

# ARM&EVA / First Steps

Peer Georgi  
Conitec Datensysteme GmbH

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## Introduction

This document describes the first steps for getting the MCU module up and running. Some basic knowledge with LINUX systems, especially KNOPPIX, are recommended.

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## 1 The included development environment

In addition to the delivered hardware you've received a software package containing:

- Documentation of hardware and development tools
- Source code of the sample programs
  - boot loader, Linux loader, demo software, ...
  - configuration sample
- Development environments
  - for developing **Linux programs** for the ARM9 platform
  - for developing **OS-independent programs** for the ARM9 platform
  - for configuring the **Linux kernel**
  - for setting up a **Linux root directory (Linux-Distribution)**
- Programs for **fast data transfer** to the ARM9 target system, generation of flash memory contents.

Everything can be found on a **bootable** Linux Live CD-ROM based on „KNOPPIX-4”.

### 1.1 Software tools

All tools are contained on the included development CD. They are frequently updated and thus also available for download at [www.conitec.com](http://www.conitec.com). Details about the structure and usage of the tools can be found on the CD under **doc/de/pakete.pdf**.

## 1.2 Setup from CD...

After starting the included CD-ROM, all files of the development environment can be found at:

**/usr/local/carmeva**

They are structured as follows:

- ▷ „doc” - documentation
- ▷ „sw” - software relevant data
- ▷ „hw” - hardware relevant data
- ▷ „bin” - precompiled programs for the development PC

It's recommended to make yourself familiar with the directory structure.

**Note**

As mentioned, the CD is bootable and should be used to boot up the system. Previous experiences with KNOPPIX based Live CDs are useful.

## 1.3 From the Internet...

All tools are available from the Conitec website **www.conitec.com**.

The included CD is a Debian based distribution. Thus you can make advantage of our Debian tools. The only thing you need is Internet access. Enter the commands „apt-get update” and „apt-get upgrade” in any root shell. All tools are then automatically updated.

### Distribution

Our software is available as „tar” archive or as update for Debian based distributions.

## 2 State of delivery

The MCU module is delivered with preinstalled Linux. The operating system and the root file system are stored in the integrated serial Flash Memory. The boot loader in the Flash initializes the basic periphery, loads the operating system and starts up Linux. The preinstalled system contains the following components:

- Boot loader
- Linux kernel (version 2.6.12-rc4)
- Root file system

The configuration is included and can always be restored. See tutorial on the included CD-ROM.

### Settings

Some of the settings are stored in the root file system configuration files and the boot loader. Among them:

- Serial interface parameters  
Default: **115200 Bauds, 8N1**
- IP address  
default: **192.168.1.12**
- Possible NFS shares

## 3 Setup

This chapter describes the setup of the MCU module. Be aware that the module can be damaged by a faulty hardware configuration.

The optional evaluation board "eva" offers all necessary power supply voltages and makes setup a lot easier.

**Note**

### 3.1 Prerequisites

#### Power supply

The MCU module requires **stabilized 3.3V** operating voltage. Any power supply can be used that delivers ca. 350mA.

For the USB **Host** function an additional +5V voltage is required. For details please refer to the evaluation board "eva" and MCU data sheet.

The 1.8V kernel voltage for the MCU is generated on board by a low drop regulator. This voltage is available at the mcu module socket and can be used for additional purposes (10 mA only).

The 1.8V kernel voltage is generated on board and must not be supplied externally.

**Attention**

## Important signals

For using the MCU module without evaluation board "eva", some important signals must be connected. Among them:

Signal	Active	Connection	Function
JTAG_NTRST	Low	High	JTAG input
NRESET	Low	Reset Button	Reset input
User LED1	Low	see source code (scll.c)	Output

For a connection example please refer to the evaluation board ("eva") circuit diagram.

## End user application

For using the MCU module in an end user application, please note that the MCU firmware as well as the boot loader use some of the I/O ports.



## 3.2 Development environment

The included Live CD contains everything necessary for developing or modifying software for the MCU module. For extended developing however a Linux PC is recommended.

You don't need to use any communication interfaces for running programs on the MCU module. However for development, using a V24/RS232 connection is recommended for getting startup messages. Those messages are also important when developing system programs or device drivers for the Linux OS.

Depending on the application, the USB Client or Ethernet interface can be used for fast data transfer, either for the application or for transferring programs.

The following development environment is recommended:

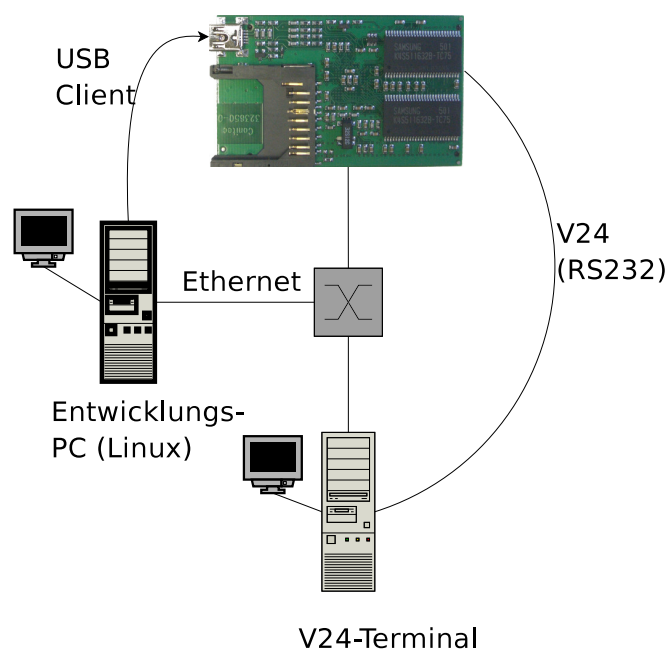


Abbildung 1: Overview of a recommended development environment

The serial interface of the MCU module must **not** be directly connected to a PC serial interface! For this a signal converter is required. Such a converter is contained on the evaluation board.

**Note**

### 3.3 Getting started

In the following we assume that the evaluation board "eva" is used as it offers all necessary supply voltages.

#### 3.3.1 Your development PC

Take care that your PC can boot from the CD-ROM drive (adapt BIOS settings if necessary). Insert the included CD-ROM and restart the PC. After the operating system is running, start the program „**gtkterm**”.

Arbitrary programs can be started by the key combination **ÄLT+F2**".

**Note**

The „**gtkterm**” program needs to be informed about the serial port connected to the evaluation board. This is done by menu under „Configuration▷Port” or by pressing „**Ctrl+S**”. Here, „**/dev/ttyS0**” is the same serial interface named „**COM1**” by other operating systems. bezeichnen. For the baud rate set 115200 (see 2).

#### 3.3.2 Your evaluation board

- Connect the development PC to the evaluation board with a RS232 cable. Set the connection parameters (see 2) in a terminal program<sup>1</sup>.
- Connect the ethernet interface to the local area network.
- Provide power supply through the included AC adaptor.

The local area network can be connected with an ethernet cable to an „Ethernet-Hub” or „Ethernet-Switch”. Alternatively, use a crossover cable. Please note that the MCU module is preconfigured with a fixed IP address (see 2.) that must not be occupied in the local area network.

### 3.4 First Linux startup

After connecting the power supply or performing a reset with the connected reset button, the MCU module automatically starts from the Flash Memory. If a terminal program is connected, the startup messages can be observed.

The Linux startup process end with the start of a shell (command line). The Linux system is now ready and awaits your commands, programs or application.

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<sup>1</sup>Under Linux the terminal programs „**minicom**” or „**gtkterm**” can be used, under Windows it's „**Hyperterm**”.

When using the evaluation board with display option, an additional shell is displayed on the LCD screen. Use any USB keyboard for entries.

The preinstalled Linux distribution offers the following channels for communication with the target system:

1. Console via serial interface
2. Console on the LCD screen together with a USB keyboard
3. Network consoles via the „**telnet**” program
4. A FTP server for file transfer
5. A Web server that displays a start page and offers access to SD / MMC media.

## 4 The next steps...

The preinstalled Linux distribution contains a FTP server, which can be accessed in the local network under:

**ftp://192.168.1.12**

This way data can be copied directly to the MCU RAM-Disk - for instance programs to be executed via a Telnet connection. The files handled by FTP transfer are located in the „/home/ftp” folder on the target system.

Additionally, the preinstalled distribution contains a web server that can be used for interactively controlling the hardware. The server can be accessed under:

**http://192.168.1.12** (Try it!)

After the first start of the preinstalled Linux distribution you might want to apply modifications. For this please refer to the tutorial under „/usr/local/carmeve/doc/de/tutorial/tutorial.pdf” on the included CD-ROM. Basics and various applications are described there.

Have fun!