



Description

The PP5024 SuperIntegration™ System-On-Chip is a complete digital media system featuring dual ARM7TDMI® microprocessors, Hi-Speed USB 2.0 with host and device support, and integrated analog targeted at high-capacity, flash-based players.

The PP5024 has 200 MIPS of processing power for digital audio, imaging, motion video and gaming applications.

The level of integration in the PP5024 minimizes system BOM cost for audio and photo-based digital media devices.

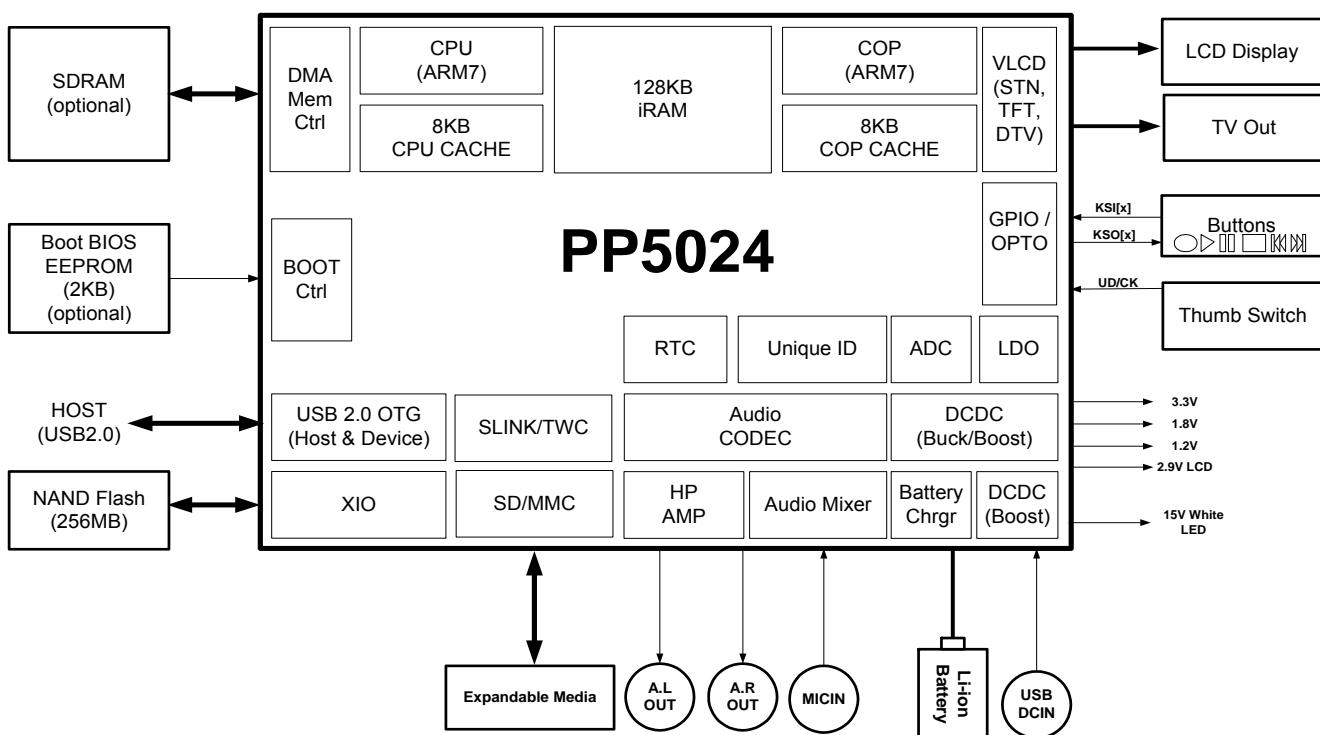
PortalPlayer™ supports the PP5024 with an embedded OS that includes robust development tools enabling custom feature sets and enhancements.

The PortalPlayer PP5024 is available in a new, thinner TFBGA package with a 10mm X 10mm footprint.

- USB 2.0 Device/Host/OTG
- Java MIDP2.0 compliant
- High Speed NAND I/F
- Supports MLC & SLC devices
- Multi-bit Error Correction
- PictBridge Support
- PictSync™ Logo Program
- TFT, STN & TV out support
- Integrated Stereo DAC
- Headphone Amp 2x40mW
- Stereo line-out
- DC-DC converter 1.0-3.2V input, 3.2 or 3.4V output
- Step down for core supply
- Five on-chip voltage regulators
- Li-Ion Battery charger
- 15V BackLight driver for 3 LEDs
- 10-bit battery monitoring ADC
- RTC for music services
- Analog audio mixer
- 10mm x 10mm package

Features

- MP3, WMA, AAC, ACELP.net
- JPEG, MJPEG
- Microsoft WMP10 DRM PlaysForSure™ ready
- MPEG-4 SP CIF decode, 30fp



Dual ARM Processors

- Dual 32-bit ARM7TDMI processors
- Up to 100 MHz processor operation per core with independent clock-skipping feature on COP
- Efficient cross-bar implementation providing zero wait state access to internal RAM
- Integrated 128KB of SRAM
- 8KB of unified cache per processor
- Six DMA channels

Memory Controller

- Supports two banks of SDRAM (up to 128MB per bank) on 16-bit data bus
- Supports 1.8V and 2.5V low power mobile SDRAM
- Supports two banks of NOR flash (up to 128MB per bank) on 8 or 16 bit data bus
- Support for Serial EE Prom
- Supports up to 16GB of NAND Flash

Stereo DAC (Audio Output)

- Dynamic range: 93dB (typ)
- SNR: 92dB
- THD: 0.001% (typ)
- Audio sampling rates: 8, 11.025, 12, 16, 22.05, 24, 32, 44.1, and 48kHz
- De-emphasis for 8kHz to 48kHz

Stereo Headphone Audio Amp

- Max. 2x 40mW @ 16Ω
- Analog volume control 2x32 steps @ 1.5dB and mute Click- and pop-less startup and power down
- Headphone detection
- Phantom ground to eliminate external DC blocking capacitors
- Over-current protection with programmable timeout

Microphone Input

- Differential inputs
- Three gain presets (28/34/40 dB) and OFF with AGC
- Analog volume control 2x32 steps @ 1.5dB and OFF
- Microphone detection with approximately 50uA
- Microphone supply with max 1mA

Audio Mixer (Analog)

- Mixes Line inputs, Microphone inputs, and DAC output
- Separate selectable source for right and left channel
- Possibility to select AGC to prevent clipping

Line Input

- Max 1Vp @ 10KΩ
- Analog volume control 2x32 steps @ 1.5dB and mute

Display Interfaces

- Integrated LCD controller drives single-scan 1-, 2-, or 4-bit monochrome STN panels
- Bridge interface to intelligent color or grayscale LCD panel drives 1-bit, 4-bit or 8-bit interfaces

Peripheral Interfaces

- Integrated Hi-Speed USB 2.0 controller and transceivers that can operate in host or device mode, at any USB transfer speed
- Support for 13 dedicated GPIOs for player navigation controls
- 5 x 8 matrix enabling up to 40 buttons
- TWC interface provides support for CD-ROMs, playback of CDDA audio, and compressed digital audio formats
- Support for infrared remote, key matrix, and GPIO interfaces
- I²C serial control interface operating in both master and slave mode

Power Management

The PP5024 features advanced power management capabilities that enable shutdown of most functional modules when not in use, providing significant power savings and longer battery life. Advanced clock and battery management capabilities are also available.

- Modular suspend/resume for intelligent power management
- Clock frequencies programmable from 32KHz to 100MHz for optimal performance and power consumption
- Integrated 8-bit, 4-channel ADC for energy level monitoring

On-chip LDO Regulator

- 3.3V typical (with 50mV adjustable steps)
100mA Max, 5mA Typical (Optimized) Currents
- ~3.6V Li-Ion/Poly Battery (Vsource)
(3.0 to 4.2V input ranges)
- >92% Conversion Efficiency at 5mA output

On-chip 1/2 Step Down Charge Pump (VDD-MEM)

- 1.8V Typical (with 25mV adjustable steps)
100mA Max, 15mA Typical (Optimized) Currents
- >92% Conversion Efficiency at 15mA output

On-chip 1/3 Step Down Charge Pump (VDD-MEM)

- 1.2V Typical (with 10mV adjustable steps)
200mA Max, 15mA Typical (Optimized) Currents
- >92% Conversion Efficiency at 15mA output

10 Bit PMU ADC

- Battery monitoring
- Temperature supervision
- Input multiplexer to measure other sources

On-chip High Performance LDO Voltage Regulators

- Digital Supply (PMU), 2.9V (LDO of Vsource)
- Analog Supply (CODEC), 2.9V (LDO of Vsource)
- Peripheral Supply (LCD), 2.9V (LDO of Vsource)
- RTC Supply, ~0.9V (LDO of Vbat-main or Vbat-backup)
- USB Transceiver supply, 3.26V

Li-Ion Charger

- 50mA trickle charging
- 100 ~ 400mA constant current charging (50mA steps)
- ~4.2V const. voltage charging (50mV steps)
- Input Sources (USB cable 100mA~500mA and/or AC adapter 500mA)

15V Back-light Step Up Converter

- Drives up to four white LEDs in series to achieve uniform illumination.
- Current programmable from 2.5mA to 40mA in 2.5mA steps

RTC (Battery Backed Up)

- 32kHz Oscillator with 32bit second counter
- Selectable minute or second alarm (INTR/WAKE)
- RTC battery backed-up scratch-pad registers (128 bits)
- Trimmable oscillator
- Supplied via the RTC LDO

Test and Debug Support

The PP5024 features a JTAG port that permits full in-circuit emulation and device control using industry standard emulation tools from ARM.

In addition to in-circuit emulation, flash programming and product testing can be performed through the JTAG port.

Development Support

PortalPlayer drives the PP5024 with the powerful Digital Media Firmware Developer's Kit (FDK). The FDK allows developers to rapidly create differentiated platforms based on a complete suite of standard functions, database engines, codecs, etc.

PortalPlayer's in-house development staff can help develop or support your specific firmware requirement.

Specifications

	Min	Typical	Max	Units
Operating Conditions				
Core Supply Voltage	1.14V	1.2V	1.32V	VDC
I/O Supply Voltage	3.0V	3.3V	3.6V	VDC
Operating Temperature	-40C	25C	85C	OC
General				
Operating Frequency	32KHz	-	100MHz	-

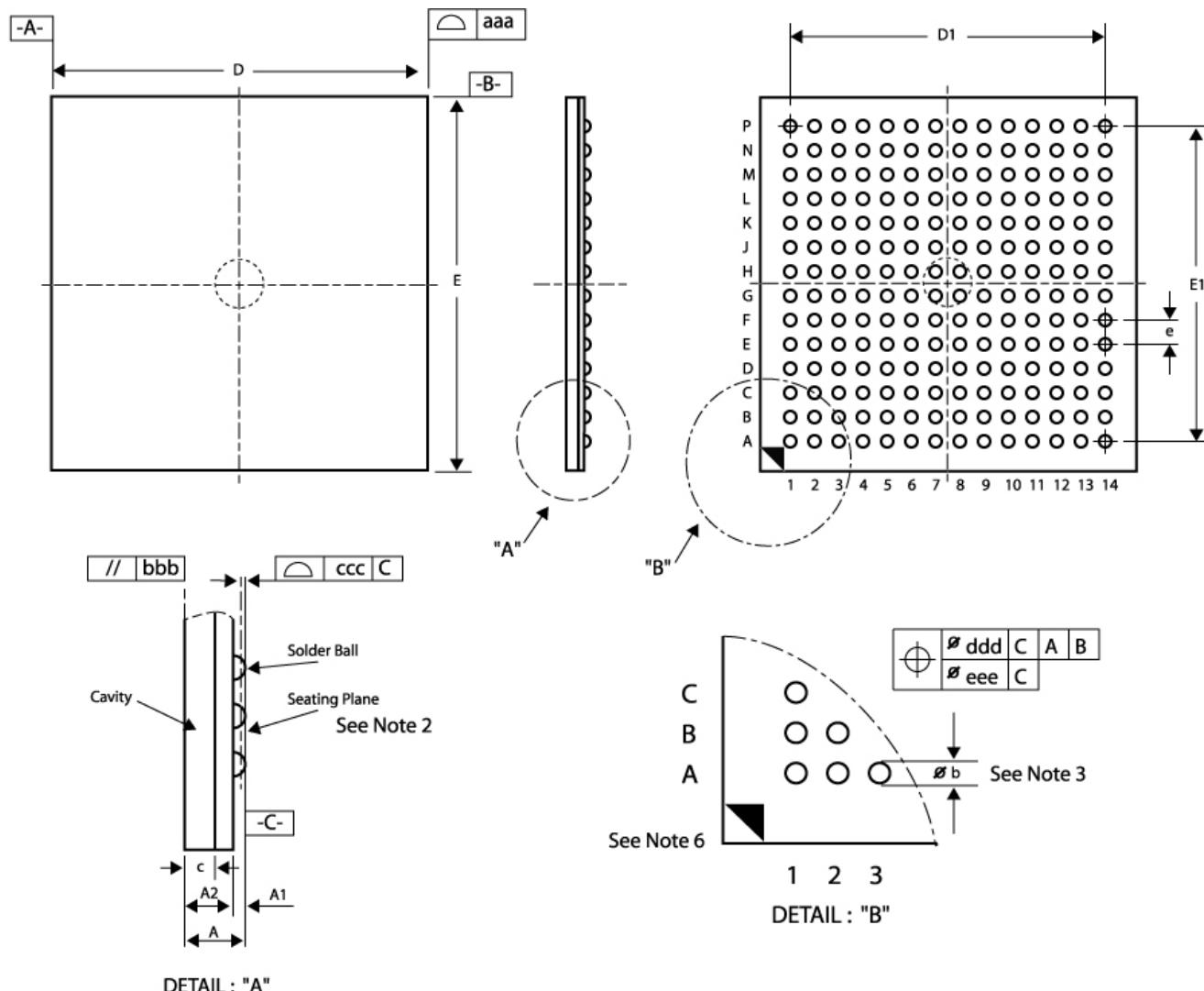
Package

The following table and diagram detail the PP5024 196-pin TFBGA package. This package is preliminary and is subject to change.

Symbol	Dimension in mm			Symbol	Dimension in mm		
	MIN	NOM	MAX		MIN	NOM	MAX
A	1.26	1.36	1.46	e	-	0.65	-
A1	0.15	0.20	0.25	b	0.25	0.30	0.35
A2	1.06	1.16	1.26	aaa	-	0.15	-
c	0.81	0.86	0.91	bbb	-	0.20	-
D	9.90	10.00	10.10	ccc	-	0.10	-
E	9.90	10.00	10.10	ddd	-	0.15	-
D1	-	8.45	-	eee	-	0.08	-
E1	-	8.45	-				
MD / ME				14/14			

Notes

1. Controlling Dimension = mm
2. Primary Datum C and Seating Plane are defined by the spherical crowns of the solder balls
3. Dimension b is measured at the maximum solder ball diameter, parallel to primary datum C
4. There shall be a minimum clearance of 0.25mm between the edge of the solder ball and the body edge
5. Reference doc: JEDEC MO-207
6. The pattern of pin 1 fiducial is for reference only



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