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Internet Radio without wires or a computer

AI1100-DTS-INTR

A HomePlug certified reference design incorporating the Arkados AI-1100 system-on-chip and Direct-to-Speaker™ firmware that enables robust Internet Radio applications

POWERLINE Communications

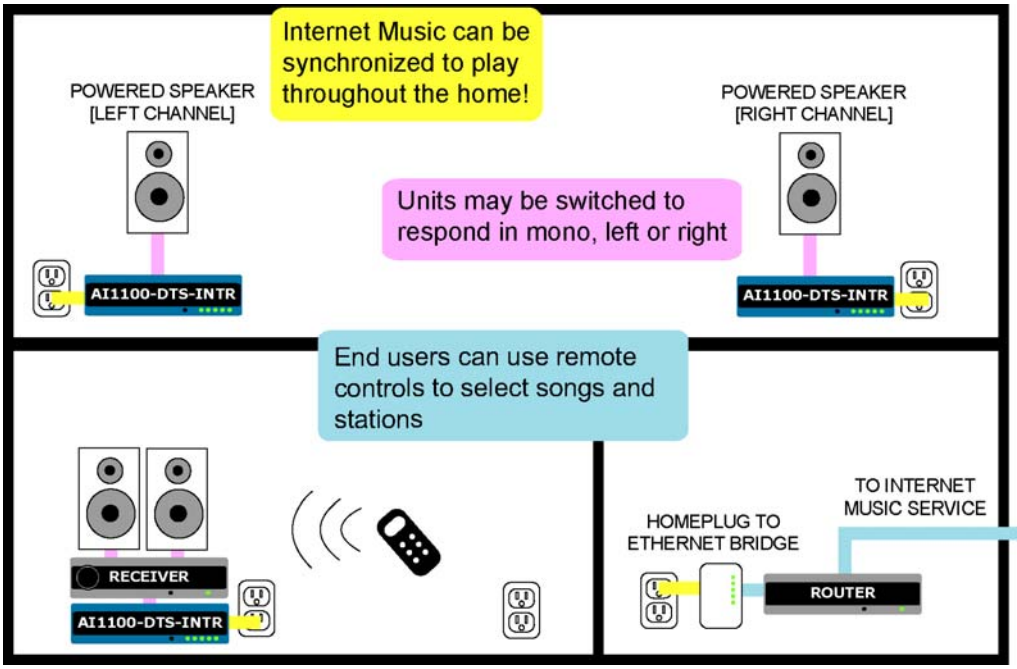
Powerline communications uses the existing electrical wiring within a residence as a networking infrastructure and enables the digital home without the requirement for new wires. The HomePlug specifications are industry standards for implementing powerline communications technology.

AC power wiring is a harsh environment for high-speed data communication. The random nature of the wiring connections results in mismatched impedances that cause significant amplitude and phase variations over frequency. In addition, the devices connected to this network (motors, lights, switches, etc.) along with external sources (amateur and citizens band radio) induce significant amounts of random noise into the network.

HomePlug technology overcomes these problems with a combination of physical and data link layer techniques. At the physical layer, an OFDM scheme with tone allocations, variable modulation techniques, FEC and bit interleaving is used to adapt to the specific characteristics of the link. The link layer adds error detection, an automatic repeat request process, and also provides quality of service (QoS) and security functions.
Powerline communications implemented using the HomePlug standard provides the convenience, easy setup and robust performance.

The Arkados Direct-to-Speaker™ Internet Radio Reference Design (AI1100-DTS-INTR) demonstrates the capabilities of the AI-1100 chip and its associated firmware by offering a way to stream Internet Radio stations without using a personal computer. The device acts as a "bridge" between the digital music programming and a stereo receiver or powered speakers.

Internet music services come alive with the Arkados design for HomePlug enabled Internet radio devices



The AI-1100 contains a 32-bit ARM CPU core and a variety of communication interfaces in a single device. This solution offers a faster time to market and lower component count, ultimately resulting in lower BOMs and greater margin possibilities.

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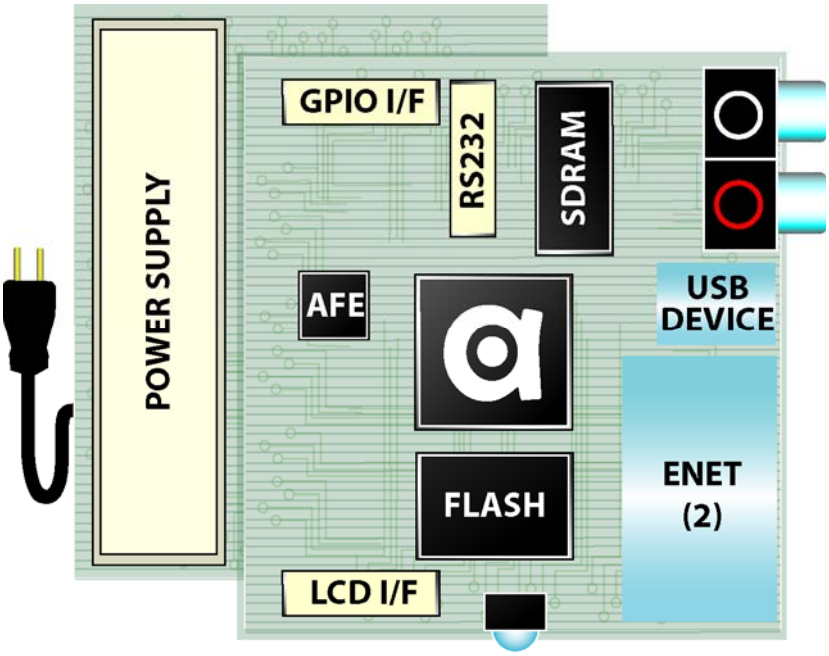

Figure 1: Major components of the AI1100-DTS-INTR

Arkados AI1100-DTS-INTR Reference Design

The Internet radio reference design demonstrates the system's flexibility and the ease with which boards can be created.

Firmware Loads Can Define Vertical Applications

The AI-1100 has a built-in ARM9 processor, allowing applications to be run directly on-chip. By simply loading different firmware, vertical applications can be built, many times from the same board layout. This feature can broaden product offerings, extend the product lifecycle, and allow hardware production in greater volumes – further lowering overall cost.

With a full TCP/IP stack and embedded web server, the AI-1100 enables the creation of web-based configuration and control interfaces.

Product developers can design a basic Internet Radio client featuring Shoutcast Radio, as an example, and then easily add features for product differentiation and targeted vertical applications.

Embedded controllers and interfaces

The numerous interfaces and controllers inside the AI-1100 offer product line enhancements such as buttons, LCDs, remote controls, Ethernet or USB connectivity, and other product options.

Demonstration System Available

Contact arkados for more information.

AI-1100 Features:

- **Upgradeable firmware loads**
- **HomePlug-Compliant Powerline Interface**
  - Fully HomePlug compliant MAC/PHY
  - Arkados extensions for increased performance and future-proofing
- **ARM926EJ-S Processor**
  - Internet radio application runs directly on-chip
  - Manufacturers can broaden product offerings with multiple firmware changes to a single board design
- **TCP/IP Stack**
  Full TCP/IP Stack runs in the AI-1100
- **SDRAM Controller**
  Supports external parts up to 256Mb
- **SRAM Controller/Expansion Bus Interface**
  Easily connects to external FLASH memory and product options such as LCD controllers.
- **Ethernet controllers**
  - Standard MII port (802.3u) – or - PHY Emulation Port (PEP) MII (emulates Ethernet PHY)
  - 10/100 Ethernet and HomePlug can run simultaneously for powerful product options
- **Serial I/O Controllers**
  - **I^2S** for direct connection to audio DAC
  - **Consumer IR interface allows for the direct connection of IR receiver for remote control functions.**
  - **IrDA** adds the ability to communicate with PDAs, etc. using SIR/MIR or FIR modes.
  - 16550d compatible UART for console, and connection to serial devices
- **GPIO Controller**
  Connects to LEDs, pushbuttons, SPI, and offers I2C-compatible emulation
- **JTAG / Debug Interface**

HOMEPLUG CERTIFIED