Abstract: A portable mobile communications device (110) for altering the destination of mobile television programs broadcast by a mobile television service provider (132) includes a mobile television device (250), a processor (220) running a mobile television redirect application (222) communicable with the mobile television service provider (132), and a user interface (210) for controlling the mobile television device (250) and the mobile television redirect application (222) such that mobile television broadcast programs can be redirected to an alternate device at higher definitions in response to input received by the user interface (210) and sent to the mobile television service provider (132). The alternate device can include a home media server (160) or a computer (150) coupled to and communicable with the mobile television service provider (132) via the Internet (140).
MOBILE DEVICE CONTROL OF MOBILE TELEVISION BROADCAST SIGNALS TO ALTERNATE DESTINATIONS

DESCRIPTION

Background Art

The present invention relates to portable mobile communications devices and systems, and more particularly to a portable mobile communications device, system and method that can control the distribution of live television broadcast signals from the mobile device.

Portable mobile communications devices such as mobile phones are becoming more sophisticated and include many new features and capabilities. One such feature is the capability to receive mobile broadcast television signals or mobile television or the like, such as digital video broadcast-handheld (DVB-H), digital media broadcast (DMB), integrated services digital broadcast-terrestrial (ISDB-T), mobile broadcast multi-cast service (MBMS), or similar technologies. When integrated into a mobile phone, all of the aforementioned technologies utilize a separate mobile television tuner except for MBMS which can be received using the portable mobile communications device existing mobile radio receiver and transmitter.

The convenience factor for receiving such broadcasting is high for mobile users. Unfortunately, the mobile user's viewing experience is constrained by the mobile equipment itself, particularly the screen size and resolution of the mobile device as well as the bandwidth provided for sending and receiving the mobile broadcast television signals.

Currently, there are no provisions addressing the user's dilemma described above. What is needed is a mechanism that allows the user to direct a mobile video broadcast from the source to an alternate device at higher definitions such as a home media server for later consumption.

Disclosure of Invention

In accordance with an embodiment of the present invention, there is described a portable mobile communications device for altering the destination of mobile television programs broadcast by a mobile television service provider. The portable mobile communications device includes a mobile television device, a processor running a mobile television redirect application communicable with the mobile television service...
provider, and a user interface for controlling the mobile television redirect application such that mobile television programs (signals) can be redirected to an alternate device and in a higher definition format in response to input received by the user interface and sent to the mobile television service provider. The alternate device can include a home media server, a computer, or other video playback device coupled to and communicable with the mobile television service provider via the Internet.

In accordance with another embodiment of the present invention, there is described a method of altering the destination of mobile television programs broadcast by a mobile television service provider to the portable mobile communications device.

The method comprises receiving input from a user interface on the portable mobile communications device, the input for selecting a broadcast program from a programming channel guide to be broadcast. A prompt, via a display on the portable mobile communications device, is displayed for one or more destinations for the selected broadcast program and whether to send a higher definition format of the selected program. Input is then received from a user interface on the portable mobile communications device identifying an alternate destination and desired definition (higher or lower) for the selected broadcast program. The portable mobile communications device causes the redirection of the selected broadcast program from the mobile television service provider to the selected alternate destination in the selected lower or higher definition format. This is achieved by wirelessly sending a control signal to the mobile television service provider with instructions to redirect the selected broadcast program from the mobile television service provider to the alternate destination such as a home media server, computer, or other playback device coupled with the mobile television service provider via the Internet.

**Brief Description Of The Drawings**

Figure 1 is a block diagram of an exemplary system for altering the destination of broadcast mobile television signals in accordance with an embodiment of the present invention.

Figure 2 is a block diagram of an exemplary portable mobile communications device for use within the system of Figure 1 for controlling the destination of broadcast mobile television signals in accordance with an embodiment of the present invention.
Figure 3 is a flow chart of a method for altering the destination and definition of broadcast mobile television signals in accordance with an embodiment of the present invention.

Best Mode(s) For Carrying Out The Invention

The following detailed description of embodiments refers to the accompanying drawings, which illustrate specific embodiments of the invention. Other embodiments having different structures and operations do not depart from the scope of the present invention.

As will be appreciated by one of skill in the art, the present invention may be embodied as a method, system, or computer program product. Accordingly, the present invention may take the form of an entirely hardware embodiment, an entirely software embodiment (including firmware, resident software, micro-code, etc.) or an embodiment combining software and hardware aspects that may all generally be referred to herein as a "circuit," "module" or "system." Furthermore, the present invention may take the form of a computer program product on a computer-usable storage medium having computer-usable program code embodied in the medium.

Any suitable computer readable medium may be utilized. The computer-usable or computer-readable medium may be, for example but not limited to, an electronic, magnetic, optical, electromagnetic, infrared, or semiconductor system, apparatus, device, or propagation medium. More specific examples (a non-exhaustive list) of the computer-readable medium would include the following: an electrical connection having one or more wires, a portable computer diskette, a hard disk, a random access memory (RAM), a read-only memory (ROM), an erasable programmable read-only memory (EPROM or Flash memory), an optical fiber, a portable compact disc read-only memory (CD-ROM), an optical storage device, a transmission media such as those supporting the Internet or an intranet, or a magnetic storage device. Note that the computer-usable or computer-readable medium could even be paper or another suitable medium upon which the program is printed, as the program can be electronically captured, via, for instance, optical scanning of the paper or other medium, then compiled, interpreted, or otherwise processed in a suitable manner, if necessary, and then stored in a computer memory. In the context of this document, a computer-usable or computer-readable medium may be
any medium that can contain, store, communicate, propagate, or transport the program for use by or in connection with the instruction execution system, apparatus, or device.

Computer program code for carrying out operations of the present invention may be written in an object oriented programming language such as Java, Smalltalk, C++ or the like. However, the computer program code for carrying out operations of the present invention may also be written in conventional procedural programming languages, such as the "C" programming language or similar programming languages. The program code may execute entirely on the user's computer, partly on the user's computer, as a stand-alone software package, partly on the user's computer and partly on a remote computer or entirely on the remote computer or server. In the latter scenario, the remote computer may be connected to the user's computer through a local area network (LAN) or a wide area network (WAN), or the connection may be made to an external computer (for example, through the Internet using an Internet Service Provider).

The present invention is described below with reference to flowchart illustrations and/or block diagrams of methods, apparatus (systems) and computer program products according to embodiments of the invention. It will be understood that each block of the flowchart illustrations and/or block diagrams, and combinations of blocks in the flowchart illustrations and/or block diagrams, can be implemented by computer program instructions. These computer program instructions may be provided to a processor of a general purpose computer, special purpose computer, or other programmable data processing apparatus to produce a machine, such that the instructions, which execute via the processor of the computer or other programmable data processing apparatus, create means for implementing the functions/acts specified in the flowchart and/or block diagram block or blocks.

These computer program instructions may also be stored in a computer-readable memory that can direct a computer or other programmable data processing apparatus to function in a particular manner, such that the instructions stored in the computer-readable memory produce an article of manufacture including instruction means which implement the function/act specified in the flowchart and/or block diagram block or blocks.

The computer program instructions may also be loaded onto a computer or other programmable data processing apparatus to cause a series of operational steps to be performed on the computer or other programmable apparatus to produce a computer implemented process such that the instructions which execute on the computer or other
programmable apparatus provide steps for implementing the functions/acts specified in
the flowchart and/or block diagram block or blocks.

Figure 1 is a block diagram of an exemplary system for controlling the
destination of broadcast mobile television signals in accordance with an embodiment of
the present invention. The system 100 may be a digital video broadcast-handheld (DVB-
H)$_5$ digital media broadcast (DMB), integrated services digital broadcast-terrestrial
(ISDB-T), mobile broadcast multi-cast service (MBMS), or other similar technology.
When integrated into a mobile phone, all of the aforementioned technologies utilize a
separate mobile television tuner except for MBMS which can be received using the
portable mobile communications device existing mobile radio receiver and transmitter.

The portable mobile communications device 110 may be a cordless telephone,
cellular telephone, personal digital assistant (PDA), communicator, computer device or
the like and is not unique to any particular communications standard, such as Advanced
Mobile Phone Service (AMPS), Digital Advanced Mobile Phone Service (D-AMPS),
Global System for Mobile Communications (GSM), Code Division Multiple Access
(CDMA) or the like. The design of the portable mobile communications device 110
illustrated in Figure 2 is for purposes of explaining the present invention and the present
invention is not limited to any particular design.

The portable mobile communications device 110 shown in Figure 2 may include
an operator or user interface 210 to facilitate controlling operation of the portable mobile
communications device 110 including initiating and conducting phone calls and other
communications. The user interface 210 may include a display 212 to provide visual
signals to a subscriber or user as to the status and operation of the portable mobile
communications device 110. The display 212 may be a liquid crystal display (LCD) or
the like capable of presenting color images. The display 212 may provide information to
a user or operator in the form of images, text, numerals, characters, a graphical user
interface (GUI) and the like. The display 212 may also be used to present programming
carried by the broadcast signals described with respect to method 300 of Figure 3.

The user interface 212 may also include a keypad and function keys or buttons
214 including a pointing device, such as a joystick or the like. The keypad, function
buttons and joystick 214 permit the user to communicate commands to the portable
mobile communications device 110 to dial phone numbers, initiate and terminate calls,
establish other communications, such as access to a mobile television provider, the
Internet, send and receive email, text messages and the like. The keypad, function buttons and joystick 214 may also be used to control other operations of the portable mobile communications device 110. The keypad, function buttons and joystick 214 may also be implemented on a touch sensitive display adapted to receive tactile input.

5 The display 212, keypad, and function buttons 214 may be coupled to a main processor and control logic unit 220. The processor and control logic unit 220 may be a microprocessor or the like. The processor and logic unit 220 may include a feature 222 to enable redirecting broadcast signals to an alternate destination. The functions and operations described with respect to a portable mobile communications device 110 in the method of Figure 3 may be embodied in the feature 222 for redirecting broadcast signals. The redirecting broadcast signals feature 222 may be embodied in hardware, firmware, software (data structures) or combinations thereof. The processor and logic unit 220 may also include other data structures, software programs, computer applications and the like to encode and decode control signals; perform communication procedures and other functions as described herein.

10 The user interface 210 may also include a microphone and a speaker 216. The microphone 216 may receive audio or acoustic signals from a user or from another acoustic source. The microphone 216 may convert the audio or acoustic signals to electrical signals. The microphone 216 may be connected to the processor and logic unit 220 wherein the processor and logic unit 220 may convert the electrical signals to baseband communication signals. The processor and control logic unit 220 may be connected to a mobile radio transmitter and receiver 230 that may convert baseband signals from the processor and control logic unit 220 to radio frequency (RF) signals. The mobile radio transmitter and receiver 230 may be connected to an antenna assembly 240 for transmission of the RF signals to a communication medium or system, such as a mobile radio access network (MRAN) 120 or the like. Mobile radio transmitter and receiver 230 can also receive mobile television broadcasts according to the MBMS standard. In this scenario, the MRAN 120 acts as the mobile television service provider.

15 The antenna assembly 240 may receive RF signals over the air and transfer the RF signals to mobile radio transmitter and receiver 230. The mobile radio transmitter and receiver 230 may convert the RF signals to baseband signals. The baseband signals may be applied to the processor and control logic unit 220 which may convert the baseband signals to electrical signals. The processor and control unit 220 may send the
electrical signals to the speaker 216 which may convert the electrical signals to audio
signals that can be understood by the user.

The portable mobile communications device 110 may also include a mobile
television device 250. The mobile television device 250 may be a DVB-H type device or
the like. The mobile television device 250 may be integrally formed as part of the
portable mobile communications device 110 or may be a separate unit that may be
connected and operate in association with the portable mobile communications device
110. The mobile television device 250 may include an antenna assembly 252 for
receiving broadcast signals of programming from a mobile television broadcast network,
broadcast radio access network (B-RAN) 130 or the like. A receiver 254 may be coupled
to the antenna assembly 252 to receive the broadcast signals. A signal processor 256
may receive the broadcast signals from the receiver 254 and convert the signals to a
format for presentation on the display 212 of the portable mobile communications device
110. Or, a signal processor 256 may receive the broadcast signals from the receiver 230
and convert the signals to a format for presentation on the display 212 of the portable
mobile communications device 110.

The B-RAN 130 may originate the mobile television or DVB-H broadcast signals
for broadcasting to communications devices or mobile television devices, such as
portable mobile communications device 110 and mobile television device 250. The B-
RAN 130 may include a transmitter to transmit the broadcast signals.

The B-RAN 130 may be connected to a mobile television service provider 132.
The mobile television service provider 132 may originate programming for broadcasting
to communications devices 110 or mobile television devices 250 via the B-RAN 130.
The mobile television service provider 132 may include a broadcast application server
134. The broadcast application server 134 may include an application 136 for redirecting
broadcast signals.

The B-RAN 130 may be connected to the Internet 140 or other private network
that may utilize Internet protocol (IP) or the like. The B-RAN 130 and the mobile
television service provider 132 may receive and transmit signals or messages to control
the redirecting of broadcast signals via the Internet 140. Messages and signals to control
the playback of recorded programming may also be transmitted and received via the
Internet 140.
In another embodiment of the present invention, as discussed with respect to method 300 of Figure 3, a third party recorder such as a notebook computer 150 or a third party record playback application server such as a home media server 160, or other playback device 180 may be options to receive the redirected broadcast signals and to record the programming carried by the redirected broadcast signals. The third party devices 150, 160, 180 may be connected to the Internet 140 to receive the redirected broadcasted program. Then, at a later date, the user can access the third party devices 150, 160, 180 and play back the recorded programming. In the case of a notebook computer 150 (or other like device) the user can access the redirected broadcast directly via the computer and a suitable application hosted thereon. In the case of a home media server 160 (or other like device) the user can access the redirected broadcast via a television 170 (or television monitor) that is connected to the home media server 160. The combination of the home media server 160 and television 170 would include a suitable application for retrieving, manipulating, and viewing the redirected broadcasted program.

One of the added benefits of redirecting the mobile television broadcast signals over the Internet 140 to an alternate destination 150, 160 is that the mobile television broadcast signals can be transmitted over a higher bandwidth transmission system for display on a higher resolution display system. Thus, certain alternate destinations can support signals characterized as high definition.

Use of a third party device 150, 160 as a destination for redirected programming would typically be accomplished via an Internet 140 connection, preferably a broadband connection, between the mobile television service provider 132 and the selected third party device(s) 150, 160. The broadband connection likely affords a higher bandwidth than the wireless mobile television broadcast. The user can control the destination of programming from his portable mobile communications device 110 using its ability to wirelessly communicate with mobile television service provider 132 through M-RAN 120. The redirect application running on the portable mobile communications device 110 can send control signals to mobile television service provider 132 indicating the destination preference(s) of selected programming. If one or more of the selected preferences is a third party device 150, 160 then the mobile television service provider 132 will, via its own redirect application 136, simultaneously direct a stream of video via the Internet 140 to the desired alternate destination.
Figure 3 is a flow chart of a method for altering the destination and definition of broadcast mobile television signals in accordance with an embodiment of the present invention. In block 310, the user invokes the television viewing application resident within or attached to the mobile television portable mobile communications device 110. In block 320, the user can then access and view a programming guide channel that illustrates the current and future programming available on the channels receivable by the portable mobile communications device 110. The receivable channels are likely the result of a subscription agreement between the user of the portable mobile communications device 110 and the mobile television service provider 132. In block 330, the user will navigate the programming channel guide using the keypad, function buttons, and/or joystick 214 of the portable mobile communications device 110 until he finds and selects a program of interest. In decision block 340, the redirect application 222 prompts the user via the portable mobile communications device display 212 for a destination for the selected program. The user/viewer then selects one of the destination options. If the user selects the mobile destination then, by default, the program will be sent or broadcast to the portable mobile communications device 110 in the lower (typical) definition format 360. If a destination other than the default portable mobile communications device 110 or in addition to the default mobile device is selected, the user is also prompted 350 whether the alternate destination should receive a higher definition format of the selected program. The user could be charged a premium for selecting higher definition redirecting as opposed to standard definition or basic (same as mobile) definition television signals. The extra fees can offset the additional bandwidth and coding necessary to 'push' the selected program to the desired destination.

In block 370, the redirect application 222 will process the user's selection and direct the broadcasted program to the desired destination in the selected lower or higher definition format. This is accomplished by wirelessly sending a control signal to the mobile television service provider with instructions to simultaneously redirect the selected broadcast program from the mobile television service provider to the selected destinations.

Any prompts associated with the invention may be presented and responded to via an interactive voice feature, a graphical user interface (GUI) presented on the display of the portable mobile communications device or the like.
The flowcharts and block diagrams in the Figures illustrate the architecture, functionality, and operation of possible implementations of systems, methods and computer program products according to various embodiments of the present invention. In this regard, each block in the flowchart or block diagrams may represent a module, segment, or portion of code, which comprises one or more executable instructions for implementing the specified logical function(s). It should also be noted that, in some alternative implementations, the functions noted in the block may occur out of the order noted in the figures. For example, two blocks shown in succession may, in fact, be executed substantially concurrently, or the blocks may sometimes be executed in the reverse order, depending upon the functionality involved. It will also be noted that each block of the block diagrams and/or flowchart illustration, and combinations of blocks in the block diagrams and/or flowchart illustration, can be implemented by special purpose hardware-based systems which perform the specified functions or acts, or combinations of special purpose hardware and computer instructions.

The terminology used herein is for the purpose of describing particular embodiments only and is not intended to be limiting of the invention. As used herein, the singular forms "a", "an" and "the" are intended to include the plural forms as well, unless the context clearly indicates otherwise. It will be further understood that the terms "comprises" and/or "comprising," when used in this specification, specify the presence of stated features, integers, steps, operations, elements, and/or components, but do not preclude the presence or addition of one or more other features, integers, steps, operations, elements, components, and/or groups thereof.

Although specific embodiments have been illustrated and described herein, those of ordinary skill in the art appreciate that any arrangement which is calculated to achieve the same purpose may be substituted for the specific embodiments shown and that the invention has other applications in other environments. This application is intended to cover any adaptations or variations of the present invention. The following claims are in no way intended to limit the scope of the invention to the specific embodiments described herein.
CLAMS

1. A portable mobile communications device 110 for altering the destination of mobile television programs broadcast by a mobile television service provider 132 comprising:

   a mobile television receiver 254;
   a processor 220 running a mobile television redirect application 222 communicable with the mobile television service provider 132;
   a user interface 210 for controlling a mobile television device 250 and the mobile television redirect application 222;

   such that mobile television broadcast programs can be redirected to an alternate device 180 in a higher definition format in response to input received by the user interface 210 and sent to the mobile television service provider 132.

2. On a portable mobile communications device, a method of altering the destination of mobile television programs broadcast by a mobile television service provider to the portable mobile communications device, the method comprising:

   receiving input from a user interface on the portable mobile communications device, the input for selecting a broadcast program from a programming channel guide to be broadcast 330;

   prompting, via a display on the portable mobile communications device, for an alternate destination for the selected broadcast program 340;

   receiving input from a user interface on the portable mobile communications device, the input for identifying the alternate destination for the selected broadcast program;

   receiving input from a user interface on the portable mobile communications device, the input for identifying whether a lower or higher definition format for the selected broadcast program is to be redirected to the alternate destination 350; and

   causing the redirection of the selected broadcast program from the mobile television service provider to the alternate destination in the selected lower or higher definition format 360, 370.
3. The method of claim 2 wherein causing the redirection of the selected broadcast program from the mobile television service provider to the alternate destination comprises processing the received input for identifying the alternate destination for the selected broadcast program and wirelessly sending a control signal to the mobile television service provider with instructions to send the selected broadcast program from the mobile television service provider to the alternate destination.

4. The method of claim 2 wherein the alternate destination includes a home media server 160 coupled with the mobile television service provider 132 via the Internet 140.

5. The method of claim 2 wherein the alternate destination includes a computer 150 coupled with the mobile television service provider 132 via the Internet 140.

6. On a portable mobile communications device 110, a computer program product for altering the destination of mobile television programs broadcast by a mobile television service provider 132 to the portable mobile communications device 110, the computer program product comprising:
   - computer program code for receiving input from a user interface on the portable mobile communications device, the input for selecting a broadcast program from a programming channel guide to be broadcast 330;
   - computer program code for prompting, via a display on the portable mobile communications device, for an alternate destination for the selected broadcast program 340;
   - computer program code for receiving input from a user interface on the portable mobile communications device, the input for identifying the alternate destination for the selected broadcast program;
   - computer program code for receiving input from a user interface on the portable mobile communications device, the input for identifying whether a lower or higher definition format for the selected broadcast program is to be sent to the alternate destination 350; and
   - computer program code for causing the redirection of the selected broadcast program from the mobile television service provider to the alternate destination in the selected lower or higher definition format 360, 370.
7. The computer program product of claim 6 wherein the computer program code for causing the redirection of the selected broadcast program from the mobile television service provider to the alternate destination comprises computer program code for processing the received input for identifying the alternate destination for the selected broadcast program and wirelessly sending a control signal to the mobile television service provider with instructions to send the selected broadcast program from the mobile television service provider to the alternate destination.
Invoke TV Viewing Application on Mobile Phone

View Programming Guide Channel Information

Select Program From Programming Guide

Prompt Viewer for Destination of Selected Live Broadcast Program

Home Server Destination, Notebook Computer Destination, or Other than Mobile Destination

Prompt User Whether to Send Higher or Lower Definition Television Signal to Destination for Other Than Mobile Destination

Selected Mobile Television Program is Routed According to Viewer Destination Selection Using Lower Definition Signal

Selected Mobile Television Program is Routed According to Viewer Destination Selection Using Higher Definition Signal
INTERNATIONAL SEARCH REPORT

A. CLASSIFICATION OF SUBJECT MATTER
INV. H04N7/173

According to International Patent Classification (IPC) or to both national classification and IPC.

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
H04N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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<th>Relevant to claim No</th>
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