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(54) **ETHERNET OVER COAXIAL COUPLING SYSTEM, METHOD AND APPARATUS**

(75) Inventors: **Vernon Reed**, Austin, TX (US); **Ahmad C. Ansari**, Cedar Park, TX (US); **David Rackley**, Austin, TX (US)

(73) Assignee: **AT&T Intellectual Property I, L.P.**, Atlanta, GA (US)

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H04N 7/18 (2006.01)

(52) **U.S. Cl.**
USPC **725/78**

(58) **Field of Classification Search** ..... None
See application file for complete search history.

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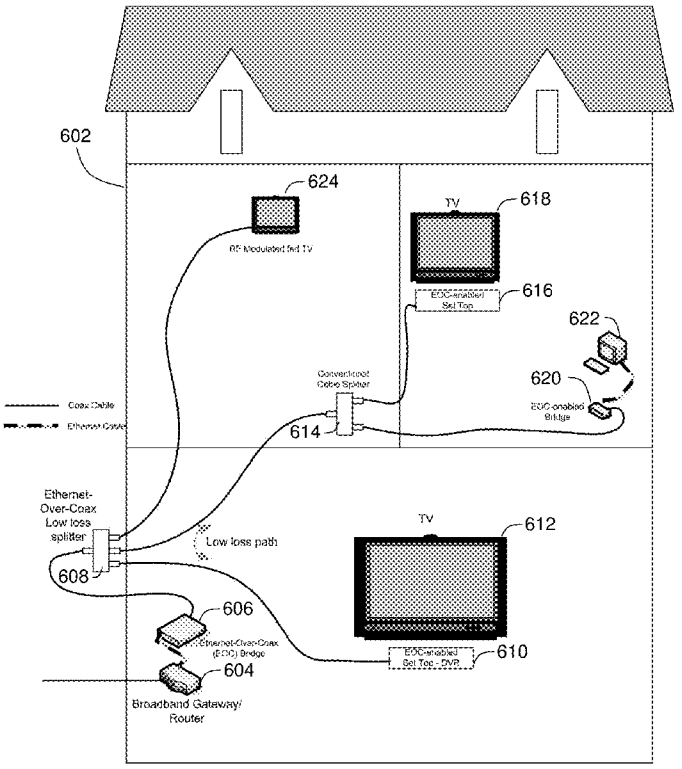
Primary Examiner — Vivek Srivastava
Assistant Examiner — Rong Le
(74) *Attorney, Agent, or Firm* — Guntin & Gust, PLC; Jay H. Anderson

(57) **ABSTRACT**

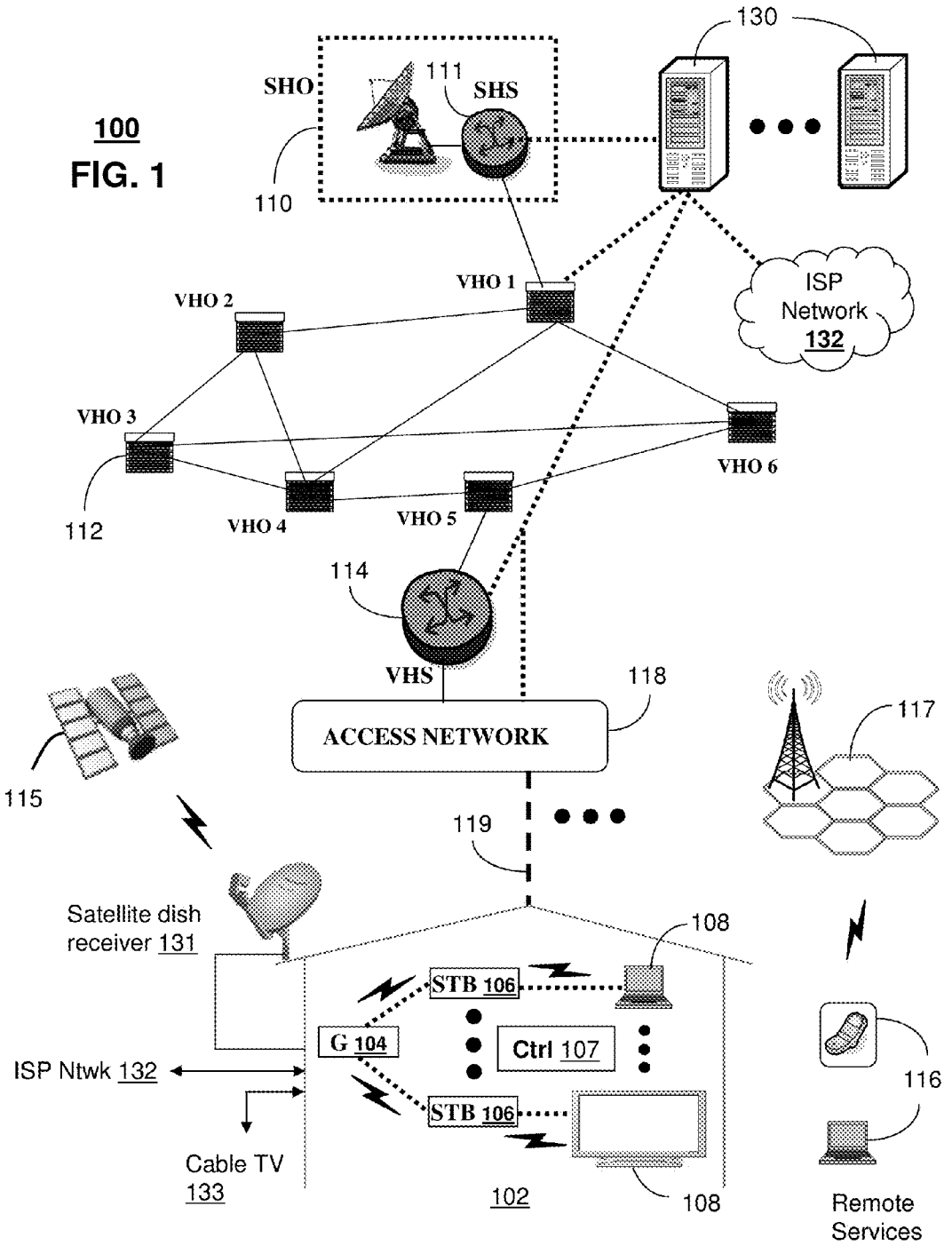
A device that incorporates teachings of the present disclosure may include, for example, a controller to provide low loss connectivity to a plurality of coaxial ports over a broadband range of frequencies in a coaxial network providing Ethernet networking, detune secondary coaxial splitters in the coaxial network that reduces an output-to-output isolation loss among secondary coaxial splitter output ports, and enable re-distribution of modulated radio frequency video signals from a point on the coaxial network to any alternative point on the coaxial network. Other embodiments are disclosed.

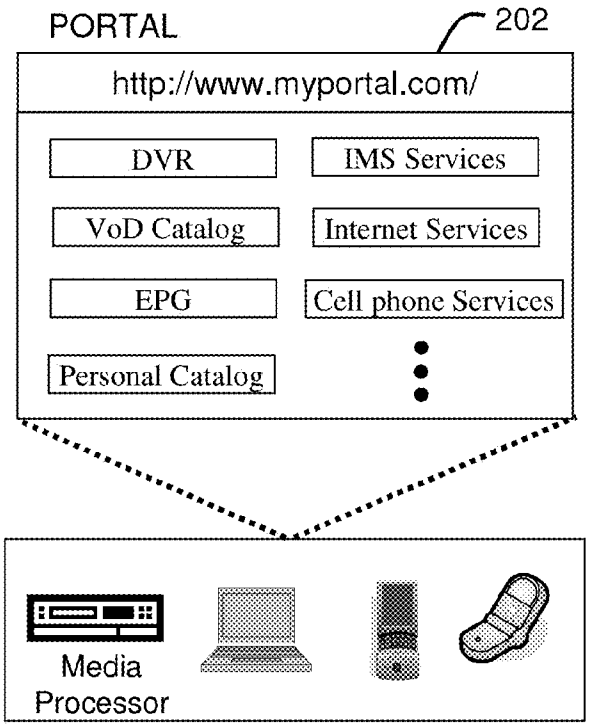
18 Claims, 5 Drawing Sheets



100

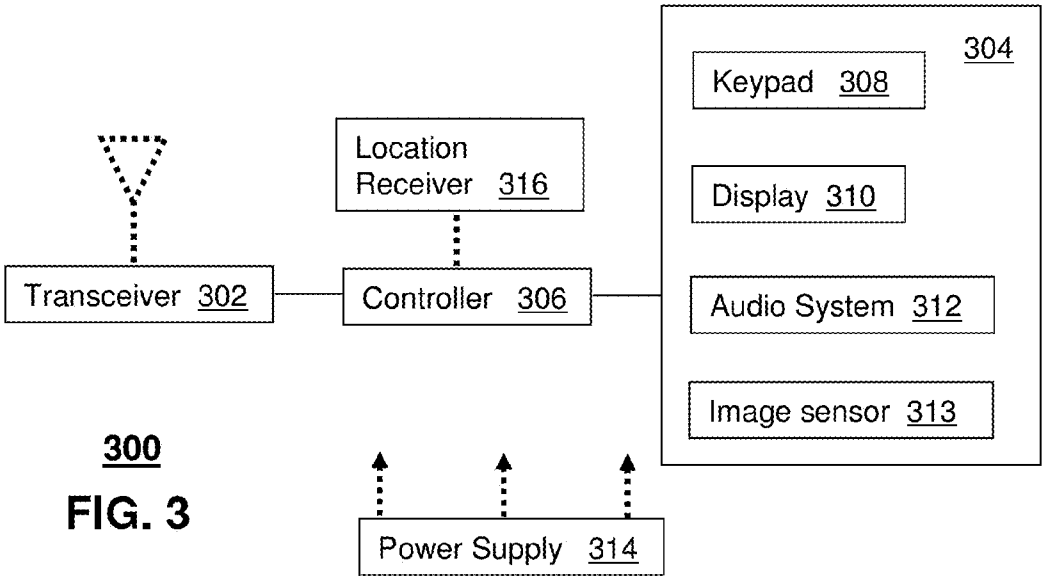
FIG. 1


130
SHO
111
SHS
110
VHO 1
VHO 2
ISP
Network
132
VHO 3
VHO 6
112
VHO 4
VHO 5
114
VHS
118
ACCESS NETWORK
117
115
119
Satellite dish
receiver 131
108
STB 106
G 104
Ctrl 107
ISP Ntwk 132
STB 106
116
Cable TV
133
102
108
Remote
Services



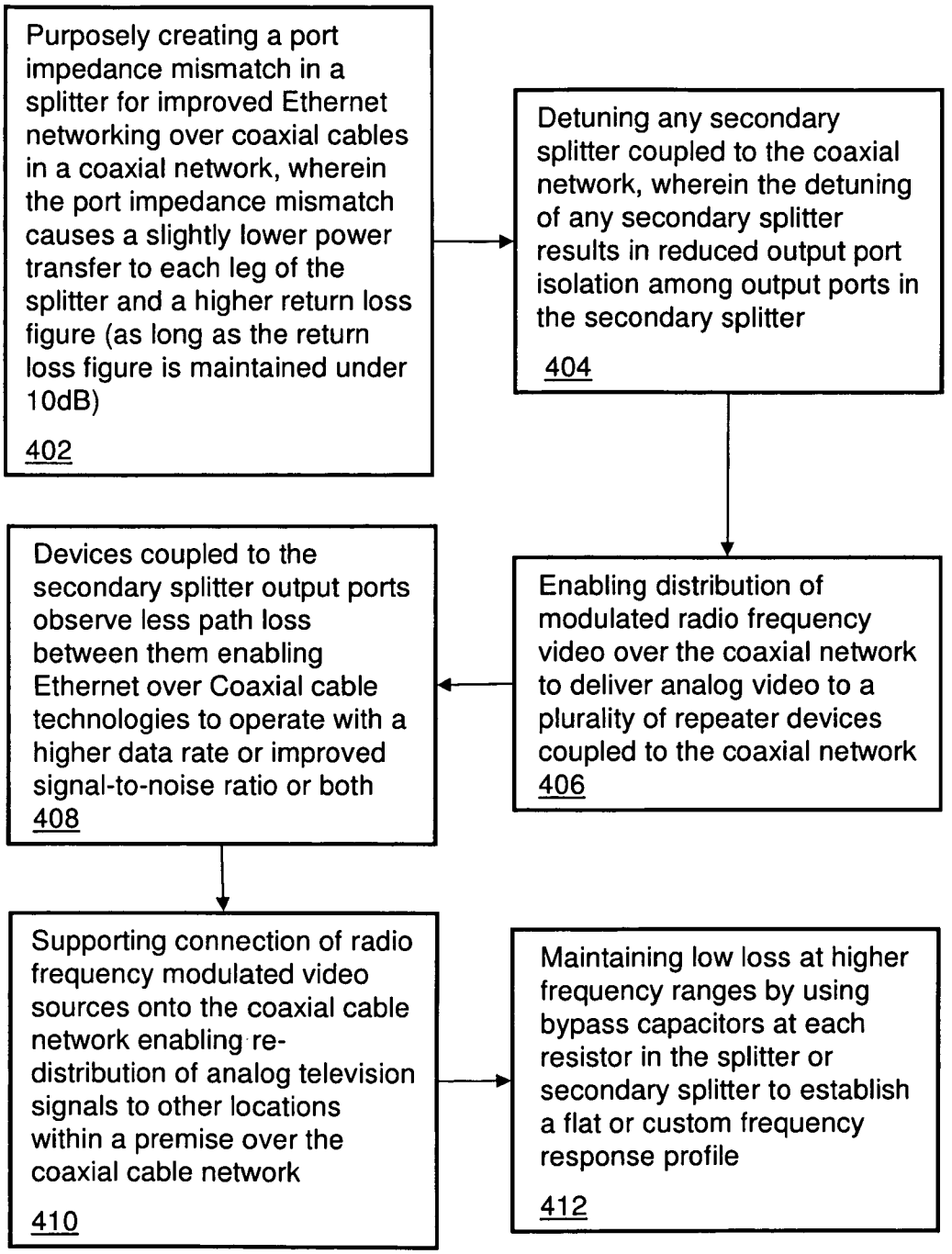
200

FIG. 2



300

FIG. 3


Purposely creating a port impedance mismatch in a splitter for improved Ethernet networking over coaxial cables in a coaxial network, wherein the port impedance mismatch causes a slightly lower power transfer to each leg of the splitter and a higher return loss figure (as long as the return loss figure is maintained under 10dB)
402
Detuning any secondary splitter coupled to the coaxial network, wherein the detuning of any secondary splitter results in reduced output port isolation among output ports in the secondary splitter
404
Enabling distribution of modulated radio frequency video over the coaxial network to deliver analog video to a plurality of repeater devices coupled to the coaxial network
406
Devices coupled to the secondary splitter output ports observe less path loss between them enabling Ethernet over Coaxial cable technologies to operate with a higher data rate or improved signal-to-noise ratio or both
408
Supporting connection of radio frequency modulated video sources onto the coaxial cable network enabling re-distribution of analog television signals to other locations within a premise over the coaxial cable network
410
Maintaining low loss at higher frequency ranges by using bypass capacitors at each resistor in the splitter or secondary splitter to establish a flat or custom frequency response profile
412

400

FIG. 4

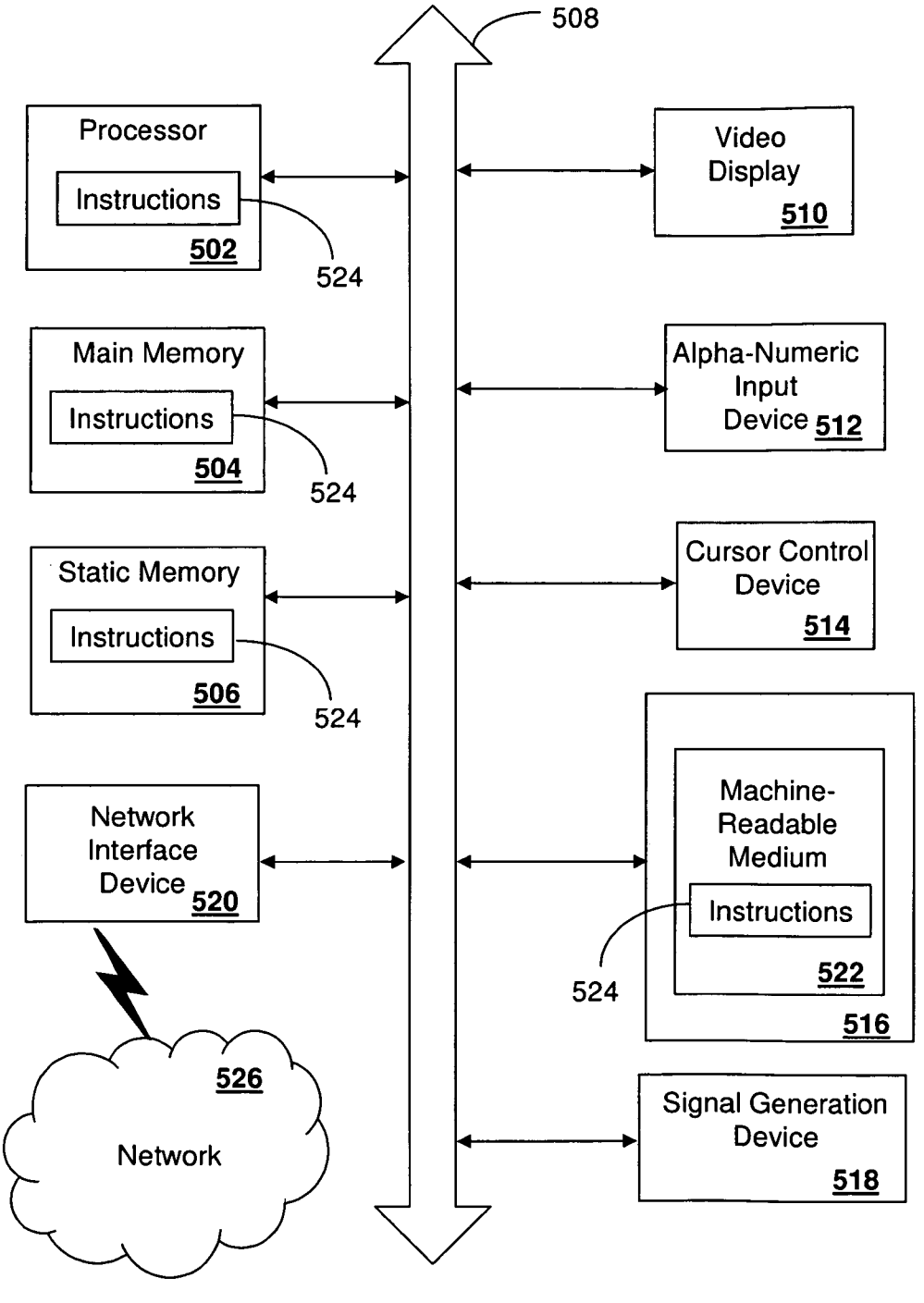
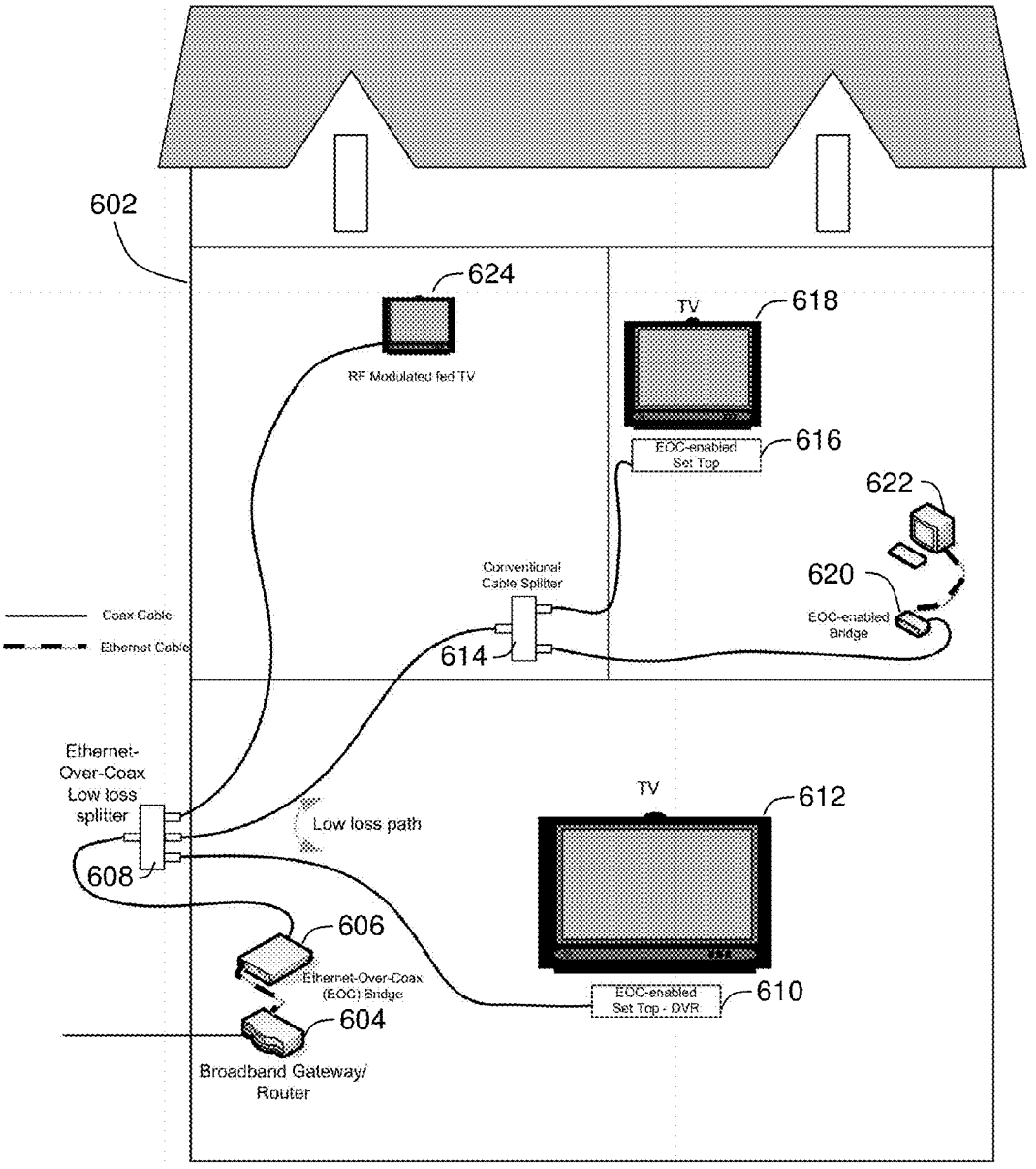

508
Processor
Instructions
502
524
Main Memory
Instructions
504
524
Static Memory
Instructions
506
524
Network Interface Device 520
526
Network
Video Display 510
Alpha-Numeric Input Device 512
Cursor Control Device 514
Machine-Readable Medium
Instructions
522
524
516
Signal Generation Device 518
500

FIG. 5


602
624
RF Modulated fed TV
TV
618
EOC-enabled Set Top
616
622
620
EOC-enabled Bridge
Conventional Cable Splitter
614
Coax Cable
Ethernet Cable
Ethernet-Over-Coax Low loss splitter
608
Low loss path
TV
612
606
Ethernet-Over-Coax (EOC) Bridge
EOC-enabled Set Top - DVR
610
604
Broadband Gateway/ Router

600

FIG. 6

ETHERNET OVER COAXIAL COUPLING SYSTEM, METHOD AND APPARATUS

FIELD OF THE DISCLOSURE

The present disclosure relates generally to coupling devices and more specifically to support an Ethernet-Over-Coax (EOC) technology coupling system, method, and device.

BACKGROUND

Coaxial splitters were implemented by cable companies as a means of providing analog cable signals to multiple television units within a home. However, due to imperfections in a cable plant or intermediate network elements, analog signals can "reflect" from one coaxial path back onto an adjacent path causing "Ghost TV images." Because of the ghost image problem, splitter designs have evolved to incorporate a high signal isolation between their output ports to suppress the signal reflections (and ghost images).

The evolution of Internet Protocol (IP) networking technologies today makes it possible to deliver video (as well as voice and data) over these new networks, leveraging also the ability to map packet-based data onto a variety of Ethernet over Coax (EOC) network technologies (e.g., Home Phone-Line Network Assn., or HPNA; Multimedia over Coax Assn., or MoCA, or other similar competing solutions that permit the use of existing coax to deliver IP-network data throughout the home without rewiring). Unfortunately, use of the traditional Cable-TV splitter devices as part of EOC networks can severely impair achievable data rates between devices attached to the output ports because of the high design isolation of the legacy home network design that utilizes high isolation splitters.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** depicts an illustrative embodiment of a communication system;

FIG. **2** depicts an illustrative embodiment of a portal interacting with the communication system of FIG. **1**;

FIG. **3** depicts an illustrative embodiment of a communication device utilized in the communication system of FIG. **1**;

FIG. **4** depicts an illustrative embodiment of a method operating in portions of the communication system of FIG. **1**;

FIG. **5** is a diagrammatic representation of a machine in the form of a computer system within which a set of instructions, when executed, may cause the machine to perform any one or more of the methodologies discussed herein; and

FIG. **6** is an illustration of a system using a splitter having a port impedance mismatch for Ethernet networking over coaxial cables in accordance with the embodiments herein.

DETAILED DESCRIPTION

One embodiment of the present disclosure can entail a method involving setting a port impedance mismatch in a splitter for Ethernet networking over coaxial cables in a home coaxial network, detuning any secondary splitter coupled to the home coaxial network, and enabling distribution of modulated radio frequency video over the home coaxial network to deliver analog video to a plurality of repeater devices coupled to the home coaxial network.

Another embodiment of the present disclosure can entail a computer-readable storage medium having computer instructions for creating a port impedance mismatch in a splitter operating in a home coaxial network resulting in the detuning of a secondary splitter coupled to the home coaxial network, detuning a secondary splitter coupled to the coaxial network, and enabling distribution of modulated video over the home coaxial network to deliver analog video to a plurality of repeater devices coupled to the home coaxial network.

Yet another embodiment of the present disclosure can entail a device having a controller to provide low loss connectivity to a plurality of coaxial ports over a broadband range of frequencies in a coaxial network providing Ethernet networking, detune secondary coaxial splitters in the coaxial network that reduces an output-to-output isolation loss among secondary coaxial splitter output ports, and enable re-distribution of modulated radio frequency video signals from a point on the coaxial network to any alternative point on the coaxial network.

Yet another embodiment of the present disclosure can entail a device having a splitter providing low loss connectivity to a plurality of coaxial ports over a range of frequencies in a coaxial network by having a port impedance mismatch that causes a lower power transfer to each leg of the splitter and a higher return loss relative to an impedance matched splitter. The splitter can be constructed to detune a secondary coaxial splitter when coupled in an Ethernet over coaxial network and constructed to reduce an output-to-output isolation loss among secondary coaxial splitter output ports when coupled in the Ethernet over coaxial network.

FIG. **1** depicts an illustrative embodiment of a first communication system **100** for delivering media content. The communication system **100** can represent an Internet Protocol Television (IPTV) broadcast media system. The IPTV media system can include a super head-end office (SHO) **110** with at least one super headend office server (SHS) **111** which receives media content from satellite and/or terrestrial communication systems. In the present context, media content can represent audio content, moving image content such as videos, still image content, or combinations thereof. The SHS server **111** can forward packets associated with the media content to video head-end servers (VHS) **114** via a network of video head-end offices (VHO) **112** according to a common multicast communication protocol.

The VHS **114** can distribute multimedia broadcast programs via an access network **118** to commercial and/or residential buildings **102** housing a gateway **104** (such as a common residential or commercial gateway). The access network **118** can represent a group of digital subscriber line access multiplexers (DSLAMs) located in a central office or a service area interface that provide broadband services over optical links or copper twisted pairs **119** to buildings **102**. The gateway **104** can use common communication technology to distribute IP-based media signals to media processors **106** such as Set-Top Boxes (STBs) using an EOC technology which in turn present broadcast channels to media devices **108** such as computers or television sets managed in some instances by a media controller **107** (such as an infrared or RF remote control).

The gateway **104**, the media processors **106**, and media devices **108** can utilize tethered interface technologies (such as coaxial or phone line wiring) or can operate over a common wireless access protocol. With these interfaces, unicast or multicast IP communications can be invoked between the media processors **106** and subsystems of the IPTV media system for services such as video-on-demand (VoD), browsing an electronic programming guide (EPG), or other infrastructure services.

Some of the network elements of the IPTV media system can be coupled to one or more computing devices **130** a

portion of which can operate as a web server for providing portal services over an Internet Service Provider (ISP) network **132** to wireline media devices **108** or wireless communication devices **116** directly or indirectly by way of a wireless access base station **117** operating according to common wireless access protocols such as Wireless Fidelity (WiFi), or cellular communication technologies (such as GSM, CDMA, UMTS, WiMAX, Software Defined Radio or SDR, and so on).

It will be appreciated by an artisan of ordinary skill in the art that a satellite broadcast television system can be used in place of the IPTV media system. In this embodiment, signals transmitted by a satellite **115** supplying media content can be intercepted by a common satellite dish receiver **131** coupled to the building **102**. Modulated signals intercepted by the satellite dish receiver **131** can be submitted to the digital media processors **106** for generating broadcast channels which can be presented at the media devices **108**. The media processors **106** can be equipped with a broadband port to the ISP network **132** to enable infrastructure services such as VoD and EPG described above.

In yet another embodiment, an analog or digital broadcast distribution system such as cable TV system **133** can be used in place of the IPTV media system described above. In this embodiment the cable TV system **133** can provide Internet, telephony, and interactive media services under conditions where the ECO technology and cable or satellite service frequency use does not overlap.

It follows from the above illustrations that the present disclosure can apply to any present or future interactive media content services.

FIG. **2** depicts an illustrative embodiment of a portal **202** which can operate from the computing devices **130** described earlier of communication **100** illustrated in FIG. **1**. The portal **202** can be used for managing services of communication systems **100-200**. The portal **202** can be accessed by a Uniform Resource Locator (URL) with a common Internet browser such as Microsoft's Internet Explorer™ using an Internet-capable communication device such as those described for FIGS. **1-2**. The portal **202** can be configured, for example, to access a media processor **106** and services managed thereby such as a Digital Video Recorder (DVR), a VoD catalog, an EPG, a personal catalog (such as personal videos, pictures, audio recordings, etc.) stored in the media processor, provisioning IMS services described earlier, provisioning Internet services, provisioning cellular phone services, and so on.

FIG. **3** depicts an exemplary embodiment of a communication device **300**. Communication **300** can serve in whole or in part as an illustrative embodiment of the communication devices of FIGS. **1-2**. The communication device **300** can comprise a wireline and/or wireless transceiver **302** (herein transceiver **302**), a user interface (UI) **304**, a power supply **314**, a location receiver **316**, and a controller **306** for managing operations thereof. The transceiver **302** can support short-range or long-range wireless access technologies such as Bluetooth, WiFi, Digital Enhanced Cordless Telecommunications (DECT), or cellular communication technologies, just to mention a few. Cellular technologies can include, for example, CDMA-1X, UMTS/HSDPA, GSM/GPRS, TDMA/EDGE, EV/DO, WiMAX, SDR, and next generation cellular wireless communication technologies as they arise. The transceiver **402** can also be adapted to support circuit-switched wireline access technologies (such as PSTN), packet-switched wireline access technologies (such as TCPIP, VoIP, etc.), and combinations thereof.

The UI **304** can include a depressible or touch-sensitive keypad **308** with a navigation mechanism such as a roller ball, joystick, mouse, or navigation disk for manipulating operations of the communication device **300**. The keypad **308** can be an integral part of a housing assembly of the communication device **300** or an independent device operably coupled thereto by a tethered wireline interface (such as a USB cable) or a wireless interface supporting for example Bluetooth. The keypad **308** can represent a numeric dialing keypad commonly used by phones, and/or a Qwerty keypad with alphanumeric keys. The UI **304** can further include a display **310** such as monochrome or color LCD (Liquid Crystal Display), OLED (Organic Light Emitting Diode) or other suitable display technology for conveying images to an end user of the communication device **300**. In an embodiment where the display **310** is touch-sensitive, a portion or all of the keypad **308** can be presented by way of the display.

The UI **304** can also include an audio system **312** that utilizes common audio technology for conveying low volume audio (such as audio heard only in the proximity of a human ear) and high volume audio (such as speakerphone for hands free operation). The audio system **312** can further include a microphone for receiving audible signals of an end user. The UI **304** can further include an image sensor **313** such as a charged coupled device (CCD) camera for capturing still or moving images.

The power supply **314** can utilize common power management technologies such as replaceable and rechargeable batteries, supply regulation technologies, and charging system technologies for supplying energy to the components of the communication device **300** to facilitate long-range or short-range portable applications. The location receiver **316** can utilize common location technology such as a global positioning system (GPS) receiver for identifying a location of the communication device **100** based on signals generated by a constellation of GPS satellites, thereby facilitating common location services such as navigation. The controller **306** can utilize computing technologies such as a microprocessor, a digital signal processor (DSP), and/or a video processor with associated storage memory such a Flash, ROM, RAM, SRAM, DRAM or other storage technologies.

The communication device **300** can be adapted to perform the functions of the media processor **106**, the media devices **108**, or the portable communication devices **116** of FIG. **1**. It will be appreciated that the communication device **300** can also represent other common devices that can operate in communication systems **100** of FIG. **1** such as a gaming console and a media player.

FIG. **4** depicts an illustrative method **400** that operates in portions of the communication system of FIG. **1**. Method **400** can begin with step **402** in which the method purposely creates a port impedance mismatch in a splitter for improved Ethernet networking over coaxial cables in a coaxial network such as a home coaxial network or a coaxial network in an office setting. The port impedance mismatch causes a slightly lower power transfer to each leg of the splitter and a higher return loss figure. The return loss figure generally should be under a 10 dB loss. The method **400** at **404** can detune any secondary splitter coupled to the coaxial network where the detuning of any secondary splitter results in a reduced output port isolation among output ports in the secondary splitter. Note that the secondary splitters are assumed to be impedance matched to a coaxial cable at 75 Ohms for example and an input to the splitter can be an IPTV or iTV input signal. At **406**, the method can enable distribution of modulated radio

frequency (RF) video over the home coaxial network to deliver analog video to a plurality of repeater devices coupled to the home coaxial network.

Devices coupled to the secondary splitter output ports observe less path loss between them enabling Ethernet over Coaxial cable technologies to operate with a higher data rate or improved signal-to-noise ratio or both at **408**. Note that the splitter can minimize splitter losses in all directions while enable operations over the coaxial cable at frequencies up to 1 Gigahertz or higher. At **410**, the splitter can support connection of radio frequency modulated video sources onto the coaxial cable network enabling re-distribution of analog television signals to other locations within a home over the coaxial cable network. The method **400** maintains low loss at higher frequency ranges by using bypass capacitors at each resistor in the splitter or secondary splitter to establish a flat or custom frequency response profile at **412**.

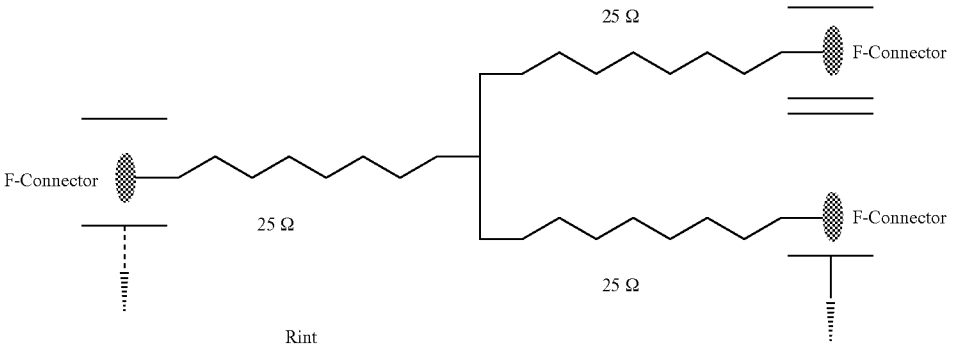
Upon reviewing the aforementioned embodiments, it would be evident to an artisan with ordinary skill in the art that said embodiments can be modified, reduced, or enhanced without departing from the scope and spirit of the claims described below. For example, the network is not limited to a home coaxial network, but can be configured for use in office or building scenarios and multi-dwelling units.

The embodiments herein further include a new coaxial splitter design that will serve not only to minimize the point-to-point loss that affects all existing EOC technologies, but also enables devices using these technologies to communicate in all directions with minimal loss, to detune any secondary splitter that may be hidden in the wall or attic or elsewhere, and also permit the distribution of modulated RF video on the coax network to deliver analog video to video repeater devices (2 or more secondary televisions) throughout the home, dwelling or building. This device performs all three of these functions simultaneously once installed at the "Main Home Splitter" location.

An impedance-matching purely resistive splitter is typically designed based on the following formula:

$$R_{int} = \frac{Z(N-2)}{N}$$

where Z=Load Impedance (e.g., 75 ohms), and N=Total # of splitter ports However, a purely resistive splitter which looks like the following schematically:



These equations and schematics may be expanded to accommodate many additional port configurations (e.g., 1:3, 1:4, 1:5, 1:6, etc.). Note however that the above example assumed all terminations are impedance matched to the coax (in this case RG-59 or RG-6 is at 75 ohms).

By purposely designing the splitter to represent a port impedance of either higher or lower than 75 ohms (predetermined impedance match), the net effect is a slightly less power transfer to each leg of the splitter, at the expense of somewhat higher than desired return loss figure. However, the port mismatch this creates propagates through the coax to an embedded splitter which results in a mismatch at its input port. As a result, the internal circuitry of a secondary conventional splitter is 'detuned' from its design optimum, resulting in reduced output port isolation in the output ports of the secondary splitter(s). Devices attached to the secondary splitter outputs thereby observe less path loss between them, making EOC technologies operate with higher rate or improved signal to noise ratios (or both). This effect works extremely well as long as return loss figures are not allowed to get completely out of hand (e.g., <10 dB).

The splitter device can be designed to minimize splitter losses in all directions, and also at frequencies up to approximately 1 GHz (or higher) in order to support connection of RF modulated video sources onto the coax plant in a way that permits re-distribution of the analog TV signal to other location is a premise (whether a home, office, or other structure). Maintaining low loss at higher frequency may be achieved using bypass capacitors at each resistor to establish a flat or custom frequency response profile. Current test units have demonstrated support for EOC and RF signals up to 1.5 GHz. Since most RF modulators provide output signal levels of +15 to +23 dBmV, and television receivers expect to have signal levels of at least −8 dBmV, the loss budget for the new splitter is between 23 and 31 dB for good quality video distribution. The splitter in accordance with the embodiments herein can exhibit even in a 1:6 configuration, losses in the 14 dB range in a worst case scenario. This relatively low loss easily permits RF distribution even in quite large homes or buildings.

Other suitable modifications can be applied to the present disclosure without departing from the scope of the claims below. Accordingly, the reader is directed to the claims section for a fuller understanding of the breadth and scope of the present disclosure.

FIG. **5** depicts an exemplary diagrammatic representation of a machine in the form of a computer system **500** within which a set of instructions, when executed, may cause the machine to perform any one or more of the methodologies discussed above. In some embodiments, the machine operates as a standalone device. In some embodiments, the machine may be connected (e.g., using a network) to other machines. In a networked deployment, the machine may

operate in the capacity of a server or a client user machine in server-client user network environment, or as a peer machine in a peer-to-peer (or distributed) network environment.

The machine may comprise a server computer, a client user computer, a personal computer (PC), a tablet PC, a laptop computer, a desktop computer, a control system, a network router, switch or bridge, or any machine capable of executing a set of instructions (sequential or otherwise) that specify actions to be taken by that machine. It will be understood that a device of the present disclosure includes broadly any electronic device that provides voice, video or data communication. Further, while a single machine is illustrated, the term "machine" shall also be taken to include any collection of machines that individually or jointly execute a set (or multiple sets) of instructions to perform any one or more of the methodologies discussed herein.

The computer system **500** may include a processor **502** (e.g., a central processing unit (CPU), a graphics processing unit (GPU, or both), a main memory **504** and a static memory **506**, which communicate with each other via a bus **508**. The computer system **500** may further include a video display unit **510** (e.g., a liquid crystal display (LCD), a flat panel, a solid state display, or a cathode ray tube (CRT)). The computer system **500** may include an input device **512** (e.g., a keyboard), a cursor control device **514** (e.g., a mouse), a disk drive unit **516**, a signal generation device **518** (e.g., a speaker or remote control) and a network interface device **520**.

The disk drive unit **516** may include a machine-readable medium **522** on which is stored one or more sets of instructions (e.g., software **524**) embodying any one or more of the methodologies or functions described herein, including those methods illustrated above. The instructions **524** may also reside, completely or at least partially, within the main memory **504**, the static memory **506**, and/or within the processor **502** during execution thereof by the computer system **500**. The main memory **504** and the processor **502** also may constitute machine-readable media.

Dedicated hardware implementations including, but not limited to, application specific integrated circuits, programmable logic arrays and other hardware devices can likewise be constructed to implement the methods described herein. Applications that may include the apparatus and systems of various embodiments broadly include a variety of electronic and computer systems. Some embodiments implement functions in two or more specific interconnected hardware modules or devices with related control and data signals communicated between and through the modules, or as portions of an application-specific integrated circuit. Thus, the example system is applicable to software, firmware, and hardware implementations.

In accordance with various embodiments of the present disclosure, the methods described herein are intended for operation as software programs running on a computer processor. Furthermore, software implementations can include, but not limited to, distributed processing or component/object distributed processing, parallel processing, or virtual machine processing can also be constructed to implement the methods described herein.

The present disclosure contemplates a machine readable medium containing instructions **524**, or that which receives and executes instructions **524** from a propagated signal so that a device connected to a network environment **526** can send or receive voice, video or data, and to communicate over the network **526** using the instructions **524**. The instructions **524** may further be transmitted or received over a network **526** via the network interface device **520**.

While the machine-readable medium **522** is shown in an example embodiment to be a single medium, the term "machine-readable medium" should be taken to include a single medium or multiple media (e.g., a centralized or distributed database, and/or associated caches and servers) that store the one or more sets of instructions. The term "machine-readable medium" shall also be taken to include any medium that is capable of storing, encoding or carrying a set of instructions for execution by the machine and that cause the machine to perform any one or more of the methodologies of the present disclosure.

FIG. **6** depicts an exemplary diagrammatic representation of a system **600** in a premise **602** such as a home or office where the new coaxial splitter design as contemplated herein in the form of splitter **608** can serve not only to minimize the point-to-point loss that affects all existing EOC technologies, but also enables devices using these technologies to communicate in all directions with minimal loss, to detune any secondary splitter such as secondary splitter **614** that may be hidden in the wall or attic or elsewhere, and also permit the distribution of modulated RF video on the coax network to deliver analog video to video repeater devices (2 or more secondary televisions such as TV **624**) throughout the home, dwelling or building.

As illustrated, the system **600** can include a broadband gateway or router **604** coupled to an EOC bridge **606** over an Ethernet cable. The bridge **606** feeds a signal to the EOC low loss splitter **608** as contemplated in the embodiments herein. The splitter **608** can have low loss paths in multiple directions including a path to an EOC-enabled set top box (STB) or digital video recorder **610** that is coupled to TV **612** or a path to the secondary splitter **614**. Since the secondary splitter **614** is detuned as discussed above, other EOC-enabled devices (such as EOC-enabled STB **616** and EOC-enabled Bridge **620** and their respective presentation devices **618** and **622**) will operate without significant or perceptible detriment to the end user.

The term "machine-readable medium" shall accordingly be taken to include, but not be limited to: solid-state memories such as a memory card or other package that houses one or more read-only (non-volatile) memories, random access memories, or other re-writable (volatile) memories; magneto-optical or optical medium such as a disk or tape; and/or a digital file attachment to e-mail or other self-contained information archive or set of archives is considered a distribution medium equivalent to a tangible storage medium. Accordingly, the disclosure is considered to include any one or more of a machine-readable medium or a distribution medium, as listed herein and including art-recognized equivalents and successor media, in which the software implementations herein are stored.

Although the present specification describes components and functions implemented in the embodiments with reference to particular standards and protocols, the disclosure is not limited to such standards and protocols. Each of the standards for Internet and other packet switched network transmission (e.g., TCP/IP, UDP/IP, HTML, HTTP) represent examples of the state of the art. Such standards are periodically superseded by faster or more efficient equivalents having essentially the same functions. Accordingly, replacement standards and protocols having the same functions are considered equivalents.

The illustrations of embodiments described herein are intended to provide a general understanding of the structure of various embodiments, and they are not intended to serve as a complete description of all the elements and features of apparatus and systems that might make use of the structures

described herein. Many other embodiments will be apparent to those of skill in the art upon reviewing the above description. Other embodiments may be utilized and derived therefrom, such that structural and logical substitutions and changes may be made without departing from the scope of this disclosure. Figures are also merely representational and may not be drawn to scale. Certain proportions thereof may be exaggerated, while others may be minimized. Accordingly, the specification and drawings are to be regarded in an illustrative rather than a restrictive sense.

Such embodiments of the inventive subject matter may be referred to herein, individually and/or collectively, by the term "invention" merely for convenience and without intending to voluntarily limit the scope of this application to any single invention or inventive concept if more than one is in fact disclosed. Thus, although specific embodiments have been illustrated and described herein, it should be appreciated that any arrangement calculated to achieve the same purpose may be substituted for the specific embodiments shown. This disclosure is intended to cover any and all adaptations or variations of various embodiments. Combinations of the above embodiments, and other embodiments not specifically described herein, will be apparent to those of skill in the art upon reviewing the above description.

The Abstract of the Disclosure is provided to comply with 37 C.F.R. §1.72(b), requiring an abstract that will allow the reader to quickly ascertain the nature of the technical disclosure. It is submitted with the understanding that it will not be used to interpret or limit the scope or meaning of the claims. In addition, in the foregoing Detailed Description, it can be seen that various features are grouped together in a single embodiment for the purpose of streamlining the disclosure. This method of disclosure is not to be interpreted as reflecting an intention that the claimed embodiments require more features than are expressly recited in each claim. Rather, as the following claims reflect, inventive subject matter lies in less than all features of a single disclosed embodiment. Thus the following claims are hereby incorporated into the Detailed Description, with each claim standing on its own as a separately claimed subject matter.

What is claimed is:

1. A method, comprising:

setting an output port of a primary splitter to a first impedance to cause a mismatch with a second impedance of an input port of a secondary splitter and to cause an increased return loss and a reduced output port isolation, wherein the primary splitter is coupled to the secondary splitter by way of coaxial cables in a home coaxial network;

detuning the secondary splitter coupled to the home coaxial network responsive to the mismatch thereby causing a reduction in a signal isolation between first and second output ports of the secondary splitter;

bypassing via a capacitor each resistor of a plurality of resistors in the primary splitter and in the secondary splitter to establish at least one of a flat profile, a custom profile, or a combination thereof; and

distributing from the primary splitter Ethernet signals over the home coaxial network to devices coupled to the home coaxial network by way of the first and second output ports of the secondary splitter.

2. The method of claim **1**, wherein the secondary splitter is impedance matched to a coaxial cable.

3. The method of claim **2**, wherein the secondary splitter is impedance matched to a coaxial cable at 75 Ohms and the primary splitter receives as an input a media signal distributed as Ethernet signals over the home coaxial network.

4. The method of claim **1**, wherein the mismatch causes a reduction in power transfer from an input port of the primary splitter to the output port of the primary splitter and an increase in return loss figure relative to the second impedance of the input port of the secondary splitter.

5. The method of claim **4**, wherein the return loss figure is maintained under 10 dB.

6. The method of claim **1**, wherein devices coupled to the secondary splitter first and second output ports observe less path loss between them enabling Ethernet over Coaxial cable technologies to operate with a higher data rate, improving signal-to-noise ratios, or both.

7. The method of claim **1**, wherein the primary splitter reduces splitter losses in all directions while enabling operations over the home coaxial network at frequencies up to 2 Giga-Hertz.

8. The method of claim **7**, wherein the primary splitter supports connection of radio frequency modulated video sources onto the home coaxial network enabling re-distribution of analog television signals to other locations within a home over the home coaxial network.

9. A non-transitory computer-readable storage medium, comprising computer instructions which, when executed by at least one processor, cause the at least one processor to perform operations for:

setting an output port impedance of a primary splitter to a first impedance to cause a mismatch with a second impedance of an input port of a secondary splitter and to cause an increased return loss and a reduced output port isolation, wherein the primary splitter is coupled to the secondary splitter by way of a home coaxial network, and wherein the mismatch causes a reduction in signal isolation between first and second output ports of the secondary splitter;

bypassing via a capacitor each resistor of a plurality of resistors in the primary splitter and in the secondary splitter; and

enabling from the primary splitter distribution of Ethernet signals to devices coupled to the home coaxial network by way of first and second output ports of the secondary splitter, wherein signal to noise ratios of the Ethernet signals distributed from the first and second output ports of the secondary splitter are improved responsive to the reduction in signal isolation between first and second output ports.

10. A method, comprising:

causing output ports of a primary splitter to have an impedance mismatch with a plurality of coaxial input ports of secondary splitters over a broadband range of frequencies in a coaxial network providing Ethernet networking and causing an increased return loss and a reduced output port isolation;

detuning secondary splitters in the coaxial network responsive to the impedance mismatch thereby reducing an output-to-output isolation loss among output ports of the secondary splitters;

bypassing via a capacitor each resistor of a plurality of resistors in the primary splitter and in the secondary splitter; and

distributing Ethernet signals from the output ports of the secondary splitters responsive to the detuning of the secondary splitters.

11. The method of claim **10**, wherein the broadband range of frequencies is from D.C. to 2 Giga-Hertz, and wherein the coaxial input ports of the secondary splitters are matched to a coaxial cable at 75 Ohms.

12. The method of claim 10, wherein the mismatch causes a lower power transfer from an input port of the primary splitter to the output ports of the primary splitter and a higher return loss figure.

13. The method of claim 12, wherein the primary splitter supports transmission of radio frequency modulated video sources onto the coaxial cable network enabling re-distribution of analog television signals to other locations within a home over the coaxial cable network.

14. The method of claim 10, wherein devices coupled to the output ports of the secondary splitters observe less path loss between them enabling Ethernet over Coaxial cable technologies to operate with a higher data rate or improved signal-to-noise ratio or both as long as the return loss figure is maintained under 10 dB.

15. A device, comprising:

a primary splitter comprising:

an output impedance that is mismatch with an input impedance of an input port of a secondary splitter to cause an increased return loss and a reduced output port isolation; and

a plurality of capacitors each bypassing each resistor of a plurality of resistors of primary splitter, wherein the mismatch causes a lower power transfer from an input port of the primary splitter to an output port of the primary splitter and a higher return loss figure relative to the input impedance of the secondary splitter, wherein the primary splitter is constructed to have an impedance mismatch with the secondary splitter to cause a detuning of the secondary splitter to reduce an output-to-output isolation loss among first and second output ports of the secondary splitter when coupled in an Ethernet over coaxial network.

16. The device of claim 15, wherein the primary splitter enables re-distribution of modulated radio frequency video signals from any point on the coaxial network to any alternative point on the coaxial network.

17. The device of claim 15, wherein devices coupled to the first and second output ports of the secondary splitter observe less path loss between them enabling Ethernet over Coaxial cable technologies to operate with a higher data rate or improved signal-to-noise ratio or both.

18. The device of claim 15, wherein the primary splitter supports transmission of radio frequency modulated video sources onto the coaxial network enabling re-distribution of analog television signals to other locations within a home over the coaxial network.

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