

Description

[0001] The present invention relates to an interactive gaming and digital audiovisual transmission system, in particular a gaming and digital television transmission system.

[0002] Broadcast transmission of digital data is well-known in the field of pay TV systems, where scrambled audiovisual information is sent, usually by a satellite or satellite/cable link, to a number of subscribers, each possessing a decoder capable of descrambling the transmitted program for subsequent viewing. Terrestrial digital broadcast systems are also known. Recent systems have also used the broadcast link to transmit other data, in addition to or as well as audiovisual data, such as computer programs or interactive applications to the decoder or to a connected PC.

[0003] The increasing sophistication of such technology, in particular in relation to the receiver/decoder devices used in the systems, has led to an increase in the possible services that may be provided thereby. In particular, a number of systems have been proposed using interactive technology to enable a viewer to, for example, participate in a quiz show, or to select further information regarding a product currently being displayed on a shopping channel.

[0004] In the case of gaming applications, a number of largely theoretical systems have been proposed to enable a viewer to gamble a sum of money on the outcome of a sporting event or casino-type game broadcast over a television network. In most of these systems, a viewer is usually obliged to open an initial account with the controlling gaming authority by phoning or mailing a money transfer to the gaming authority before any gambling can be carried out. The disadvantages of this sort of procedure will be apparent.

[0005] Alternative systems are also known, in which the viewer buys credits to be gambled in the form of an electronic purse, i.e. a smart card or the like, the credits in the purse being available for subsequent gaming operations. The card is inserted in the decoder and the credits used thereafter in the subsequent gaming operations. When the contents of the purse are exhausted, the viewer buys a new card or re-charges the card at a suitable sales point. This system again implies a certain infra-structure to be put in place to enable a user to obtain the necessary credits to be gambled.

[0006] The present invention seeks to overcome some or all of the disadvantages of these prior art systems.

[0007] According to the present invention, there is provided an interactive gaming and audiovisual transmission system comprising a central gaming computer means for processing gaming data, a decoder adapted to receive gaming data from the central gaming computer together with transmitted audiovisual data, the decoder further including a card reading device for interacting with a user's bank card in order to credit a gaming account held by the central gaming computer means

in response to a transfer of credit from the user's bank account.

[0008] In this way, the present invention enables a user to simply and quickly open and credit a gaming account from the comfort of his home, avoiding the more elaborate payment methods of the known systems.

[0009] The type of bank card used in this transaction may be of the debit or credit type. The card reading device may in particular comprise a smart card reader adapted to interact with a bank card in the form of a smart card.

[0010] Advantageously, the decoder is further equipped with a second card reading device. For example, in the case where the decoder forms part of a television subscription service, the subscriber may be provided with a subscription card in the form of a smart card or the like. The provision of two card reader devices in the decoder permits the decoder to carry out credit transactions on a bank card inserted in one reader whilst the subscription card is held in the second reader.

[0011] In one realisation, the decoder may be adapted to obtain transfer of credit information in the form of an electronic certificate generated by the bank card in response to transaction data submitted by the decoder. This transaction information may include, for example, the details of the bank account of the gaming authority to be credited in the operation, the sum of money to be transferred etc.

[0012] Typically, data is entered by the user into the decoder using a handheld remote control. In the case where a credit transaction is to be carried out, it may be necessary to enter the bank card PIN number using the remote control. In one embodiment, the decoder is provided with a handheld remote control, some or all of the data sent to the decoder being encrypted by the handheld remote control and subsequently decrypted by the decoder. In this way, interception by third parties of sensitive data emitted by the remote control may be avoided.

[0013] Preferably, the decoder is adapted to transmit transfer of credit information from the decoder to a bank server via a network communication link, for example, using a modem integrated in the decoder.

[0014] The decoder may be adapted to directly communicate transfer of credit information to a bank computer. However, preferably, the system further comprises an intermediate communications server, adapted to receive transfer of credit information communicated from the decoder and to forward this information on to a bank server.

[0015] The intermediate communications server may further be adapted to communicate with the central gaming computer means, for example, to inform the central communication means of a transfer of credit instruction being forwarded from the intermediate communication means to a bank computer, so as to permit

the gaming computer means to set up an account without having to verify the transaction carried out at an associated bank server.

[0016] The central gaming computer means may equally be adapted to receive and transmit credit information to or from a bank server via a network communication link. This may be necessary, for example, in the case of a win or in order to verify the transfer of funds from the bank account of a user to the gaming authorities bank account before opening a gaming account.

[0017] Preferably, the decoder is adapted to communicate gaming information to the central gaming computer during gaming operation via a network communication link. This may be the same link as used to communicate transfer of credit information to a bank computer, for example, using a modem device integrated in the decoder.

[0018] Some or all of the gaming information communicated from the decoder to the central gaming computer during gaming operation may be encrypted by the decoder. For example, the decoder may be adapted to transmit in encrypted form a code word entered by the user associated with the gaming account of the user held by the central gaming computer.

[0019] The decoder may be adapted to directly communicate information to the central gaming computer during gaming operation. However, preferably, the system further comprises an intermediate communications server, adapted to receive information communicated from the decoder during gaming operation and to forward this information on to the central gaming computer. This may be the same intermediate server as used for the transfer of credit information between the decoder and a bank.

[0020] In the case where gaming information is encrypted by the decoder, the intermediate communications server may be adapted to simply pass this information "as is" to the central gaming computer. However, in one embodiment, the intermediate communications server is adapted to decrypt information received from the decoder and to re-encrypt this information for subsequent communication to the central gaming computer. This may be required, for example, in the case where different encryption algorithms are used by the decoder and central gaming computer.

[0021] The intermediate communications server may further be adapted to communicate information to and from other computer devices, for example, computer databases holding TV subscriber information. In this way, the intermediate communications server may obtain directly information regarding the user of the system (name, address etc) to be used in setting up a gaming account, without the user having to re-enter the same information.

[0022] The communication means used to transmit gaming data from the central gaming computer to the decoder may be defined in a number of different ways and by a number of different communication elements.

For example, some or all of the gaming data sent from the gaming computer to the decoder may be transmitted via a transmitter means used to transmit audiovisual data to the decoder.

[0023] In addition, or alternatively, some or all of the gaming data sent from the central gaming computer to the decoder may be sent via a network communication link, for example, the same network used to communicate information from the decoder to the central gaming computer during gaming operation.

[0024] In practice, a mixture of these two communication paths may prove optimal, the network path being used for rapid dialogue between the decoder and the gaming computer during real-time operation and the transmission path being used for relatively fixed data, such as screen format display data or the like.

[0025] The present invention also extends to a gaming system for processing gaming data, comprising:

- means for transmitting gaming data to a user's decoder;
- means for receiving data from the user's decoder; and
- means for connection to a bank server holding the user's bank account in order to transfer credit to or from the account.

[0026] The gaming system may include a gaming account held by the gaming system which can be credited in response to the transfer of credit.

[0027] The gaming system may be adapted to communicate with the decoder and the bank server via a communications server. If so, the gaming system may be adapted to receive encrypted information from the communications server.

[0028] The present invention also provides a interactive gaming and audiovisual transmission system comprising a gaming system as aforementioned, said user's decoder, and said bank server.

[0029] As mentioned above the system may be used to permit gaming in relation to various events. For example, the central gaming computer may be adapted to generate a computer game (computer blackjack or the like), the computer generated images being transmitted via the audiovisual link to the decoder.

[0030] However, as will be appreciated, the combination of gaming and audiovisual systems makes the present invention particularly adapted to permit gaming in relation to televised sports, such as horse racing or the like. In one embodiment, the present invention comprises a central gaming computer adapted to provide gaming data related to a real-time sporting event, the decoder being adapted to receive both gaming data and associated audiovisual data of the event.

[0031] In the context of the present application the term <<audiovisual transmission system>> refers to all transmission systems for transmitting or broadcasting primarily audiovisual or multimedia digital data. The

present invention is particularly, but not exclusively, applicable to a broadcast digital television system.

[0032] In this application the term « smart card » is used to mean any conventional chip-based card device possessing, for example, microprocessor and/or memory storage. Also included in this term are chip devices having alternative physical forms, for example key-shaped devices such as are often used in TV decoder systems.

[0033] In the present application, the term "decoder" is used to apply to an integrated receiver/decoder for receiving and decrypting an encrypted transmission, the receiver and decoder elements of such a system as considered separately, as well as to a receiver capable of receiving non-encrypted broadcasts. The term equally covers decoders including additional functions, such as web browsers, together with decoder systems integrated with other devices, for example, integrated VHS/decoder devices or the like.

Figure 1 shows the overall architecture of a digital television system, as may be incorporated in the gaming system of the present invention;

Figure 2 shows the conditional access system of the television system of Figure 1;

Figure 3 shows the structure of the decoder of Figures 1 and 2;

Figure 4 shows a gaming system incorporating the television system of Figures 1 and 2; and

Figure 5 shows a flow diagram of the logical steps involved in a gaming transaction

Digital Television System

[0034] An overview of a digital television broadcast and reception system 1000 adaptable to the present invention is shown in Figure 1. The system includes a mostly conventional digital television system 2000, which uses the known MPEG-2 compression system to transmit compressed digital signals. In more detail, the MPEG-2 compressor 2002 in a broadcast centre receives a digital signal stream (typically a stream of video signals). The compressor 2002 is connected to a multiplexer and scrambler 2004 by linkage 2006. The multiplexer 2004 receives a plurality of further input signals, assembles one or more transport streams and transmits compressed digital signals to a transmitter 2008 of the broadcast centre via linkage 2010, which can of course take a wide variety of forms including telecom links.

[0035] The transmitter 2008 transmits electromagnetic signals via uplink 2012 towards a satellite transponder 2014, where they are electronically processed and broadcast via notional downlink 2016 to earth

receiver 2018, conventionally in the form of a dish owned or rented by the end user. The signals received by receiver 2018 are transmitted to an integrated receiver/decoder 2020 owned or rented by the end user and connected to the end user's television 2022. The receiver/decoder 2020 decodes the compressed MPEG-2 signal into a television signal for the television set 2022.

[0036] A conditional access system 3000 is connected to the multiplexer 2004 and the receiver/decoder 2020, and is located partly in the broadcast centre and partly in the decoder. It enables the end user to access digital television broadcasts from one or more broadcast suppliers. A smart card, capable of decrypting messages relating to commercial offers (that is, on or several television programmes sold by the broadcast supplier), can be inserted into the receiver/decoder 2020. Using the decoder 2020 and smart card, the end user may purchase events in either a subscription mode or a pay-per-view-mode.

[0037] An interactive system 4000, also connected to the multiplexer 2004 and the receiver/decoder 2020 and again located partly in the broadcast and partly in the decoder, enables the end user to interact with various applications via a modemmed back channel 4002. Such interactive applications may include an interactive shopping service, a quiz application, an interactive programme guide etc.

[0038] In point of fact, whilst the interactive system 4000 has been represented as a discrete logical block, the physical elements of this system, such as the server or servers used to handle communications between the receiver/decoder and central servers, may be elements shared with the conditional access system 3000. This will become clear in the description of the gaming system of Figure 4.

Conditional Access System

[0039] With reference to Figure 2, the conditional access system 3000 includes a Subscriber Authorization System (SAS) 3002. The SAS 3002 is connected to one or more Subscriber Management Systems (SMS) 3004, one SMS for each broadcast supplier, by a respective TCP-IP link 3006 (although other types of linkage could alternatively be used). Alternatively, one SMS could be shared between two broadcast suppliers, or one supplier could use two SMSs, and so on.

[0040] First encrypting units in the form of ciphering units 3008 utilising « mother » smart cards 3010 are connected to the SAS by linkage 3012. Second encrypting units again in the form of ciphering units 3014 utilising mother smart cards 3016 are connected to the multiplexer 2004 by linkage 3018. The receiver/decoder 2020 receives a « daughter » smart card 3020. It is connected directly to the SAS 3002 by Communications Servers 3022 via the modemmed back channel 4002. The SAS sends amongst other things subscription

rights to the daughter smart card on request.

[0041] The smart cards contain the secrets of one or more commercial operators. The ((mother)) smart card encrypts different kinds of messages and the ((daughter)) smart cards decrypt the messages, if they have the rights to do so.

[0042] The first and second ciphering units 3008 and 3014 comprise a rack, an electronic VME card with software stored on an EEPROM, up to 20 electronic cards and one smart card 3010 and 3016 respectively, for each electronic card, one (card 3016) for encrypting the ECMs and one (card 3010) for encrypting the EMMS.

[0043] Also shown in Figure 2 is a handheld remote control used by the viewer to control and program functions of the receiver/decoder 2020.

Multiplexer and Scrambler

[0044] With reference to Figures 1 and 2, in the broadcast centre, the digital video signal is first compressed (or bit rate reduced), using the MPEG-2 compressor 2002. This compressed signal is then transmitted to the multiplexer and scrambler 2004 via the linkage 2006 in order to be multiplexed with other data, such as other compressed data.

[0045] The scrambler generates a control word CW used in the scrambling process and included in the MPEG-2 stream in the multiplexer 2004. The control word CW is generated internally and enables the end user's integrated receiver/decoder 2020 to descramble the programme. Access criteria, indicating how the programme is commercialised, are also added to the MPEG-2 stream. The programme may be commercialised in either one of a number of ((subscription)) modes and/or one of a number of ((Pay Per View)) (PPV) modes or events.

[0046] In the subscription mode, the end user subscribes to one or more commercial offers, of ((bouquets)), thus getting the rights to watch every channel inside those bouquets. In the preferred embodiment, up to 960 commercial offers may be selected from a bouquet of channels. In the Pay Per View mode, the end user is provided with the capability to purchase events as he wishes. This can be achieved by either pre-booking the event in advance ((pre-book mode)), or by purchasing the event as soon as it is broadcast ((impulse mode)).

[0047] Both the control word CW and the access criteria are used to build an Entitlement Control Message (ECM); this is a message sent in relation with a scrambled program. The message contains a control word (which allows for the descrambling of the program) and the access criteria of the broadcast program. The access criteria and control word are transmitted to the second encrypting unit 3014 via the linkage 3018. In this unit an ECM is generated, encrypted with an exploitation key Cex and transmitted on to the multiplexer and scrambler 2004.

Programme Transmission

[0048] The multiplexer 2004 receives encrypted EMMs from the SAS 3002, encrypted ECMs from the second encrypting unit 3014 and compressed programmes from the compressor 2002. The multiplexer 2004 scrambles the programmes and communicates the scrambled programmes, the encrypted EMM (if present) and the encrypted ECMs to a transmitter 2008 of the broadcast centre via linkage 2010. The transmitter 2008 transmits electromagnetic signals towards the satellite transponder 2014 via uplink 2012.

Programme Reception

[0049] The satellite transponder 2014 receives and processes the electromagnetic signals transmitted by the transmitter 2008 and transmits the signals on to the earth receiver 2018, conventionally in the form of a dish owned or rented by the end user, via downlink 2016. The signals received by receiver 2018 are transmitted to the integrated receiver/decoder 2020 owned or rented by the end user and connected to the end user's television set 2022. The receiver/decoder 2020 demultiplexes the signals to obtain scrambled programmes with encrypted EMMs and encrypted ECMs.

[0050] If the programme is not scrambled the receiver/decoder 2020 decompresses the data and transforms the signal into a video signal for transmission to television set 2022.

[0051] If the programme is scrambled, the receiver/decoder 2020 extracts the corresponding ECM from the MPEG-2 stream and passes the ECM to the ((daughter)) smart card 3020 of the end user. This slots into a housing in the receiver/decoder 2020. The daughter smart card 3020 controls whether the end user has the right to decrypt the ECM and to access the programme. If not, a negative status is passed to the receiver/decoder 2020 to indicate that the programme cannot be descrambled. If the end user does have the rights, the ECM is decrypted and the control word extracted. The decoder 2020 can then descramble the programme using this control word. The MPEG-2 stream is decompressed and translated into a video signal onward transmission to television set 2022.

Subscriber Management System (SMS)

[0052] A Subscriber Management System (SMS) 3004 includes a database 3024 which manages, amongst others, all of the end user files, commercial offers (such as tariffs and promotions), subscriptions, PPV details, and data regarding end user consumption and authorization. The SMS may be physically remote from the SAS

[0053] Each SMS 3004 transmits messages to the SAS 3002 via respective linkage 3006 to enable modifications to or creations of Entitlement Management Mes-

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