

NAME

Trinamic – Trinamic QUADpack/SIXpack motor controllers

DESCRIPTION

The Trinamic QUADpack and SIXpack motor controllers are supported by `spec` over both serial (RS-232C) and CAN-bus interfaces. `spec` support for Trinamic controllers was introduced in release 5.05.03-2 (May 2004). A number of bug fixes and updates have been included in subsequent release. A major upgrade in parameter configuration was included in release 5.07.04-1 (October 2007). Details are included in the text below.

FUNCTIONS

The Trinamic controllers support many configuration parameters that are not normally used by `spec`. `spec` does provide the capability to set practically all of the parameters. Note, though, changing the values of some of the parameters may interfere with `spec`'s operation of the motor controller.

The following `motor_par()` options are available while running `spec`. The parameter names are not sensitive to case (upper and lower case letters are equivalent).

`motor_par(mne, "get_io1")` – Returns the logic state of the TTLIO1 pin.

`motor_par(mne, "set_io1", arg)` – Sets the logic state of the TTLIO1 pin, using it as an output. Note, the TTLOUT1 pin is set simultaneously using the value given with the "set_out1" option.

`motor_par(mne, "set_out1", arg)` – Sets the logic state of the TTLOUT1 pin. Note, the TTLIO1 pin is set simultaneously using the value given with the "set_io1" option.

The following three options can be set on the standard optional-parameters screen in `spec`'s hardware configuration editor. (Type `p` when on the Motor screen.) As of `spec` release 5.07.04-6, there are additional ways to set the same motor parameters. See below.

`motor_par(mne, "misc_par_1" [, arg])` – Sets or gets the peak current in percent. See "PeakCurrent" below.

`motor_par(mne, "misc_par_2" [, arg])` Sets or gets the power-down current in percent. See "PowerDownCurrent" below.

`motor_par(mne, "misc_par_3" [, 0|1])` – Sets or gets the limit configuration. A zero configures normally closed limits, while a one configures normally open limits. See "NullPositive" below.

The following parameters allow setting of all the power parameters associated with the Trinamic controller.

`motor_par(mne, "PeakCurrent" [, arg])` – Sets or returns the peak current in percent. Note the maximum peak current is configured via a DIP switch on the SIXpack2 models. Note also, the peak current is set in pairs, i.e., channels 0 and 1 share the setting, as do channels 2 and 3 and channels 4 and 5. Default value is 50.

`motor_par(mne, "PowerDownCurrent" [, arg])` – Sets or returns the power-down current as a percent of the peak current. The power-down current kicks in after the power-down delay interval. Default value is 0.

`motor_par(mne, "StandingCurrent" [, arg])` – Sets or returns the stand-still current as a percent of the peak current. The stand-still current kicks in at the end of a move. Default value is 50.

`motor_par(mne, "RunningCurrent" [, arg])` – Sets or returns the constant-velocity current as a percent of the peak current. Default value is 75.

`motor_par(mne, "AccelerationCurrent" [, arg])` – Sets or returns the acceleration current as a percent of the peak current. Default value is 100.

`motor_par(mne, "PowerDownDelay" [, arg])` – Sets or returns the power-down delay time in milliseconds. The power-down delay is the time between when a motor has reached its target position and the time the current is set to the power-down value. Default value is 1000 (1 second).

The following fifteen parameters can be set individually or all at once by using the built-in optional "home_method" parameter, also described below. Setting any of the following parameters individually will override values set via the home-method parameter.

Note, although these parameters can all be set, certain settings may interfere with spec's ability to control the motors. In general, one shouldn't modify the values from the defaults without a good reason and an understanding of the consequences.

The meaning and significance for these parameters can be sought in Trinamic's documentation.

`motor_par(mne, "RotaryAxis" [, 0|1])` – Sets or returns the value of the rotary-axis parameter (zero or one). Default value is zero.

`motor_par(mne, "AutoNullCmd" [, 0|1])` – Sets or returns the value of the auto-null flag (zero or one). Default value is zero.

`motor_par(mne, "TestNull" [, 0|1])` – Sets or returns the value of the test-null flag. Default value is zero.

`motor_par(mne, "NullLeft" [, 0|1])` – Sets or returns the value of the null-left flag. Default value is one.

`motor_par(mne, "NullCenter" [, 0|1])` – Sets or returns the value of the null-center flag. Default value is zero.

`motor_par(mne, "StopNull" [, 0|1])` – Sets or returns the value of the stop-null flag. Default value is one.

`motor_par(mne, "FilterSwitch" [, 0|1])` – Sets or returns the value of the filter-switch flag. Default value is one.

`motor_par(mne, "WayOptimization" [, 0|1])` – Sets or returns the value of the way-optimization flag. Default value is zero.

`motor_par(mne, "FastRef" [, 0|1])` – Sets or returns the value of the fast-reference flag. Default value is zero.

`motor_par(mne, "MechRef" [, 0|1])` – Sets or returns the value of the mechanical-reference flag. Default value is zero.

`motor_par(mne, "DelayTestNull" [, 0|1])` – Sets or returns the value of the delay-test-null flag. Default value is zero.

`motor_par(mne, "StopSoft" [, 0|1])` – Sets or returns the value of the stop-soft flag. Default value is zero.

`motor_par(mne, "StopNoRef" [, 0|1])` – Sets or returns the stop-no-ref flag. Default value is one.

`motor_par(mne, "NullPositive" [, 0|1])` – Sets or returns the null-positive flag. Default value is one.

`motor_par(mne, "home_method" [, arg])` – Sets or returns the value of the Trinamic-specific home-method parameter. For the Trinamic controller, the home method is a 16-bit number that encodes the flags included in the above parameters as follows:

```

0x0002 RotaryAxis
0x0004 AutoNullCmd
0x0008 TestNull
0x0010 NullLeft
0x0020 NullCenter
0x0040 StopNull
0x0080 FilterSwitch
0x0100 WayOptimization
0x0200 FastRef
0x0400 MechRef
0x0800 DelayTestNull
0x1000 StopSoft
0x2000 StopNoRef
0x4000 NullPositive
0x8000 StopAtFullSteps

```

The "home_method" option provides an alternative to setting the parameters individually. However, setting parameters individually will override the value selected with this parameter.

`motor_par(mne, "PosLimit" [, arg])` – Set or returns the value of the position-limit parameter used in the home search.

`motor_par(mne, "StopAtFullSteps" [, 0|1])` – Sets or returns the stop-at-full-steps flag. Default value is zero.

`motor_par(mne, "DebouncingTime" [, arg])` – Sets or returns the debouncing time. Default value is 22 msec.

`motor_par(mne, "StopAfterSearch" [, 0|1])` – Sets or returns the stop-after-search flag. Default value is zero.

`motor_par(mne, "NullOffset" [, arg])` – Sets or returns the null-point offset value. Default value is zero.

`motor_par(mne, "TestNullRange" [, arg])` – Sets or returns the test-null range. Default value is 240.

`motor_par(mne, "dump")` – Displays current values for the above Trinamic-specific parameters along the following lines:

```

          PeakCurrent =      50 %
AccelerationCurrent =     100 %
          RunningCurrent =     75 %
          StandingCurrent =     50 %
PowerDownCurrent =         0 %
          PowerDownDelay =    1000 msec
          DebouncingTime =     22 msec
          StopAfterSearch =         0
          NullOffset =         0 steps
          TestNullRange =     240 steps
          PosLimit = 400000 steps
          RotaryAxis =         0 (0x0002)
          AutoNullCmd =         0 (0x0004)
          TestNull =           0 (0x0008)
          NullLeft =           1 (0x0010)
          NullCenter =         0 (0x0020)
          StopNull =           1 (0x0040)

```

```

    FilterSwitch =      1 (0x0080)
  WayOptimization =    0 (0x0100)
    FastRef =          0 (0x0200)
    MechRef =          0 (0x0400)
  DelayTestNull =     0 (0x0800)
    StopSoft =         0 (0x1000)
    StopNoRef =        1 (0x2000)
    NullPositive =     1 (0x4000)
  StopAtFullSteps =   0 (0x8000)
  "home_method" =    0x60D0

```

`motor_par(mne, "disable_limit_checks" [, 0|1])` – Sets or returns the value of the standard optional motor parameter to disable limit checks. Set this parameter if the limit inputs are to be used for a reference search but not to stop motion.

CHECKING FOR RESET

Trinamic parameters need to be reprogrammed after a power cycle. It is possible to have `spec` continuously check whether power has been cycled by requesting a particular status response from the controller. To enable such an automatic check (as of `spec` release 5.09.01-1), set the custom controller parameter `"check_interval"` in the hardware `config` file. If this parameter has a value greater than zero, `spec` will check for reset no more frequently than that number of seconds. If a reset is noted, all parameters will be reprogrammed. The check will be performed before moving, reading positions, on the `sync` command, and before changing parameters with `mot_par()`, but no more often than the specified interval. When the controller is idle, there is no checking done.

To set the parameter, go the controller configuration line on the **Devices** screen of the configuration editor and type `p` to enter the parameter:

```
Custom Parameters for "Trinamic QUADpack/SIXpack (Serial)"
```

NAME	VALUE
<code>check_interval</code>	2

The above example configures the checking at no more often than every two seconds. In the current implementation, the parameter needs to be separately configured for each controller for which checks are to be enabled.