

APPLICATION NOTE

RTD Linux Support Overview



RTD Embedded Technologies, Inc.

"Accessing the Analog World"®

ISO9001 and AS9100 Certified

SWM-64000020

Rev C



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Revision History

09/14/2004	Revision A issued
07/15/2005	Revision B issued Added Fedora Core 4 notes to "2.6 Kernels" section
04/07/2010	Revision C issued Document Title changed Content significantly re-written to cover current Linux distributions Added information about x86 compatibility Added AS9100 Information

Introduction

RTD strives to provide Linux support for all current board-level products. This document outlines RTD's Linux compatibility. Where applicable, RTD offers software packages to provide Linux support.

RTD currently uses the following Linux distributions internally for development and testing:

- 2.6 Kernel Distribution: openSUSE 11.x
- 2.4 Kernel Distribution: Red Hat 9.0

cpuModule Linux Support

RTD's current cpuModule products are x86 compatible. From an operating system perspective, there is little difference between an RTD cpuModule and a typical desktop PC. This makes Linux support fairly straightforward.

Most standard desktop Linux distributions can be installed onto an RTD cpuModule with little effort. The procedure for installing Linux onto an RTD cpuModule is essentially the same as a desktop PC:

1. Obtain a copy of the Linux distribution install discs (CD or DVD).
2. Attach a DVD-ROM or CD-ROM drive to the RTD cpuModule (attach to IDE/SATA or USB).
3. Configure the BIOS to boot to the DVD/CD drive.
4. Insert the Linux install disc.
5. Boot to the install disc.
6. Follow the on-screen instructions.

NOTE: The ATA Disk Chip provided by RTD has a limited capacity (typically 1, 4, or 8GB). Desktop Linux distributions usually contain several large software packages (e.g. OpenOffice.org). Due to disk space constraints, it may be necessary to forego these packages when installing to an ATA Disk Chip.

A major benefit of x86 compatibility is that most onboard hardware should work "out of the box" under Linux. This includes:

- ATA Disk Chip (uses a standard IDE/SATA Interface)
- VGA
- Serial Ports
- USB
- Ethernet

Special RTD Features: Most RTD cpuModules include special features such as Advanced Digital I/O (aDIO) and Advanced Analog I/O (aAIO). To use these features, drivers are provided by RTD. These drivers are similar to the ones provided for our peripheral modules (see below).

NOTE: The RTD drivers are not necessary to use the standard PC features of your cpuModule. If you do not intend to use the RTD special features, no additional drivers will be needed.

Peripheral Module Linux Support

RTD offers a diverse range of Peripheral Modules (Data Acquisition, Wireless, etc). The required software support for these modules can vary. Some peripheral boards are natively supported by the Linux kernel, and require no additional software support from RTD. Others require RTD drivers.

Linux support for Peripheral Modules can be divided into four categories:

1. **Native Support** – Drivers are built into the Linux kernel. No additional software support from RTD is required.
Examples: Ethernet, USB, and FireWire
2. **RTD Support** – Drivers are provided by RTD.
Example: dataModules
3. **Hybrid Support** – Drivers for core functionality are built into the Linux kernel. RTD provides software packages for extended functionality and improve ease of use.
Examples: GPS and Cellular Modems
4. **Community Support** – Drivers were developed by the open source community, and are not under the control of RTD.
Example: Frame Grabbers

RTD-developed Linux Drivers

Due to the fragmented nature of Linux, it is almost impossible to produce a Linux driver that is compatible across all Linux kernels and distributions in use. As a result, RTD focuses Linux development and testing on a specific set of popular kernels and distributions.

The current test matrix for RTD Linux drivers is:

- 2.4 Kernel Support:
 - Red Hat 9.0 with the standard kernel included with the distribution
 - Red Hat 9.0 with the latest "stable" 2.4-series kernel from www.kernel.org
- 2.6 Kernel Support
 - openSUSE 11.x with the standard kernel included with the distribution
 - openSUSE 11.x with the latest "stable" 2.6-series kernel from www.kernel.org

NOTE #1: This test matrix applies to current RTD driver development. Older drivers may have been developed with older Linux distros. Consult README.TXT for specific information.

NOTE #2: The version number of the latest stable kernel from www.kernel.org will vary. RTD will use latest stable version that is available at the time the driver is developed.

The specific Linux distribution and kernel revision used for driver development/testing is documented in the README.TXT file that is included with the software package. Consult this documentation to verify compatibility prior to compiling the driver.

Linux Support Limitations

1. **Kernel Version** - The Linux kernel APIs are a "moving target". The APIs frequently change between kernel revisions. Additionally, the kernel supplied by the distribution vendor may have patches applied that alter the APIs. Therefore, RTD cannot guarantee compatibility with Linux platforms other than those documented in README.TXT. It may be necessary to modify the driver source code and/or Makefiles to

accommodate an unsupported platform.

2. **Real-Time Linux** - Several real-time versions of Linux exist. These Linux versions have wildly divergent programming models, with no clear market share leader. As a result, RTD Linux drivers currently do not utilize the feature of any real-time Linux platform. Note that on most platforms, the standard RTD Linux driver will usually compile and run, however it will not be able to take advantage of the real-time features.
3. **Non-x86 Processor Architectures** - RTD Linux drivers are currently developed and tested only with x86 processors. RTD does not provide support for non-x86 platforms.

Since full source code is provided by RTD, the customer is free to modify the driver as necessary to accommodate their platform.

Technical Support & Driver Updates

Updated software and documentation is frequently posted to the RTD web site. Be sure to visit www.rtd.com regularly for newer versions. Updated Linux drivers may add support for newer kernels and distros.

Users with questions regarding RTD products and software are encouraged to contact Technical Support:

Phone: 814-234-8087

E-Mail: techsupport@rtd.com

Note that RTD Technical Support is not a general Linux help desk. Customers who require general Linux support are encouraged to contact their Linux distribution supplier, and/or visit their local Linux Users Group (LUG).