Computer Systems, Inc.

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README

FM3TR Waveform Reference Implementation

SDR Forum Contract

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1 Introduction

This document describes the steps for installing and running the FM3TR waveform application in audio or data mode. The audio and data modes are implemented as separate waveforms but they share some of the components. Each waveform implements the full receive and transmit chain (in loopback mode), therefore the waveforms can be run and tested on a single computer.

The project folders contain both the waveform source code and the compiled binaries. We advise users to try to run the precompiled binaries first to make sure that the environment is setup properly. Once it is verified that both audio and data waveforms are running, the source code can be modified and recompiled.

If you are having problems while trying to start the applications, please review the Frequently Asked Questions document.

2 Environment Setup

2.1 Dependencies

2.1.1 Hardware

The following minimum configuration is required to run the waveform applications:
- Pentium processor 1.6 GHz or better
- 1 GB memory
- Sound Card (for audio mode)

2.1.2 Software

Microsoft Windows XP: The FM3TR waveform applications are designed and developed to execute on Microsoft Windows XP.

SCARI-Open: The FM3TR waveform applications are designed to run under Microsoft Windows XP on the SCARI-Open Core Framework. It is the user's responsibility to compile and run the SCARI-Open Core Framework on Windows using toolkits such as Cygwin or MKS. Both environments have been tested and verified by Mercury Computer Systems.

ACE/TAO: The executable device and the waveform applications use ACE/TAO as the CORBA Object Request Broker. Please make sure ACE version **5.3a_p1-OCI** and TAO version **1.3a_p1-OCI** are installed on the machine and the necessary environment variables are set (ACE_ROOT, TAO_ROOT and path).

Microsoft Visual Studio .NET: The FM3TR source code package supports the Microsoft Visual Studio .NET environment for development. The necessary solution and project files are supplied as a part of the package.

PentiumDevice: An SCA compliant executable device implementation is provided to run the waveform component binaries in Windows environment. This executable device is provided in binary form only as it is not a part of the waveform.

2.2 Copying Files

Please copy - *do not move* - the following files to the specified directories.

1) Copy and extract all files under C:\sdr\

2) Copy the following files from C:\sdr\xml\PentiumDevice\ to scari-Open\demosources\Node1\profile\

-PentiumDevice.spd.xml
-PentiumDevice.scd.xml
-PentiumDevice.prf.xml
-PentiumDevice.dpd.xml

3) Copy **DeviceBootstrap.exe** file from C:\sdr\bin\ to scari-Open\demosources\Node1\profile\

4) Create a directory named **FM3TR** under scari-Open\demosources\waveforms\

5) Copy the **audio.jar** and **data.jar** files from sdr\bin\ to scari-Open\demosources\waveforms\FM3TR\

2.3 Environment Variables

You will need to set the following environment variable to be able to compile and run the waveform applications.

MC_SDR_PATH = C:\sdr\bin

Also update your Path variable to include C:\sdr\bin

Please make sure that the environment variables ACE_ROOT, TAO_ROOT, JAVA_HOME, CLASS_PATH and SCA_HOME are also set according to the instructions provided by the ACE/TAO and SCARI-Open installations.

3 Running the Waveforms

Follow the below steps to run the application. The instructions assume Cygwin is being used to run the SCARI-Open Core Framework but a similar approach can be followed to use MKS.

1) In a Cygwin window, go to the SCARI-Open home directory and start the naming service by executing the command: startNamingService. When the naming service is up and running on port 1050, you should see the message:
"Ready."

2) In a separate Cygwin window, go to the SCARI-Open home directory and boot up the core framework by executing the command: DemoPlatformNode1Bootup
When the core framework is ready, you should see the message:
"Node Started..."
"Press <Enter> to terminate nodeBoot"

3) In a Windows command prompt, go to the MC_SDR_PATH directory and boot up the Executable Device by executing the command: runPentiumDeviceforSCARI.bat
Once started, the executable device finds the domain manager through the naming service and registers itself. When the device is ready, you should see the message:
"Pentium Device operational"

4) As an optional step, you can run the Component Inspector to see the components of the core framework as well as the new executable device (Pentium Device). To do this, in a Cygwin window, go to the SCARI-Open home directory and execute the command: startComponentInspector

5) In a separate Cygwin window, go to the SCARI-Open home directory and start the Application Manager by executing the command: startApplicationManager.

6) In the Application Manager window, select "File" from the menu, then browse to find the waveform file (SCARI-Open/demosources/waveforms/FM3TR/audio.jar for audio mode and SCARI-Open/demosources/waveforms/FM3TR/data.jar for data mode). Click on install, then exit.

7) The installed waveform should appear on the Application Manager window. Click on the waveform name, then click on create. Assign a name to the waveform application instantiation. You should then see multiple windows, each representing a separate component.

8) Click on start. If audio mode is running, you can speak through a microphone and hear yourself back on the speakers. If data mode is running, a file gets transferred (input and output file names are defined in the component XML files). The data mode introduces random errors and retransmits packages to show MAC/LLC functionality therefore it can take a long time to transfer a file.

9) Click on stop to stop the waveform.

10) Click on shutdown to tear down the waveform instance. The waveform component windows should disappear.

11) Optionally, you can also uninstall the waveform from the File menu. Remember to uninstall and reinstall the waveform if you make any changes to the XML files or the source code.

12) Shutdown the SCARI Domain Manager and Device Manager. This should trigger the shutdown of the Pentium Device.

4   Modifying the Source Code

The FM3TR source code package includes a Microsoft Visual Studio .NET solution file to facilitate the code modification and development process. Click on the file components_only_sdrf.sln to open the solution. You can then view and modify the source code and recompile each project. After compilation, the binaries get copied to the bin directory and the libraries get copied to the lib directory.

5   Creating a New Waveform Package

If the XML files or the source code of the waveform components get modified, the waveform needs to be reinstalled to the domain manager. To do this, create a directory, put all the waveform xml files (SAD, SPD, SCD and PRF) and the component dll files in this new directory, and then run the command:
jar –cvf filename.jar *.*

You can choose any filename for your jar file. Each jar file should contain only one waveform's files (i.e. do not put audio and data waveform files in the same jar file).

Then copy this new jar file to the directory:
SCARI-Open/demosources/waveforms/FM3TR

Finally, install the modified waveform using the Application Manager.