

Overview

The aJile aJ-200MEK is a compact and versatile multimedia evaluation kit for the aJ-200 SOC that directly executes both Java Virtual Bytecode instructions, real-time Java threading primitives, network, graphics, MPEG4 video codec, and I/O functions. The aJ-200MEK is designed with a display panel, a CMOS sensor, a MPEG4 video codec, a stereo audio, and a typical I/O configuration required for Internet mobile multimedia appliances.

The aJ-200MEK bundled with the aJile RTOS, an optimizing application builder (JEMBuilder) and debugging tools provide a complete silicon-based solution for the JME platform. Using commercial Java IDEs, application developers can create applications written entirely in Java with the performance and memory efficiency of system programmed in C and assembly. The aJ-200MEK allows users to evaluate, prototype, and create the next generation of aJ-200-based Internet mobile multimedia appliances such as iP cameras, web pads, video servers, handheld devices, and thin clients.

Features

Processor

- aJile network media direct execution SOC “aJ-200” for the JME platform

Memory configuration

- 32 MB SDRAM
- 32 MB NAND Flash

Display

- Optrex 5” TFT panel
- 800 x 480 resolution
- 24-bit color
- Touch screen and backlight

Input devices

- Touch screen
- Keypad
 - Telephone keys
 - Four hard keys
 - Four-way navigation

10/100 base-T Ethernet port

- RJ-45 connector

Dual serial channels

- RS-232
- DB9M connector

USB master port

- USB type A receptacle

Secure digital card slot

- SD/SDIO
- Memory card
- WLAN 802.11b/g

Video capture port

- VGA
- 8-bit YcrCb
- Omnivision CMOS sensor “OV7740”

MediaCodec

- Compliant with MPEG-4 simple profile L0 ~ L3 standards,
- Sub QCIF, QCIF, CIF, VGA, 4CIF, and D1 @ 30 fps

- Compliant with JPEG (ISO/IEC 10918-1) base-line standard
- Short video header (H.263 baseline)
- H.263/MPEG/JPEG quantization methods

Stereo audio codec

- AC97 compliance
- Left and right audio input
- Left and right audio output
- Speaker (8Ω) header
- Microphone

Realtime clock with a battery backup

8-bit GPIO port

UMTS/HSDPA connector

- 50-pin slimstack receptacle
- Cinterion HC-25/28 module (option)

Zigbee module connector

- 20-pin header
- Xbee/Xbee-Pro module (option)

Status LEDs

- Ethernet port
- USB port
- SD slot
- WLAN
- UMTS/HSPDA
- Zigbee
- Power on

Power supply

- 100-240V 5V/3A DC external adapter
- Rechargeable Li-Ion battery pack @ 3.7V 1800 mAh

JTAG header

- Debug interface
- 5V power supply via USB host device
- Debug serial channel (UART3)

aj-200 Multimedia Evaluation Kit

aj-200MEK

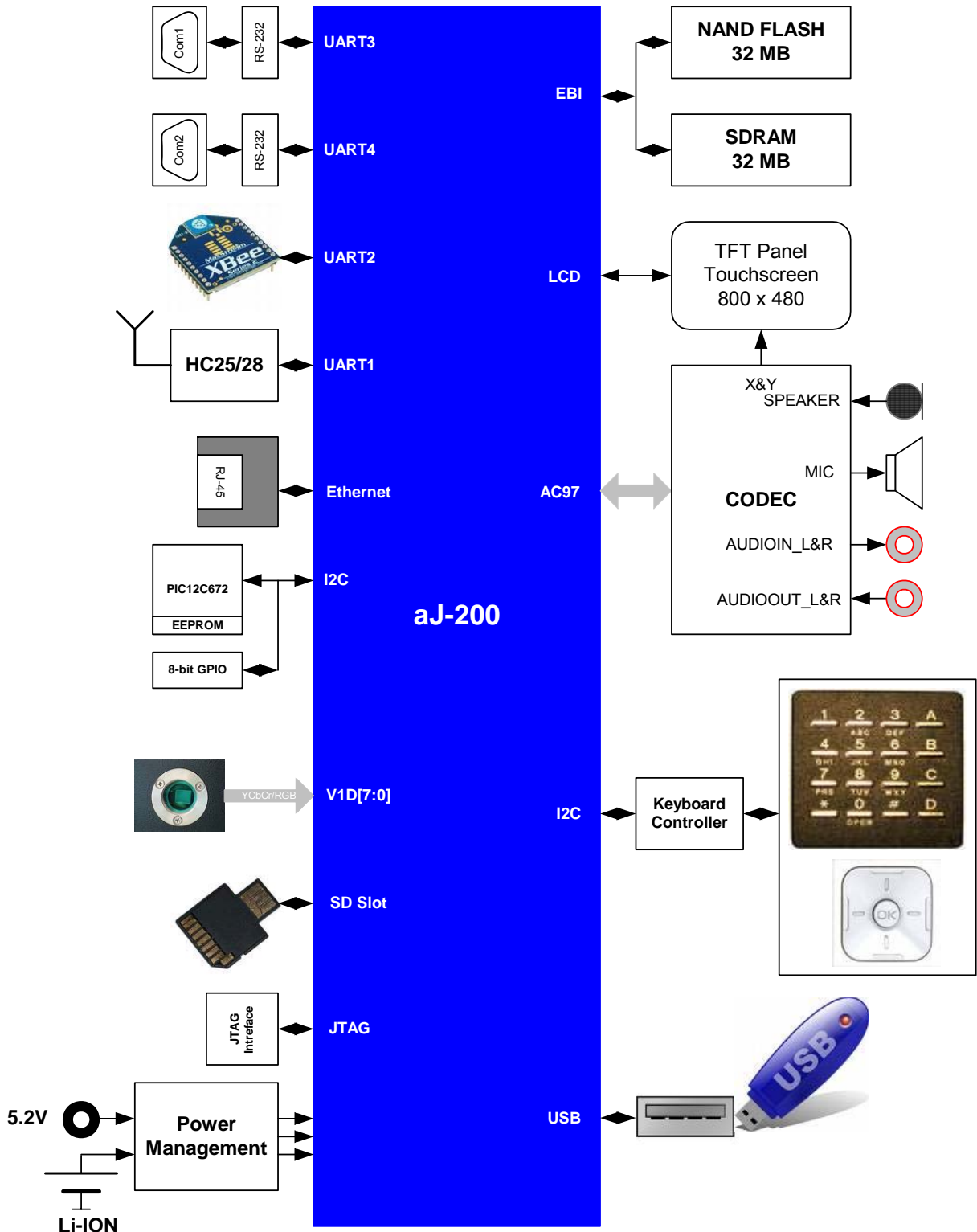


Figure 1. Block Diagram of aj-200MEK

System Development Support

The aJ-200MEK bundled with the aJile RTOS, an optimizing application builder (JEMBuilder), debugging tools and an evaluation board provides a complete silicon-based solution for the JME platform. The key components are:

aJile RTOS

The aJile RTOS is implemented entirely in Java as illustrated in Figure 2. In addition, the aJile Multiple JVM (MJM) enables multiple applications to execute concurrently and independently in a deterministic, timesliced scheduling. This allows hard real-time applications to run independently and safely exist with networked applications.

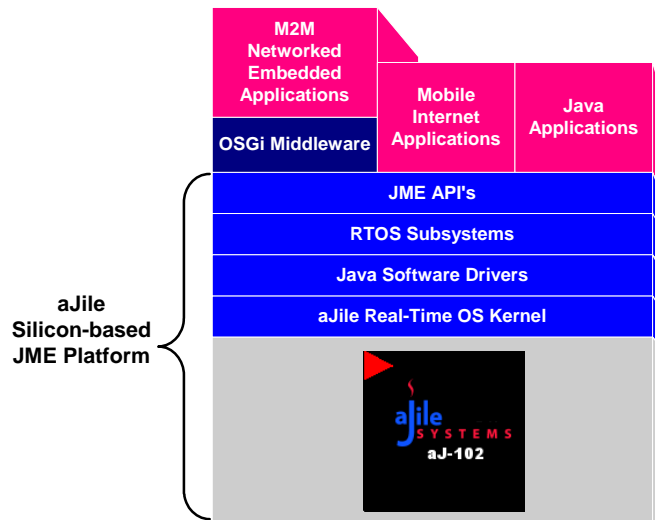


Figure 2. The Silicon-based JME Platform

The primary components of the aJile real-time operating system are outlined as follows:

- **JME API's**
 - CLDC 1.1
 - CDC 1.1/Foundation Profile (FP)
 - MIDP2.0
- **Network Stack, File System, and Security Framework**
 - TCP/IPJME runtime libraries and aJile's Java implementation of JNI, graphics primitives
 - TCP/IP network stack including PPP, DHCP, DNS, SNMP services
 - FAT 32 file system for USB and SD memory cards
 - USB 2.0 host/slave stack
 - Security frame work
 - Bootloader for emote application updates
- **Java Software Drivers**
 - All integrated I/O's
 - USB serial drivers for memory sticks, keyboards, and mice
 - SD memory card, WLAN card
- **aJile Real-time OS Kernel**

aJile processors include an internal microprogrammed real-time kernel. It performs the traditional operating system functions (scheduling, context switching, interrupt preprocessing, error preprocessing, and object synchronization). Java threads are native threads on the aJile processor, and extended

bytecode instructions are used to implement these Java threading primitives (sleep, wait, notify, notifyall, yield, monitor enter, monitor exit, and interrupt) in order to provide extremely fast and atomic (non-interruptible) executive operations. The on-chip real-time thread manager performs priority-based preemptive scheduling with extremely fast context switch times of less than 1 μ s. In addition, aJile Multiple JVM (MJM) technology enables multiple applications to execute concurrently and independently in a deterministic, timesliced scheduling. Each JVM employs its own threading and memory policies to enable real-time applications to execute concurrently with networked applications without the threat of garbage collection (G.C.) pauses and other interruptions. The MJM capability takes the Java "sandbox" security model to the next level, providing a mechanism to easily isolate applications and allocated resources. aJile RTOS enables hard real-time applications to run independently and safely co-exist with networked applications.

Development Tools

The development environment allows the use of any off-the-shelf IDE that produces Java standard class files such as Eclipse or Netbeans. It consists of the following key components:

- **Optimizing Linker/Application Builder (JEMBuilder)**
- **Application Debugging Tools**
- **Multimedia Evaluation Kit**
 - aJ-200MEK board
 - JTAG-to-USB converter
 - USB cable
 - AC power adapter
 - Schematics and gerber file can be downloaded via aJile website www.ajile.com