SILICONSOFTWARE

microEnable IV

Silicon Software Runtime

Version 5.2.2 for Linux

Installation Guide

Imprint

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Content

1 Introduction

1.1 Linux Distributions

The Silicon Software runtime environment is designed for machine vision applications, with particular focus on durable systems. To meet the demands for durability on operating system level, Ubuntu with LTS support qualifies as the Linux distribution of choice. Ubuntu with LTS support offers a longer life cycle and a longer maintenance period than other Linux distributions. The Silicon Software Runtime has been tested with particular care on this operating system. Nevertheless, the Silicon Software Runtime does not use a distribution dependent implementation. It should work on other distributions as well. Implementation on one of these other distributions should be tested in a given case.

1.2 System Requirements

To install and use the Silicon Software Runtime, you need the following components:

- Kernel 3.2
- Ubuntu 12.04 LTS
- glibc version: >= version 2.8
- zlib version: >= version 1.2.3
- libtiff version: >= version 3.8.2
- C-Compiler

Other Systems

Other systems should be tested in each individual case.

1.3 Further Prerequisites

Root User Access Rights: For installing the Silicon Software Runtime, you need the according access rights on the system. Therefore, you have to log on as a root user before installation.

Plugged Frame Grabber Hardware: To install the runtime components, you do not need to plug the microEnable frame grabber to the system. Nevertheless, available hardware makes it a lot easier to verify if an installation has been successful (for information on how to install the frame grabber hardware, see the according section in the document Getting Started/Hardware).

2 Installing the Software

2.1 Installation Components

The installation of the Silicon Software Runtime consists of three components:

- Driver package
- Software components and documentation package
- Installation script

Driver package: The driver comes as source code and has to be compiled and installed before usage (see section 2.3 below). The file name of the device driver package is:

```
menable_linuxdrv_src_3.9.17_4.0.6.tar.bz2
```

(The figures “3.9.17_4.0.6” indicate the version of the driver and may differ with another delivery.)

Software components and documentation package: The package contains all software components and the documentation (in HTML and PDF). The components come as ready-to-use binary files. You can use the installation script to extract and copy the files to their final destination within the file system (see section 2.4 below).

The file name of the software and documentation package is:

- **`siso-rt5-5.2.2-linux-amd64.tar.bz2`** (for 64 bit systems)
- **`siso-rt5-5.2.2-linux-ia32.tar.bz2`** (for 32 bit systems)

(The figures “rt5-5.2.2” indicate the version of the software and may differ with another delivery.)

The following main software components are contained (amongst others):

- Runtime libraries (SDK) as library (*.so)
- Applets (*.so)
- Header files and linker libraries (*.h and *.a) of the Software Development Kit (SDK)
- Tools in form of executable files (command line and GUI tools for support, diagnosis and parameterization)
- Firmware files for the individual frame grabber types and models (*.hap)
- Documentation

Installation script: To ease the installation of the software components, a shell script is delivered which copies the software component files to their final destination (installation folder) and makes entries in the system environment (see below for details). The file name of the installation script is:

- **`siso-rt5-5.2.2-linux-amd64-installer.sh`** (for 64 bit systems)
- **`siso-rt5-5.2.2-linux-ia32-installer.sh`** (for 32 bit systems)

(The figures “rt5-5.2.2” indicate the version of the software and may differ with another delivery.)

2.2 General Installation Procedure

To install the Silicon Software Runtime, you have to carry out three steps:

- Install the device drivers for framegrabbers microEnable III (32 Bit only) and/or microEnable IV
- Install the software components and documentation
- Adapt the system environment

2.3 Installing the Driver

To install the driver, you have to carry out four steps:

- Extract the driver source code files (the drivers come as source code)
- Compile and link the driver sources
- Load the driver
- Set the access rights

Detailed Driver Installation Information

In addition to the following instructions, you may also refer to the „INSTALL“ file (which you find in the archive of the driver sources). It contains a detailed description of the whole driver installing procedure, and tips for troubleshooting.

Although the driver installation procedure has been tested most carefully, minor difficulties can occur due to the manifold of systems. The troubleshooting tips in the „INSTALL“ file provide you with solutions for those cases.

2.3.1 Extracting the Driver Sources

To extract the driver source files:

1. Open a terminal window.
2. Go to the directory where you want to extract the sources to.
3. Start extracting the driver sources by entering the command

```
tar xjvf menable_linuxdrv_src_3.9.17_4.0.6.tar.bz2
```

2.3.2 Compiling and Installing the Driver

To compile and install the driver:

1. Open a terminal window.
2. Go to the directory where you have the driver sources extracted to (see above).
3. Start the build procedure by entering commands

```
make && sudo make install
```

4. Enter your password when you are asked.

Now, all necessary files are built and installed.

2.3.3 Loading the Driver

To load the driver:

1. Enter command

```
sudo modprobe menable
```

If you have a frame grabber plugged into your system, you can check if the driver is loaded and fully functional:

2. Enter command

```
dmesg | grep menable
```

2.3.4 Setting the Access Rights

After the driver has been loaded, the microEnable frame grabbers can only be accessed by users that have administrative access rights.

	**Enabling user accounts** We recommend you assign all users you want to be able to access the driver (and thereby the frame grabber) to the group “video”.

To assign users to the group “video”:

1. Enter the command

   ```
   sudo usermod -aG video <username>
   ```

   (Replace <username> with the user name of the user.)

After the user’s next login to the system, the changes in group membership are active. The user is now able to fully use the microEnable boards from his/her own account.

2.3.5 Driver Entries

Entries by the driver are written into the file **`/etc/udev/rules.d/10-siso.rules.`**

2.3.6 Additional Helpful Commands for Setting Up the Driver

Command	Result	Application Area
insmod	Show loaded modules and accessing programs	Diagnosis
modinfo modinfo <modulename>	Show information on loaded modules	Diagnosis
modprobe Loading: modprobe –a <modulename> Unloading: Modprobe –r <modulename>	Load/unload modules including implicit dependencies	Loading and unloading manually
depmod	Enter information on module dependencies into file **/lib/module/**<Kernelversion>**/modules.dep** so that module can be loaded automatically during system start	Important step during Installation
-	Load module automatically during system start: Entry in file **/etc/modules**	Important step during Installation

Table 1: Commands for Driver Set-Up

2.3.7 Further Information

Further information and guidance in case of difficulties you can find in document “INSTALL“ which is located in the archive of the driver source files.

Driver Re-Installation after Kernel Update

Please keep in mind that after a kernel update, you have to re-build and install the driver again.

2.4 Installing the Software Components

There are two options for installing the software components of the Silicon Software Runtime.

You can either

- use the installation script that has come together with the other packages (as described below), or
- extract the files and copy them into the target directory of the installation.

2.4.1 Using the Installation Script

Read here how to install the Silicon Software Runtime under Linux using the installation script via shell.

Using the call parameters of the installation script

If you use the shell script as described below, you will have to enter some installation-relevant data during installation. Alternatively, you can use the according call parameters of the installation script.

Use the command

```
[prompt] ./[NameOfRuntimeInstallerFile] -h
```

to get an overview listing all available installation parameters, together with their preset default values. The order in which you enter the parameters is of no relevance.

To install the Silicon Software Runtime using the shell script:

1. Boot the system.
2. Go to the directory that contains the Silicon Software Runtime installer.
   Depending on the system you are using (32 or 64 bit), you will have been provided with one of these two installer files:

   - **siso-rt5-5.2.2-linux-amd64-installer.sh** , or
   - **siso-rt5-5.2.2-linux-ia32-installer.sh**

3. Enter either

   ```
   [prompt] ./siso-rt5-5.2.2-linux-amd64-installer.sh
   ```

   or

   ```
   [prompt] ./siso-rt5-5.2.2-linux-ia32-installer.sh
   ```

4. Decide where on your system you want to install the Silicon Software Runtime.

Access Rights

- Make sure you have full administrative access to the folder where you want to install the runtime in (e.g., as a root user). You must be able to execute files within this installation folder.
- Make sure the file can be executed. If not, use the **chmod** command. You can change access permissions so that they correspond to the required setting by using the **chmod** command:

  ```
  chmod +x [NameOfRuntimeInstallerFile]
  ```

5. Use the **-d** command to specify the directory where you want to install the Silicon Software runtime in (without a slash at the end of the path):

```
[prompt] ./[NameOfRuntimeInstallerFile] -d [PathToTargetDirectory]
```

Now, the target directory you specified is displayed.

6. Confirm the target directory you have chosen by writing **yes** (you have to write the whole word, to write just an y will not be enough).

Tip

Alternatively to the last steps, you can also specify an installation directory and directly affirm your choice.

To do so, add an -y after the installation command:

```
[prompt] ./[NameOfRuntimeInstallerFile] -d [PathToTargetDirectory] -y
```

Now, the installation process is started:

- The installer file will be unzipped into the directory you specified.
- The extracted files will be modified in so far as absolute paths are being set.

After successful installation, the absolute paths are displayed in the shell.

If you want to read the full installation log:

7. Go to the installation directory (using the **cd** command) and enter

```
[prompt] cat install.log.txt
```

Now, the content of the installation log file *install.log.txt* is displayed in the shell.

2.4.2 Adapting the Environment

After installing the runtime, the environment variables have to be set. You can either do this automatically, or manually.

Setting Important Environment Variables Manually

After (re)installation of the Silicon Software Runtime, at least one environment variable needs to be updated:

- SISODIR5

The variable SISODIR5 must point to the installation directory where the runtime is installed.

1. Set SISODIR5 by using the following command:

   ```
   export SISODIR5=/opt/SiliconSoftware/Runtime5.2.2
   ```

   (in this example, /opt/SiliconSoftware/Runtime5.2.2 is the directory where the runtime is installed; specify the path to the installation directory according to your file system.)

2. Set the GenICam environment for the runtime:

   ```
   export GENICAM_ROOT_V2_2=${SISODIR5}/genicam
   export GENICAM_CACHE_V2_2=${SISODIR5}/genicam/cache
   export
   GENICAM_LOG_CONFIG_V2_2=${SISODIR5}/genicam/log/config/SisoLogging.prop
   erties
   ```

3. To locate the corresponding modules PATH and LD_LIBRARY_PATH, use the following commands:

   ```
   export PATH=${SISODIR5}/bin:${PATH}

   export
   LD_LIBRARY_PATH=${GENICAM_ROOT_V2_2}/bin/<PLATFORM>:${SISODIR5}/lib
   :${LD_LIBRARY_PATH}
   ```

   <PLATFORM> is either “Linux32_i86” or “Linux64_x64”.

Note

When using Ubuntu 12.04 LTS, you can make these entries for the current terminal in file

```
/etc/profile.d
```

Adapting the Environment Automatically

After installing the runtime, the environment variables have to be set. This can be done automatically. In this case, you simply have to start the process.

1. To start the automatic setting of the necessary environment variables, enter

   ```
   [prompt] source <INSTALLDIR>/setup-siso-env.sh
   ```

   Upon pressing ENTER, all environment variables required for using the runtime are set to the appropriate values automatically.

2. You can read which environment variables have been set, and which values are being used. To read the according file, enter

   ```
   [prompt] cat <INSTALLDIR>/setup-siso-env.sh
   ```

   Now, the content of the file is displayed in the shell.

2.4.3 Setting User Access Rights

We recommend to grant full access rights to all users to the directories

```
<INSTALLDIR>/bin/log
<INSTALLDIR>/genicam/cache
```

Only when write access is enabled, the Silicon Software Runtime can place log files in these directories. Without sufficient access rights, some tools and features may not work properly (e.g., microDiagnostics).

2.4.4 Placing the Applet Files

To use VisualApplets (*.hap) files created by Visual Applets:

1. Copy the (*.hap) files into this folder:

   <INSTALLDIR>/Hardware Applets/<Platform>

   <PLATFORM> refers here to the frame grabber hardware platform, e.g, mE4AD4-CL, mE4VD4-CL, mE4VQ4-GPoE …

VisualApplets (*.hap) files enhance the image processing functionality of the frame grabber.

3 The Generic Service

	**The Program gs** The program gs implements the „Generic Service“ and is in the following referred to as „Generic Service“.

When using a GigE Vision frame Grabber, you have to start the Generic Service before working with frame grabber and runtime.

	**Important** The Generic Service must be always running. We recommend to start the Generic Service at system start. Refer to the documentation of your current distribution to get detailed information on how to do that. You could, for example, write an according Shell Script for starting the service, and place it in directory **/etc/init.d/**

3.1 Starting the Generic Service Manually

To start the service manually (via a terminal window):

1. Enter

   ```
   [prompt] gs start
   ```

2. To check if the service is running, enter:

   ```
   [prompt] gs status
   ```

   You will get a return saying "Service is running."

3.2 Stopping the Generic Service Manually

To stop the service manually (via a terminal window):

1. Enter:

   ```
   [prompt] gs stop
   ```

2. To check if the service has really been stopped, enter:

   ```
   [prompt] gs status
   ```

   You will get a return saying "Service is not running."

3.3 Running the Generic Service directly in the Shell

You can also run the service directly in the shell.

To run the service directly in the shell:

1. Enter

   ```
   [prompt] gs run
   ```

To stop the service when running in the shell:

2. Use the key combination

   CTRL + C

4 Starting microDisplay and microDiagnostics

To set up and control your image acquisition system, you can use the programs **microDisplay** and **microDiagnostic** which come as part of the installation package.

Important

Before running microDisplay, microDiagnostics, any other tool, or even an SDK project, please make sure that for the specific runtime version you are using

- the frame grabber is loaded with the required firmware, and
- the required device driver is installed.

To open microDisplay:

1. Enter

```
[prompt] microDisplay
```

   For further information, please refer to the microDisplay Documentation.

To open microDiagnostics:

1. Enter

```
[prompt] microDiagnostics
```

   For further information, please refer to the microDiagnostics Documentation.

5 Deinstallation

5.1 Deinstalling Drivers

To uninstall the driver manually:

1. Enter the following commands in a terminal:

```
sudo rmmod menable.ko
sudo rm /etc/udev/rules.d/10-siso.rules
sudo rm /sbin/men_path_id /sbin/men_uiq
sudo rm `find /etc/modules -name menable.ko`
```

Note

Please note that ` above must be a backtick, usually entered as an accent grave.

Alternatively, you can:

- Enter the **find** command seperately,
- Specify the path of **menable.ko,** and then
- Call **sudo rm** using the specified path.

5.2 Deinstalling Software Components

To deinstall software components of the Silicon Software Runtime:

1. Delete all files in the corresponding install directory.
2. Undo all manual changes you made to the system.

6 Parallel Installations

If you want to use multiple installations of the Silicon Software Runtime on one system, we recommend the following procedure:

1. Install the newest driver on the system.
2. Switch between the installations by setting the environment variable SISODIR5 to the according installation path.

This way, applications out of a specific installation can be started via scripts (that have been adapted accordantly).

7 Support

For technical support please contact our support team:

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