

# SLAVE\_F\_TO\_Z Module Operation (FTP firmware)

Controllers with the SLAVE\_F\_TO\_Z module facilitates use of a master/slave set of motorized axes. When the master axis is moved or adjusted then the slave axis is correspondingly changed automatically. The user should almost always interact with the master axis so that the two axes remain synchronized. During setup it may be helpful to interact with the slave axis to get them mechanically aligned.

## Supported Commands with Slave Separate

For these commands, moves or changes to the master axis will be applied to the slave axis automatically but not vice versa. It is possible to change only the slave axis by sending commands to it.

- [MOVE](#)
- [MOVREL](#)
- [HERE](#)

MS-2000 v9.55 and Tiger v3.54 added additional slave separate commands:

- [AALIGN](#)
- [KA](#)
- [KD](#)
- [KI](#)
- [KP](#)
- [KV](#)

## Supported Commands with Mirror Behavior

For these commands, changes made to either axis will be copied to the other one.

- [SPEED](#)
- [ACCEL](#)
- [CNTS](#)
- [WAIT](#)
- [MOTCTRL](#)
- [MAINTAIN](#)
- [EPOLARITY](#)
- [HALT](#) (\) because all axes are affected
- [ZERO](#) serial command and [ZERO](#) BUTTON because all axes are affected
- [HOME](#) button because all axes are affected
- In most situations the [CUSTOMA](#) commands are implicitly supported because they will apply to the system, e.g. all Z leadscrews are set together

MS-2000 v9.55 and Tiger v3.54 added additional mirrored commands:

- OS
- ERROR
- PCROS
- BACKLASH



**Note:** The mirror behavior of the CNTS, EPOLARITY, MAINTAIN, and WAIT commands had a bug where setting any axis would also set both FTP axes to that value. For example, WT X=10 would also set the Z and F axes to 10. This **only applies to the MS-2000** and was **fixed in v9.55**.

## Supported Events

- Limits: when one axis reaches one of its hardware (magnet) or software limit a mirror event is also triggered on the other axis too.
- AXIS enabled/disabled. When one of the axes is enabled /disabled either due to user command or controller action (e.g. move error), the other axis is also enabled/disabled.
- KNOB and PEDAL actions are supported
- JOYSTICK actions are supported as of Tiger v3.32 but not previously (very rare situation, normally on wheel)

## Unsupported Commands

Make note that these following commands are not supported:

- Software Limits SU and SL. Changing one axis software limit position will not alter the axis software limit position. However, both axes will stop when a limit is encountered on either one.
- SPIN. Spin command will only move the commanded axis only. This is may aid during installations but otherwise should never be used on slaved axes because the motors are running in “open loop” without any position feedback.

## Supported Modules

- AUTOFOCUS
- CRISP
- PEDALS
- TTL i.e. IN0\_INTERRUPT

## Aligning/Synchronizing

- Use the MOVE F=# or MOVREL F=# serial command to move the F axis to the desired position

without affecting Z axis's position. This should not be used routinely, only to achieve initial alignment if needed.

- Once aligned and synchronized use the [HERE command](#), [ZERO command](#) or button to zero the positions. From then on, F axis will move identical to Z axis.
- When encountering limit magnets, one of the axes will detect the limit and halt the motion of the other axis. Temporarily there might be a slight mismatch which is rarely noticeable, and when moving back into the normal operation range they will synchronize again. Do not use the HERE or ZERO command or zero button in this state because then you will “lock in” any slight deviation. Similarly, if the pair of stages ever disable themselves due to a mechanical crash or other event, do not use the HERE or ZERO command or zero button until you have moved the Z axis (really both of them) back to a normal state.

[tech note](#), [ftp](#), [tiger](#), [ms2000](#)

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