14. Trouble Shooting Guide

14.1 LED Status Display

The 7 segment status display on the front panel of *SmartMove* provides an indication of the move which is in progress and any error conditions. For two and three axis controllers, a flashing dot indicates an error condition.

Motion Status:

Display	Meaning
-	Servo power off
0	Servo powered up & idle
c	Cam profiling
c	Cam table (superscript)
C	Circular interpolation
E	Encoder following mode
F	Flying shear (no flashing dot)
H	Homing (datuming)
J	Jogging (velocity) mode
o	Offset mode
P	Linear positional move
q	Torque control mode
S	Stop asserted
U	Pulse following mode

Error Status:

Display	Meaning
E	External error, typically generated by the drive.
E	Software abort or interpreter error
F	Max following error exceeded
L	Limit switch open
o	Digital outputs short circuit or over current.

14.2 Trouble Shooting

Symptom	Check
Status display blank and controller not functioning.	• Check the power supply (18Vac or 24V dc) is connected and switched on.
Status display shows S.	• Check stop switch input is correctly wired and has power applied
Status display shows L.	• Check limit switch input is correctly wired has power applied
	• Check that opto-isolator supply (UP) is connected.
Cannot communicate with controller over RS232 port (cannot get **P>** or **C>** prompt by pressing return.)	• Verify that the terminal emulator program is loaded and set-up correctly.
	• Check that the terminal emulator program is configured for the correct serial port (**COM1** or **COM2**) and that the lead is plugged in both ends.
	• Confirm that a mouse driver or other serial device is not conflicting with *cTERM*
	• Check wiring for RS232 lead.
	• Check that there is not a program ready running on the controller (type **[Ctrl]+[E]** to abort the program).
	• Check that the MINT Comms Protocol is not running.
	• Check that the controller card is not an RS485 model. If a RS485 controller is used, confirm that the RS232 to RS485 converter is working correctly.
	• For RS485 devices, check that the correct card has been selected (using $).

Symptom	Check
Controller appears to be powered-up and working but will not cause motors to turn over.	• Check that the connections between motor and controller are correct. (Type **`TQ[0,1,2] = 100`**; to set all axis numbers to +10V and verify that this voltage appears on the **demand/command** input to the servo drive - remember to ensure that the motors will not cause any physical damage when doing this). • Ensure that the servo drive is enabled and working when the controller is not in error. (When the controller is first powered up the servo drives should be disabled if there is no program loaded for automatic execution (there is often an LED on the front of the drive to indicate status). Typing **`RESET`** at the **`C>`** prompt should cause the drives to be enabled.) • Check that *Configuration buffer* is loaded into controller and has been **`RUN`**, or that the servo loop gains are correctly set-up. (Type **`PRINT GN`** to verify that the controller proportional gain is no zero and refer to servo-system set-up).
Motor runs off uncontrollably when controller is switched on (Status display shows an 8).	• Check that encoders are connected to controller and are functioning correctly. (Use a dual trace oscilloscope to display both channels of the encoder simultaneously). • Check that servo drives are connected correctly to controller and that with zero demand there is 0V at the drive **demand/command** input. (Type **`SO[0,1,2]`** to set all **demand/command** outputs to 0V and verify that this voltage appears at the output from the controller. A voltage of +10V or -10V indicates that the controller analog output is damaged.) • Verify that the servo drives are correctly set-up and that the motor does not move with 0V on the **demand/command** input. • Verify that the controller and servo drive are correctly grounded to a common ground point.

Symptom	Check
Motor runs off uncontrollably when controller is switched on and servo loop gains are applied or a when move is set in progress, motor then stops after a short time and status display shows an F.	• Check that encoder 0 and **demand 0/command 0 D0** are connected to the same axes of motion; repeat for axis 1 and 2. • Check servo drive connection is correct with respect to polarity of servo drive demand/command. (Try swapping the **+demand/command+** and **-demand/-command** connections to the servo drive; note: this is not possible with some servo drives due to ground reference problems in which case you need to swap the encoder channels A and B.) • Check maximum following error is set to a reasonable value. (F indicates maximum following error exceeded; for setting up the maximum following error should be set to a high value. Type **`MF[0,1,2] = 16000`**; to set all axes to maximum following error of 16000 encoder counts.)
Motor is under control, but vibrates or overshoots during a move.	• Servo loop gains may be set too high. (Go through the servo system set-up procedure to establish correct gains.)

Symptom	Check
Motor is under control, but when moved to a position and back to start does not return to the same position.	• Check that the encoders channels A and B are clean signals and that they are correctly wired to the controller. (Use a dual trace oscilloscope to display both channels of the encoder at the controller back plane. Verify that when the motor turns, the two square wave signals are 90 degrees out of phase.) • Check that the encoder signal is free from electrical noise. Use the oscilloscope as above – verify that the complimentary outputs on the encoder (if fitted) are correctly wired. • If single ended encoders are fitted to the motors and the signals are noisy, try re-routing the encoder cables to avoid any source of electrical noise (notably the motor power leads). If this fails, the only solution may be to fit encoders with differential line driver outputs. • Ensure that the encoder leads use screened/shielded cable and that the screen/shield is attached to the screen connection on the encoder plug **at the controller end only.**) • Verify that the controller and servo drive are correctly grounded to a common ground point.