Original Problem Statement:

Create a PLC state machine that will be started with switch X120, move the IAI slide to position 1 (5mm), then make ten moves of 1mm each (incremental moves), return to position 1, make another ten incremental moves, and then move to position 2 (20mm) and stop. You will use a counter in the PLC ladder, and the "handshaking" signals between the PLC and the DS controller to accomplish this.

Selwin commands that will be useful are:

HOME	Home axis
SVON	Servo on
BTON/BTOF	Bit on/off
WTON/WTOF	Wait for input bit on/off
MOVP	Move to position
MVPI	Move incrementally by position #
IFEQ	Compare two variables
IN	Read bits into variable 99
LET	set a variable to a constant value

Remember that the PLC is connected to the DS controller this way:

Y0	=>	011
Y1	=>	012
Y2	=>	013
Y3	=>	014
X0	<=	302

You could use Y0 to "trigger" the DS controller and Y1-Y3 to indicate what it should do. If you chose this approach, you would do a WTON 011, and an IN 012 014, and compare "magic" variable 99 (which contains the input values) with 0-7

One solution:

This solution uses Y1 (012) to indicate position 1 move, Y2 (013) to indicate incremental move, and Y3 (014) to indicate position 2 move. The PLC uses stage counters to count incremental moves and first and second layer moves (returns to position 1). Stage counters are like conventional counters, but can be reset in a different stage than the one the counter resides in.

One complication in using counters in stages is that an SP1 (always on) contact cannot be used to trigger a count. The solution I used was to trigger the counter at the same time as the JMP to the new stage.

Solution:

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We will use two counters, one for the incremental moves, and one for the two sets of moves. The SEL program in the DS controller simply waits for 011 (Y0 at the PLC) to go high, then checks 012, 013, and 014 to decide which type of move to make. Output 302 (X0 at the PLC) is high when the DS controller is ready, and low when it is moving. The SEL program looks like this:

C:\SELWIN\JUSTIN1.PRG

06/02/08 17:12 06/02/08 17:12 P 1

Ns	Step	A/O Cond	Cmnd	Operand	1	Operand	2	Pst	Comment
1 1	1 2		BTOF SVON	302 1					Tell PLC not rdy Servo on
1	3		ACC	1					Set accel
1	4		VEL	150					Set Velocity
1	5		HOME	1					Go Home
1	6		BTON	302					Signal PLC ready
1	7		TAG	1					Return for loop
1	8		WTON	11					Wait for PLC Go
1	9		IN	12		14			Read move # bits
1	10		BTOF	302					Signal PLC moving
2	11		IFEQ	99		1			Is 012 true?
2	12		MOVP	1					Move pos 1 (5mm)
1	13		EDIF						
2	14		IFEQ	99		2			Is 013 true?
2	15		MVPI	3					Increment by 1mm
1	16		EDIF						
2	17		IFEQ	99		4			Is 014 true?
2	18		MOVP	2					Move pos 2 (20mm)
1	19		EDIF						
1	20		BTON	302					Tell plc ready
1	21		WTOF	11					Be sure plc saw it
1	22		GOTO	1					Repeat to tag 1



Note that we could have just as well used Y1=0, Y2=0 to indicate position 1, Y1=1, Y2=0 to indicate position 2, and Y1=0, Y2=1 to indicate position 3. In that case, the SEL program would do IFEQ 99 0 for position 1, IFEQ 99 1 for position 2, and IFEQ 99 2 for position 3.



