Application Note

Homing with MEI Motion Card and ASIC-100

This application note explains a correct method of homing one or more axes using MEI motion controller with ASIC-100 software. Homing is a way to establish a reference position for the motion when an incremental position feedback device is used, such as an incremental encoder.

Homing Configuration

Homing configuration has five parameters that a user needs to set in the ASIC-100 configuration. These parameters are Home Speed, Home Position, Home Direction, Home Limit Switch Level, and Home Index Pulse. This application note assumes that you have a closed loop configuration with an incremental encoder for each of the motors.

Home Speed: This is the speed at which the axis will move toward home whenever the home jog is selected. The units of this parameters are the same as the velocity (feedrate) units for that axis. For example, 20 in/sec, 100 rev/sec, and so on.

Home Position: This is the position that is assumed by an axis when homing is complete and the axis has stopped. This parameter has the same unit as position unit for that axis. Remember that this is not the same as the motor position. This parameter sets the axis position. For example, 0 in, 100 rev, 25 cm, and so on.

Home Direction: This is the direction in which the homing will be performed. When an axis is commanded to move to the home position, the motor will start to turn in this direction looking for a home switch and/or index pulse. When it finds the home switch and/or index pulse, it will stop. Be sure to choose the correct direction if you have a linear axis. The machine must be able to move back and forth if the homing is done on a linear axis. For a rotary axis, homing can be done in clockwise (positive) or counter-clockwise (negative) direction. When commanded to home, the direction of the jog command is ignored.

Home Limit Switch Level: This is the polarity (active high or active low) of a physical home switch. Active high for MEI card is +5 VDC and Active low is 0 VDC. This switch should be wired according to *DSP-Series Motion Controller Installation Manual*. This home switch can be a dry contact limit switch, a proximity sensor, a photo eye, and so on.

Home Index Pulse: Home index pulse is a way to get accuracy in home position. While a home limit switch provides uniqueness to the home position, the home index pulse provides accuracy and repeatability of the position. This is the best alternative with the MEI card. A combination of home limit switch and home index pulse can provide a very accurate home position. The home index pulse also has a polarity, which is active high or active low.

It is important to note that MEI specifies homing parameters in the group of 4 axes (0 to 3 and 4 to 7). This will mean that the last changes for any of the four axis will over-write the rest of the axes in that group. This is particularly important if you intend to use some axis in a group without index pulse and the rest of them with index pulse or some axis with home switch and some without home switch.

If at least one of the axis uses active high index pulse and remaining axes do not, index pulse should be pulled to high through a 2.2 KΩ resister by wiring it between $Index^{+}$ and +5 VDC on the MEI connector for the axes that do not use index pulse. Similarly, if at least one of the axes uses active low index pulse, rest of the axes should be pulled to 0 VDC by hard wiring it to the MEI ground.

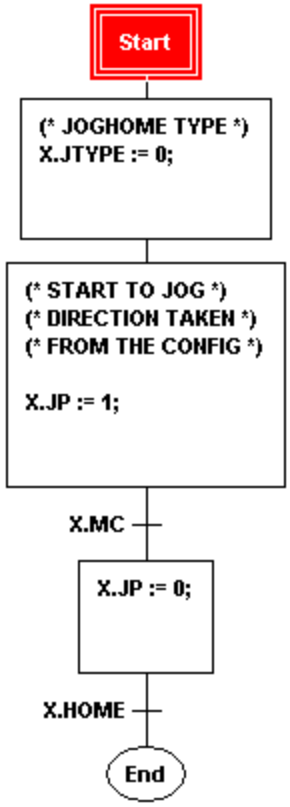
Remember that the homing switch mentioned here is connected to the dedicated home input for each axis on the MEI card. And because of this, the homing is completely handled by the card itself instead of the driver. This means that when an axis is commanded to home from ASIC-100, it will stop upon finding the home switch even if no motion programs are running under ASIC-100 but the runtime is running. Of course, the axis has to be configured first to perform homing.

Following are the valid combinations of the home switch and index –pulse on a per axis-group basis:

#	**Home Switch Choice**	**Index Pulse Choice**	**Description**
1	LOW LEVEL	HOME ONLY	Using active low home switch only
2	HIGH LEVEL	HOME ONLY	Using active high home switch only
3	INDEX PULSE ONLY	HIGH LEVEL	Using active high index pulse only
4	INDEX PULSE ONLY	LOW LEVEL	Using active low index pulse only
5	LOW LEVEL	HIGH LEVEL	Using active low home switch and active high index pulse
6	HIGH LEVEL	HIGH LEVEL	Using active high home switch and active high index pulse
7	INDEX PULSE ONLY	HOME ONLY	Not using either one – Homing will not be executed

Application Code for Homing Axes Sequentially

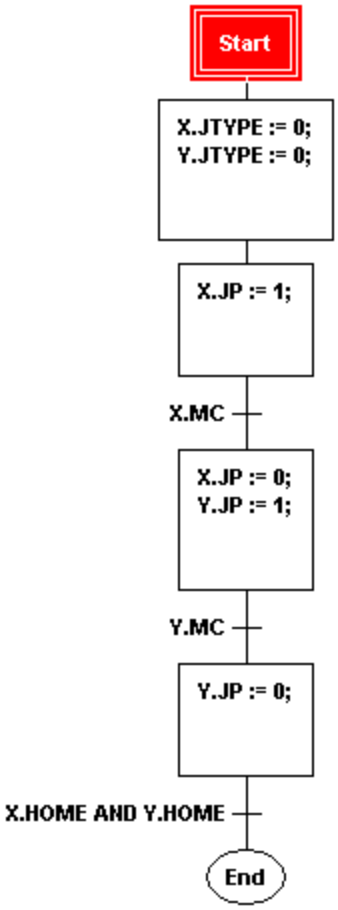
Homing One Axes



<axis>.MC becomes TRUE when the home motion is complete. <axis>.HOME becomes TRUE when the physical home switch AND/OR index pulse is found AND <axis>.JP is set to FALSE.

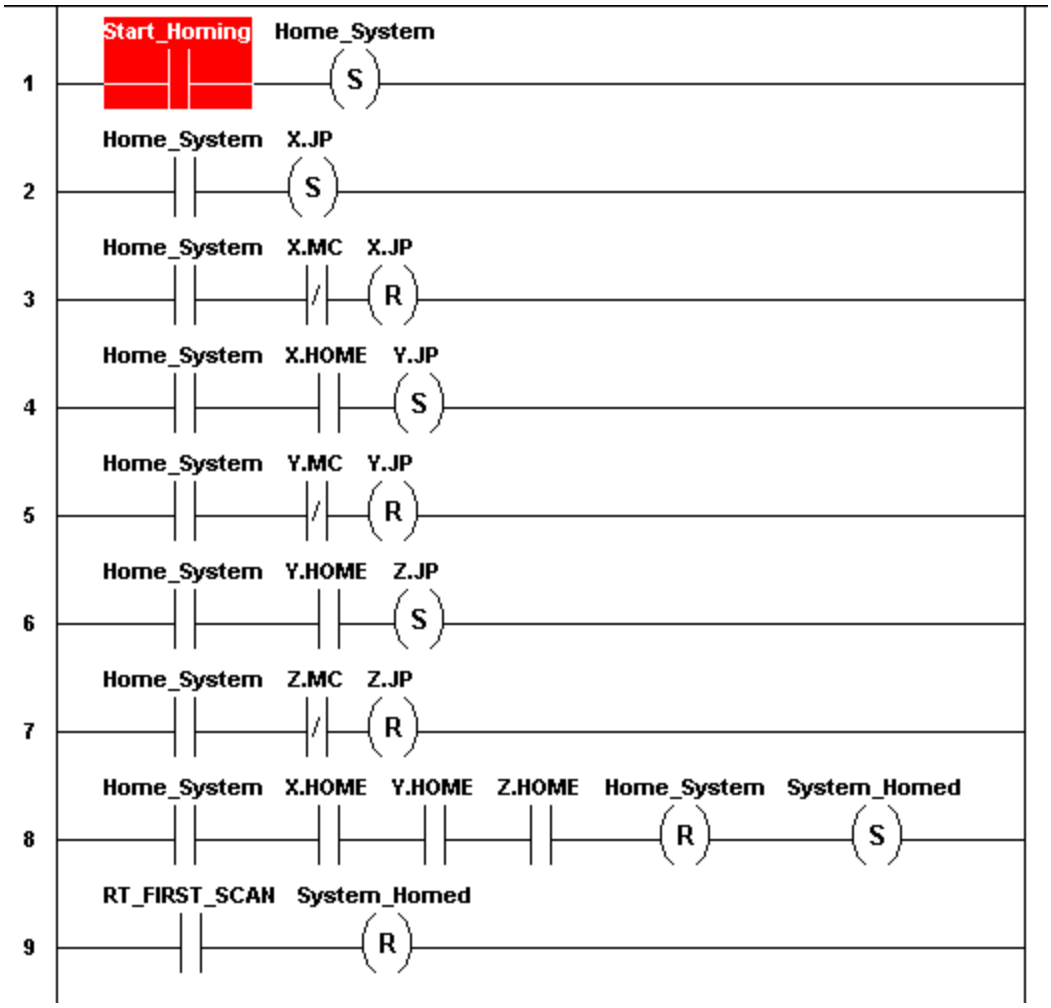
After homing is completed successfully, the program should be able to make other motion moves as desired using G-Codes or structured text motion functions.

Homing Two Axes (Can be applied to more axes in a similar fashion)



If you wish to use relay ladder logic to perform homing, you can follow the example on the next page.

Homing Three Axes (Can be expanded for more axes in a similar fashion)



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