
TPMC868-SW-95

QNX6 Neutrino Device Driver

16-Channel UART

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User Manual

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16 Channel UART

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1 Introduction

The TPMC868-SW-95 QNX-Neutrino device driver is a full-duplex serial device driver which allows the operation of a TPMC868 serial PMC on Intel x86 based QNX6-Neutrino operating systems.

The TPMC868-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 64 Byte transmit and receive FIFO
- Programmable trigger level for transmit and receive FIFO

2 Installation

The software is delivered on a PC formatted 3½" HD diskette.

The directory A:\TPMC868-SW-95 contains the following files:

TPMC868-SW-95.pdf	This manual in PDF format
tpmc868.tar	TAR archive with driver source code

The TAR archive tpmc868.tar contains the following files and directories:

```
tpmc868/driver/common.mk
tpmc868/driver/externs.h
tpmc868/driver/externs.c
tpmc868/driver/init.c
tpmc868/driver/intr.c
tpmc868/driver/main.c
tpmc868/driver/options.c
tpmc868/driver/proto.h
tpmc868/driver/tedit.c
tpmc868/driver/tpmc868.h
tpmc868/driver/tto.c
tpmc868/driver/nto/Makefile
tpmc868/driver/nto/x86/Makefile
tpmc868/driver/nto/x86/sys_ttyinit.c
tpmc868/driver/nto/x86/o/Makefile
```

In order to perform the installation insert the diskette into the floppy drive and mount the floppy for DOS file system (e.g. `mount -t dos /dev/fd0 /floppy`). Now extract all files in the TAR archive into the directory `/usr/src` (e.g. `tar -x -f /floppy/TPMC868-SW-95/tpmc868.tar -C /usr/src`).

Its absolute important to create the tpmc868 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").

2.1 Build the device driver

1. Change to the `/usr/src/tpmc868/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 TPMC868 device driver respective the TPMC868 serial communications manager you have to enter the process name with optional parameter from the command shell or in the startup script.

```
devc-tpmc868 [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). Only valid for TPMC868-10. Must be disabled for TPMC868-11 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. Valid settings for the receiver FIFO are: 1, 8, 16, 56, and 60 (default 56).
- t** *number* Set the transmit FIFO trigger level. Valid settings for the transmitter FIFO are: 1, 8, 16, 32, and 56 (default 8).
- u** *number* Append number to the device name prefix (*/dev/ser*). The default is 3, which mean the first TPMC868 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-tpmc868 manager is based on the standard QNX6 devc-ser8250 serial communications manager and can support any number of serial ports and TPMC868 PMC modules.

The devc-tpmc868 manager searches the entire PCIbus for TPMC868 devices and creates devices for each serial channel (16 per PMC). The first device created depends on the **-u** option. If the **-u** option is omitted the first TPMC868 serial device is `/dev/ser3`. In this configuration the devices `/dev/ser3`, `/dev/ser4`, ...`/dev/ser18` will be created for the first TPMC868, `/dev/ser19` ... `/dev/ser34` will be created for the second TPMC868 and so on.

Usually the device names `/dev/ser1` and `/dev/ser2` are assigned to the default PC serial ports, therefore the TPMC868 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 TPMC868 devices by defining an appropriate number with the **-u** option (please check also the `/dev` directory).

All devices are fully interrupt driven and by default support standard hardware flow control on input and output (RTS/CTS) for TPMC868-10. This can be disabled by the **-F** option for the TPMC868-10 and **must** be disabled for TPMC868-11 PMC's.

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
<code>c_cc</code>	All characters
<code>c_iflag</code>	BRKINT ICRNL IGNBRK IXON
<code>c_oflag</code>	OPOST
<code>c_cflag</code>	CLOCAL CSIZE CSTOPB PARENB PARODD
<code>c_lflag</code>	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-tpmc868 &
```

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

```
devc-tpmc868 -b 38400 &
```

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

```
devc-tpmc868 -u 5 &
```