

TIP865-SW-82

Linux Device Driver

4 Channels Serial IPAC

Version 1.0.x

User Manual

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Table of Contents

1	INTRODUCTION.....	4
2	INSTALLATION.....	5
	2.1 Build and install the device driver.....	5
	2.2 Uninstall the device driver	6
	2.3 Install device driver into the running kernel	6
	2.4 Remove device driver from the running kernel	6
	2.5 Change Major Device Number	7
	2.6 Number of supported devices	7

1 Introduction

The TIP865-SW-82 Linux device driver allows the operation of a TIP865 IPAC module on Linux operating systems with kernel version 2.4.4 or higher installed.

The TIP865-SW-82 device driver is based on standard Linux serial device drivers and supports all standard terminal functions (TERMIOS).

Because the TIP865 device driver is stacked on the TEWS TECHNOLOGIES IPAC carrier driver, it's necessary to install also the appropriate IPAC carrier driver. Please refer to the IPAC carrier driver user manual for further information.

The TIP865 device driver includes the following features:

- Baud rates up to 115200 baud.
- Hardware (RTS/CTS) for TIP865-10 and software flow control (XON/XOFF).
- Direct support of different physical interfaces (RS-232, TTL, RS-422, RS-485).
- Creates a *TTY* device *tyTIP* and dialout device *cuaTIP* with dynamically allocated or fixed major device numbers.
- TEWS TECHNOLOGIES IPAC carrier driver support.

2 Installation

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

The directory A:\TIP865-SW-82 contains the following files:

TIP865-SW-82.pdf	This manual in PDF format
TIP865-SW-82.tar.gz	GZIP compressed archive with driver source code

The GZIP compressed archive TIP865-SW-82.tar.gz contains the following files and directories:

tip865/tip865drv.c	Driver source code
tip865/tip865def.h	Driver include file
tip865/makenode	Script to create device nodes on the file system
tip865/makefile	Device driver make file
tip865/example/test865.c	Transfer data between two channels (example)
tip865/example/setspeed.c	Set new baud rates (example)
tip865/example/makefile	Example application make file

In order to perform an installation, extract all files of the archive TIP865-SW-82.tar.gz to the desired target directory.

Before building a new device driver, the TEWS TECHNOLOGIES IPAC carrier driver must be installed properly, because this driver includes the header file *ipac_carrier.h*, which is part of the IPAC carrier driver distribution. Please refer to the IPAC carrier driver user manual in the directory path A:\CARRIER-SW-82 on the separate distribution diskette.

2.1 Build and install the device driver

- Login as *root*
- Change to the target directory
- To create and install the driver in the module directory */lib/modules/<version>/misc* enter:

make install

- Also after the first build we have to execute *depmod* to create a new dependency description for loadable kernel modules. This dependency file is later used by *modprobe* to automatically load the correct IPAC carrier driver modules.

depmod -aq

2.2 Uninstall the device driver

- Login as *root*
- Change to the target directory
- To remove the driver from the module directory */lib/modules/<version>/misc* enter:
make uninstall
- Update kernel module dependency description file
depmod -aq

2.3 Install device driver into the running kernel

To load the device driver into the running kernel, login as root and execute the following commands:

```
# modprobe tip865drv
```

After the first build or if you are using dynamic major device allocation it's necessary to create new device nodes on the file system. Please execute the script file *makenode* to do this.

```
# sh makenode
```

On success the device driver will create four minor devices for each TIP865 module found. The first TIP865 (channel 1...4) can be accessed through device node */dev/ttyTIP0.../dev/ttyTIP3*, the second TIP865 (channel 1...4) through device nodes */dev/ttyTIP4.../dev/ttyTIP7* and so on.

The allocation of device nodes to physical TIP865 modules depends on the search order of the IPAC carrier driver. Please refer to the IPAC carrier user manual.

Loading of the TIP865 device driver will only work if kernel KMOD support is installed, necessary carrier board drivers already installed and the kernel dependency file is up to date. If KMOD support isn't available you have to build either a new kernel with KMOD installed or you have to install the IPAC carrier kernel modules manually in the correct order (please refer to the IPAC carrier driver user manual).

2.4 Remove device driver from the running kernel

To remove the device driver from the running kernel login as root and execute the following command:

```
# modprobe tip865drv -r
```

Be sure that the driver isn't opened by any application program. If opened you will get the response "*tip865drv: Device or resource busy*" and the driver will still remain in the system until you close all opened files and execute *modprobe -r* again.

2.5 Change Major Device Number

The TIP865 driver use dynamic allocation of major device numbers by default. If this isn't suitable for the application it's possible to define a major number for the *TTY* and *CUA* driver.

To change the major number edit the file `tip865drv.c`, change the following symbol to appropriate value and enter **make install** to create a new driver.

TIP865_TTY_MAJOR Defines the value for the terminal device. Valid numbers are in range between 0 and 255. A value of 0 means dynamic number allocation.

TIP865_CUA_MAJOR Defines the value for the dialout device. Valid numbers are in range between 0 and 255. A value of 0 means dynamic number allocation.

Example:

```
#define TIP865_TTY_MAJOR          122
#define TIP865_CUA_MAJOR        123
```

Be sure that the desired major number isn't used by other drivers. Please check `/proc/devices` to see which numbers are free.

Keep in mind that's necessary to create new device nodes if the major number for the TIP865 driver has changed.

2.6 Number of supported devices

By default the TIP865 device driver supports up to 8 minor devices (serial channels). If this isn't enough the number of supported TIP865 modules respective the number of minor devices can be increased by modifying the macro **NUM_TIP865** in `tip865drv.c`.