Multiple Micro-controller Homing and Probing

Klipper supports a mechanism for homing with an endstop attached to one micro-controller while its stepper motors are on a different micro-controller. This support is referred to as "multi-mcu homing". This feature is also used when a Z probe is on a different micro-controller than the Z stepper motors.

This feature can be useful to simplify wiring, as it may be more convenient to attach an endstop or probe to a closer micro-controller. However, using this feature may result in "overshoot" of the stepper motors during homing and probing operations.

The overshoot occurs due to possible message transmission delays between the micro-controller monitoring the endstop and the micro-controllers moving the stepper motors. The Klipper code is designed to limit this delay to no more than 25ms. (When multi-mcu homing is activated, the micro-controllers send periodic status messages and check that corresponding status messages are received within 25ms.)

So, for example, if homing at 10mm/s then it is possible for an overshoot of up to 0.250mm (10mm/s * .025s == 0.250mm). Care should be taken when configuring multi-mcu homing to account for this type of overshoot. Using slower homing or probing speeds can reduce the overshoot.

Stepper motor overshoot should not adversely impact the precision of the homing and probing procedure. The Klipper code will detect the overshoot and account for it in its calculations. However, it is important that the hardware design is capable of handling overshoot without causing damage to the machine.

Should Klipper detect a communication issue between micro-controllers during multi-mcu homing then it will raise a "Communication timeout during homing" error.

Note that an axis with multiple steppers (eg, `stepper_z` and `stepper_z1`) need to be on the same micro-controller in order to use multi-mcu homing. For example, if an endstop is on a separate micro-controller from `stepper_z` then `stepper_z1` must be on the same micro-controller as `stepper_z`.