13

Reference Frameworks

Introduction

This chapter provides an introduction to the Reference Frameworks for eXpressDSP^{TM}, recently introduced by TI[1]. The fererence frameworks use a both DSP/BIOS and the TMS320 DSP Algorithm Standard, also known as XDAIS. The C6713 and C6416 DSK's both include a tutorial book[2] on this subject, however the frameworks can be used on the C5510 and C6711 DSK's as well.

In 1999 TI introduced the eXpressDSP software technology which includes:

- **DSP/BIOS**, a optimized, scalable, and extensible software kernel
- **TMS320 DSP Algorithm Standard** (XDAIS), which sets rules and guidelines for algorithm developers, thus making life easier for system integrators
- **A network of third-party suppliers**, to provide eXpressDSP compliant algorithms and eXpressDSP compli-

1. Texas Instruments Application Report, Reference Frameworks for ExpressDSP Software: A White Paper, SPRA094A, December 2002.
2. S. Blonstein and M. Katorgi, *eXpressDSP^{TM} for Dummies*, Wile Publishing, 2003.

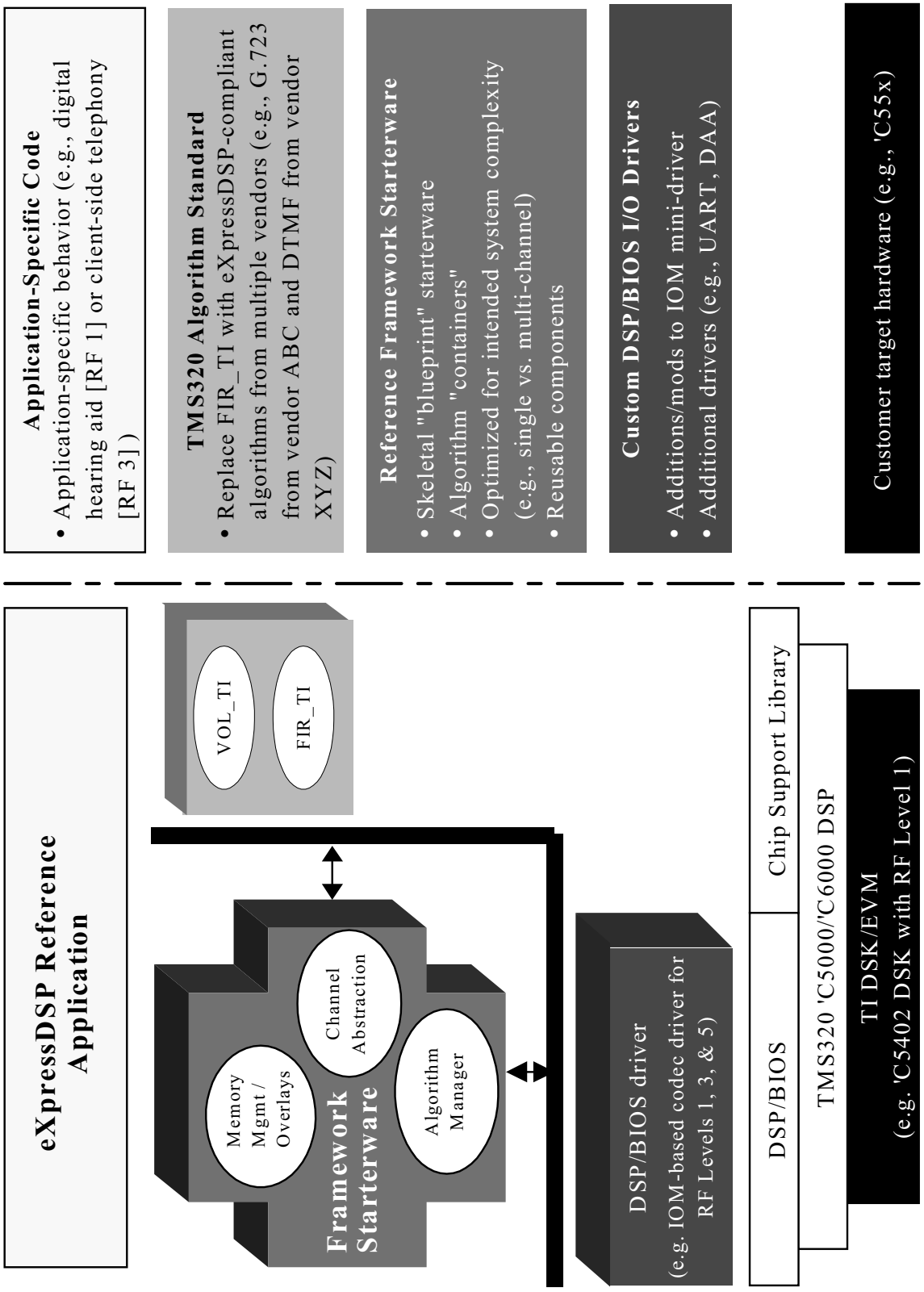
ant plug-ins for CCS

Simply put, “The reference frameworks contain *design-ready*, reusable, C language source code for TMSC5x and C6x DSPs”. A devaloper can then build on top of this framework with confidence that the components will work together. In application note SPRA795A TI defines the reference framework as:

- Generic DSP *starterware* source code using DSP/BIOS and the TMS320 DSP Algorithm Standard
- Customers can adapt the framework and populate it with eXpressDSP-compliant algorithms to achieve application-specific solutions

Beyond the eXpressDSP for Dummies book TI application notes SPRA094A, SPRA793D, SPRA793D, and SPRA795A, provide descriptions of the reference frameworks ranging from an overall white paper, details on a *Compact Static System* (RF1), *A Flexible, Multi-Channel, Multi-Algorithm, Static System* (RF3), to *An Extensive, High-Density System* (RF5) respectively.

The Software and Entry Points



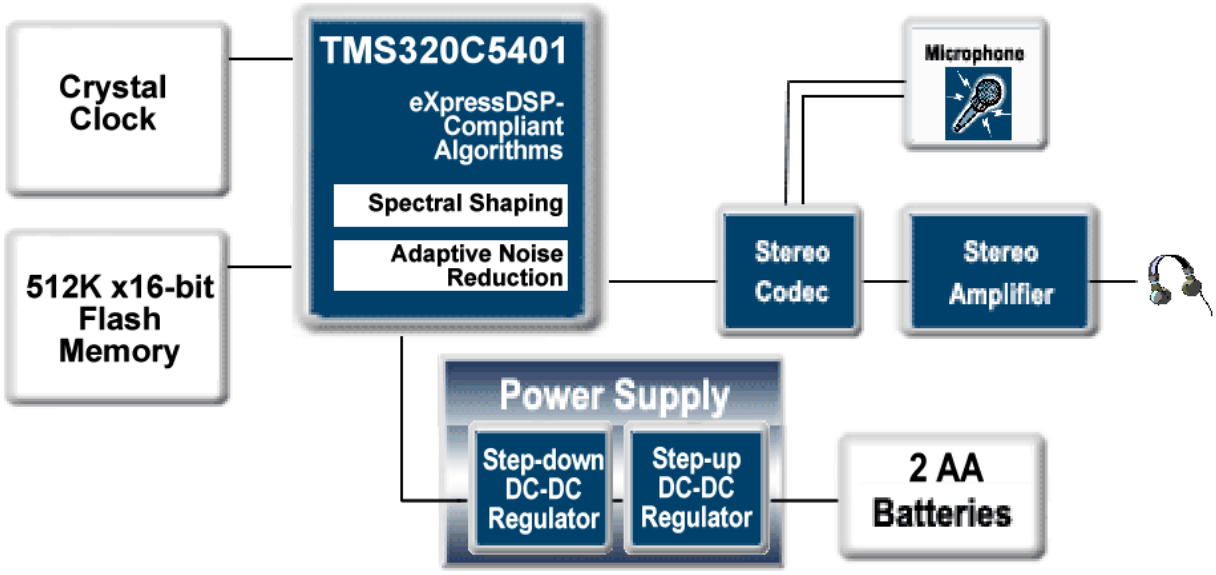
Frameworks Overview

Presently there are three frameworks levels:

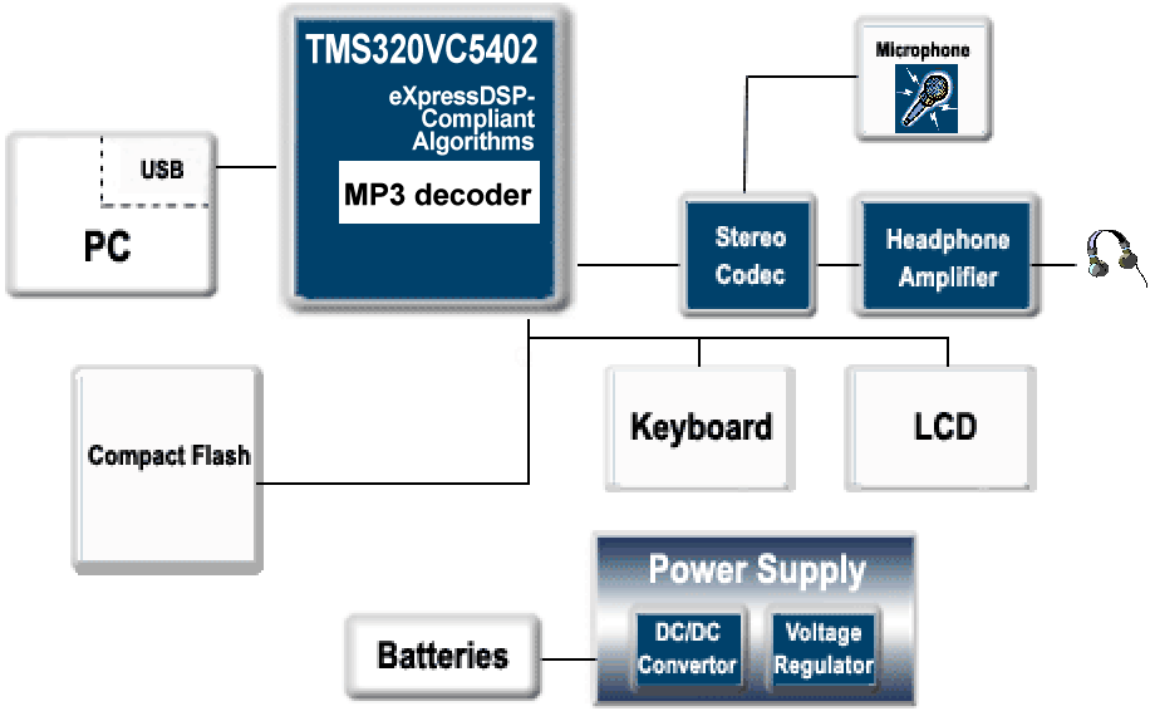
Design Parameter	RF1	RF3	RF5
Absolute minimum memory footprint	✔	✖	✖
Static configuration	✔	✔	✔
Dynamic object creation (e.g., DSP/BIOS objects)	✖	✖	✔ Supported, but static configuration preferred for simplicity and footprint
Static memory management	✔	✔	✔
Dynamic memory allocation	✖	✔	✔
Number of channels recommended	1-3+	1-10+	1-100+
Number of eXpressDSP-compliant algorithms recommended	1-3+	1-10+	1-100+
Uses DSP/BIOS real-time analysis	✔ In stop-mode only. RTDX not configured by default.	✔	✔
Uses DSP/BIOS scheduling kernel	✖ HWI and IDL only	✔ no TSKs	✔
Uses Chip Support Library	✔	✔	✔
Uses XDAIS algorithms	✔	✔	✔
Portable to other devices, ISAs, boards	✔	✔	✔
Supports multiple execution rates and priorities	✖	✔ Single rate per channel	✔
Supports thread blocking	✖	✖	✔
Implements control functionality	✖	✔	✔
Implements DSP-GPP functionality	✖	✖	✖ Will be key feature of RF6

All Reference Frameworks are application-agnostic. Each framework can be used for many applications, including telecommunication, audio, video, and more.

Applications Suited to RF 1



A Digital hearing Aid System



A Low-Cost Internet Audio Player Running a Single Audio Decoder (MP3)

Applications Suited to RF 3

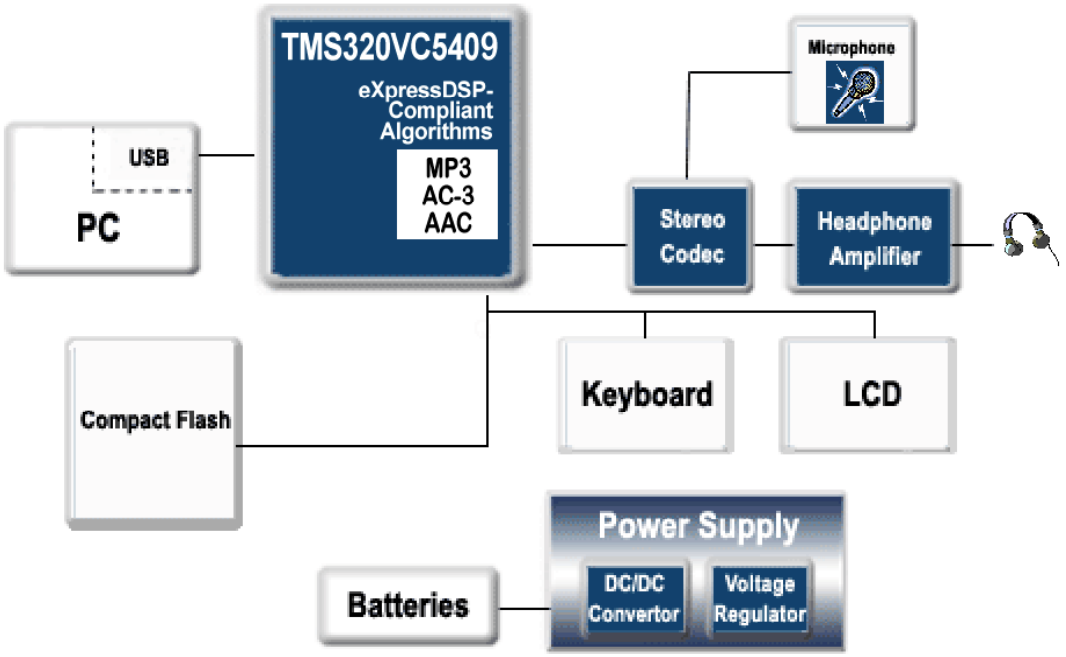
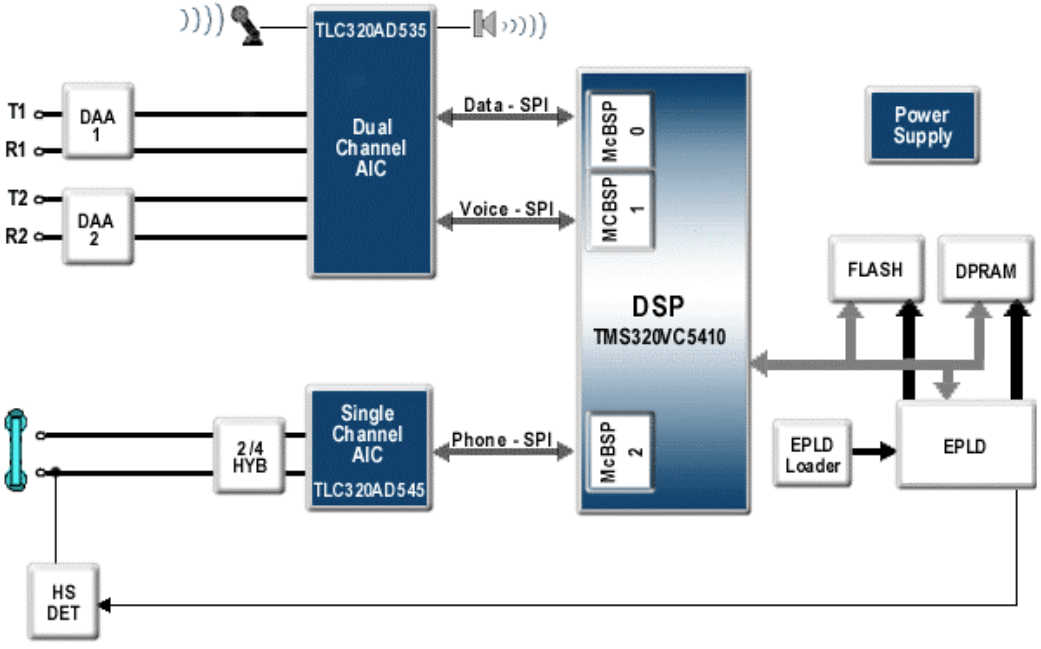
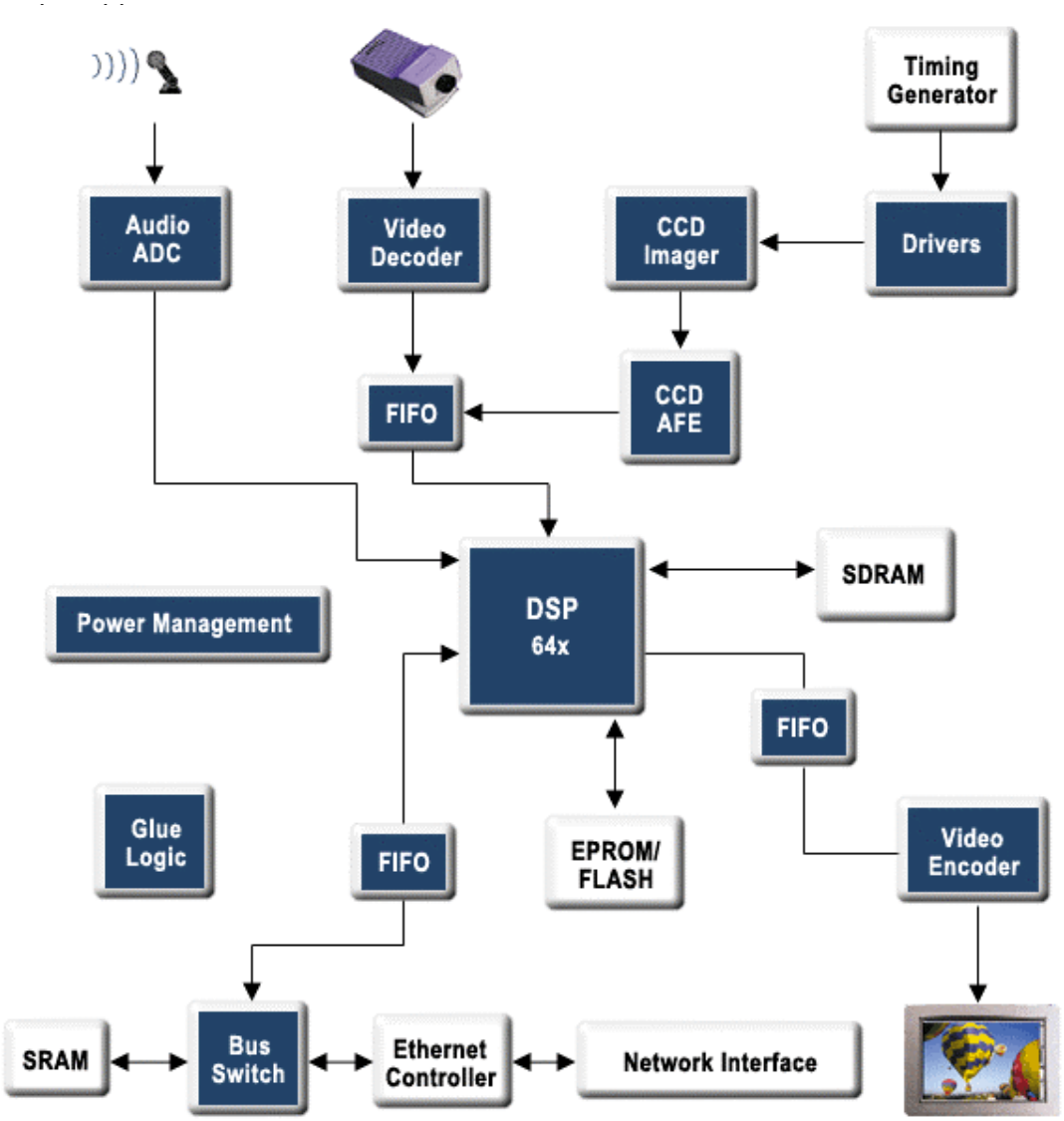


Figure 2. Internet Audio Player



A Web Phone

Applications Suited to RF 5



A Video Surveillance System

Other applications for which RF5 can be adapted include:

- 3G wireless infrastructure devices
- Video infrastructure devices, for example, security applications
- Interactive TV server
- Universal Port Switch