portalplayer

PP5002 SOC
digital media management system-on-chip

Description

The PP5002 SuperIntegration™ System-On-Chip™ is a digital audio system. The PP5002 features dual ARM7TDMI® microprocessors, generating twice the performance of the leading competitors. It supports encoding/decoding of digital audio data directly to/from flash or rotating storage media. The PP5002 incorporates a GLF™ (Glue-Logic Free) interface to most major storage media including leading solid state formats and E-IDE based devices. Integration of key peripheral controllers including USB, LCD and communications interfaces provide the PP5002 with all of the necessary functionality and interfaces to build a complete embedded consumer audio system.

The PP5002 has a comprehensive set of development tools enabling custom feature sets and enhancements. The PP5002 is designed to provide an easy upgrade path for next generation codecs and DRMs.

Features

- Encodes real-time MP3, WMA and ATRAC3 formats
- Decodes real-time MP3, WMA, AAC, ATRAC3 and ACELP.NET formats
- Supports robust data encryption/decryption including leading DRM technologies
- Capable of multiple audio processing effects (5-band graphic EQ, preset listening modes, bass boost, etc.)
- Low power and suspend mode operation provides >14 hours of playback from a single AA battery
- Provides Integrated SDRAM, SRAM and NAND Flash controllers
- Provides GLF™ interface to Sony Memory Stick®, SmartMedia™, MultiMediaCard™, CompactFlash™ and SD (Secure Digital) formats
- E-IDE controller provides GLF™ interface to CD-ROMs, CD-R/Ws, HDDs and IBM's Microdrive™
- Integrated USB 1.1 Device Controller
- Controller and bridge interface to LCD panels
- 16 GPIO pins with support for an 8x8 key matrix for up to 64 buttons
- Two RS-232 serial interfaces
- I^2C Serial Control Interface and S/P-DIF
- Supports AC97 and I^2S Audio codecs
- Available in 208 pin TQFP and micro BGA (CSP) packages

Applications

- HDD-based home stereo and portable jukeboxes
- Portable digital audio player/recorders
- Automotive receivers and jukeboxes

Typical Application

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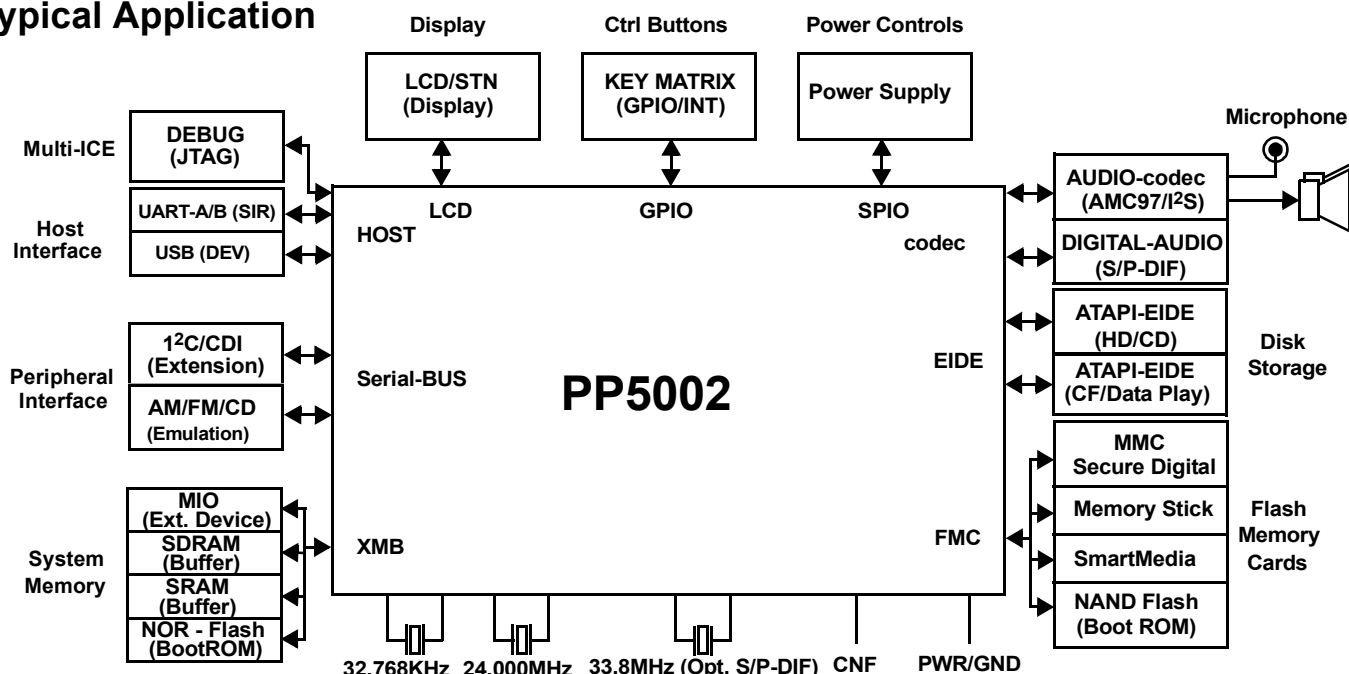
Dual ARM7TDMI Architecture

Based on an ARM7TDMI symmetric dual processor architecture, the PP5002 includes support for a variety of storage devices, display panels and audio controllers. Capable of running at 90MHz, the PP5002 includes the AMBA per processor, system bus interconnect for improved inter-module performance. Four routable interrupts with multi-level interrupt capabilities provide for an efficient multi-threaded multi-tasking operating environment.

- Dual 32-bit ARM7TDMI processors
- Patent pending cross-bar implementation provide multiprocessor support while reducing memory and interrupt latencies

Memory and Storage Media Controller

The chip has an integrated SDRAM controller and an integrated ROM/FLASH memory controller with programmable access times. The 16-bit data bus to memory provides the designer with a direct GLF™ interface to popular flash media formats and rotating storage media. The PP5002 integrates 96Kbytes of shared on-chip RAM to enable real time encoding of audio files in multiple formats.

- Support for up to two banks of 128Mbytes external SDRAM (maximum 256 Mbytes)
- GLF™ interface to Sony Memory Stick, SmartMedia, MultimediaCard, CompactFlash and Secure Digital formats
- 8Kbytes integrated cache per processor

Peripheral Controllers

The PP5002 features an integrated USB 1.1 device controller. Two RS232 ports and an I^{2}C interface are integrated to provide enhanced flexibility. A single scan monochrome panel can interface directly to the on-chip LCD controller. Sixteen dedicated GPIOs are included for support of various transport/navigation buttons. The E-IDE interface provides the capability to directly connect to hard disk drives and other storage devices.

- Integrated GLF™ LCD interface
- Supports Infrared, Key Matrix and GPIO interfaces
- E-IDE controller supports all leading rotating media (HDD, CD-ROM, CD-R/W, IBM Microdrive™, etc.)
- Supports DataPlay drives

Audio codec and Serial Interfaces

The PP5002 provides compatibility with all leading serial communication and control interfaces including provisions for multiple analog source inputs.

- Multi-channel digital interface support for AC97 and I^{2}C codecs (including AMC97 Modem extensions)
- Multiple serial interfaces including I^{2}S stereo in/out as master or slave and I^{2}C
- S/P-DIF audio in/out

Power Management

The PP5002's advanced power management enables shutdown of most unused modules for significant power and battery life savings. Advanced clock management and battery management capability is also available.

- Modular suspend/resume for intelligent power management
- Programmable clock frequencies from 32KHz to 90MHz for optimal performance/power consumption
- Smart Battery logic for energy level monitoring

Development Support

The PP5002 is supported by a complete PortalPlayer Software Developers Kit (SDK). The SDK allows developers to rapidly create their own applications based on a complete suite of standard functions, database engines, codecs, etc. PortalPlayer's in-house development staff can develop firmware that meets your company's specific needs.

Test and Debug Support

The PP5002 features a JTAG port which permits full in-circuit emulation and device control using industry standard emulation tools from ARM. In addition, flash programming and product testing can be performed through the JTAG port.

Ordering Information

PP5002 in 208 pin TQFP.............................PP5002x-T
PP5002 in 208 pin micro BGA (CSP)............PP5002x-C

PP5002 Specifications Overview

Operating Conditions	Min	Typ	Max	Units
Core Supply Voltage	1.7	1.8	2.0	VDC
I/O Supply Voltage	3.0	3.3	3.6	VDC
Power Consumption				
MP^3 Decode		170		mW
Standby		300		μW
Absolute Maximum Ratings	**Min**		**Max**	
Core Supply Voltage			2.75	VDC
I/O Supply Voltage			3.6	VDC
Operating Temperature (Standard)	0		70	Celsius
Operating Temperature (Automotive)	-20		85	Celsius
DC Characteristics	**Min**		**Max**	**Units**
VIH	1.7		VDD+0.3	VDC
VIL	-0.3		0.8	VDC
VOH	2.5			VDC
VOL			0.5	VDC
General	**Min**	**Typ**	**Max**	**Units**
Operating Frequency	32KHz		90MHz	
Process Technology	CMOS			
Package Body Dimensions (micro BGA)	L: 15.0	W: 15.0	H: 1.2	mm
Package Body Dimensions (TQFP)	L: 28.0	W: 28.0	H: 1.6	mm

PP5002 Architecture
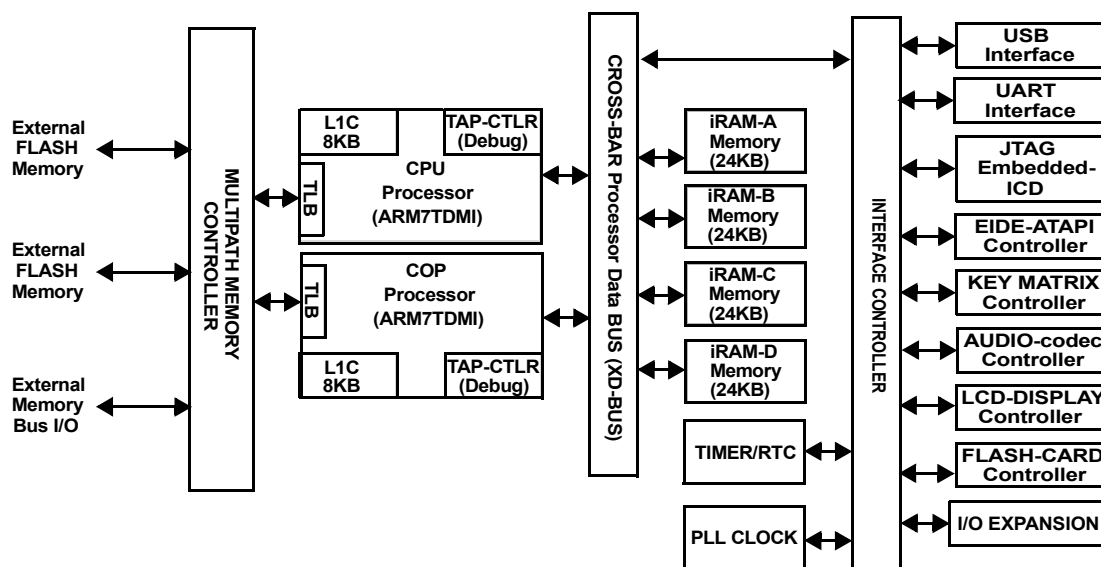
Micro BGA (CSP) Package Specifications (all dimensions in millimeters)
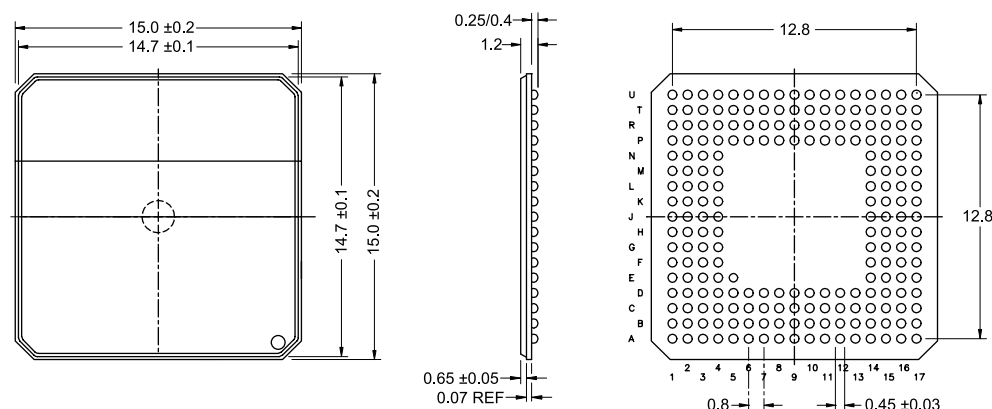
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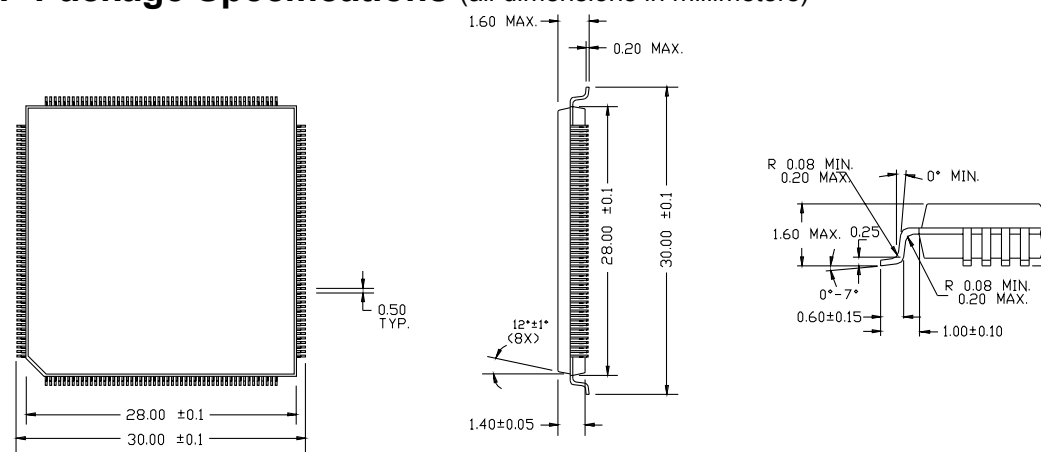
PortalPlayer Digital Audio Platform

This document describes one of four components included in PortalPlayer's digital audio platforms: SuperIntegration™ system-on-chip ICs, customizable firmware suite, PC based digital media manager, and integrated third-party technologies. PortalPlayer's extensive systems experience ensures support for your design and integration programs: from portable digital audio player/recorders and hybrid home stereo systems, to mass-storage-equipped digital jukeboxes and car audio systems. We blend PC knowledge and embedded design expertise to deliver innovative base platforms for consumer-friendly, feature-rich audio products.

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