Capsim Buffer Management

Simulation Kernel

Connections

Synchronous and Asynchronous Data Flow

XCAD Corporation

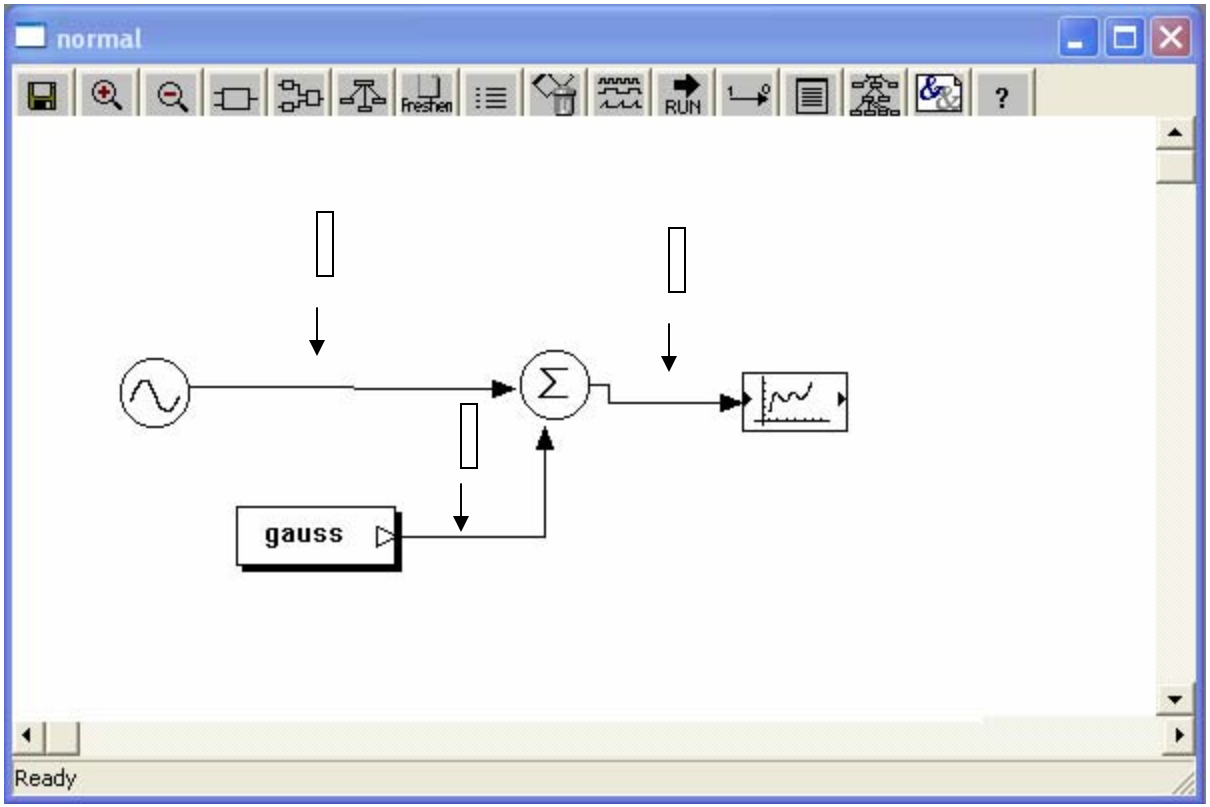
http://www.xcad.com

Original IEEE Papers by Messerschmitt on BLOSIM

David G. Messerschmitt, "A Tool for Structured Functional Simulation",
IEEE Journal on Selected Areas in Communications, Vol. SAC-2, NO.1,
January 1984, pp.137-147

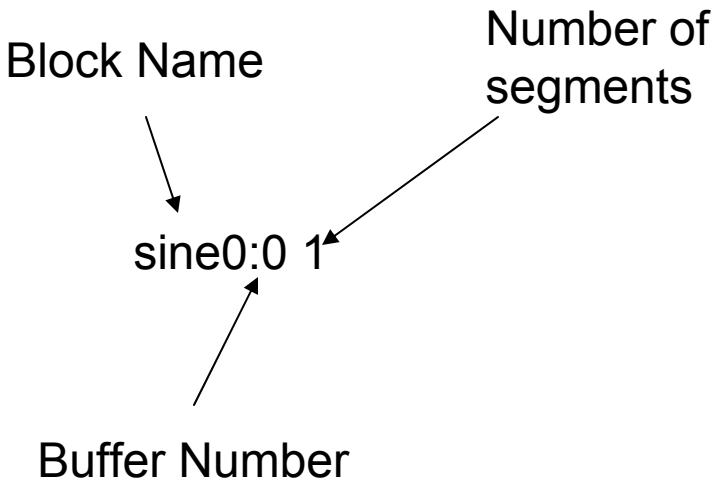
David G. Messerschmitt, "Structured Interconnection of Simulation Programs",
1984 *IEEE GlobeComm*. pp. 808-811

http://capsimtmk.sourceforge.net/blosim.htm



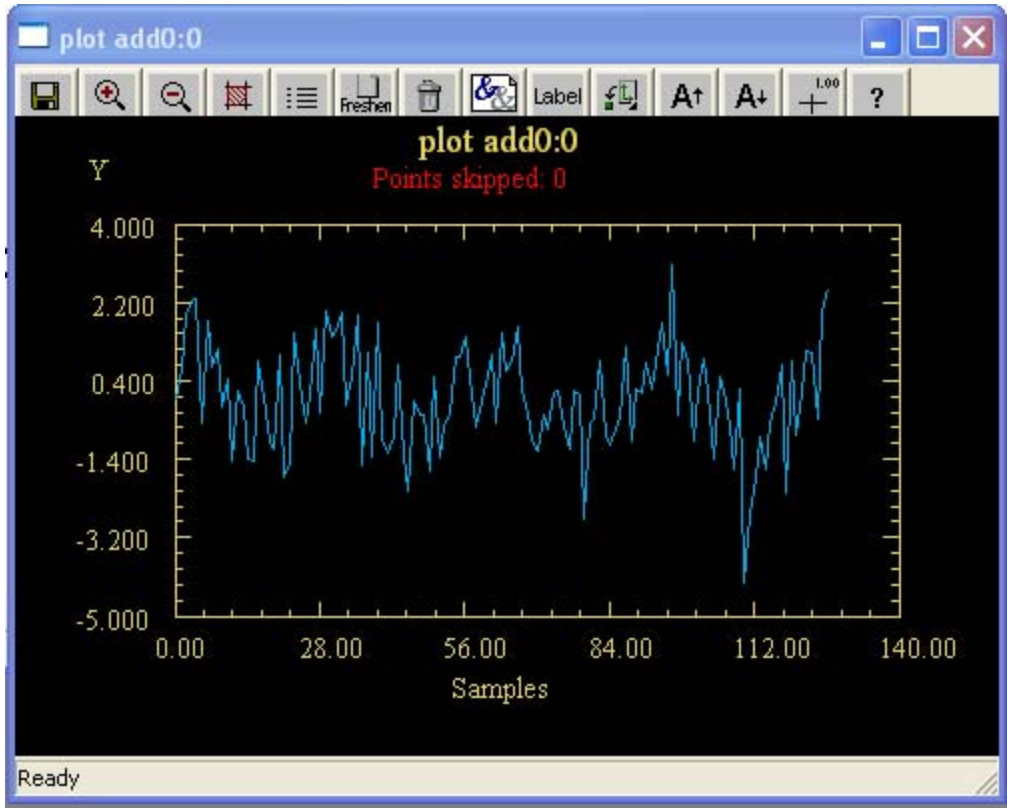
Buffer.dat

sine0:0 1
gauss0:0 1
add0:0 1

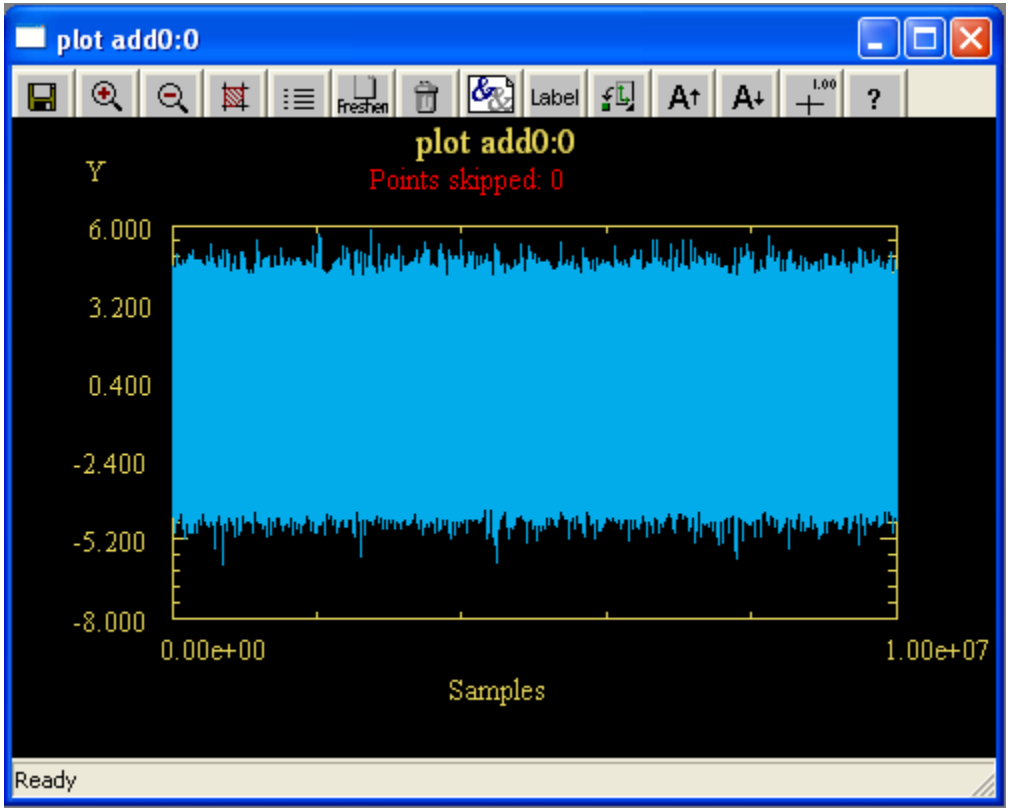


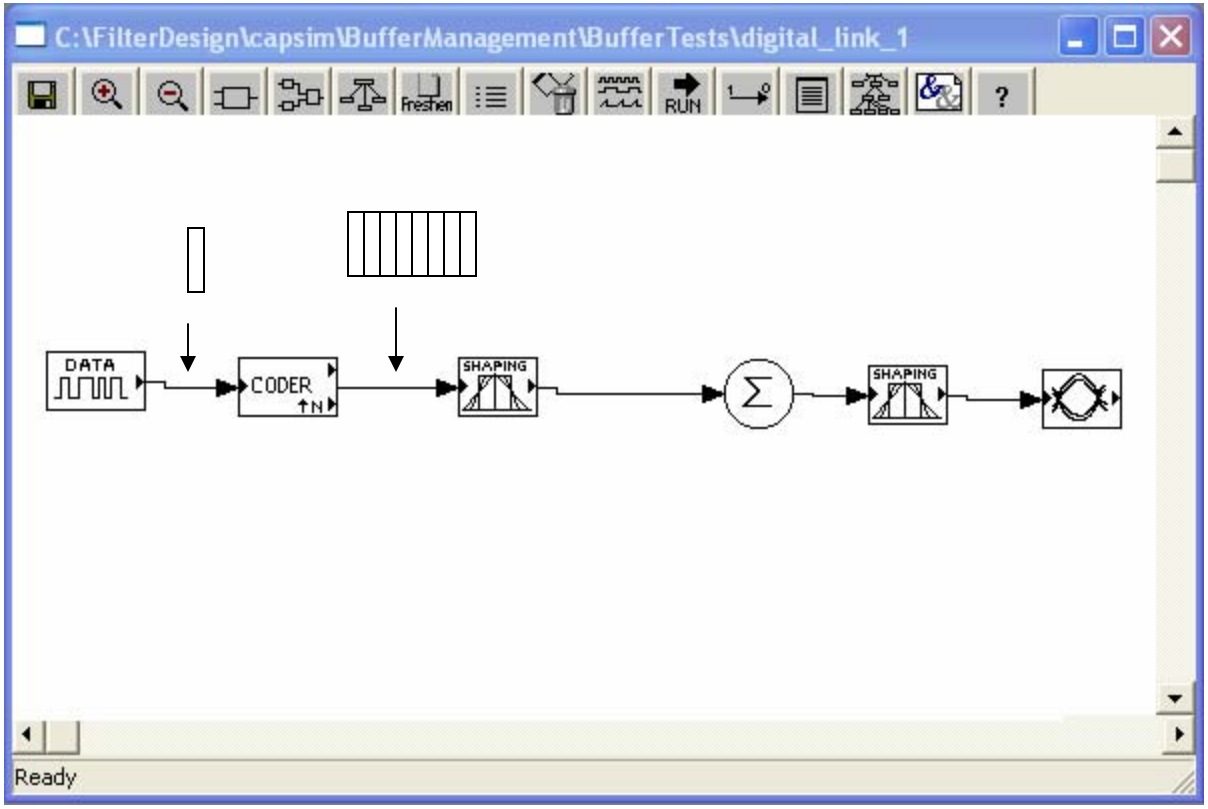
Each segment is 128 cells (each cell is floating point sample in this case)

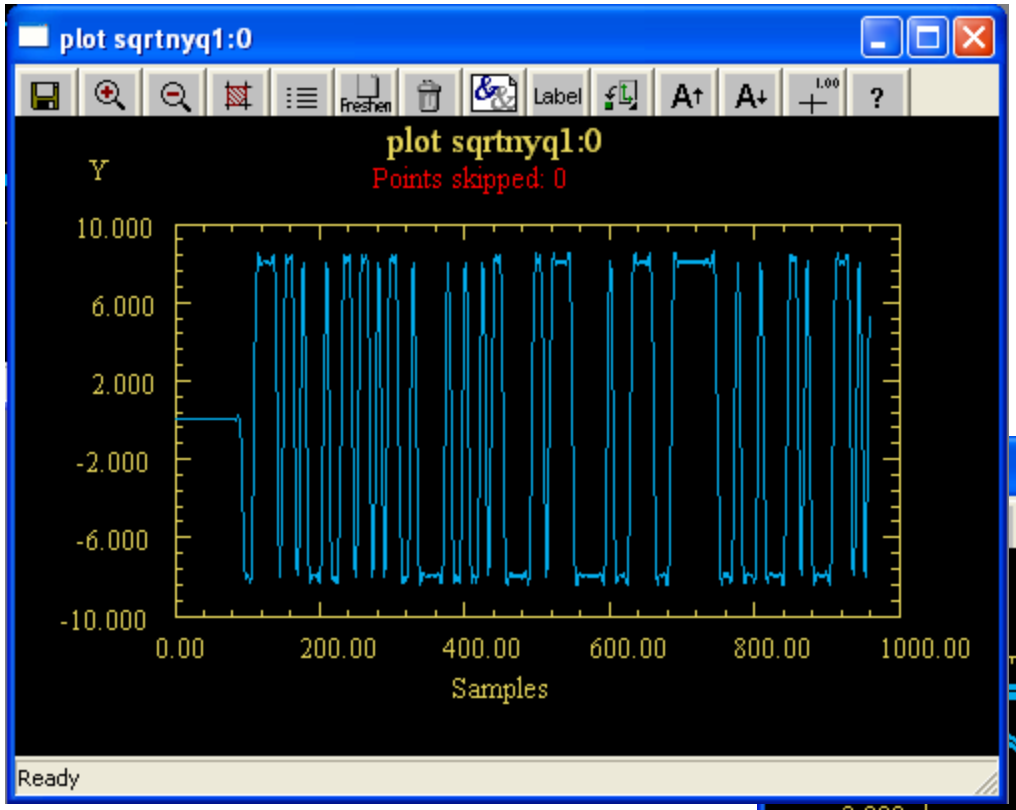
Simulation 128 Samples

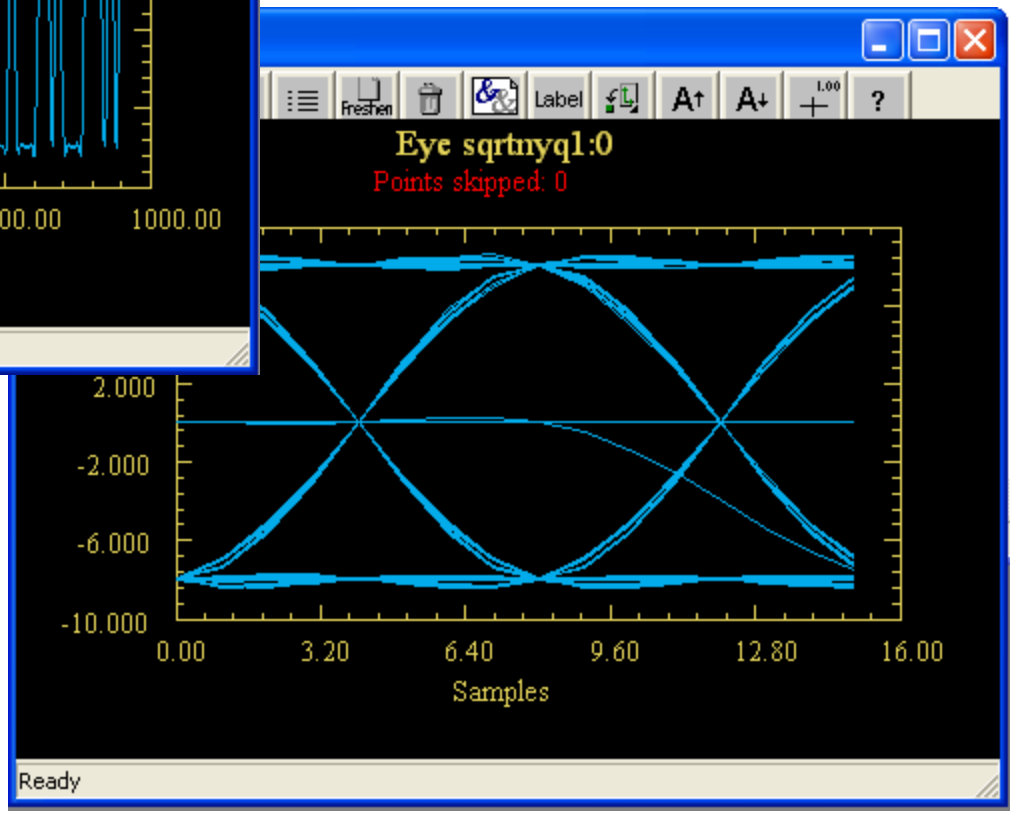


Simulation with 10,000,000 Samples





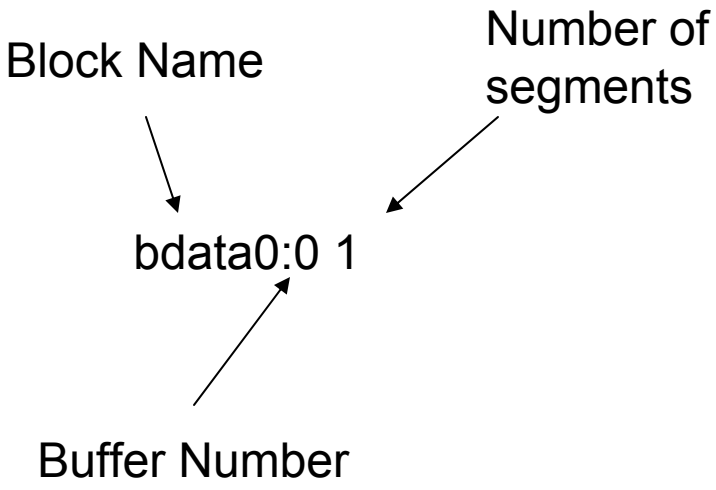




Buffer.dat

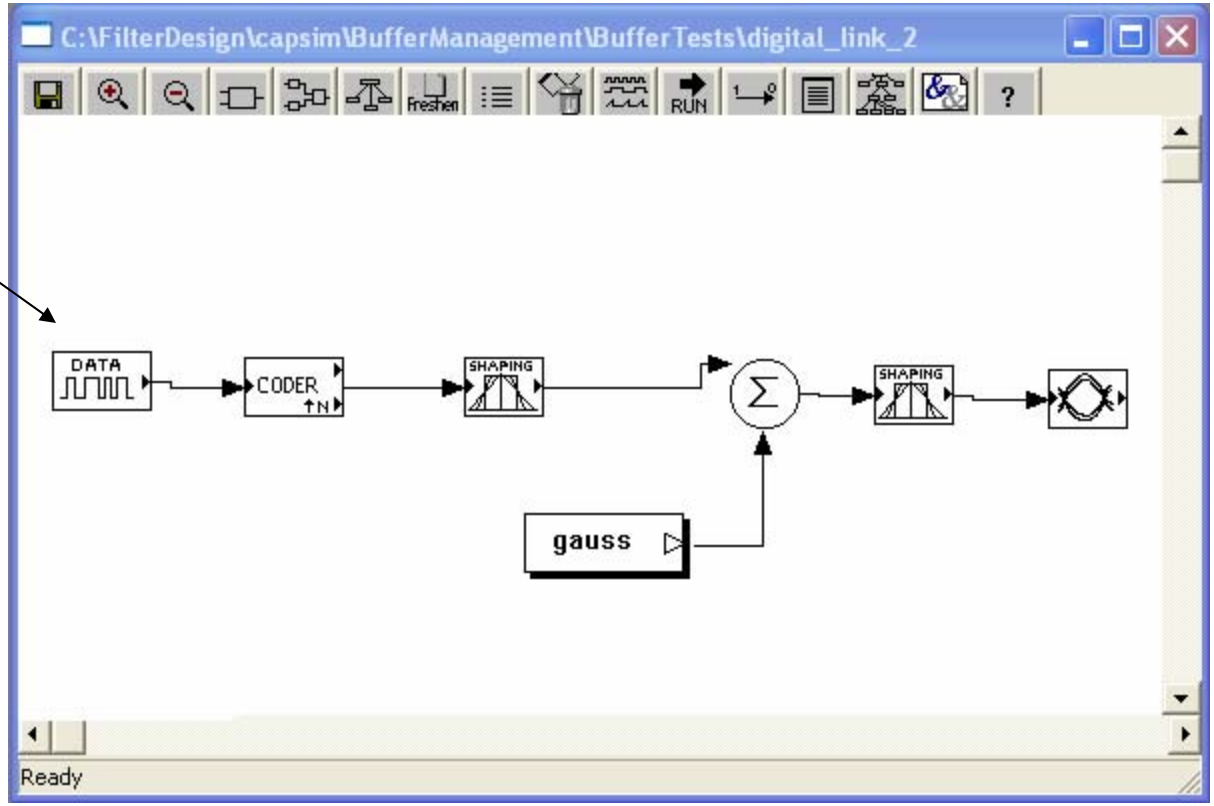
bdata0:0 1
linecode0:0 1
linecode0:0 2
linecode0:0 3
linecode0:0 4
linecode0:0 5
linecode0:0 6
linecode0:0 7
linecode0:0 8
sqrtnyq0:0 1
sqrtnyq0:0 2
sqrtnyq0:0 3
sqrtnyq0:0 4
sqrtnyq0:0 5
sqrtnyq0:0 6
sqrtnyq0:0 7
sqrtnyq0:0 8

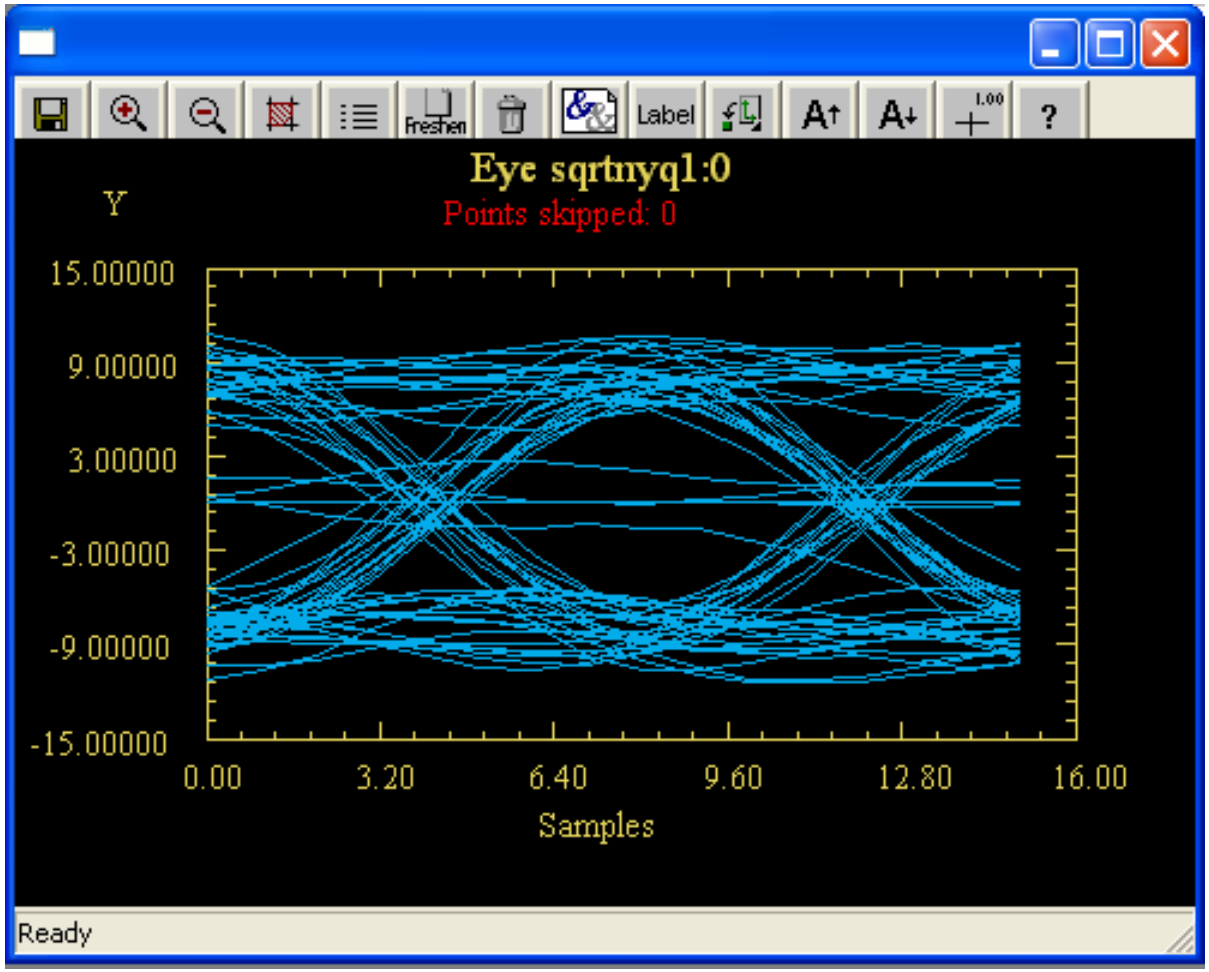
add0:0 1
add0:0 2
add0:0 3
add0:0 4
add0:0 5
add0:0 6
add0:0 7
add0:0 8
sqrtnyq1:0 1
sqrtnyq1:0 2
sqrtnyq1:0 3
sqrtnyq1:0 4
sqrtnyq1:0 5
sqrtnyq1:0 6
sqrtnyq1:0 7
sqrtnyq1:0 8



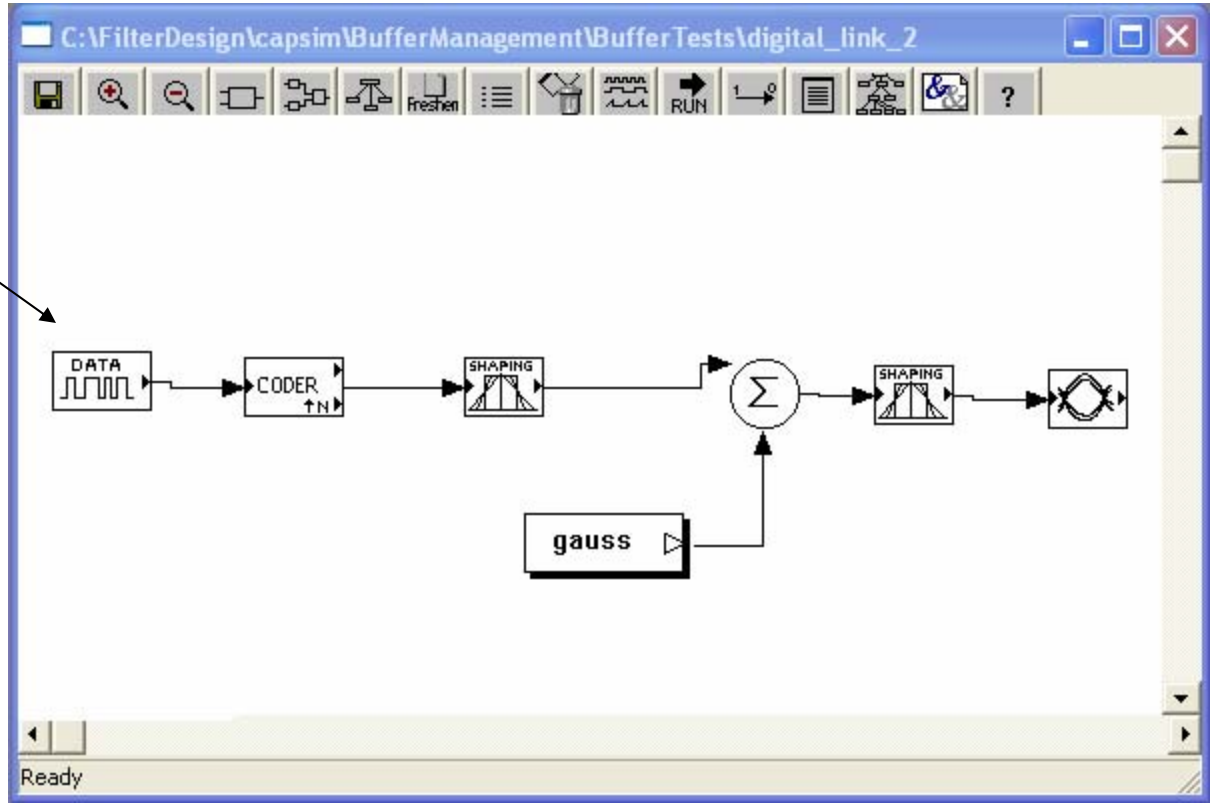
Each segment is 128 cells (each cell is floating point sample in this case)

Generates
128 Samples





Generates
128 Samples

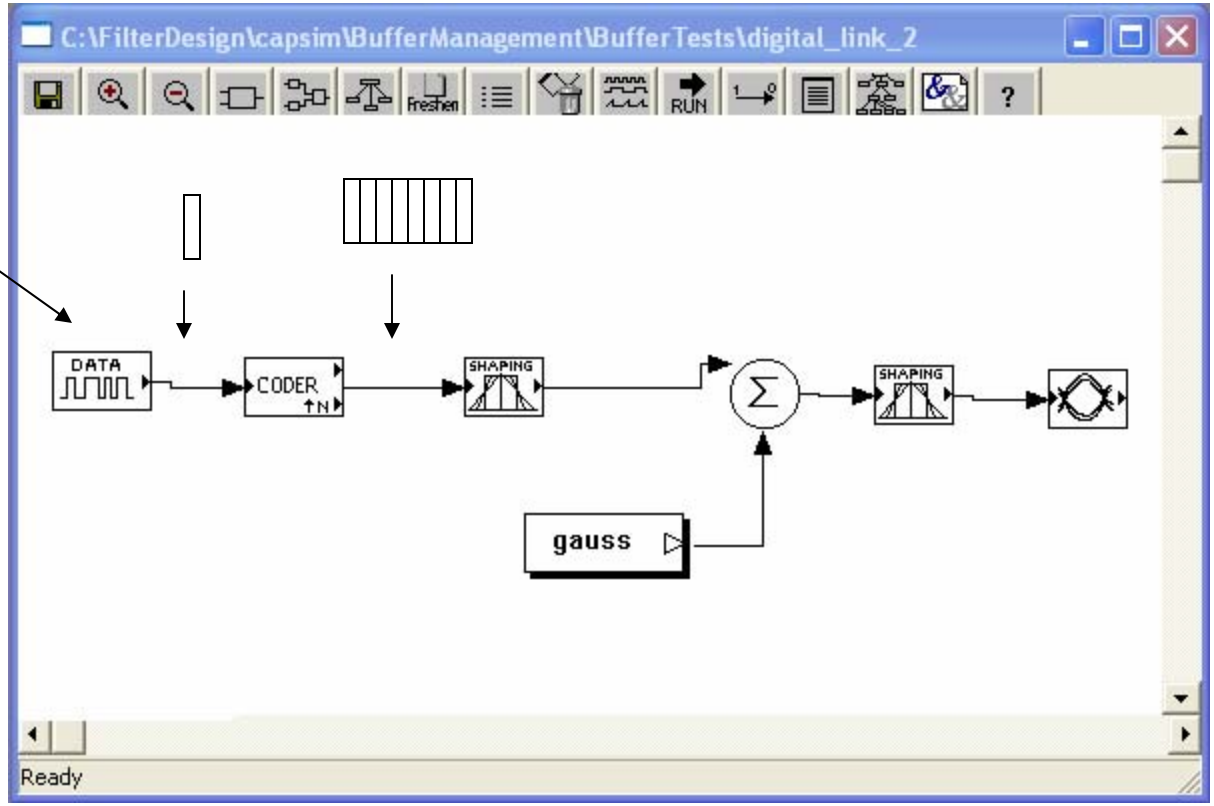


Buffer.dat when *gauss* generates the exact number of samples required

bdata0: 1
linecode0: 1
linecode0: 2
linecode0: 3
linecode0: 4
linecode0: 5
linecode0: 6
linecode0: 7
linecode0: 8
sqrtnyq0:0 1
sqrtnyq0:0 2
sqrtnyq0:0 3
sqrtnyq0:0 4
sqrtnyq0:0 5
sqrtnyq0:0 6
sqrtnyq0:0 7
sqrtnyq0:0 8
gauss0:0 1
add0: 1
sqrtnyq1:0 1
sqrtnyq1:0 2

Case where *bdata* generates 1024 samples

Generates
1024 Samples



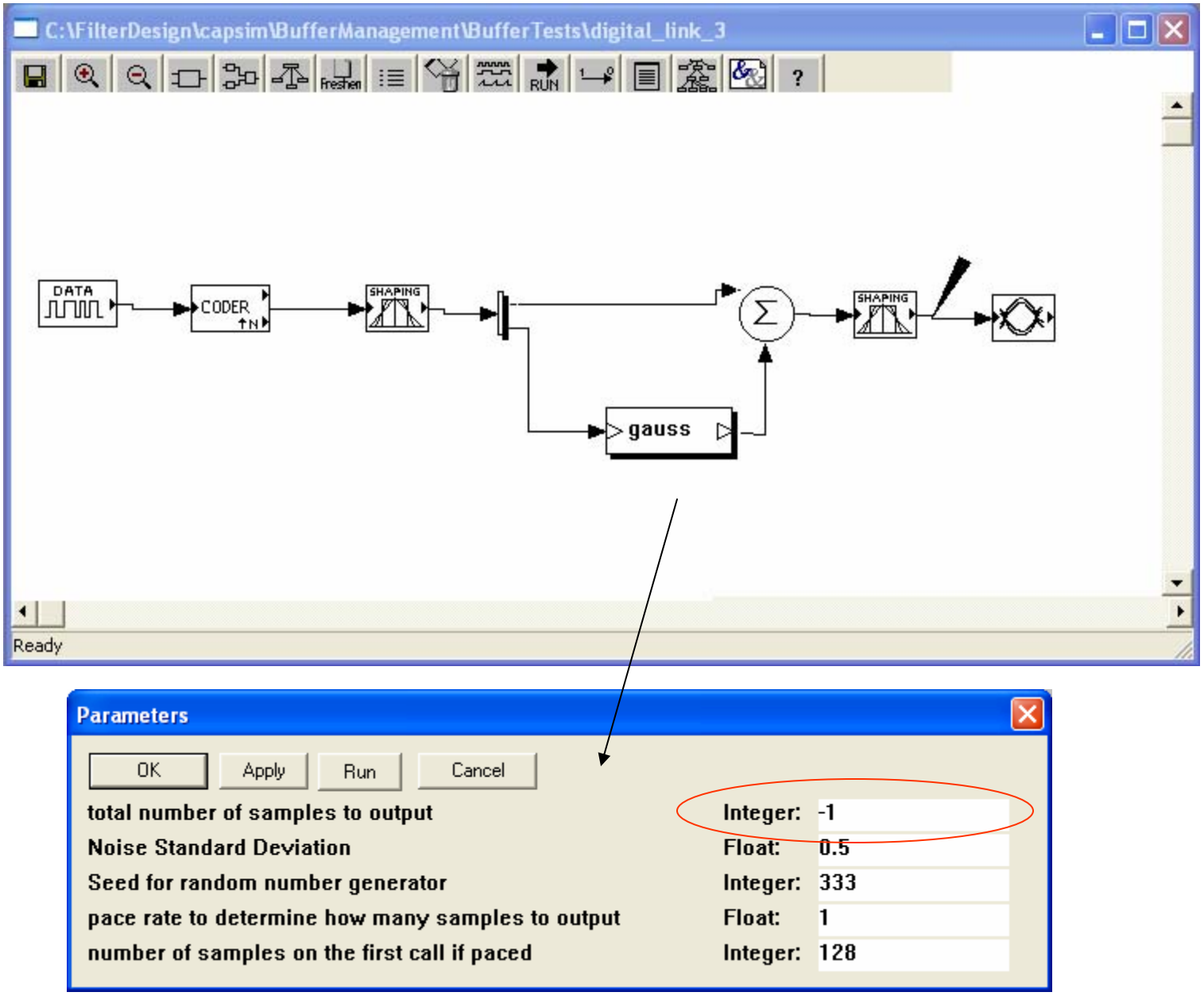
bdata0: 1
linecode0: 1
linecode0: 2
linecode0: 3
linecode0: 4
linecode0: 5
linecode0: 6
linecode0: 7
linecode0: 8
sqrtnyq0:0 1
sqrtnyq0:0 2
sqrtnyq0:0 3
sqrtnyq0:0 4
sqrtnyq0:0 5
sqrtnyq0:0 6
sqrtnyq0:0 7
sqrtnyq0:0 8
gauss0:0 1
add0: 1
sqrtnyq0:0 9
sqrtnyq0:0 10

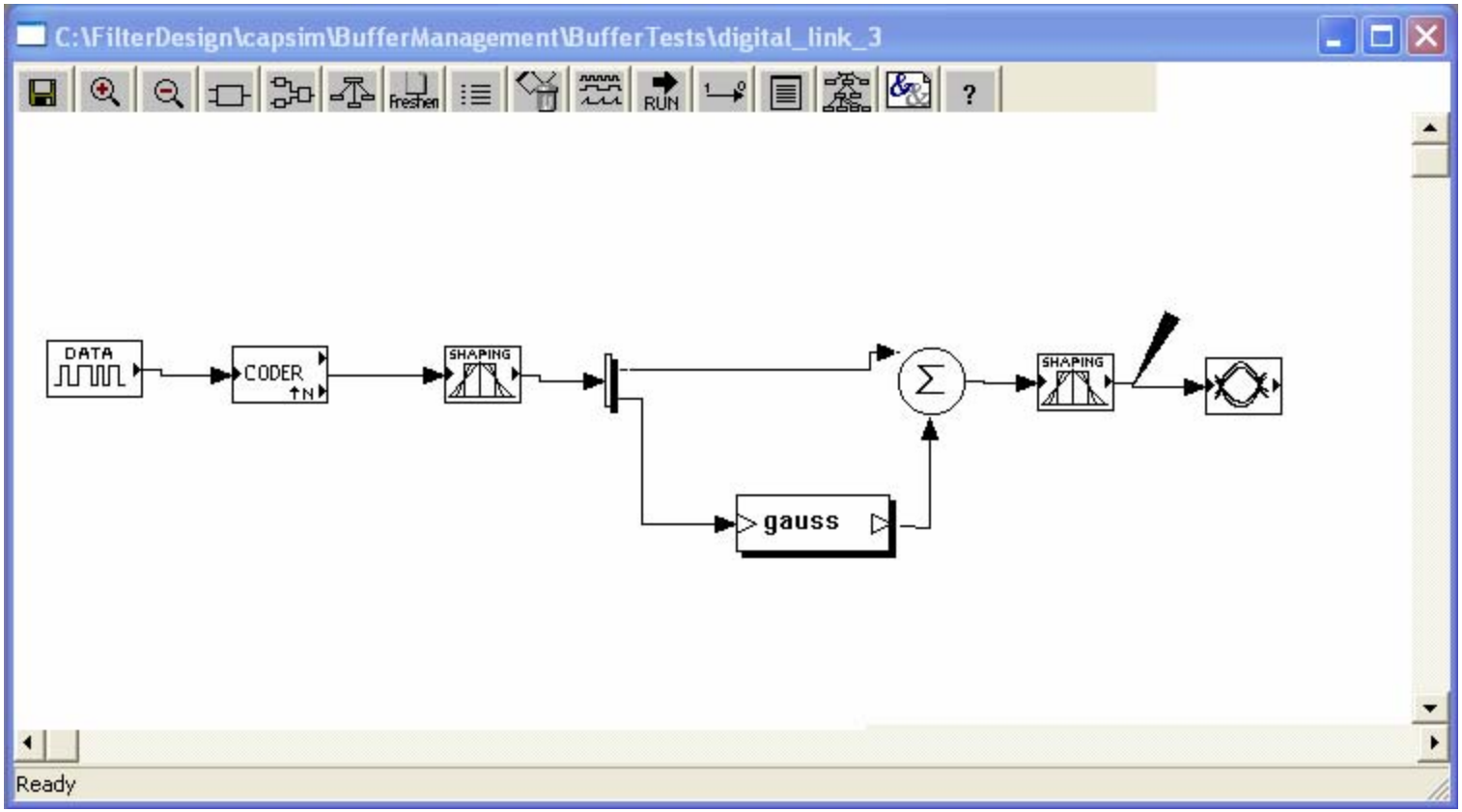
sqrtnyq0:0 11
sqrtnyq0:0 12
sqrtnyq0:0 13
sqrtnyq0:0 14
sqrtnyq1:0 1
sqrtnyq1:0 2
sqrtnyq0:0 15
sqrtnyq0:0 16
sqrtnyq0:0 17
sqrtnyq0:0 18
sqrtnyq0:0 19
sqrtnyq0:0 20
sqrtnyq0:0 21
sqrtnyq0:0 22
sqrtnyq0:0 23
sqrtnyq0:0 24
sqrtnyq0:0 25
sqrtnyq0:0 26
sqrtnyq0:0 27

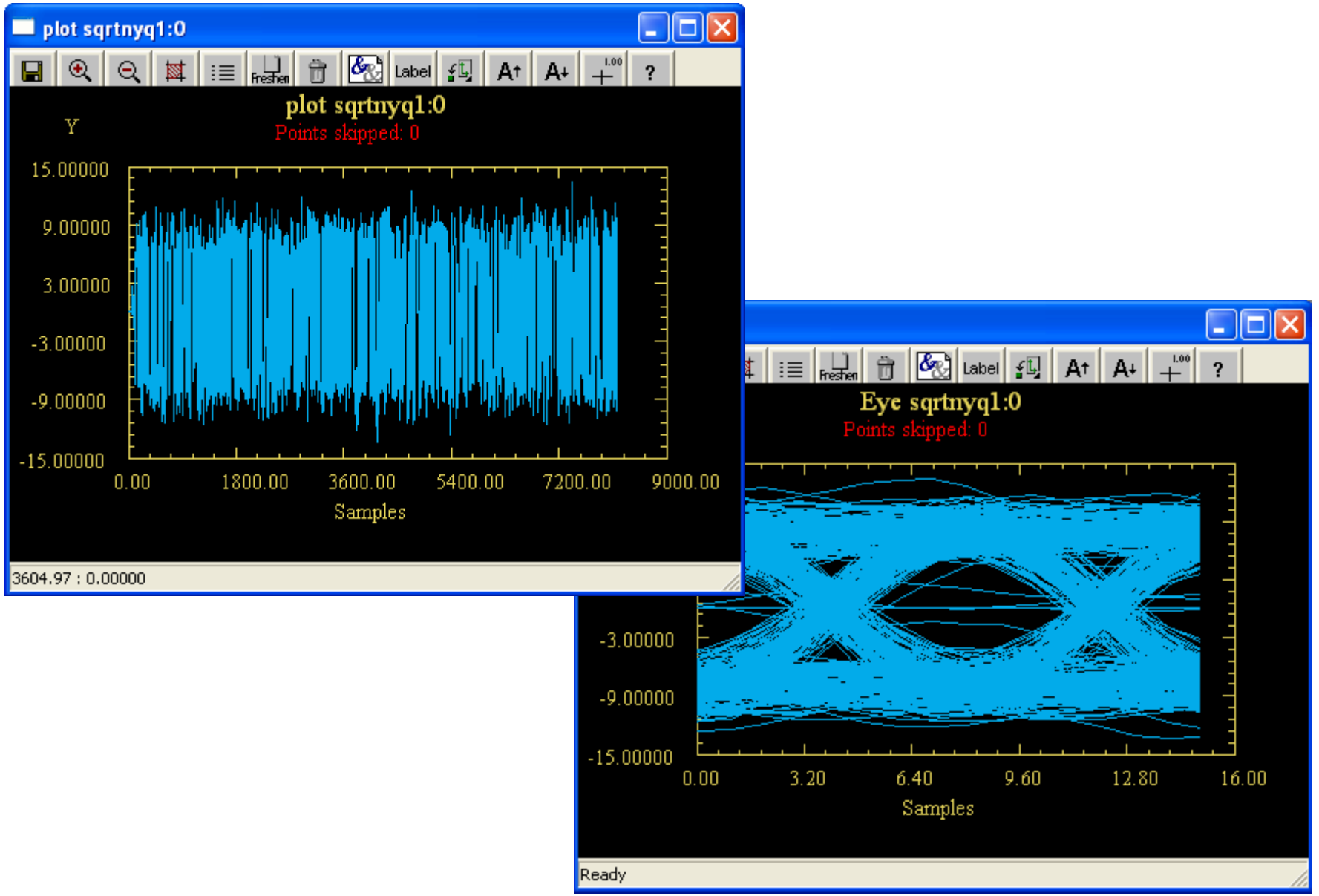
sqrtnyq0:0 28
sqrtnyq0:0 29
sqrtnyq0:0 30
sqrtnyq0:0 31
sqrtnyq0:0 32
sqrtnyq0:0 33
sqrtnyq0:0 34
sqrtnyq0:0 35
sqrtnyq0:0 36
sqrtnyq0:0 37
sqrtnyq0:0 38
sqrtnyq0:0 39
sqrtnyq0:0 40
sqrtnyq0:0 41
sqrtnyq0:0 42
sqrtnyq0:0 43
sqrtnyq0:0 44
sqrtnyq0:0 45
sqrtnyq0:0 46

sqrtnyq0:0 47
sqrtnyq0:0 48
sqrtnyq0:0 49
sqrtnyq0:0 50
sqrtnyq0:0 51
sqrtnyq0:0 52
sqrtnyq0:0 53
sqrtnyq0:0 54
sqrtnyq0:0 55
sqrtnyq0:0 56
sqrtnyq0:0 57

Segment Allocation Growth !



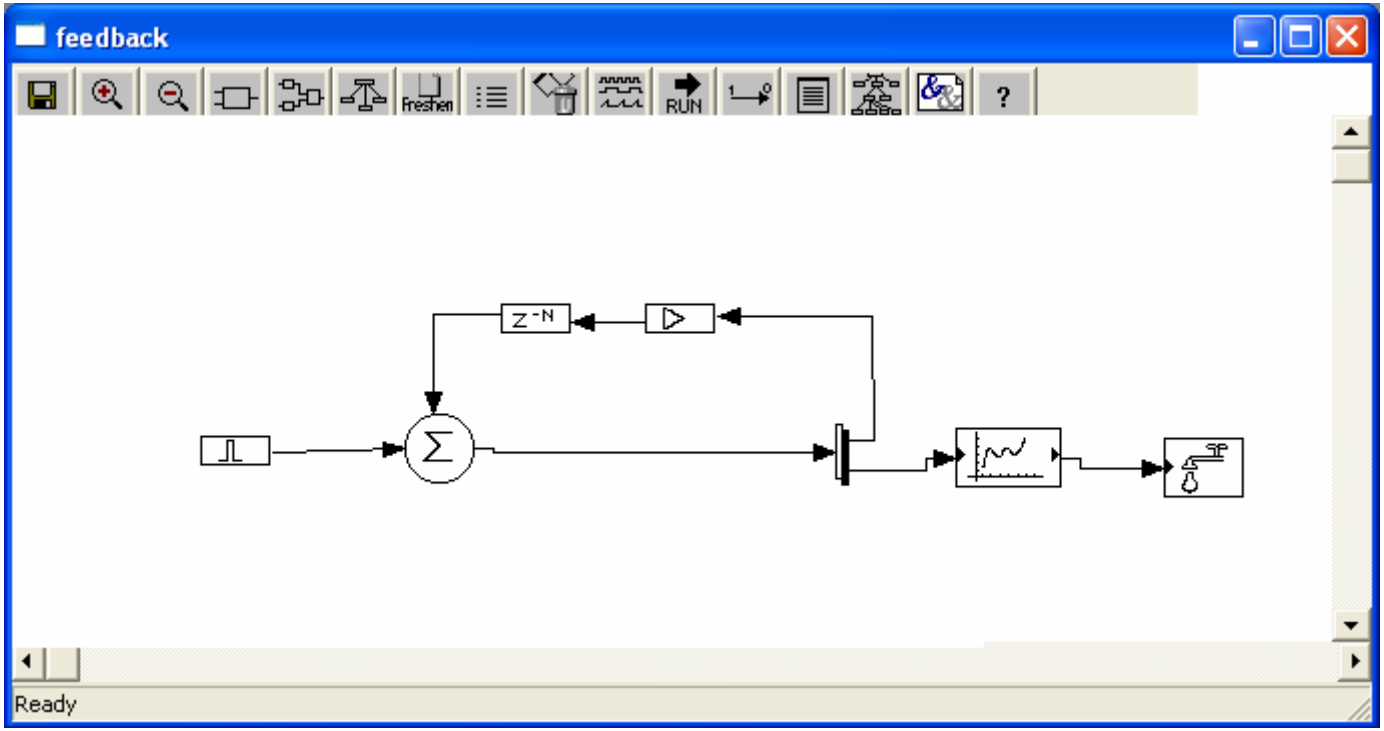


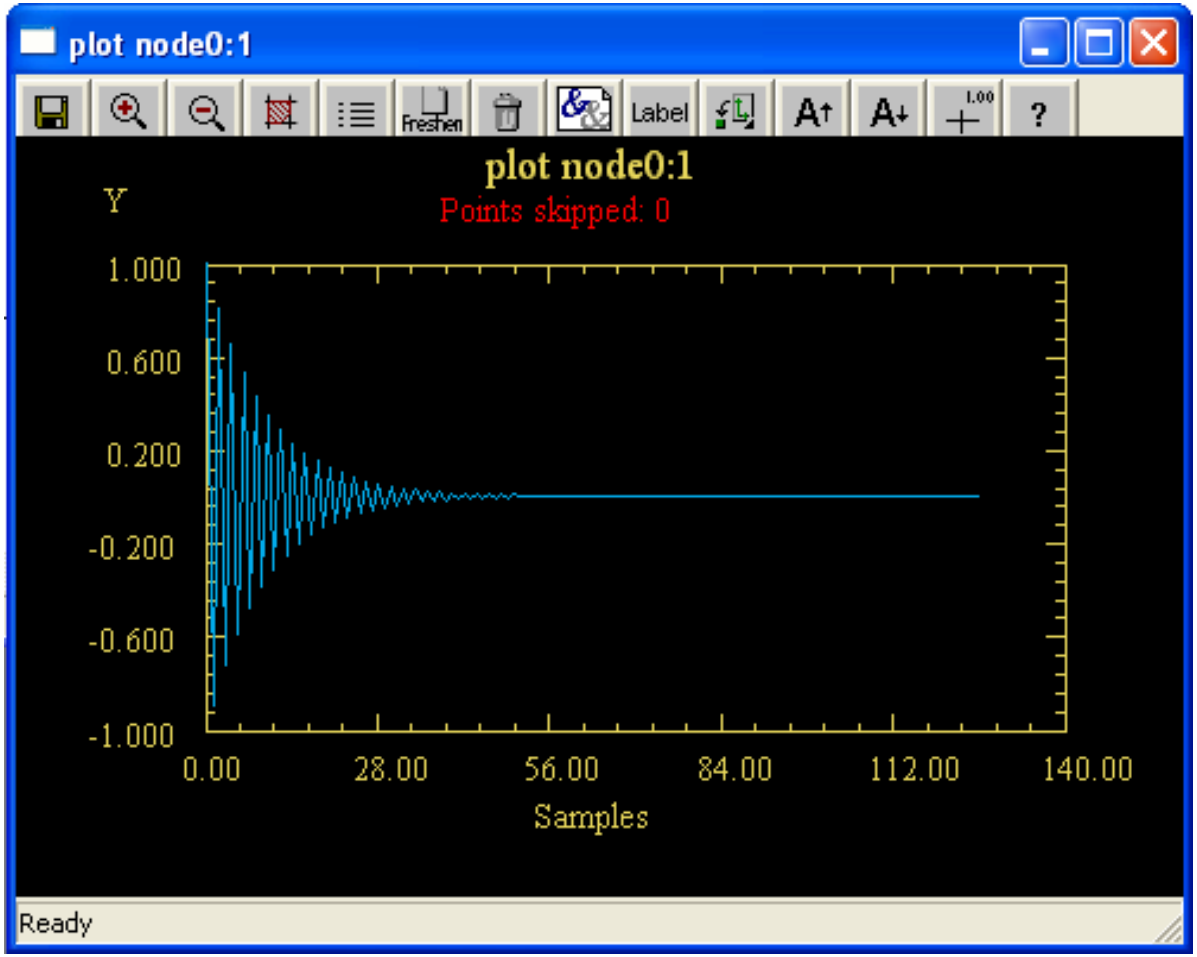


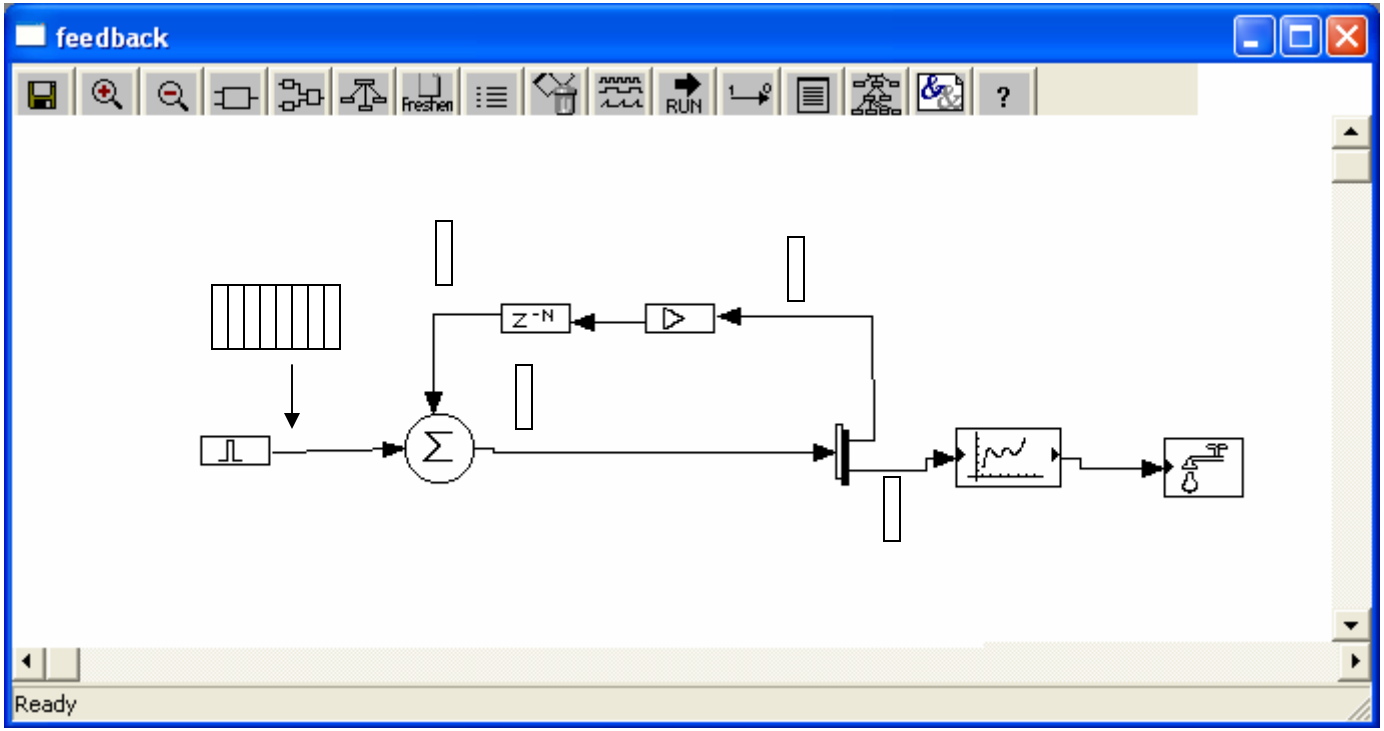
bdata0: 1
linecode0: 1
linecode0: 2
linecode0: 3
linecode0: 4
linecode0: 5
linecode0: 6
linecode0: 7
linecode0: 8
sqrtnyq0:0 1
sqrtnyq0:0 2
sqrtnyq0:0 3
sqrtnyq0:0 4
sqrtnyq0:0 5
sqrtnyq0:0 6
sqrtnyq0:0 7
sqrtnyq0:0 8
sqrtnyq0:0 1
node0:1 1
sqrtnyq0:0 2
node0:1 2
sqrtnyq0:0 3
node0:1 3
sqrtnyq0:0 4
node0:1 4
sqrtnyq0:0 5
node0:1 5
sqrtnyq0:0 6
node0:1 6
sqrtnyq0:0 7
node0:1 7
sqrtnyq0:0 8
node0:1 8
gauss0:0 1
add0: 1
sqrtnyq1:0 1
sqrtnyq1:0 2
sqrtnyq1:0 1
sqrtnyq1:0 2
gauss0:0 2
add0: 2
sqrtnyq0:0 9
sqrtnyq0:0 9
node0:1 9

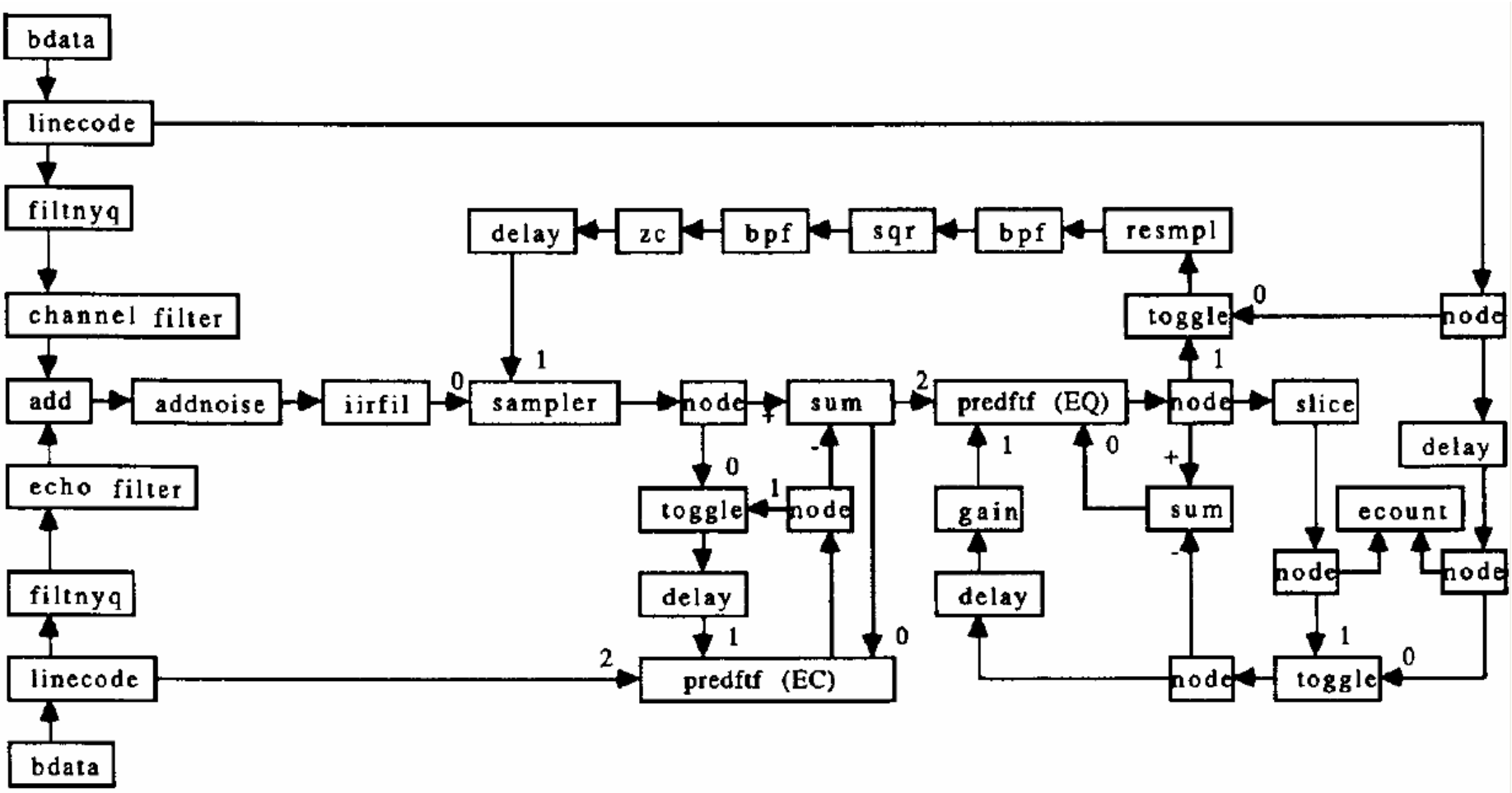
Problem Solved !

Feedback

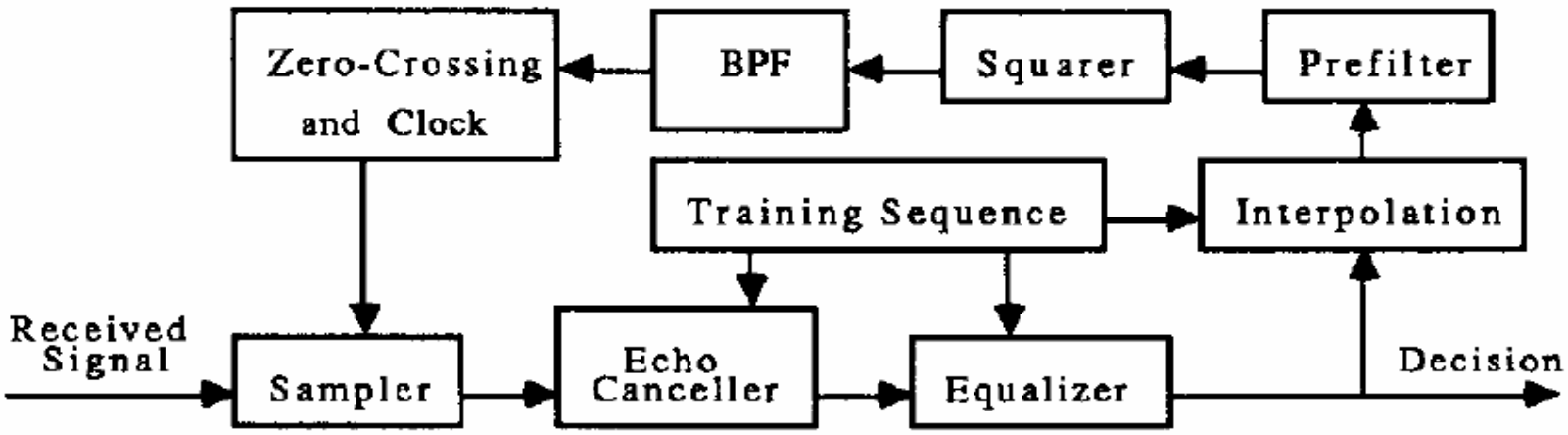








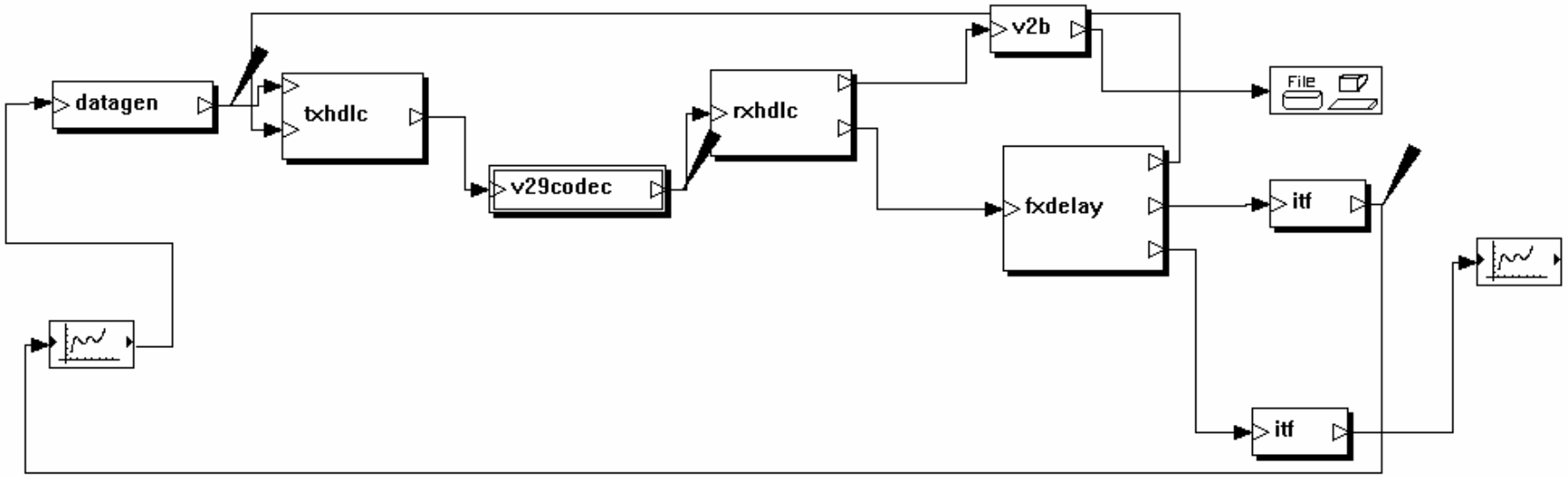
Joint echo canceller/equalizer and timing recovery for high speed full duplex baseband transmission systems
Lee, J.; Ardalan, S.H.,Military Communications Conference, 1990. MILCOM '90, Conference Record, 'A New Era'. 1990 IEEE
Date: 30 Sep-3 Oct 1990, Pages: 776 - 780 vol.2

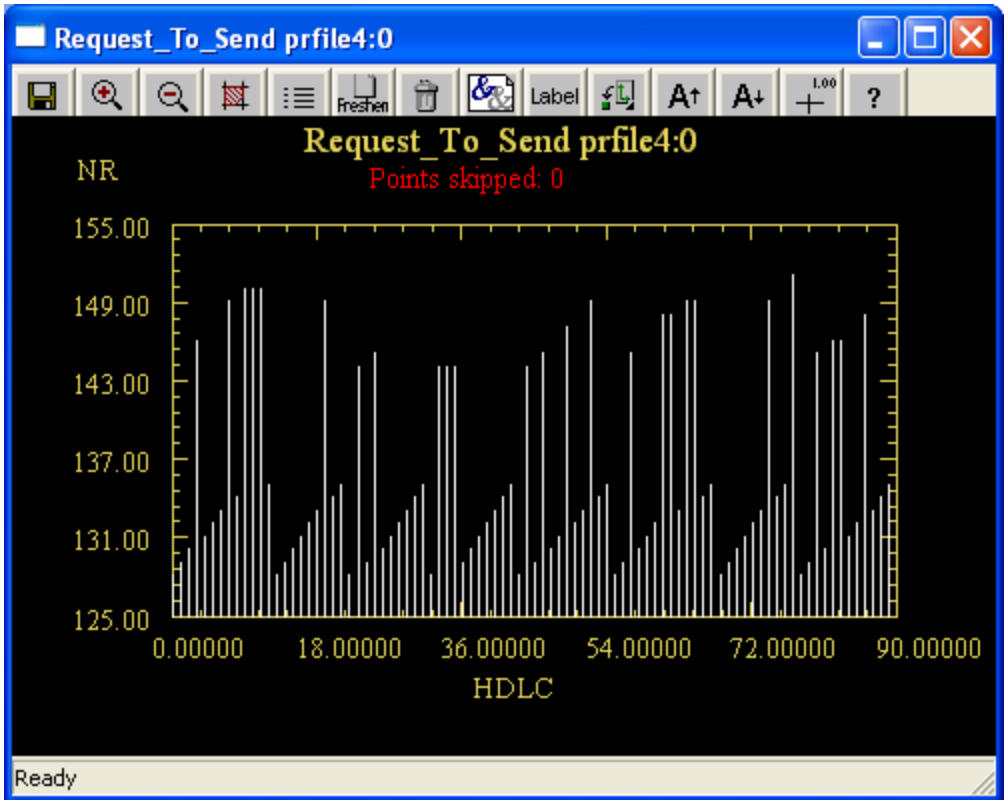


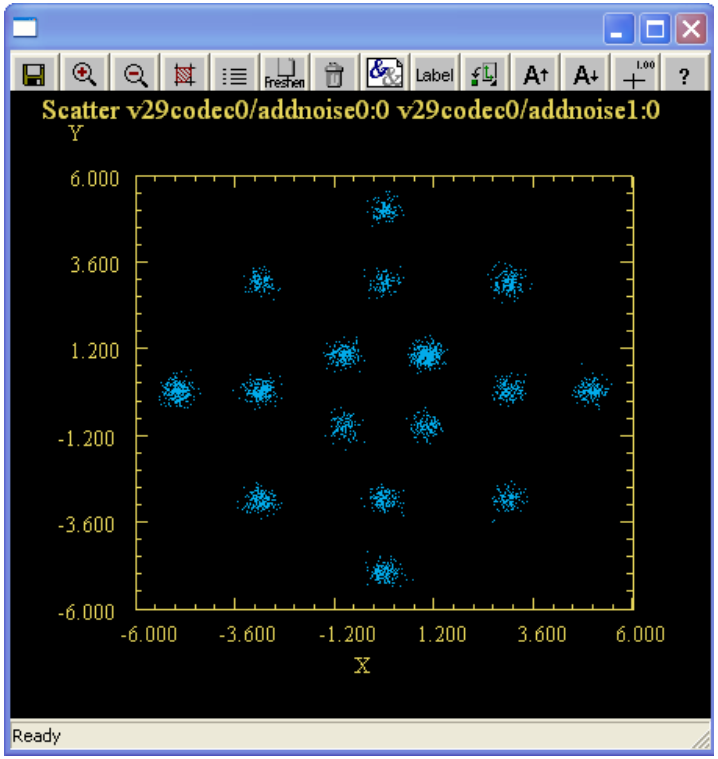
Timing Recovery System

Lee, Ardalan, Milcom

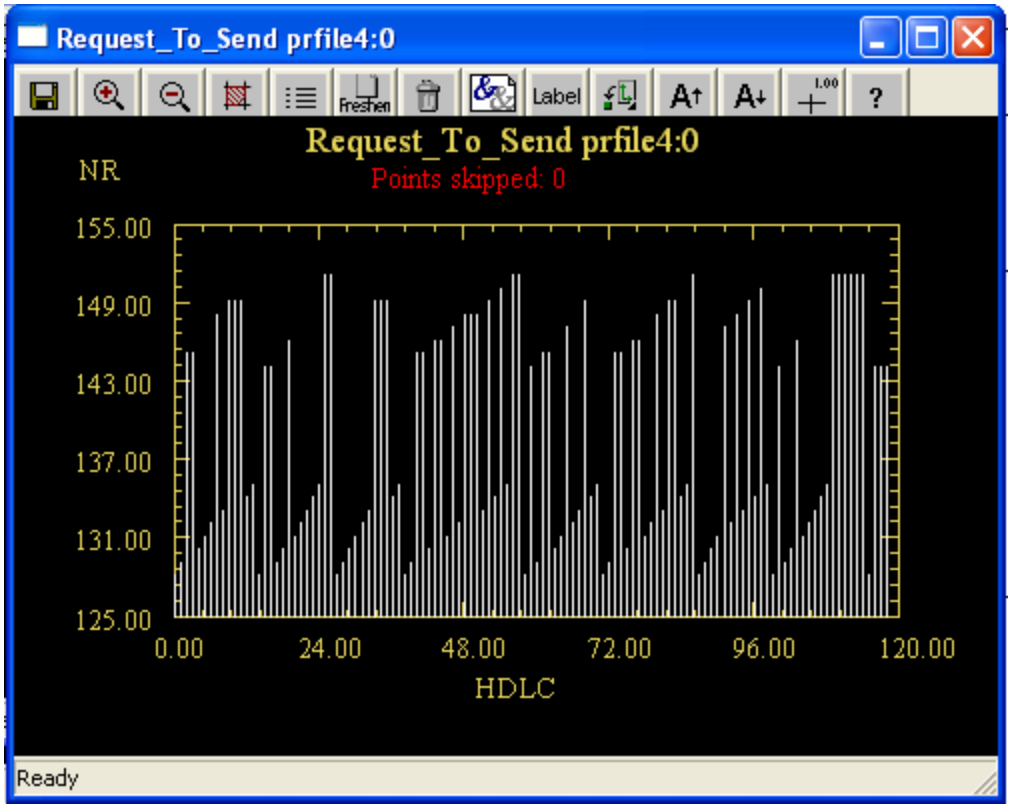
Combined Asynchronous and Synchronous Data Flow

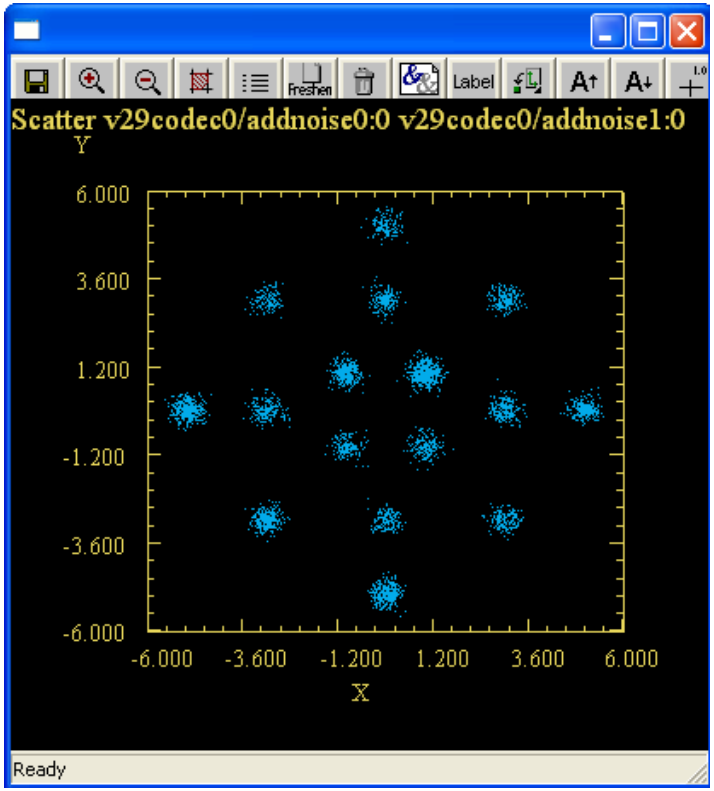







```
 TxHDLC: number of outputted frames=90
TxHDLC: number of bits outputted =10906
ecount: hits/samples = 79/10904  (ignore 0)  BER = 79/10904 = 0.007245
RxHDLC: number of received frames=90
RxHDLC: number of bits received 10881
RxHDLC: number of errors =20
RxHDLC: number of correct frames =64
Done
```

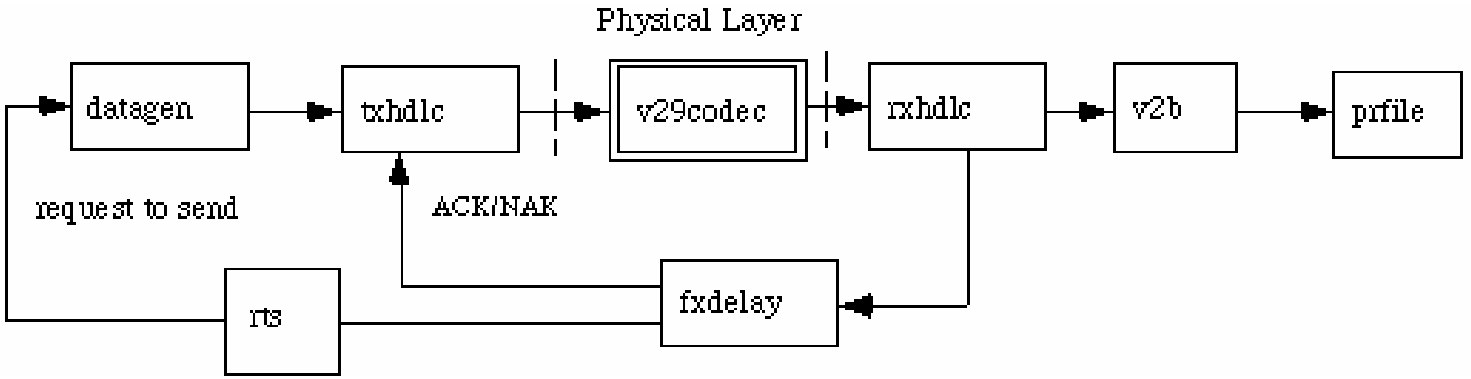





```
 TxHDLC: number of outputted frames=119
TxHDLC: number of bits outputted =14421
ecount: bits/samples = 160/14420  (ignore 0)  BER = 160/14420 = 0.0111
RxHDLC: number of received frames=119
RxHDLC: number of bits received 14394
RxHDLC: number of errors =50
RxHDLC: number of correct frames =65
Done
```

Reference for Combined Asynchronous and Synchronous Data Flow

http://www.xcad.com/xcad/arq.html



Acknowledgement

Like to acknowledge Bill Hughes, GE Corporate Research, 1990, for developing the pacer concept and methods for controlling buffer growth.