Product Bulletin

IP Phone Solutions TNETV1050/1055

Texas Instruments' TNETV1050/1055 IP Phone Solutions are composed of an integrated silicon platform, featuring the market-leading programmable TMS320C55x™ Digital Signal Processor (DSP) and a MIPS32™ 4KEc™ processor, combined with the field-proven Telogy Software™ for VoIP.

TI's TNETV1050/1055 IP Phone solutions leverage TI's investment in communication processors for VoIP and broadband applications to provide the superior processing horsepower needed to support current and evolving IP phone standards, as well as the addition of advanced functionality.

One of the unique features of TI's IP Phone solutions is the accompanying starter kit. The starter kit includes the software development license, software training and complete IP Phone reference design for immediate demonstration and development.

Telogy Software for IP Phone Applications

TI's Telogy Software provides an efficient framework for real-time voice processing that has been pre-integrated and rigorously tested. The complete DSP solution feature set includes: PCM reception, tone generation, acoustic echo cancellation, voice activity detection, voice playout, and a variety of voice compression options. The solutions are provided in several packages to allow customization for a full range of phone products.

The Telogy microprocessor software, along with third party components, offers a toolkit with a variety of functions to support IP Phone implementations. This includes voice applications services that access DSP services and support APIs necessary for implementation of call processing features. Sample code for device drivers and network management is provided. An industry-leading, enhanced security framework is also available, using an IPSEC engine to provide DES/3DES/AES encryption/decryption services. Additional packages include full signaling services with standard network protocols, SIP, H.323 and MGCP. Figure 1 shows the IP Phone software architecture.

The TNETV1050/1055 IP Phone product provides the functionality required for today's executive enterprise desktop speakerphones. It includes acoustic echo cancellation for full duplex speakerphone capability (when used in a properly designed enclosure), support for three-way conferencing and support for low bit rate and wideband codecs.

Silicon Solutions

TI's IP Phone solutions include a programmable TI C55x™ DSP for optimal IP Phone voice processing and signal processing features. The MIPS32 4KEc processor provides a standards-based RISC architecture for customer ease in feature development and integration with Telogy Software. The three port line rate internal Ethernet Switch with dual MAC and PHY provides support for IP Phone and PC connectivity to the Ethernet LAN.

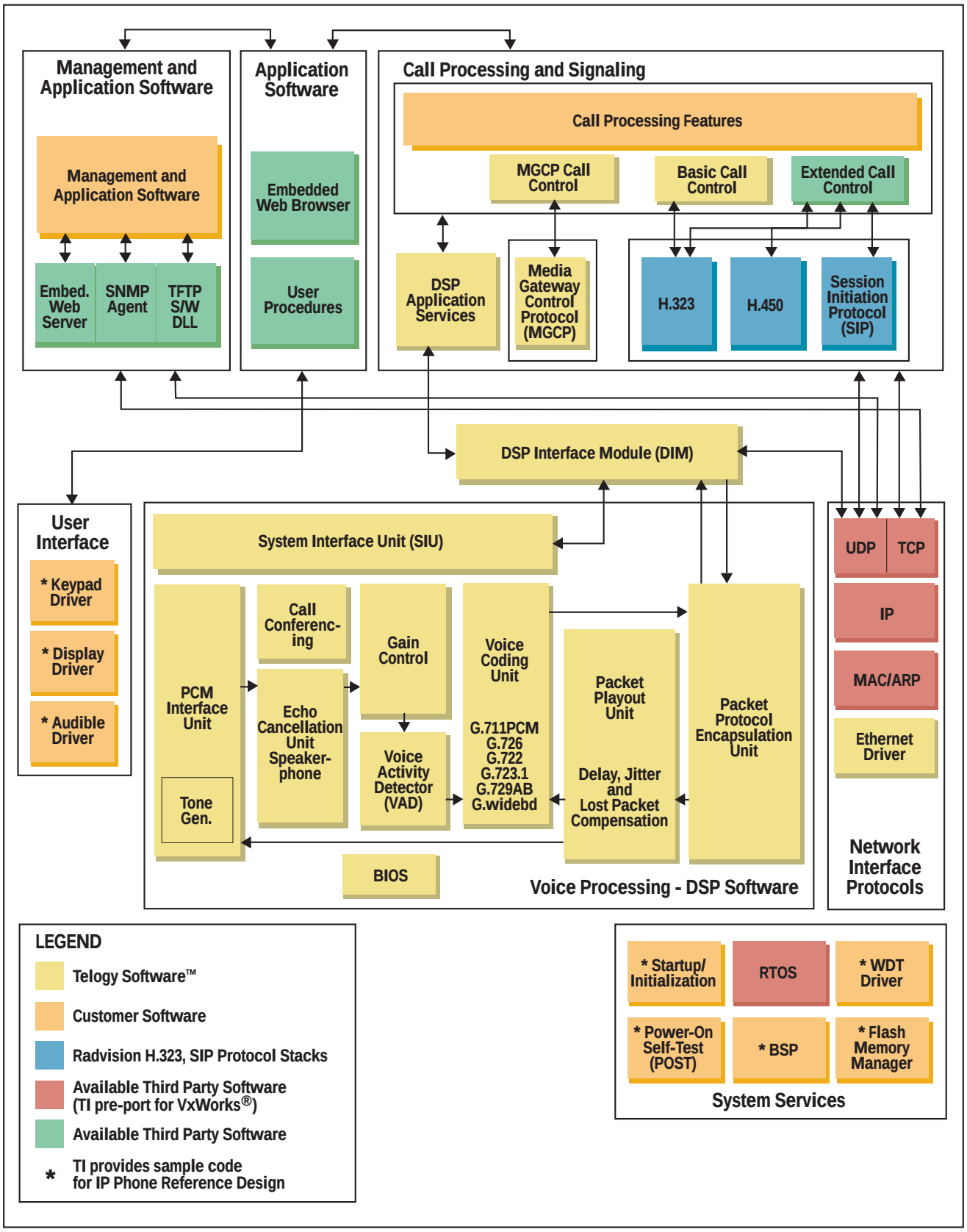
Key Features:

- Leverages proven TI DSP technology, featuring
  - Code compatibility
  - Advanced process technology
  - Production facilities
- Field-proven Telogy Software™ for VoIP with enhanced QOS, interoperability and remote monitoring
- Expandable solution supporting next-generation IP phone applications
- Pre-integrated RTOS and Network protocol stacks (SIP, H.323, MGCP) enabling rapid implementation of customer's unique features and services
- Most comprehensive feature set
- Largest installed base worldwide of IP phone solutions
- World-class technical support
- Industry-leading in indemnification program with broad patent portfolio
- Industry-leading, production-quality enhanced security framework (DES/3DES/AES)

The TNETV1050 IP Phone processor has a USB 1.1 controller and PHY that support either USB host or peripheral. The USB interface allows for a wide variety of possible devices to connect to the phone for user value-add. These devices support applications such as card readers, fingerprint recognition, PDA synchronization, video conferencing, etc.

The TNETV1050/1055 solutions also support TI's VLYNQ™ interface, a low cost, low pin count and low complexity chip-to-chip serial interface. VLYNQ makes it easy to add off-chip

TNETV1050/1055 IP Phone Software Architecture



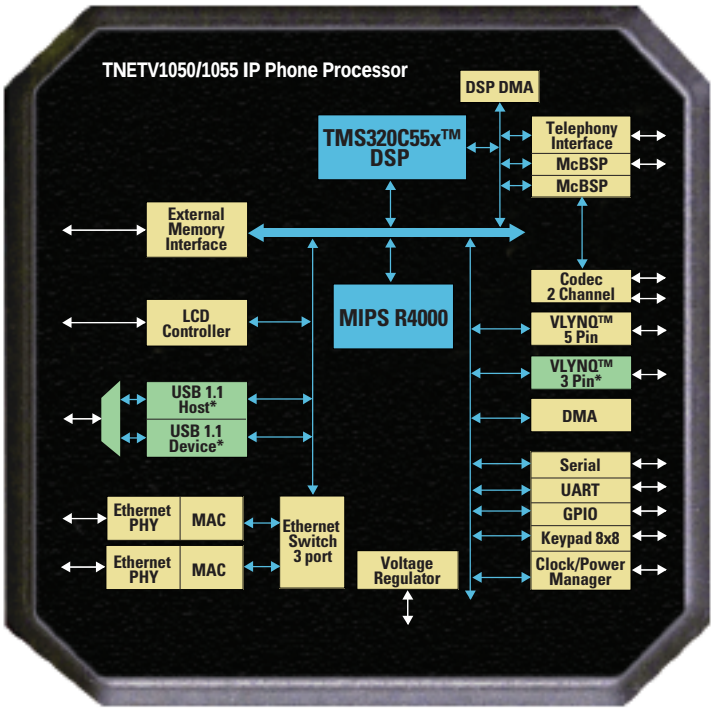
co-processors and peripheral capability to the phone. VLYNQ enables the customer to bring in value-added features such as video/multimedia, wireless connectivity, security, speech recognition and more.

Description

The TNETV1050/1055 is a communications processor based on a MIPS32 Reduced Instruction Set Computer (RISC) processor along with a C55x DSP. This device has a rich peripheral set architected specifically for IP Phone applications, which reduces the bill of materials cost, time and complexity associated with developing an IP Phone. The TNETV1050/1055 combines the key processor, communication, and peripheral functions necessary to build a basic or advanced IP Phone. The TNETV1050/1055 architecture uses advanced design features to provide flexibility and performance throughput, while conserving power consumption. Combined with Telogy Software for IP Phone applications, the TNETV1050/1055 provides a complete hardware/software solution capable of reducing system design cycle times.

The RISC processor supplies the overall system services and performs user interface, network management, protocol stack management, call processing and task scheduling functions. The DSP processor provides real-time voice processing functions such as echo cancellation, compression, PCM processing and tone generation/detection.

IP Phone designs are simplified through on-chip peripherals such as a 16-bit color LCD controller, 8x8 keypad interface, USB 1.1 controller (Host or Device) on TNETV1050 only, UART serial interface, programmable serial port, two VLYNQ interfaces



*Available only on TNETV1050

(TNETV1055 only has one), and several general purpose I/O.

The integrated dual-channel 16-bit codec includes the critical functions needed for IP Phone applications, including two ADCs (with five programmable inputs) and two DACs (with four programmable outputs).

Other codec features include analog and digital sidetone control, anti-aliasing filter, programmable gain options and programmable sampling rate (8 or 16 ksps).

32-bit RISC Processor

Memory Configuration

- 16K-Byte 4-way set associative Instruction-Cache
- 16K-Byte 4-way set associative Data-Cache
- Programmable Memory Management Unit (MMU)
- 4K-Byte RAM on chip
- 4K-Byte ROM on chip, with boot code

Processor Speed

- TNETV1050: 165MHz
- TNETV1055: 125MHz

Digital Signal Processor (DSP)

Memory Configuration

- 12K-Word 2-way set associative Instruction-Cache
- 64K-Word RAM on chip:
  - 32K-Word dual access
  - 32K-Word single access
- Universal 4-channel DMA controller
- Dedicated peripheral DMA controller

Processor Speed

- TNETV1050: 125MHz
- TNETV1055: 100MHz

External Memory Interface

Supporting

- 2 SDRAM Chip Selects providing 128M-Byte
- 3 Chip Selects providing 16M-Byte each, RAM or ROM
- 1 Chip Select providing 32M-Byte, FLASH

Overall

- 324-Ball PBGA (Plastic Ball Grid Array) package
- 3.3V I/O Supply Voltage
- 1.5V Core Supply Voltage, integrated Voltage Regulator
- Reduced power modes available

Specifications: Telogy Software™ for IP Phone Processor

IP PHONE FEATURES – DSP

PCM Voice Mode
- G.711 Codec with support for Annex I and II

Gain Control
- Analog and Digital Tx/Rx Control

Voice Activity Detection
- Adaptive Voice Activity Detection (VAD)
- Configurable Hangover Period
- Useable with any Codec (disabled w/ codec internal VAD)
- Bi-Directional Silence Detection
- Silence Insertion Descriptor (SID) Support

Voice Playout
- Noise Level Matching
- Adaptive Pink Comfort Noise Generation
- Configurable, Adaptive Jitter Buffer
- Lost Packet Compensation

Echo Cancellation
- Acoustic Echo Cancellation for Full Duplex Speakerphone when used with properly designed enclosure
- Doubletalk Detection

Packet Protocol
- VoIP (RTP) Packet Format

Real Time Diagnostics
- Telchemy™ QOS Support
- PCM Pattern Detection
- Signal Level Measurement and Report
- Jitter Statistics
- Transmit, Receive, Lost Packet Counts
- Loopback Mode

Codec Options*
- G.711 Codec, G.726, G.729AB, G.723.1A, G.722 wideband codec

Advanced Power Management

3-Way Conferencing and Group Listen

Full Duplex Speakerphone Support
- G.167 Acoustic Echo Cancellation*

IP Phone Processor Software Product Specifications

MICROPROCESSOR FEATURES

IP Phone Platform

Voice Applications Services
- APIs to access DSP Services
- APIs needed to setup DSP for basic and supplementary services
- APIs to generate inband tones
- Sample Display and Keypad Drivers

Sample Network Management Module

VxWorks® RTOS support
- RTOS Run-Time licenses provided with complete solution (optional)
- Development and any related tools must be obtained via RTOS vendors

Security Framework
- IPSEC engine for DES/3DES/AES

Signaling Services Package (In addition to Voice Application Services features above)

TI MGCP (NCS) Protocol – with TI sample Basic Call control Basic call support

OR

TI H.323 Protocol support - TI sample Basic Call control. H.323 Network Protocol Stack available via Radvision, Third Party partner

OR

Radvision H.323 Call Control and Protocol Stack support - with support for supplementary services, available via Radvision, a TI Third Party partner

OR

Radvision SIP Call Control and Protocol Stack support - with support for supplementary services, available via Radvision, a TI Third Party partner

* Please consult your sales representative for latest product features and availability.

For more information, please contact your TI sales representative or call 972-644-5580.
www.ti.com/voip

TEXAS INSTRUMENTS

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