Wideband IP Phone Solution
Texas Instruments
TNETV105x core

Adaptive Digital's wideband IP phone solutions are based upon the Texas Instruments' TNETV105x integrated silicon processors. The TNETV1050/55/56/57 features the market-leading programmable TMS320C55x™ Digital Signal Processor (DSP) and a MIPS32™ 4KEc™ processor, combined with Adaptive Digital's field-proven VoIP software.

Adaptive Digital's VoIP Software for IP Phone Applications

Adaptive Digital's VoIP 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 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 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. The three port on-chip Ethernet Switch with dual MAC and PHY provides support for IP Phone and PC connectivity to the Ethernet LAN.
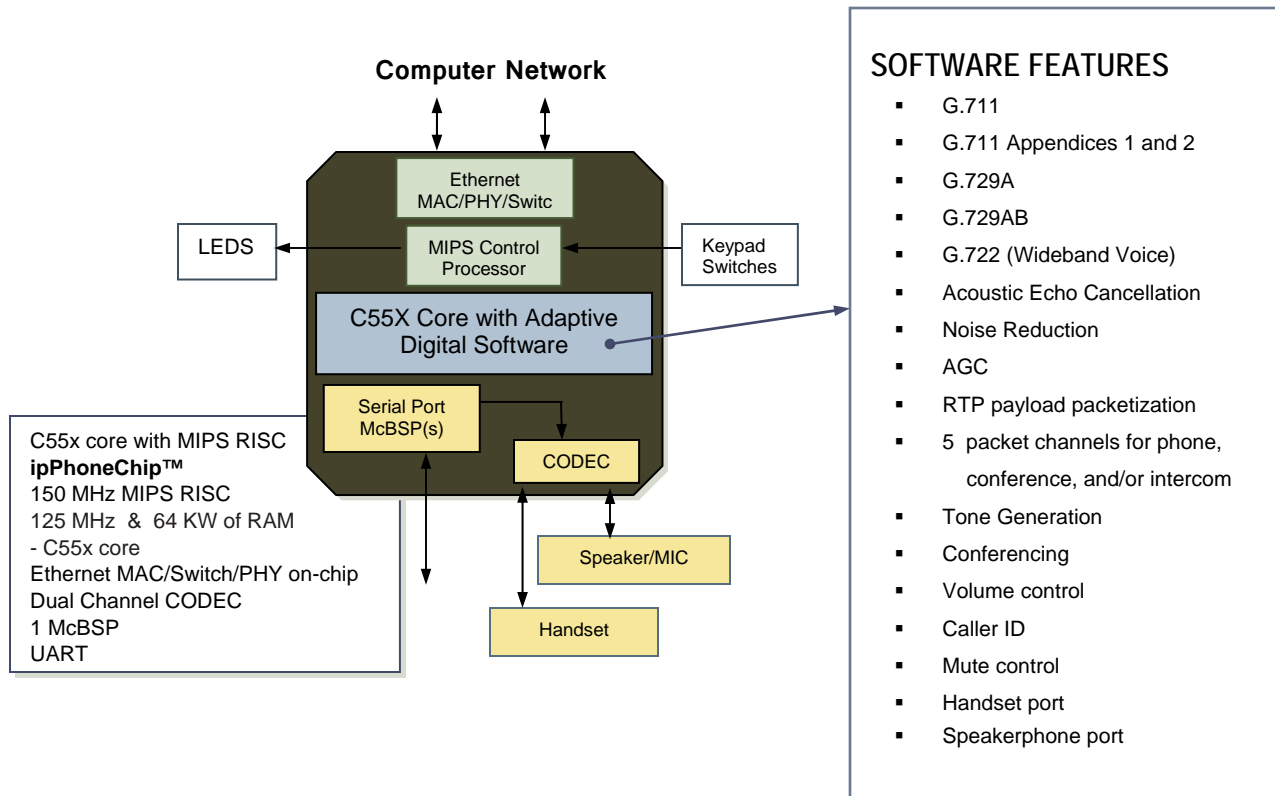
TNETV1050 IP Phone processor has a USB 1.1 controller and PHY that support either USB host or peripheral. The USB interface allows for a wide variety of possible devices to connect to the phone for user value-add. These devices support applications such as card readers, fingerprint recognition, PDA synchronization, 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 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.

FEATURES

- Leverage Proven TI DSP technology
- Field proven Adaptive Digital Software for VoIP
  - AT&T certified Echo canceller
  - Acoustic echo canceller
  - Packet protocol
  - Codec options
  - Full duplex speaker phone
  - Conferencing
  - PCM voice mode
- Expandable Solution supporting next generation IP phone applications
- World-class technical support
- Available through TI: Linux based chip support package.

TNETV105x SOLUTION DIAGRAM

Computer Network

Ethernet
MAC/PHY/Switc

LEDS

MIPS Control
Processor

Keypad
Switches

C55X Core with Adaptive
Digital Software

Serial Port
McBSP(s)

CODEC

Speaker/MIC

Handset

C55x core with MIPS RISC
ipPhoneChip™
150 MHz MIPS RISC
125 MHz & 64 KW of RAM
- C55x core
Ethernet MAC/Switch/PHY on-chip
Dual Channel CODEC
1 McBSP
UART

SOFTWARE FEATURES

- G.711
- G.711 Appendices 1 and 2
- G.729A
- G.729AB
- G.722 (Wideband Voice)
- Acoustic Echo Cancellation
- Noise Reduction
- AGC
- RTP payload packetization
- 5 packet channels for phone, conference, and/or intercom
- Tone Generation
- Conferencing
- Volume control
- Caller ID
- Mute control
- Handset port
- Speakerphone port

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 architecture uses advanced design features to provide flexibility and performance throughput, while conserving power consumption. Combined with Adaptive Digital IP Phone software, the TNETV1050/1055 provides a 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 (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).

TNETV1050/1055 IP Phone Processor − Block Diagram
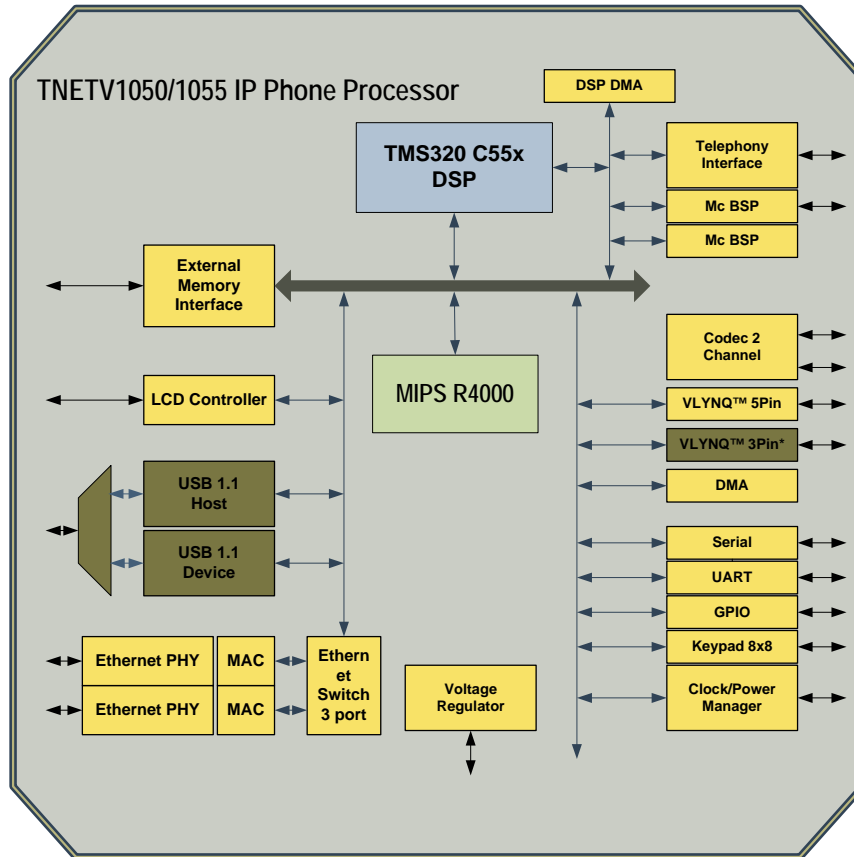
The following chart explains differences between families of TNETV105x devices, but does not list the entire feature for each device.

DEVICE	PHONE TYPE	DSP (MHz)	Micro (MHz)	ETHERNET	SDRAM EMIF	PERIPHERAL DIFFERENCES
1050	Full-featured 2 ports with switch	125	165	Ethernet switch, Dual 10/100 MAC/PHYs "Compliant"	32 bit	USB, 5 & 3-pin VLYNQ, with McBSP
1055	Medium featured 2 ports with switch	100	125	Ethernet switch, Dual 10/100 MAC/PHYs "Compliant"	32 bit	No USB, 5-pin VLYNQ only, with McBSP
1056	Low cost 1 port no switch	100	125	No switch. Single 10/100 MAC/PHY. "Compliant"	32 bit	No USB, 5-pin VLYNQ only, with McBSP
1057	Low cost 2 ports with switch	87.5	87.5	Ethernet switch, Dual 10/100 MAC/PHYs "Compliant"	16 bit	No USB, no VLYNQ, no McBSP

Device Overview
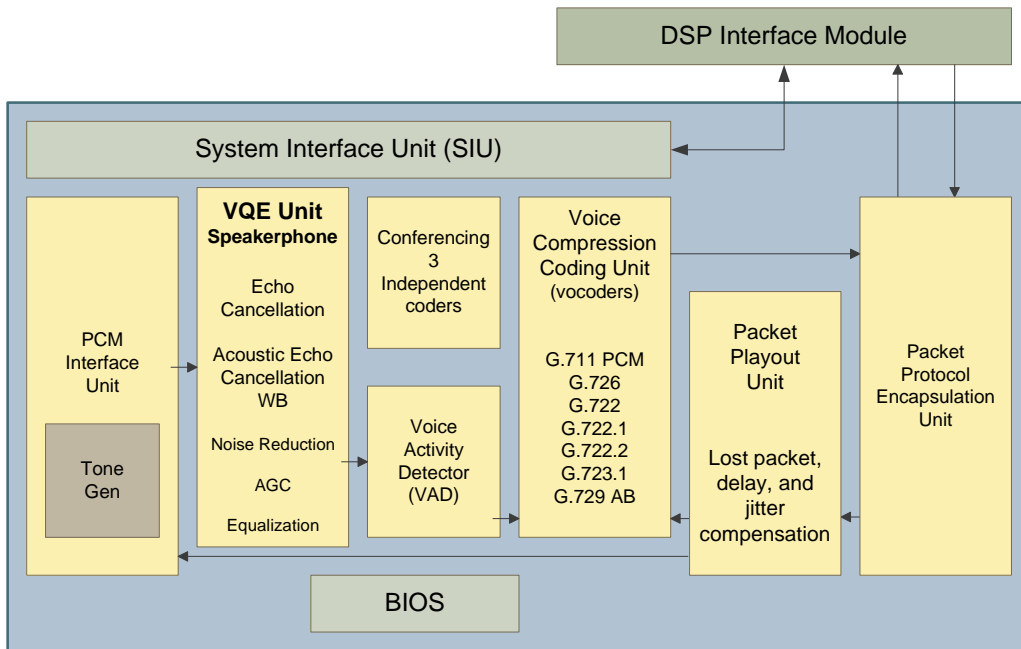
SOFTWARE FEATURES – ADAPTIVE DIGITAL

- Wideband Audio Support (16Khz PCM sampling rate and sampling rate conversion when interfacing to narrowband paths)
- G.711 with appendix 1(Packet Loss Concealment)
- G.722 with packet loss Concealment
- G.729 AB
- AEC (wideband 16Khz)
- Conferencing (3 independent coders)
- Automatic Gain Control (AGC)

- Tone Generate
- Equalization
- Noise Reduction
- VQE Software
- Diagnostics recording

Optional Features

- G.723.1A
- G.711 Appendix 2 (Discontinuous Transmission)

- G.728
- T-38 Fax Relay

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