PIO-821H/821L

Multifunction Card

Linux Software Manual

Warranty

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1. Linux Software Installation

The PIO-821H/821L can be used in linux kernel 2.4.X and 2.6.X. For Linux O.S, the recommended installation and uninstall steps are given in Sec 1.1 ~ 1.2

1.1. Linux Driver Installing Procedure

Step 1: Copy the linux driver "ixpio-0.20.14.tar.gz" (or the later driver version) in the directory "NAPDOS\Linux" of the companion CD or download the latest driver from our website to the linux host.

Step 2: You must use the '**root**' identity to compile and install PIO/PISO linux driver.

Step 3: Decompress the tarball "ixpio.tar.gz".

Step 4: Type '**cd**' to the directory containing the package's source code and type '**./configure**' to configure the package for your linux system.

Step 5: Type '**make**' to compile the package.

Step 6: You can type '**./ixpio.inst**' to install the PIO/PISO driver module and build the device file "ixpioX" in the device directory "/dev" automatically.

1.2. Linux Driver Uninstalling Procedure

Step 1: Type '**cd**' to the directory containing the package's source code.

Step 2: Type '**./ixpio.remove**' to remove the PIO/PISO driver module.

2. PIO-821H/821L Linux Demo

All of demo programs will not work normally if PIO/PISO linux driver would not be installed correctly. During the installation process of PIO/PISO linux driver, the install-scripts "ixpio.inst" will setup the correct kernel driver. After driver (version 0.20.14 or the later driver version) compiled and installation, the related demo programs and declaration header files for different development environments are presented as follows.

Table 2.1

Driver Name	Directory Path	File Name	Description
ixpio-0.20.14	Include	ixpio.h	PIO-821 driver header
	examples/pio821	dio.c	Digital Input/Output Demo
		dio2.c	Digital Input/Output Demo
		ao.c	Analog Output Demo
		ai_soft.c	Analog Input Demo
		ai_pacer.c	Analog Input Demo
		counter.c	Timer Demo

2.1 Demo code "dio.c" "dio2.c"

After user connect the CN1 and CN2 with cable "CA-2002", user can use the demo "dio.c" and "dio2.c" to read/write digital value. Please refer to figure 2-1 and figure 2-2.

```
[root@localhost pio821]# ./dio
Press <enter> for next, ESC to exit.

Digital Output: 0x 00 01    Input: 0x 00 01    <Enter> next, ESC exit
Digital Output: 0x 00 02    Input: 0x 00 02    <Enter> next, ESC exit
Digital Output: 0x 00 04    Input: 0x 00 04    <Enter> next, ESC exit
Digital Output: 0x 00 08    Input: 0x 00 08    <Enter> next, ESC exit
Digital Output: 0x 00 10    Input: 0x 00 10    <Enter> next, ESC exit
Digital Output: 0x 00 20    Input: 0x 00 20    <Enter> next, ESC exit
Digital Output: 0x 00 40    Input: 0x 00 40    <Enter> next, ESC exit
Digital Output: 0x 00 80    Input: 0x 00 80    <Enter> next, ESC exit
Digital Output: 0x 01 00    Input: 0x 01 00    <Enter> next, ESC exit
Digital Output: 0x 02 00    Input: 0x 02 00    <Enter> next, ESC exit
Digital Output: 0x 04 00    Input: 0x 04 00    <Enter> next, ESC exit
Digital Output: 0x 08 00    Input: 0x 08 00    <Enter> next, ESC exit
Digital Output: 0x 10 00    Input: 0x 10 00    <Enter> next, ESC exit
Digital Output: 0x 20 00    Input: 0x 20 00    <Enter> next, ESC exit
Digital Output: 0x 40 00    Input: 0x 40 00    <Enter> next, ESC exit
Digital Output: 0x 80 00    Input: 0x 80 00    <Enter> next, ESC exit
```

Figure 2-1

```
[root@localhost pio821]# ./dio2
Press <enter> for next, ESC to exit.

Digital Output: 0x0001    Input: 0x0001    <Enter> next, ESC exit
Digital Output: 0x0002    Input: 0x0002    <Enter> next, ESC exit
Digital Output: 0x0004    Input: 0x0004    <Enter> next, ESC exit
Digital Output: 0x0008    Input: 0x0008    <Enter> next, ESC exit
Digital Output: 0x0010    Input: 0x0010    <Enter> next, ESC exit
Digital Output: 0x0020    Input: 0x0020    <Enter> next, ESC exit
Digital Output: 0x0040    Input: 0x0040    <Enter> next, ESC exit
Digital Output: 0x0080    Input: 0x0080    <Enter> next, ESC exit
Digital Output: 0x0100    Input: 0x0100    <Enter> next, ESC exit
Digital Output: 0x0200    Input: 0x0200    <Enter> next, ESC exit
Digital Output: 0x0400    Input: 0x0400    <Enter> next, ESC exit
Digital Output: 0x0800    Input: 0x0800    <Enter> next, ESC exit
Digital Output: 0x1000    Input: 0x1000    <Enter> next, ESC exit
Digital Output: 0x2000    Input: 0x2000    <Enter> next, ESC exit
Digital Output: 0x4000    Input: 0x4000    <Enter> next, ESC exit
Digital Output: 0x8000    Input: 0x8000    <Enter> next, ESC exit
```

Figure 2-2

2.2 Demo code "ao.c"

User can use the demo "ao.c" to output analog value. Please refer to figure 2-3.

```
[root@localhost pio821]# ./ao
Press <enter> for next, ESC to exit.

Analog output: 0x 00 00    <Enter> next, ESC exit
Analog output: 0x 00 01    <Enter> next, ESC exit
Analog output: 0x 00 03    <Enter> next, ESC exit
Analog output: 0x 00 07    <Enter> next, ESC exit
Analog output: 0x 00 0f    <Enter> next, ESC exit
Analog output: 0x 00 1f    <Enter> next, ESC exit
Analog output: 0x 00 3f    <Enter> next, ESC exit
Analog output: 0x 00 7f    <Enter> next, ESC exit
Analog output: 0x 00 ff    <Enter> next, ESC exit
Analog output: 0x 01 ff    <Enter> next, ESC exit
Analog output: 0x 03 ff    <Enter> next, ESC exit
Analog output: 0x 07 ff    <Enter> next, ESC exit
Analog output: 0x 0f ff    <Enter> next, ESC exit
```

Figure 2-3

2.3 Demo code "ai_soft.c" "ai_pacer.c"

User can use the software trigger ("ai_soft.c") and pacer trigger ("ai_pacer.c") to get analog value. Please refer to figure 2-4 and figure 2-5.

```
[root@localhost pio821]# ./ai_soft

ADC read = 0x0000 ==> -5.000000V        ESC exit

ADC read = 0x0000 ==> -5.000000V        ESC exit

ADC read = 0x0000 ==> -5.000000V        ESC exit
```

Figure 2-4

```
[root@localhost pio821]# ./ai_pacer

ADC read = 0x0000 ==> -5.000000V        ESC exit

ADC read = 0x0000 ==> -5.000000V        ESC exit

ADC read = 0x0000 ==> -5.000000V        ESC exit
```

Figure 2-5

2.4 Demo code "counter.c"

The demo "counter.c" can be used to configure the counter and startup timer interrupt to read/write digital value. Please refer to figure 2-6.

```
[root@localhost pio821]# ./counter
Time beat: 1    Digital Output: 0x0001    Input: 0x0001
Time beat: 2    Digital Output: 0x0002    Input: 0x0002
Time beat: 3    Digital Output: 0x0004    Input: 0x0004
Time beat: 4    Digital Output: 0x0008    Input: 0x0008
Time beat: 5    Digital Output: 0x0010    Input: 0x0010
Time beat: 6    Digital Output: 0x0020    Input: 0x0020
Time beat: 7    Digital Output: 0x0040    Input: 0x0040
Time beat: 8    Digital Output: 0x0080    Input: 0x0080
Time beat: 9    Digital Output: 0x0100    Input: 0x0100
Time beat: 10    Digital Output: 0x0200    Input: 0x0200
Time beat: 11    Digital Output: 0x0400    Input: 0x0400
Time beat: 12    Digital Output: 0x0800    Input: 0x0800
Time beat: 13    Digital Output: 0x1000    Input: 0x1000
Time beat: 14    Digital Output: 0x2000    Input: 0x2000
Time beat: 15    Digital Output: 0x4000    Input: 0x4000
Time beat: 16    Digital Output: 0x8000    Input: 0x8000
```

Figure 2-6