



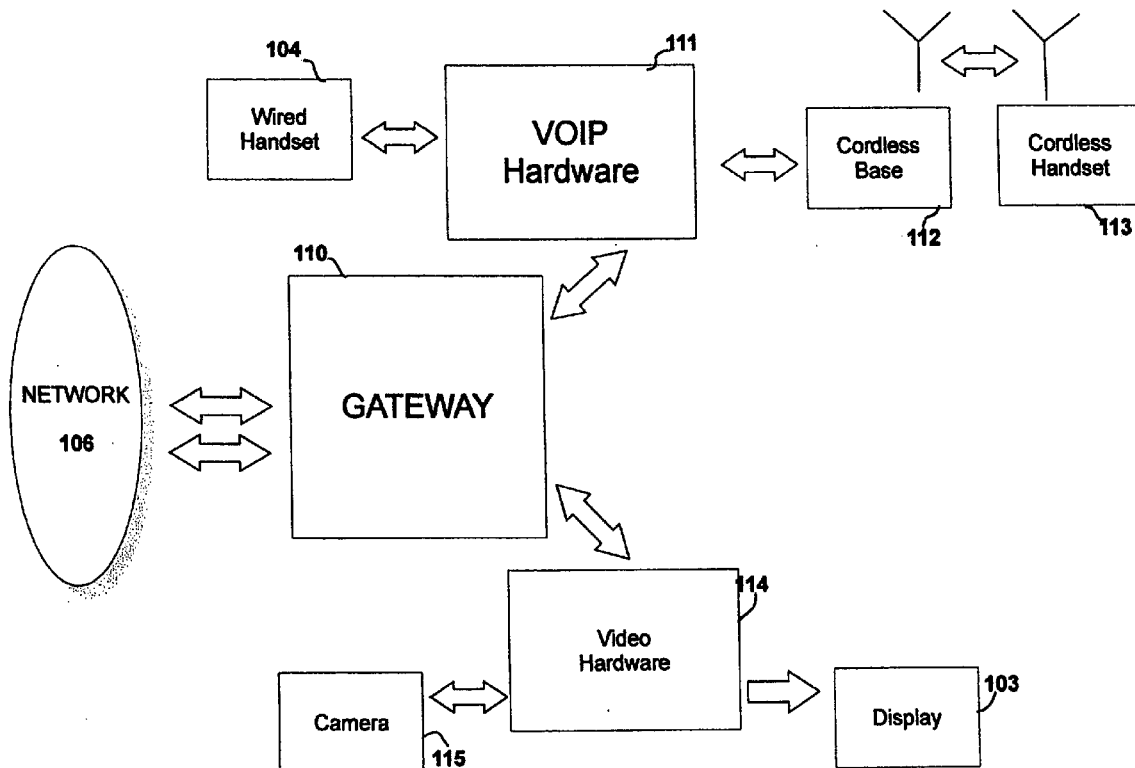
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(19) **United States**(12) **Patent Application Publication**
Pulitzer(10) **Pub. No.: US 2006/0031910 A1**(43) **Pub. Date: Feb. 9, 2006**(54) **INTEGRATED
VOICE-OVER-INTERNET-PROTOCOL
MULTIPLE TERMINAL ADAPTER AND A/V
TELECOMMUNICATION DEVICE**11/184,032, filed on Jul. 30, 2004. Provisional appli-
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036, filed on Aug. 5, 2004.(76) Inventor: **J. Hutton Pulitzer**, Addison, TX (US)

Correspondence Address:

JACKSON WALKER LLP
2435 NORTH CENTRAL EXPRESSWAY
SUITE 600
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(57)

ABSTRACT**Related U.S. Application Data**(60) Provisional application No. 11/184,030, filed on Jul.
30, 2004. Provisional application No. 11/184,031,
filed on Jul. 30, 2004. Provisional application No.An A/V telecommunication terminal including a network
connection, a telecommunications processor connected to
the network connection and a video processor connected to
the network connection may include an integrated VoIP
multimedia terminal adapter.

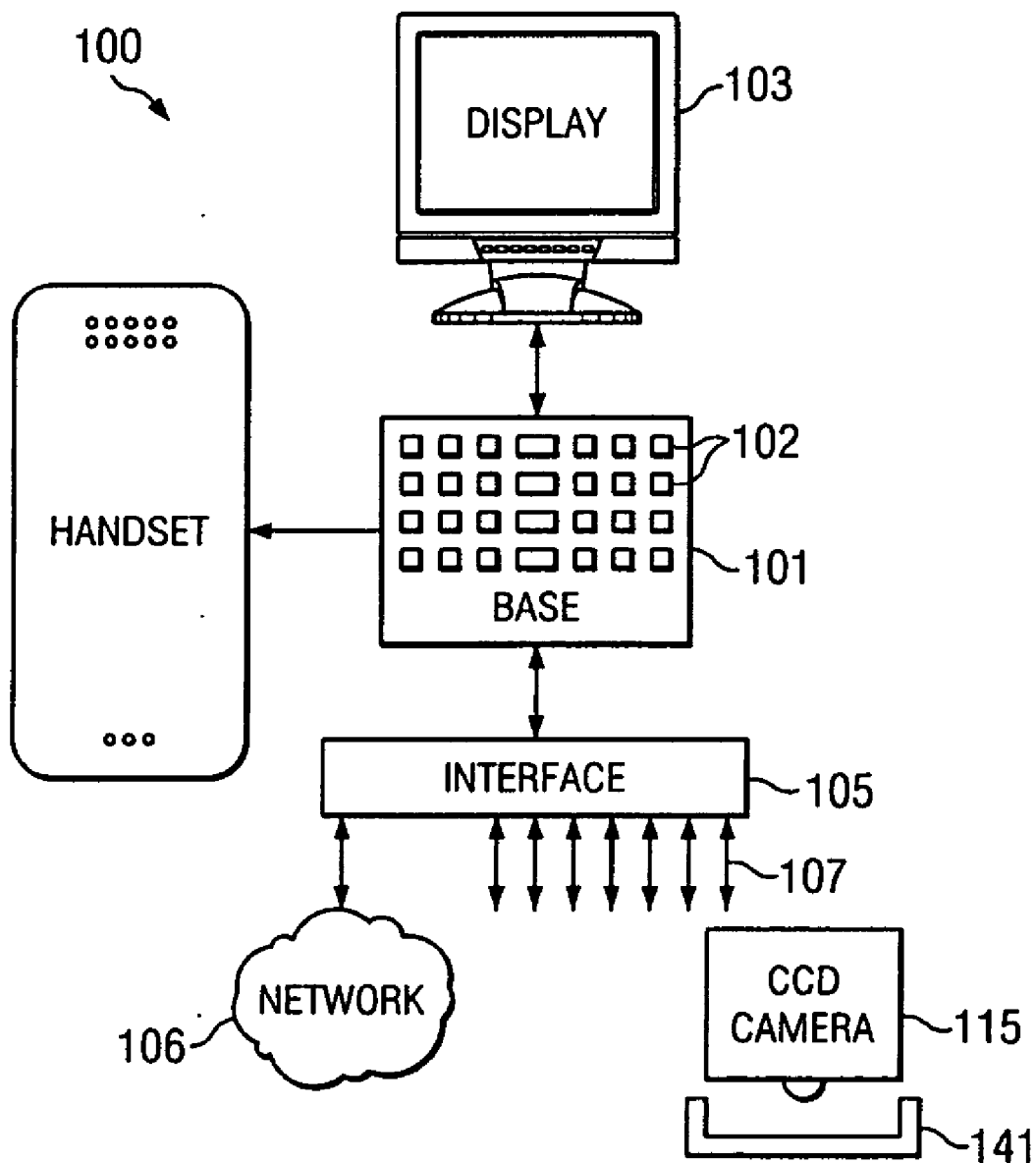


Figure 1

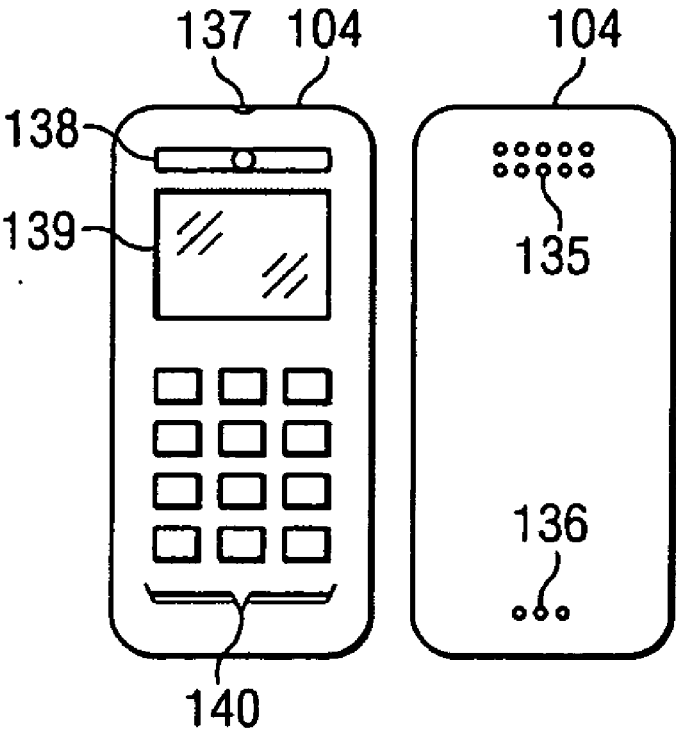


Figure 1a

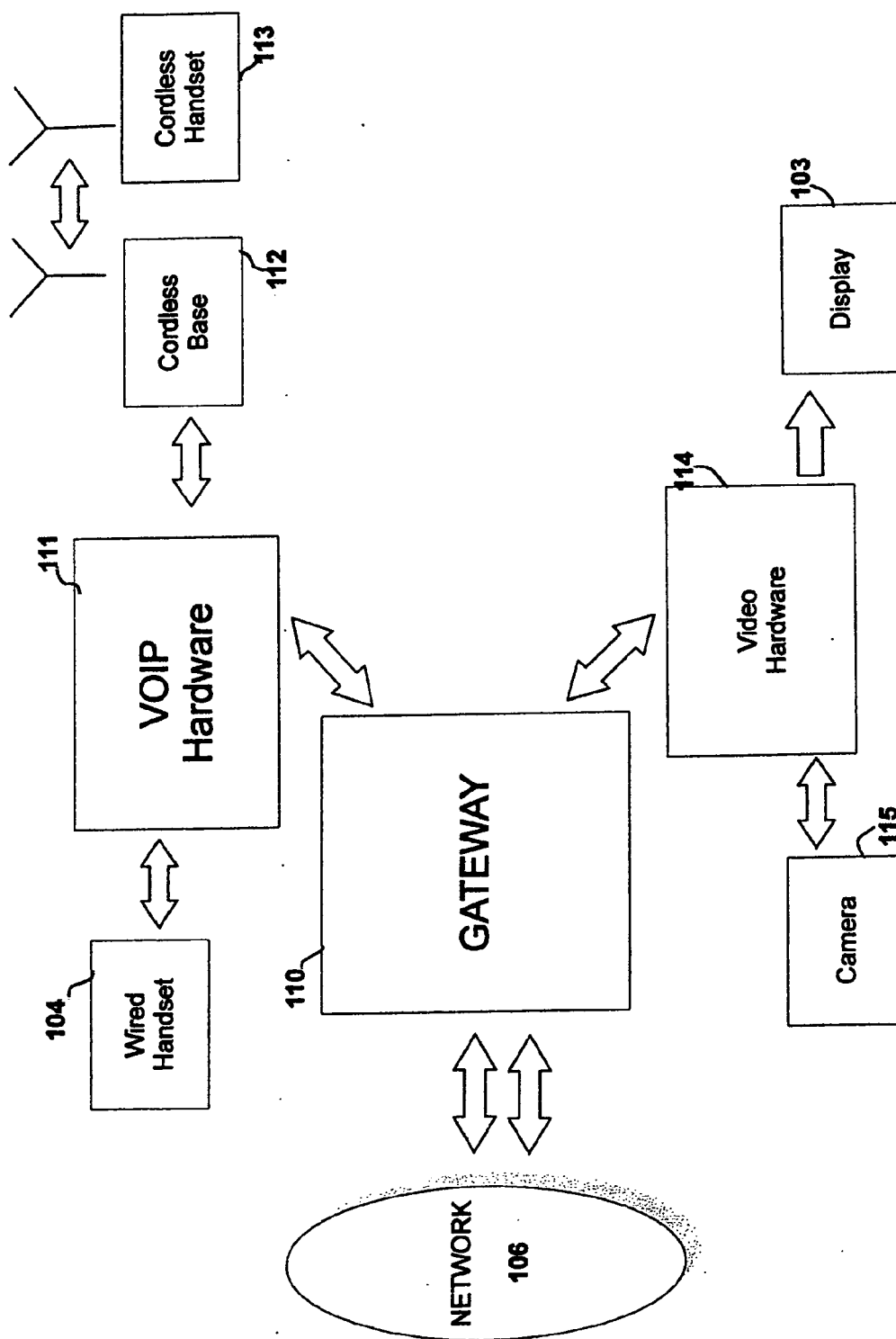


Figure 2

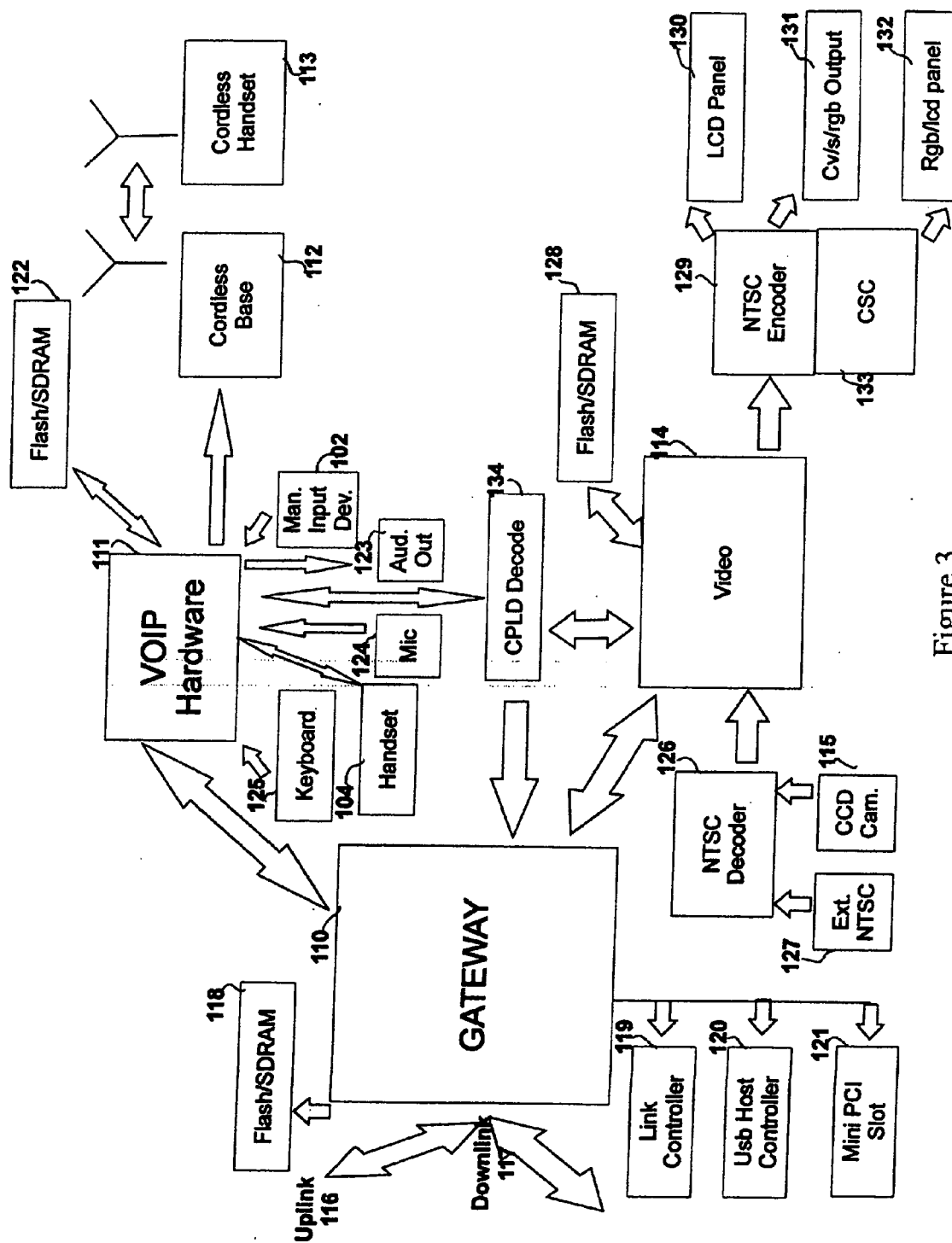


Figure 3

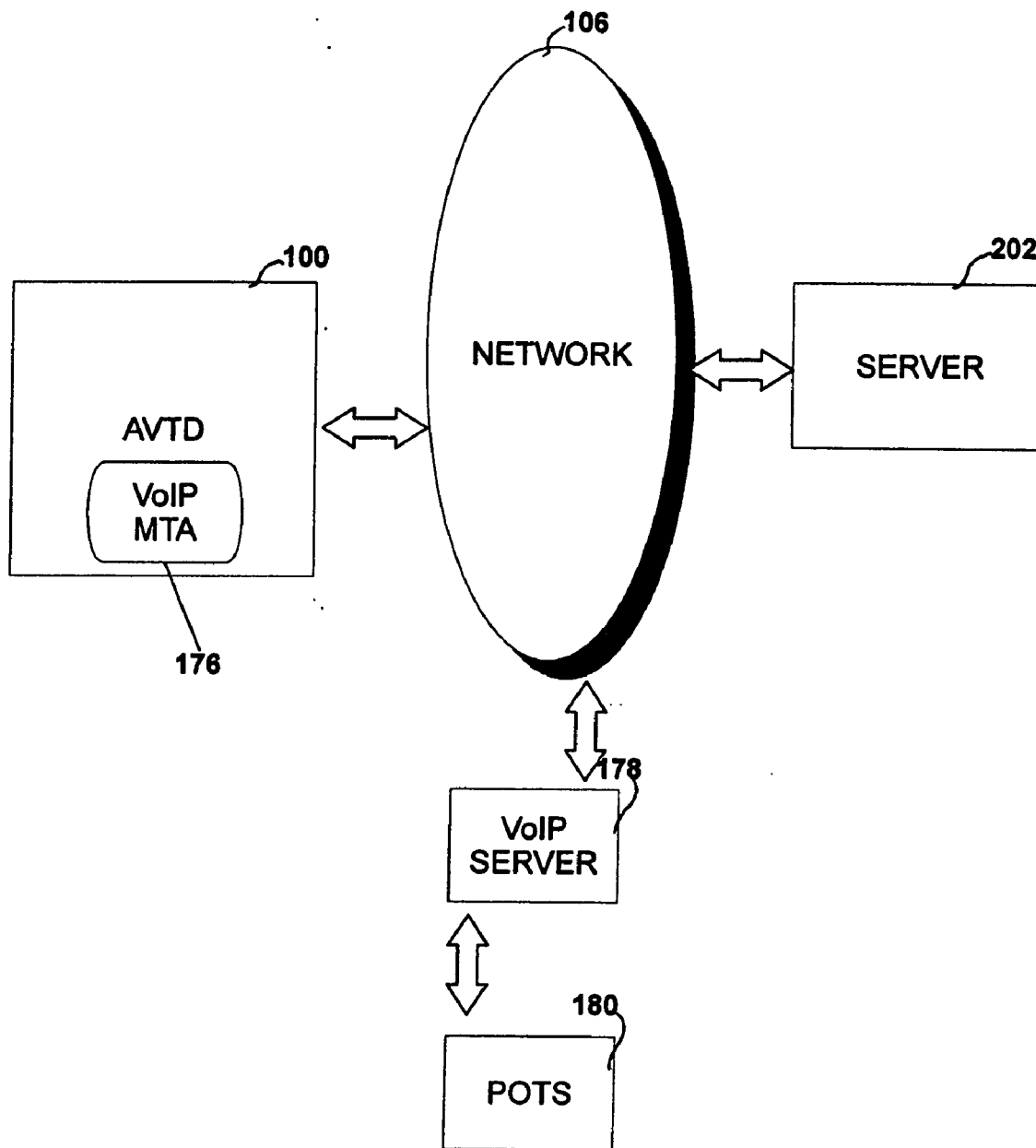


Figure 4

**INTEGRATED
VOICE-OVER-INTERNET-PROTOCOL MULTIPLE
TERMINAL ADAPTER AND A/V
TELECOMMUNICATION DEVICE**

TECHNICAL FIELD OF THE INVENTION

[0001] The invention relates to the field of video telephony, in particular to an integrated multi-network video telephones.

BACKGROUND OF THE INVENTION

[0002] The combination of video and audio channels provide a unique platform for interpersonal communication. With the availability of broadband Internet network connections in the home, there is an opportunity to provide further methods of interaction between content providers and consumers.

[0003] What is needed, therefore, is a system and method of providing a broadband information appliance.

SUMMARY OF THE INVENTION

[0004] An A/V telecommunication terminal including a network connection, a telecommunications processor connected to the network connection and a video processor connected to the network connection may include an integrated VoIP multimedia terminal adapter.

BRIEF DESCRIPTION OF THE DRAWINGS

[0005] For a more complete understanding of the present invention and the advantages thereof, reference is now made to the following description taken in conjunction with the accompanying Drawings in which:

[0006] **FIG. 1** illustrates a household broadband information appliance;

[0007] **FIG. 1A** illustrates a handset for a household broadband information appliance;

[0008] **FIG. 2** illustrates a block diagram of a household broadband information appliance;

[0009] **FIG. 3** illustrates a block diagram of a household broadband information appliance; and

[0010] **FIG. 4** illustrates an AVTD with an integrated VoIP multimedia adapter.

**DETAILED DESCRIPTION OF THE
INVENTION**

[0011] Referring now to the drawings, wherein like reference numbers are used to designate like elements throughout the various views, several embodiments of the present invention are further described. The figures are not necessarily drawn to scale, and in some instances the drawings have been exaggerated or simplified for illustrative purposes only. One of ordinary skill in the art will appreciate the many possible applications and variations of the present invention based on the following examples of possible embodiments of the present invention.

[0012] With reference to **FIG. 1**, a functional depiction of a broadband information appliance **100** is shown. The broadband information appliance **100** includes a base unit **101**. The base unit **101** typically houses the processing circuits,

memory storage, interfaces **105**, manual inputs **102** and power connections. The base unit **101** may be attached to a display **103**. The display **103** may be integral with the base unit **101**. The display **103** may be an independent unit fixedly attached to the base unit **101**. The display **103** may be interchangeably attached to the base unit **101** such that the display **103** may be easily exchanged for a different display **103**.

[0013] Base unit **101** may include manual inputs **102**. Typically the manual inputs **102** may include a standard telephone keypad with ten numeric buttons plus “#” and “*” buttons. The manual inputs **102** may further include any number of other buttons, switches, thumbwheels or other appropriate manual input devices. A wide variety of functions and features may be controlled using the manual inputs **102**. Manual inputs **102** may include navigation keys or a joystick for up, down, right and left selections, programmable soft keys. Power and status LEDs may also be provided.

[0014] Base unit **101** may be connected to a handset **104**. Handset **104** may be substantially a standard telephone handset including a microphone and speaker. Handset **104** may be directly connected to the base unit **101**. A handset **104** directly connected to the base unit **101** may be called a “tethered” or “wired” handset. Handset **104** may also include a wireless transceiver for wireless connection to a base unit including (or connected to) a wireless transceiver. The wireless transceivers may be a 2.4 gigahertz transceivers or may use any other suitable wireless transceiver frequency. The wireless transceivers may be spread spectrum transceivers. A handset **104** wirelessly connected to the base unit may be called a “wireless” handset.

[0015] Base unit **101** may be connected to an interface **105**. Typically, interface **105** will be integral with base unit **101**. Interface **105** includes an interface for connection to network **106**. Network **106** may be an open network such as the Internet. Interface **105** includes interface connections **107** for connecting the base unit **101** to a variety of peripherals or networks. Typically, the interface **105** will provide Ethernet ports, telephone handset and keypad support, video capture and display ports including NTSC composite input and output ports, S-video ports, NTSC camera ports and LCD display ports. The interface **105** may include audio capture and reproduction ports, an external microphone port, an external speaker port, two audio line level inputs, a handsfree speakerphone,

[0016] A digital video camera **115** may be connected to base unit **101**. Typically digital video camera **115** is a CCD camera device. The digital video camera **115** may be integral with the base unit **101** or the display **103**. An additional digital video camera **137** may be integral with the handset **104**. A privacy shield **141** may be a cover provided to disable the digital video camera **137** by covering the lens of the digital video camera **137**.

[0017] With reference to **FIG. 1A**, a more detailed depiction of the features that may be incorporated into handset **104** is shown. The handset **104** typically includes a speaker **135** and a microphone **136** to provide standard audio communication. Handset **104** may include a digital video camera **137**, typically at one end of the handset **104**. A scanner **138** may be provided on the handset **104** to read machine readable codes or to scan image data. An LCD display **139**

may be provided on the handset **104** to allow the user to see the input from digital video camera **137**, show video data being shown on display **103** when the handset **104** is being used remotely from the base **101**. The handset display **139** may also show alternate visual data. The handset **104** may include further manual inputs **140** to control the video camera **137**, handset display **139**, scanner **138**.

[0018] With reference to **FIG. 2**, a functional block diagram of a basic broadband information appliance **100** is shown. A gateway **110** provides an interface to network **106**. The gateway communicates with voice-over-internet-protocol (VoIP) hardware **111** and video hardware **114**. The VoIP hardware **1-14** may be directly connected to wired handset **104** or may be connected to a cordless base unit **112** which provides wireless communication with a cordless handset **113**. The video hardware **114** may be connected to a video camera **115** and a display **103**.

[0019] With reference to **FIG. 3**, a more detailed functional block diagram of a broadband information appliance **100** is shown. A gateway **110** provides communication with one or more networks **106**. Gateway **110** may be a Micrel KS8695P processor. The gateway **110** typically acts as the master boot processor for the broadband information appliance **100**. The gateway **110** is typically an integrated, multi-port PCI bridge system on a chip. The KS8695P integrates an ARM922T CPU, a PCI bridge that can support up to 3 external PCI masters and a 5-port switch with integrated media access controllers and low power Ethernet PHYs. The PCI interface can be connected gluelessly to miniPCI or cardbus wireless LAN cards that support 802.11a/g/b. Those skilled in the art will recognize that other processors, chips or configurations could be used for the gateway **110**.

[0020] The KS8695P gateway processor includes five Ethernet MAC and PHY, 10/100 Base-Transceivers. It includes a PCI bridge and Master arbiter of up to 3 external PCI 2.1 compliant controllers, supporting a 32 bit data bus at 33 MHz clock speed. The processor includes a memory controller for glueless synchronous DRAM support at 133 MHz access of up to 32 MB. The processor has a standard memory bus for SRAM and flash ROM, 32 bit address, 32 bit data up to 32 MB, with general purpose I/O pins and a JTAG port.

[0021] Gateway **110** provides one or more external Ethernet ports. Gateway **110** includes Ethernet ports for both uplink **116** and downlink **117** connections. Typically, uplink **116** and downlink **117** are integrated, however according to some embodiments, separate communication links may be provided for the uplink **116** and downlink **117**, particularly where bandwidth limitations make it advisable to provide greater bandwidth for the downlink **117** than the uplink **116**.

[0022] Gateway **119** may be connected to a link controller **119**, a USB host controller **120**, a mini-PCI slot **121** or other interfaces. Gateway **119** may be connected to gateway memory **118**. Gateway memory **118** may be flash memory, SDRAM or other suitable memory device.

[0023] Gateway **119** may be connected to a VoIP processor **111**. A VoIP processor **111** is a communication processor for audio codec and telephone management. The VoIP processor **11** may be a Telogy TNETV1050 DSP. The VoIP processor may include a MIPS32 reduced instruction set computer

processor and a C55 DSP. The RISC processor software supplies overall system services and performs user interface, network management, protocol stack management, call processing and task scheduling functions. The DSP software provides real-time voice processing functions such as echo cancellation, compression, pulse-code modulation data processing and tone generation and detection.

[0024] Two 10/100 Base-T Ethernet MAC and PHY are included with integrated layer-2 three-port Ethernet switches. On-chip peripherals include an 8x8 keypad interface, USB controller host, universal asynchronous receiver/transmitter serial interface, a programmable serial port, several general-purpose input/outputs and integrated voltage regulator.

[0025] The integrated dual channel 16-bit voice coder/decoder integrates the critical functions needed for IP phone applications, including two analog-to-digital converters and two digital to analog converters. Other features include analog and digital sidetone control, filter, programmable gain options, a programmable sampling rate, 8-speaker driver, microphone, handset and headset interfaces.

[0026] The VoIP processor **111** may include dual Ethernet MAC and PHY, 10/100 base transceivers. The VoIP processor **111** may include a speaker and microphone for handset, headset, and optional input and output sources. The VoIP processor **111** may include a PC and Palm compatible IrDA transceiver, a RS-232 serial port, a USB host port, general purpose I/O pins for LED and configuration options. The VoIP processor **111** may include synchronous DRAM, 133 MHz up to 128 MB, a standard memory bus, a JTAG port and HP Logic analyzer connectors. Those skilled in the art will recognize that other VoIP processors may be used as suitable.

[0027] VoIP processor **111** may be connected to a VoIP memory **112**. VoIP memory **112** may be a flash memory, SDRAM or other suitable memory devices. The VoIP hardware **111** may be connected to a handset **104** or a cordless base **112** which provides wireless communication with a cordless handset **113**. The VoIP hardware **111** may be connected to manual input devices **102**, a microphone **124**, a speaker **123**. VoIP hardware **111** may be connected to an alpha-numeric keyboard **125**.

[0028] Gateway **110** may be connected to video processor **114**. The video processor **114** is a video codec and LCD panel controller. The VoIP processor **111** may be a TI TMS320DM642 digital signal processor. The digital signal processor may be based on the second-generation high-performance advanced VelociTI very-long-word-instruction (VLIW) architecture. The digital signal processor may provide 4800 million instructions per second at a clock rate of 600 MHz. The DSP offers operational flexibility of array speed controllers and the numerical capability of array processors. A DSP core processor has 64 general purpose registers of 32-bit word length and eight independent functional units including two multipliers for 32 bit word length and six arithmetic logic units. The DSP provides extensions in the eight functional units including new instructions to accelerate performance in video and imaging applications to extend parallelism. The DSP can produce four 32-bit multiply accumulates per cycle for a total of 2400 million MACs per second or eight 8-bit MACs per cycle for a total of 4800

million MACs. The DSP may have application specific hardware logic, on-chip memory and additional on-chip peripherals.

[0029] The DSP typically uses a two-level cache-based architecture. A Level 1 program cache is a 128-Kbit direct mapped cache and a Level 1 data cache is a 128-Kbit 2-way set-associative cache. A Level 2 memory cache consists of a 2-Mbit-memory space that is shared between program and data space. Level 2 memory can be configured as mapped memory.

[0030] The peripheral set may include configurable video ports; a 10/100 Mb/s Ethernet MAC; a management data input/output; a VCXO interpolated control port; a multi-channel buffered audio serial port; an inter-integrated circuit bus module; two multichannel buffered serial ports; three 32-bit general purpose timers; a user-configurable 16-bit or 32-bit host port interface; a peripheral component interconnect; a 16-ping general-purpose input/output port with programmable interrupt/event generation modes; and a 64-bit glueless external memory interface which is capable of interfacing to synchronous and asynchronous memories and peripherals.

[0031] The DSP may have three configurable video port peripherals. These video port peripherals provide a glueless interface to common video decoder and encoder devices. The DSP video port peripherals support multiple resolutions and video standards. The video ports peripherals are configurable and can support video capture and video display modes. Each video port may include two channels with a 5120 byte capture/display buffer that is split-able between the two channels.

[0032] The DSP may include three video ports including a capture port interfaced with a Philips SAA7115 decoder with integrated multiplexer for NTSC, S-video sources; display port interfaced with Philips SAA7105 NTSC and S-video encoder and a third port dedicated to an LCD panel. The DSP may include Ethernet MAC 10/100 Base-Transceivers. The DSP may include general purpose I/O pins and a JTAG port. The DSP may be a synchronous DRAM 64-bit wide, 133 MHz up to 1 GB support. The DSP may include a standard asynchronous memory bus 32 bit. The DSP may include HP logic analyzer connectors for memory bus address, data and control signals. Those skilled in the art will recognize that other DSP processors may be implemented.

[0033] The video processor 114 may be connected to a video memory 128. Video memory 128 may be a flash memory, SDRAM or other suitable memory device. The video processor 114 may be connected to an video decoder 126. Video decoder 126 may be a NTSC decoder. Video decoder 126 may receive video signals from an external source 127 or a video camera 115. The video processor 114 may be connected to a video encoder 129. The video encoder 129 may be an NTSC encoder. The video encoder 129 may be integral with a CSC 133 to provide video signals to an RGB/LCD panel 132. The video encoder 129 may provide video signals to an LCD panel 130 and a CV/S/RGB output.

[0034] The gateway 110, VoIP processor 111 and video processor 114 may be mutually connected to a CPLD decoder 134.

[0035] The broadband information appliance 100 may include smart media access, an infrared transceiver, an unpowered firewire port, fast peripheral ports, a wireless interface, Bluetooth support and a HomePlug interface.

[0036] The broadband information appliance 100 may be an AC powered device, using residential power distribution of 120 VAC at 60 Hz or 230 VAC at 50 Hz. A power adapter may convert the AC power to 12 volts DC.

[0037] The broadband information appliance typically includes three memory module, particularly the gateway memory 118, the VoIP memory 122 and the video memory 128. SDRAM memory may be connected through each of the direct SDRAM interfaces in the DSP and gateway processors. SDRAM may be rated to operate at 133 MHz and terminated with discrete components. Dedicated SDRAM for each processor may be used.

[0038] With reference to FIG. 4, an A/V telecommunications device 100 with an integrated VoIP MTA 176 is shown. The VoIP multimedia terminal adapter 176 manages the connection of the A/V telecommunications device 100 with voice-over-IP telephony. When an incoming or outgoing telephone call is initiated, the signal goes through a VoIP server 178 connected to a POTS 180 communicably connected to VoIP multimedia terminal adapter 176. The VoIP multimedia terminal adapter 176 may implement media manipulation including sampling, encoding or decoding, encapsulation such as encryption or framing and call signaling protocols.

[0039] It will be appreciated by those skilled in the art having the benefit of this disclosure that this invention provides a broadband information appliance. It should be understood that the drawings and detailed description herein are to be regarded in an illustrative rather than a restrictive manner, and are not intended to limit the invention to the particular forms and examples disclosed. On the contrary, the invention includes any further modifications, changes, rearrangements, substitutions, alternatives, design choices, and embodiments apparent to those of ordinary skill in the art, without departing from the spirit and scope of this invention, as defined by the following claims. Thus, it is intended that the following claims be interpreted to embrace all such further modifications, changes, rearrangements, substitutions, alternatives, design choices, and embodiments.

What is claimed is:

1. An A/V telecommunication terminal comprising
 - a network connection;
 - a telecommunications processor connected to the network connection;
 - a video processor connected to the network connection; and
 - an integrated VoIP multimedia terminal adapter.

* * * * *