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VIDEO TRANSCEIVER

BACKGROUND OF THE INVENTION

5 Videophones typically make use of Integrated Service Digital Network (ISDN) digital phone lines which have a broader bandwidth than analog telephone lines, i.e., Public Switching Telephone Network (PSTN) phone lines. Communications over the ISDN digital phone lines are expensive, and they are not universally available.

10 With the advent of relatively fast modems, e.g., 28.8k bps modems, it has become increasingly desirable to send video as well as audio information over the PSTN analog phone lines. However, the use of videophones over the PSTN analog phone lines had many drawbacks.

15 First, because of the bandwidth limitation and lack of defined standard of video quality, the quality of the video was very poor. Second, because of a lack of standardization of communications protocol, manufacturers were producing videophone products that are not interoperable with each other, i.e., a videophone manufactured by one manufacturer was not able to communicate with another videophone manufactured by another manufacturer.

20 In order to allow for an interoperable, quality audiovisual communications over a PSTN analog phone line, the International Telecommunications Union (ITU) recently has adopted a new standard called H.324. The H.324 protocol, adopted by the ITU, is now the standard for audiovisual/multimedia communications over the PSTN analog phone lines. This new standard allows for interoperability and high quality video, voice, and data based phone calls. The H.324 standard makes possible a common method for the transmission of video, voice and data simultaneously over a high-speed modem connection.

25 Since the adoption of the H.324 standard, the desirability of products based on this new standard have become apparent. Some desirable applications of the new standard include video conferencing, remote video surveillance, security system monitoring and closed circuit television (CCTV). The standard also supports products which can be used in fire control and home automation applications. Other desirable applications include Internet browsing, electronic identification of fingerprints (EPI) and electronic handwriting recognition.

30 Those skilled in the art would understand the desirability of having a product that provides the capability to perform all nine of the above listed functions in an integrated fashion. In addition, the current implementation of these desirable functions is cumbersome because a dedicated interface unit is not available. Therefore, those skilled in the art would understand the desirability of having a self-contained video transceiver for multi-functional applications. This type of self contained video transceiver would necessarily provide automation applications
35 including fire control, Internet browsing, electronic identification of fingerprints, and electronic handwriting recognition, thus providing these functions in an integrated unit.



SUMMARY OF THE INVENTION

An embodiment of the present invention is directed to a video transceiver which satisfies this need. In one embodiment, a video transceiver includes a keypad for entering a telephone number, and a transceiver circuit capable of formatting a video input, an audio input and the entered telephone number for transmission on a PSTN telephone line. The transceiver circuit is also capable of extracting a PSTN telephone line input comprising a video signal, an audio signal and a telephone number identifying the video transceiver. Preferably, the video transceiver includes an indicator which indicates when the telephone number identifying the video transceiver is extracted by the video transceiver.

In alternative embodiments of the present invention, the video transceiver is employed in numerous applications. By way of example, in one embodiment, a video transceiver having a keypad is coupled to a detector and an indicator which is responsive to the detector. The video transceiver includes a transceiver circuit which dials a telephone number in response to the detector, and couples an output of the detector to a PSTN telephone line. Preferably, an interface module is used to couple the detector and the indicator to the video transceiver.

A video camera output may also be coupled to the PSTN telephone line through the video transceiver in response to the detector and recorded by a video cassette recorder.

In an alternative embodiment, a video transceiver is coupled to the PSTN telephone line. The video transceiver includes a keypad and a transceiver circuit capable of extracting an appliance control signal from the PSTN telephone line. An appliance, responsive to the extracted appliance control signal, is coupled to the video transceiver. Preferably, an interface module is used to couple the video transceiver to the appliance.

In another embodiment, a video transceiver is coupled to the PSTN telephone line. The video transceiver includes a keypad and a transceiver circuit capable of extracting a number of appliance control signals from the PSTN telephone line. The appliances are preferably coupled to the video transceiver through an interface module, and are responsive to their respective extracted appliance control signals.

In yet another embodiment, a multiplex video transceiver is coupled to a number of keypad controllers. Each keypad controller is coupled to a video camera, a television monitor, a speaker, and a microphone. The multiplex video transceiver is coupled to a video transceiver having a keypad on a PSTN telephone line. Preferably, the video transceiver also includes a video camera, a television monitor, a speaker, and a microphone.

The described embodiments are multi-functional systems capable of performing video conferencing, remote video surveillance, security system monitoring, CCTV applications, fire control, home automation, Internet browsing, electronic identification of fingerprints and electronic handwriting recognition. The dedicated keypad of the video transceiver eliminates the need for using a telephone keypad for user control. Finally, the integration of a speaker and microphone into the video transceiver eliminates the need to rely on a telephone headset or a

1 computer for voice communications. In other embodiments, the video transceiver may also be coupled to a handset.

Many of the attendant features of this invention will be more readily appreciated as the same becomes better understood by reference to the following detailed description considered
5 in connection with the accompanying drawings in which like reference symbols designate like parts throughout. The invention is capable of alternative embodiments and its details are capable of modification in various other respects, without departing from the spirit and scope of the present invention. Accordingly, the drawings and detailed description are to be regarded as illustrative in nature and not as restrictive.

10 DESCRIPTION OF THE DRAWINGS

These and other features and advantages of the present invention will be better understood from the following detailed description read in light of the accompanying drawings where:

FIG. 1 is a functional block diagram of a video transceiver;

15 FIG. 2 is a typical packaging for a home transceiver;

FIG. 3 is a typical packaging for a portable transceiver;

FIG. 4 is a keypad layout of a video transceiver;

FIG. 5 is a system block diagram of an audio/video circuit;

20 FIG. 6 is an audiovisual communications system with two video transceivers connected in a point-to-point communication system over a PSTN;

FIG. 7A is a simplified block diagram of a home security and automation module;

FIG. 7B is a typical packaging of a home security and automation module;

FIG. 8 is a security control system which uses a home security and automation module;

25 FIG. 9 is a home automation system which uses three home security and automation modules;

FIG. 10A is a simplified block diagram of a fire control module;

FIG. 10B is a typical packaging of a fire control module;

FIG. 11 is a fire control system with a fire control module;

FIG. 12 is a block diagram of an extension module;

30 FIG. 13 is a preferred packaging of a multiplex video transceiver;

FIG. 14A is a system block diagram of a multiplex video transceiver;

FIG. 14B is a video conferencing system using multiple video transceivers including one multiplex video transceiver;

FIG. 15 is a preferred packaging of a keypad controller;

35 FIG. 16 is a preferred packaging of a call station;

FIG. 17 is a system block diagram of a keypad controller;

FIG. 18 is a flow diagram of initiating a call using a video transceiver;

FIG. 19 is a flow diagram of receiving a call using a video transceiver;

- 1 FIG. 20 is a flow diagram of a security system;
 FIG. 21 is a flow diagram of a home automation system;
 FIG. 22 is a flow diagram of a fire control system;
 FIG. 23 is a connection diagram of a home transceiver;
 5 FIG. 24 is a left and right side views of a home transceiver;
 FIG. 25A is an engineering drawing of a portable receiver having a thin film transistor
 (TFT) LCD screen;
 FIG. 25B is an illustration of an embodiment of a transceiver including a video camera;
 FIG. 26 is an illustration of a description of the features of a video transceiver;
 10 FIG. 27 is a keypad layout of a video transceiver;
 FIG. 28A is an illustration of a handwriting recognition device;
 FIG. 28B is a diagram of a home transceiver having a handset;
 FIG. 29 is a flow diagram of making an E-commerce transaction over the Internet;
 FIG. 30 is a block diagram of an E-commerce system;
 15 FIG. 31 is a flow diagram of making credit card transaction using electronic identification
 of fingerprints;
 FIG. 32 is a block diagram of an E-commerce system using electronic identification of
 fingerprints;
 FIG. 33 is a block diagram of a fingerprint collection unit;
 20 FIG. 34A is a block diagram of a home transceiver or a portable transceiver;
 FIG. 34B is a block diagram of an embodiment of a controller unit;
 FIG. 34C is an embodiment for a hardware system for correlating CAT data and
 fingerprint identification;
 FIG. 34D is a block diagram of an alternative embodiment of a hardware system for
 25 correlating CAT data and fingerprint data, including an image input device for the copying of
 fingerprints;
 FIG. 34E is an alternative embodiment of a hardware system for correlating CAT data and
 fingerprint data that includes an image input device to copy fingerprints;
 FIG. 35 is a block diagram of a portable receiver with a handset and a TFT display, where
 30 the TFT display is in a closed position;
 FIG. 36 is a block diagram of a portable receiver with a handset and a TFT display, where
 the TFT display is in an open position;
 FIG. 37 is a view of a six-camera extension module;
 FIG. 38 is a view of a home security & automation module;
 35 FIG. 39 is a view of a fire control module;
 FIG. 40 is a block diagram of a multimedia processor circuit;
 FIG. 41 is a block diagram of a handwriting recognition circuit;
 FIG. 42 is a block diagram of a fingerprint recognition circuit;

1 FIG. 43 is a flow diagram of using a fingerprint recognition system;
 FIG. 44 is a block diagram of a home automation system;
 FIG. 45 is a block diagram of an embodiment of a wall switch module;
 FIG. 46 is a block diagram of a handheld controller;
 5 FIG. 47 is a block diagram of an RF transmitter; and
 FIGS. 48A-48N illustrate a number of connections that are utilized in providing ISP
 services to users of a system incorporating the transceiver.

DETAILED DESCRIPTION OF THE INVENTION

10 FIG. 1 is a functional block diagram of a video transceiver 21 utilized in hand and portable
 applications. The transceiver is packaged to function as a home based unit, and alternatively, as
 a portable unit. The portable unit may be carried about and coupled to the PSTN via a hard wired
 modem connection or wireless connection via RF infrared signals. The video transceiver is used
 15 to transmit and receive audio 18 and video 16, 20 and data 14 signals over a Public Switching
 Telephone Network (PSTN). Those skilled in the art will appreciate that the video transceiver
 is capable of being adapted to work on telephone lines employing various signal transmission
 standards including ISDN, DSL and ADSL.

20 The video transceiver includes a keypad circuit 25 which provides a user interface to a
 transceiver circuit 21. The controller circuit 27 operates in cooperation with a multimedia
 processor circuit 23. The controller circuit 27 is responsible for managing overall operations of
 the video transceiver 21 and coordinating the flow of data 14, 16, 18 and 20 into and out of the
 system.

25 The controller circuit 27 preferably includes memory 24 for storing a directory of
 telephone numbers that are automatically dialed by the multimedia processor circuit 23 upon the
 occurrence of a certain event. Alternatively, the controller circuit 27 commands the multimedia
 processor circuit 23 to dial a telephone number inputted by the user via the keypad circuit 25.

30 The multimedia processor circuit 23 accepts commands from the controller circuit 27,
 processes video signals 16, 20, processes audio signals 18 and provides an interface to the PSTN
 telephone line through a modem connection 14.

35 The multimedia processor circuit 23 accepts video 16, 20 and audio inputs 18 from
 external sources and in response to commands from the controller circuit 27, the multimedia
 processor circuit 23 formats the audio and video signals for delivery over a PSTN telephone line
 through a modem coupled to the modem in/out line 14.

The video input 16 is typically supplied by a video camera providing a video camera signal
 having a standard video output such as NTSC or PAL. NTSC and PAL are video standards well
 known in the art that specify line and field rates and include color information encoding. NTSC
 and PAL standards provide composite video signals having luminance and color information
 encoded in one signal. An NTSC compatible system operates with 525 lines per frame and 30

1 frames per second. A PAL compatible system operates with 625 lines per frame and 25 frames per second. In an alternative embodiment, the video signals 16, 20 are provided in a digital format. The audio input 18 typically comprises unmodulated voice or speech signals that vary in amplitude and frequency.

5 Incoming signals on the PSTN telephone line received through the modem in/out line 14 are separated into video and audio signals, processed, and delivered to the respective video 20 and audio outputs 18. The video output 20 is typically a standard video signal, such as PAL or NTSC, with sufficient drive for a television monitor. The audio output 18 is typically comprises voice or speech signals capable of driving an audio speaker.

10 The controller circuit 27 also processes dedicated transmit and receive lines 32, 34. The transmit and receive lines are used to connect the controller circuit 27 to other modules 35 to increase functionality of the video transceiver. Exemplary modules include a home security module, automation module, and a fire control module.

15 FIG. 2 illustrates a typically packaged home transceiver 35. In an embodiment, the video transceiver utilizes high density packaging and a light weight construction useful in both the home and portable applications. The home transceiver 35 is shown with an exterior housing 36 formed of a suitably sturdy material such as high impact plastic or metal. The home transceiver 35 includes an upward facing keypad 25. The housing 36 also incorporates four stands 38a, 38b, 38c, 38d to support the housing 36 above an operating surface such as a table or countertop. In
20 an alternative embodiment, the four stands 38a, 38b, 38c, 38d are eliminated to enhance the portability of the home transceiver.

The keypad layout in other embodiments may be different. For example, the keypad in other embodiments may have larger keys. The video transceiver may also include a remote handset 37 to be used during video conferencing.

25 In an alternative embodiment, the portable video transceiver has a thin film transistor (TFT) liquid crystal display (LCD) screen for the display of information being sent or received.

FIG. 3 shows a portable video transceiver constructed to sit directly on a desktop or other operating surface. Exemplary dimensions of the housing are 8.7 inches long by 8.7 inches wide and 3.3 inches high.

30 FIG. 4 illustrates a typical keypad layout utilized in an embodiment of the transceiver. The keypads in other embodiments may have different layouts. The keypad shown has ten alphanumeric keys as well as "*" and "#" keys which are typically utilized in many push-button type telephones. In addition, the keypad includes a function key "FUNC" 22, a dial key "DIAL" 24, an answer key "ANS" 26 and a clear key "CLR" 28. The integrated keypad eliminates the
35 need to use a telephone or a computer keyboard as an input device.

The alphanumeric keys are used to enter user inputs such as telephone numbers and passwords. The FUNC key 22, the DIAL key 24, the ANS key 26 and the CLR key 28 are used to enter control command inputs. The FUNC key is used to establish communications and also

1 to select different modes of operation. The DIAL key is pressed before entering a telephone number to initiate a call. The ANS key is used to answer a call. The CLR key is used to indicate the end of communications.

5 FIG. 5 is a system block diagram of the multimedia processor circuit 23. During the transmission of a locally generated video signal, that signal is routed to the video input 16 and is subsequently applied to the input of a video encoder/decoder 35 initial to the multimedia processor circuit 23. In alternative embodiments, the video encoder/decoder 35 is equipped with input multiplexing capability to allow video inputs from a number of video sources. The multiplexer 36 allows from 1 to any number "n" video signals to be sequentially coupled to the
10 video input line 16. The video signal is amplified, filtered, and converted to a digital video signal 38 by the video encoder/decoder 35 by conventional methods known to those skilled in the art. The digital video signal 38 is then coupled to a video buffer circuit 31.

A video buffer circuit 31 manages the flow of the digital video signal into a digital signal processor (DSP) 33.

15 The video interface buffer 43 provides temporary storage of the digital video. The video interface buffer utilizes conventional memory circuits known by those skilled in the art. Preferably, the video interface buffer 43 includes a dual port RAM configured such that both the controller circuit 27 (see FIG. 1) and the DSP circuit 33 can have access to the video interface buffer simultaneously.

20 The output of the video buffer circuit 31 is coupled to a DSP 33. The DSP 33 provides data compression utilizing conventional compression circuitry known to those skilled in the art for data compression. The digital video signal presented to the DSP circuit 33 is compressed in accordance with a H.263 video compression format which is a new standardized format for transmitting video data over a PSTN telephone line. The H.263 video compression format is an
25 International Telecommunications Union (ITU) standard for "Video Coding for Low Bit Rate Communication" and is well known to those with ordinary skill in the art.

The audio input 18, typically a speech or other audio signal, is applied to an audio coder-decoder (CODEC) 39. The audio CODEC 39 provides initial amplification and includes a bandpass filter designed to pass voice frequencies while limiting unwanted circuit noise.
30 Typically, the bandpass filter (not shown) is designed to pass in-band signals having frequencies in the range of 300 Hz to 3400 Hz. The in-band signal from the bandpass filter is next converted to a digital audio signal in the audio CODEC 39 by conventional methods known by those skilled in the art and provided to the DSP circuit 33.

35 In the DSP circuit 33, the compressed digital video signals produced in it are integrated with the digital audio signals from the audio CODEC 39 into a format compatible with a H.324 protocol for transmitting and receiving audio and video data over the PSTN. Integration of the digital and video signals is accomplished with mixing circuitry known to those skilled in the art. This produces a formatted H.324 signal.

1 A modem CODEC circuit 41 next processes the formatted H.324 signal. The formatted
H.324 compatible signals are then modulated by the modem coder-decoder (CODEC) circuit 41.
The modulated formatted H.324 signal is then transmitted out of the modem CODEC circuit via
the modem in/out line 14. Preferably the modem used is a 33.6 kbps, V.34bis modem which is
5 compatible with the H.324 format. Equivalently, any modem compliant with the H.324 format
will perform satisfactorily.

During reception of a signal, the modem CODEC circuit 41 receives input signals over
the PSTN through the modem in/out line 14. The input signals are demodulated, in a
conventional manner known to those skilled in the art, and sent to the DSP circuit 33. The DSP
10 circuit 33 extracts a digital video signal and a digital audio signal in a conventional manner
known by those skilled in the art. The digital video signal, which is configured in the H.263
video compression format, is decompressed by the DSP circuit 33 in a conventional manner
known by those skilled in the art.

The video buffer circuit 31, under control of the DSP circuit 33, manages the flow of
15 decompressed digital video from the DSP circuit 33 to the video encoder/decoder 35. The flow
of decompressed digital video from the DSP circuit 33 to the video encoder/decoder 35 is
facilitated by use of the video interface buffer 43 which provides temporary storage.

Next, the video encoder/decoder 35 further processes the decompressed video signal. The
decompressed digital video signal is converted to an analog signal, amplified and filtered at the
20 video encoder/decoder 35. In an alternative embodiment, a video demultiplexer 32 may be
provided after the video encoder/decoder 35 to process a decompressed multiplexed digital video
signal. The video output 20, which includes a number of demultiplexed video outputs in the
alternative embodiment, is preferably routed to a television monitor compatible of processing a
signal having a PAL or NTSC formatted signal or its equivalent.

25 The DSP circuit 33 provides the digital audio signal 40, which has been extracted, to the
audio CODEC circuit 39. The digital audio signal is converted in the CODEC 39 to an analog
signal, filtered, amplified into an analog audio signal by conventional conversion filter and
amplification circuitry known to those skilled in the art. The signal produced is suitable for
driving an audio speaker at the audio CODEC output 18. The speaker compatible signal is
30 outputted onto the audio in/out line 18.

The described embodiment of the video transceiver is used in numerous applications. For
example, audiovisual communication is established over a PSTN telephone line between two
video transceivers. In an alternative embodiment, a computer or a telephone is used during such
audiovisual communications. However, neither is required in the main embodiment.

35 FIG. 6 shows in detail two video transceivers 51A and 51B in a point-to-point
communication system coupled by a PSTN telephone line 67. The video transceivers include
keypads 63A and 63B, respectively. The point-to-point communication system employs any
number (n) of video transceiver systems 56A, 56B . . . 56n coupled via PSTN telephone lines.

1 Those skilled in the art will appreciate that any number of transceivers may be connected to the PSTN telephone to put multiple sites in communication with each other, for example, communications facilities video conferencing among a number of participants at various locations.

5 The advantages of the video transceivers in audiovisual communications are realized by employing a number of peripheral devices. For example, in a preferred embodiment, each of two video transceivers 51A and 51B is connected respectively to a monitor 53A, 53B, a video camera 55A, 55B, a microphone 57A, 57B, a speaker 59A, 59B and an earpiece 61A, 61B.

10 In an embodiment of the present invention, the microphones 57A, 57B and the speakers 59A, 59B are integrated into their respective video transceivers 51A, 51B. In another embodiment of the present invention, the microphones 57A, 57B and the speakers 59A, 59B are standalone units.

15 In an embodiment, the monitors 53A, 53B are standard television sets. The video transceivers 51A, 51B have an adaptive video output for interfacing with a television set capable of processing any number of standard video signal formats, including PAL and NTSC.

20 The video cameras 55A, 55B are typically commercially available cameras having, for example, a PAL or NTSC video camera output. Equivalently, any other standard signal format may be used. In an embodiment, the video cameras have color CMOS or CCD image sensors 58A, 58B in 1/4" to 1/2" format and generate composite NTSC/PAL or S-Video signals. A split screen configuration may be employed to handle a number video signals. By way of example, video transceiver 51A could be configured with multiple video cameras which are multiplexed by the video transceiver 51A, transmitted over the PSTN telephone line 67, and demultiplexed by the video transceiver 51B in a manner described above in connection with FIG. 5. The demultiplexed video signals from the video transceiver 51B could be connected to additional television monitors, or alternatively, formatted into a split screen configuration.

25 Those with ordinary skill in the art can appreciate that number of cameras that could be coupled to a single video transceiver can easily be varied. Moreover, additional video camera can be added by including additional input channels and modify internal circuits to handle the multiplexing of additional video signal inputs.

30 Increased functionality can be achieved by utilizing a home security and automation module ("automation module") with the video transceiver. A simplified block diagram of the automation module is illustrated in FIG. 7A. FIG. 7B is a typical packaging of the automation module.

35 The automation module 115 includes a controller circuit 81 which has two pairs of dedicated transmit and receive lines 93, 95 and 97, 99 in addition to a video signal output 101. The controller circuit 81 also has bi-directional capability utilizing a RS-232 interface 103 which can be used to re-program the automation module 115 from a computer.

1 The controller circuit 81 includes provisions to support three video cameras 83A, 83B, 83C, three microphones 85A, 85B, 85C, three sensors 89A, 89B, 89C and three home automation appliances 91A, 91B, 91C. In the described embodiment, the viewing zones are shown in FIG. 7A with each zone having one video camera, one microphone, one sensor and one home automation appliance. The transmit and receive lines 97, 99 are used to connect the automation module 115 to another automation module or a fire control module. Therefore, the automation modules and fire control modules can be connected in series to a single video transceiver. The other transmit and receive lines 93, 95 are for connection to the controller circuit 27 of the video transceiver (see FIG. 1). The controller circuit of the video transceiver manages the flow of video and audio out of the automation module 115. By way of example, the controller circuit 115 includes a multiplexer (not shown) for multiplexing the video and audio from one of the zones in response to instructions from controller circuit 27 of the video transceiver.

5 FIG. 8 illustrates one application of the video transceiver with the automation module in a security control system. A burglar detector sensor 121 is used to detect an intrusion into a home. The automation module 115 receives an input from the burglar detector sensor 121 and activates a strobe light/siren 113. At the same time, the automation module 115 monitors the surroundings with a video camera 119. The video camera output is coupled by the automation module 115 to a video recorder 123.

10 The burglar detection sensor output is coupled by the automation module to the video transceiver 117 which automatically dials one or more numbers to alert interested parties. A call can be made to a pager 128 to alert an owner of a home intrusion, or made to the owner's telephone 129A. The call can also be placed to the owner's video transceiver 125A to allow direct viewing by the owner through a television monitor 127A. If the owner is alerted over the telephone, the owner can use the video transceiver 125A to monitor his or her home or property with the television monitor 127A. If the owner is alerted over the video transceiver 125A, the owner can monitor his or her home or property with the television monitor 127A simply by entering a password.

15 In response to the burglar detection output, the video transceiver 117 can also be programmed to alert police by dialing the telephone number for the police department 129B or a video transceiver 125B used by the police department. Similar to the owner, the police can monitor a home or property being burglarized by using the video transceiver 125B and the television monitor 127B. In order to gain access to the video transceiver 117, the police also need to know the password.

20 The owner of the home or property and the police can access the video transceiver 117 and monitor a burglary in progress at the same time. Control over the automation system can be given either to the owner or the police through a request sent to the video transceiver 117 over the PSTN telephone line 111. Once access to the automation system is acquired by either the owner or the police, commands can be entered into the keypad of his or her respective video

1 transceiver. By way of example, if the owner gains control of the automation system, the owner
may need to select one zone to view if his or her television monitor 127A lacks split screen
capability. In that case, the owner enters the appropriate command on the keypad of his or her
video transceiver 125A. The command is sent over the PSTN telephone line to the video
5 transceiver 117. The video transceiver causes the controller circuit in the automation module to
multiplex the selected zone back to the transceiver for transmission over the PSTN telephone to
the owner. Generally, once control is surrendered to one of the viewers, e.g., the owner, the other
viewer merely becomes a passive viewer merely observing what is being transmitted over the
PSTN telephone line.

10 FIG. 9 illustrates another application of the video transceiver utilizing three automation
modules 139, 141 and 143. A video transceiver 133 is coupled to a PSTN telephone line 131.
A video transceiver 135 and a telephone 137 are also coupled to the PSTN telephone line 131.

As illustrated in FIG. 7A and described earlier, each automation module can control up
to three zones. Since the automation module can control only one home automation appliance
15 in each zone, each automation module can control up to three home automation appliances. By
connecting three automation modules in series, nine home appliances can be controlled. In the
described embodiment, the automation module 143 controls a living room light 145, a garden
fountain 153 and a garden sprinkler system 155. The automation module 141 controls an air
conditioning unit 147 and a heater 157. The automation module 139 controls a cooking
20 appliance 149, a television 159 and a garage door 151.

The automation modules 139, 141 and 143 are controlled by a user over the PSTN
telephone line 131 from the telephone 137 or the video transceiver 135. In order for the user to
control various home automation appliances, the user must know a password to access the video
transceiver 133. First, the user dials the number for the video transceiver 133 from the telephone
25 137 or the video transceiver 135. Then the user enters the password, and then controls the home
automation appliances by sending control commands to the automation modules.

FIG. 10A illustrates another application of the video transceiver utilizing a fire control
module 162. As shown in FIG. 10, the structure and signals of the fire control module is similar
to the structure and signals of the automation module illustrated in FIG. 7A. FIG. 10B is a
30 typical packaging for the fire control module.

The fire control module includes a controller circuit 161 which has two pairs of dedicated
transmit and receive lines 177, 179 and 181, 183 as well as a video signal output 185. The
controller circuit 161 also has a capability for a bi-directional RS-232 interface 187 which can
be used to re-program the automation module 162 from a computer.

35 The controller circuit 161 also has capabilities for connections to three video cameras
163A, 163B and 163C, three microphones 165A, 165B and 165C, three speakers 167A, 167B
and 167C, three sensors 169A, 169B and 169C and three bells or sirens 171A, 171B and 171C.
The controller circuit 161 also can be connected to up to six auxiliary devices with auxiliary

1 outputs 173A-C and 175A-C. The connections for devices are organized into three zones A, B and C. The video camera 163A, the microphone 165A, the speaker 167A, the sensor 169A and the bell or siren 171A as well as auxiliary outputs 173A and 175A would be in the zone A. Similarly, other devices and outputs would be organized into zones B and C.

5 The transmit and receive lines 181, 183 are used to connect the fire control module 162 to another fire control module or an automation module. The other transmit and receive lines 177, 179 are for connection to the controller circuit 27 of the video transceiver (see FIG. 1). The controller circuit of the video transceiver manages the flow of video and audio out of the fire control module 162. By way of example, the controller circuit 161 includes a multiplexer (not shown) for multiplexing the video and audio from one of the zones in response to instructions from controller circuit 27 of the video transceiver. The controller circuit 161 is used to process inputs and outputs of the fire control module.

FIG. 11 illustrates a fire control system with a fire control module 195 connected to a video transceiver 193. The video transceiver 193 is coupled to a PSTN telephone line 191.

15 In case of a fire, the fire is detected by a fire detector 201. The fire detector output is coupled to the fire control module 195 causing a bell or siren 197, as well as a fire extinguishing system 199, to activate. The fire detector output is coupled from the fire control module 195 to the video transceiver 193. In response, the video transceiver 193 automatically dials the owner of a home or property where the fire has occurred at a video transceiver 207A over the PSTN telephone line 191, a telephone 211A or a pager 213. The video transceiver 193 also dials the fire station to access a video transceiver 207B or a telephone 211B. The access and control of the transceiver 193 by either the owner or the fire station is similar to the case of the security system based on an automation module as described above.

25 In an alternative embodiment of the present invention, an extension module is used to provide video camera expansion capability for the video transceiver. FIG. 12 illustrates a block diagram of an exemplary extension module. A video multiplexer 221 is used in the extension module to multiplex video signal inputs from video cameras. Four video cameras 225A-D provide the video signal inputs to the video multiplexer. Of course, those skilled in the art will appreciate that the actual number of video camera used can vary. A video signal output is generated by the video multiplexer of the extension module. The video extension module is connected to the video encoder/decoder 35 of multimedia processor circuit 23 of the video transceiver (see FIG. 5).

35 Another embodiment of the present invention is a video transceiver that can be controlled from remote locations with external keypad controllers. FIG. 13 is a preferred packaging of a multiplex video transceiver which is capable of being controlled from remote locations.

Turning to FIG. 14A, an alternative embodiment of the present invention is shown using a multiplex video transceiver. The multiplex video transceiver includes a transceiver circuit 240 comprising an audio/video circuit 243 coupled to a controller circuit 231. The controller circuit

1 231 is responsible for managing all operations of the multiplex video transceiver and coordinating the flow of data into and out of the system. The audio/video circuit 243 accepts commands from the controller 231 formats the data for transmission on a PSTN telephone line.

5 The multiplex video transceiver also includes a number of interface circuits. A video multiplexer circuit 233 provides a video camera interface to the controller circuit 231 of the transceiver circuit 240. The video multiplexer 233 receives a number of video camera inputs and provides a single video signal input to the controller circuit 231. A number of I/O circuits 235 A-F provide an audio interface, as well as other peripheral interfaces, to the controller circuit 231 of the transceiver circuit 240. More particularly, each I/O circuit provides an interface between
10 a two way audio communication line, a sensor input and an alarm output. In the described embodiment, the controller circuit 231 communicates with six I/O circuits, but the number of I/O circuits can vary.

The multiplex video transceiver also includes a keypad circuit 245 which provides a user interface to the transceiver circuit 240. An LCD display 247 is connected to the keypad circuit
15 245. The LCD display is used to display status messages. In particular, when a system check is run, results of the system check are displayed on the LCD display. In addition, the multiplex video transceiver has a capability for video in/out and keypad in/out interfaces for communicating with one keypad controller at a time. The keypad in/out interface includes an audio in/out interface.

20 A power circuit 237 is connected to the controller circuit 231. The power circuit includes an AC/DC converter which allows DC power to be applied to the multiplex video transceiver by a conventional AC power outlet. A DC battery 241 is connected in parallel to the output of the AC/DC converter 239 to maintain power in the event of an AC power failure. The power circuit 237 is also connected to a number of exterior connectors. As a result, peripheral devices such
25 as video cameras can be simply plugged into the multiplex video transceiver to operate without an independent power source.

The audio/video circuit 243 is identical to the multimedia processor circuit of the home or portable video transceiver (see FIG. 5). However, the interface between the controller circuit 231 and the audio/video circuit 243 is slightly different. In the multiplex video transceiver, all
30 audio/video circuit 243 inputs and outputs are routed through the controller circuit 243. This is more a matter of convenience and one skilled in the art will readily appreciate that the inputs and outputs of the audio/video circuit 243 could be coupled directly to the video sources, audio sources and the PSTN telephone line as described with respect to the home or portable video transceiver of FIG. 5. By way of example, the controller circuit 231 provides a convenient mount
35 for a telephone jack (not shown) for transmitting and receiving modem signals over a PSTN telephone line is connected to the controller circuit 231. Consequently, the output of the modem processor circuit 41 (see FIG. 5) is routed through the controller circuit 231.

1 FIG. 14B is a video telephone conferencing system using one home transceiver 148, one
portable transceiver 178, and one multiplex video transceiver 142. The video transceivers 142,
148 and 172 are coupled to each other over a PSTN 140. The home transceiver 148 and the
5 portable transceiver 178 receive video camera outputs from video cameras 152 and 174,
respectively, and displays to monitors 150 and 176, respectively. For the home and portable
transceivers, audio communications are carried out through speakers 156, 168 and microphones
158, 172, respectively, or through earpieces 154 and 166, respectively, for hands-free operation.

10 A fire control module 144 and an automation module 146 provide additional capabilities
for fire control and home automation/security system, respectively, to the multiplex video
transceiver 142. However, the fire control module and the automation module can extend
capabilities of the home transceiver 148 or the portable transceiver 178 as well.

15 The multiplex video transceiver is also connected to multiple input and output devices
including sensors 180A-B, alarms 182A-B, video cameras 184A-B and call stations 188A-B.
Even though two devices of each type are shown as example in FIG. 14B, the multiplex video
transceiver has capabilities for handling many more input and output devices.

20 In a preferred embodiment of the present invention, the multiplex video transceiver can
be connected to up to six keypad controllers simultaneously. In FIG. 14B, the multiplex video
transceiver is connected to three keypad controllers 186A-C. From each of the remote locations
associated with each keypad controller, audiovisual communication can be established with either
the home transceiver or the portable transceiver through the multiplex video transceiver over the
PSTN 140.

25 The three keypad controllers 186A-C receives video camera inputs from video cameras
192A-C, respectively, displays video signal outputs on monitors 194A-C, respectively, and
establish bi-directional audio communications using earpieces 190A-C, respectively. Of course,
the audio communications can be established using separate speakers and microphones instead
of using the earpieces.

30 In a system with more than two video transceivers coupled together over a PSTN as shown
in FIG. 14B, a two-way audiovisual communication can be established between any two video
transceivers. In addition, a three-way or a multi-way audiovisual communications can be
established as well in a similar manner as a three-way or a multi-way telephone communications.

35 FIG. 15 is a preferred packaging of the keypad controller which includes a keypad and an
LCD display similar to the keypad on the multiplex video transceiver. In the preferred
packaging, the keypad is a membrane keypad rather than a face plate with individual keys. A
preferred packaging of the call box is illustrated in FIG. 16. The call box operates as a
microphone and a speaker.

FIG. 17 is a system block diagram of a keypad controller. A video signal output from the
keypad controller goes to a television while a video signal input from a video camera is received
by the keypad controller and transmitted to the multiplex video transceiver. As shown in FIG.

1 17, video lines 251 and 253 are connected and interrupted using relays. For example, if the relay in the video line 251 is open, the television connected to the video line 251 does not receive any signals to display. Similarly, if the relay in the video line 253 is open, no video signal input from the connected video camera can be passed onto the multiplex video transceiver.

5 Similar to the video lines, audio lines 255 and 257 can be opened or closed based on on/off status of relays. An audio output signal from the multiplex video transceiver passes through the relay in the audio line 255, is amplified by an audio amplifier 259, and transmitted to an earpiece. An audio input signal from the earpiece is amplified by an audio amplifier 261 and passes through the relay in the audio line 257, and then transmitted to the multiplex video transceiver. The audio lines 255 and 257 establish audio communications between the multiplex video transceiver and respective one of the remote control keypad controllers.

10 A keypad 263 of the keypad controller is used for entering user inputs which are provided to a keypad decoder 265. A keypad decoder 265 decodes user inputs made up of a series of alphanumeric and other keys. The decoded user inputs are transmitted to the multiplex video transceiver using a keypad interface circuit 267. In addition to driving the interface with the multiplex video transceiver, the keypad interface circuit drives an LCD display 269. Over the keypad in/out interface, the keypad controller remotely controls the multiplex video transceiver. The LCD display informs the user of the status of interface.

20 FIG. 18 is a flow diagram of how a caller initiates audiovisual communications with the video transceiver system over the PSTN. The caller picks up the handset as shown in step 271. Then the caller enters the phone number of the video transceiver to be accessed as shown in step 273.

25 When the call is picked up by a user on the other side as shown in step 275, the caller and the user can start video conferencing immediately. In one embodiment of the present invention, once the call is picked up, the user or the caller needs to press their respective video key as shown in step 277. Any time during video conferencing in step 279, either side can hang up by putting down the handset as indicated in step 281.

30 FIG. 19 is a flow diagram indicating how a call to the video transceiver over the PSTN is received. As a caller with a first video transceiver dials the number of a second video transceiver, when the incoming signal is received as shown in step 291, a user on the side of the second video transceiver is alerted by a ringing sound similar to a telephone ringing as shown in step 293. The video transceiver then waits for the user to pickup the handset as shown in step 295.

35 Once the handset is picked up, the video transceiver waits for the video key to be pressed by either the caller or the user as indicated in step 297. In one embodiment of the present invention, a call is automatically answered if unanswered after a predetermined number of rings. In this case, the caller needs to enter a password to start audiovisual communications with the video transceiver at the user's end.

1 Step 299 shows video conferencing between the second video transceiver and the first video transceiver. The communication can be for any of remote video surveillance, security system monitoring, closed circuit (CCTV) viewing, fire control monitoring or home automation applications. Once again, either side can hang up by putting down the handset as indicated in
5 step 301.

FIG. 20 is a flow diagram of an exemplary operation of a security system which includes a video transceiver and a home security and automation module. Upon breaking in, a burglar is detected by a burglar detector sensor as shown in step 311, and the video transceiver receives warning per step 313. The video transceiver commands the home security and automation
10 module to activate strobe light and siren, and the home security and automation module activates them as indicated in step 315.

Meanwhile, the video transceiver automatically calls and informs the police and the property owner of the intrusion as indicated in step 317. At the same time, the burglary is video taped as shown in FIG. 319. The police or the property owner can call the video transceiver from
15 another video transceiver and monitor and control the security system if they enter the correct password upon calling as indicated in steps 321, 323 and 325.

FIG. 21 is a flow diagram of an exemplary operation of a home automation system. To activate the home automation system, the user calls with a phone or a video transceiver as indicated in step 331. The home automation system checks for the input of a correct password
20 as shown in step 333. Then the user enters commands and the video transceiver receives them to turn home appliances on or off as shown in steps 335 and 337.

FIG. 22 is a flow diagram of an exemplary operation of a fire control system using a fire control module and a video transceiver. The operation of the fire control system is similar to the operation of the security system illustrated in FIG. 20. Steps 341, 343, 345, 347, 349, 351, 353
25 and 355 are similar to corresponding steps for the security system. A difference is that the fire control module detects fire with a fire detector sensor rather than burglary.

Accordingly, the present invention provides a remote surveillance and conferencing system for applications in the CCTV system, security systems, video conferencing, remote video surveillance, fire control and home automation. Although this invention has been described in
30 certain specific embodiments, many additional modifications and variations would be apparent to those skilled in the art. It is therefore to be understood that this invention may be practiced otherwise than as specifically described. Thus, the present embodiments of the invention should be considered in all respects as illustrative and not restrictive, the scope of the invention to be determined by the appended claims and their equivalents rather than the foregoing description.

35 FIG. 23 is a connection diagram of a home transceiver unit. A home transceiver 2302 includes a multiple I/O port 2304 that is coupled to a cable system 2306. A multi-pin connector at the multiple I/O port 2304 allows signals from various devices to be coupled to the transceiver 2302 via the cable system 2306. The cable system 2306 allows connection to the PSTN through

1 a telephone line connection 2308 so that a modem internal to the transceiver may transmit and receive information through a standard telephone line.

A number of cameras 2316, 2318, 2320, 2322 are coupled to the transceiver via the cable system 2306. In the embodiment shown, four cameras are coupled to the transceiver unit.
5 However, as will be appreciated by one skilled in the art, as few as one or as many cameras as desired may be coupled to the transceiver depending upon the number of cable connections provided for the cameras. In addition, a cable connection is provided to an external television set 2314, an A/C adapter 2312 and a external module 2310.

The transceiver 2302 shown includes a handset 2324 and a keypad 2326. In the system
10 shown, a user may use the handset and the keypad to establish communications or request services through the PSTN network that is coupled to the transceiver through the telephone line connection 2308. Camera signals 2316, 2318, 2320, 2322 are processed by the transceiver and may be viewed on the television 2314 or viewed on an external monitor. The external monitor is coupled to the transceiver through a monitor connector 2328 that is separate from a multiple
15 I/O port connector. However, in alternate embodiments, the monitor connection is included in the multiple I/O port connector 2304. Video signals received from the video cameras are processed by the transceiver in the manner previously described and output to the PSTN after processing by internal transceiver circuitry, including the internal modem.

In alternative embodiments, the cable system may be reduced or eliminated. In alternative
20 embodiments, a wireless connection is provided in lieu of the multiple I/O port 2304 and cable system 2306, or an external wireless module 2310 is included as a wireless module coupled to the cable system 2306. Cameras having a wireless transmission capability utilize either radio frequency or infrared signals to transmit video signals to the transceiver through the wireless module without the need for a hard wired connection.

FIG. 24 is a left and right side view of an embodiment of a home transceiver having an
25 integral telephone set with a handset. The right side view of the transceiver 2302 shows an embodiment having a front panel LED 2402 to indicate whether or not the unit is active. Alternatively, the LED may be replaced by a bulb or other visual status indicator. The right side view also shows an embodiment of the transceiver including a voice volume control 2404 for
30 controlling the volume to the handset 2324.

The left side view of the transceiver 2302 illustrates a ringer volume control 2406 included
in an embodiment of the transceiver. When the telephone set included in the transceiver including keypad controls 2326 and handset 2324 is activated from an outside source, the ringer volume controls the volume to the handset.

35 FIG. 25A is an engineering drawing of an embodiment of a portable transceiver unit. A portable transceiver unit 2502 is used as a replacement for the previously described transceiver unit (2302 of FIG. 24). The portable transceiver is capable of being transported to various locations with a minimum of effort. The portable transceiver is coupled to a telephone line via

1 an RJ11 jack present on the portable transceiver 2508. The portable transceiver is also coupled to a cable system (2306 of FIG. 23) through a cable connection 2510. Alternatively, the cable connection is replaced by a wireless module that functions at radio frequencies or equivalently at infrared frequencies.

5 The portable transceiver 2502 has a lid 2506 that shuts during transport and protects a key layout 2504. The lid 2506 contains a display 2512, that is typically of an LCD, TIF or equivalent type.

10 In an alternative embodiment a transceiver is emulated by a personal computer that is running a supplied software program that imitates the functions of a transceiver. A personal computer configured with an transceiver emulation package, and a modem is able to mimic the functions at the portable transceiver when remotely accessing the peripheral modules through a PSTN line. For example when traveling, or when located at a distance from the peripheral devices, a laptop computer equipped with a modem and a transceiver software emulation package is used to access a security system.

15 FIG. 25B is an illustration of an embodiment of a transceiver including a video camera. The transceiver 2506 incorporates a camera module 2502 into the body of the transceiver 2506. In the embodiment shown, the camera includes a 360° pan/tilt/zoom capability. The transceiver incorporating the camera assembly brings open circuit television (OCTV) to a user, enabling integrated channeling of voice, data and video signals. In the embodiment described, a user has access to video conferencing, remote surveillance, closed circuit television, home automation, security protection, fire protection, IP telephony, and PC free keyboardless Internet browsing.

20 The transceiver 2506 includes a keypad layout 2504 that includes standard numeric keypad and control keys that enable the user to control the remote functions described in the previous paragraph. The transceiver 2506 also includes a handset 2508 coupled via a cord 2510 to the body of the transceiver.

25 In the embodiment shown, the extension modules of FIGS. 37, 38 and 39 may be added. The extension modules are added through cable connections (2310 of FIG. 23) or equivalent. A six camera extension module allows a user to connect more cameras to the transceiver. A fire protection module and a home security and automation module provide fire and security monitoring. The fire protection and home security module include capabilities for remote surveillance by utilizing keypad controls 2504 to manipulate a remote camera positioning. Also included are auto dialout capabilities to a preset telephone or pager number, as well as pre-theft recording and automated fire extinguishing capabilities.

30 In an embodiment, the transceiver is capable of IP telephony. In this embodiment, IP telephony is used to transmit telephone calls. In telephony transmission enables a user to transmit, for example, voice over IP, and facsimile over IP, without incurring substantial long distance charges. With the addition of a camera 2502, transmitting data in digital form over standard telephone lines enables low cost video conferencing.

1 FIG. 26 is an illustration of the features of a video transceiver coupled to the PSTN
through a transceiver. The PSTN 2602 is coupled via a standard telephone line to a transceiver
2604. The transceiver 2604 is, in turn, coupled the units implementing a number of functions.
Typical functions include, a closed circuit television 2606, video conferencing 2608, home
5 security system 2610, home automation 2612, fire control system 2614, remote video
surveillance 2616, Internet surfing 2618 (including keyboard free Internet surfing 2620), and
electronic fingerprint identification (EFI) authentication for e-commerce 2622.

In the configuration shown, no computer is required. The system utilizes an existing home
television 2624 to provide the functions recited above. The closed circuit television unit 2606
10 provides 24 hour surveillance of offices, home, warehouses and so on. A video conferencing
mode 2608 provides live video and audio interaction between people located at various remote
locations. The home security system 2610 provides theft prevention through the use of an alarm
and an autodial-out alert circuit. The home automation system 2612 provides remote control of
home appliances through the transceiver. The fire control system 2614 provides fire prevention
15 through an alarm system and dial out alert circuit. The remote video surveillance system 2616
monitors crowds, riot conditions, offices and so on. The Internet surfing system 2618 allows web
surfing via a conventional television set utilizing the transceiver 2604. The keyboard free
Internet surfing system 2620 utilizes a cyberpad to facilitate data entry. The EFI system 2622
provides authentication of the user in e-commerce transactions. The EFI system ensures secure
20 transactions through electronic fingerprint identification circuitry coupled to the transceiver 2604.

FIG. 27 is a keypad layout of an embodiment of a video transceiver. The keypad includes
a standard numeric dial pad arrangement 2702 that allows the standard functionality of the
telephone handset to be achieved. In addition, the keypad layout includes four function keys
2704. The four functions (FUNC, DIAL, ANS and CLR) allow efficient implementation of
25 transceiver functions without excessive keystrokes.

FIG. 28A is an illustration of a handwriting recognition device. The handwriting
recognition device utilizes conventional handwriting recognition circuitry to recognize and
convert words to electronic signals suitable for display on a monitor or TV screen. For example,
the embodiment shown is capable of recognizing English and Chinese words or characters. The
30 device includes a hard back surface 2802 to write against containing sensing elements that track
the position of a pen tip 2804 as it is moved across the surface. The pen is coupled via cord 2806
to the electronics contained in the pad surface 2802. A signal stream is output from the
handwriting recognition device to the transceiver that is indicative of a series of pen positions on
the pad. Text is entered by tapping the pen on the surface. The handwriting recognition device
35 is constructed from conventional handwriting recognition circuitry. Equivalently, the pad is
constructed with a cordless pen. The handwriting recognition device is coupled to a transceiver
(2302 of FIG. 3) by a cable or alternatively by a wireless connection.

1 A series of two dimensional coordinates output from the pad to the transceiver allow reproduction of a two dimensional image, such as a persons' signature. Use of a handwriting recognition device also enables keyboard free Web surfing. The handwriting recognition device is able to function alternatively as an input device for a user interface with a Web page accessed through the telephone connection.

5 FIG. 28B is an illustration of an embodiment of a home transceiver having a data display and handset. The home transceiver unit 2302 is equipped with a handset 2324 in the embodiment shown. In the embodiment, the handset 2324 utilizes two of four legs 2804 present to form a cradle for the handset 2324. The transceiver unit operates with a keypad 2326 and a display 2802 to provide all the functions necessary to eliminate the need for a computer terminal.

10 FIG. 29 is a flow diagram of an e-commerce transaction made over the Internet. In order to make such a transaction, the customer typically utilizes a home transceiver as shown in FIG. 23. As shown in FIG. 23, an external module 2310 is coupled via the cable system 2306 to a transceiver unit 2302 and in turn to the public switched telephone network 2308 to enable the transaction to be made. The external module 2310 in an embodiment includes an electronic fingerprint identification (EFI) module for reading a user's fingerprint via the transceiver module 2302 and subsequently transferring it over the telephone wires 2308.

15 Returning to FIG. 29, a typical transaction utilizing electronic fingerprint identification starts with the user initiating the process 2902 through the transceiver unit (2302 of FIG. 23). At step 2904, the personal computer is turned on and the fingerprint collation application begins. At step 2906, the consumer selects goods, typically from a Web page displayed on a CRT display. The consumer typically utilizes the Web display to place these goods in a shopping cart or other equivalent means of selection on screen. At step 2908, a storekeeper coupled to the Internet sends the shopping information concerning the transaction being attempted by the consumer to a host computer. At step 2910, the consumer inputs his/her credit card data into a personal computer.

20 At step 2912, the personal computer instructs the consumer to place his/her Internet commerce (IC) card on the personal computer. The IC card typically contains an electronic replication of the consumer's fingerprint or equivalently a copy of the consumer's fingerprint. At step 2916, the personal computer reads the fingerprint data from the IC card and transfers the data to a fingerprint reader (FPR). Such a fingerprint reader is typically disposed in an electronic fingerprint module coupled to the transceiver previously described.

25 At step 2918, the consumer is requested to place his/her finger on the fingerprint reader. At step 2920, the consumer places his/her finger on the FPR. At step 2922, the FPR collates the fingerprint data from the finger just placed on the reader against the fingerprint data contained in the IC card. At step 2924, the personal computer processes the result received from the fingerprint reader. If the FPR reading is acceptable, credit information from the IC card is read.

1 At step 2926, credit data for the consumer is transferred to the personal computer. At step 2928, the transaction is complete.

FIG. 30 is a block diagram of an e-commerce system. An e-commerce transaction system is illustrated in the block diagram that implements the transaction from the flowchart of FIG. 29. The system includes a personal computer 2924 that is coupled to a fingerprint reader 2922 and also to a IC card reader 2918. The personal computer 2924, the IC card reader 2918 and the fingerprint reader 2922 typically are located near the user. A remote host computer 2924 processes the transaction.

The consumer makes the goods selection 2902 at the personal computer 2924, typically placing goods in an Internet shopping basket. Next, an Internet storekeeper or merchant sends the shopping information 2904 to a host computer 2924. Next, the merchant's credit data is transferred from the host computer to the personal computer 2906. A controller 2916 in the personal computer 2924 sends setup data to the fingerprint reader 2908. The customer places an IC card 2910 on the IC card reader 2918. The IC card reader reads fingerprint data in the IC card. The IC card reader then transfers credit data from the IC card to the personal computer 2926. The controller 2916 in the personal computer 2924 sends IC card data read 2908 to the fingerprint reader 2922.

The controller in the personal computer 2924 determines if the person whose fingerprint is being read has authorization to use the IC card they are attempting to make the transaction with. If the person using the IC card, as verified by the fingerprint reading, is authorized to make the transaction then credit card data is transferred 2914 from the personal computer 2924 to the host computer 2924.

FIG. 31 is a flowchart diagram of making a credit card transaction using electronic fingerprint identification. The credit card flowchart for a credit authorization terminal (CAT) implements a series of steps beginning with step 3102 where the process is initiated by a user. At step 3104, the user places the IC card on a reader terminal. At step 3106, the reader terminal reads the fingerprint data in the IC card. At step 3108, the reader transfers fingerprint data to a controller. At step 3110, the controller sends data from the IC card stored in the reader to a fingerprint reader module.

At step 3112, the controller requests the user to place his/her finger on the FPR. At step 3114, the user places his/her finger on the fingerprint reader. At step 3116, the fingerprint reader collects the fingerprint data from the reading made by the FPR and compares it with the data collected from the IC card via the controller.

At step 3118, the fingerprint reader sends a result to the controller. The result comprises an okay (OK) or no good (NG) indication. At step 3120, the controller receives the result from the fingerprint reader and if OK, that is the fingerprints match the information on the IC card, the controller reads information from the IC card. At step 3122, identification data is sent to the host computer. At step 3124, the process ends.

1 FIG. 32 is a block diagram of the hardware implementation of an e-commerce system
utilizing electronic identification of fingerprints. In the embodiment shown, a controller 3224
coordinates the functioning of a IC card reader 3218 and a fingerprint reader 3222 coupled to the
controller via two-way communication line. An IC card is placed on an IC card reader 3218, the
5 IC card reader reads fingerprint data in the IC card and transfers 3212 the fingerprint data to the
controller 3224.

Once the controller 3224 receives the information from the card reader 3218, the controller
forwards 3216 the data to the fingerprint reader via line 3208. The user places his/her finger
3220 on the fingerprint reader 3224 and the fingerprint reader locally compares the user's
10 fingerprint to the data from the IC card, routed via the controller, to the fingerprint reader. The
fingerprint reader decides if the user of the IC card is permitted to make the transaction and sends
via line 3228 an OK or NG signal back to the controller 3224.

The controller 3224 has a display 3222 that provides an indication to the user to place
his/her finger on the fingerprint reader 3222. If the fingerprint reader sends an OK signal back
15 to the controller, the controller next sends identification data 3202 to a remote host computer.

FIG. 33 is a block diagram of a fingerprint collection unit. The unit is coupled to the
transceiver (2302 of FIG. 23) by an external cable system (2306 of FIG. 23) as an external
module (2310 of FIG. 23).

The fingerprint collection unit 3301 is provided with an RS-232C type cable 3302 to
20 transfer data between the fingerprint collection unit and another device, for example, a
transceiver. Equivalently, other forms of serial or parallel data transmission are used to transfer
data between the fingerprint collection unit and the peripheral device via a wireless or hardwire
connection.

The fingerprint collection unit is constructed from circuitry conventionally known to those
25 skilled in the art. Signals entering the unit via the RS-232 cable 3302 are coupled to a
conventionally constructed RS-232 driver circuit 3204. The driver is coupled to a conventionally
constructed microprocessor unit (MPU) 3206. The MPU 3206 includes a serial I/O interface
3608 coupled to the RS-232 driver 3204. Data is input to the MPU 3206 through a parallel I/O
interface (PIO) 3610 that is coupled to a conventionally constructed fingerprint sensor 3618. The
30 fingerprint sensor 3618 reads an image of a user's fingerprint and streams parallel data
representing the fingerprint into the parallel IO of the MPU.

A conventionally constructed fingerprint data memory 3616, that is capable of
remembering the fingerprints of up to 1,000 fingers, is coupled to the MPU 3206. Localized
memory in the MPU, such as ROM 3612 or RAM 3614, is used in aiding a comparison of the
35 fingerprint input to the MPU (via the fingerprint sensor 3618) to the fingerprint stored in data
memory 3616. The MPU determines if the fingerprint being read at the fingerprint sensor
matches the fingerprint in the data memory. If the fingerprints match, an okay signal is sent over
the RS-232 line 3302 to a remote device, such as a transceiver.

1 FIG. 34A is a block diagram of a home transceiver or equivalently a portable transceiver,
utilizing handwriting recognition and fingerprint recognition input modules. In the embodiment
shown, the transceiver 3402 includes a multimedia processor circuit 3412 that processes video
in and out signals, as well as an audio in/out line and a modem in/out line. The controller circuit
5 3414 receives signals from extension modules and also transmits signals to the extension
modules. In addition, the controller circuit accepts commands from a keypad circuit 3404 and
an auxiliary keyboard 3408. Input is also provided to the controller circuit from a handwriting
recognition device 3406 and a fingerprint recognition device 3410.

10 FIG. 34B is a block diagram of an embodiment of a controller unit. The controller unit
utilizes conventional circuitry known to those skilled in the art. The embodiment of the
controller 3450 shown provides interfaces to a camera 3424, an IC card reader 3422, a fingerprint
collection unit 3420, an LCD display 3426, a keyboard 3428, and an LED indicator lamp 3430.
A CPU 3446 operating under control of a bus line 3448 coordinates the functions managed by
the controller.

15 A conventionally constructed serial I/O circuit 3442 is coupled to the bus 3448. In turn,
the serial I/O is coupled to the IC card reader 3422 and the fingerprint collection unit 3420. The
IC card reader is coupled to the serial I/O via conventionally constructed line drivers 3436. The
fingerprint collection unit 3420 is coupled to the serial I/O 3442 via conventionally constructed
line drivers 3438. Data collected from the IC card reader and the fingerprint collection unit are
20 transmitted over the bus 3448.

 An interface 3424 for a remote video camera is provided as coupled to the CPU 3446 via
conventionally constructed line drivers 3432 and 3434. The CPU 3446 is also coupled to an LCD
display 3426, and to a keyboard 3428. An indicator lamp 3430 providing an OK or NG
indication is coupled to the CPU 3436 through a conventionally constructed LED driver circuit
25 3440. The LED indicator lamp 3430 is equivalently be constructed from a bicolor LED or other
device of capable of emitting an indication of the presence of one of two states. Alternatively,
two individual LEDs are used.

 FIG. 34C is an embodiment for a hardware system for correlating CAT data and
fingerprint identification. In the embodiment shown, a remote unit 3470 including a keyboard
30 3468, a display 3464 and a printer 3462, works in conjunction with a second unit 3472 having
an IC card reader 3452, a fingerprint collection unit 3454, a display 3458 and an OK/NG
indicator 3456. The first unit 3470 is in turn coupled to a computer 3466. In an alternative
embodiment, the second unit 3472 is coupled to a keyboard 3460.

 The first unit 3470 is operated by a merchant who is inputting a transaction that is being
35 attempted via a keyboard 3468. A display 3464 provides feedback that the transaction has been
correctly entered and also provides information as to the status of the transaction. A printer 3462
prints a receipt and is an alternative embodiment capable of outputting other information
desirable to the customer or merchant. The first unit 3470 is coupled to a computer 3466 that

1 collects information from one or more units, such as 3470, in order to track and bill the financial transaction logged at each of a set of terminals, such as 3470 and 3472.

5 The second unit 3472 is equipped with an IC card reader 3452 that a consumer wishing to purchase goods or services places an IC card into. The customer also, for identity verification, places a finger on the fingerprint collection unit 3454. Data from the IC card and fingerprint are compared. If the fingerprint matches that of a person authorized to use the IC card, and OK indication is provided 3456. If the person is not authorized or the card or the fingerprint are misread, the NG indication is produced at 3456. In addition, a display 3458 is provided to give instructions to the customer in entering his/her order or payment information.

10 FIG. 34D is a block diagram of an alternative embodiment of a hardware system for correlating CAT data and fingerprint data, including an image input device for the copying of fingerprints. A fingerprint collection unit 3480 is coupled to a controller. The controller typically co-exists in the same physical unit containing the fingerprint collection unit and other associated electronics. However, this is not required. The controller 3488 is in turn coupled to the display unit 3476 and in an alternative embodiment, a keyboard 3474. A controller is also
15 coupled to an IC card reader/writer 3478. A scanner, camera or other device capable of recording images 3484 is coupled to the controller 3488 and operates under software commands to copy a fingerprint or other item place on the scanner.

20 FIG. 34E is an alternative embodiment of a hardware system for correlating CAT data and fingerprint data that includes an image input device to copy fingerprints. A housing unit 3482 contains the controller (3488 of FIG. 34C), a fingerprint collection unit 3480, an IC card writer 3478, and a display 3476. The unit 3482 is coupled to a keyboard 3474 and a remote scanner 3484. Equivalently, a camera is used in place of the scanner to provide an imaging device. The scanner utilized is one containing conventional circuitry known to those skilled in the art.

25 FIG. 35 is a block diagram of a portable receiver 3502 with a handset and a TFT display disposed in a lid assembly 3506 where the lid assembly is in a closed position. The portable transceiver 3502 presents a sleek and ergonomic appearance when the unit is closed up for movement. The handset 3504 is incorporated into the exterior of the device and is easily accessed. The handset is coupled to the body of the transceiver via a cord 3508. The TFT
30 display is incorporated in a lid assembly 3506. When the lid is closed, the display faces inwards and is protected.

35 FIG. 36 is a block diagram of a portable receiver with a handset and a TFT display, with the TFT display disposed in a lid assembly that is in an open position. In the open position, the portable transceiver is ready for use. The transceiver body 3502 has a removable handset 3504 coupled to the body via a cord 3508. When the lid having a TFT display is opened, the TFT display is visible and a keypad 3602 is accessible. When the lid is closed, the TFT display 3506 and the keypad 3602 are protected by the lid.

1 FIG. 37 is a view of a six-camera extension module. The extension module is utilized to add more cameras to a given transceiver configuration. The extension module is coupled to the transmit and receive lines of the controller circuit 3414 of FIG. 34A.

5 FIG. 38 is a view of a home security and automation module. The home security and automation module is coupled to the transmit and receive inputs of the controller circuit 3414 of FIG. 34A. The home security module provides an interface for alarms, motion detection, and other home security devices. In addition, home automation is provided to control lighting, environment and appliances remotely.

10 FIG. 39 is a view of a fire control module. The fire control module is an auxiliary module that is coupled to the transmit and receive line of the controller circuit 3414 of the transceiver shown in FIG. 34A. The fire control module allows remote control and monitoring through the transceiver. A number of zones within a structure are monitored, and various alarms, smoke and gas detection units are coupled to the module for re-out through the transceiver.

15 FIG. 40 is a block diagram of a multimedia processor circuit. The embodiment of the multimedia processor circuit 3412 is part of the transceiver (3402 of FIG. 34). The multimedia processor circuit is coupled to the controller circuit 3414 of FIG. 34A via an interface circuit 4006 internal to the multimedia processor. The interface block provides conventional signal interface, by circuitry commonly known in the art to the DSP core 4006 previously described. The controller instructs the DSP core with regards to which signal processing function is to be achieved at a given time.

20 For example, instructions to process the audio in/out line, the modem in/out line, the video in line, or the video out line are controlled through the controller. In addition, the DSP core encodes and decodes signals being output or input respectively such that they are suitable for transmission via the modem 4004 to a conventional telephone line coupled to the modem in/out line. The audio CODEC circuit 4002 is coupled to the DSP core and in turn to an audio in/out line. The audio CODEC processes sound received from a microphone on the audio in line and converts it to a digital format suitable for processing by the DSP core 4008. For signals being output to a speaker coupled to the audio out line that is in turn coupled to the audio CODEC 4002, the DSP core supplies a digital signal to the CODEC that is converted to an audio signal suitable for reproduction over a speaker. The audio CODEC circuit 4002 is implemented utilizing conventional circuitry known to those skilled in the art.

25 Video in and out lines are coupled to the DSP core 4008 through a video buffer 4010. The video buffer 4010 utilizes conventional memory circuits known to those skilled in the art. The video buffer holds signal input until the DSP core 4008 is ready to process the signal being held in the video buffer 4010. A video in line is coupled to the video decoder 4012 that converts the analog video in signal to a digital signal being input to the video buffer 4010. The video decoder converts the analog signal to a digital signal utilizing conventional circuitry known to those skilled in the art.

1 The video encoder 4014 processes a digital video signal received from the video buffer 4010 into an analog video output signal. The video encoder utilizes conventional video encoding circuitry known to those skilled in the art.

5 FIG. 41 is a block diagram of a handwriting recognition circuit. The handwriting recognition circuit 3406 is coupled to a transceiver (3402 of FIG. 34A), as previously described. A touch pad or writing surface 4108 converts handwritten input into a digital signal. The touch pad circuitry is implemented by conventional touch pad circuit known to those skilled in the art. The digital signal from the touch pad 4108 is input to the DSP block 4106. In the DSP block, the analog signal is converted to a digital signal and processed into a format suitable for transmission. The digital signal from the DSP module is input to the interface module 4104 for conditioning prior to output to the controller circuit via line 4102. The interface circuit is implemented by conventional circuitry known to those skilled in the art.

10 FIG. 42 is a block diagram of a fingerprint recognition circuit. The fingerprint recognition circuit 3410 is coupled to the controller circuit previously described in FIG. 34A. A fingerprint sensor 4202 reads a fingerprint and produces an analog signal representative of the fingerprint utilizing conventional fingerprint sensors. The analog signal representative of the fingerprint is input into a DSP module 4206. An IC card reader 4204 reads information from an IC card that will be compared to information from the fingerprint sensor 4202. The IC card reader is constructed from conventional card reader circuitry.

15 Inside the DSP 4206, the fingerprint read by the fingerprint sensor 4202 is compared to fingerprint information stored on the IC card reader 4204. If the fingerprint sensor signal matches information on the IC card reader, the DSP 4206 outputs an OK signal to the interface module 4208. If the fingerprint read from the fingerprint sensor 4202 does not match the information stored on the IC card reader 4204, the DSP 4206 outputs an NG signal to the interface circuit 4208. The interface circuit 4208 provides, through conventional interface circuitry known to those skilled in the art, sufficient current to drive the controller circuit line coupled to the transceiver of FIG. 34.

20 FIG. 43 is a full diagram of an e-commerce transaction utilizing a fingerprint recognition system. The process is initiated at block 4302. At block 4304, a displayed web page requests a credit card number. At block 4306, a user inserts the credit card into the card reader. At block 4308, the user's fingerprint is scanned. At block 4310, the scanned fingerprint data is compared with data read from the credit card. At block 4312, a decision is made. If the information on the credit card correctly matches fingerprint information, the process continues to block 4314. If the fingerprint does not match the credit card information at block 4312, the process goes to block 4318 where the process returns to the start 4302 for a second attempt.

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1 Returning to block 4312, if the information is correct yielding a "yes" response, the process proceeds to block 4314 where the credit card number is read. At block 4316, the credit card number is output to the web page and the transaction is completed. Program control at 4318 returns to the beginning to start the process again.

5 FIG. 44 is a block diagram of a home automation system. The home automation system 4400 shown includes a transceiver 4402 coupled to a pair of RF transmitters 4408, 4410. The RF transmitters are coupled in a daisy chain fashion utilizing a cable from the transceiver to the first transmitter 4408 and a second cable from the first transmitter 4408 to the second transmitter 4410.

10 In an embodiment the home automation system is coupled to a closed circuit television network such as illustrated in FIG. 26. The home automation system and closed circuit television system are coupled to a transceiver through a PSTN telephone line.

15 Transmitter 1 and 2 are designed to operate in differing zones of operation, such as different rooms in a home. Alternatively, more locations are controlled by adding additional transmitters.

20 Transmitter 1, 4408, covers zone one 4404 by emitting RF signals 4430 that selectively activate one or more wall switches 4418, 4420, 4422 in zone 1. The RF transmitter 4408 is operating under the control of a remote transmitter 4402. The wall switches 4418, 4420, 4422 provide relay control over an appliance plugged into the wall switches.

25 In addition to controlling the wall switches through the RF transmitter 4408, a handheld controller unit 4414 is used. The handheld controller 4414 emits a radio frequency signal 4430 that will selectively activate one of the wall switches. The handheld controller functions like a conventional remote control module, and allows a person in the room to activate various appliances.

30 A transmitter 4402 typically operates a home automation system through an extension module, such as a home security and automation module (of FIG. 38). In a similar manner, multiple zones may be controlled. For example, zone 9, 4406, is controlled substantially the same as zone 1. The home automation module enables a user to control appliances in the entire household utilizing a handheld remote unit. Alternatively, the home may be controlled through the use of a portable transmitter 4402 from a remote location. Functions such as activating an air conditioner or closing a garage door accidentally left open are implemented with the home automation module.

35 FIG. 45 is a block diagram of an embodiment of a wall switch module. The wall switch module is equipped with an antenna 4502 for the reception of RF signals from a handheld controller or RF transmitter (4414, 4416 of FIG. 44). An RF receiver 4504 demodulates a control signal modulated at radio frequency in a conventional manner. In the exemplary embodiment, AM modulation at a carrier frequency of 433 MHz is used.

1 The demodulated control signal is coupled to a microcontroller module 4506 that determines if the user intended to activate the particular wall switch unit. If the controller determines that the particular wall switch unit is the one selected by a user, the control signal is sent to a relay 4508 that switches on or off AC power to an appliance coupled to the relay at its terminals 4518. A power module 4510 powers the wall switch unit by converting AC power to a voltage sufficient to drive the wall switch circuitry. Power conversion is achieved by conventional power conversion circuitry techniques.

5 In addition to a remote controller, the appliance may be controlled directly at the wall switch by pressing an ON button 4512 or an OFF button 4518 that are coupled to the microcontroller 4506 that directly activates or deactivates the solid state relay 4502 through the microcontroller. A training button 4516 is provided that is coupled to the microcontroller 4506. The training button puts the wall switch into a learn mode responsive to a handheld controller or RF transmitter emitting a command that the microcontroller accepts as its address, to trigger activation during use.

10 FIG. 46 is a block diagram of a handheld controller. The handheld controller receives input via a numeric keypad 4602 that is coupled to a microcontroller 4610. The microcontroller generates a control signal based upon a numerical address entered into the keypad 4602 by a user. The address and the command associated with the address are coupled to an RF transmitter 4612 where the command and address are modulated on an RF carrier and transmitted from an antenna 4614. In the embodiment shown, the RF transmitter is an AM transmitter operating at 433 MHz carrier frequency having a 10mW output power. Alternatively, those skilled in the art will realize that the RF transmitter will operate satisfactorily in cooperation with wall switch units operating in similar fashion with different types of modulations and frequencies. In addition, those skilled in the art will also appreciate that other wireless methods of transmission may be equivalently substituted, such as infrared light.

15 A handheld controller is equipped with a training button 4604 that is used to input an address for the handheld controller into the unit at its initial activation period. The handheld controller is powered by a battery 4606 coupled to a AC/DC converter 4608 that produces a variety of voltages that are coupled to the microcontroller and the RF transmitter as required by those units.

20 FIG. 47 is a block diagram of an RF transmitter (4408, 4410 of FIG. 44). The RF transmitter is constructed from conventionally constructed components, as is known to those skilled in the art. The RF transmitter 4408, 4410 has a unique address assigned to it depending upon its location. The address is set via an address switch 4710. A typical address switch is a 4 bit DIP switch. The address switch is coupled to a microcontroller 4704.

25 A microcontroller 4704 is coupled to a bus 4714 that is in turn coupled to a remote transceiver. When a command is issued from a remote transceiver, it simultaneously goes to all RF transmitters coupled to the bus 4714. To prevent all RF transmitters from being activated,

1 the microcontroller listens for an address transmitted simultaneously with the command from the transceiver. When the transmitted address matches the address input on the DIP switch 4710, a microcontroller accepts the command transmitted over the bus 4714. The microcontroller is coupled to an RF transmitter 4706. Upon accepting the command from the bus 4714, the
5 microcontroller transmits the command to the RF transmitter 4706 where it is modulated and transmitted over an antenna 4708.

The exemplary RF transmitter modulates a control signal as an AM broadcast signal at a 433 MHz carrier with a 10mW output power. Alternatively, other modulation techniques and frequencies compatible with the remaining system hardware may be utilized. In a further
10 alternative embodiment, infrared signals may be used instead of radio frequency signals. The RF transmitter is powered through a power regulator 4708 that distributes power to the microcontroller and the RF transmitter. The power regulator receives power over the bus line 4714.

FIGS. 48A-N illustrate a number of connections that are utilized in providing ISP services
15 to users of a system incorporating the transceiver. FIG. 48A illustrates a connection of a transceiver via a PSTN line to a telecommunications center where a second PSTN line is coupled to an individual telephone set. Such a system will transfer a telephone call from the transceiver to a typical telephone set. FIG. 48B illustrates a video transceiver to video transceiver connection capable of transmitting audio and video signals. A transceiver is coupled to a PSTN line and
20 routed to a telecommunications network or a second PSTN line coupled to a telecommunications network to a second video transceiver.

FIG. 48C illustrates the use of the video transceiver in an Internet browsing configuration. The video transceiver is coupled to a PSTN line and routed through a telecommunications network to an ISP server. The server is in turn coupled to the Internet. Visual information is
25 transmitted to the video transceiver for display on a monitor or display device, and manipulation of a displayed web page is achieved through utilization of an input device, such as the handwriting recognition device previously described in FIG. 28A.

In alternative embodiments, ISDN lines are used to couple video transceivers to a telecommunications network. In FIG. 48D, a video transceiver is coupled to an ISDN modem and in turn coupled to an ISDN line to a telecommunications network. The telecommunications network through an ISDN line is coupled to a second ISDN modem, which is coupled to a video
30 transceiver. FIG. 48E illustrates a video transceiver coupled to an ISDN modem or ADSL modem through an ISDN or ADSL transmission line to a telecommunications network. The telecommunications network is coupled to an ISP server, which is in turn coupled to the Internet. In this manner, Internet browsing via an ISDN line (or equivalently an ADSL line) is achieved.
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Alternatively, a cable TV network is utilized to couple video transceivers to the Internet. In the embodiment shown in FIG. 48F, a video transceiver is coupled to a cable modem that in

1 turn is coupled to a cable TV network via a cable transmission system. The cable TV network is coupled to an IPS provider that is in turn coupled to the Internet.

FIG. 48G illustrates one-way communication from the first video transceiver to a second video transceiver. The first video transceiver is coupled via a PSTN line to the Internet. The Internet is coupled to an ADSL or cable modem by an ADSL or cable TV transmission system. The ADSL or cable modem is in turn coupled to the second video transceiver. For this configuration to operate properly, it is desirable for the second transceiver to have a fixed IP address and to remain on-line at all times.

FIG. 48H illustrates a system capable of providing two-way VoIP communications over the Internet. In this configuration, it is desirable for both parties to have fixed IP addresses and to remain on-line at all times. In the embodiment shown, conventionally coded VoIP software has been installed into each transceiver circuit that utilizes the VoIP protocol in receiving and transmitting.

The first video transceiver is coupled to an ADSL or cable modem, which in turn couples the cable modem to the Internet via an ADSL or CATV transmission system. The Internet is coupled to a second ADSL or cable modem through a second ADSL or cable CATV transmission line. The ADSL or cable modem is in turn coupled to the second video transceiver.

Using the video transceiver, it is also possible to transmit and receive VoIP communications between a variety of groups comprising video transceivers and conventional telephone sets. FIG. 48I is a block diagram of VoIP transmission from a video transceiver to a group comprising video transceivers and conventional telephone sets. The transmitting video transceiver is coupled to a PSTN line, which is in turn coupled to the Internet. The Internet is coupled to a gateway via an ADSL or equivalently a CATV transmission system. The gateway is in turn coupled to multiple video transceivers and conventional telephone sets that are capable of receiving the VoIP communication. To ensure satisfactory system operation, it is desirable to have a fixed gateway address and for the gateway to remain on-line at all times.

FIG. 48J is a block diagram illustrating two-way VoIP communications from group to group. Multiple video transceivers and conventional telephone sets are coupled to a first gateway, which is in turn coupled to the Internet. The Internet is coupled to a second gateway, which is in turn coupled to a second group of video transceivers and conventional telephone sets. In this configuration, it is desirable that both gateways have fixed IP addresses and remain on-line at all times.

FIG. 48K illustrates one-way VoIP video transceiver to telephone utilizing a video transceiver as a gateway to a second group of video transceivers and conventional telephone sets. A transmitting video transceiver is coupled to the Internet via a PSTN line. The Internet is coupled to an ADSL or cable modem from the Internet via an ADSL or CATV line. The ADSL or cable modem is coupled to the video transceiver that is being utilized as a gateway. The gateway video transceiver is coupled via a PSTN line to a local telecommunications company

1 network where multiple video transceivers and conventional telephone sets are coupled to the local telecom through individual PSTN lines.

FIG. 48C illustrates a VoIP telephone connection utilizing a video transceiver as a gateway. The first group of video transceivers and conventional telephone sets are coupled via
5 PSTN lines to a local telecommunications company network. The local telecommunications network is coupled via a PSTN line to a video transceiver functioning as a first gateway. The first gateway is coupled to an ADSL or cable modem, which is in turn coupled via an ADSL or CATV line to the Internet. The Internet is in turn coupled by a second ADSL or CATV line to
10 a second ADSL or cable modem. The second ADSL or cable modem is coupled to a second video transceiver being used as a gateway. The second video transceiver is coupled to a second local telecommunications network via a PSTN line. The local telecommunications network couples a group of video transceivers and conventional telephone sets to the local telecommunications network through individual PSTN lines. In this configuration, the video transceivers functioning as gateways typically utilize fixed IP addresses and remain on-line at all
15 times.

A third party may provide a call center for coupling leased telephone lines to the Internet in order to couple VoIP communications. FIG. 48M illustrates a VoIP telephone to telephone connection utilizing video transceivers as a call center gateway. A group of video transceivers and conventional telephone sets are coupled to a local telecommunications network through
20 individual PSTN telephone lines. The first local telecommunications company is coupled to a video transceiver call center through a leased line. The first video transceiver call center is in turn coupled to the Internet through a leased line. A second video transceiver call center is coupled to the Internet via a leased line. The second transceiver is in turn coupled through a leased line to a second local telecommunications network. The second local telecommunications
25 network is in turn coupled to a second group of video transceivers and conventional telephone sets through conventional PSTN telephone lines.

FIG. 48N is a block diagram of a VoIP telephone to telephone transmission through a gateway with a built-in ISP. A first group of video transceivers and conventional telephone sets are coupled through conventional PSTN lines individually to a first local telecommunications
30 network. The first local telephone communications network is coupled through a leased line to a first ISP with VoIP gateway. The first ISP with VoIP gateway is coupled through a backbone line to the Internet. A second ISP with VoIP gateway is coupled through a backbone line to the Internet. The second ISP with VoIP gateway is then coupled through a leased line to a second local telecommunications network. The second local telecommunications network is coupled
35 to a second group of video transceivers and conventional telephone sets through individual PSTN telephone lines.

CLAIMS:

1. A video transceiver, comprising:
an integral open circuit television camera;
a user input device to enter a telephone number; and
a transceiver capable of formatting video input from the camera, audio input and the entered telephone number for transmission on a network.
2. The video transceiver of claim 1 wherein the user input device comprises a keypad.
3. The video transceiver of claim 1 or 2 wherein the network comprises a PSTN.
4. The video transceiver of claim 1, 2 or 3, wherein the video input is digitally compressed.
5. The video transceiver of any one of the preceding claims further comprising a handset to provide the audio input.
6. The video transceiver of any one of the preceding claims wherein the format comprises VoIP.
7. The video transceiver of any one of the preceding claims further comprising a handwriting recognition device to recognize alpha-numeric characters input by a user, the transceiver formatting the alpha-numeric characters for transmission on the network.

8. The video transceiver of any one of the preceding claims further comprising a television for viewing the input, the input comprising a web page.
9. The video transceiver of any one of the preceding claims further comprising an electronic fingerprint identification unit to verify that a user is authorized to make an e-commerce transaction.
10. The video transceiver of claim 9 wherein the electronic fingerprint identification unit includes a credit authorization terminal to read electronically encoded fingerprint data from a card.
11. A home automation system comprising:
 - a wall switch;
 - a signal;
 - a transceiver to generate a control signal; and
 - a wireless transmitter to control the wall switch in response to the control signal.
12. The home automation system of claim 11 further comprising a handheld controller for selectively activating the wall switch remotely.
13. The home automation system of claim 11 or 12, further comprising a closed circuit television system to monitor conditions remote from the wireless transmitter.
14. The home automation system of claim 11, 12 or 13 wherein the control signal comprises H.324 protocol.

15. The home automation system of any one of claims 11 to 14, further comprising a fire control module coupled to the transmission.
16. A method of providing remote video surveillance comprising:
generating real time video representative of the monitored local area;
a remote area with a closed circuit camera; and
coupling the real time video through a PSTN telephone line to a closed circuit camera system in real time.
17. A method of providing electronic commerce comprising:
imaging a fingerprint from a person desiring to make a transaction;
reading electronically coded fingerprint information encoded into a card;
comparing the imaged finger print to the electronically coded fingerprint information read; and
allowing a transaction to be processed based upon a match between the imaged finger print and the electronically coded fingerprint information read.
18. The method of providing electronic commerce of claim 17 wherein the card includes credit card data.
19. A method of providing electronic commerce comprising:
coupling a remote computer to a first unit;
coupling the first unit to a second unit;
collecting fingerprint information from a person and
reading electronically encoded fingerprint information and credit card data from a card; and

processing by a remote computer a transaction billed to the credit card entered into the first unit upon a match of the collected fingerprint information and the read electronically encoded fingerprint information.

20. A video transceiver constructed and arranged to operate substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings.
21. A home automation system constructed described with reference to and as illustrated in the accompanying drawings.
22. A method of providing remote surveillance, substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings.
23. A method of providing electronic commerce substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings.