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TPMC861-SW-95

QNX6 Neutrino Device Driver

4 Channel UART

Version 1.2.x

User Manual

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TPMC861-SW-95

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4 Channel UART

Supported Modules:
TPMC861

Issue	Description	Date
1.0	First Issue	July 11, 2003
1.1.0	QNX 6.3.x support and general revision	September 20, 2005
1.2.0	Modification for devc-devices and QNX6.3.x with SPx	April 17, 2009

Table of Contents

1 INTRODUCTION 4
2 INSTALLATION 5
2.1 Build the device driver 6
2.2 Start the Driver Process 6

1 Introduction

The TPMC861-SW-95 QNX-Neutrino device driver is a full-duplex serial device driver which allows the operation of a TPMC861 serial PMC on Intel x86 based QNX6-Neutrino operating systems.

The TPMC861-SW-95 device driver is based on the standard QNX6 8250 serial communication manager. Due to this way of implementation the driver interface and function is compatible to the standard QNX6 serial device manager.

All standard utility programs for configuration (e.g. stty) and maintaining terminal interfaces could be used in the same manner.

Additional supported features:

- Each channel has a 128 Byte transmit and receive FIFO
- Programmable trigger level for transmit and receive FIFO

The TPMC861-SW-95 device driver supports the modules listed below:

TPMC861	4 Channel Isolated Serial Interface RS422/RS485	(PMC)

To get more information about the features and use of TPMC861 devices it is recommended to read the manuals listed below.

TPMC861 User manual

TPMC861 Engineering Manual

2 Installation

The directory TPMC861-SW-95 on the distribution media contains the following files:

TPMC861-SW-95-SRC.tar.gz	Driver source archive
TPMC861-SW-95-1.2.0.pdf	This manual in PDF format
Release.txt	Information about the Device Driver Release
ChangeLog.txt	Release history

The TAR archive TPMC861-SW-95-SRC.tar.gz contains the following files and directories:

```
tpmc861/driver/nto/x86/o/Makefile
tpmc861/driver/nto/x86/Makefile
tpmc861/driver/nto/Makefile
tpmc861/driver/common.mk
tpmc861/driver/common.mk-nops
tpmc861/driver/common.mk-nopm
tpmc861/driver/externs.c
tpmc861/driver/externs.h
tpmc861/driver/init.c
tpmc861/driver/intr.c
tpmc861/driver/main.c
tpmc861/driver/Makefile
tpmc861/driver/options.c
tpmc861/driver/proto.h
tpmc861/driver/tedit.c
tpmc861/driver/tpmc861.h
tpmc861/driver/tto.c
tpmc861/example/nto/x86/o/Makefile
tpmc861/example/nto/x86/Makefile
tpmc861/example/nto/Makefile
tpmc861/example/common.mk
tpmc861/example/example.c
tpmc861/example/Makefile
```

In order to perform the installation copy the tar-archive into the /usr/src directory and unpack it (`e.g. tar –xzvf TPMC861-SW-95-SRC.tar.gz`). After that the necessary directory structure for the automatic build and the source files are available underneath the new directory called *tpmc861*.

Its absolute important to create the *tpmc861* project directory in the /usr/src directory otherwise the automatic build with make will fail.

For building the device driver it is necessary that the QNX serial DDK is installed. (Installer: "/QNX Realtime Platform/Software Development/Device Driver Kits/ Character (Serial) DDK targeting x86").

For Serial DDKs not using the pm library, please use common.mk-nopm instead of common.mk build file. In detail, for QNX system releases before 6.3.0 copy common.mk-nopm to common.mk and start the build process.

For Serial DDKs not using the ps library, please use common.mk-nops instead of common.mk build file. In detail, for QNX system releases 6.3.x without a Service Pack copy common.mk-nops to common.mk and start the build process.

2.1 Build the device driver

1. Change to the /usr/src/tpmc861/driver/nto directory
2. Execute the Makefile

```
# make install
```

After successful completion the driver binary will be installed in the */bin* directory.

2.2 Start the Driver Process

To start the TPMC861 device driver respective the TPMC861 serial communications manager you have to enter the process name with optional parameter from the command shell or in the startup script.

```
# devc-tpmc861 [options] &
```

OPTIONS

-b number	Initial baud rate (default 9600).
-C size	The size of the canonical buffer in bytes (default 256).
-E	Start in raw mode (the default). Software flow control is disabled by default.
-e	Start in edit mode (default raw). Software flow control is enabled by default.
-F	Disable hardware flow control (default to hardware flow control enabled).
-f	Enable hardware flow control (default). Must be disabled for TPMC861 modules.
-I number	The size of the interrupt input buffer in bytes (default 2048).
-O number	The size of the interrupt output buffer in bytes (default 2048).
-S|s	Disable / enable software flow control. The default depends on the mode: in raw mode (*-E*, the default), its disabled; in edited mode (*-e*), it's enabled. The order in which you specify the *–E* or *–e*, and *–S* or *–s* options matters:

Options	Mode	Software flow control
-e	Edited	Enabled
-S –e	Edited	Enabled
-e –S	Edited	Disabled
-E	Raw	Disabled
-s –E	Raw	Disabled
-E –s	Raw	Enabled

-r number	Set the receive FIFO trigger level. Every receiver trigger level from 1 to 127 is valid (default 56).
-t number	Set the transmit FIFO trigger level. Every transmitter trigger level from 1 to 127 is valid (default 8).

-u number	Append number to the device name prefix (/dev/ser). The default is 3, which mean the first TPMC861 device is /dev/ser3; additional device are given increasing numbers.
-v	Print out debug information.

Most of the options above are standard options for serial communications manager. Please refer also to related QNX6 documentation if necessary.

DESCRIPTION

The devc-tpmc861 manager is based on the standard QNX6 devc-ser8250 serial communications manager and can support any number of serial ports and TPMC861 PMC modules.

The devc-tpmc861 manager searches the entire PCI bus for TPMC861 devices and creates devices for each serial channel. The first device created depends on the **–u** option. If the **–u** option is omitted the first TPMC861 serial device is */dev/ser3*. In this configuration the devices */dev/ser3, /dev/ser4, …/dev/ser6* will be created for the first TPMC861, */dev/ser7 … /dev/ser10* will be created for the second TPMC861 and so on.

Usually the device names /dev/ser1 and /dev/ser2 are assigned to the default PC serial ports, therefore the TPCM861 devices can start with /dev/ser3 (default). If there are additional onboard serial devices you have to start with a higher device number for the TPMC861 devices by defining an appropriate number with the **–u** option (please check also the */dev* directory).

Since the TPMC861 does not support hardware handshake (RTS/CTS) and the QNX terminal manager setup hardware handshake by default, this feature must be disabled by the –F option.

A read request by default returns when at least 1 character is available. To increase efficiency, you can control three parameters to control when a read is satisfied:

Time	Return after a specified amount of time has elapsed (c_cc[VTIME]).
Min	Return when this number of characters is in the input buffer (c_cc[VMIN]).
Char	Return if the forwarding character is in the input buffer (c_cc[VEND]).

These parameters, and other, are set using library routines (see *tcgetattr(), txsetattr(), readcond()* and *TimerTimeout()* in the Library Reference).

The following fields and flags are supported in the *termios* structure.

Field	Supported fields and flags
c_cc	All characters
c_iflag	BRKINT ICRNL IGNBRK IXON
c_oflag	OPOST
c_cflag	CLOCAL CSIZE CSTOPB PARENB PARODD
c_lflag	ECHO ECHOE ECHOK ECHONL ICANON IEXTEN ISIG NOFLSH

EXAMPLES

Start the device driver with default parameters (first created device is */dev/ser3*, 9600 baud, see also options above…):

```
# devc-tpmc861 -F &
```

Start the device driver with default parameters and change baud rate to 38400

```
# devc-tpmc861 -F –b 38400 &
```

Start the device driver with default parameters. The first created device is */dev/ser5*.

```
# devc-tpmc861 -F –u 5 &
```