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(54) **INTEGRATED DIGITAL MEDIA SERVER AND A/V TELECOMMUNICATION DEVICE**

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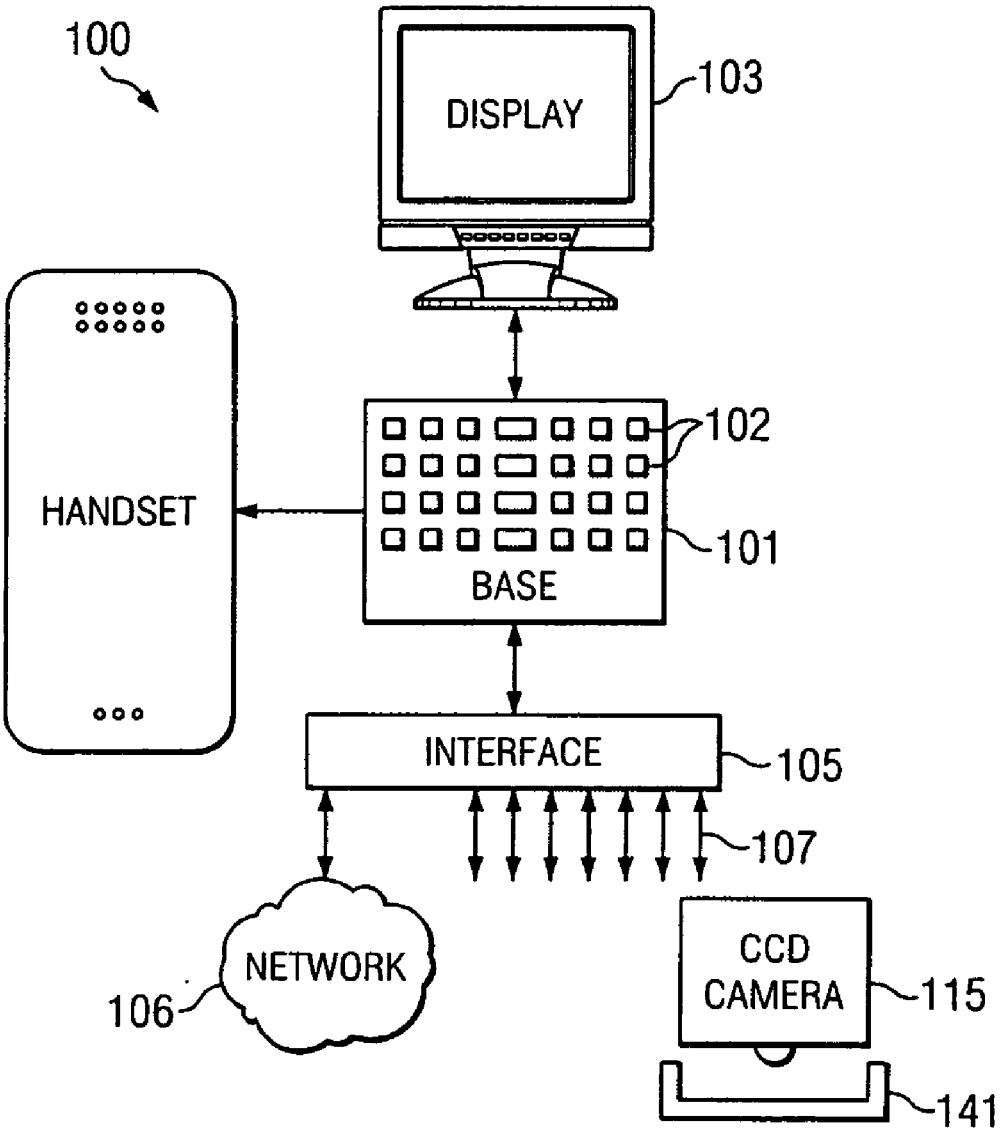
(57) **ABSTRACT**

An integrated digital picture server and A/V telecommunication device includes a network connection, a telecommunications processor connected to the network connection and a video processor connected to the network connection. A memory is connected to the video processor and a picture file input connection is connected to the memory. The picture files stored in memory are displayed by the video processor on a video display.



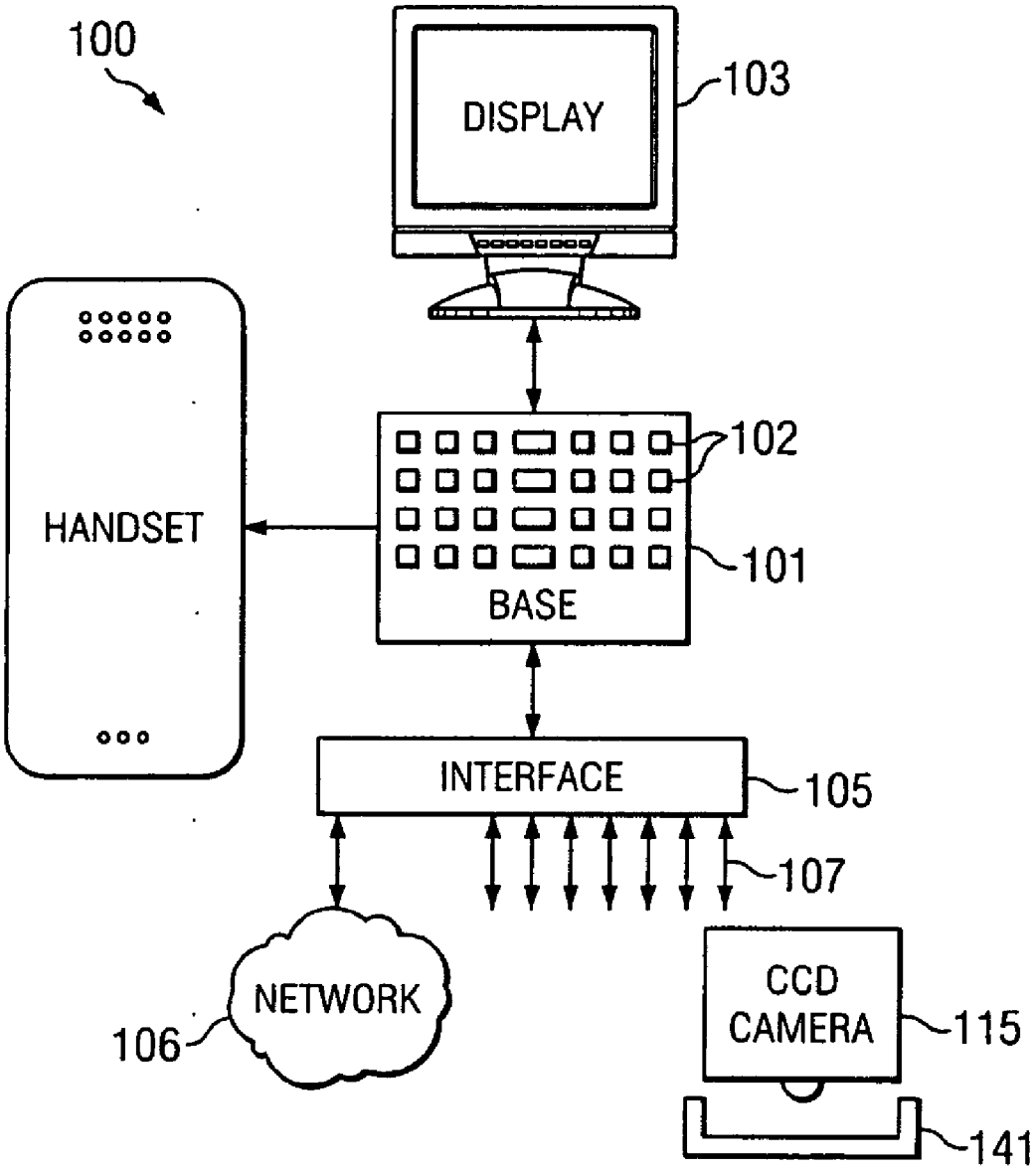

100
DISPLAY
103
HANDSET
102
101
BASE
INTERFACE
105
107
NETWORK
106
CCD
CAMERA
115
141

Figure 1

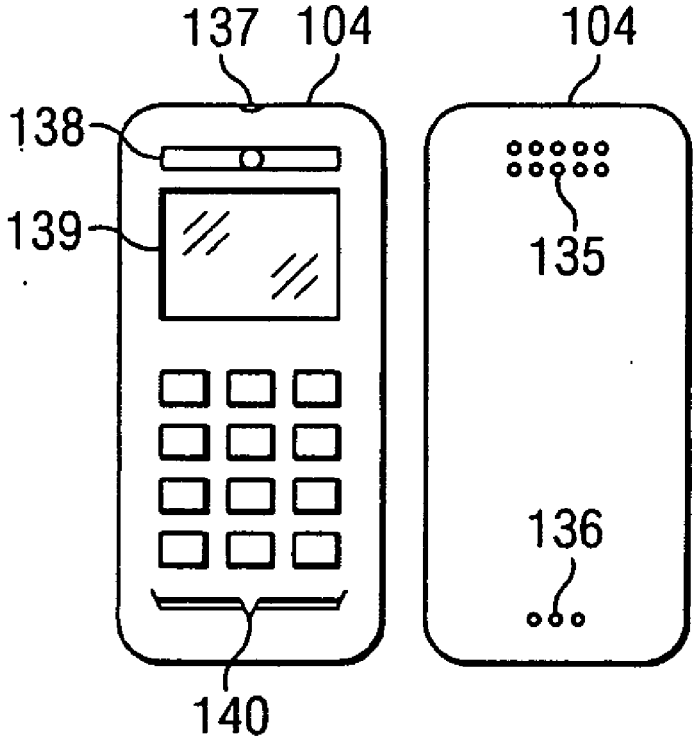


Figure 1a

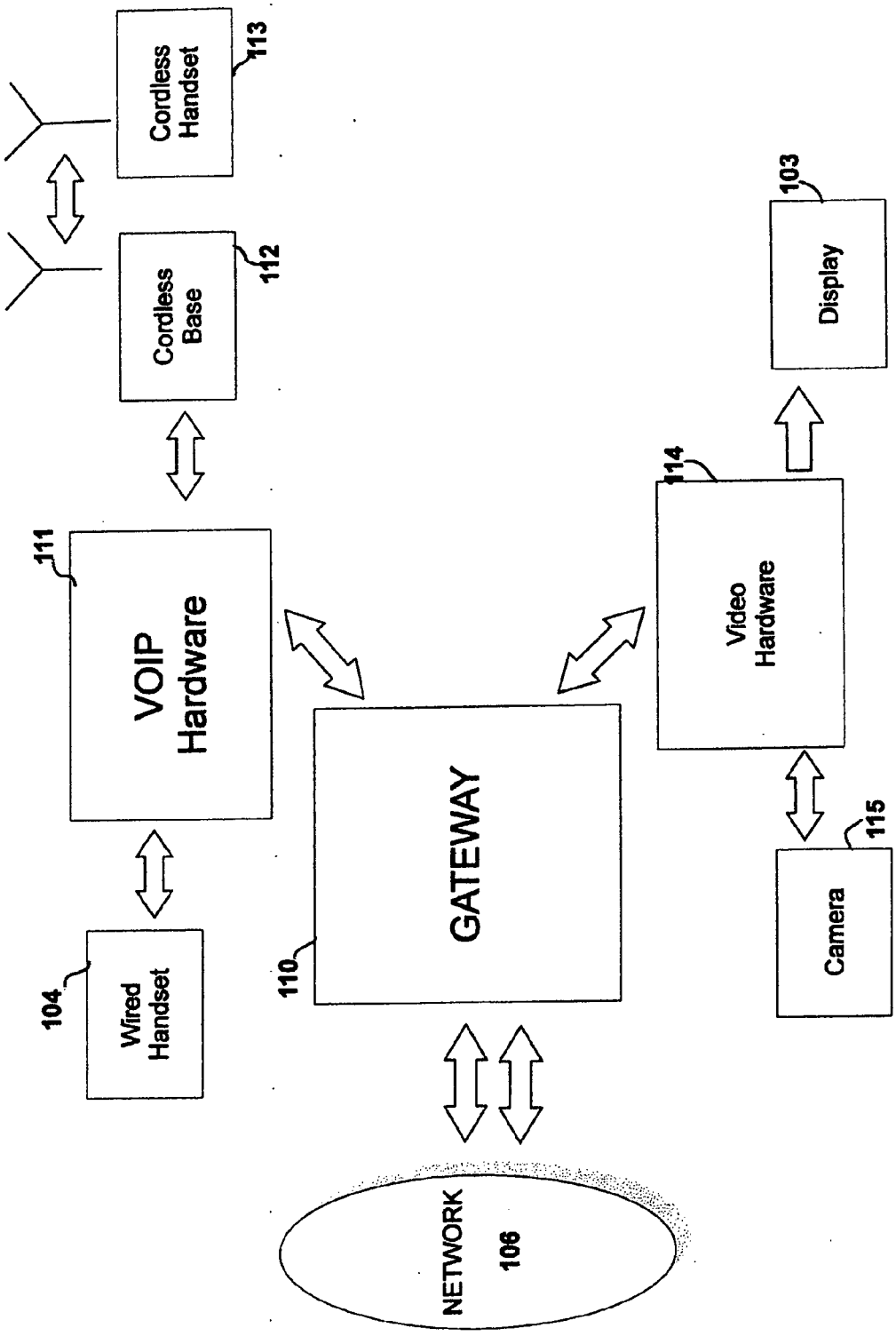

Cordless Handset
113
Cordless Base
112
VOIP Hardware
111
Wired Handset
104
GATEWAY
110
NETWORK
106
Video Hardware
114
Display
103
Camera
115

Figure 2

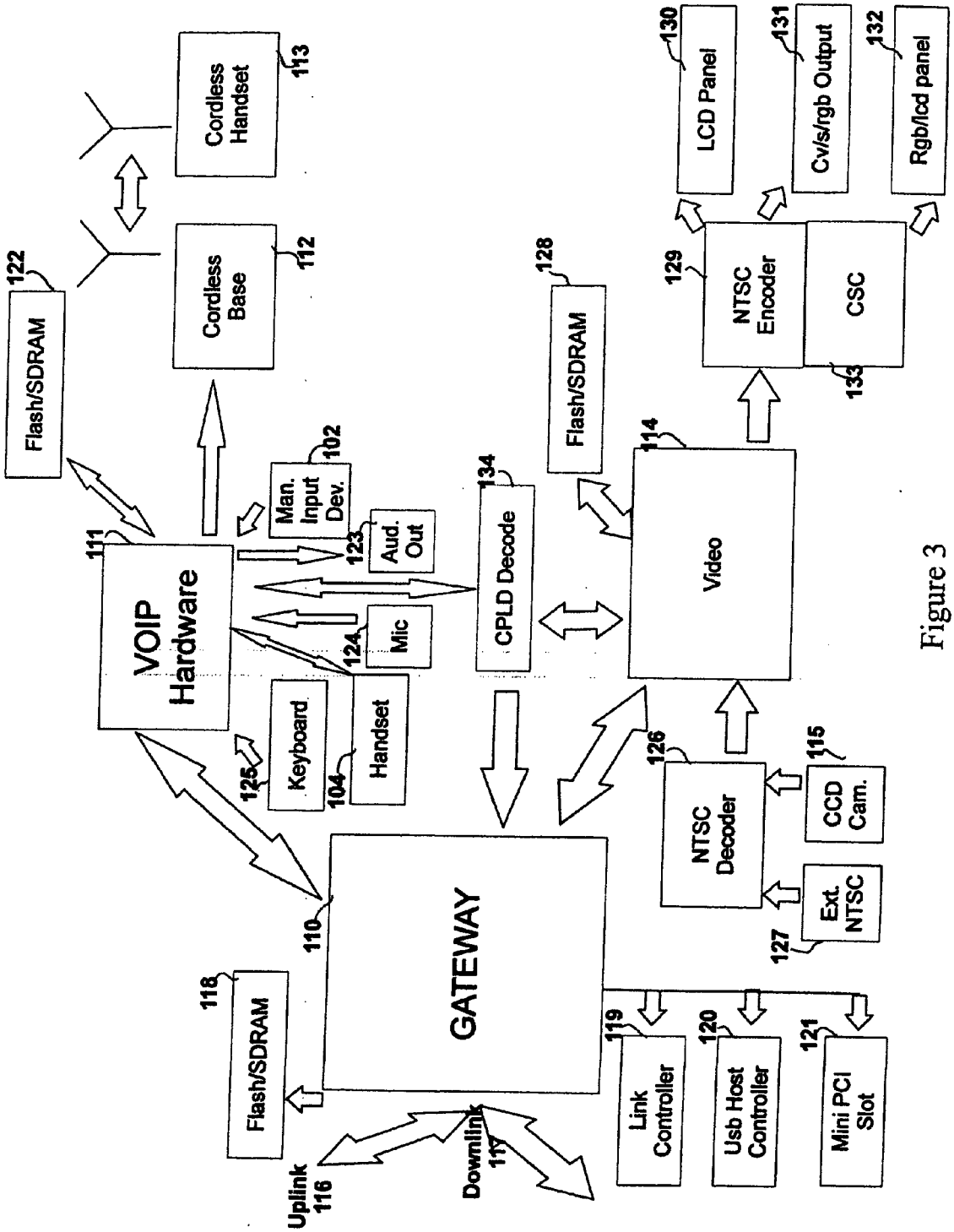

Cordless Handset
113
Cordless Base
112
Flash/SDRAM
122
VOIP Hardware
111
Man. Input Dev.
102
Aud. Out
123
Mic
124
Keyboard
125
Handset
104
CPLD Decode
134
Flash/SDRAM
128
Video
114
NTSC Encoder
129
CSC
133
LCD Panel
130
Cv/s/rgb Output
131
Rgb/lcd panel
132
NTSC Decoder
126
CCD Cam.
115
Ext. NTSC
127
GATEWAY
110
Flash/SDRAM
118
Uplink
116
Downlink
117
Link Controller
119
Usb Host Controller
120
Mini PCI Slot
121

Figure 3

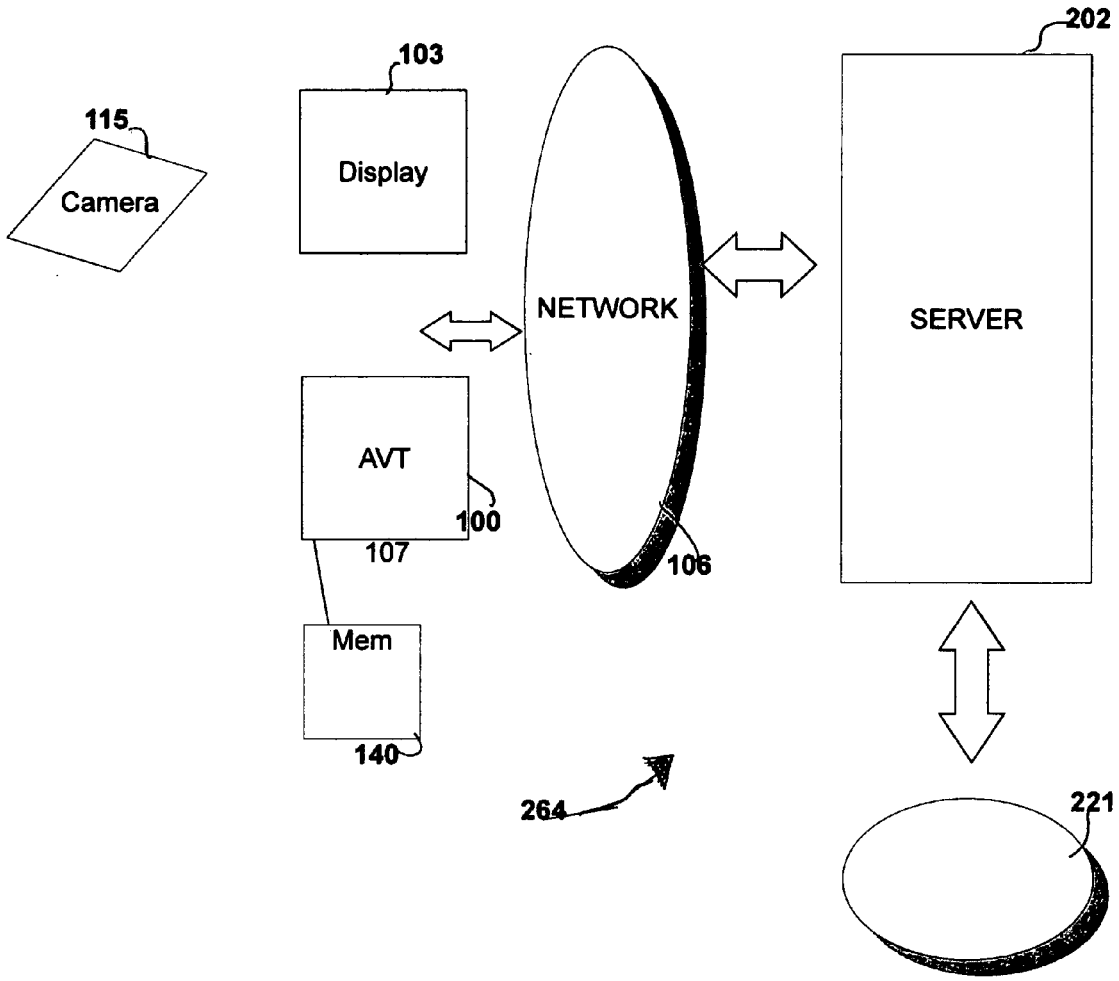

202
103
115
Display
Camera
NETWORK
SERVER
AVT
100
107
106
Mem
140
264
221

Figure 4

INTEGRATED DIGITAL MEDIA SERVER 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 integrated digital picture server and A/V telecommunication device includes a network connection, a telecommunications processor connected to the network connection and a video processor connected to the network connection. A memory is connected to the video processor and a picture file input connection is connected to the memory. The picture files stored in memory are displayed by the video processor on a video display.

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. **1**A 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 a system including an integrated photo server and A/V telecommunication device.

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** maybe 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 **1105** 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. **1**A, 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 **114** 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 as 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 110/100 Base-T Ethernet MAC and PHY are included with integrated layer-2 three-port Ethernet switches. On-chip peripherals include an 8×8 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 high 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/even 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/**0** 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 conver 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**, a system **264** providing an integrated digital picture server and A/V telecommunication device **100** is shown. The A/V telecommunication device **100** includes a visual display **103** and a memory device **140** such as flash memory or a hard-drive. Still picture files taken with a video camera may be input to the A/V telecommunication device via the flash drive **140**, an I/O connection **107**, from CCD camera **115** or over the network **106**. The still picture files may be stored on the memory device **140** and displayed on display **103**. The display of the picture files may be manually directed or may be tied to automatic display functions so that the picture files are displayed at intervals on display **103**. The pictures files may be stored on memory **221** of the host server **202** and delivered to the A/V telecommunication device in a similar fashion.

[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 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 integrated digital picture server and A/V telecommunication device comprising:

a network connection;

a telecommunications processor connected to the network connection;

a video processor connected to the network connection;

a memory connected to the video processor;

a picture file input connection connected to the memory;

wherein picture files stored in memory are displayed by the video processor on a video display.

* * * * *