VOIP PHONE
REFERENCE DESIGN KIT

Adaptive Digital Technologies, Inc.

PRODUCT DESCRIPTION

The VoIP Reference Kit by Adaptive Digital provides off-the-shelf hardware and software environments for developing voice over IP telephones. It enables companies to develop new voice over IP applications in a fast and cost effective way.

The hardware environment consists of a commercially available VoIP telephone (2) with serial and JTAG ports added on to allow application development.

FEATURES

- Available on the TI TMS320C5000™ platform
- Reference Kit Based upon production VOIP Phone
- C5471 DSP + ARM chip
- ADT DSP Software
- ARM7 Software Available
- Fast time to market
- ADT DSP field proven Software

Component TI products:

- **Digital Signal Processor - TMS320VC5471** - This device includes:
    - 100 MHz 'C54X DSP with:
        - 72K words (16-bit) of internal RAM
        - 2 Multi-Channel Buffered Serial Ports (McBSP)
        - Host Port Interface to on-chip ARM7 general purpose processor
        - Timer
    - 47.5 MHz ARM7 general purpose processor
        - 16K bytes of internal RAM
        - 10/100 Ethernet MAC
        - Host Port Interface to the on-chip 'C54X DSP
        - 2 Timers
        - 1 I2C interface
        - 1 SPI interface
        - 2 UARTs
        - 1 IrDA interface
        - 36 general purpose I/O pins
    - All voice processing software is deployed on the DSP.

    [TMS320C5471 Product Folder](#)

Audio codec - TLV320AIC22CPT - The audio interface for the VoIP reference kit is provided via a TI TLC320AIC2x family codec. The AIC2x family provides both A/D and D/A functions for two channels of audio. The interface to the AIC2x is provided via one of the DSP buffered serial ports. The AIC22 device is a dual-channel PCM or G.711

codec with 8 or 16kHz sampling frequencies, and includes handset, headset, microphone, and speakerphone pre-amplifier circuits.
[TLV320AIC22C Product Folder](#)

Component TI products (Continued):

- **D-type Flip Flop - SN74LVC374APW**
  [SN74LVC374A Product Folder](#)
- **DC-DC Converter – UCC2809D-2**
  [UCC2809-2 Product Folder](#)

- **Power over Ethernet controller – TPS2370D**
  [TPS2370 Product Folder](#)

- **Bus Switch – SN74CBTLV3245A**
  [SN74CBTLV3245A Product Folder](#)

- **Low Drop-Out Regulator – TPS72118DBV**
  [TPS72118 Product Folder](#)
- **Shunt Regulator – TLV431IDBVR**
  [TLV431 Product Folder](#)
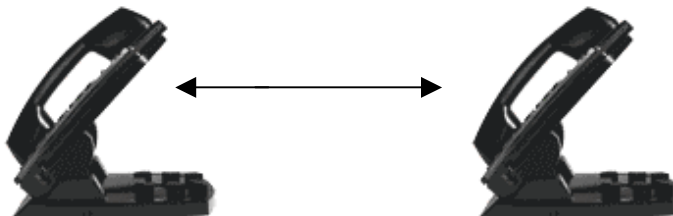- **Supply Voltage Supervisor**

  [TPS3809K33 Product Folder](#)

- **Multichannel RS-232 Line Driver/Reciever**

  [MAX3223 Product Folder](#)

Other products:

- **FLASH memory** - serves as non-volatile storage for code and data across power cycle events. In a production design, many systems may in fact not require this memory element, because the internal ROM of the C5407 may be sufficient.
- **SRAM** - intended primarily to serve as program space, from which the DSP would execute, after having copied program code from the FLASH memory bank to the SRAM bank during boot-up.
- **3-Port Ethernet Switch** – provides Ethernet interfaces to Internet and computer.
- **RS-232 UART** – Provides serial communications for development and debug.

Software:

The software environment provides all of the major tools necessary to test-bed voice over IP applications, including the following:
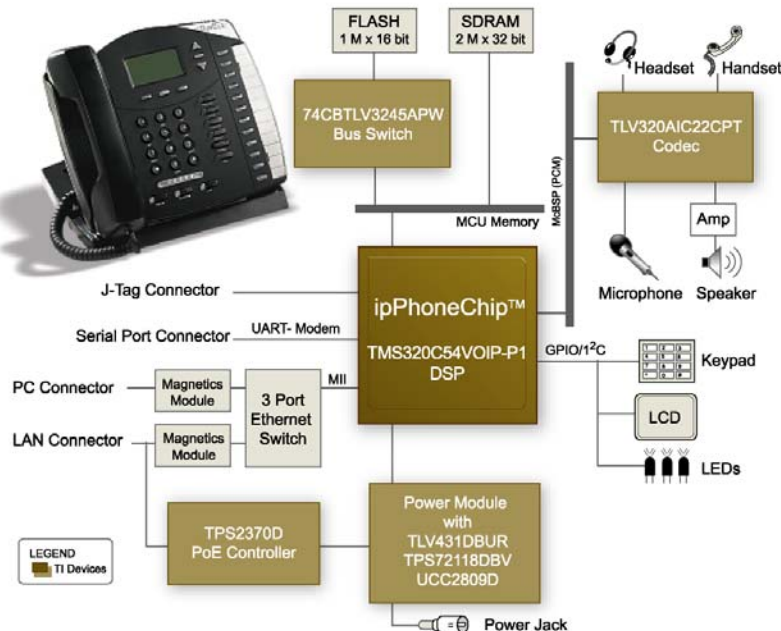
- **Simple phone application** - serves as starting point for developing a complete VoIP application.

- **SIP stack** – easy-to-use interface that provides all necessary processing to start VoIP sessions via the SIP/2.0 protocol.

- **Device drivers** – provides access to all hardware components including keypad, LCD and flash memory.
- **Voice algorithms** – Adaptive Digital Technology's voice processing software including:
    - G.729AB Speech Compression
    - Acoustic Echo Cancellation
    - DTMF Tone Detection
    - Tone Generation
    - Automatic Gain Control
    - Audio Conferencing

The phone supports three simultaneous channels of speech:

- Two channels to support three-way calling
- One additional channel for intercom
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System example:

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Adaptive Digital is a *strategic* member of the TI's TMS320™ Third Party Program, the most extensive collection of Digital Signal Processing development support in the industry.