

# VXM Stepping Motor Controller

## Application Note # AN109

### Coil Winding with VXM-1-1, VXM-3, VXM-4

Two VXM controllers in a bussed configuration (VXM1-1, VXM-3, VXM-4) have the capability to do highly coordinated motion. An application for winding wire or filament on a spool requires speed/start/stop coordination between spool RPM and traverse speed.

Using the send data to Slave command ([*command*,...]) and program associate command (PMAx) the VXM can start two motors simultaneously running at different speeds. Refer to Appendix G in the VXM User's Manual for more information.

With the U65 and U66 commands (Master Stop/Kill Slave\*) it is possible to accomplish a coordinated stop over long distances and time without calculating distances at speeds to exact ratios.

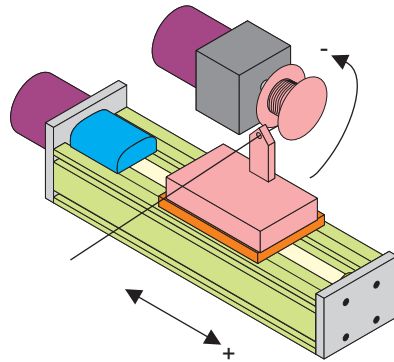
### Master Stop Slave Commands\*

**U65** Decelerate motor on Slave to a stop.  
Memory usage = **2 bytes**.

**U66** Kill operation on Slave. This command will immediately interrupt any running program. The user outputs will be reset, all looping and hold flags will be reset, and if a motor is moving it will be stopped immediately. If the motor speed is above 1000 steps/sec. when the interrupt occurs, the motor may lose position due to mechanical overshoot.  
Memory usage = **2 bytes**.

### Materials Needed:

1. Motor driven linear traverse for wire guiding
2. Constant tensioner for wire and wire guide arm
3. Step motor with gear reduction for spool rotation



Gear motor distance/speed is determined by these formulas:  
 $Rev/sec = Steps/sec \div (400 \times gear\ ratio)$       $Steps/sec = Rev/sec \times (400 \times gear\ ratio)$   
 $Revolutions = Steps \div (400 \times gear\ ratio)$       $Steps = Revolutions \times (400 \times gear\ ratio)$

Refer to "Units & Directions" in the VXM User's Manual for information on linear traverse units.

The example below assumes the winding motor is motor 3 (gear motor rotating spool.)

Example #1	Motors run	Function
Mtr 1 Traverse Coordinated to Mtr 3 Rotation	2	Motors 1 and 3 start/run/stop same time Traverse stops Rotation at end

```
E
PMA0,          ;Set Program Associate Master/Slave to program 0
PM-0,          ;Select and clear program 0 (Traverse)
A1M5,S1M3000,  ;set Acceleration and Speed (Traverse)
LM0,           ;set Loop Marker here
I1M6000,       ;Traverse Positive 6000 steps
LA-10,         ;Run out and back 10x
U65,           ;Decelerate Mtr 3 (Rotation) to a stop
;Next is Accel, Speed and a negative Continuous run on Mtr 3
[PM-0,A1M5,S1M800,LM0,U77,I1M-16000000,L0,]
```

The example below assumes the winding motor is motor 1

Example #2	Motors run	Function
Mtr 3 Traverse Coordinated to Mtr 1 Rotation	2	Motors 1 and 3 start/run/stop same time Rotation stops Traverse at end

```
E
PMA0,          ;Set Program Associate Master/Slave to program 0
PM-0,          ;Select and clear program 0 (Rotation)
A1M5,S1M800,   ;set Acceleration and Speed (Rotation)
I1M-15000000, ;Rotate Negative 15000000 steps
U65,           ;Decelerate Mtr 3 (Traverse) to a stop
;Next is Accel, Speed and Alternating Continuous Traverse
[PM-0,A1M5,S1M3000,LM0,I1M6000,I1M-6000,L0,]
```

7550 State Route 5 & 20  
 Bloomfield, NY 14469 USA  
 www.velmex.com

