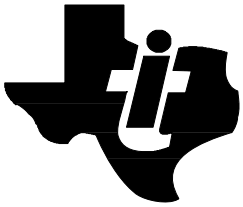
MMCODECS

EQ on TMS320C55xx
RELEASE NOTES



Software Released	Release version	Release Date
EQ	**2.3**	**29/Jan/04**

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Date	29/Jan/04	29/Jan/04

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1 Introduction

Read this release bulletin carefully before installing and using this software.

This document corresponds to the release of TI's XDAIS compliant implementation of Equalizer algorithm.

This release is tested on TMS320C55xx EVM using CCS version 2.2 and Code Generation Tools version 2.56.

1.1 Feature Summary

TI's implementation of the EQ algorithm has the following features:

- Supports N bands of Equalization
- Gains adjustable from –15db to +15 db in 1db steps
- Distortion free flat spectrum at 0 dB gain
- No unpleasant audible artifacts during gain changes
- 16-bit mono PCM input and output audio data
- Center frequencies and bandwidths are configurable off-line
- Implemented by 2^{nd} order IIR sections in cascade.
- Fully validated on TMS320C55xx EVM using CCS version 2.2 with the code generation tools version 2.56

1.2 Release Contents

The contents of the release are listed below.

1. Release Notes (this document) providing overview of this release.

2. User guide document of this release.
3. Data sheet detailing about the memory and MIPS.
4. Compliance Test Report of XDAIS QualiTI Testing
5. EQ algorithm test application, test streams and test utilities.

2 Tools Specification

This section documents the tools used during the project lifecycle, and their relevant versions.

2.1 Hardware Tools

2.1.1 Target Device

This project has been built and tested on TMS320C55xx EVM using CCS version 2.2 and Code Generation Tools version 2.56.

2.2 Software Tools

2.2.1 Development Environment

This project is developed using **Code Composed Studio** (**CCS**) *version 2.20* from Texas Instruments.

2.2.2 Code Generation Tools

This project is compiled, assembled, archived and linked using TMS320C55xx Code Generation Tools Version 2.56**.**

2.2.3 External Dependencies

None.

2.2.4 XDAIS Compliancy Tools

Testing for TMS320 Algorithm Interface Standard has been performed using the tool **QualiTI version 3.3**, by Texas Instruments.

3 Installation Procedure

This section is applicable only for source code release of the algorithm. The installation procedure and the directory structure will be different for a binary only release.

The TI EQ algorithm loads and runs under the TI Code Composer Studio (CCS) for OMAP version 2.2. Therefore, CCS must be properly installed before the user can run the TI EQ software. Installation of the CCS is beyond the scope of this document. Please contact your TI sales representative to obtain and install CCS.

Included in the algorithm software package is a test framework that allows the developer to run various input PCM files through the algorithm and store them in output files.

To install the EQ algorithm software onto the PC, the user must copy the zip file into the desired directory then decompress the file using an unzip utility. The file will automatically complete the installation process by making all necessary directories and installing the algorithm files into the appropriate directories on the hard drive. Upon completion of the installation process, you should have the following directory structure installed on your PC;

eqc55x_xdais \ algorithm

eqc55x_xdais \ application

eqc55x_xdais \ config

eqc55x_xdais \ docs

eqc55x_xdais \ interface

eqc55x_xdais \ test

Note: To maintain consistency of the directory structure, some of the directories are created without any files or subdirectories inside.

3.1 algorithm Directory Description

This directory has the algorithm source files and library build file to make ISA specific builds.

**\ build **	Contains algorithm project file or make file.
**\ build \ debug **	Contains the generated object files.
**\ Include **	Contains algorithm header files needed to build the library.
**\ src \ c **	Contains algorithm C files needed to build the library
**\ src \ asm **	Contains algorithm ASM files needed to build the library

3.2 docs Directory Description

This directory contains the entire documentation and datasheets for the algorithm implementation.

**\ docs **	Contains XDAIS Compliance test report, User's guide and Release notes.

3.3 config Directory Description

This directory contains the configuration file to be executed on MATLAB for generating the Equalizer Coefficients.

3.4 application Directory Description

The directory contains entire source and build files to test the algorithm.

**\ build **	Contains wrapper application project file or make file.
**\ build \ debug **	Contains the generated object files. The wrapper .out and MAP files are present here.

**\ Include **	Contains header files needed to test the library.
**\ src **	Contains source files needed to test the library

3.5 interface Directory Description

This directory contains interface source, header and algorithm library files.

**\ Include **	Contains XDIAS support header files.
**\ src **	Contains XDIAS support source files
**\ lib **	Contains algorithm library file

3.6 test Directory Description

This directory contains input, output and reference files.

**\ input **	Contains input files for testing the algorithm
**\ output **	Will contain generated output files
**\ reference **	Contains reference files for the algorithm test

4 Building and Testing the Library

The information given in this section regarding building algorithm library is applicable only for a source code release of the algorithm. For an algorithm library only release, only the description regarding building application project is applicable.

This section explains how to build the TI EQ algorithm library, execute and test it using the sample application.

Running the program involves the following steps:

- Building eq_ti.l55 algorithm library.
- Building the test application and running it.

NOTE: The eq_ti.l55 algorithm library is already included in the package and the user can directly go to step 2 to run the sample application. This has been done for the convenience of the user.

4.1 Building eq_ti.l55 algorithm library

To build eq_ti.l55 library open the project eqc55x.pjt in CCS. This project file is located in algorithm\build\ directory. Build this project by selecting the Build option from the Project menu. The project will build the algorithm library eq_ti.l55 into application\build\ folder.

4.2 Building the test application and running it.

A test application project named eqc55x_application.pjt is located in application\build directory. Open this project in CCS and build it. Before you build this, make sure that you already have the eq_ti.l55 in application\build directory. (If you have followed the first two steps or have not deleted any files this should already be there). While opening this project, CCS may ask to locate the rts_ext.lib if your CCS installation is not in c:\ti. Locate it and select Project/Build. This will build eqc55x_application.out file in application\build\debug\ directory. Load this program and run it.

By default, this application will select the input stream from interface\test\input directory and dump the output file in interface\test\output directory.

Input Parameters:

- set macro N value indicating the number of equalizer bands
- infilename : Input PCM File name
- outfilename : Output PCM File name
- equalizer coefficients generated from configuration files.
- gains : set of N gain values as input

5 Verifying the output

The outputs generated by the EQ algorithm are tested using Cool Edit software.

5.1 Cool Edit tool description

This is used to analyze and compare audio signals.

6 Issues and Constraints

None.

7 References

- TMS320 Algorithm Standard Developer's Guide: spru424c.pdf

APPENDIX A
SUMMARY OF PAST CHANGES IN PREVIOUS RELEASES

DOCUMENT HISTORY

Date	Authors	Notes
29 Jan 2004	Srividya M. S.	Initial Version.

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