



“Plus” Version Firmware refers to the optional version 4.76 or later.  
 It incorporates Fail-Safe Hardware Limit Switch Inputs as well as Software Interrupt limits.

**The Hardware Limit inputs are Active-High-Asserted Only and cannot be made Active Low!**

This means that when the voltage on Pin 3 (Port C) or Pin 4 (Port D) reaches a logic level 1 (>~2.5VDC) the processor will see it as an active limit input and stop the motor.

**Note: There is an internal 5Kohm pull-up resistor on all I/O pins.**

When the limit inputs are grounded, the processor will not see active limits and the motor will be allowed to move.

Should either or both of the limits become active, the associated real-time bits **and** historical bits will be set. The motor **will not** be allowed to move until the associated historical bit that was set is cleared.

The chart below covers limit switch input ports and their associated status bits and command to clear them.

**The Limit switches are directional.**

If the positive limit (Port C) is active, the motor will be prevented from moving in the positive direction.

If the Historical bit is cleared via the **ZS** or **Zr** command, the motor will be allowed to move in the negative direction only so as to move clear of the limit switch.

If the negative limit (Port D) is active, the motor will be prevented from moving in the negative direction.

If the Historical bit is cleared via the **ZS** or **ZI** command, the motor will be allowed to move in the positive direction only so as to move clear of the limit switch.

**IF Motor movement is desired but no limit switches are connected to the motor, the limit switch inputs must be disabled.**

To disable the Positive limit switch (Port C), issue the command **UCI**.  
 To re-enable it as a limit switch input issue the command **UCP**

To disable the Negative limit switch (Port D), issue the command **UDI**.  
 To re-enable it as a limit switch input issue the command **UDM**

Port	Pos/Neg	Plus/Minus	Left/Right	Status Bits		Command to	Command to	Command to
				Real Time	Historical	Clear Historical Bit	Disable Limit Input	Enable limit input
Port C	Positive	PLUS	RIGHT	Br	Bp	Zr, or ZS	UCI or UCO	UCP
Port D	Negative	MINUS	LEFT	Bl	Bm	ZI, or ZS	UDI or UDO	UDM

Note: Use of **UCO** or **UDO** commands set the ports as Digital Outputs. Be aware that the ports can actively be driven to 5VDC or 0VDC with the following commands:

- UC=0 'set Port C to Zero Volts
- UC=1 'set Port C to 5VDC
- UD=0 'set Port D to Zero Volts
- UD=1 'set Port D to 5VDC

Use Normally-Closed or NPN “sinking” type Limits switches.  
 Normally-Closed Switches should be connected as shown:

**Software Limits Example:**

- SLD 'disable soft limits
- SLP=20000 'set positive soft limit
- SLN=-500 'set negative soft limit
- SLE 'enable soft limits
- 'Once enabled, they trigger the same Status bits
- 'as do hardware limits.
- 'They should be disabled prior to changing, then re-enabled.

