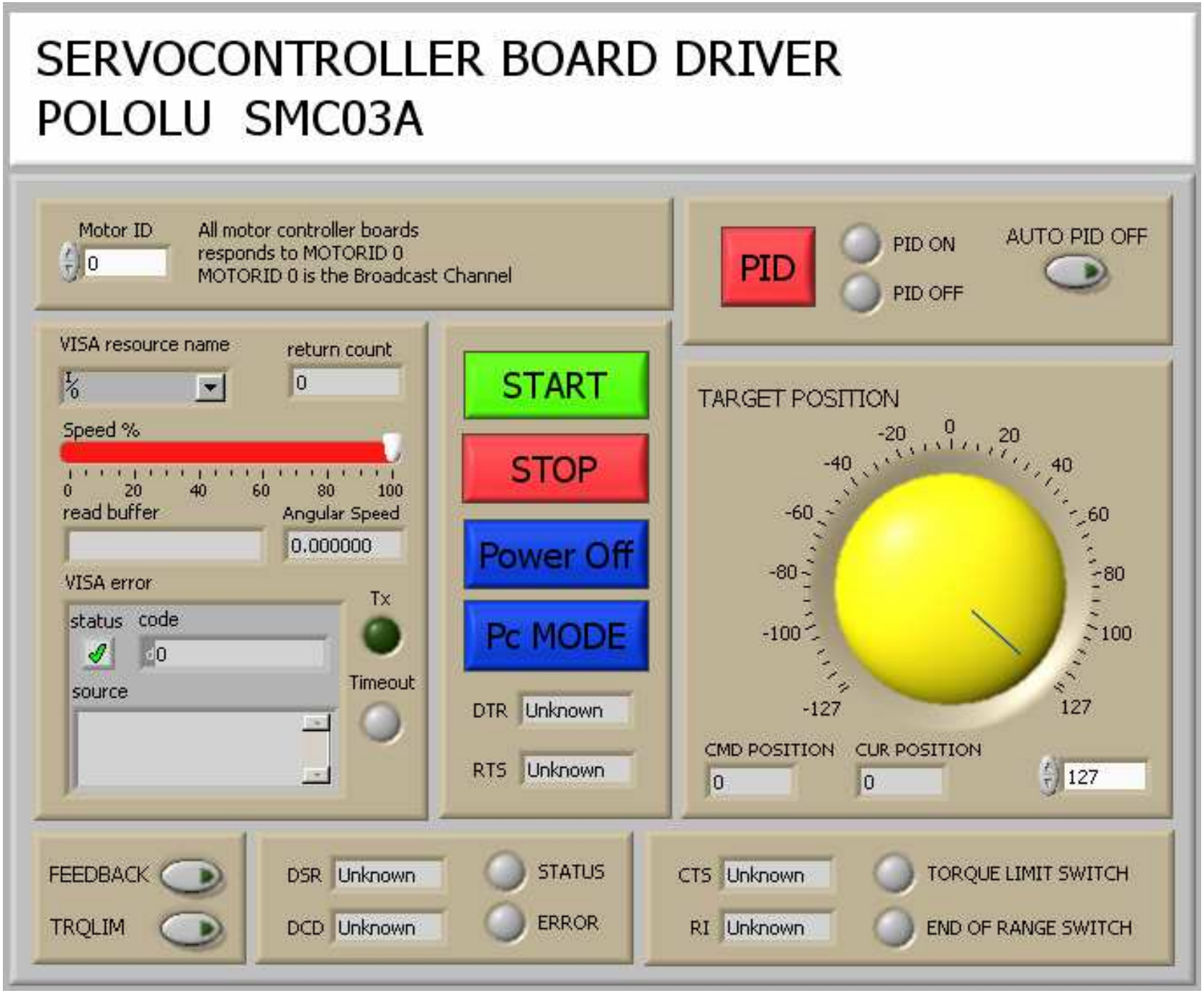
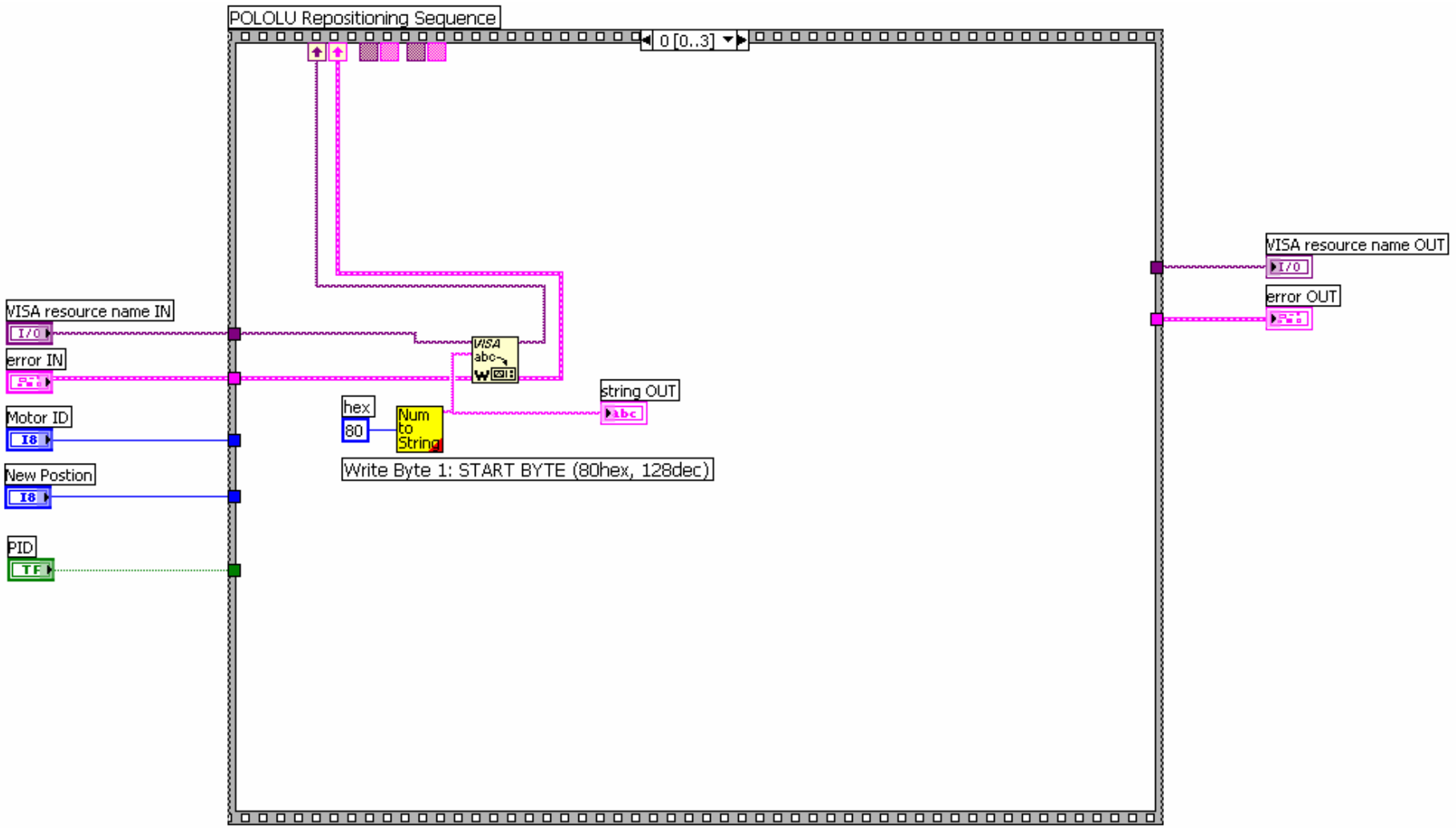
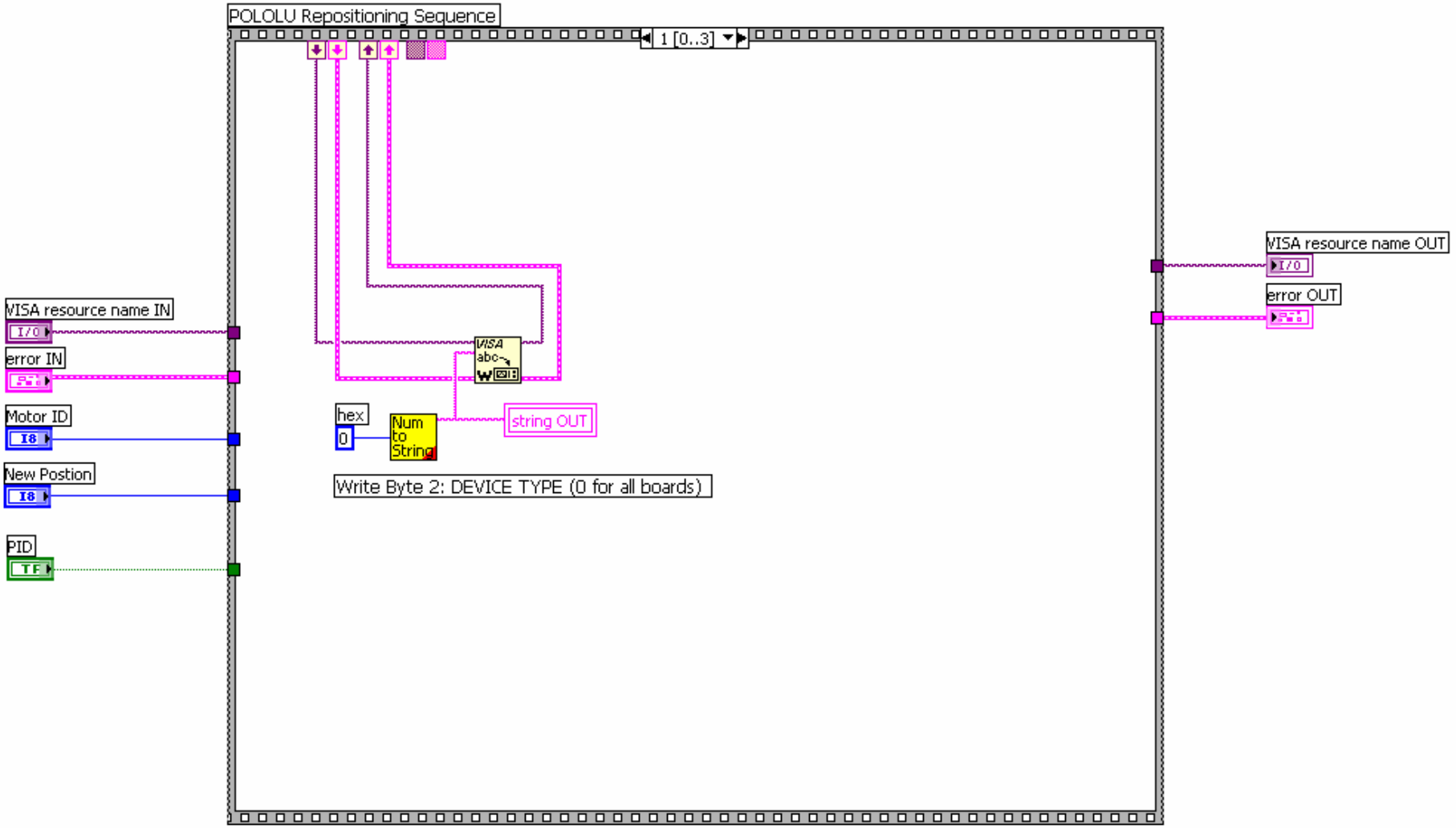
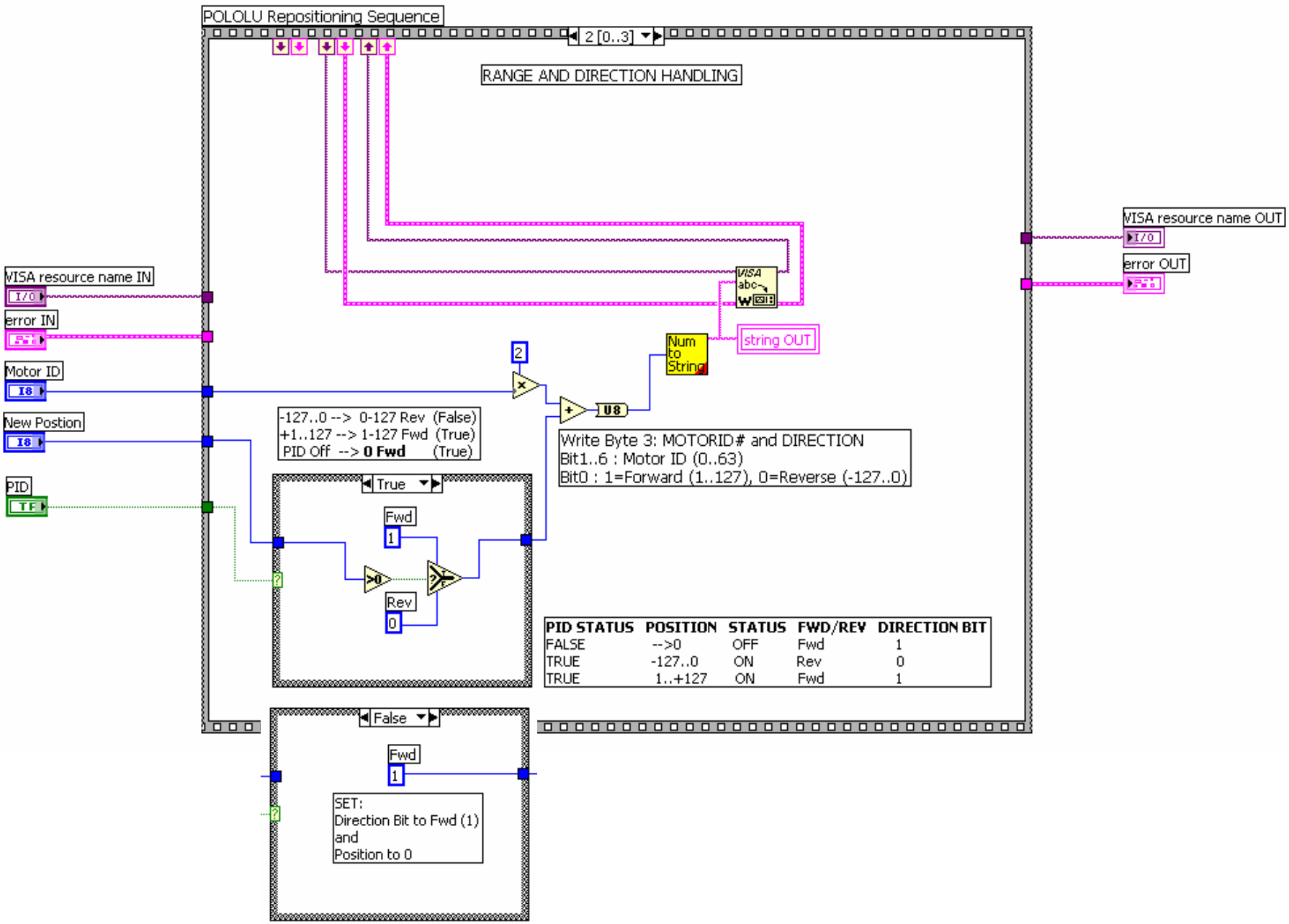
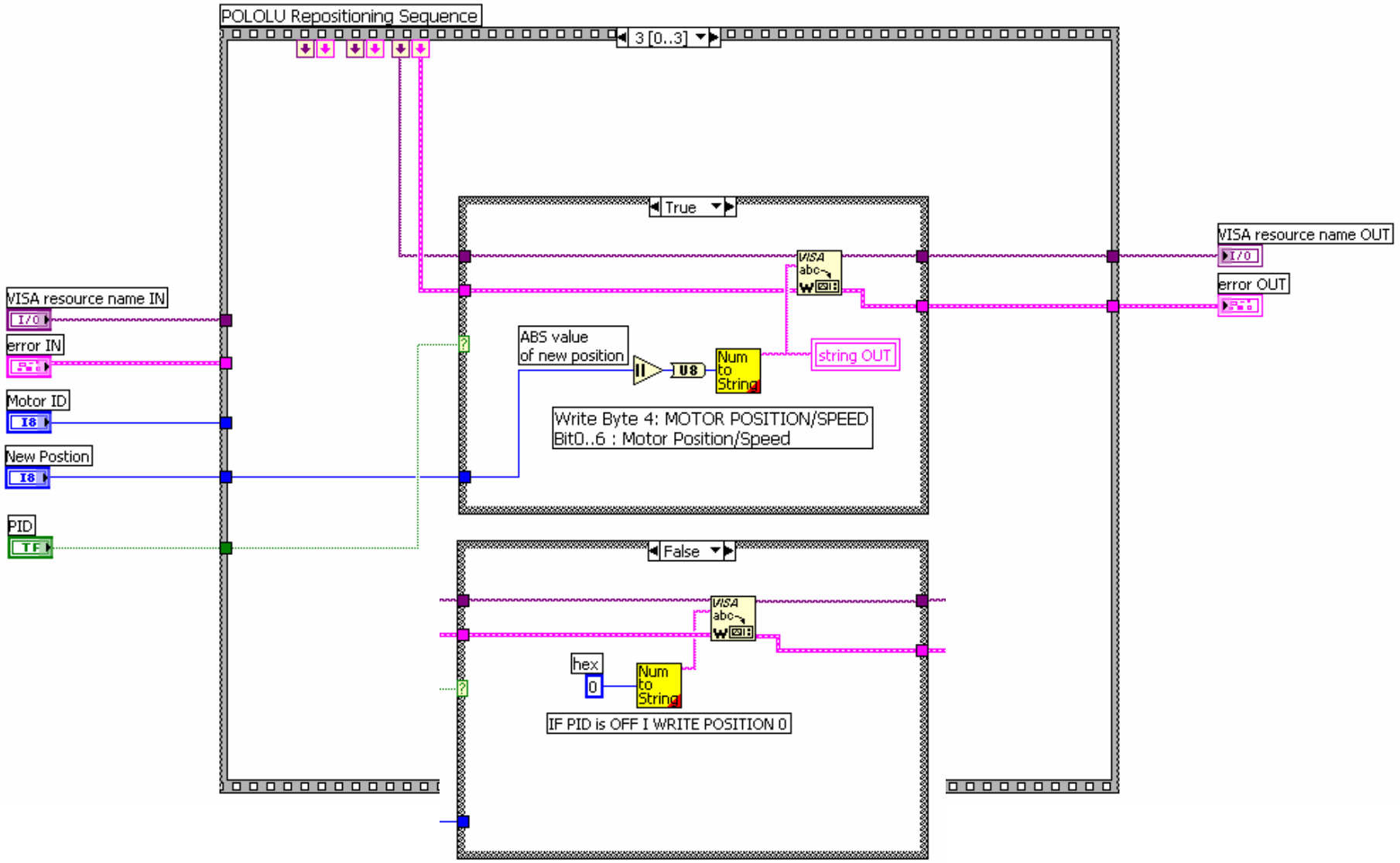

SERVOCONTROLLER BOARD DRIVER
POLOLU SMC03A
Motor ID
0
All motor controller boards
responds to MOTORID 0
MOTORID 0 is the Broadcast Channel
PID
PID ON
PID OFF
AUTO PID OFF
VISA resource name
return count
0
Speed %
0 20 40 60 80 100
read buffer
Angular Speed
0.000000
VISA error
status
code
0
source
Tx
Timeout
START
STOP
Power Off
Pc MODE
DTR Unknown
RTS Unknown
TARGET POSITION
-20 0 20 -40 40 -60 60 -80 80 -100 100 -127 127
CMD POSITION
0
CUR POSITION
0
127
FEEDBACK
TRQLIM
DSR Unknown
DCD Unknown
STATUS
ERROR
CTS Unknown
RI Unknown
TORQUE LIMIT SWITCH
END OF RANGE SWITCH

POLOLU REPOSITIONING SubVI

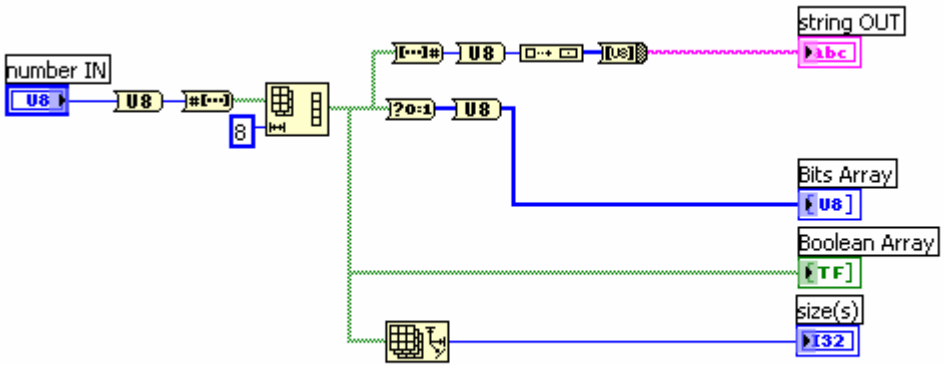



POLOLU Repositioning Sequence
1 [0..3]
VISA resource name IN
error IN
Motor ID
New Postion
PID
hex
0
Num to String
string OUT
Write Byte 2: DEVICE TYPE (0 for all boards)
VISA resource name OUT
error OUT


POLOLU Repositioning Sequence
2 [0..3]
RANGE AND DIRECTION HANDLING
VISA resource name IN
error IN
Motor ID
New Postion
PID
VISA resource name OUT
error OUT
string OUT
Num to String
2
U8
-127..0 --> 0-127 Rev (False)
+1..127 --> 1-127 Fwd (True)
PID Off --> 0 Fwd (True)
Write Byte 3: MOTORID# and DIRECTION
Bit1..6 : Motor ID (0..63)
Bit0 : 1=Forward (1..127), 0=Reverse (-127..0)
True
Fwd
1
>0
Rev
0
False
Fwd
1
SET:
Direction Bit to Fwd (1)
and
Position to 0
PID STATUS POSITION STATUS FWD/REV DIRECTION BIT
FALSE -->0 OFF Fwd 1
TRUE -127..0 ON Rev 0
TRUE 1..+127 ON Fwd 1


POLOLU Repositioning Sequence
3 [0..3]
True
False
VISA resource name IN
error IN
Motor ID
New Postion
PID
VISA resource name OUT
error OUT
ABS value
of new position
U8
Num
to
String
string OUT
Write Byte 4: MOTOR POSITION/SPEED
Bit0..6 : Motor Position/Speed
hex
0
IF PID is OFF I WRITE POSITION 0

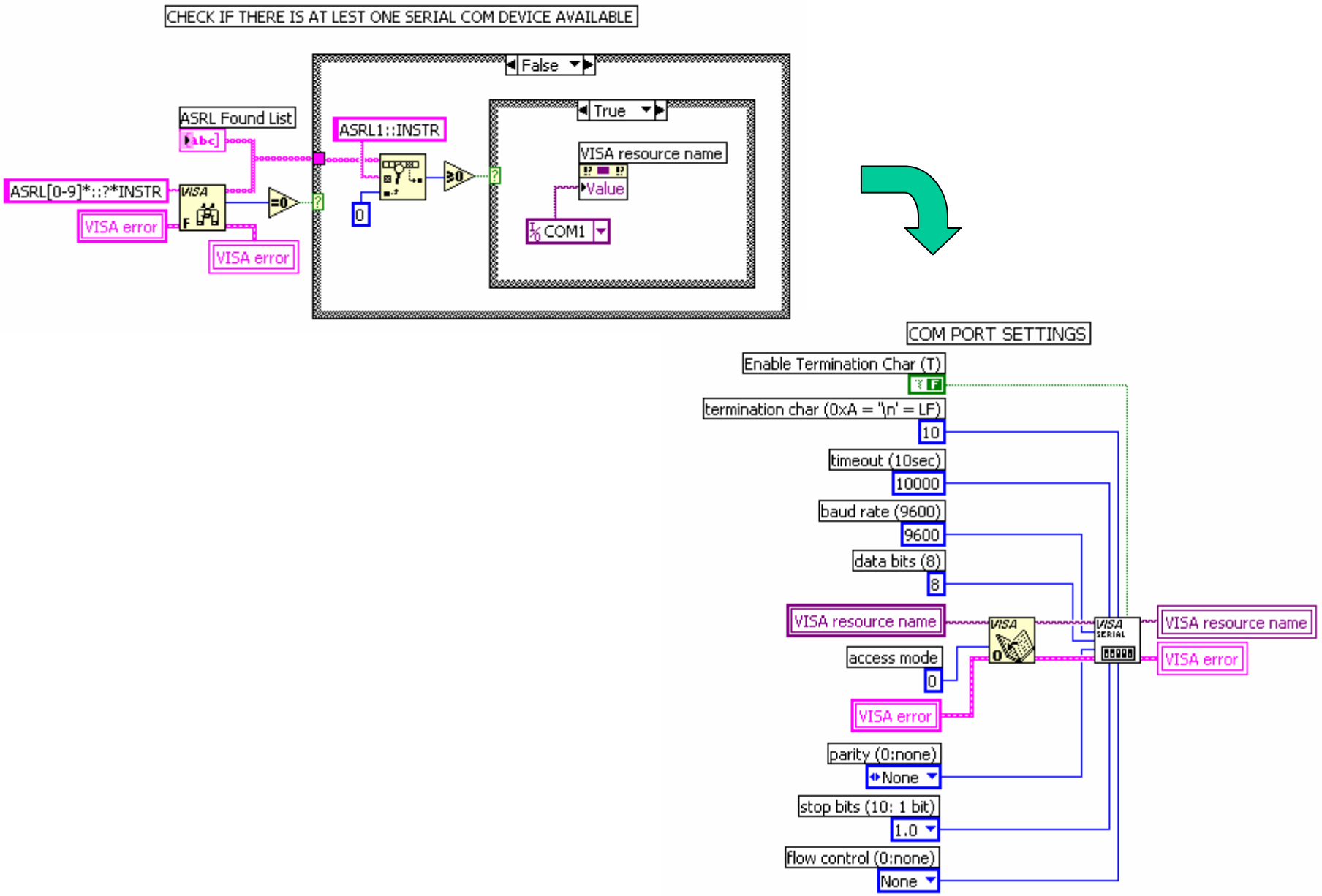
CONVERT NUMBER TO STRING FOR VISA CALL



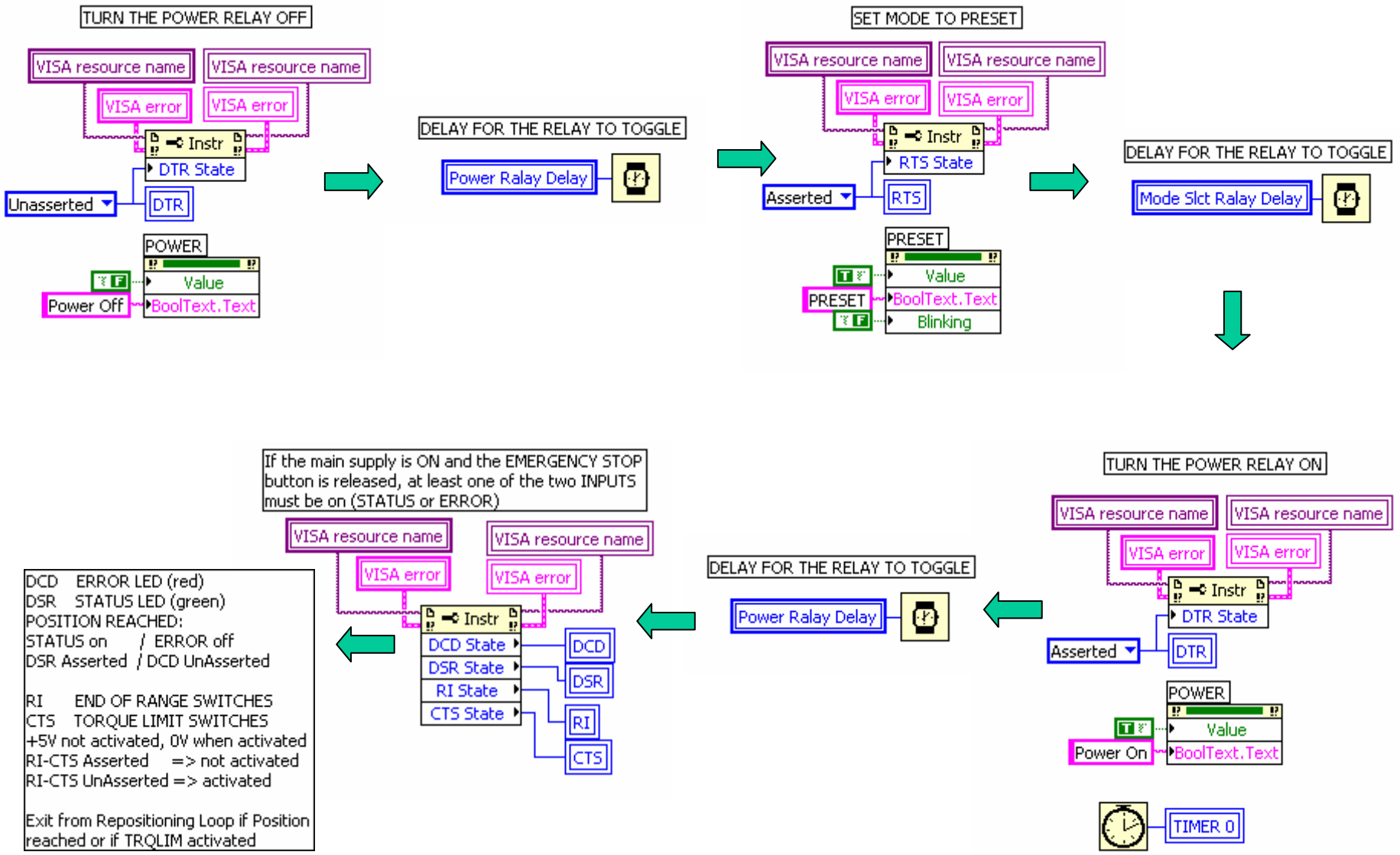
To write one single byte to the serial COM port:
- cast the dec number to U8
- convert the dec number to an array of booleans
- reshape the array to 8 elements exactly
- convert the array of 8 booleans to a decimal number
- cast the dec number to U8
- build the dec number into a one element array
- convert the one byte array into a string

The VISA Write accepts only strings as inputs
If you convert a dec number to string you will have the ASCII equivalent and not what you would like.
Example (see Doc.3J7G77XL NI developer Zone):
If we want to send "9", "1001" binary or even the hex code "09" we are sending characters.
If you write the character "09" to the serial port, the hardware receives "9" which is a symbol.
The ASCII code number of this symbol is 39. This is an actual number. It is in HEX format, so 39 actually translates to the value 57 in base 10.
57 is not 9.

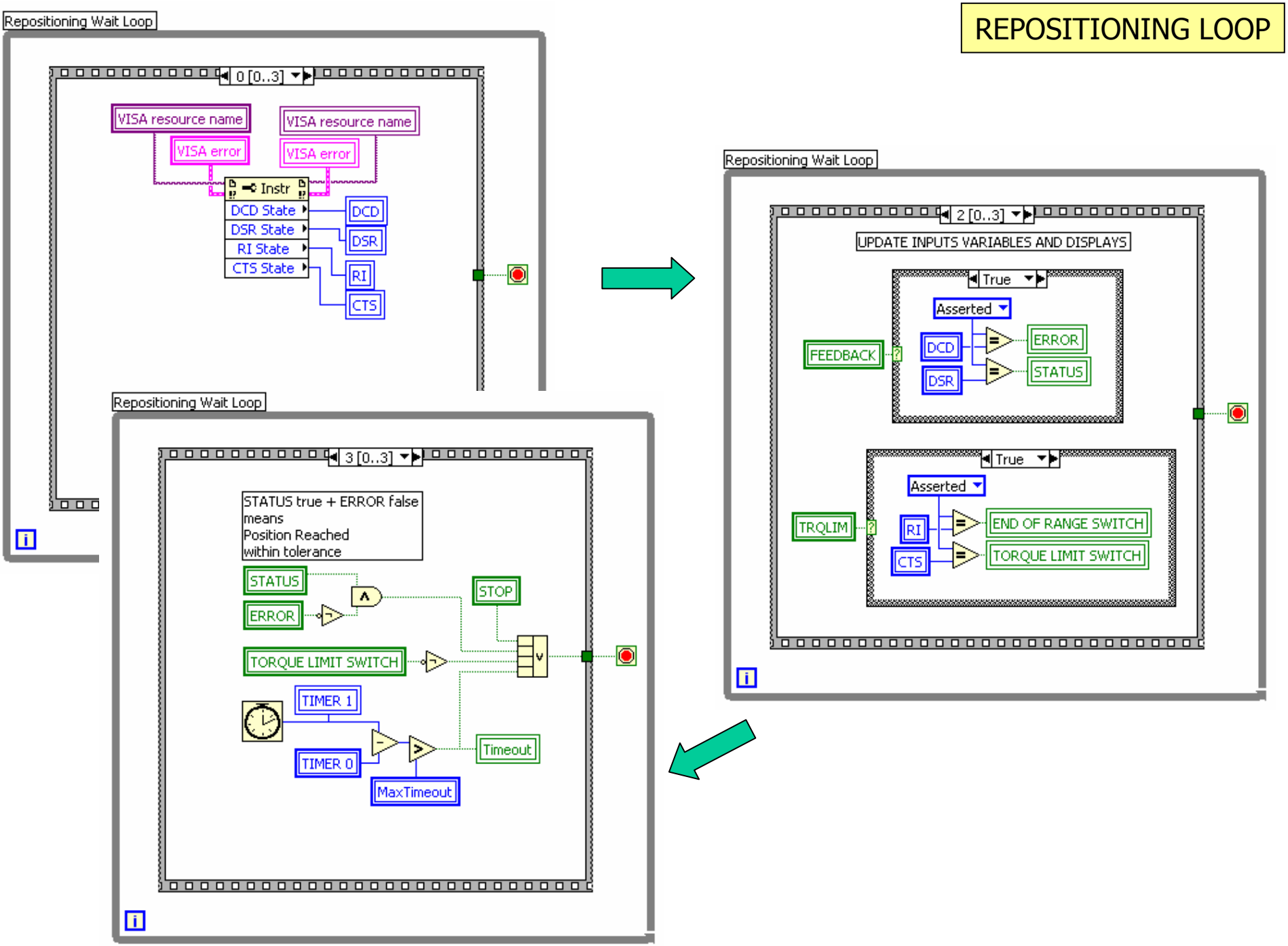
COM PORT INITIALIZE



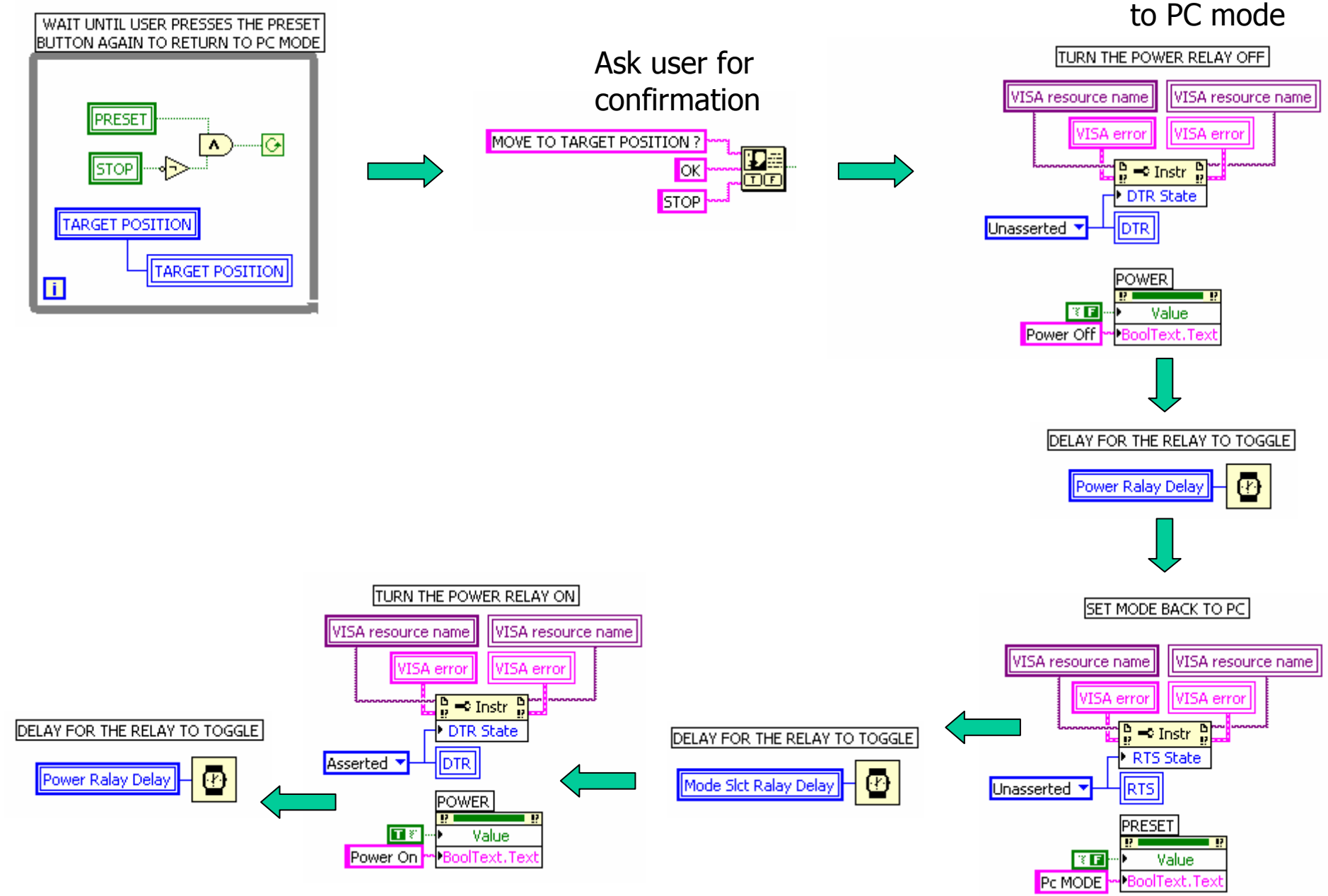
GO TO PRESET POSITION

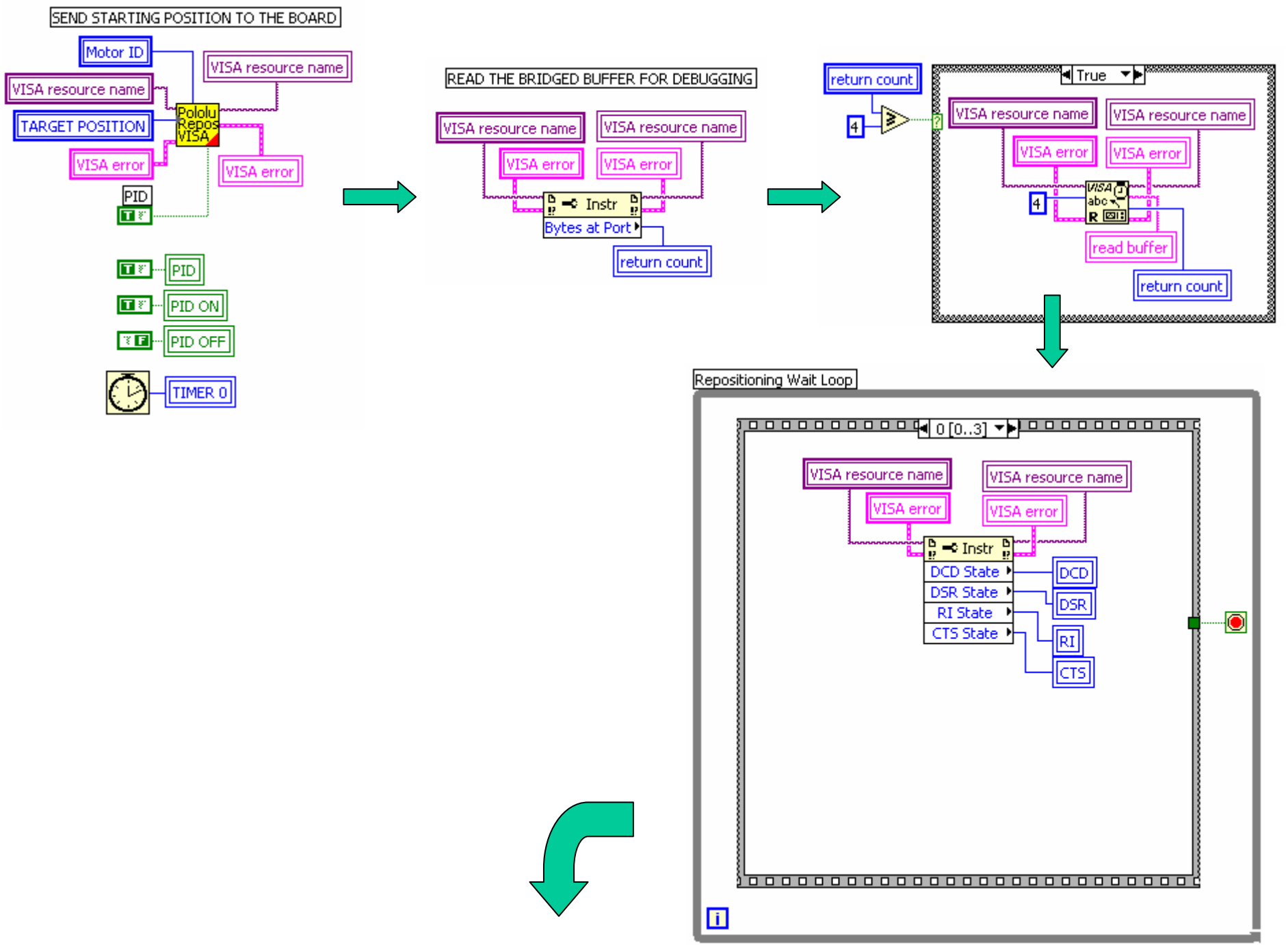


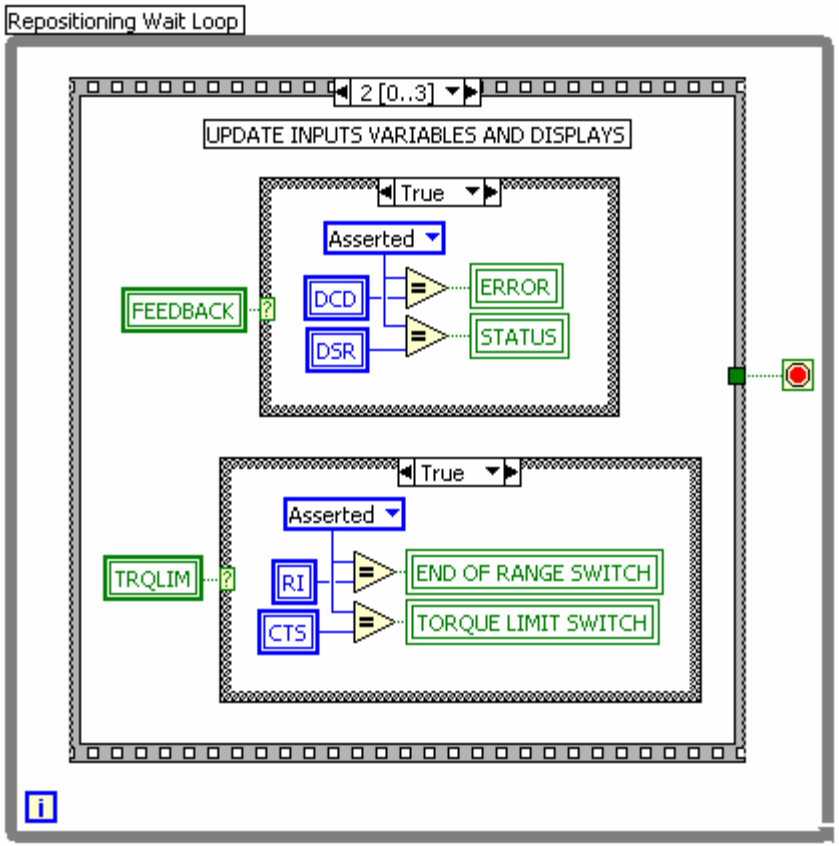
REPOSITIONING LOOP

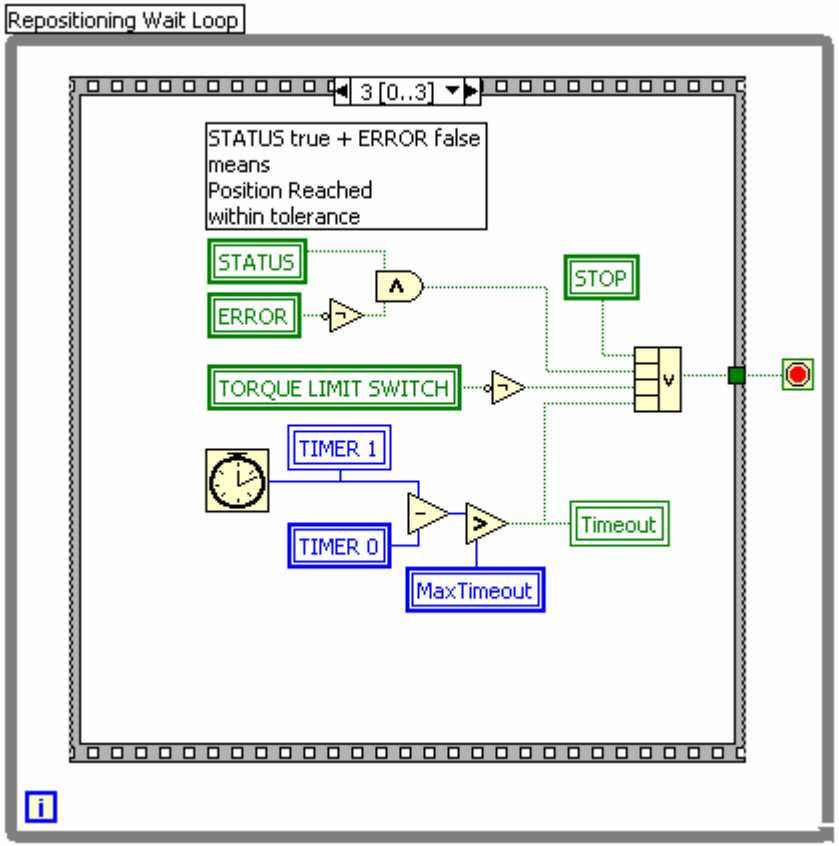


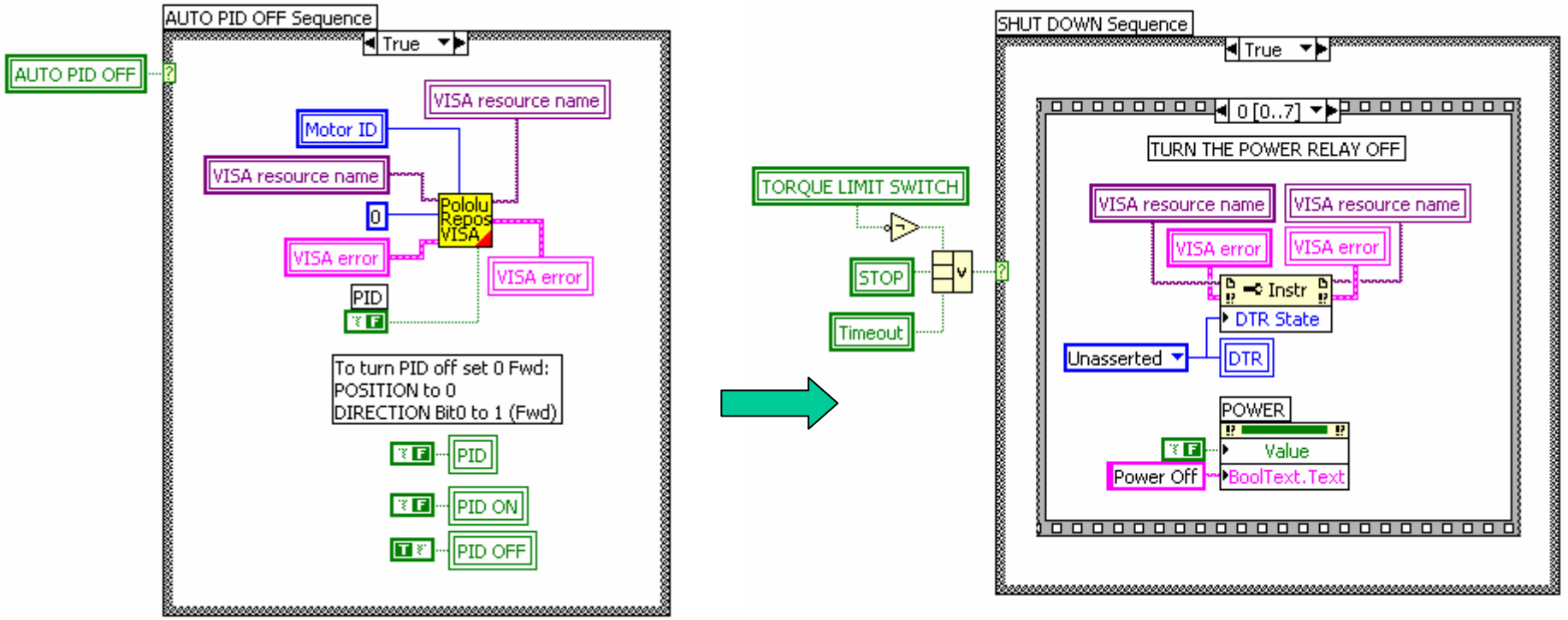
MOVE FROM PRESET POSITION (ext pot) TO TARGET POSITION (RS232)




SEND STARTING POSITION TO THE BOARD
Motor ID
VISA resource name
VISA resource name
TARGET POSITION
Pololu Repos VISA
VISA error
VISA error
PID
PID
PID ON
PID OFF
TIMER 0
READ THE BRIDGED BUFFER FOR DEBUGGING
VISA resource name
VISA resource name
VISA error
VISA error
Instr
Bytes at Port
return count
return count
4
True
VISA resource name
VISA resource name
VISA error
VISA error
4
read buffer
return count
Repositioning Wait Loop
0 [0..3]
VISA resource name
VISA resource name
VISA error
VISA error
Instr
DCD State
DSR State
RI State
CTS State
DCD
DSR
RI
CTS

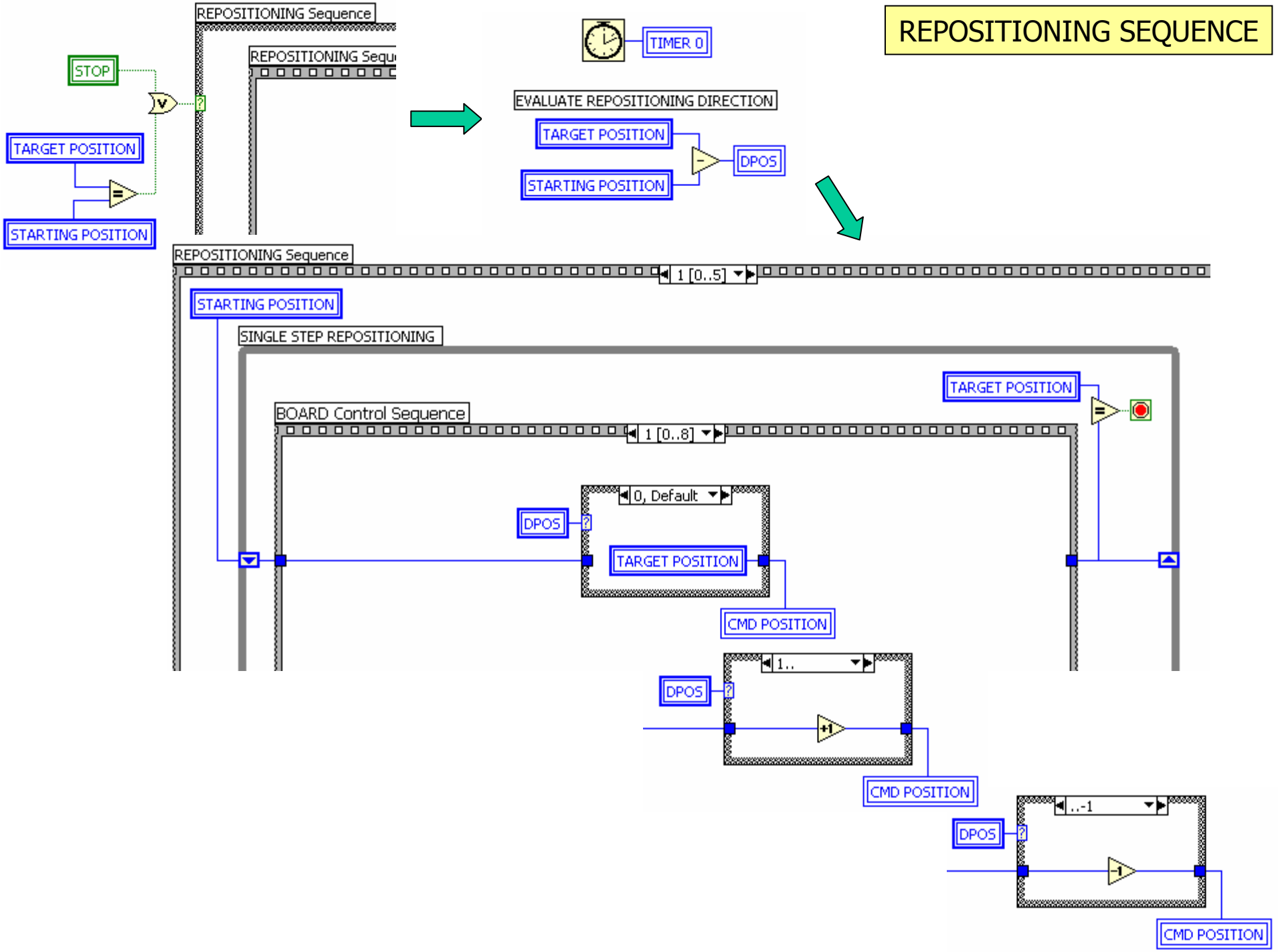

Repositioning Wait Loop
2 [0..3]
UPDATE INPUTS VARIABLES AND DISPLAYS
True
Asserted
FEEDBACK
DCD
DSR
ERROR
STATUS
True
Asserted
TRQLIM
RI
CTS
END OF RANGE SWITCH
TORQUE LIMIT SWITCH

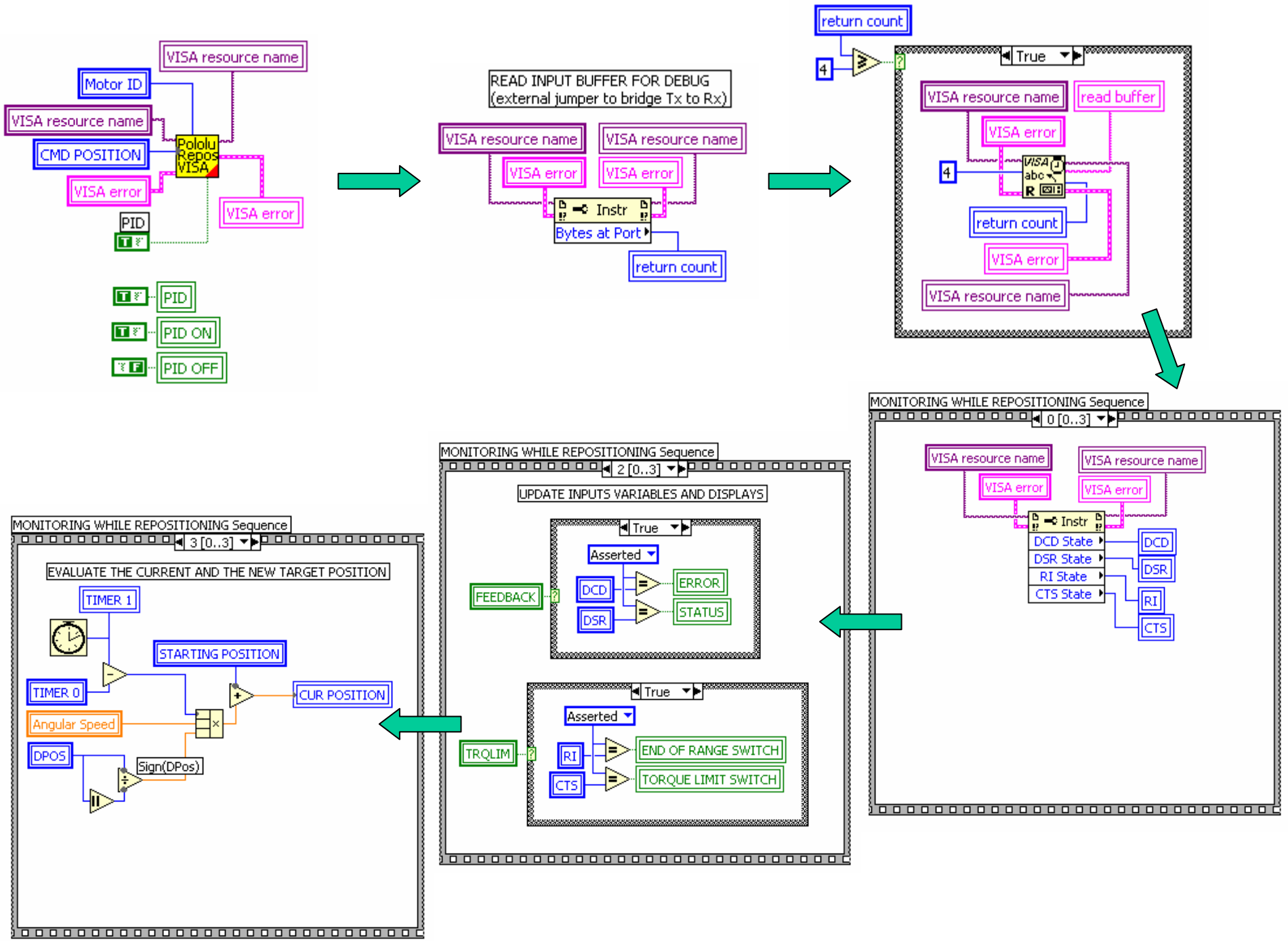

Repositioning Wait Loop
3 [0..3]
STATUS true + ERROR false
means
Position Reached
within tolerance
STATUS
ERROR
STOP
TORQUE LIMIT SWITCH
TIMER 1
TIMER 0
Timeout
MaxTimeout

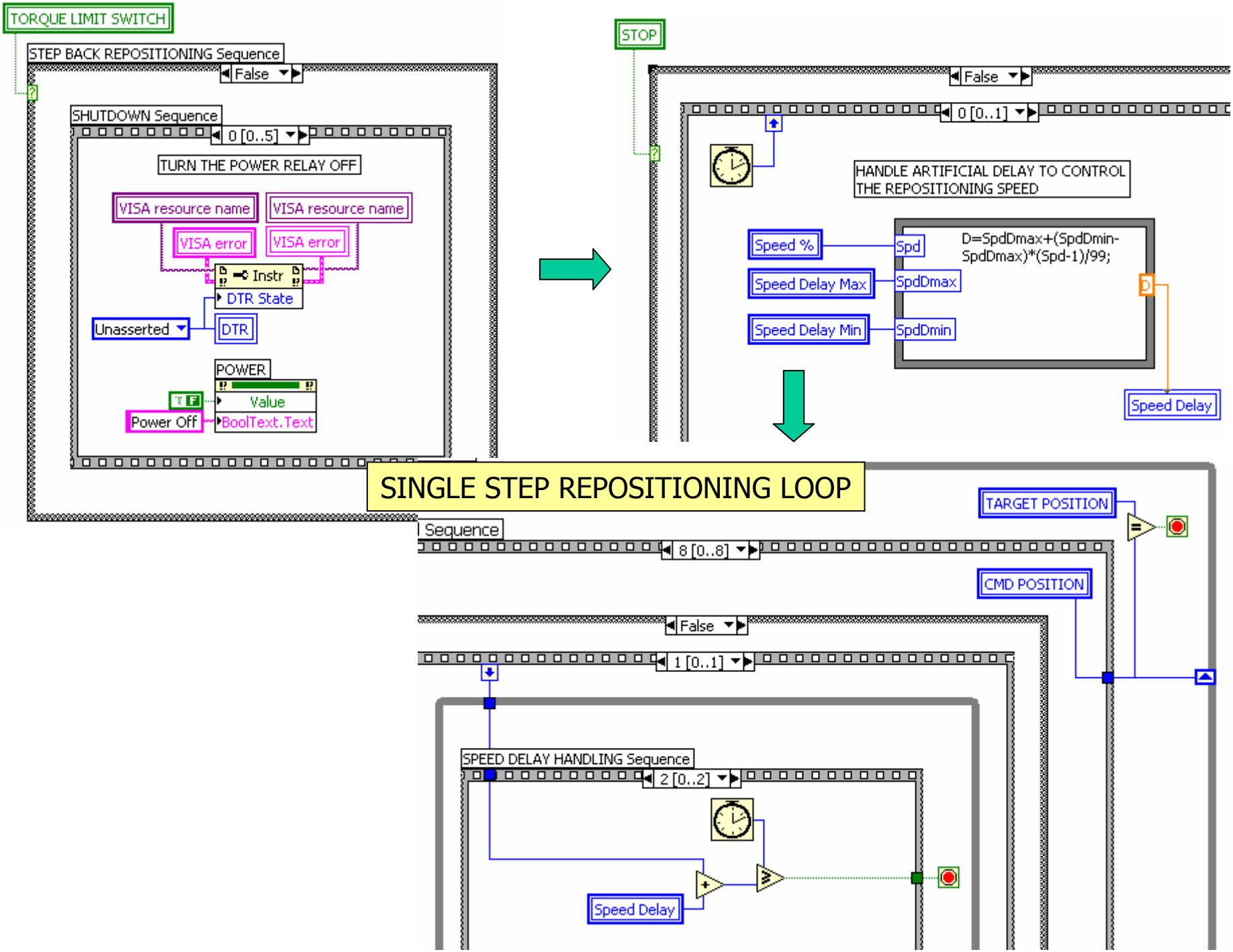


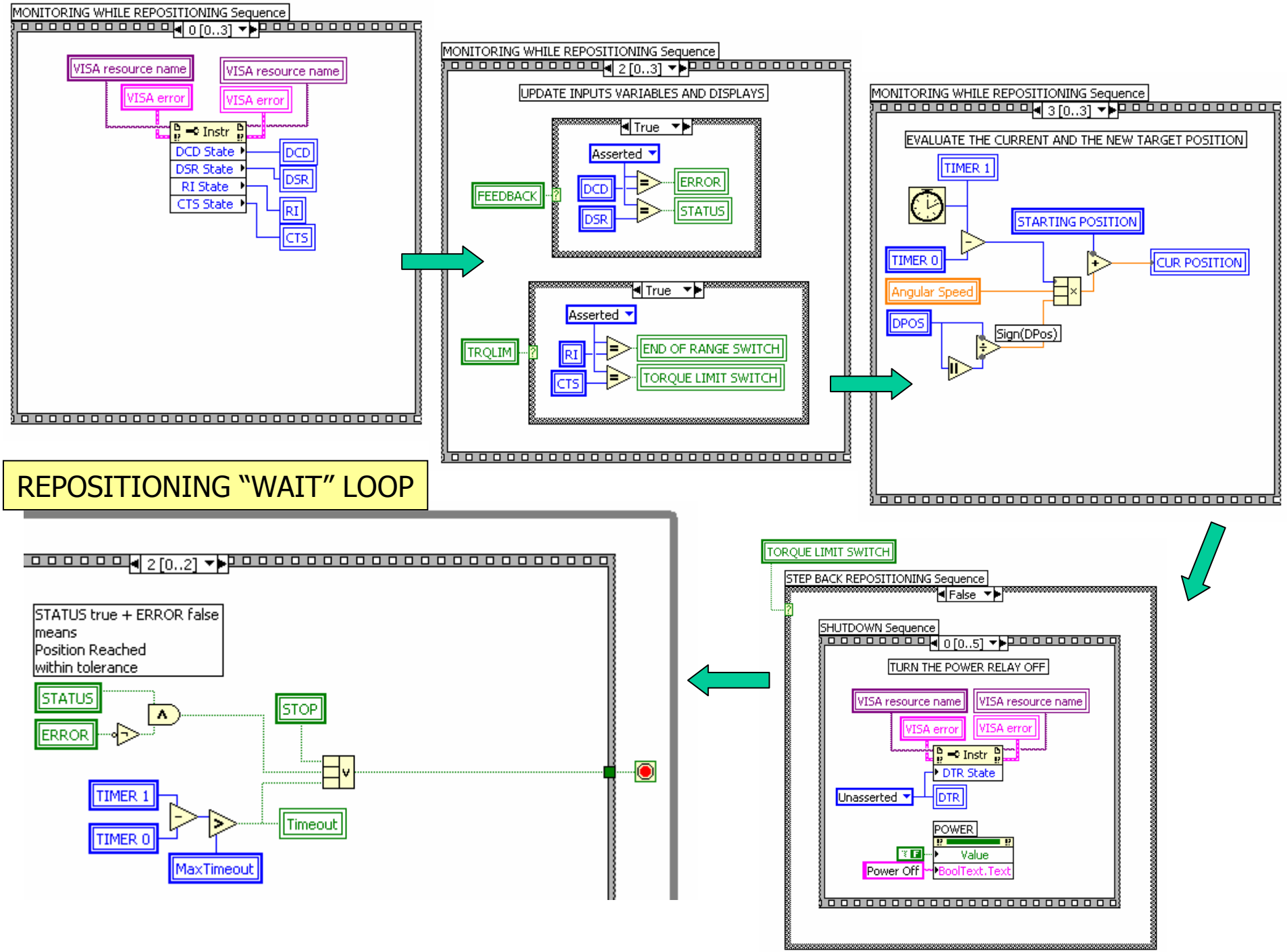
END OF REPOSITIONING SEQUENCE

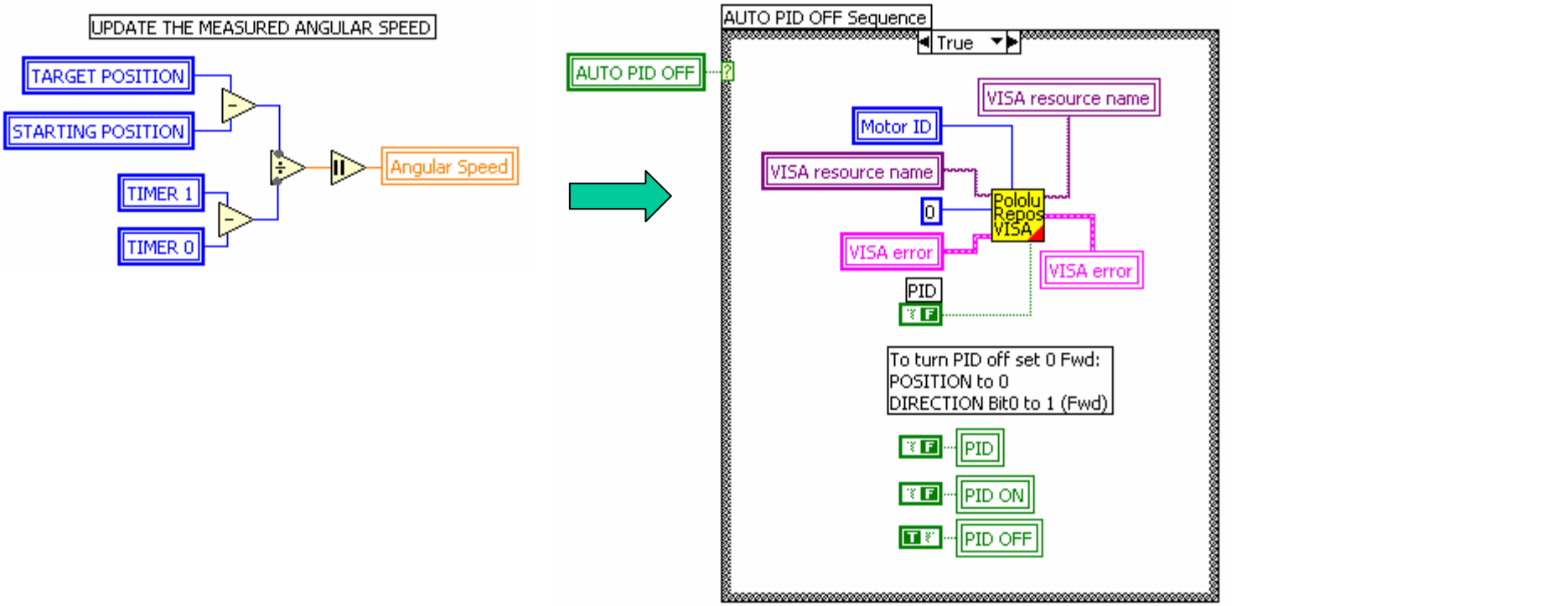
REPOSITIONING SEQUENCE

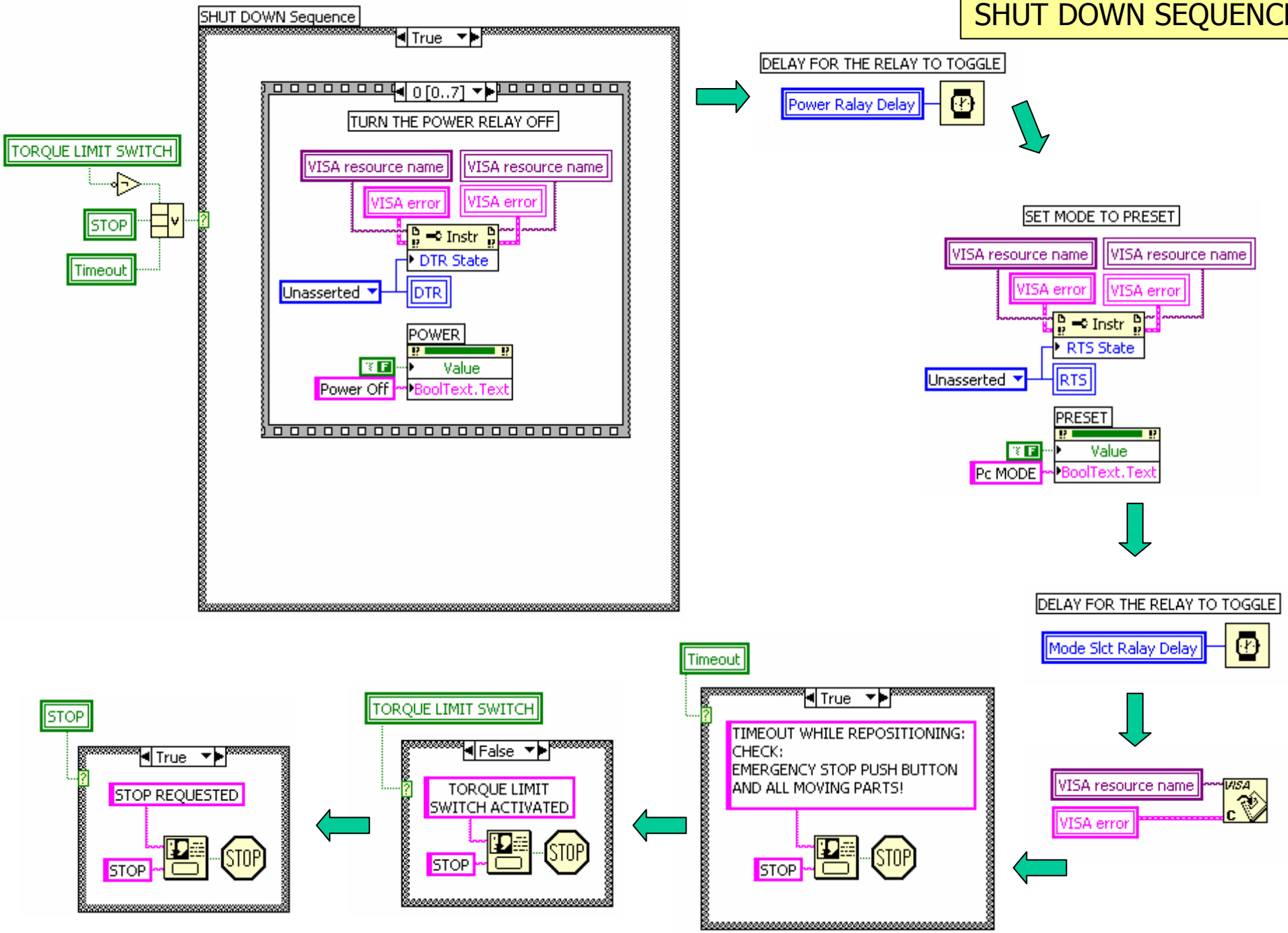



VISA resource name
Motor ID
VISA resource name
CMD POSITION
Pololu Repos VISA
VISA error
VISA error
PID
PID
PID ON
PID OFF
READ INPUT BUFFER FOR DEBUG
(external jumper to bridge Tx to Rx)
VISA resource name
VISA resource name
VISA error
VISA error
Instr
Bytes at Port
return count
return count
4
True
VISA resource name
read buffer
VISA error
4
return count
VISA error
VISA resource name
MONITORING WHILE REPOSITIONING Sequence
0 [0..3]
VISA resource name
VISA resource name
VISA error
VISA error
Instr
DCD State
DSR State
RI State
CTS State
DCD
DSR
RI
CTS
MONITORING WHILE REPOSITIONING Sequence
2 [0..3]
UPDATE INPUTS VARIABLES AND DISPLAYS
True
Asserted
FEEDBACK
DCD
DSR
ERROR
STATUS
True
Asserted
TRQLIM
RI
CTS
END OF RANGE SWITCH
TORQUE LIMIT SWITCH
MONITORING WHILE REPOSITIONING Sequence
3 [0..3]
EVALUATE THE CURRENT AND THE NEW TARGET POSITION
TIMER 1
STARTING POSITION
TIMER 0
CUR POSITION
Angular Speed
DPOS
Sign(DPos)


TORQUE LIMIT SWITCH
STEP BACK REPOSITIONING Sequence
False
SHUTDOWN Sequence
0 [0..5]
TURN THE POWER RELAY OFF
VISA resource name
VISA resource name
VISA error
VISA error
Instr
DTR State
Unasserted
DTR
POWER
Value
Power Off
BoolText.Text
STOP
False
0 [0..1]
HANDLE ARTIFICIAL DELAY TO CONTROL THE REPOSITIONING SPEED
Speed %
Spd
D=SpdDmax+(SpdDmin-SpdDmax)*(Spd-1)/99;
Speed Delay Max
SpdDmax
Speed Delay Min
SpdDmin
D
Speed Delay
SINGLE STEP REPOSITIONING LOOP
Sequence
8 [0..8]
TARGET POSITION
CMD POSITION
False
1 [0..1]
SPEED DELAY HANDLING Sequence
2 [0..2]
Speed Delay


MONITORING WHILE REPOSITIONING Sequence
0 [0..3]
VISA resource name
VISA error
Instr
DCD State
DSR State
RI State
CTS State
DCD
DSR
RI
CTS
MONITORING WHILE REPOSITIONING Sequence
2 [0..3]
UPDATE INPUTS VARIABLES AND DISPLAYS
True
Asserted
FEEDBACK
DCD
DSR
ERROR
STATUS
True
Asserted
TRQLIM
RI
CTS
END OF RANGE SWITCH
TORQUE LIMIT SWITCH
MONITORING WHILE REPOSITIONING Sequence
3 [0..3]
EVALUATE THE CURRENT AND THE NEW TARGET POSITION
TIMER 1
STARTING POSITION
TIMER 0
CUR POSITION
Angular Speed
DPOS
Sign(DPos)
REPOSITIONING "WAIT" LOOP
2 [0..2]
STATUS true + ERROR false
means
Position Reached
within tolerance
STATUS
ERROR
STOP
TIMER 1
TIMER 0
Timeout
MaxTimeout
TORQUE LIMIT SWITCH
STEP BACK REPOSITIONING Sequence
False
SHUTDOWN Sequence
0 [0..5]
TURN THE POWER RELAY OFF
VISA resource name
VISA resource name
VISA error
VISA error
Instr
DTR State
Unasserted
DTR
POWER
Value
Power Off
BoolText.Text



END OF REPOSITIONING SEQUENCE

SHUT DOWN SEQUENCE