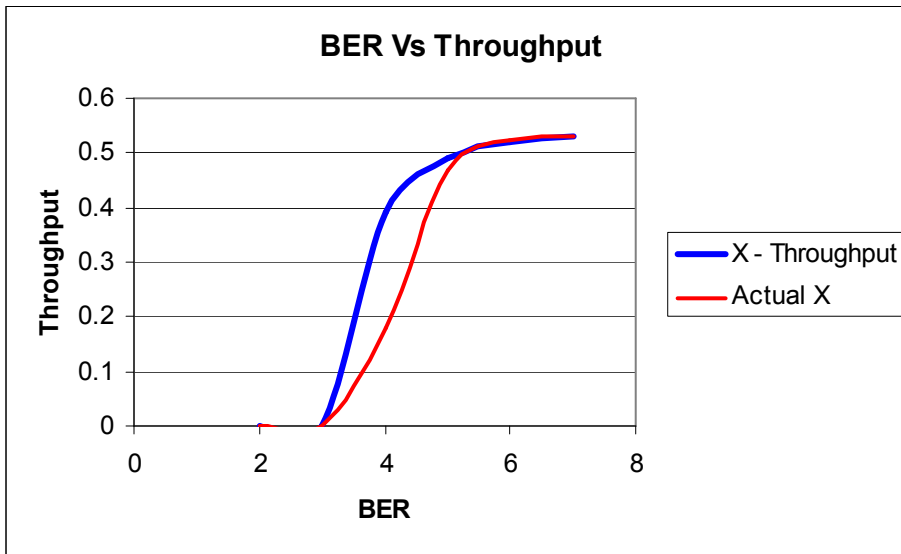
- n. From the Statistics window note down the number of successfully transmitted packets & Re-transmitted packets and calculate the throughput.
- o. Repeat the Experiment by setting different BER in the NEU.
- p. Use the values to plot the graph between BER Vs Throughput

# BENCHMARK

## Result

BER	Received Data Packets by Receiver	Ack. Received by Sender	Successfully Transmitted	X - Throughput	L = Probability of packet error	$L/(1-L)$	$T*L/(1-L)$	Actual X
6	53	53	52	0.52	0.007968089	0.00803209	0.024096269	0.523263498
5	52	49	49	0.49	0.076884023	0.083287501	0.249862503	0.467580324
4	48	40	39	0.39	0.55068901	1.225629958	3.676889874	0.178784224
3	4	0	0	0	0.999665877	2991.913686	8975.741057	0.000110497
2	1	0	0	0	1	#DIV/0!	#DIV/0!	#DIV/0!

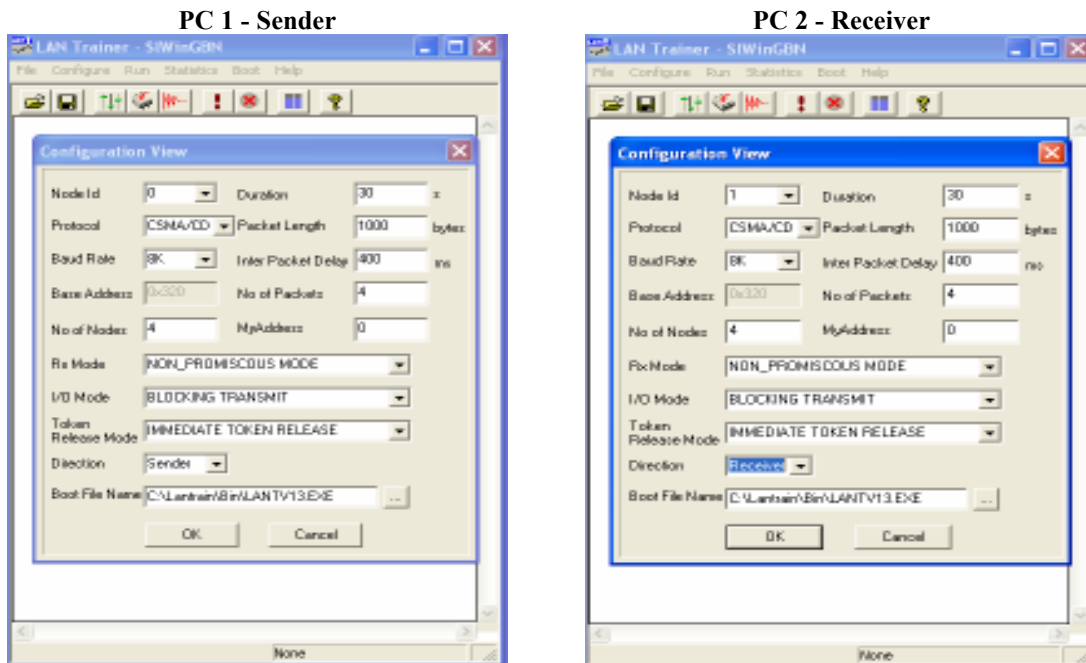
# BENCHMARK



# BENCHMARK


## Experiment 9 – SLIDING WINDOW GoBackN

- Click on the “SlwinGBN” icon from the desktop on both PCs.
- Click the Configuration  button in the window in both the Pc’s.




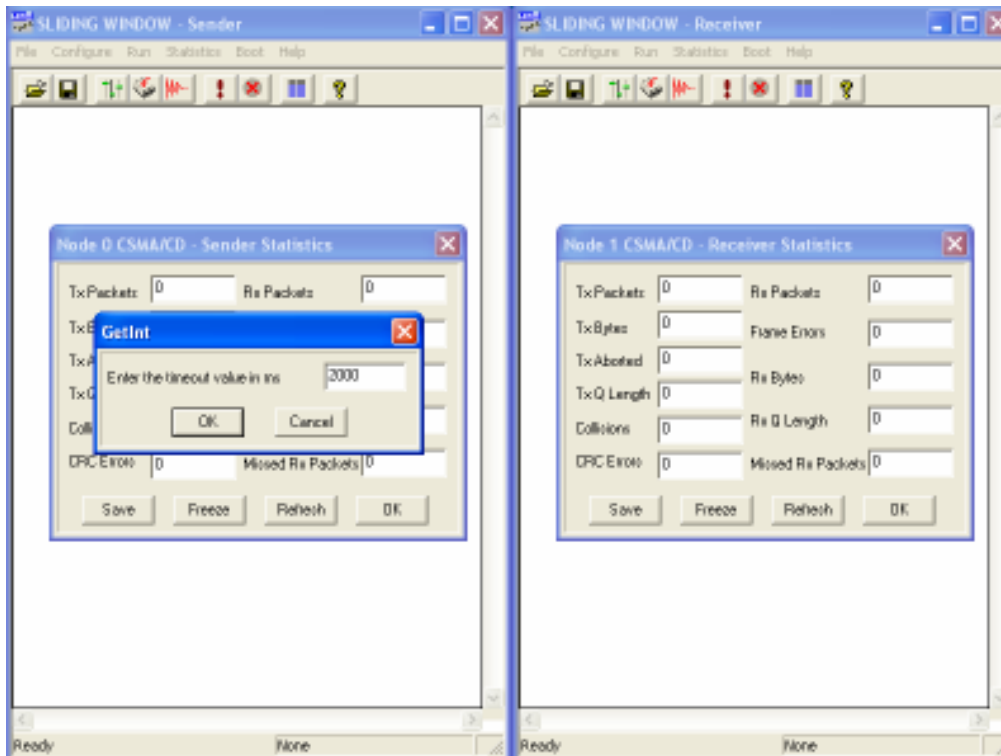
Setting the Configuration Menu:

PC 1 - Sender	PC 2 - Receiver
<ul style="list-style-type: none"> <li>Node id: “0” on config menu</li> <li>Protocol = set all to “CSMA/CD”</li> <li>Baud Rate = 8Kbps (At both the config menu and NEU)</li> <li>Duration = 30sec</li> <li>Packet Length = 1000</li> <li>Bit Delay = 0</li> <li>Direction = Sender</li> </ul>	<ul style="list-style-type: none"> <li>Node id: “1” on config menu</li> <li>Protocol = set all to “CSMA/CD”</li> <li>Baud Rate = 8Kbps (At both the config menu and NEU)</li> <li>Duration = 30sec</li> <li>Packet Length = 1000</li> <li>Bit Delay = 0</li> <li>Direction = Receiver</li> </ul>

- Set the “Inter Packet Delay” to 400msec
- Set the No. Packets as 4, this determines the Window Size
- Download the driver to the NIU using the BOOT  button command for both PCs.

# BENCHMARK

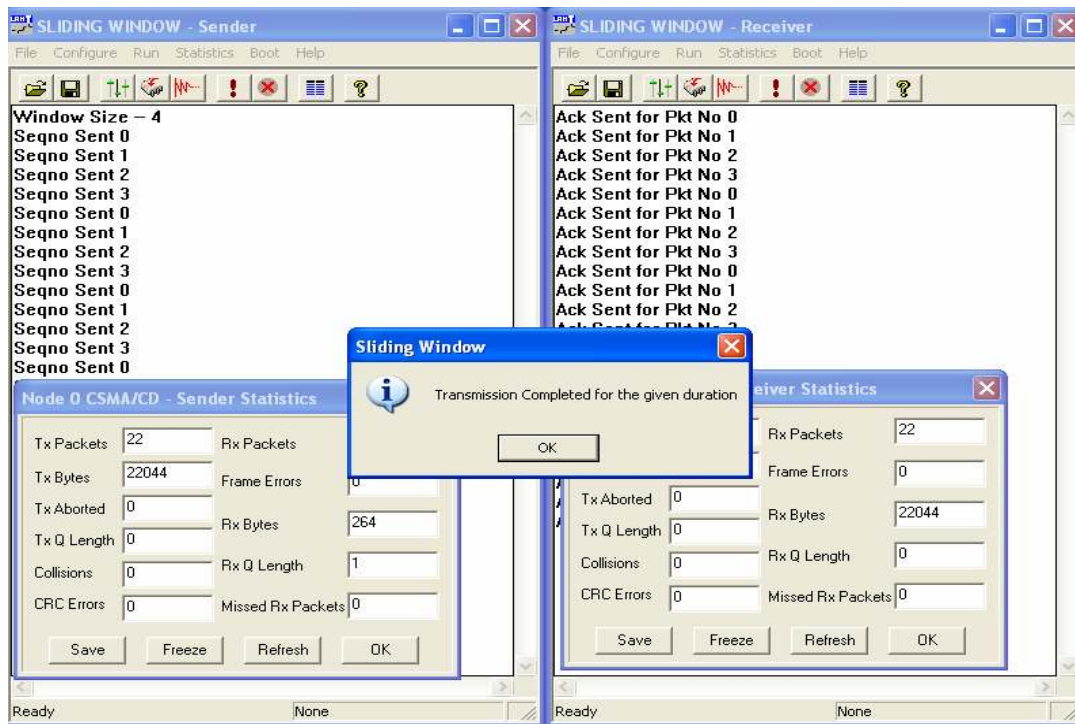
- f. Run the experiment by clicking the RUN-Start  from each application. Run the Receiver node first & then the Sender node. While you run the Sender node it will ask for timeout value
- g. Set the Timeout Value to 2000msec



# BENCHMARK

PC – 1 Sender

PC – 2 Receiver



- h. Run the experiment for various timeout values & note the No. of successfully Transmitted packets & the Retransmission count. Plot the graph between Time out Vs Throughput and find the optimum timeout value.
- i. Repeat the Experiment for various Window size and compare the throughput with stop & wait protocol throughput.
- j. Set a different Window size in the receiver window ,observe the result and explain the same.

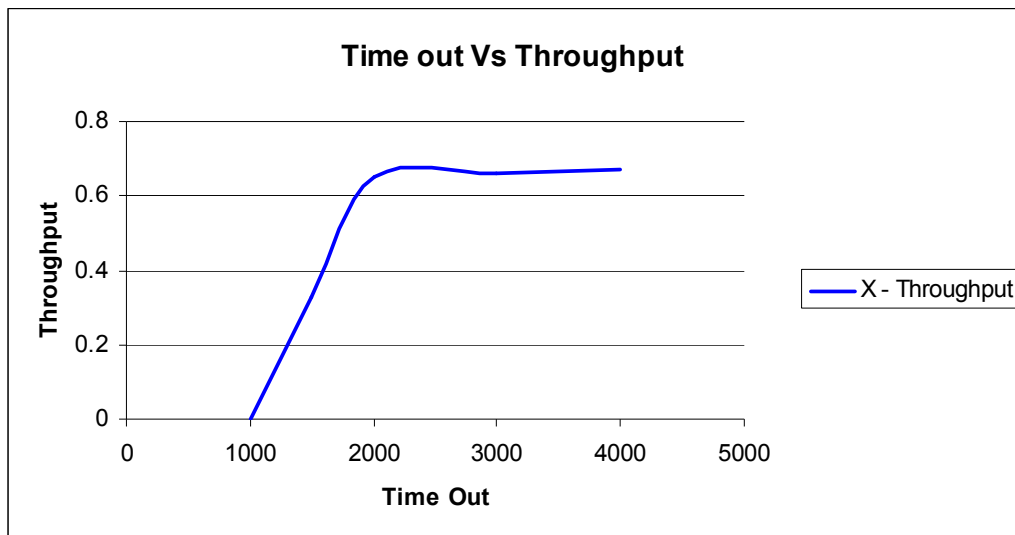


# BENCHMARK

## Result

Data Packet Length	1000
Data Rate 'C'	8000
Expt Duration (ms)	100
Ack Packet Length	10

Time out (ms)	Received Data Packets by Receiver	Acknowledgements Received by Sender	Successfully Transmitted	X - Throughput
1000	8	2	0	0
1500	70	34	33	0.33
2000	67	67	65	0.65
3000	68	68	66	0.66
4000	69	69	67	0.67



# BENCHMARK

## Experiment 10 – SLIDING WINDOW GoBackN WITH BER

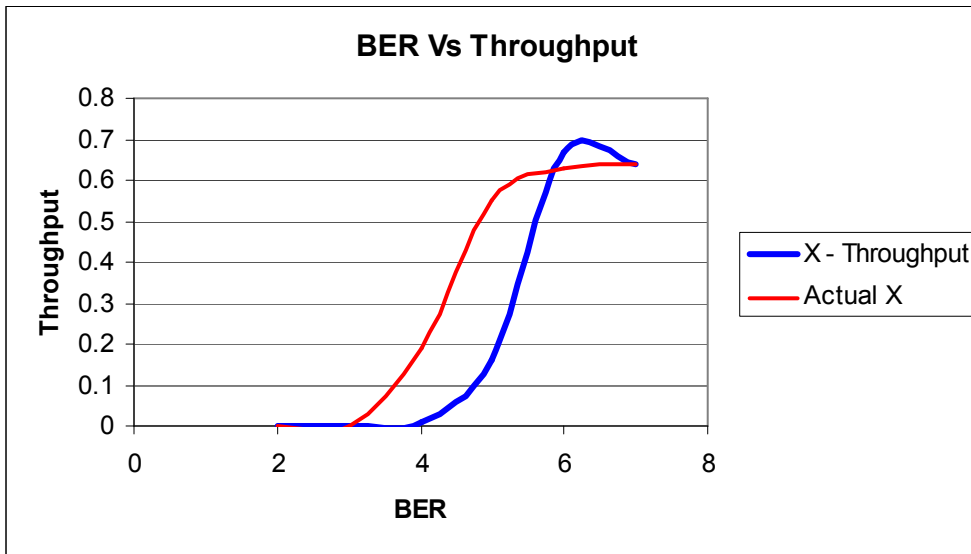
- k. Set the BER to  $10^{-3}$  in the NEU.
- l. Follow the above mentioned Procedure for running the experiment. Set the Timeout value as 3000msec in the sender window.
- m. Follow the above mentioned steps for selective repeat protocol & plot the Throughput Vs BER curve for sliding window and compare with the sliding window Go Back N.

Data Packet Length                      1000  
 Data Rate 'C'                              8000  
 Expt Duration (ms)                      100  
 Ack Packet Length                      10

Bit Delay	0
No of bits between Tx and Rx nodes	1
Time Out in ms	3000


Acknowledgements Received by Sender	Successfully Transmitted	X - Throughput	L = Probability of packet error	$L/(1-L)$	$T*L/(1-L)$	Actual X
66	64	0.64	0	0	0	0.64
69	67	0.67	0.007968	0.00803209	0.024096269	0.630202879
28	16	0.16	0.076884	0.083287501	0.249862503	0.551153212
9	1	0.01	0.550689	1.225629958	3.676889874	0.189787813
0	0	0	0.999666	2991.913686	8975.741057	0.000110501
0	0	0	1	#DIV/0!	#DIV/0!	#DIV/0!

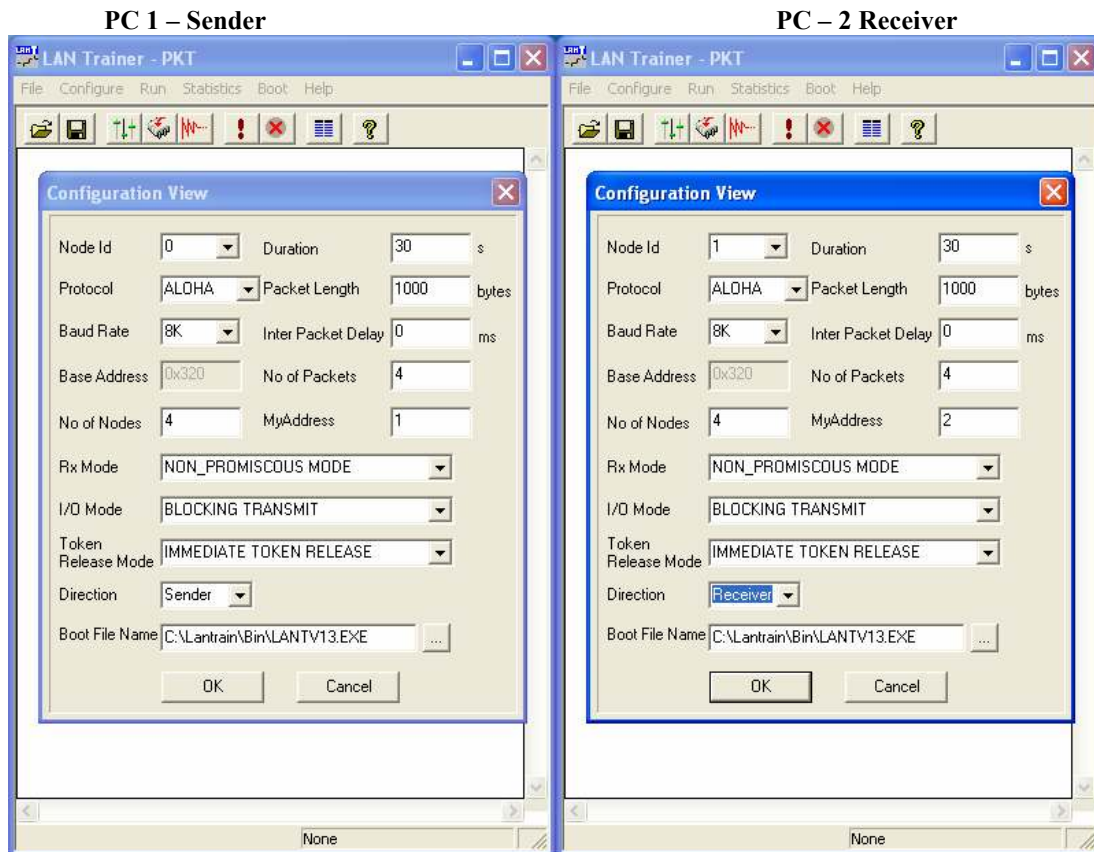
# BENCHMARK



# BENCHMARK

## Experiment 11 – PACKET TRANSMISSION

- Click on the “Pkt” icon from the desktop on both PCs.
- Click the Configuration  button in the window in both the Pc's.

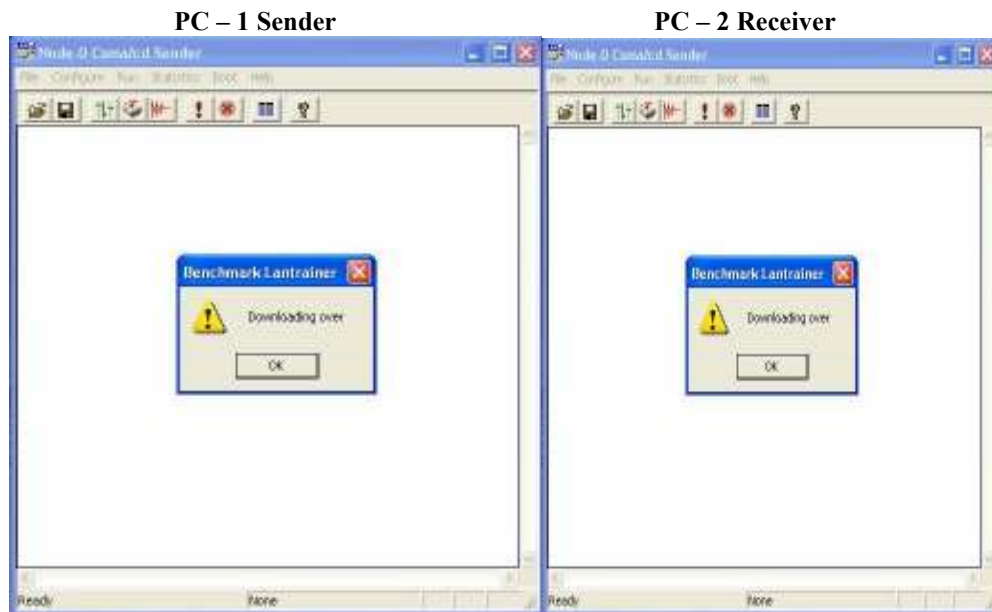


Setting the Configuration Menu:

PC 1 – Sender	PC 2 - Receiver
<ul style="list-style-type: none"><li>Node id: “0” on config menu</li><li>Baud Rate = 8Kbps (At both the config menu and NEU)</li><li>Duration = 30sec</li><li>Packet Length = 1000</li><li>MyAddress = 1</li><li>Bit Delay = 0</li><li>Direction = Sender</li></ul>	<ul style="list-style-type: none"><li>Node id: “1” on config menu</li><li>Baud Rate = 8Kbps (At both the config menu and NEU)</li><li>Duration = 30sec</li><li>Packet Length = 1000</li><li>MyAddress = 2</li><li>Bit Delay = 0</li><li>Direction = Receiver</li></ul>

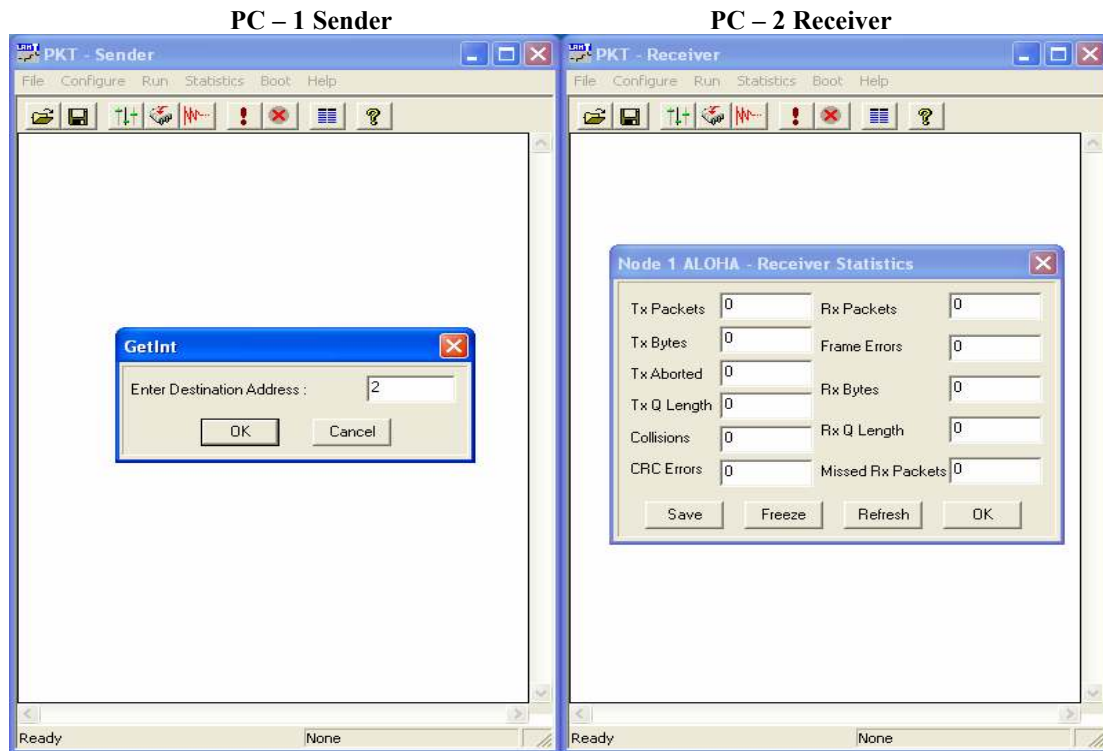
# BENCHMARK

- c. Download the driver to the NIU using the BOOT  button command for both PCs.

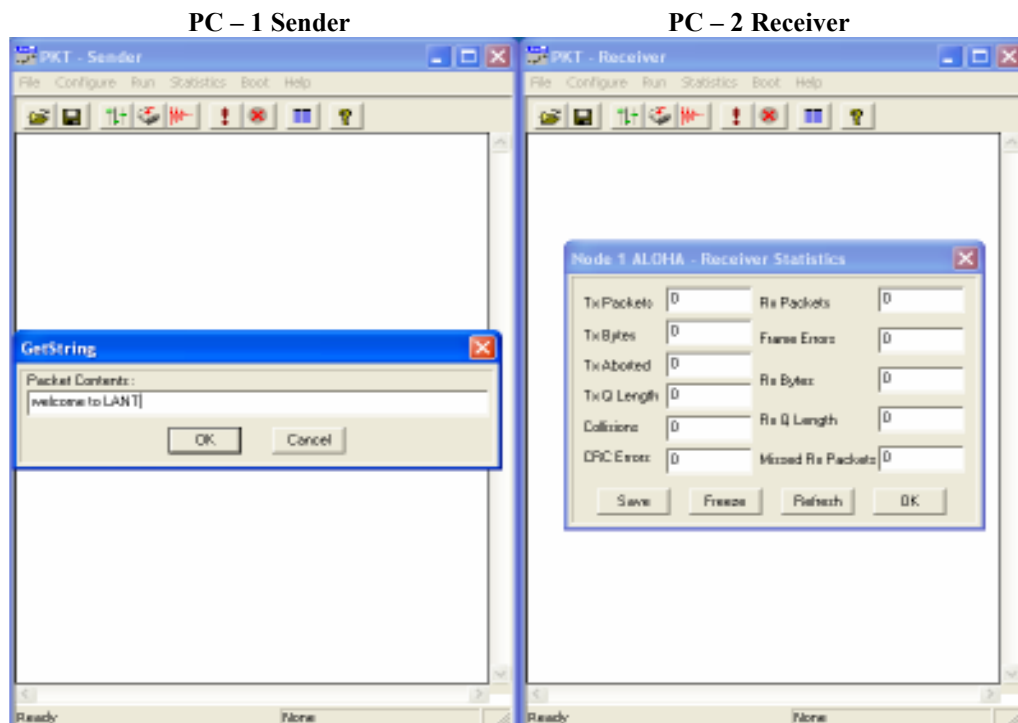


- c. Run the Receiver node first & then the transmitter window. Enter the receiver's node ID in the sender's dialogue box once it is prompted.

# BENCHMARK

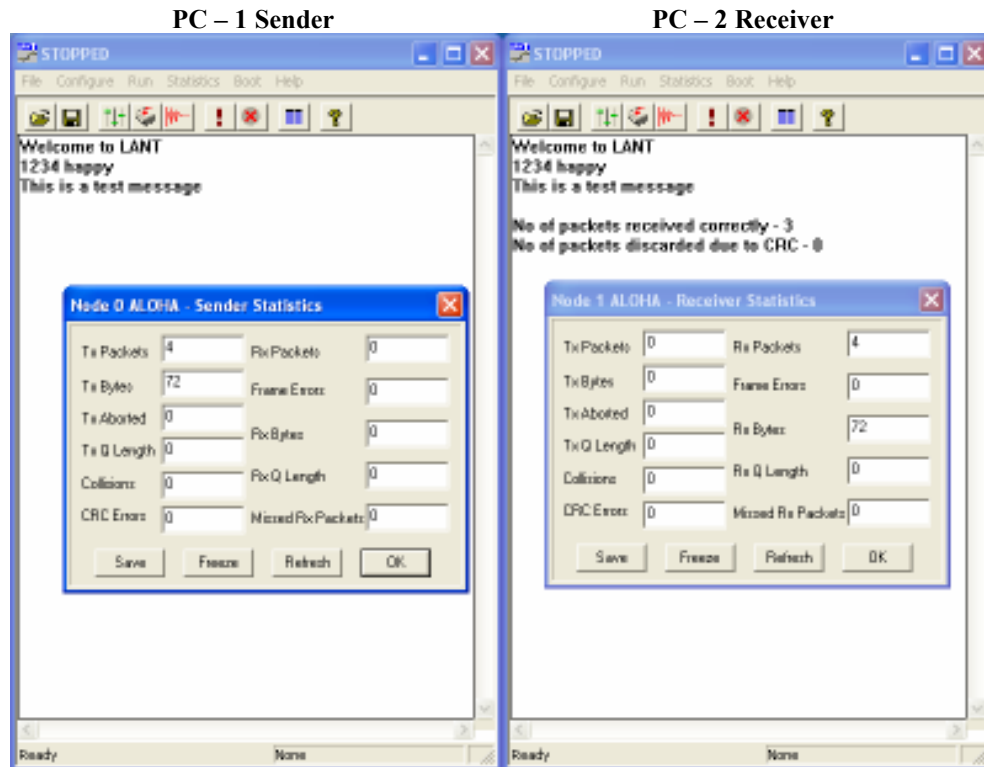


- d. After this the sender will display another “GetString” dialogue box, here you can key in your string using the keyboard & press the ok button.



# BENCHMARK


- e. Observe the Transmitted text in the receiver node. If you type an empty message, both sender and receiver should terminate.

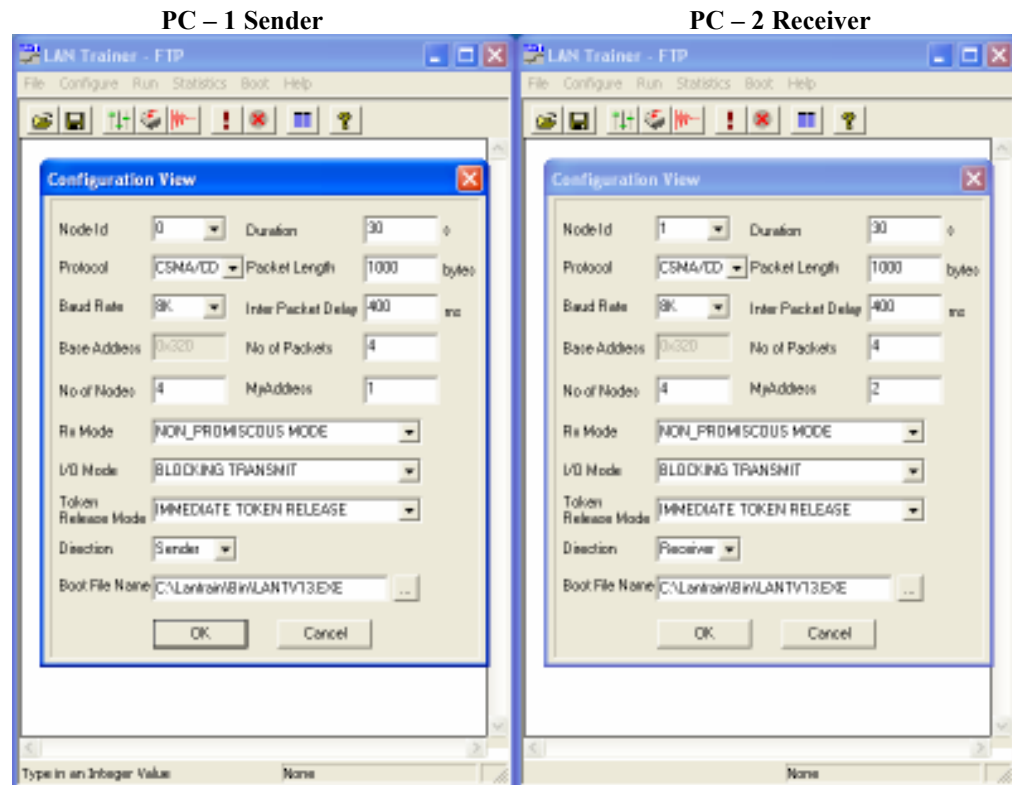


- f. Set the BER to  $10^{-4}$  and repeat the above mentioned steps and observe the results.


# BENCHMARK

## Experiment 12 – FTP

- Click on the “FTP” icon from the desktop on both PCs.
- Click the Configuration  button in the window in both the Pc’s.



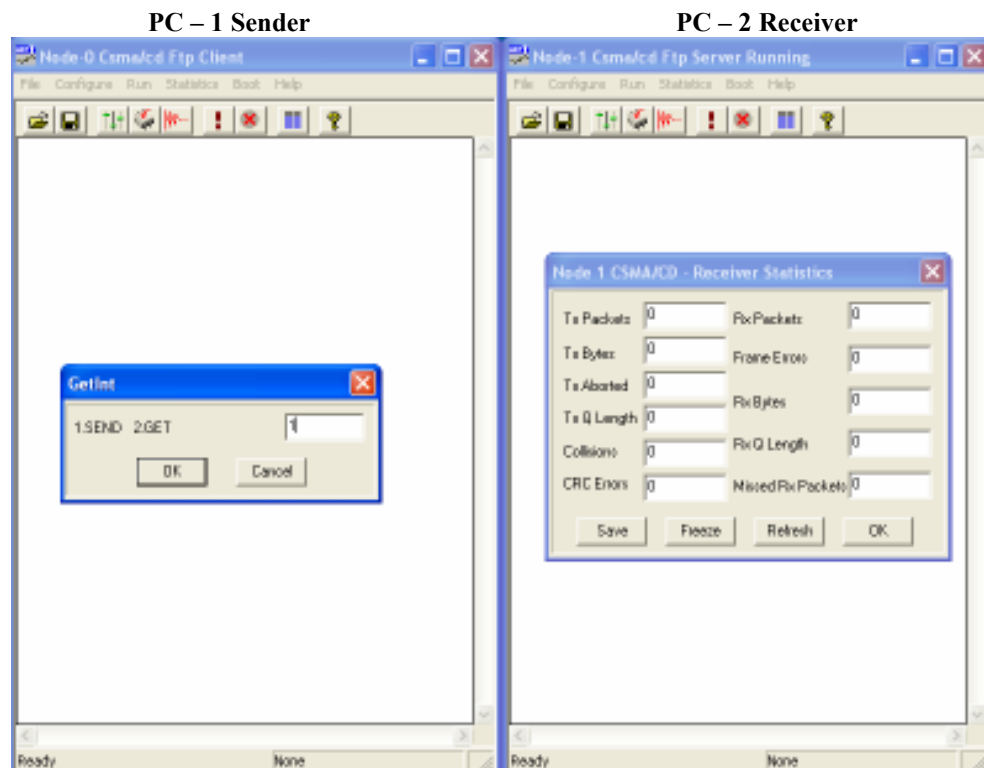
PC 1 – Sender	PC 2 - Receiver
<ul style="list-style-type: none"> <li>Node id: “0” on config menu</li> <li>Baud Rate = 8Kbps (At both the config menu and NEU)</li> <li>Duration = 30sec</li> <li>Packet Length = 1000</li> <li>Protocol = CSMACD</li> <li>MyAddress = 1</li> <li>Bit Delay = 0</li> <li>Direction = Sender</li> </ul>	<ul style="list-style-type: none"> <li>Node id: “1” on config menu</li> <li>Baud Rate = 8Kbps (At both the config menu and NEU)</li> <li>Duration = 30sec</li> <li>Packet Length = 1000</li> <li>Protocol = CSMACD</li> <li>MyAddress = 2</li> <li>Bit Delay = 0</li> <li>Direction = Receiver</li> </ul>

- Set the IPD as 400 msec.
- Download the driver to the NIU using the BOOT  button command for both PCs.



## BENCHMARK

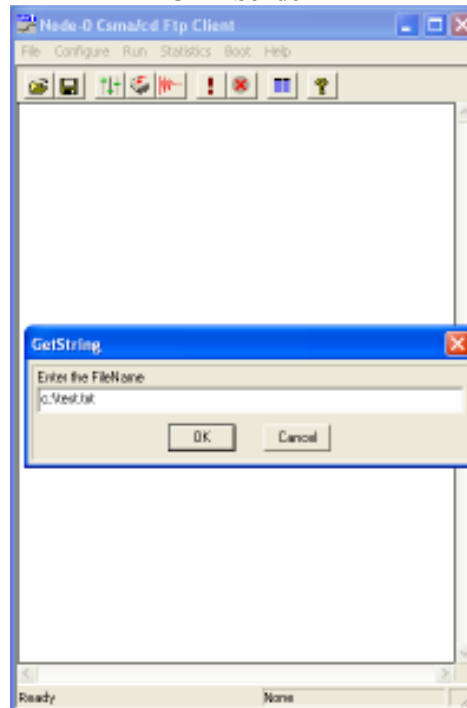
- e. Run the Receiver node first & then the transmitter window. While you do this the sender node will display a “GetInt” message box, If you want to transmit a file from Client to server, Enter 1 or else if you want to Download a file from Server to client, press 2.



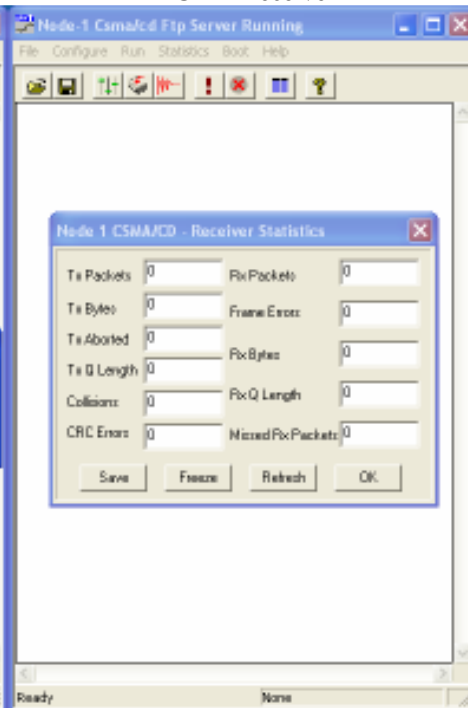
- f. Then Specify the Path of the file either to transmit or to download (i.e. c:\test.txt) & specify the timeout value.

# BENCHMARK

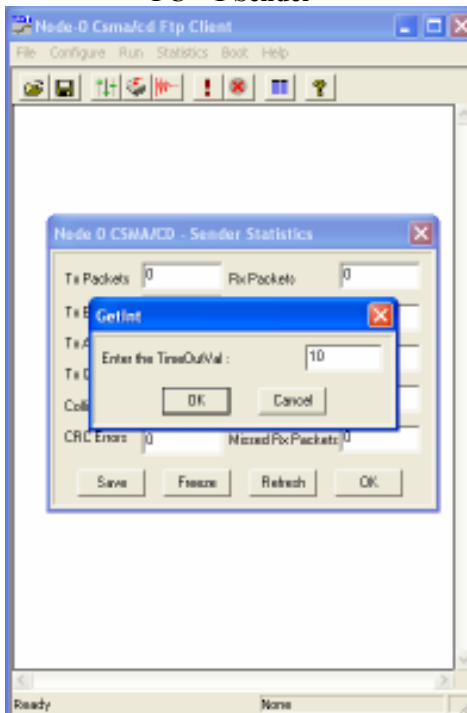
PC – 1 Sender



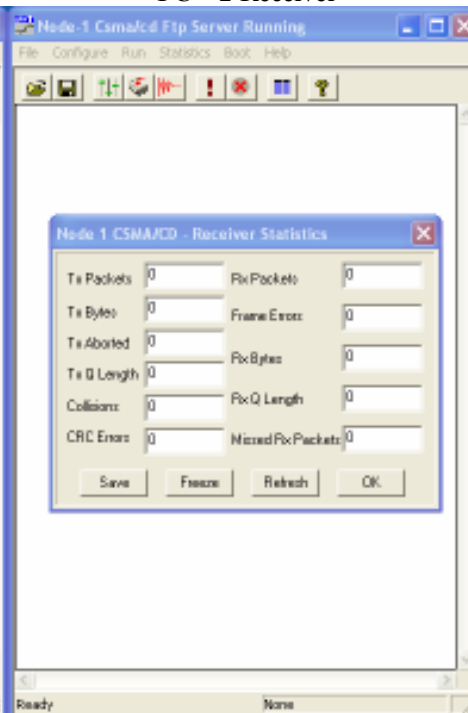
PC – 2 Receiver



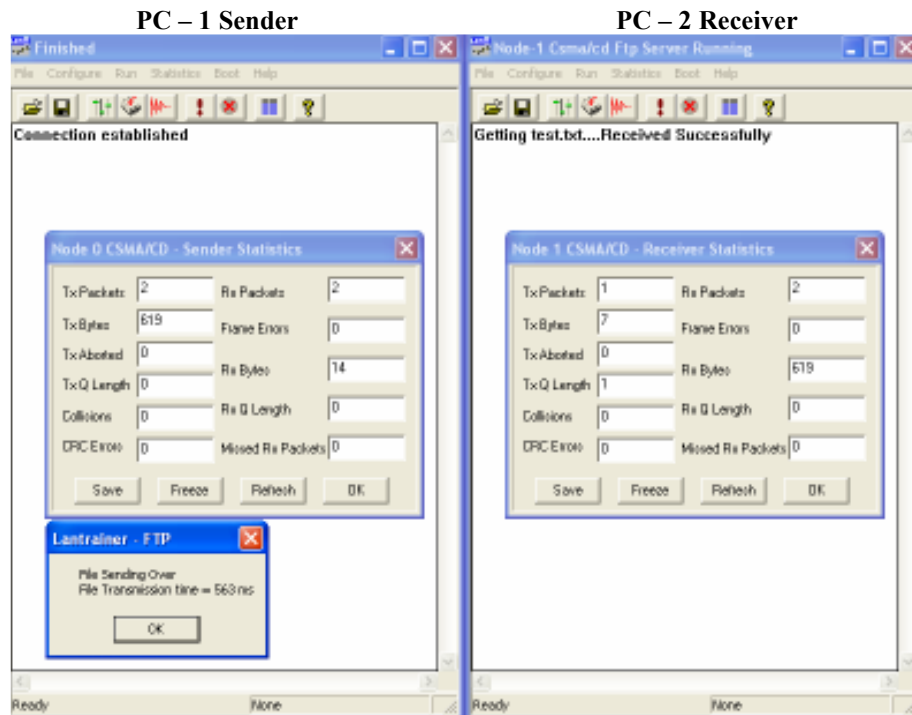
PC – 1 Sender



PC – 2 Receiver



# BENCHMARK



- g. At the end of transmission, the file will be stored in the server nodes desktop.
- h. Now, open “packet sniffing application” in another computer and set the configuration parameters as explained above.
- i. Run the packet sniffer application first and then FTP client & server application as explained above.
- j. Once the File transfer is over between the client node & the server node, press the stop button in the packet sniffer node and open the “**CapturedPkt.LanT**” in the desktop, the contents of the file which has been transmitted between the client & server node can be seen in the packet sniffer node.
- k. Repeat the above mentioned experiment with the encrypted file and observe the result.