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# Erstellt von PNCconf am Mon Aug 26 07:49:46 2024
# Using LinuxCNC version:  2.8
# Änderungen an dieser Datei werden beim nächsten
# overwritten when you run PNCconf again

loadrt [KINS]KINEMATICS
loadrt [EMCMOT]EMCMOT servo_period_nsec=[EMCMOT]SERVO_PERIOD
num_joints=[KINS]JOINTS
loadrt hostmot2
loadrt hm2_eth board_ip="192.168.1.121" config="num_encoders=1 num_pwmgens=1
num_stepgens=5 sserial_port_0=0xxxxx"
setp    hm2_7i96s.0.pwmgen.pwm_frequency 20000
setp    hm2_7i96s.0.pwmgen.pdm_frequency 6000000
setp    hm2_7i96s.0.watchdog.timeout_ns 5000000
loadrt pid names=pid.x,pid.y,pid.z,pid.s

addf hm2_7i96s.0.read          servo-thread
addf motion-command-handler   servo-thread
addf motion-controller        servo-thread
addf pid.x.do-pid-calcs       servo-thread
addf pid.y.do-pid-calcs       servo-thread
addf pid.z.do-pid-calcs       servo-thread
addf pid.s.do-pid-calcs       servo-thread
addf hm2_7i96s.0.write         servo-thread

# ---Chargepump StepGen: 0.25 velocity = 10Khz square wave output---

setp   hm2_7i96s.0.stepgen.04.dirsetup        100
setp   hm2_7i96s.0.stepgen.04.dirhold         100
setp   hm2_7i96s.0.stepgen.04.steplen         100
setp   hm2_7i96s.0.stepgen.04.stepspace       100
setp   hm2_7i96s.0.stepgen.04.position-scale  10000
setp   hm2_7i96s.0.stepgen.04.step_type       2
setp   hm2_7i96s.0.stepgen.04.control-type    1
setp   hm2_7i96s.0.stepgen.04.maxaccel        0
setp   hm2_7i96s.0.stepgen.04.maxvel          0
setp   hm2_7i96s.0.stepgen.04.velocity-cmd    0.25

net x-enable                                 => hm2_7i96s.0.stepgen.04.enable

# external output signals

# --- SPINDLE-ENABLE ---
net spindle-enable  =>     hm2_7i96s.0.ssr.00.out-00

# --- COOLANT-FLOOD ---
net coolant-flood  =>     hm2_7i96s.0.ssr.00.out-01


# external input signals

# --- HOME-X ---
net home-x     <=  hm2_7i96s.0.inm.00.input-00

# --- HOME-Y ---
net home-y     <=  hm2_7i96s.0.inm.00.input-01

# --- HOME-Z ---
net home-z     <=  hm2_7i96s.0.inm.00.input-02

# --- HOME-A ---
net home-a     <=  hm2_7i96s.0.inm.00.input-03

# --- ESTOP-EXT ---
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net estop-ext     <=  hm2_7i96s.0.inm.00.input-04

# --- PROBE-IN ---
net probe-in      <=  hm2_7i96s.0.inm.00.input-05


#*******************
#  AXIS X JOINT 0
#*******************

setp   pid.x.Pgain     [JOINT_0]P
setp   pid.x.Igain     [JOINT_0]I
setp   pid.x.Dgain     [JOINT_0]D
setp   pid.x.bias      [JOINT_0]BIAS
setp   pid.x.FF0       [JOINT_0]FF0
setp   pid.x.FF1       [JOINT_0]FF1
setp   pid.x.FF2       [JOINT_0]FF2
setp   pid.x.deadband  [JOINT_0]DEADBAND
setp   pid.x.maxoutput [JOINT_0]MAX_OUTPUT
setp   pid.x.error-previous-target true
# This setting is to limit bogus stepgen
# velocity corrections caused by position
# feedback sample time jitter.
setp   pid.x.maxerror 0.012700

net x-index-enable  => pid.x.index-enable
net x-enable        =>  pid.x.enable
net x-pos-cmd       =>  pid.x.command
net x-pos-fb        =>  pid.x.feedback
net x-output        <=  pid.x.output

# Step Gen signals/setup

setp   hm2_7i96s.0.stepgen.00.dirsetup        [JOINT_0]DIRSETUP
setp   hm2_7i96s.0.stepgen.00.dirhold         [JOINT_0]DIRHOLD
setp   hm2_7i96s.0.stepgen.00.steplen         [JOINT_0]STEPLEN
setp   hm2_7i96s.0.stepgen.00.stepspace       [JOINT_0]STEPSPACE
setp   hm2_7i96s.0.stepgen.00.position-scale  [JOINT_0]STEP_SCALE
setp   hm2_7i96s.0.stepgen.00.step_type        0
setp   hm2_7i96s.0.stepgen.00.control-type     1
setp   hm2_7i96s.0.stepgen.00.maxaccel         [JOINT_0]STEPGEN_MAXACCEL
setp   hm2_7i96s.0.stepgen.00.maxvel           [JOINT_0]STEPGEN_MAXVEL

# ---closedloop stepper signals---

net x-pos-cmd    <= joint.0.motor-pos-cmd
net x-vel-cmd    <= joint.0.vel-cmd
net x-output     => hm2_7i96s.0.stepgen.00.velocity-cmd
net x-pos-fb     <= hm2_7i96s.0.stepgen.00.position-fb
net x-pos-fb     => joint.0.motor-pos-fb
net x-enable     <= joint.0.amp-enable-out
net x-enable     => hm2_7i96s.0.stepgen.00.enable

# ---setup home / limit switch signals---

net home-x     =>  joint.0.home-sw-in
net x-neg-limit     =>  joint.0.neg-lim-sw-in
net x-pos-limit     =>  joint.0.pos-lim-sw-in

#*******************
#  AXIS Y JOINT 1
#*******************

setp   pid.y.Pgain     [JOINT_1]P
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setp   pid.y.Igain     [JOINT_1]I
setp   pid.y.Dgain     [JOINT_1]D
setp   pid.y.bias      [JOINT_1]BIAS
setp   pid.y.FF0       [JOINT_1]FF0
setp   pid.y.FF1       [JOINT_1]FF1
setp   pid.y.FF2       [JOINT_1]FF2
setp   pid.y.deadband  [JOINT_1]DEADBAND
setp   pid.y.maxoutput [JOINT_1]MAX_OUTPUT
setp   pid.y.error-previous-target true
# This setting is to limit bogus stepgen
# velocity corrections caused by position
# feedback sample time jitter.
setp   pid.y.maxerror 0.012700

net y-index-enable  => pid.y.index-enable
net y-enable        =>  pid.y.enable
net y-pos-cmd       =>  pid.y.command
net y-pos-fb        =>  pid.y.feedback
net y-output        <=  pid.y.output

# Step Gen signals/setup

setp   hm2_7i96s.0.stepgen.01.dirsetup        [JOINT_1]DIRSETUP
setp   hm2_7i96s.0.stepgen.01.dirhold         [JOINT_1]DIRHOLD
setp   hm2_7i96s.0.stepgen.01.steplen         [JOINT_1]STEPLEN
setp   hm2_7i96s.0.stepgen.01.stepspace       [JOINT_1]STEPSPACE
setp   hm2_7i96s.0.stepgen.01.position-scale  [JOINT_1]STEP_SCALE
setp   hm2_7i96s.0.stepgen.01.step_type        0
setp   hm2_7i96s.0.stepgen.01.control-type     1
setp   hm2_7i96s.0.stepgen.01.maxaccel         [JOINT_1]STEPGEN_MAXACCEL
setp   hm2_7i96s.0.stepgen.01.maxvel           [JOINT_1]STEPGEN_MAXVEL

# ---closedloop stepper signals---

net y-pos-cmd    <= joint.1.motor-pos-cmd
net y-vel-cmd    <= joint.1.vel-cmd
net y-output     => hm2_7i96s.0.stepgen.01.velocity-cmd
net y-pos-fb     <= hm2_7i96s.0.stepgen.01.position-fb
net y-pos-fb     => joint.1.motor-pos-fb
net y-enable     <= joint.1.amp-enable-out
net y-enable     => hm2_7i96s.0.stepgen.01.enable

# ---setup home / limit switch signals---

net home-y     =>  joint.1.home-sw-in
net y-neg-limit     =>  joint.1.neg-lim-sw-in
net y-pos-limit     =>  joint.1.pos-lim-sw-in

#*******************
#  AXIS Z JOINT 2
#*******************

setp   pid.z.Pgain     [JOINT_2]P
setp   pid.z.Igain     [JOINT_2]I
setp   pid.z.Dgain     [JOINT_2]D
setp   pid.z.bias      [JOINT_2]BIAS
setp   pid.z.FF0       [JOINT_2]FF0
setp   pid.z.FF1       [JOINT_2]FF1
setp   pid.z.FF2       [JOINT_2]FF2
setp   pid.z.deadband  [JOINT_2]DEADBAND
setp   pid.z.maxoutput [JOINT_2]MAX_OUTPUT
setp   pid.z.error-previous-target true
# This setting is to limit bogus stepgen
# velocity corrections caused by position
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# feedback sample time jitter.
setp   pid.z.maxerror 0.012700

net z-index-enable  => pid.z.index-enable
net z-enable        =>  pid.z.enable
net z-pos-cmd       =>  pid.z.command
net z-pos-fb        =>  pid.z.feedback
net z-output        <=  pid.z.output

# Step Gen signals/setup

setp   hm2_7i96s.0.stepgen.02.dirsetup        [JOINT_2]DIRSETUP
setp   hm2_7i96s.0.stepgen.02.dirhold         [JOINT_2]DIRHOLD
setp   hm2_7i96s.0.stepgen.02.steplen         [JOINT_2]STEPLEN
setp   hm2_7i96s.0.stepgen.02.stepspace       [JOINT_2]STEPSPACE
setp   hm2_7i96s.0.stepgen.02.position-scale  [JOINT_2]STEP_SCALE
setp   hm2_7i96s.0.stepgen.02.step_type        0
setp   hm2_7i96s.0.stepgen.02.control-type     1
setp   hm2_7i96s.0.stepgen.02.maxaccel         [JOINT_2]STEPGEN_MAXACCEL
setp   hm2_7i96s.0.stepgen.02.maxvel           [JOINT_2]STEPGEN_MAXVEL

# ---closedloop stepper signals---

net z-pos-cmd    <= joint.2.motor-pos-cmd
net z-vel-cmd    <= joint.2.vel-cmd
net z-output     => hm2_7i96s.0.stepgen.02.velocity-cmd
net z-pos-fb     <= hm2_7i96s.0.stepgen.02.position-fb
net z-pos-fb     => joint.2.motor-pos-fb
net z-enable     <= joint.2.amp-enable-out
net z-enable     => hm2_7i96s.0.stepgen.02.enable

# ---setup home / limit switch signals---

net home-z     =>  joint.2.home-sw-in
net z-neg-limit     =>  joint.2.neg-lim-sw-in
net z-pos-limit     =>  joint.2.pos-lim-sw-in

#*******************
#  SPINDLE
#*******************

setp   pid.s.Pgain     [SPINDLE_0]P
setp   pid.s.Igain     [SPINDLE_0]I
setp   pid.s.Dgain     [SPINDLE_0]D
setp   pid.s.bias      [SPINDLE_0]BIAS
setp   pid.s.FF0       [SPINDLE_0]FF0
setp   pid.s.FF1       [SPINDLE_0]FF1
setp   pid.s.FF2       [SPINDLE_0]FF2
setp   pid.s.deadband  [SPINDLE_0]DEADBAND
setp   pid.s.maxoutput [SPINDLE_0]MAX_OUTPUT
setp   pid.s.error-previous-target true

net spindle-index-enable  => pid.s.index-enable
net spindle-enable        =>  pid.s.enable
net spindle-vel-cmd-rpm-abs     => pid.s.command
net spindle-vel-fb-rpm-abs      => pid.s.feedback
net spindle-output        <=  pid.s.output

# ---setup spindle control signals---

net spindle-vel-cmd-rps        <=  spindle.0.speed-out-rps
net spindle-vel-cmd-rps-abs    <=  spindle.0.speed-out-rps-abs
net spindle-vel-cmd-rpm        <=  spindle.0.speed-out
net spindle-vel-cmd-rpm-abs    <=  spindle.0.speed-out-abs
```

```
net spindle-enable             <=  spindle.0.on
net spindle-cw                 <=  spindle.0.forward
net spindle-ccw                <=  spindle.0.reverse
net spindle-brake              <=  spindle.0.brake
net spindle-revs               =>  spindle.0.revs
net spindle-at-speed           =>  spindle.0.at-speed
net spindle-vel-fb-rps         =>  spindle.0.speed-in
net spindle-index-enable      <=>  spindle.0.index-enable

# ---Setup spindle at speed signals---

sets spindle-at-speed true


#*****************************
# connect miscellaneous signals
#*****************************

#  ---HALUI signals---

net axis-select-x  halui.axis.x.select
net jog-x-pos      halui.axis.x.plus
net jog-x-neg      halui.axis.x.minus
net jog-x-analog   halui.axis.x.analog
net x-is-homed     halui.joint.0.is-homed
net axis-select-y  halui.axis.y.select
net jog-y-pos      halui.axis.y.plus
net jog-y-neg      halui.axis.y.minus
net jog-y-analog   halui.axis.y.analog
net y-is-homed     halui.joint.1.is-homed
net axis-select-z  halui.axis.z.select
net jog-z-pos      halui.axis.z.plus
net jog-z-neg      halui.axis.z.minus
net jog-z-analog   halui.axis.z.analog
net z-is-homed     halui.joint.2.is-homed
net jog-selected-pos      halui.axis.selected.plus
net jog-selected-neg      halui.axis.selected.minus
net spindle-manual-cw     halui.spindle.0.forward
net spindle-manual-ccw    halui.spindle.0.reverse
net spindle-manual-stop   halui.spindle.0.stop
net machine-is-on         halui.machine.is-on
net jog-speed             halui.axis.jog-speed
net MDI-mode              halui.mode.is-mdi

#  ---coolant signals---

net coolant-mist      <=  iocontrol.0.coolant-mist
net coolant-flood     <=  iocontrol.0.coolant-flood

#  ---probe signal---

net probe-in     =>  motion.probe-input

#  ---motion control signals---

net in-position              <=  motion.in-position
net machine-is-enabled       <=  motion.motion-enabled

#  ---digital in / out signals---

#  ---estop signals---

net estop-out     <=  iocontrol.0.user-enable-out
net estop-ext     =>  iocontrol.0.emc-enable-in
```

```
#  ---manual tool change signals---

loadusr -W hal_manualtoolchange
net tool-change-request     iocontrol.0.tool-change       =>
hal_manualtoolchange.change
net tool-change-confirmed   iocontrol.0.tool-changed      <=
hal_manualtoolchange.changed
net tool-number             iocontrol.0.tool-prep-number  =>
hal_manualtoolchange.number
net tool-prepare-loopback   iocontrol.0.tool-prepare      =>  iocontrol.0.tool-
prepared
```