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# **Software Communications Architecture v2.2 Reference Implementation Project**

**SDRF Forum Contract  
SDRF-04-A-0002-V0.00**

## **Deliverable 3**

### **AudioEffect Application User Guide**

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## TABLE OF CONTENTS

<b>List of Figures.....</b>	<b>iv</b>
<b>1. Introduction.....</b>	<b>1</b>
<b>2. Hardware Requirements.....</b>	<b>2</b>
<b>3. Software Configuration.....</b>	<b>3</b>
3.1 Starting the Naming Service .....	3
3.2 Booting Node1 .....	3
3.3 Starting the Component Inspector .....	3
3.4 Starting the Application Manager.....	4
<b>4. AudioEffect Application Demonstration .....</b>	<b>5</b>
4.1 Hardware Connections.....	5
4.2 Installing the AudioEffect Application.....	5
4.3 Instantiating the AudioEffect Application.....	6
4.4 Starting the Application .....	6
4.5 Configuring the Application .....	7
4.6 Stopping the Application .....	8
4.7 Shutting Down the Application .....	8
4.8 Uninstalling the Application .....	9



## LIST OF FIGURES

Figure 1: Component Inspector .....	4
Figure 2: Application Manager .....	4
Figure 3: Installing the AudioEffect Application .....	6
Figure 4: AudioEffect Application .....	8
Figure 5: Uninstalling the AudioEffect Application.....	9



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## 1. INTRODUCTION

This document describes the various steps needed to install and use the AudioEffet application developed by CRC in the scope of the SCAv2.2 Reference Implementation project. The first section describes the hardware required to run the application. In the second section, the software configuration required to deploy an application is described and the third section explains how to install and use this application.



## 2. HARDWARE REQUIREMENTS

To run the provided applications, your system must meet the following requirements:

- 1 - Speakers
- 2 - Microphone
- 3 - Sound board that supports full duplex communication
- 4 - Linux device called “/dev/dsp” that is properly configured

Note: The AudioDevice provided is implemented using the “ioctl” function to configure the “/dev/dsp” device with the following properties:

- SNDCTL\_DSP\_SETDUPLEX
- SNDCTL\_DSP\_SAMPLESIZE
- SNDCTL\_DSP\_PROFILE
- SNDCTL\_DSP\_STEREO
- SNDCTL\_DSP\_SPEED
- SNDCTL\_DSP\_GETBLKSIZE

If your soundboard does not support the above “ioctl” configuration, it is possible to download different drivers such as those provided by the Advanced Linux Sound Architecture (ALSA) project.

See <http://www.alsa-project.org/> for more details.

Note: On most computers, the microphone is set to use a hardware by-pass to send its input directly to the speakers. For the demonstration application, the microphone must be configured to send its output to the operating system software mixer. This can be done using the command “kmix” in KDE.



### 3. SOFTWARE CONFIGURATION

Prior to performing any instruction described in this document, the SCARI-Open environment must be setup and the associated node and application preparation must have been performed as described in the associated “Readme.pdf” document.

#### 3.1 *Starting the Naming Service*

Start the CORBA naming service.

Run the following script in the first shell (i.e. command line window or Konsole)

```
cd $SCA_HOME  
./startNamingService
```

#### 3.2 *Booting Node1*

Start Node 1. Node 1 is composed of the following components: DomainManager, DeviceManager, ExecutableDevice, AudioDevice, RFDevice, LogService.

Run the following script in a second shell:

```
cd $SCA_HOME\  
./DemoPlatformNode1Bootup
```

#### 3.3 *Starting the Component Inspector*

The Component Inspector is a basic tool used to introspect an SCA radio. It provides a Graphical User Interface (GUI) to query the SCA radio and display run-time information regarding active SCA components in the radio. Figure 1 shows the Component Inspector layout. It is a useful tool to inspect the status of a radio after a node boot or application deployment. It provides the user with quick access to information such as the list of SCA components that have been started, where they have been deployed, and the established and pending connections. It also offers a log viewer displaying the SCA log messages generated in the radio.

Run the following commands in a separate shell.

```
cd $SCA_HOME  
./startComponentInspector
```

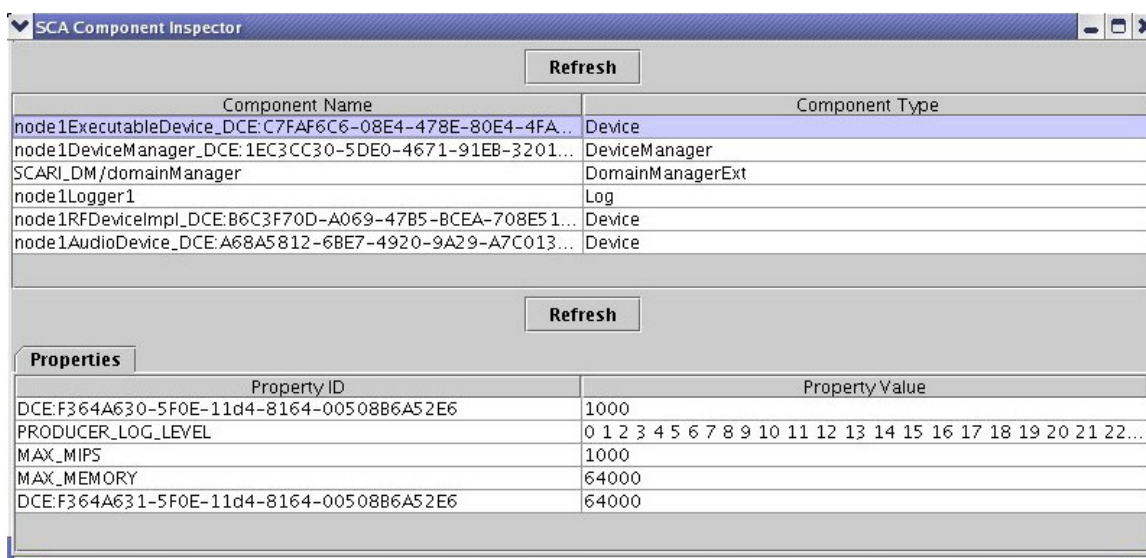


Figure 1: Component Inspector

### 3.4 Starting the Application Manager

The Application Manager is a basic tool used to install/uninstall SCA applications as well as control applications through their configuration properties.

Run the following commands in a separate shell.

```
cd $SCA_HOME  
./startApplicationManager
```

The Application Manager is used in the next section to start and control the application.

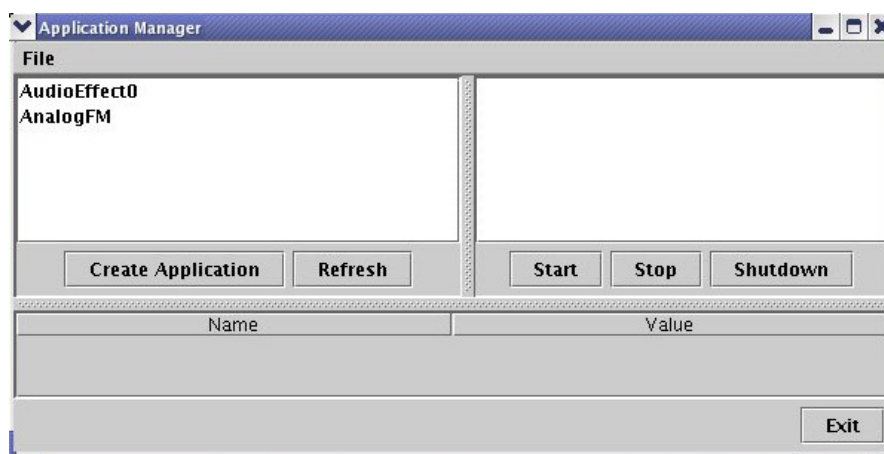


Figure 2: Application Manager





## 4. AUDIOEFFECT APPLICATION DEMONSTRATION

The AudioEffect Application performs audio effects on a voice stream. It has three configurable parameters: ECHO\_GAIN, NUMBER\_OF\_VOICES and ECHO\_DELAY. The application processes the voice which is affected by the echo gain value and a number of voices. The results can be heard from the speakers.

### 4.1 Hardware Connections

The input voice is coming from a microphone connected to the “microphone input” of the soundcard. The voice output can be heard on the speakers connected to the “speaker output” of the soundcard.

### 4.2 Installing the AudioEffect Application

- From the toolbar menu of the Application Manager select File then Install/Uninstall. The *PackagedApplicationInstaller* window will appear (see Figure 3)
- Click on the Browse button on the *PackagedApplicationInstaller*:
  - Double click on the *demosources* folder
  - Double click on the *Waveforms* folder
  - Double click on the *AudioEffect0* folder
  - Select the file *ApplicationPackage.jar*
  - Click on the Select Application button
- Click on the Install button in the *PackagedApplicationInstaller*. After few seconds, a dialog window indicating that the application has been installed successfully appears.
- Click on the OK button.
- Click on the Exit button.

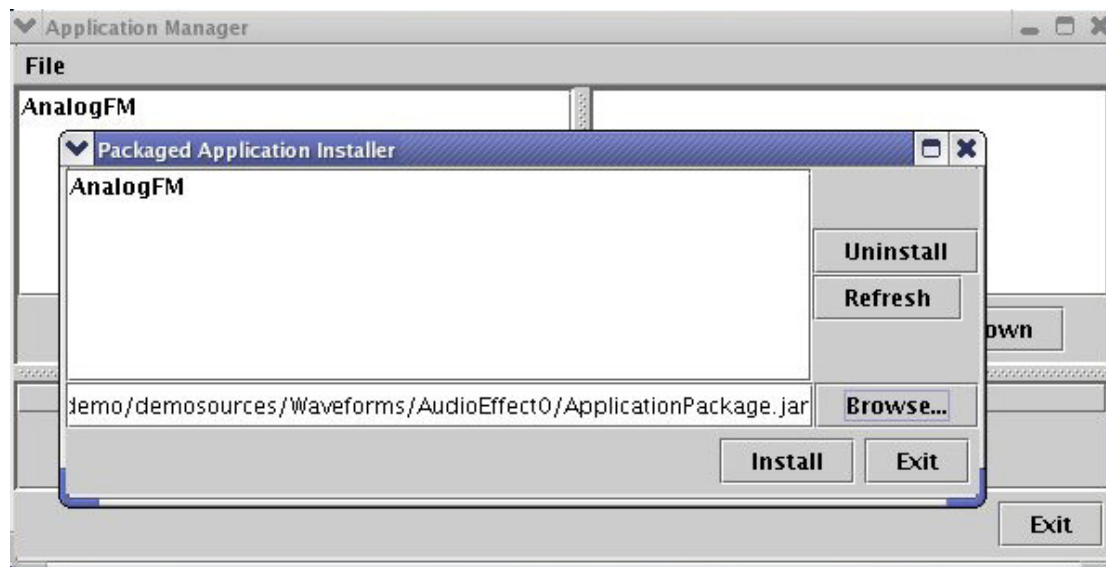


Figure 3: Installing the AudioEffect Application

### 4.3 Instantiating the AudioEffect Application

- Select the *AudioEffect0* in the list on the left in the *ApplicationManager*.
- Click the Create Application button on the *ApplicationManager*.
- Enter 'AudioApp' as the application name, and then press Enter. After a few seconds, a dialog window indicating that the application has been created successfully appears.
- Click on the OK button.
- The application of type *AudioEffect0* has been created and the name 'AudioApp' is shown in the application list (right pane).

### 4.4 Starting the Application

- Select the Application 'AudioApp' instance in the list on the right of *ApplicationManager*.
- Click the Start button. A dialog window indicating that the application has been started appears.
- Click the OK button



## 4.5 Configuring the Application

- Select the 'AudioApp' application instance in the list on the right of the *ApplicationManager*.
- Double click on the ECHO\_DELAY parameter value in property table of the *ApplicationManager*.
  - Modify the value and press enter (e.g. from 0.5 to 0.8).
  - Speak in the microphone.
  - The result is that the audio effect application processes the voice with a different echo delay value, which can be heard from the speakers.
- Double click on the NUMBER\_OF\_VOICES parameter value in property table of the *ApplicationManager*.
  - Modify the value and press enter (e.g. from 0 to 1).
  - Speak in the microphone.
  - The result is that the audio effect application processes the voice with a different number of voices, which can be heard from the speakers.
- Double click on the ECHO\_GAIN parameter value in property table of the *ApplicationManager*.
  - Modify the value and press enter (e.g. from 0.5 to 0.8).
  - Speak in the microphone.
  - The result is that the audio effect application processes the voice with a different echo gain value, which can be heard from the speakers.

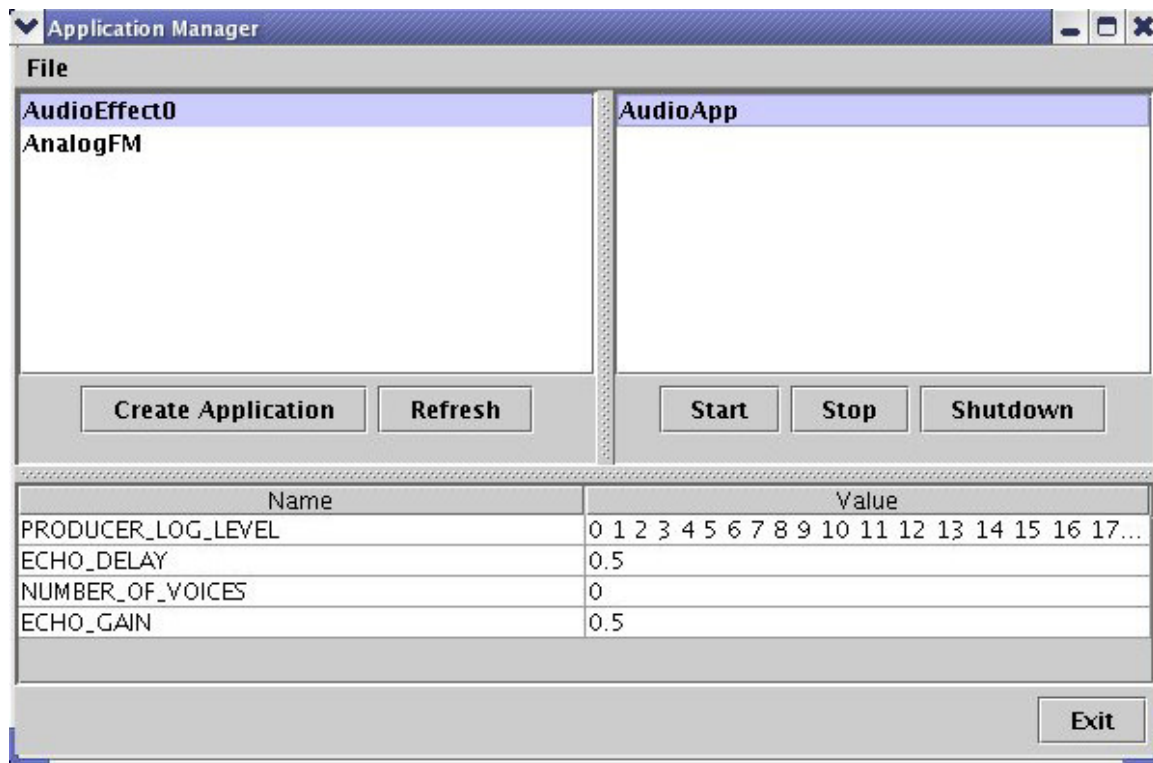


Figure 4: AudioEffect Application

#### 4.6 Stopping the Application

- Select the Application 'AudioApp' instance in the list on the right of ApplicationManager.
- Click the Stop button. A dialog window indicating that the application has been stopped appears.
- Click the OK button.

#### 4.7 Shutting Down the Application

- Select the Application 'AudioApp' instance in the list on the right of ApplicationManager.
- Click the Shutdown button. A dialog window indicating that the application has been stopped appears.
- Click the OK button.



## 4.8 Uninstalling the Application

- From the toolbar menu select File then Install/Uninstall... The *PackagedApplicationInstaller* window will appear.
- Select the *AudioEffect0* application in the list of the *PackagedApplicationInstaller*.
- Click on the Uninstall button. A dialog window will appear indicating that the application has been uninstalled successfully. After the message is displayed, the list of the *PackagedApplicationInstaller* will be empty.
- Close window.

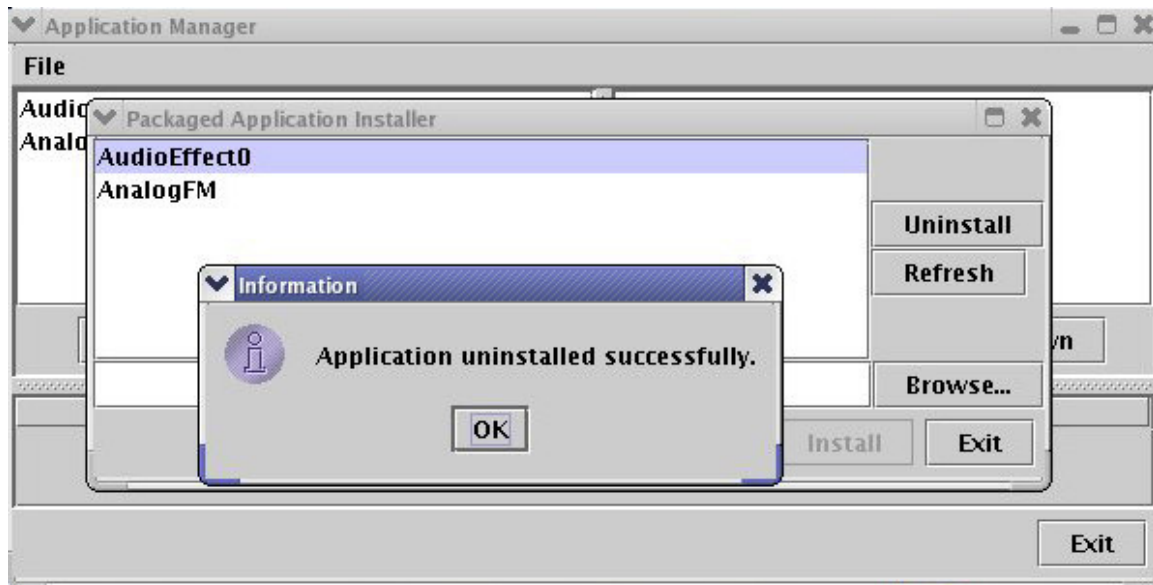


Figure 5: Uninstalling the AudioEffect Application