Appendix A

Stepper Motorized Stage (Suruga Seiki's E4010A) Specifications

Technical specs	**Details**
Stage type	Linear stage
Motor type	Stepper motor
Feedback sensor type	Rotary encoder
x-axis stage:	
Travel distance	*30mm*
Resolution (max)	*1μm*
Resolution (min)	*0.05μm*
y-axis stage:	
Travel distance	*20mm*
Resolution (max)	*1μm*
Resolution (min)	*0.05μm*
z-axis stage:	
Travel distance	*30mm*
Resolution (max)	*1μm*
Resolution (min)	*0.05μm*
θ_x- axis stage:	
Travel distance	*±3˚*
Resolution	*≈34"*
θ_y- axis stage:	
Travel distance	*±3˚*
Resolution	*≈34"*

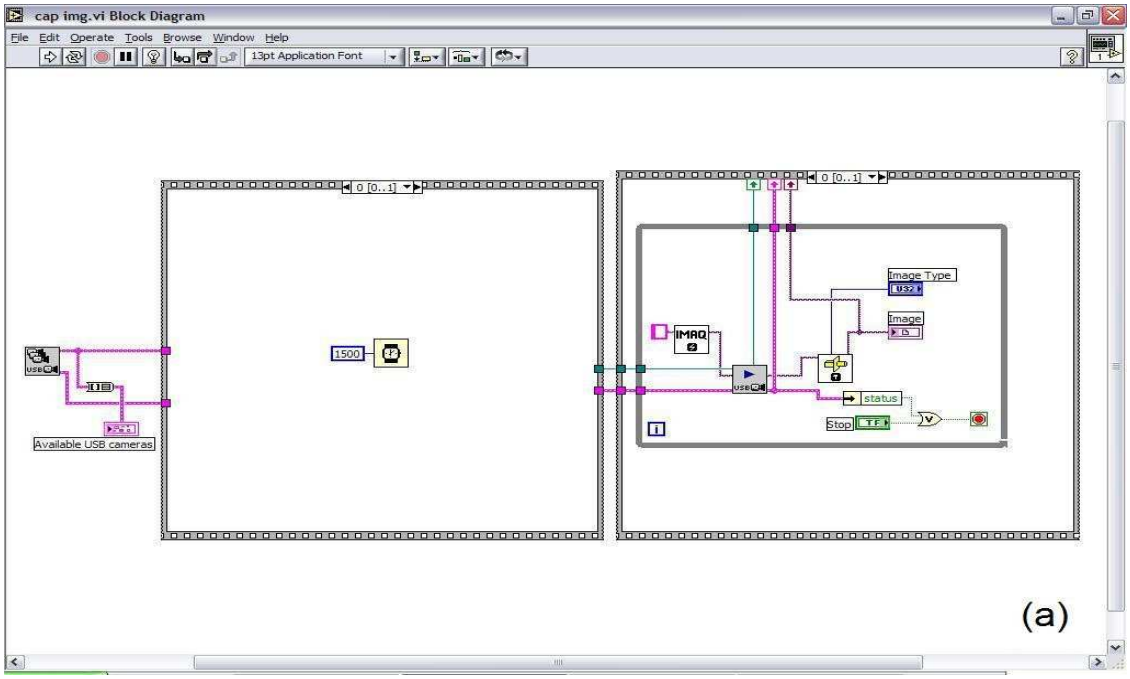
θ_z- axis stage:

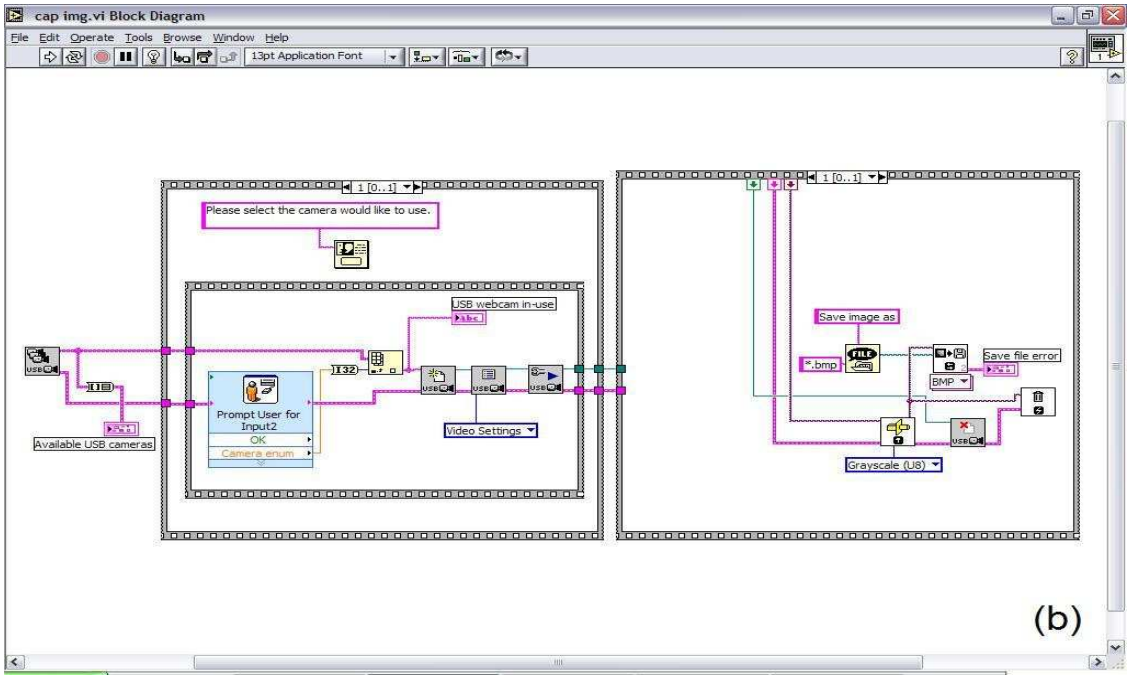
Travel distance	*±7˚*
Resolution	*0.0045˚*

Appendix B

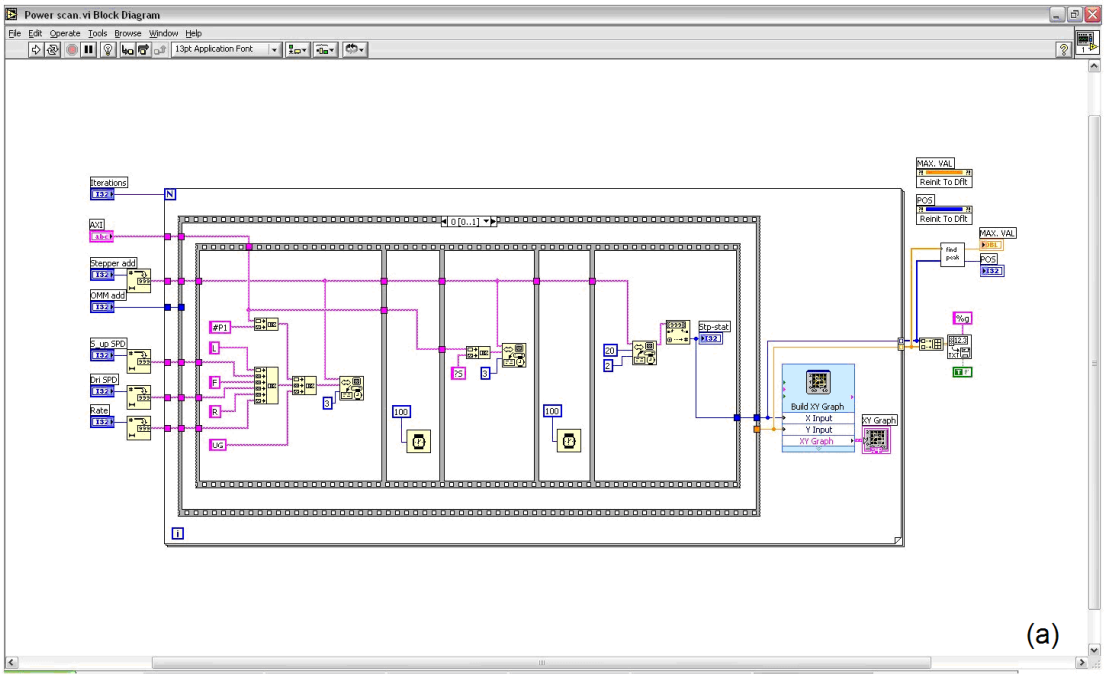
Waveguide Alignment Algorithms

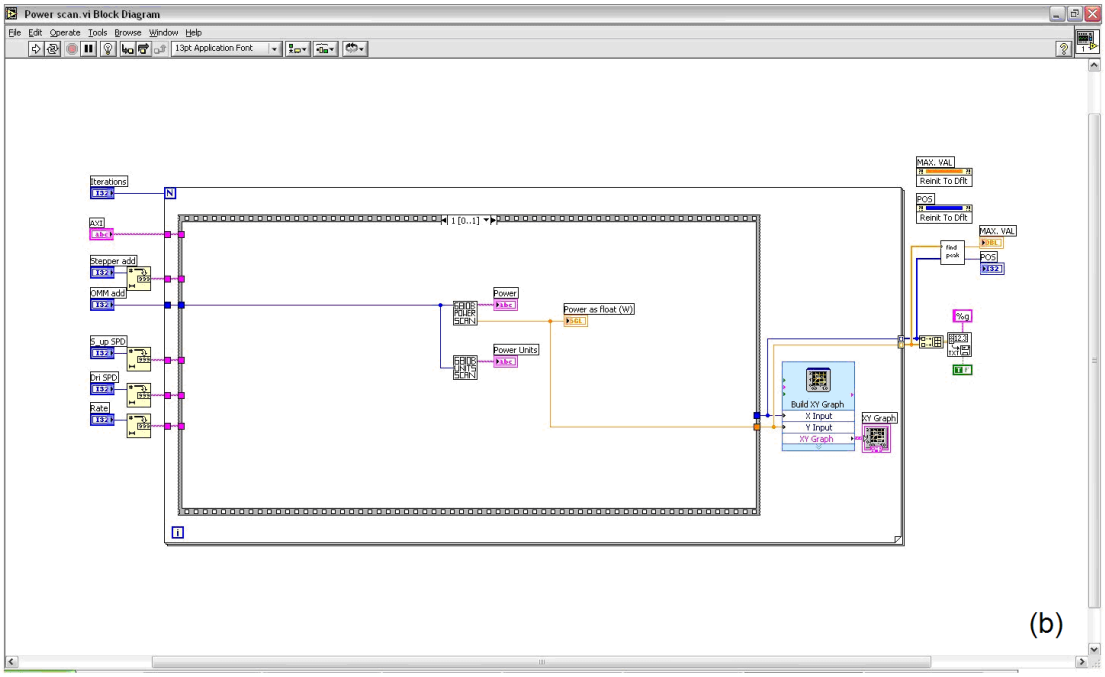
I. Vision System with Primitive Functions for Automated Waveguide Alignment



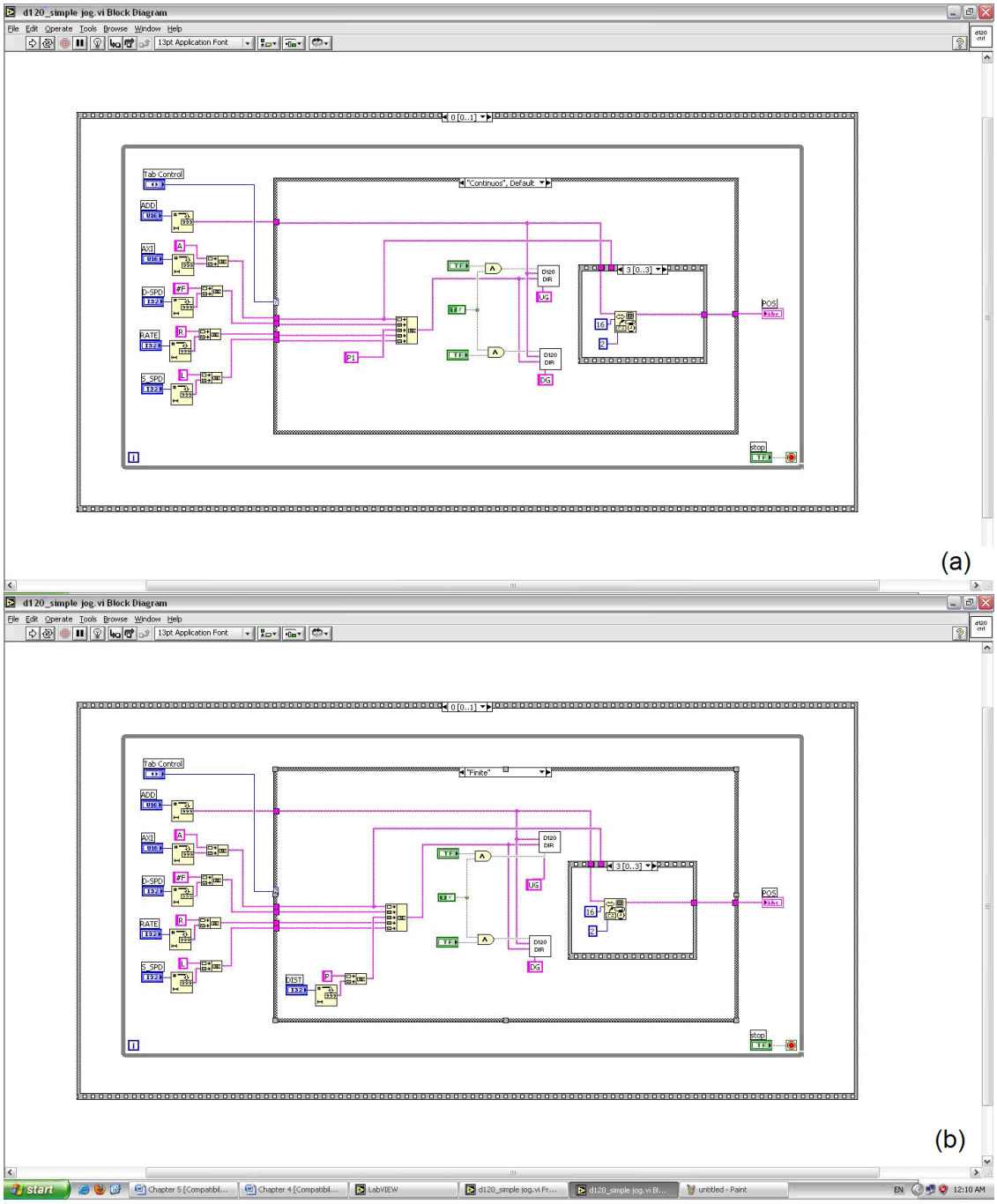


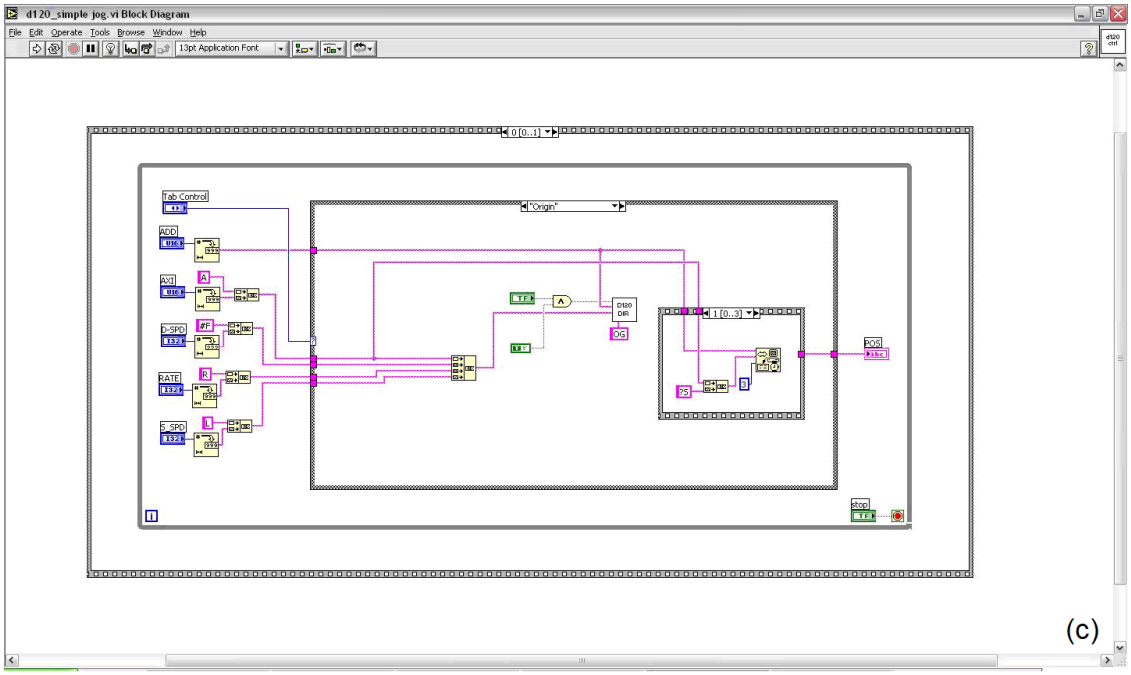
II. Peak Power Detection Algorithms



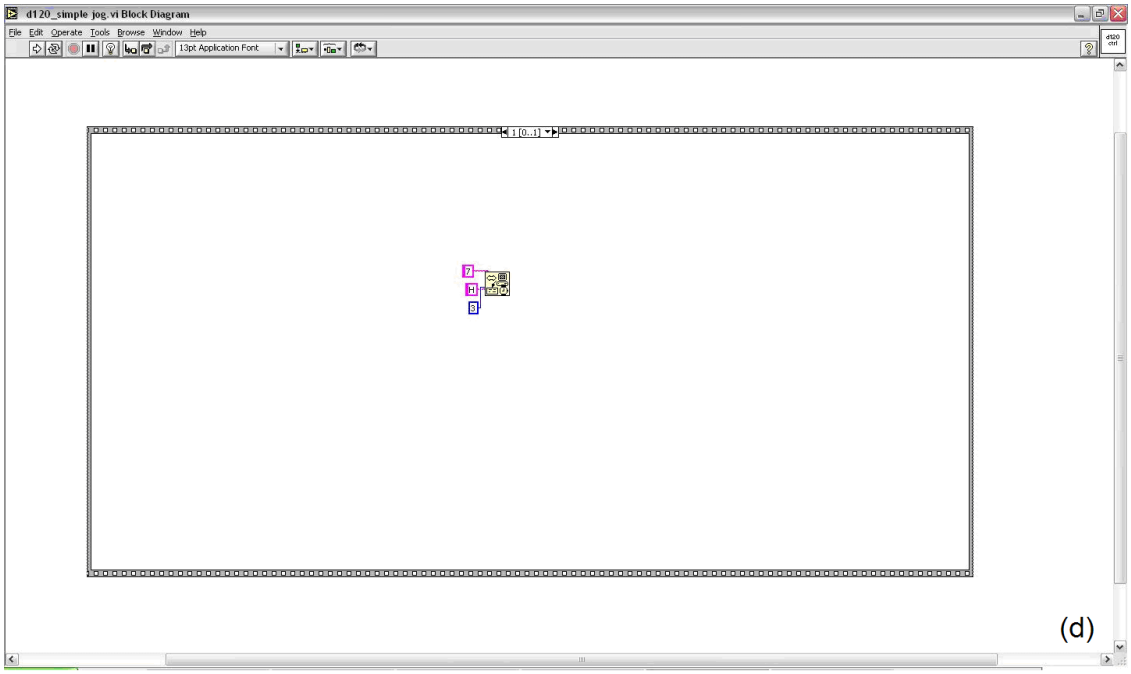


III. Manual Alignment




d120_simple jog.vi Block Diagram
File Edit Operate Tools Browse Window Help
13pt Application Font
0 [0..1]
Tab Control
"Origin"
ADD
AXI
D-SPD
RATE
S_SPD
1 [0..3]
POS
stop

(c)

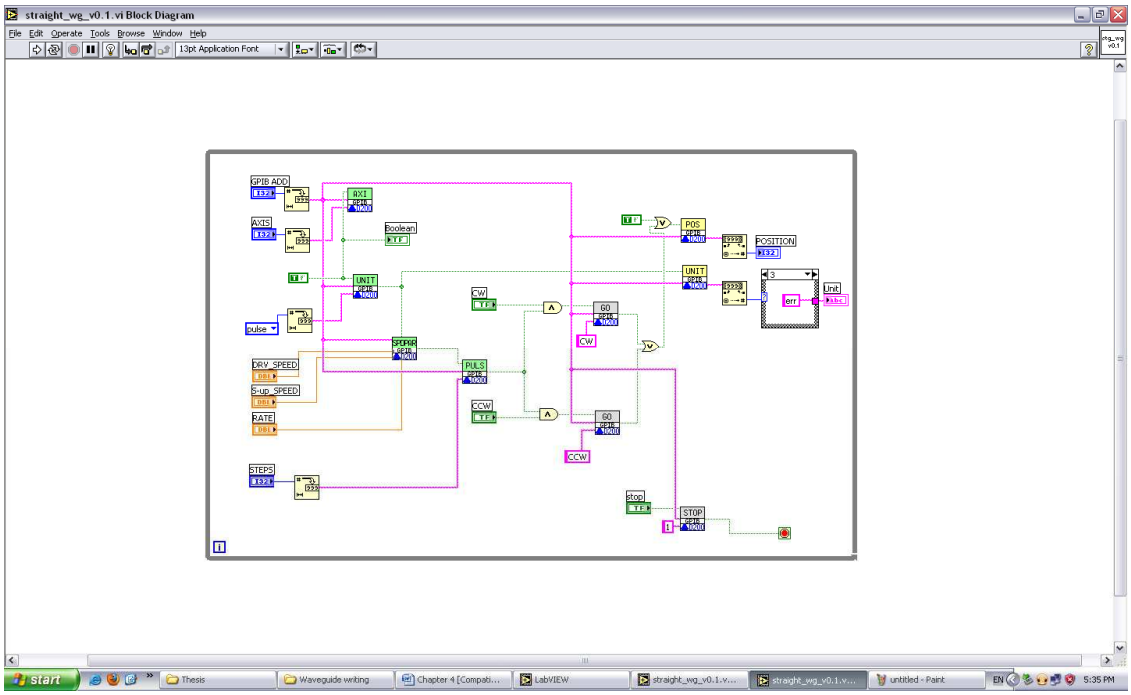

d120_simple jog.vi Block Diagram
File Edit Operate Tools Browse Window Help
13pt Application Font
1 [0..1]

(d)

Appendix C

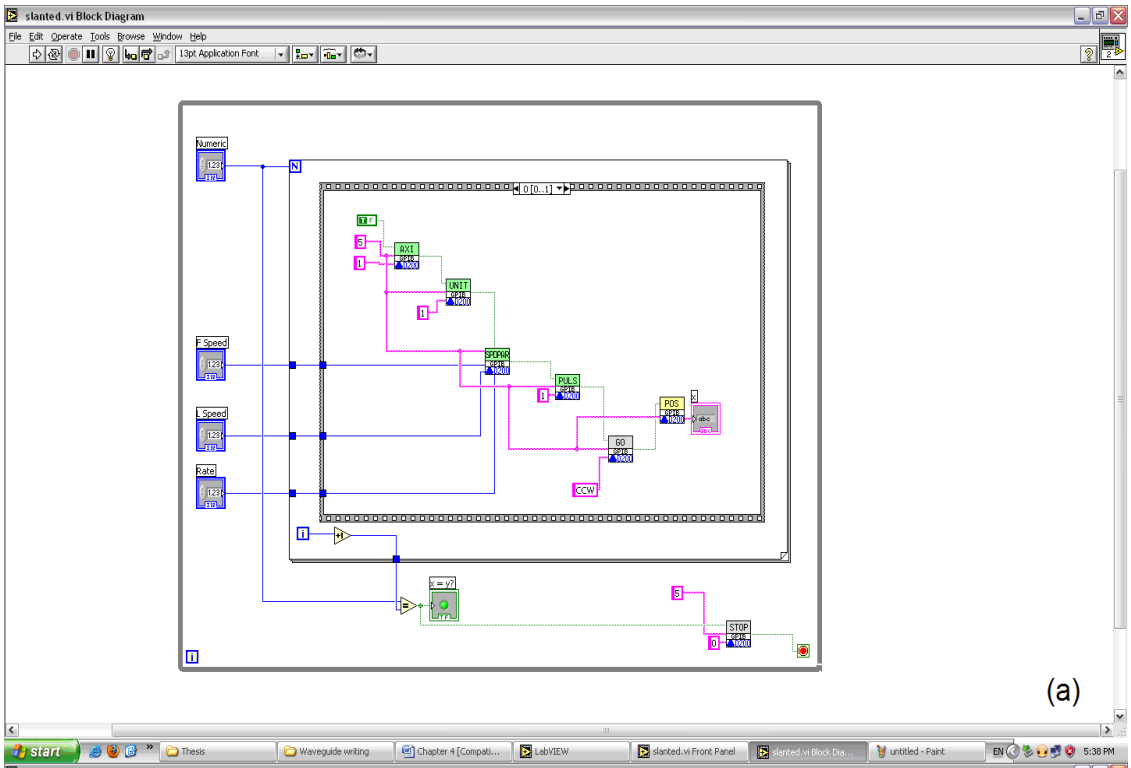
UV Writting Coding Architechures

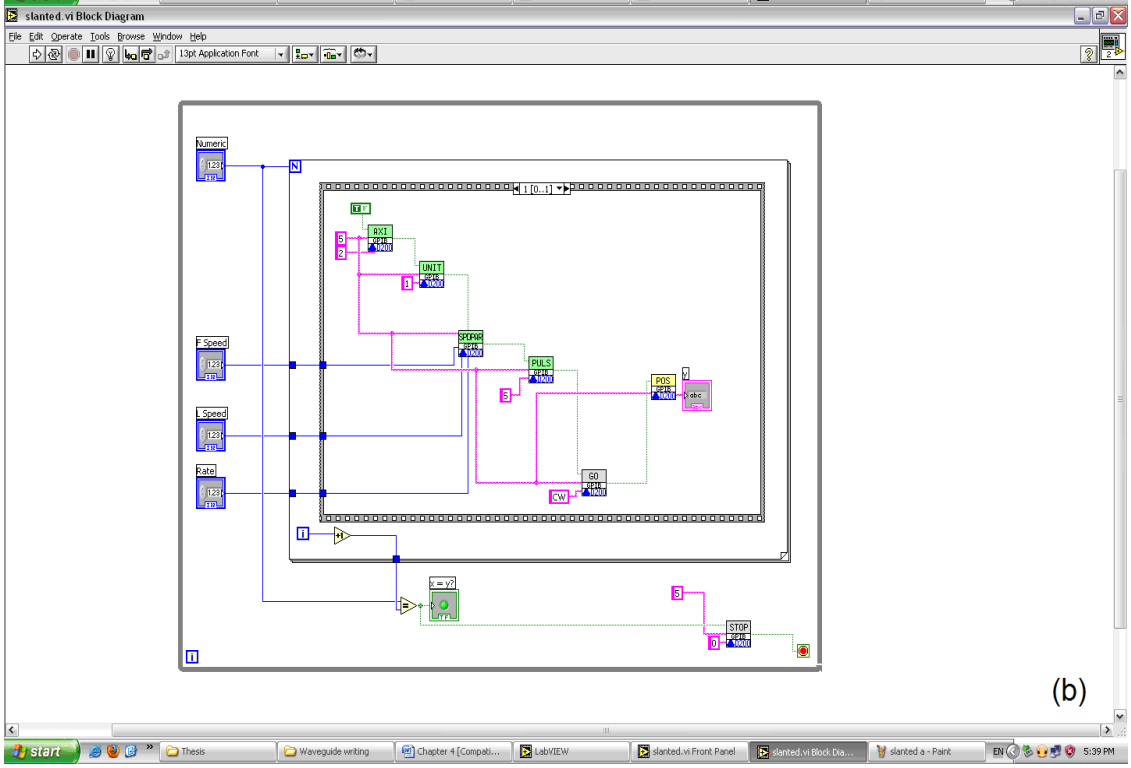
I. Simple straight channel design



Appendix C

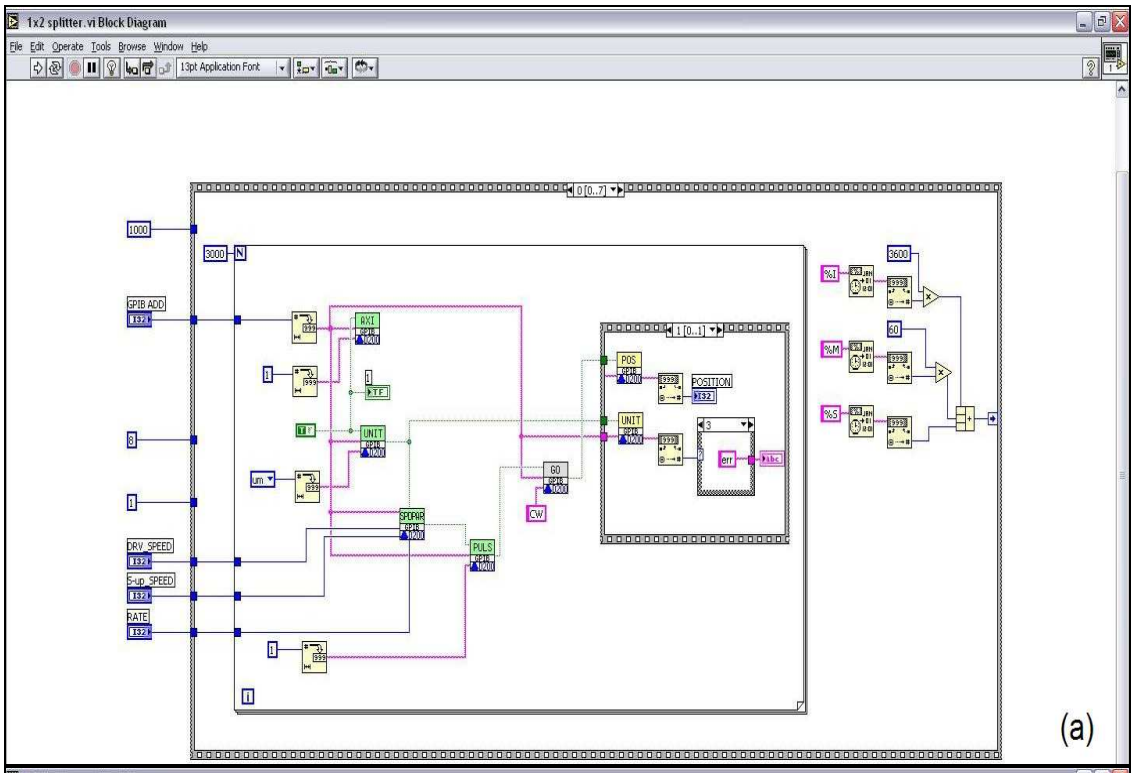
II. Slanted channel design

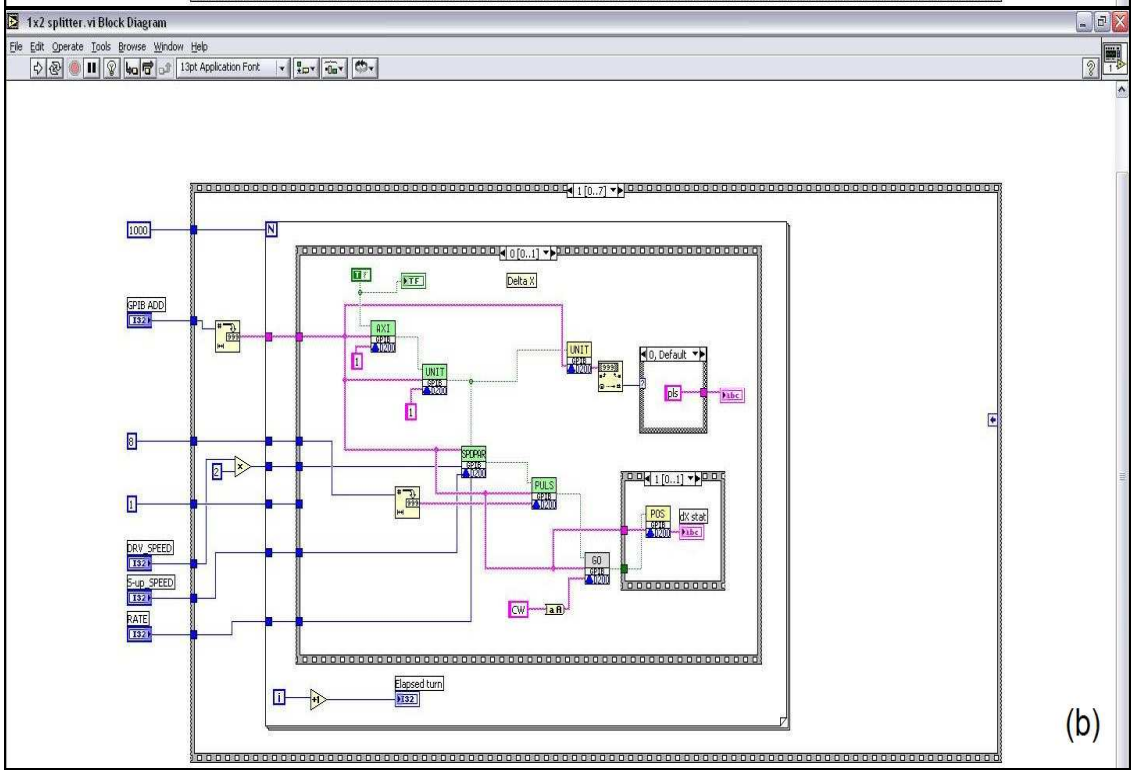




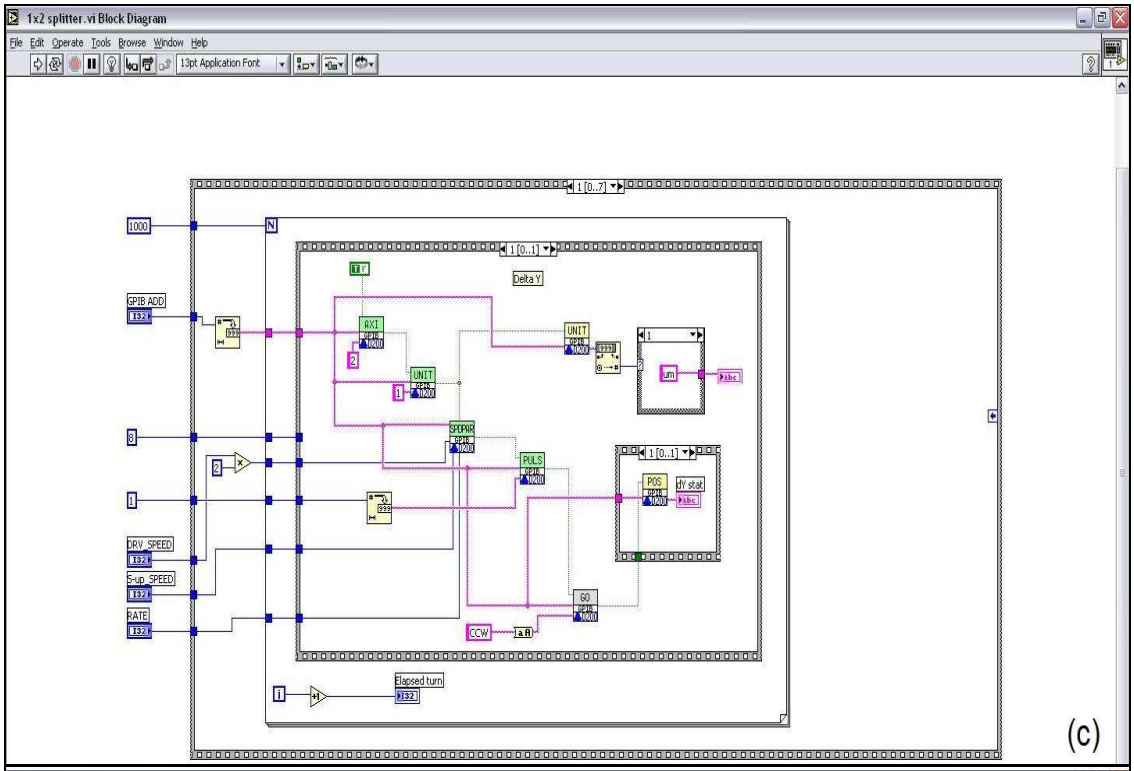
Appendix C

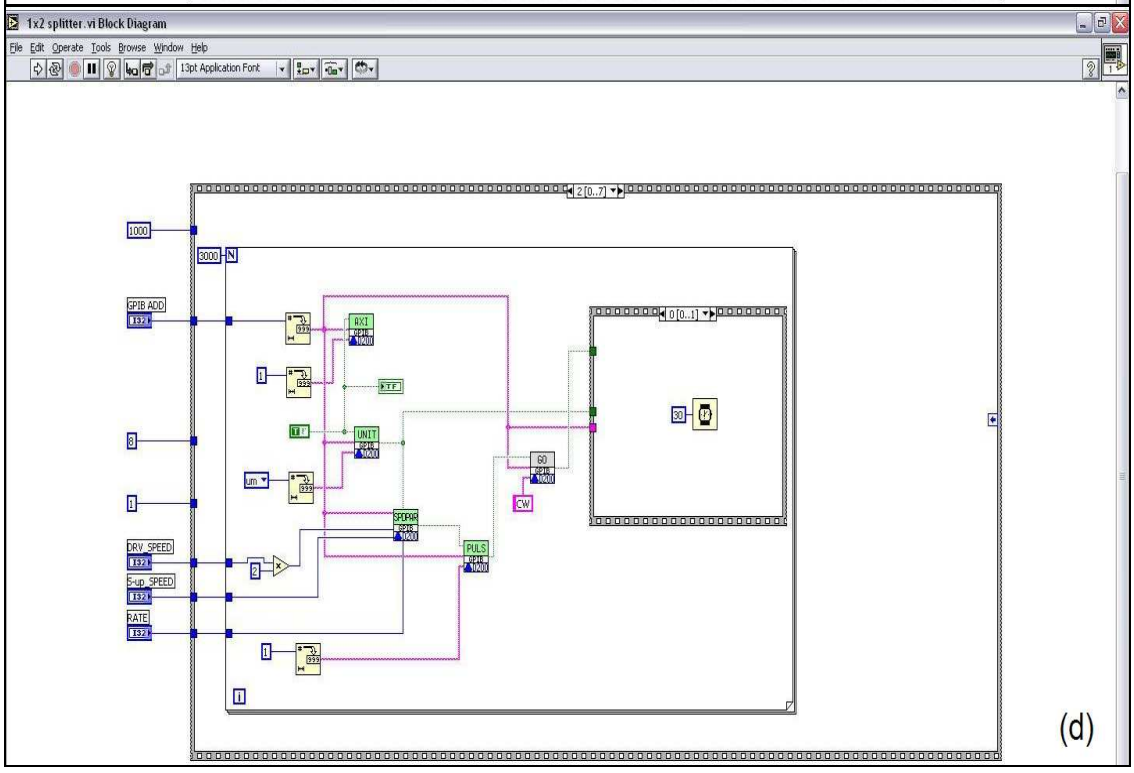
III. 1-by-2 optical power splitter



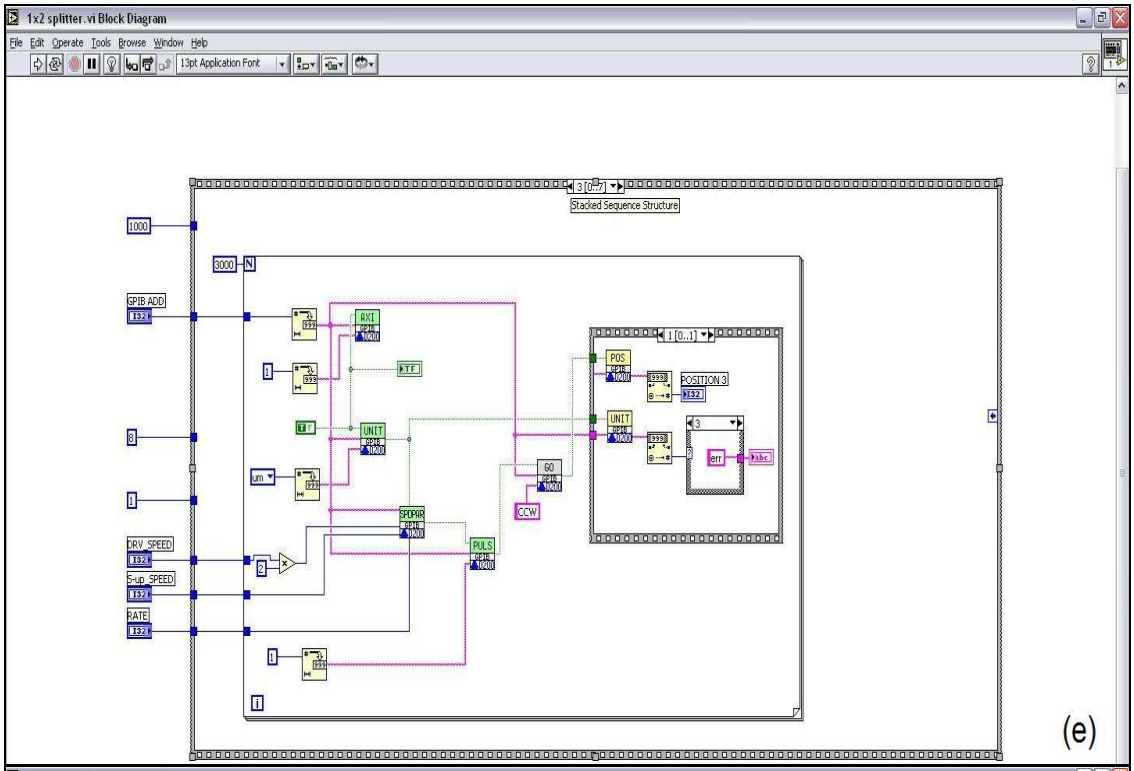


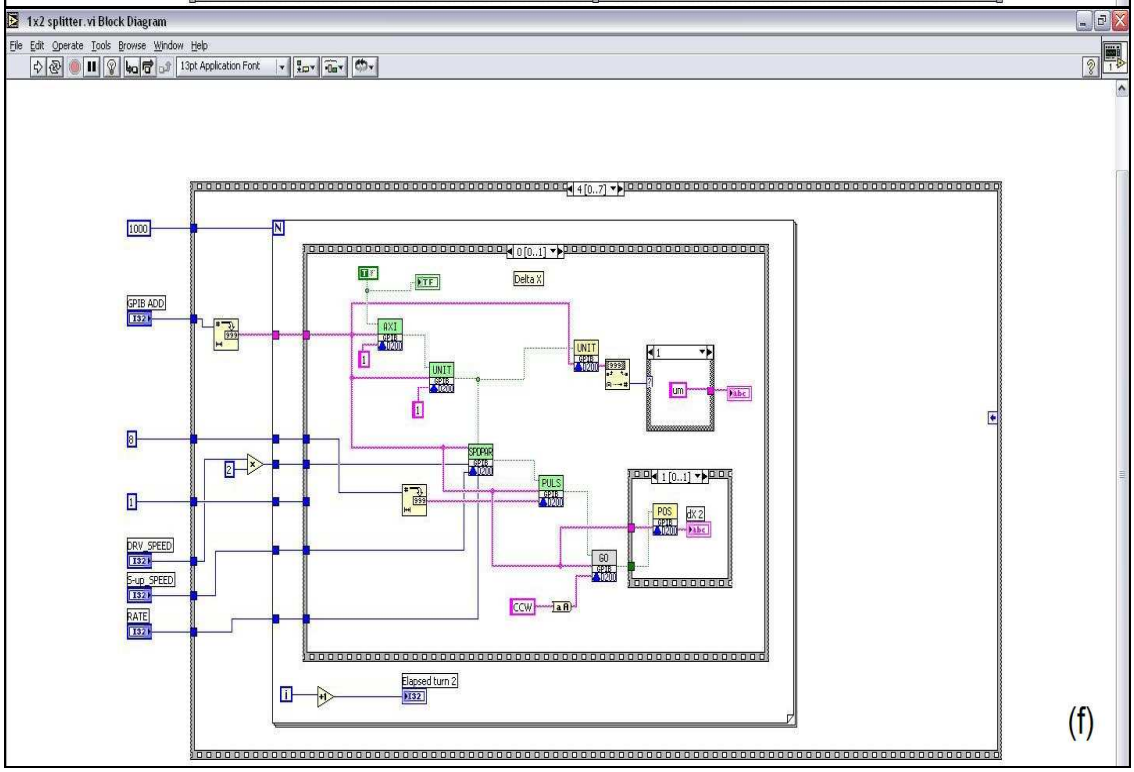
Appendix C


1x2 splitter.vi Block Diagram
File Edit Operate Tools Browse Window Help
13pt Application Font
1000
GPIB ADD
8
1
DRV_SPEED
S-up_SPEED
RATE
Delta Y
RX1
UNIT
SPDPAR
PULS
POS
dY stat
GO
CCW
Elapsed turn
(c)

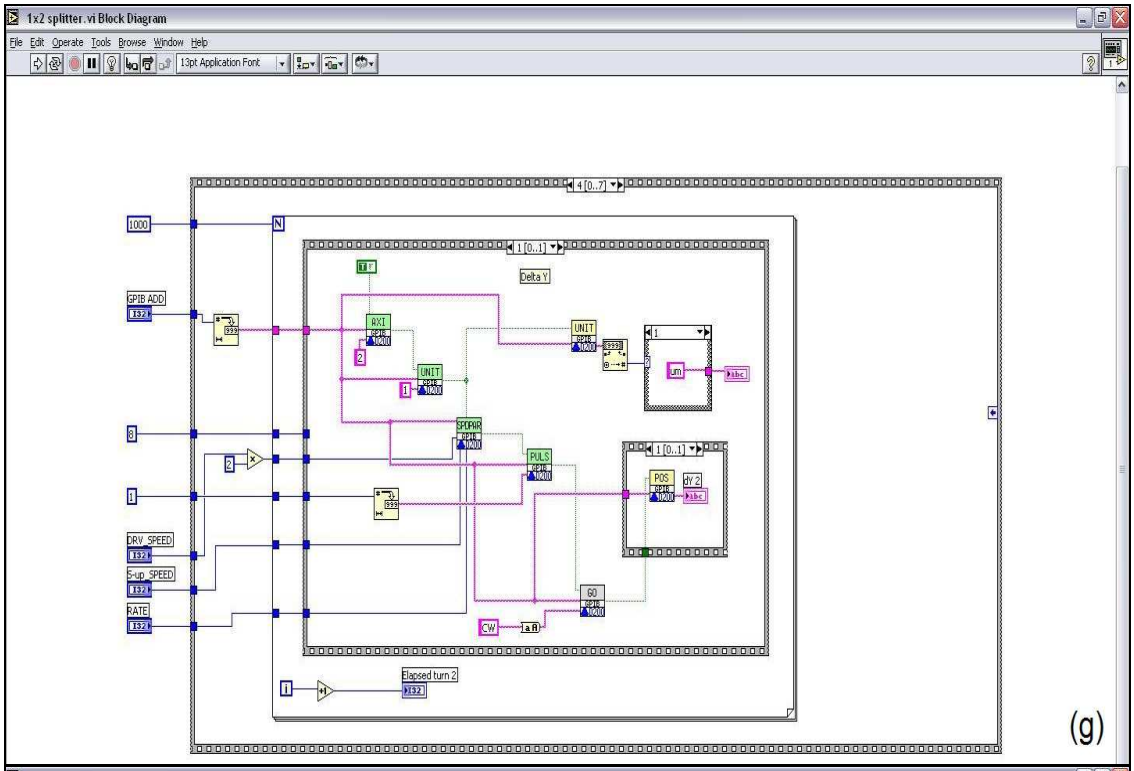

1x2 splitter.vi Block Diagram
File Edit Operate Tools Browse Window Help
13pt Application Font
1000
3000
GPIB ADD
8
1
DRV_SPEED
S-up_SPEED
RATE
RX1
UNIT
SPDPAR
PULS
GO
CW
(d)

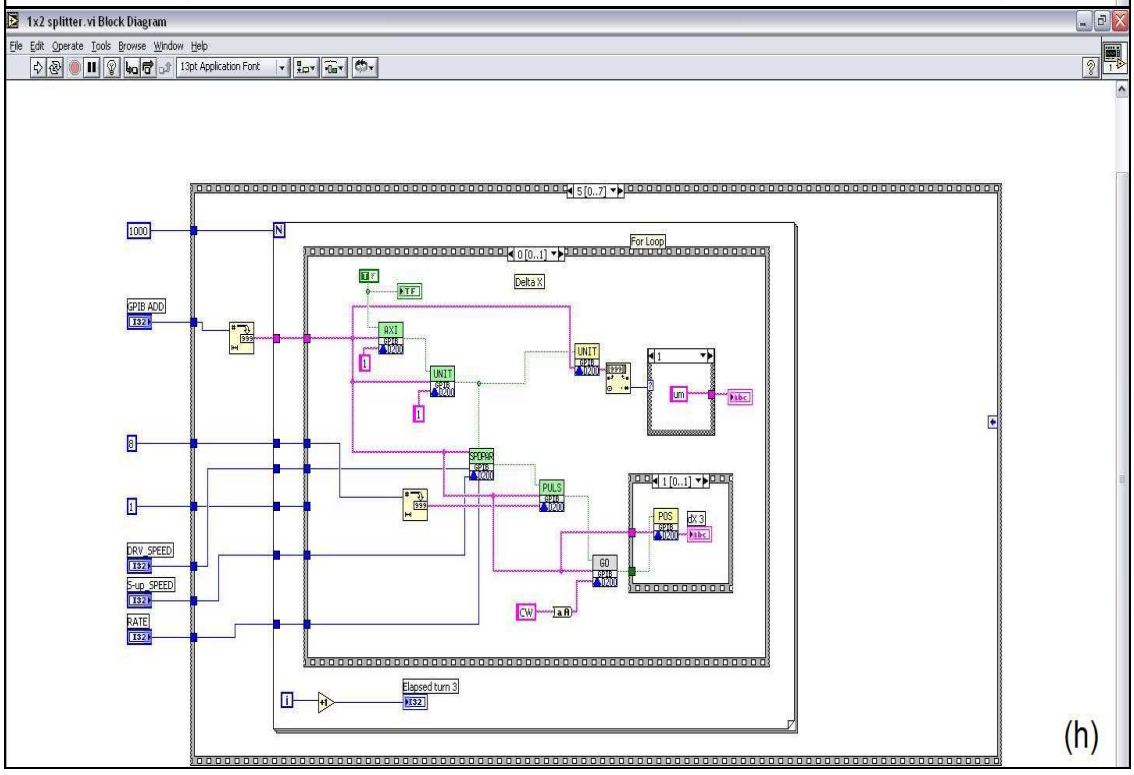
Appendix C


1x2 splitter.vi Block Diagram
File Edit Operate Tools Browse Window Help
13pt Application Font
Stacked Sequence Structure
1000
3000
GPIB ADD
8
1
DRV_SPEED
S-up_SPEED
RATE
AXI
UNIT
SPDPAR
PULS
GO
CCW
POS
POSITION 3
err
(e)

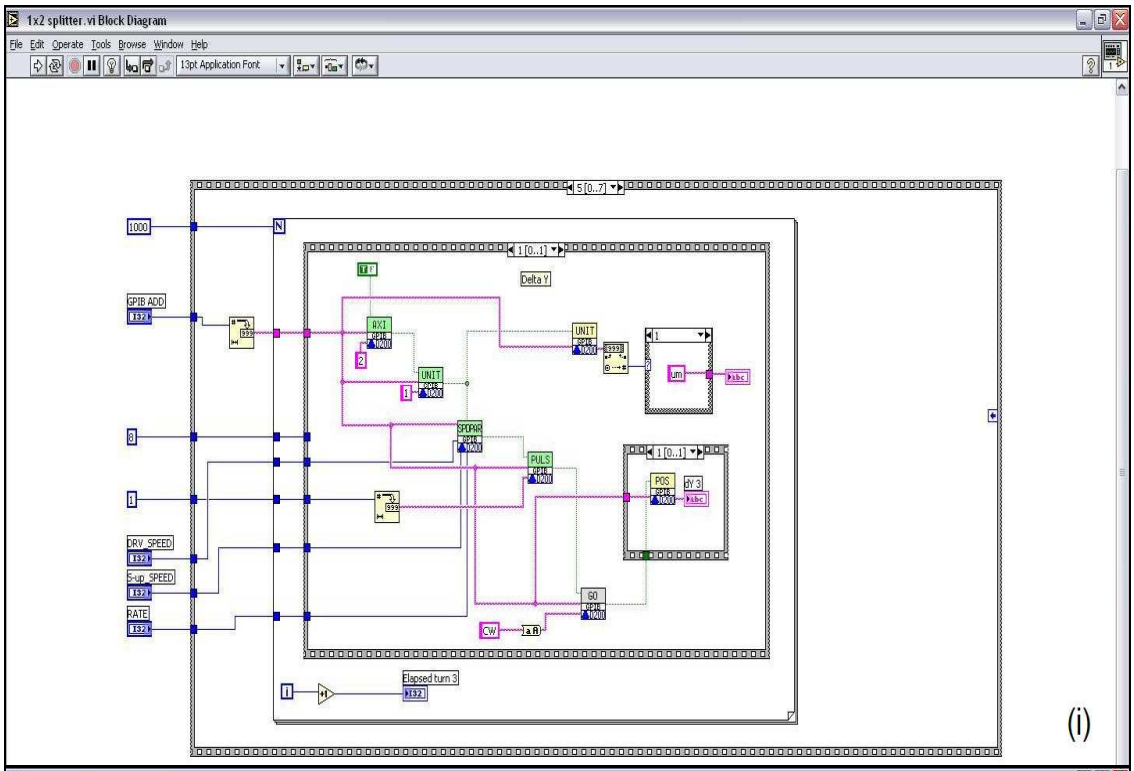

1x2 splitter.vi Block Diagram
File Edit Operate Tools Browse Window Help
13pt Application Font
1000
GPIB ADD
8
1
DRV_SPEED
S-up_SPEED
RATE
Delta X
AXI
UNIT
SPDPAR
PULS
GO
CCW
POS
dv 2
Elapsed turn 2
(f)

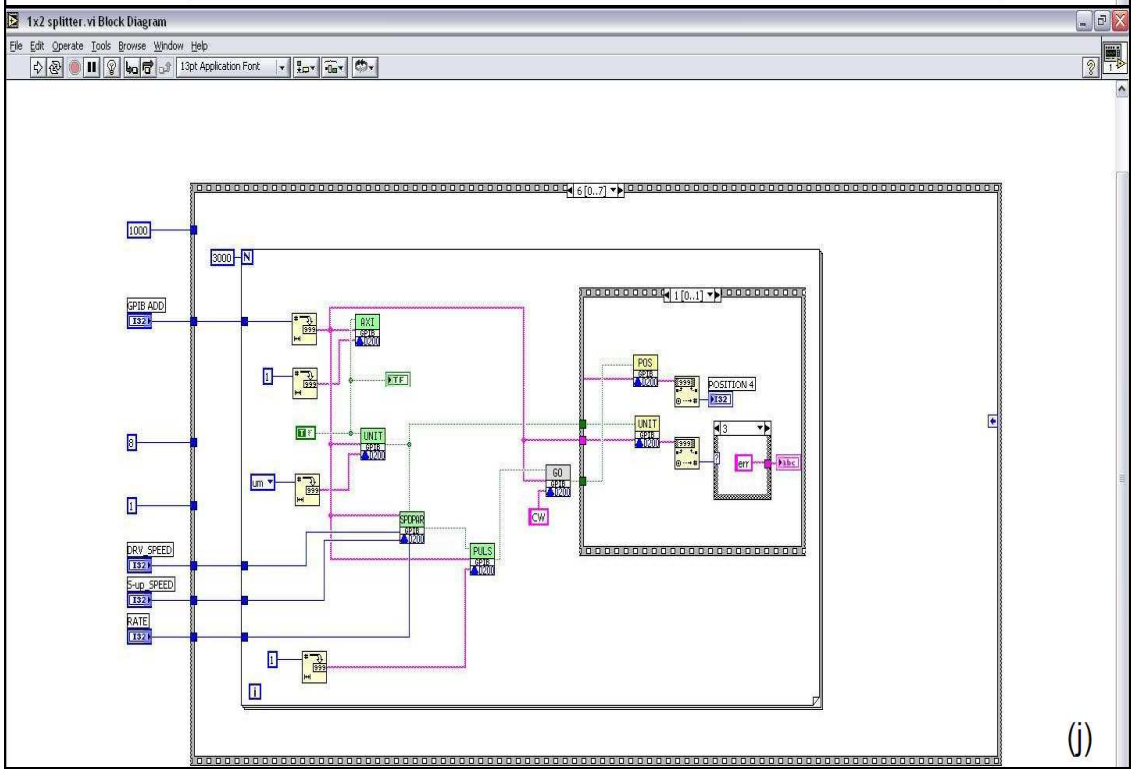
Appendix C


1x2 splitter.vi Block Diagram
File Edit Operate Tools Browse Window Help
13pt Application Font
4 [0..7]
1 [0..1]
Delta Y
GPIB ADD
DRV_SPEED
S-up_SPEED
RATE
CW
Elapsed turn 2
(g)

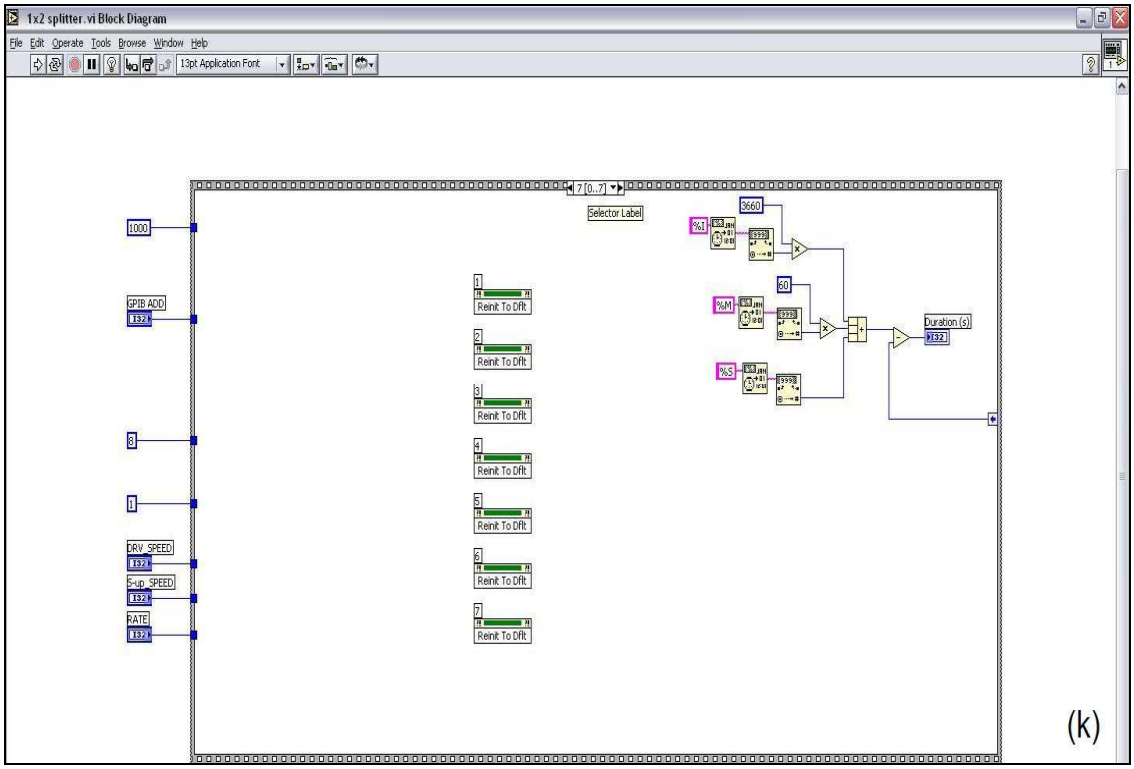

1x2 splitter.vi Block Diagram
File Edit Operate Tools Browse Window Help
13pt Application Font
5 [0..7]
0 [0..1]
For Loop
Delta X
GPIB ADD
DRV_SPEED
S-up_SPEED
RATE
CW
Elapsed turn 3
(h)

Appendix C


1x2 splitter.vi Block Diagram
File Edit Operate Tools Browse Window Help
13pt Application Font
5 [0..7]
1000
N
1 [0..1]
Delta Y
GPIB ADD
RX1
UNIT
SPDMR
PULS
POS
8
1
DRV_SPEED
S-up_SPEED
RATE
GO
CW
Elapsed turn 3
(i)

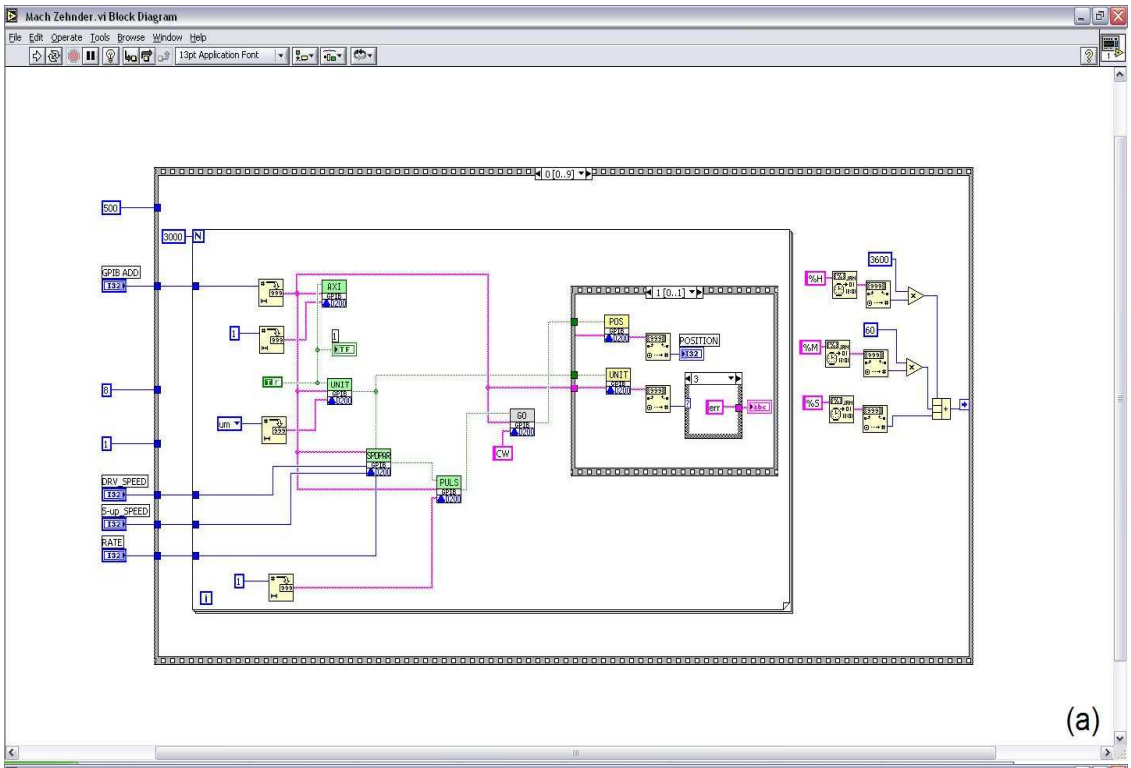

1x2 splitter.vi Block Diagram
File Edit Operate Tools Browse Window Help
13pt Application Font
6 [0..7]
1000
3000
N
GPIB ADD
RX1
UNIT
SPDMR
PULS
POS
POSITION 4
GO
CW
8
1
DRV_SPEED
S-up_SPEED
RATE
(j)

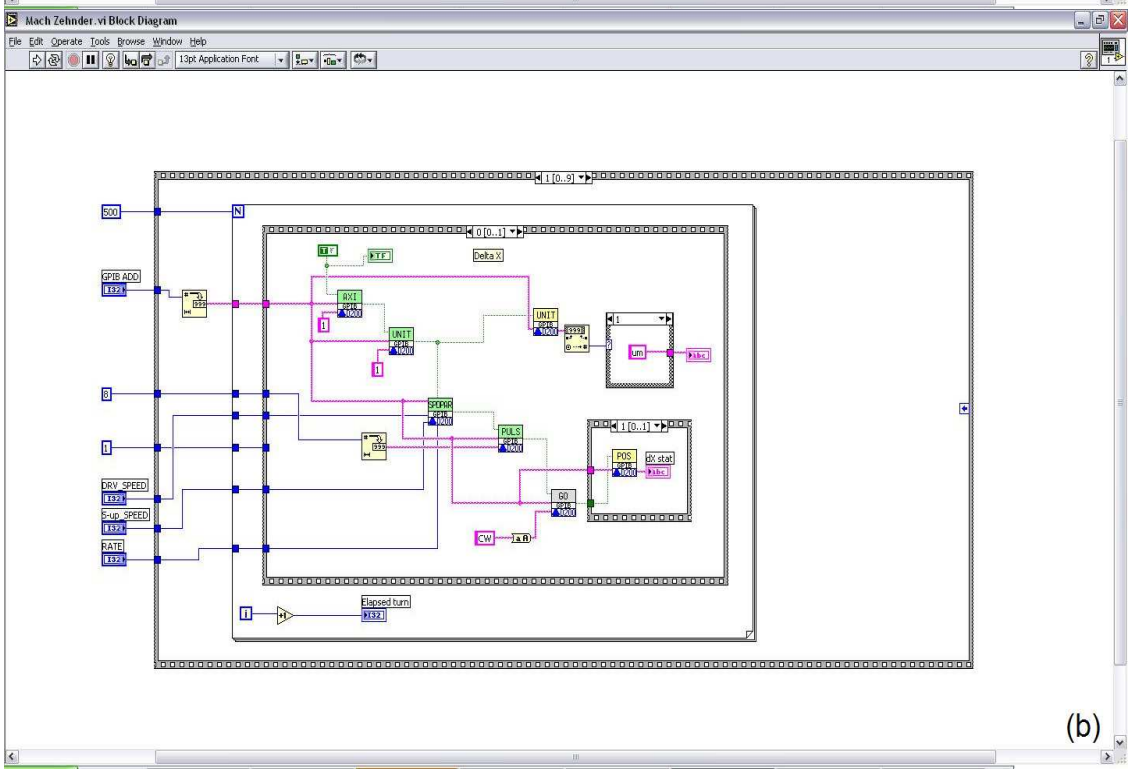
Appendix C


1x2 splitter.vi Block Diagram
File Edit Operate Tools Browse Window Help
13pt Application Font
7 [0..7]
Selector Label
1000
GPIB ADD
I32
8
1
DRV_SPEED
S-up_SPEED
RATE
Reinit To Dflt
3660
%I
60
%M
%S
Duration (s)
(k)

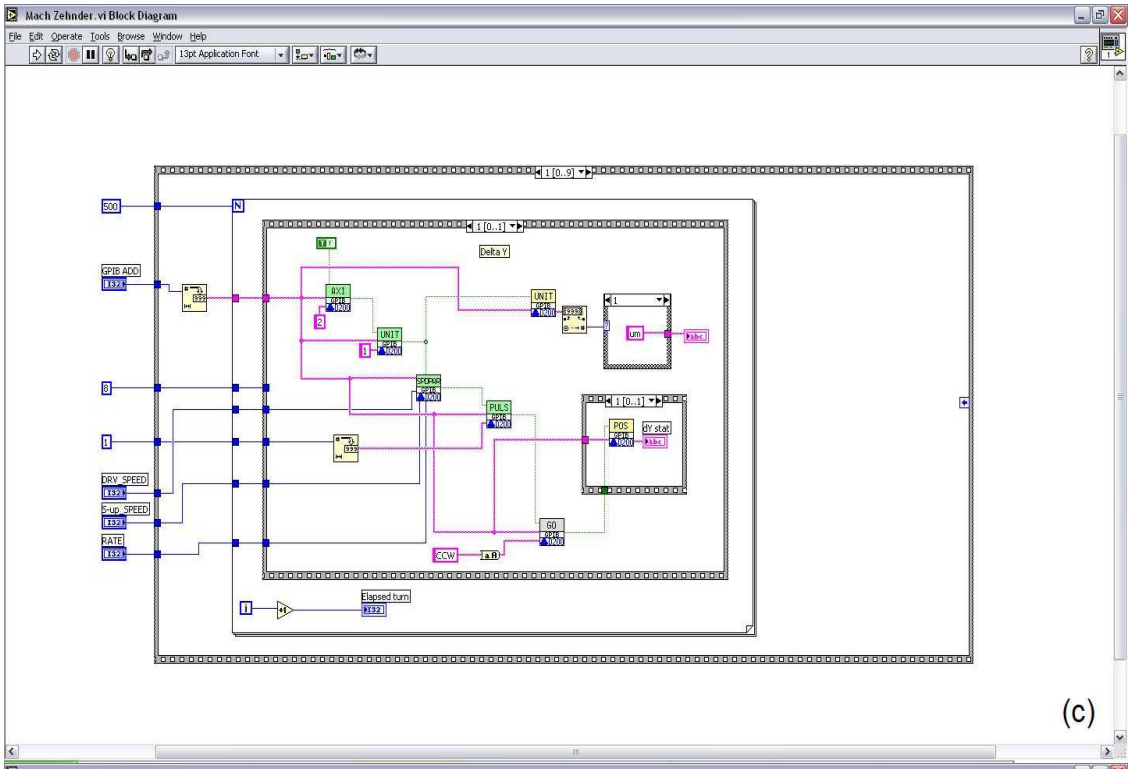
Appendix C

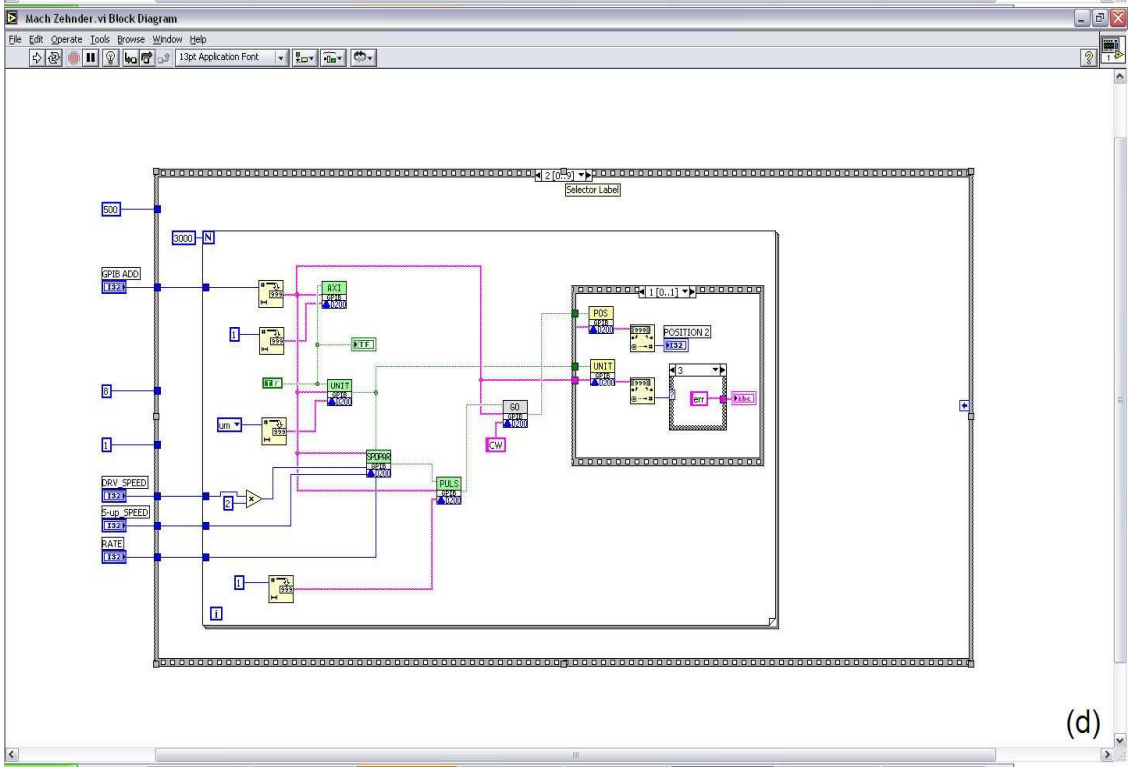
IV. Mach Zehnder Interferometer



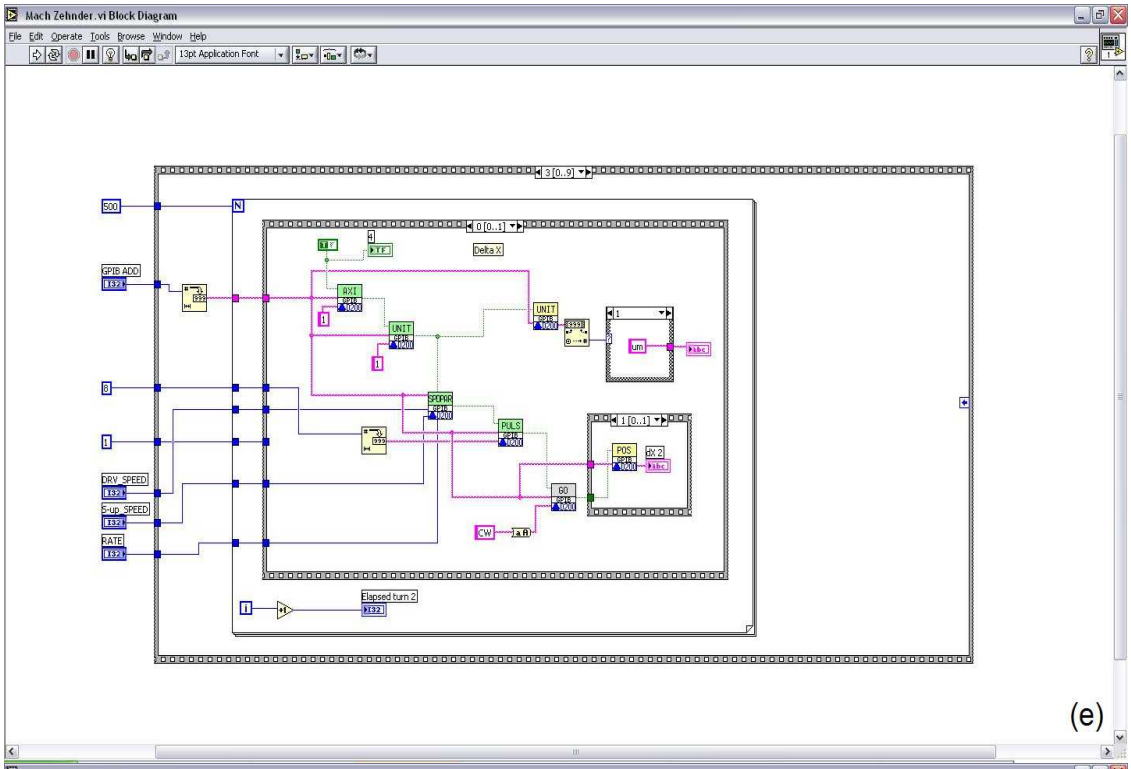


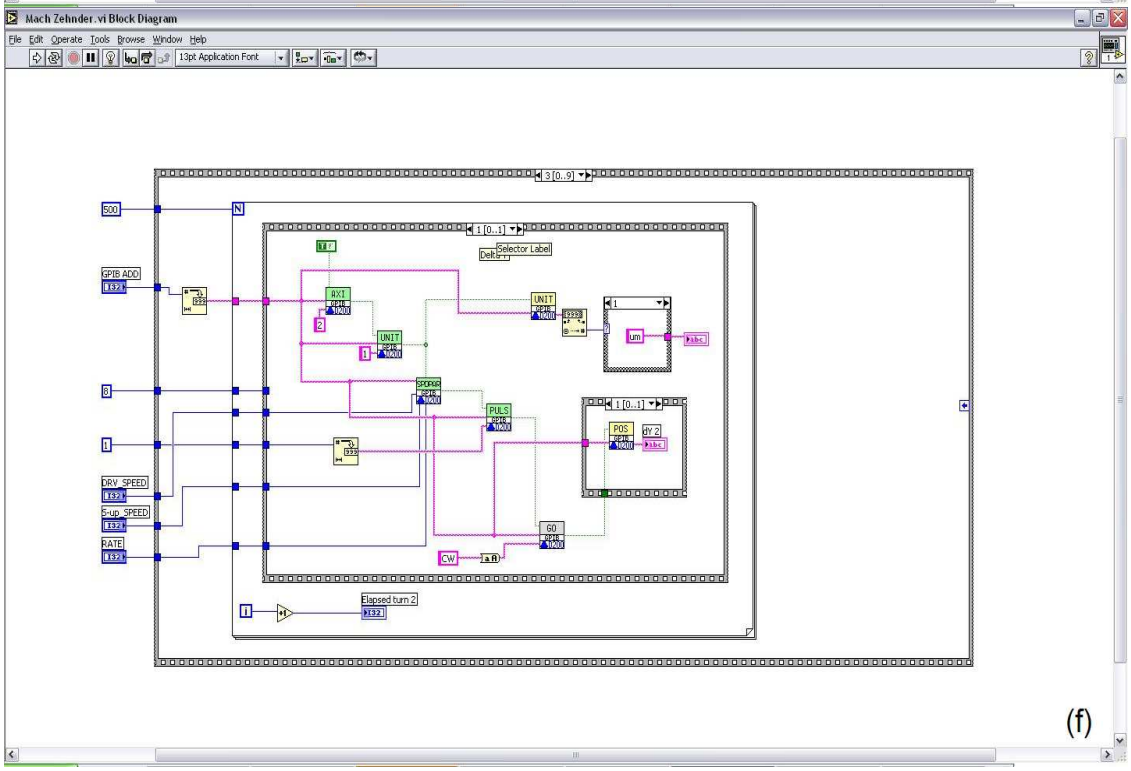
Appendix C


Mach Zehnder.vi Block Diagram
File Edit Operate Tools Browse Window Help
13pt Application Font
500
GPIB ADD
0
1
DRV_SPEED
S-up_SPEED
RATE
Delta Y
AXI
UNIT
PULS
POS
dY stat
GO
CCW
Elapsed turn
(c)

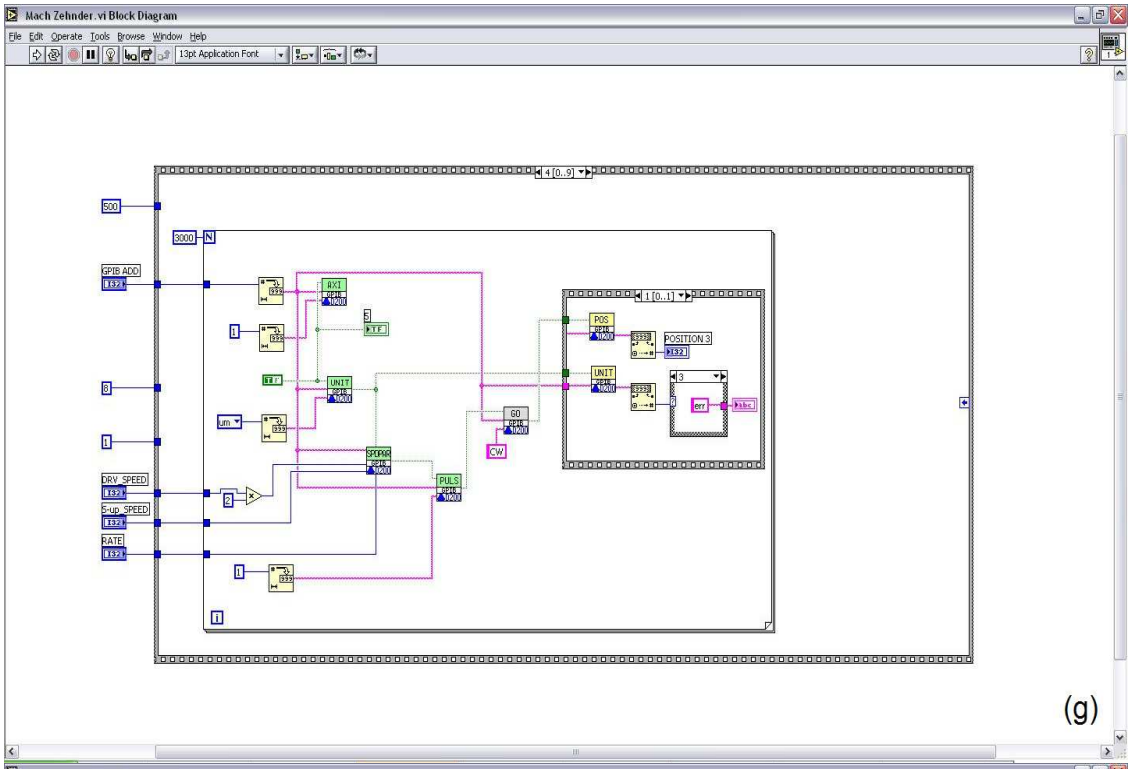

Mach Zehnder.vi Block Diagram
File Edit Operate Tools Browse Window Help
13pt Application Font
Selector Label
500
3000
GPIB ADD
0
1
DRV_SPEED
S-up_SPEED
RATE
AXI
UNIT
PULS
POS
POSITION 2
GO
CW
(d)

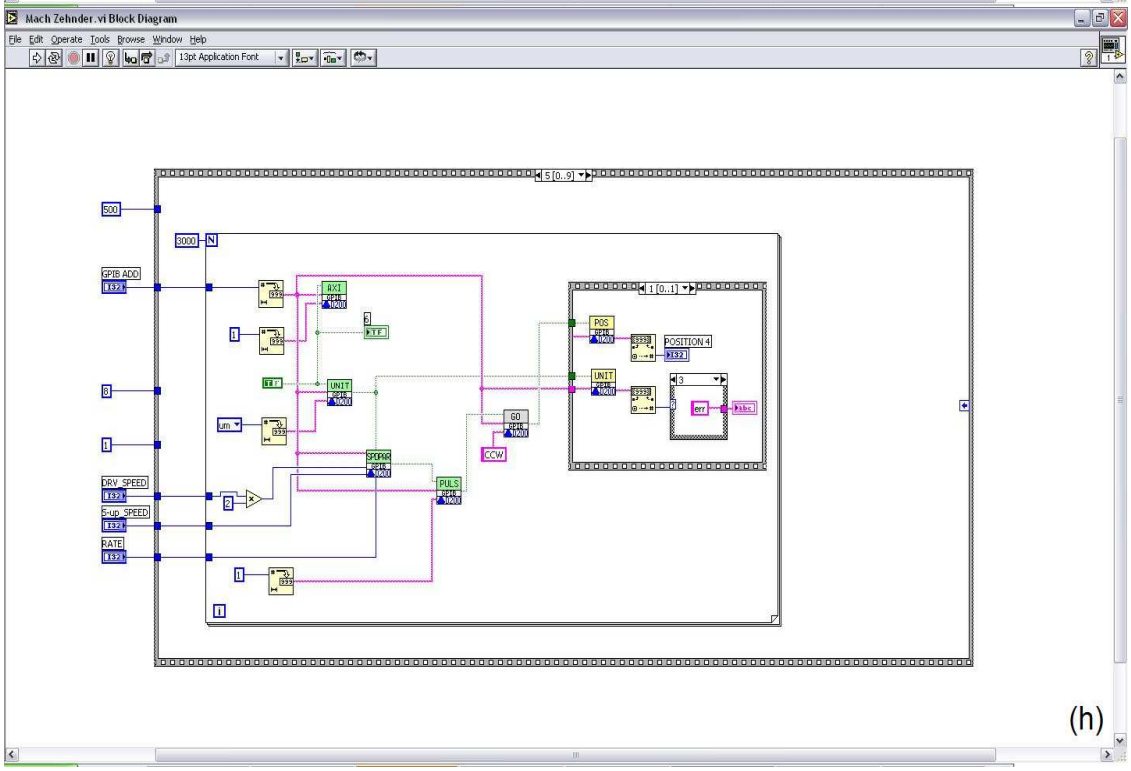
Appendix C


Mach Zehnder.vi Block Diagram
File Edit Operate Tools Browse Window Help
13pt Application Font
500
GPIB ADD
0
1
DRV_SPEED
S-up_SPEED
RATE
Delta X
UNIT
SPDMR
PULS
POS
dY 2
GO
CW
Elapsed turn 2
(e)

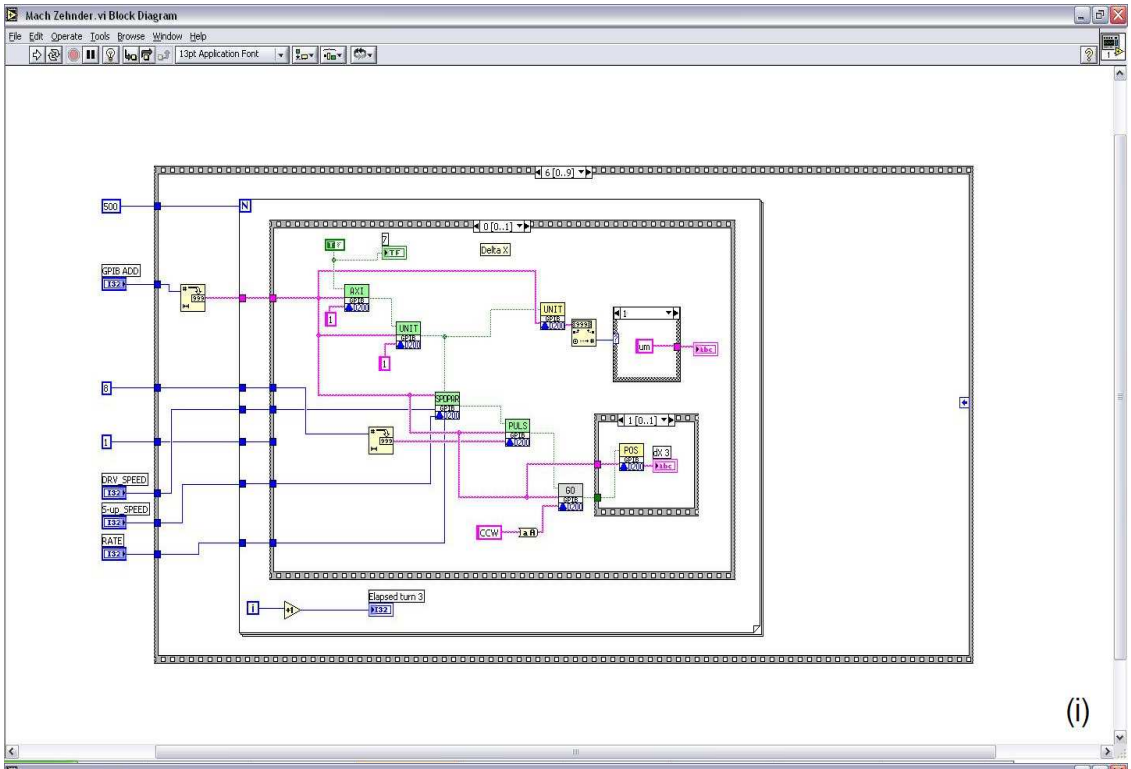

Mach Zehnder.vi Block Diagram
File Edit Operate Tools Browse Window Help
13pt Application Font
500
GPIB ADD
0
1
DRV_SPEED
S-up_SPEED
RATE
Selector Label
UNIT
SPDMR
PULS
POS
dY 2
GO
CW
Elapsed turn 2
(f)

Appendix C


Mach Zehnder.vi Block Diagram
File Edit Operate Tools Browse Window Help
13pt Application Font
4 [0..9]
500
3000
N
GPIB ADD
0
1
DRV_SPEED
S-up_SPEED
RATE
AX1
UNIT
um
SPDRP
PULS
GO
CW
1 [0..1]
POS
POSITION 3
UNIT
3
err
(g)


Mach Zehnder.vi Block Diagram
File Edit Operate Tools Browse Window Help
13pt Application Font
5 [0..9]
500
3000
N
GPIB ADD
0
1
DRV_SPEED
S-up_SPEED
RATE
AX1
UNIT
um
SPDRP
PULS
GO
CCW
1 [0..1]
POS
POSITION 4
UNIT
3
err
(h)

Appendix C



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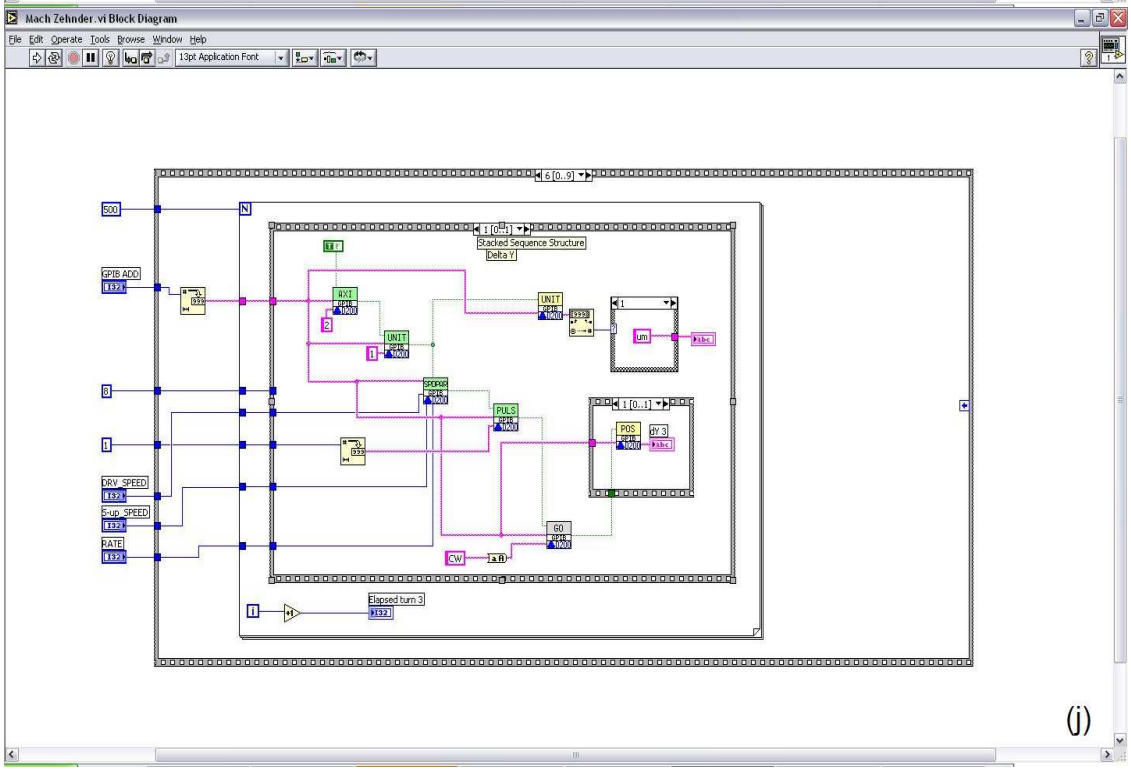

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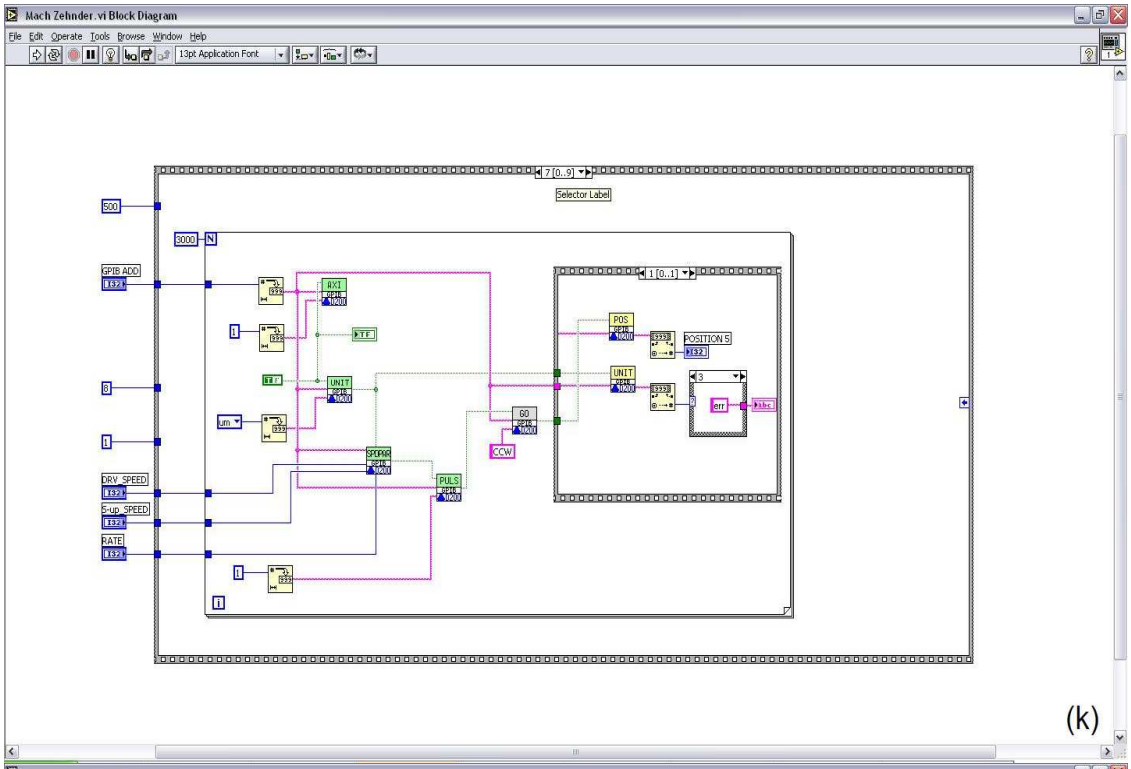
Appendix C



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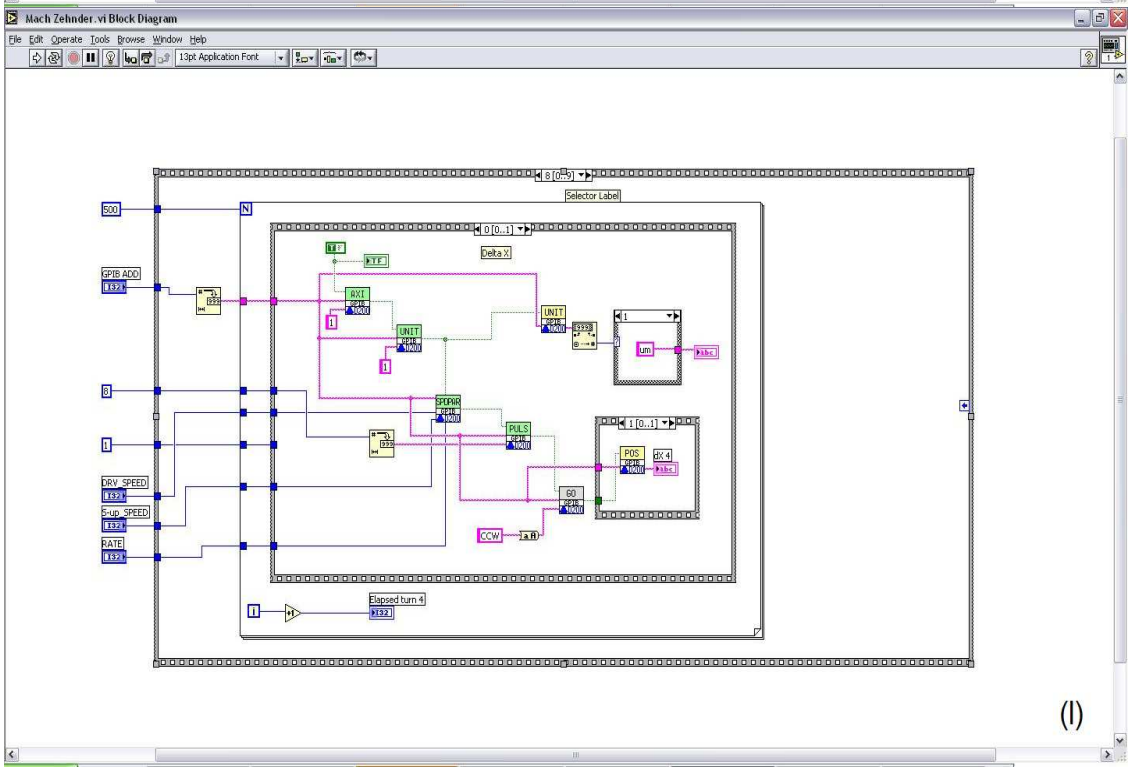
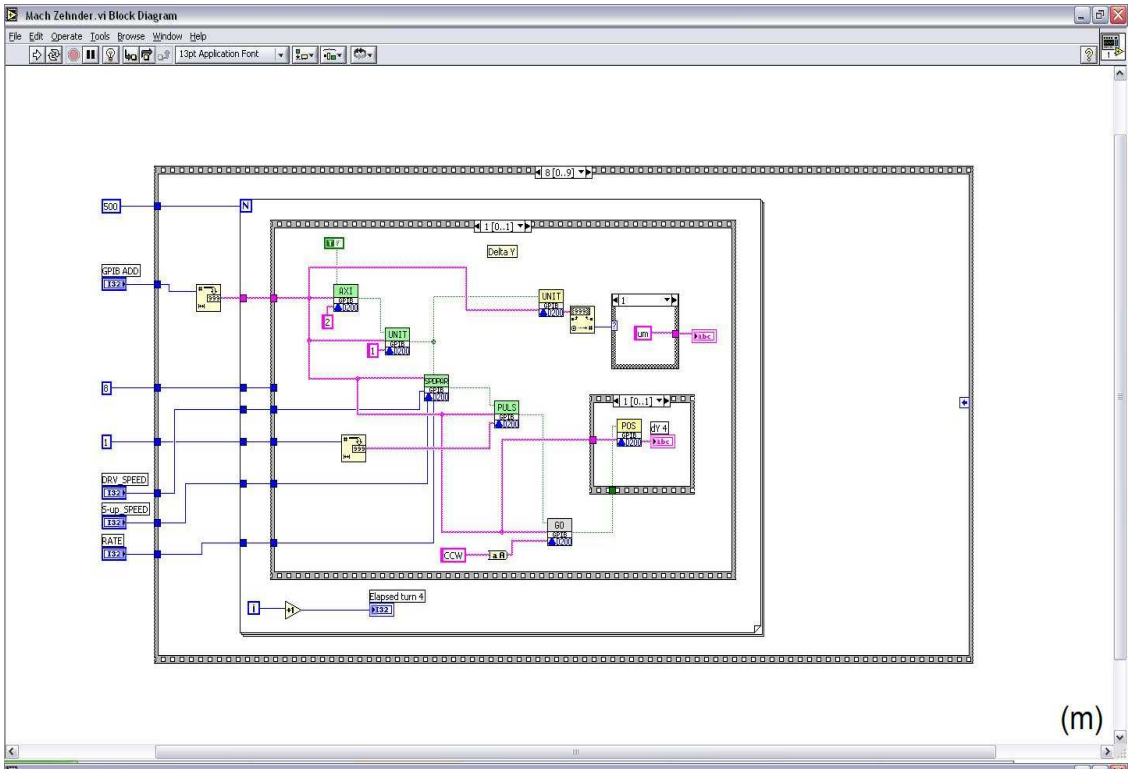


(l)

Appendix C



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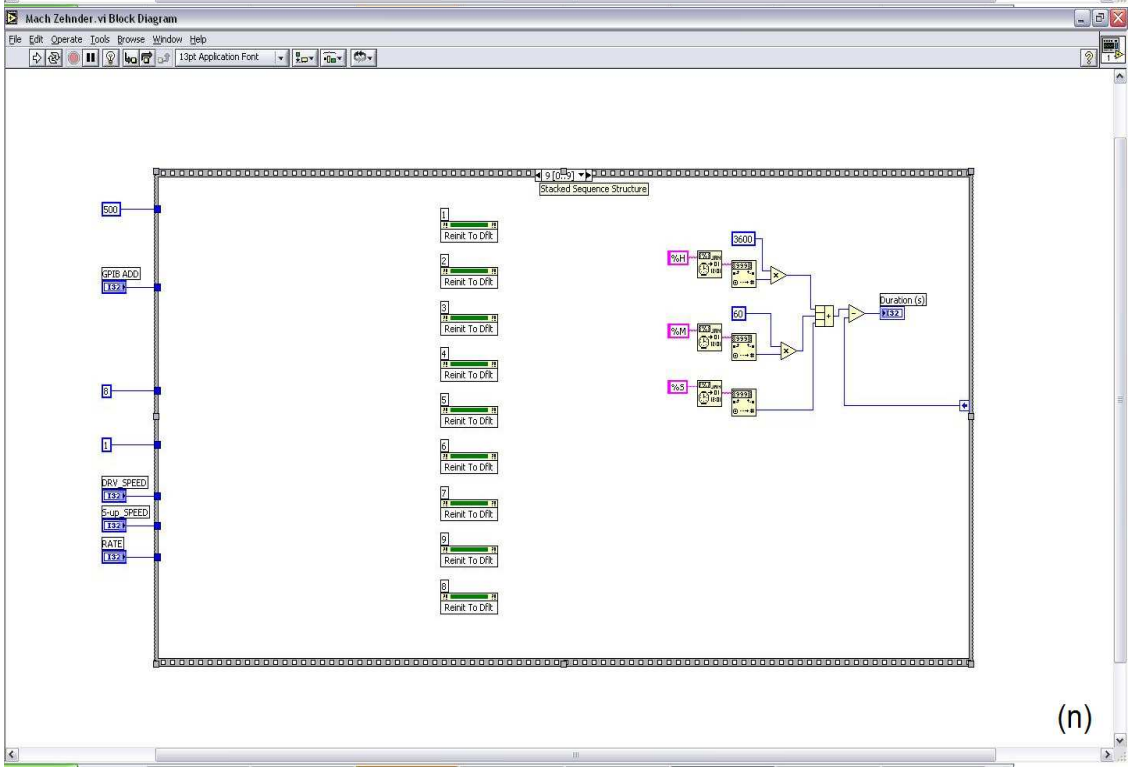

(n)