



## IP Intercom OMAP3530

### Intercom Software Subsystem

#### TARGET APPLICATIONS

*IP Based Intercom System*

#### OVERVIEW

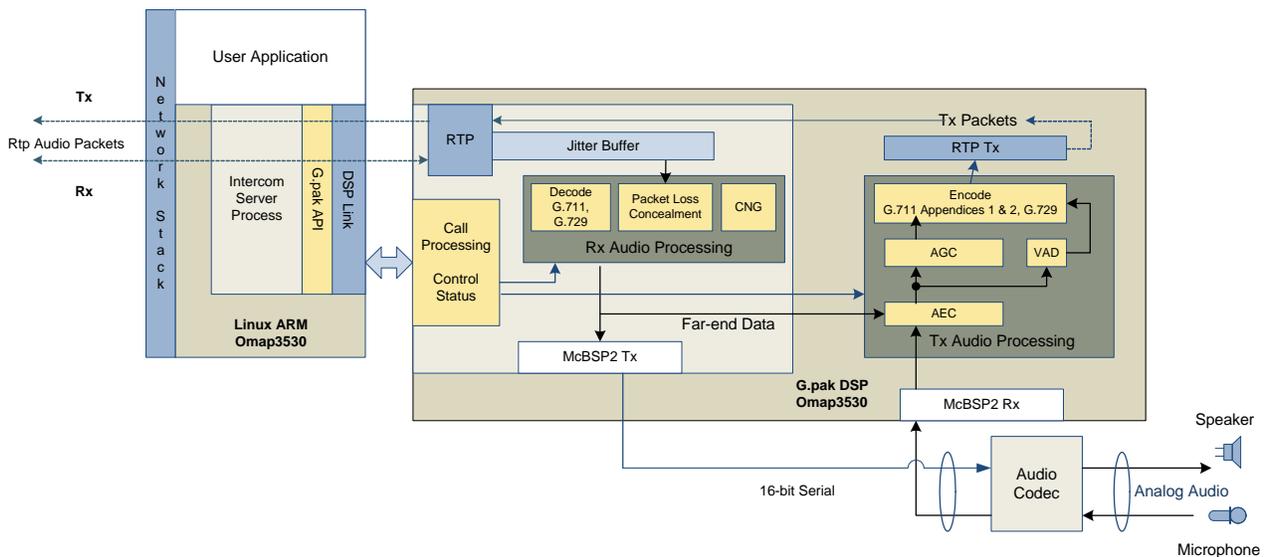
*Adaptive Digital's IP Intercom ISS-OMAP 3530 product combines Adaptive Digital's IP Intercom DSP software plus host API along with Texas Instruments' OMAP 3530 DSP to form a turnkey soft-chip for use in intercom*

#### SOFTWARE FEATURES

- Digital Gain Control
- Noise Reduction
- Generation-4 Acoustic Echo cancellation
- VAD/CNG
- AGC
- G.729AB
- G.711
- RTP + Jitter Buffer

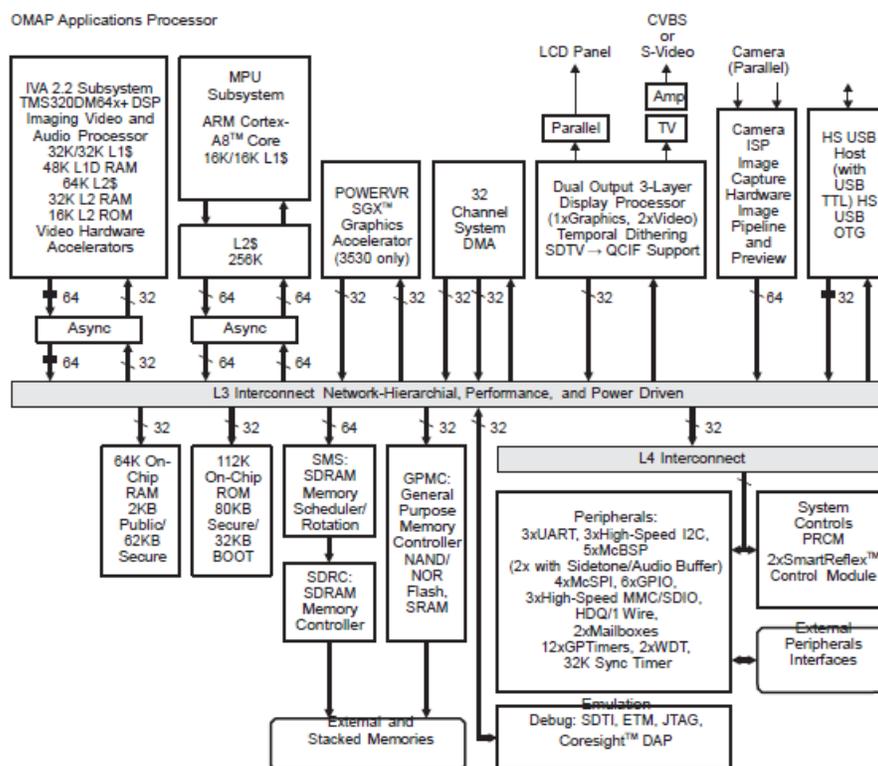
#### Optional Software Features

- G.723.1A
- G.726
- G.728
- Tone Detection



## HARDWARE FEATURES

- Up to 720-MHz ARM Cortex™-A8 Core NEON™ SIMD Coprocessor
- Up to 520-MHz TMS320C64x+™ DSP Core
- Fully Software-Compatible With C64x and ARM9™
- Endianess:
  - ARM Instructions - Little Endian
  - ARM Data – Configurable
  - DSP Instruction/Data - Little Endian
- Enhanced Direct Memory Access (EDMA) Controller (4 of 128 available Independent Channels)
- C64x+ L1/L2 Memory Architecture
  - 32K-Byte L1P Program RAM/Cache (Direct Mapped)
  - 80K-Byte L1D Data RAM/Cache (2-Way Set-Associative)
  - 64K-Byte L2 Unified Mapped RAM/Cache (4-Way Set-Associative)\
  - 32K-Byte L2 Shared SRAM and 16K-Byte L2 ROM
- 1 of 5 available Multichannel Buffered Serial Ports (McBSP 2)
- 1 of 12 available 32-bit General Purpose Timers
- IEEE-1149.1 (JTAG) Boundary-Scan Compatible



## **ADDITIONAL HARDWARE FEATURES**

- SDRAM Controller (SDRC)
  - 16, 32-bit Memory Controller With 1G-Byte Total Address Space
  - Interfaces to Low-Power Double Data Rate (LPDDR) SDRAM
  - SDRAM Memory Scheduler (SMS) and Rotation Engine
- General Purpose Memory Controller (GPMC)
  - 16-bit Wide Multiplexed Address/Data Bus
  - Up to 8 Chip Select Pins With 128M-Byte Address Space per Chip Select Pin Glueless Interface to NOR Flash, NAND Flash (With ECC Hamming Code Calculation), SRAM and Pseudo-SRAM
  - Flexible Asynchronous Protocol Control for Interface to Custom Logic (FPGA, CPLD, ASICs, etc.)
  - Nonmultiplexed Address/Data Mode (Limited 2K-Byte Address Space)
- System Direct Memory Access (sDMA) Controller
  - 32 Logical Channels With Configurable Priority
- Camera Image Signal Processing (ISP)
  - CCD and CMOS Imager Interface
  - Memory Data Input
  - RAW Data Interface
  - BT.601/BT.656 Digital YCbCr 4:2:2
  - A-Law Compression and Decompression
  - Preview Engine for Real-Time Image Processing
  - Glueless Interface to Common Video Decoders
  - Histogram Module/Auto-Exposure, Auto-White Balance, and Auto-Focus Engine
  - Resize Engine: Resize Images From 1/4x to 4x, Separate Horizontal/Vertical Control
- POWERVR SGX™ Graphics Accelerator
- Display Subsystem
  - Parallel Digital Output
  - Up to 24-Bit RGB HD Maximum Resolution
  - Supports Up to 2 LCD Panels
  - Support for Remote Frame Buffer Interface (RFBI) LCD Panels
  - 2 10-Bit Digital-to-Analog Converters (DACs) Supporting:
    - Composite NTSC/PAL Video
    - Luma/Chroma Separate Video (S-Video)
  - Rotation 90-, 180-, and 270-degrees
  - Resize Images From 1/4x to 8x
  - Color Space Converter
  - 8-bit Alpha Blending

### ADDITIONAL HARDWARE FEATURES CONT'D

- Serial Communication
  - Four Master/Slave Multichannel Serial Port Interface (McSPI) Ports
  - High-Speed/Full-Speed/Low-Speed USB OTG Subsystem (12-/8-Pin ULPI Interface)
  - High-Speed/Full-Speed/Low-Speed Multiport USB Host Subsystem
  - One HDQ/1-Wire Interface
  - Three UARTs
  - Three Master/Slave High-Speed Inter-Integrated Circuit (I2C) Controllers
- Removable Media Interfaces:
  - Three Multimedia Card (MMC)/ Secure Digital (SD) With Secure Data I/O (SDIO)
- Comprehensive Power, Reset, and Clock Management
- Test Interfaces:
  - Embedded Trace Macro Interface (ETM)
  - Serial Data Transport Interface (SDTI)
- 2 32-bit Watchdog Timers
- 1 32-bit 32-kHz Sync Timer
- Up to 188 General-Purpose I/O (GPIO) Pins

### PRODUCT OVERVIEW

Adaptive Digital's IP Intercom ISS-OMAP 3530 product highlights our field proven AEC and noise reduction algorithms in IP-based intercom applications.

Adaptive Digital's ISS-OMAP 3530 is an intercom software subsystem that simplifies software design of an IP intercom or IP phone. It implements complete VoIP capability all the way from PCM to Packet and back. This includes a process running on the ARM under Linux as well as all the necessary voice processing running on the DSP core.

A user's application, co-resident on the ARM, can set up and tear down VoIP channels via the Intercom API. The intercom software takes care of everything else.

#### MODES of RTP CONNECTIVITY

- point-point (full-duplex)
- point-to-multipoint (half-duplex)
- broadcast (half-duplex)

### SPECIFICATIONS

Application	Product Number/Silicon	Channel Count	Description
Intercom	OMAP3530 /520 MHz	1	Gen4-AEC, Noise reduction, G.729AB or G.711, RTP with Jitter Buffer, VAD/CNG, AGC, digital gain

## DETAILED DESCRIPTION

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The ISS-OMAP 3530 intercom system utilizes a TCP/IP client-server model for status and control. A set of client-side API functions provide the user application a mechanism for remotely setting-up and tearing-down calls. All client APIs functions are non-blocking.

The API functions running on the client-side of the interface format messages that are sent over a connected socket to the server. The server side of the interface responds to these messages by calling the appropriate G.pak API functions, which in turn, control the DSP. Subsequent status messages are returned to the client.

The server software runs as a Linux process on the OMAP3530. In addition to supporting client messages, the server process is responsible for booting and downloading the DSP portion of the OMAP device, controlling the DSP's operation, and the timely transfer of RTP packets between the network stack and the DSP software.

## HOST API

*The intercom host software consists of two components: client and server.*

- Client software API C-code
- Server software C-code (ARM OMAP3530)
- DSPLink Linux device-driver (ARM OMAP3530)

ISSConfigChannel ( )      configures a channel and opens RTP connection  
ISSTearDownChannel ( )    teardown channel and close RTP connection  
ISSSetSpeakerGain ( )    adjust the intercom's speaker volume  
ISSGetEvent ( )            check for a status event from the server

## REFERENCES

1. Adaptive Digital Technologies IP Intercom OMAP3530 Users Guide
2. Texas Instruments OMAP3530 Applications Processor sprs507f.pdf

### *Deliverables*

The deliverable items are platform dependent. In general, there is a single DSP-downloadable binary image along with host API software in C source code format. Also included in the deliverables is product documentation, which includes a users guide and usually includes release notes. Sample/test code may be included as well.

*Adaptive Digital is a member of the Texas Instruments Developer Network, and ARM Connected Community.*

### CONTACT INFORMATION

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