

**NAME**

nt2400 – Laboratory Equipment Corporation NT-2400 Ethernet Hardware

**DESCRIPTION**

The NT-2400 from Laboratory Equipment Corporation is an ethernet-based instrument providing motor control, timer/counter functions and MCA capability.

Note, as there is a 20-character limit to the device names entered using `spec`'s hardware configuration editor, it will be helpful to have a short name in the `/etc/hosts` file to identify the NT-2400 host, such as

```
192.42.172.13  nt2400.localnet.edu nt2400
```

To configure `spec` for the NT-2400 hardware, either run the `config` macro from `spec` or the configuration editor `edconf` directly. Change to the **Devices** screen to configure the hostname and port number of the motor controllers and counter/timers. The selections will look something like the following, with the **NUM** field specifying the total number of motors/counters at the specified host. (Note, type the single quote ' to begin string-entry mode to enter the **DEVICE** name. Use the < and > characters to select from the **TYPE** menu.)

Motor and Counter Device Configuration (Not CAMAC)

```
MOTORS      DEVICE ADDR <>MODE NUM          <>TYPE
  YES nt2400:6051                6          Labo NT-2400 Motor (UDP)
```

```
SCALERS      DEVICE ADDR <>MODE NUM          <>TYPE
  YES nt2400:6051                8 Labo NT-2400 Counter/Timer (UDP)
  YES nt2400:6051                8          Labo NT-2400 Counters (UDP)
```

For the scaler configuration, the first example is for when one of the scaler channels is to be used as master timer. With the second example, all the scalers are used only as counters.

The MCA devices are configured on the **Acquisition-type device** screen of the configuration editor. For two MCA modules on the same NT-2400 host, the screen would look something like:

MCA- and CCD-Acquisition Type Device Configuration

```
MCA-like     DEVICE ADDR <>MODE          <>TYPE
  0  YES nt2400:6051                Labo NT-2400 MCA (UDP)
  1  YES nt2400:6051                Labo NT-2400 MCA (UDP)
```

Configure individual motor channels on the **Motor** screen. Select the NT2400 controller type for each motor channel.

```
Number: <>Controller  0:  NT2400  1:  NT2400  2:  NT2400  3:  NT2400
Unit/Channel          0/1      0/2      0/3      0/4
Name                  Two Theta  Theta    Chi      Phi
Mnemonic              tth      th      chi     phi
```

Unit numbers are assigned in the order in which the NT-2400 motor controller units are specified on the **Devices** screen, and start at zero. Channel numbers start at one to match the NT-2400 numbering convention. It is not necessary for the motors to be consecutively ordered in the configuration.

The *pulse-mode* parameter (100 or 200) can optionally be entered on the second optional motor parameter screen (accessed by typing `m` twice from the main motor screen). Enter values for the pulse mode in the field for Generic parameter 1. If no value is entered, the default

value of 100 is used. In addition, the limit and home switch polarity can be optionally configured by entering a value for Generic parameter 2. The coding for switch polarities is as follows:

Bit 0 set: ccw limit positive  
 Bit 1 set: home switch positive  
 Bit 2 set: cw limit positive

Configure the NT-2400 scaler channels on the **Scaler** screen to look something like the following:

Scaler (Counter) Configuration

Number	Name	Mnemonic	<>Device	Unit	Chan	<>Use As	Scale
0	Seconds	sec	NT2400	0	2	timebase	1000
1	Monitor	mon	NT2400	0	1	monitor	1
2	Detector	det	NT2400	0	3	counter	1

For the NT-2400, only channel 2 can be used as the time base channel and only channel 1 can be used for the monitor preset counter. If there is no monitor-type preset counter, and there are only two counter channels, then channel 1 should be configured as the ordinary counter detector channel.

With such a configuration, all the standard commands for moving motors, counting and accessing the MCA are available.

Note, setting SPEC's debug level to 128 (using the debug macro or by assigning a value to the DEBUG built-in variable) will have SPEC display the commands sent and data returned from the NT-2400 in a semi-readable form.