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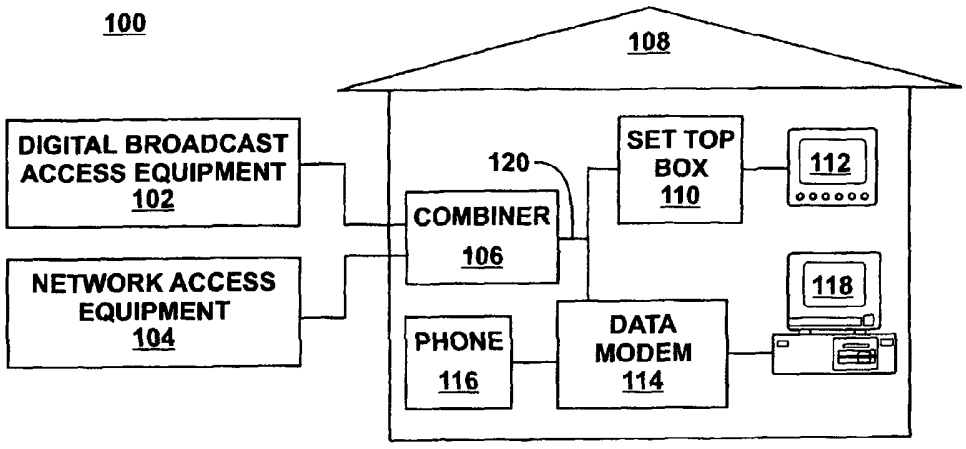
(54) Title: SYSTEM AND METHOD FOR PROVIDING DIGITAL NETWORK ACCESS AND DIGITAL BROADCAST SERVICES USING COMBINED CHANNELS ON A SINGLE PHYSICAL MEDIUM TO THE CUSTOMER PREMISES



114 MODEM DE DONNEES
110 BOITIER DECODEUR
116 TELEPHONE
106 MULTIPLEXEUR
102 EQUIPEMENT D'ACCES A HAUT DEBIT NUMERIQUE
104 EQUIPEMENT D'ACCES AU RESEAU

(57) Abstract: The disclosure is directed to customer premises equipment including a network access port configured to receive broadband digital network data from broadband wireless network access equipment, a broadcast access port configured to receive digital satellite broadcast data, and a unified access port configured to provide the broadband digital network data and the digital broadcast data via a coaxial cable.

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SYSTEM AND METHOD FOR PROVIDING DIGITAL NETWORK ACCESS AND DIGITAL BROADCAST SERVICES USING COMBINED CHANNELS ON A SINGLE PHYSICAL MEDIUM TO THE CUSTOMER PREMISES

FIELD OF THE DISCLOSURE

This disclosure, in general, relates to systems and methods for providing digital network access and digital broadcast services.

BACKGROUND

Increasingly, consumers are demanding high quality entertainment services and broadband network access. Consumers are turning to satellite television and cable television for digital broadcast entertainment and are seeking broadband network access, such as through cable modem service or digital subscriber line service. In addition, companies are offering telephone service through digital networks, such as voice-over Internet protocol (VoIP) phones and services.

Cable companies have taken advantage of bandwidth capabilities provided by coaxial cable. As a result, cable companies provide combined services including digital cable television and broadband network access. In addition, cable companies are offering voice-over IP (VoIP) telephone service. As such, cable companies are developing capabilities to provide all three consumer services including television, broadband network access, and telephone services.

As a result, the market has provided a considerable number of devices for broadband network access via coaxial cable. For example, data over cable service interface specification (DOCSIS) modems are available for accessing broadband networks. In addition, televisions and set top boxes are configured to interface with coaxial cable and include cable ready tuners.

Other players in the market have difficulty providing the combination of three services including television, broadband network access, and telephone service. It is difficult for traditional plain old telephone service (POTS) companies to provide broadcast television services via a twisted pair interface to consumers. In addition, it is difficult for Satellite television companies to provide high-speed data network access and telephone service via satellite broadcast systems. As such, an improved system and method for providing combined network access and broadcast services would be desirable.

BRIEF DESCRIPTION OF THE DRAWINGS

FIGS. 1 and 2 are block diagrams illustrating exemplary systems for providing network access and digital broadcast services.

FIG. 3 is a block diagram illustrating an exemplary embodiment of a combination unit for providing services.

FIGS. 4 and 5 are flow diagrams illustrating exemplary methods for use of the network access and digital broadcast combination unit for providing service.

DETAILED DESCRIPTION OF THE DRAWINGS

In a particular embodiment, the disclosure is directed to a system and method for combining digital network access and digital broadcast service. The system includes a services combination unit that has a digital network access port and a digital broadcast services access port. The digital network access port is configured to receive digital network data and the digital broadcast services port is configured to receive digital broadcast data. The services combination unit also includes a combined data access port that is configured to provide the digital network access data and the digital broadcast data. In addition, the combined access port may be configured to receive additional digital network data and the services combination unit may provide the additional digital network data via the digital network access port.

In one exemplary embodiment, the disclosure is directed to customer premises equipment including a network access port configured to receive broadband digital network data from broadband wireless network access equipment, a broadcast access port configured to receive digital satellite broadcast data, and a unified access port configured to provide the broadband digital network data and the digital broadcast data via a coaxial cable.

In another exemplary embodiment, the disclosure is directed to a customer premises system including digital broadcast access equipment located at a customer premises and configured to receive digital broadcast data. The customer premises system also includes data network access equipment located at the customer premises and configured to receive digital network data. The customer premises system further includes a combination unit located at the customer premises and including a network access port configured to receive the digital network data from the network access equipment, a broadcast access port configured to receive the digital broadcast data from the digital broadcast equipment and a unified access port configured to provide the digital network data and the digital broadcast data over a unified link to customer premises equipment.

In a further exemplary embodiment, the disclosure is directed to a method of providing network-based service and digital broadcast service. The method includes receiving digital network data at a customer premises combiner unit via a network access port of the customer premises combiner unit, receiving digital broadcast data at the customer premises combiner unit via a broadcast access port of the customer premises combiner unit, and providing the digital network data and the digital broadcast data via a unified access port of the customer premises combiner unit.

In another exemplary embodiment, the disclosure is directed to a method of providing network-based service and digital broadcast service. The method includes providing a combination unit to be located at a customer premises, providing digital broadcast service via a data line coupled to the combination unit, and providing network access service via the data line coupled to the combination unit.

In a further exemplary embodiment, the disclosure is directed to a method of providing data network access and digital broadcast services. The method includes coupling satellite dish equipment to a broadcast access port of a combination unit located at a customer premises, coupling data network access equipment to a network access port of the combination unit located at a customer premises, and coupling a receiving device to a combined access port of the combination unit located at a customer premises.

FIG. 1 illustrates an exemplary system for combining digital broadcast services and network access services. The system 100 includes digital broadcast access equipment 102 and network access equipment 104. At a customer premises 108, a services combination unit 106 is coupled to the digital broadcast access equipment 102 and the network access equipment 104. The combiner 106 combines data received from the digital broadcast access equipment 102 and the network access equipment 104 into a combined access medium 120, such as a coaxial cable.

Equipment adapted to access the combined access medium 120 can access digital broadcast data received from the digital broadcast access equipment 102 and network data received from the network access equipment 104. For example, a set-top box 110 can access digital broadcast data and provide television signals to a television 112. In another example, a data modem 114, such as a data over cable service interface specification (DOCSIS) modem, can access the network data, such as Internet protocol (IP)-based data or VoIP data, from medium 120 and provide the network data to end devices, such as providing digital telephone service to a digital telephone 116 and Internet service to computer equipment 118.

In one exemplary embodiment, the digital broadcast access equipment 102 is configured to receive digital broadcast data broadcast as electromagnetic signals through the atmosphere, such as microwave equipment or satellite television broadcast equipment. For example, the digital broadcast access equipment 102 can include a satellite dish and low noise block converter (LNB) equipment. The digital broadcast access equipment 102 provides the digital broadcast data, such as video and audio data, to the services combination unit 106.

In another exemplary embodiment, the network access equipment 104 includes wired or wireless forms of network access equipment. For example, the network access equipment may include wired access, such as digital subscriber line (DSL) access. In another exemplary embodiment, the network access equipment 104 may provide wireless network access, such as fixed-point wireless access, ultra-broadband wireless access, WiMax (IEEE 802.16), WiFi (802.11), and WCDMA (3GPP). For example, the customer premises unit to interface with the network access equipment can include a fixed wireless access antenna and a modem.

The network access equipment provides network access data to the service combination unit 106 and can receive network data from the service combination unit 106.

FIG. 2 is a block diagram illustrating an exemplary embodiment of the system for providing combined network access and digital broadcast services. In this exemplary embodiment, a unified receiver unit 202 has a fixed-wireless access antenna 204 and a satellite dish 206. The unified receiver 202 includes a modem 208 and LNB equipment 210. The modem 208 and the LNB equipment 210 are each coupled to a services combination unit 212 that combines the signals from the modem 208 and the LNB 210 into a unified access medium 232, such as a coaxial cable. In one exemplary embodiment, the unified receiver 202 is located at the customer premises 214, such as at a customer home or apartment, within a neighborhood, or near an office building. The unified access medium 232 may be accessed using equipment, such as a set-top box 216 and a data modem 220.

In one particular embodiment, the unified access medium 232 includes a coaxial cable. As a result, equipment adapted to provide services based on coaxial cable interfaces can be used. For example, a set-top box 216 configured to interface with coaxial cable can receive digital broadcast data such as television, video and audio data, from the services combination unit 212 and the unified receiver 220. The set-top box 216 may provide video and audio signals to a representative television 218.

In another exemplary embodiment, the data modem 220, such as a DOCSIS modem, is configured to interface with coaxial cable. Network services may be accessed through the data modem 220, such as Internet service to personal computer 230 through Ethernet cable 235 or through wireless equipment 228, and voice-over IP (VoIP) service to IP-phone 222. In addition, an IAD (integrated services device) or a converter for voice signals 224 may be used to allow plain old telephone service (POTS) telephones 226 to access the network. In one particular embodiment, the wireless access equipment 228, such as BlueTooth® or WiFi equipment, may be used in conjunction with dual-mode portable telephones, such as GSM/WiFi telephones and GSM/BlueTooth® telephones, to provide portable telephones with local wireless access.

In one particular embodiment, the unified receiver 202 is located at a customer premises, such as a customer's home or apartment. For example, a satellite dish 206 and a fixed wireless access antenna 204 are attached to or located near a customer's home. The unified receiver 202 can be located on an outside wall of the customer's home as an attachment to the antennas 204 and 206 and be powered in-line through the access medium 232, which may be a coaxial cable.

FIG. 3 depicts an exemplary services combination unit 300. The services combination unit 300 includes a digital network access port 302 and a broadcast services port 304. The services combination unit 300 may function to combine data received via the network access port 302 and the digital broadcast services port 304 into a unified access port or combined data access port 306, such as a coaxial cable port. In one

exemplary embodiment, the broadcast services port 304 includes a coaxial cable port. In another exemplary embodiment, the digital network access port 302 includes an Ethernet port.

The services combination unit 300 may include a quadrature amplitude modulation (QAM) modulator 312 that accesses downlink data associated with the network access port 302 and a quadrature phase shift keying/quadrature amplitude modulation (QPSK/QAM) demodulator 310 that accesses uplink data received via the combined data access port 306 to provide the uplink data to the network access port 302. The QPSK/QAM demodulator 310 and the QAM modulator 312 may be connected to the network data access port 302 by interface 308 and may be connected to the combined data access port 306 via interface 314. In addition, the digital broadcast data port 304 may interface to the combined data access port 306 through interface 314.

In this exemplary embodiment, network data received through network access port 302 may be accessed by QAM modulator 312 through interface 308 and provided to the combined data access port 306 via the interface 314. A data modem or other network accessing equipment may access the network data and provide uplink data through the combined data port 306. The interface 314 allows the QPSK/QAM demodulator 310 to receive the uplink network data from the interface 314 and provide the user data to the network access port 302 via the interface 308. In addition, digital broadcast service data, such as television data, video data and audio data may be provided to the combined data port 306 through interface 314. A set-top box or cable-ready television system may access the combined data access port 306 and receive television signals.

FIG. 4 is a flow diagram illustrating an exemplary method 400 for using the network data and digital broadcast data services combination unit. The method 400 includes receiving digital network data from the network access equipment, as shown at step 402. Digital broadcast data is received from a digital broadcast receiver, as shown at step 404. The digital network data and the digital broadcast data are provided through a combined data line, as shown at step 406. For example, the digital network data and the digital broadcast data may be combined and provided via a coaxial cable.

In one particular embodiment, network equipment may access the digital network data and communicate additional digital network data through the combined data line. The services combination unit may receive the additional digital network data via the combined data line, as shown at step 408. The services combination unit may provide additional digital network data to the network access equipment, as shown at step 410.

FIG. 5 is a flow diagram illustrating an exemplary method 500 for providing combined data network access and broadcast services. The method 500 includes providing a services combination unit, as shown at step 502. For example, a subscriber to various broadcast entertainment, network access, or telephony services may be provided with a services combination unit or lease the services combination unit. Depending upon

the types of services to which a customer subscribes, a set of service equipment may be linked through the services combination unit and the services provided from a single combined data access port on the services combination unit. For example, a service provider may offer satellite television service that is linked through the services combination unit via a coaxial cable, as shown at step 504.

In another exemplary embodiment, a service provider may provide network access services through a services combination unit, as shown at step 506. For example, the network access service may include broadband data network access. In another example, the service provider may provide telephone service through the services combination unit, such as digital or IP-based phone service, as shown at step 508.

In one particular embodiment, a services combination unit may be used to provide voice, data and television service in a low population density area, such as a rural area. Wired cable access is expensive for low population density areas. Wireless service access using the services combination unit may permit use of coaxial cable based equipment in regions where wired cable access is prohibitively expensive.

The above-disclosed subject matter is to be considered illustrative, and not restrictive, and the appended claims are intended to cover all such modifications, enhancements, and other embodiments, which fall within the true scope of the present invention. Thus, to the maximum extent allowed by law, the scope of the present invention is to be determined by the broadest permissible interpretation of the following claims and their equivalents, and shall not be restricted or limited by the foregoing detailed description.

WHAT IS CLAIMED IS:

1. A customer premises equipment comprising:
a network access port configured to receive broadband digital network data from broadband wireless network access equipment;
a broadcast access port configured to receive digital satellite broadcast data; and
a unified access port configured to provide the broadband digital network data and the digital broadcast data via a coaxial cable.

2. The customer premises equipment of claim 1, further comprising the broadband wireless network access equipment connected to the network access port.

3. The customer premises equipment of claim 2, wherein the broadband wireless network access equipment includes fixed wireless access equipment.

4. The customer premises equipment of claim 1, further comprising a low noise block converter (LNB) receiver connected to the broadcast access port.

5. The customer premises equipment of claim 4, wherein the LNB receiver is configured to connect to a satellite dish.

6. The customer premises equipment of claim 1, wherein the broadband digital network data includes voice-over-IP (VoIP) data.

7. The customer premises equipment of claim 1, wherein the broadband digital network data includes an Internet protocol (IP)-based data.

8. A customer premises system comprising:

digital broadcast access equipment located at a customer premises and configured to receive digital broadcast data;

data network access equipment located at the customer premises and configured to receive digital network data; and

a combination unit located at the customer premises and including:

a network access port configured to receive the digital network data from the network access equipment;

a broadcast access port configured to receive the digital broadcast data from the digital broadcast equipment; and

a unified access port configured to provide the digital network data and the digital broadcast data over a unified link to customer premises equipment.

9. The customer premises system of claim 8, wherein the network access equipment includes fixed wireless access equipment.

10. The customer premises system of claim 8, wherein the digital broadcast access equipment includes satellite receiver equipment.

11. The customer premises system of claim 8, further comprising a digital modem connected to the unified access port.

12. The customer premises system of claim 11, wherein the digital modem includes a data over cable service interface specification (DOCSIS) modem.

13. The customer premises system of claim 11, further comprising a voice over IP (VoIP) telephone coupled to the digital modem.

14. The customer premises system of claim 11, further comprising a computer coupled to the digital modem, wherein the digital modem is configured to provide Internet access to the computer.

15. The customer premises system of claim 11, further comprising wireless network equipment coupled to the digital modem.

16. The customer premises system of claim 11, further comprising a converter coupled to the digital modem, the converter configured to access a plain old telephone service (POTS) telephone and to convert signals between the POTS telephone and the digital network modem.

17. The customer premises system of claim 8, further comprising a set top box coupled to the unified access port.

18. The customer premises system of claim 17, wherein the set top box is configured to be connected to television equipment.

19. The customer premises system of claim 8, wherein the combination unit is located at a customer premises.

20. A method of providing network-based service and digital broadcast service, the method comprising:
receiving digital network data at a customer premises combiner unit via a network access port of the customer premises combiner unit;
receiving digital broadcast data at the customer premises combiner unit via a broadcast access port of the customer premises combiner unit; and
providing the digital network data and the digital broadcast data via a unified access port of the customer premises combiner unit.

21. The method of claim 20, further comprising:
receiving second digital network data via the unified access port of the customer premises combiner unit; and
providing the second digital network data via the network access port of the customer premises combiner unit.

22. The method of claim 20, wherein the digital network data includes Internet protocol (IP)-based network data.

23. The method of claim 20, wherein the network access port has an interface to an Ethernet cable.

24. The method of claim 20, wherein the broadcast access port has an interface to a coaxial cable.

25. The method of claim 20, wherein the unified access port has an interface to a coaxial cable.

26. The method of claim 20, wherein the digital network data includes voice-over-IP (VoIP) data.

27. The method of claim 20, wherein receiving digital broadcast data includes receiving digital broadcast data from satellite equipment.

28. The method of claim 20, wherein receiving digital network data includes receiving digital network data from fixed wireless access equipment.

29. A method of providing network-based service and digital broadcast service, the method comprising:
providing a combination unit to be located at a customer premises;
providing digital broadcast service via a data line coupled to the combination unit; and
providing network access service via the data line coupled to the combination unit.

30. The method of claim 29, wherein providing network access service includes providing broadband internet access service.

31. The method of claim 29, wherein providing network access service includes providing Internet protocol (IP)-based telephone service.

32. The method of claim 29, wherein providing digital broadcast service includes providing satellite television service.

33. The method of claim 29, further comprising providing network access equipment to be located at the customer premises and configured to be coupled to the combination unit.

34. The method of claim 29, further comprising providing broadcast access equipment configured to be coupled to the combination unit.

35. A method of providing data network access and digital broadcast services, the method comprising:
coupling satellite dish equipment to a broadcast access port of a combination unit located at a customer premises;
coupling data network access equipment to a network access port of the combination unit located at a customer premises; and
coupling a receiving device to a combined access port of the combination unit located at a customer premises.

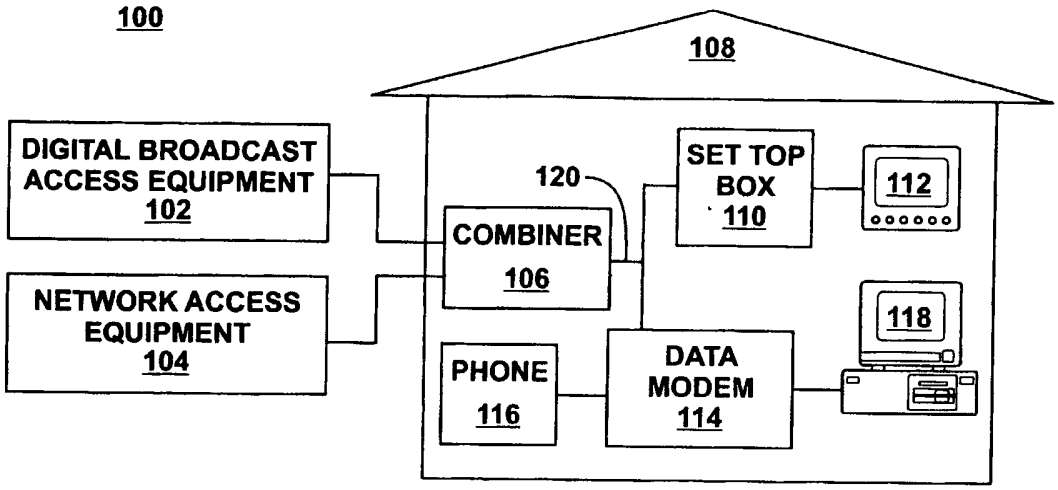
100
108
DIGITAL BROADCAST ACCESS EQUIPMENT 102
NETWORK ACCESS EQUIPMENT 104
120
COMBINER 106
SET TOP BOX 110
112
118
PHONE 116
DATA MODEM 114

FIG. 1

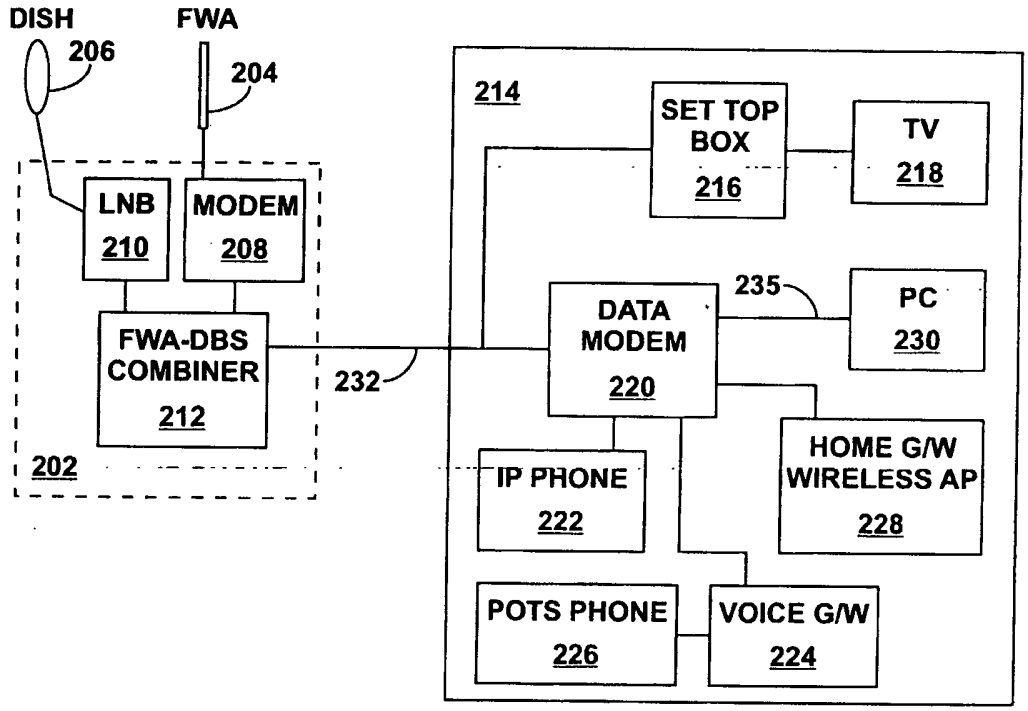
DISH
206
FWA
204
LNB 210
MODEM 208
FWA-DBS COMBINER 212
202
232
214
SET TOP BOX 216
TV 218
DATA MODEM 220
235
PC 230
IP PHONE 222
HOME G/W WIRELESS AP 228
POTS PHONE 226
VOICE G/W 224

FIG. 2

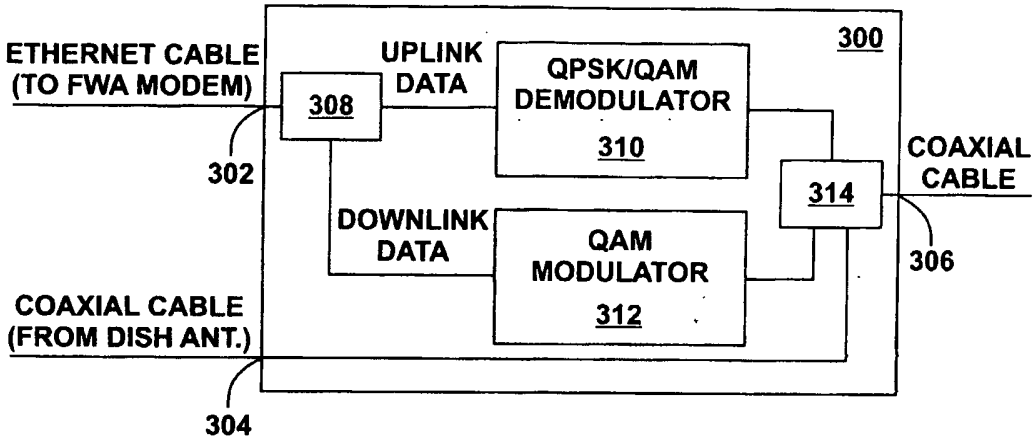
ETHERNET CABLE
(TO FWA MODEM)
302
308
UPLINK
DATA
QPSK/QAM
DEMODULATOR
310
300
COAXIAL
CABLE
314
306
DOWNLINK
DATA
QAM
MODULATOR
312
COAXIAL CABLE
(FROM DISH ANT.)
304

FIG. 3

400

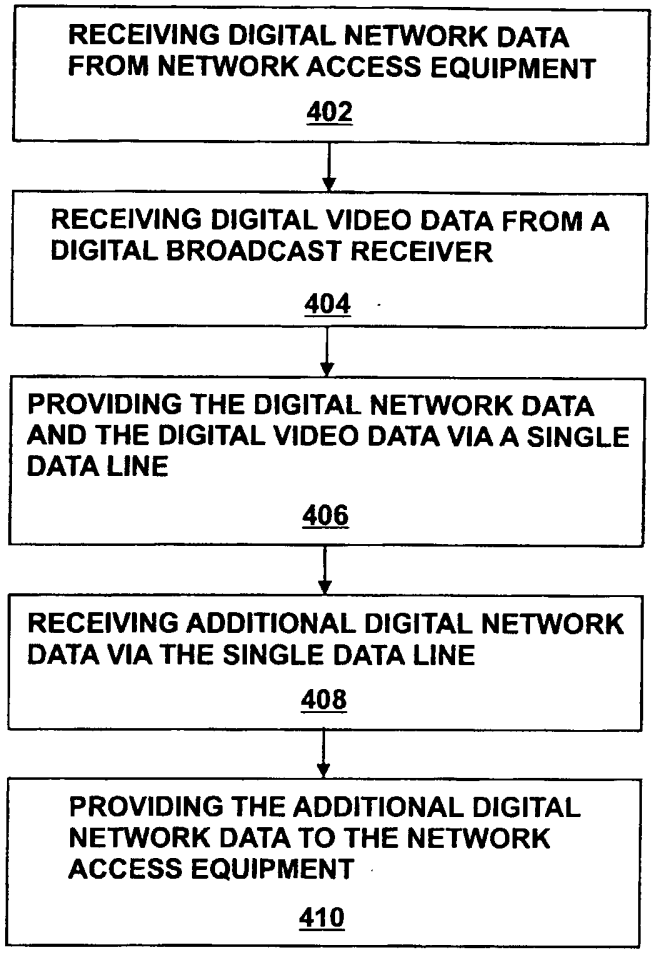
RECEIVING DIGITAL NETWORK DATA FROM NETWORK ACCESS EQUIPMENT
402
RECEIVING DIGITAL VIDEO DATA FROM A DIGITAL BROADCAST RECEIVER
404
PROVIDING THE DIGITAL NETWORK DATA AND THE DIGITAL VIDEO DATA VIA A SINGLE DATA LINE
406
RECEIVING ADDITIONAL DIGITAL NETWORK DATA VIA THE SINGLE DATA LINE
408
PROVIDING THE ADDITIONAL DIGITAL NETWORK DATA TO THE NETWORK ACCESS EQUIPMENT
410

FIG. 4

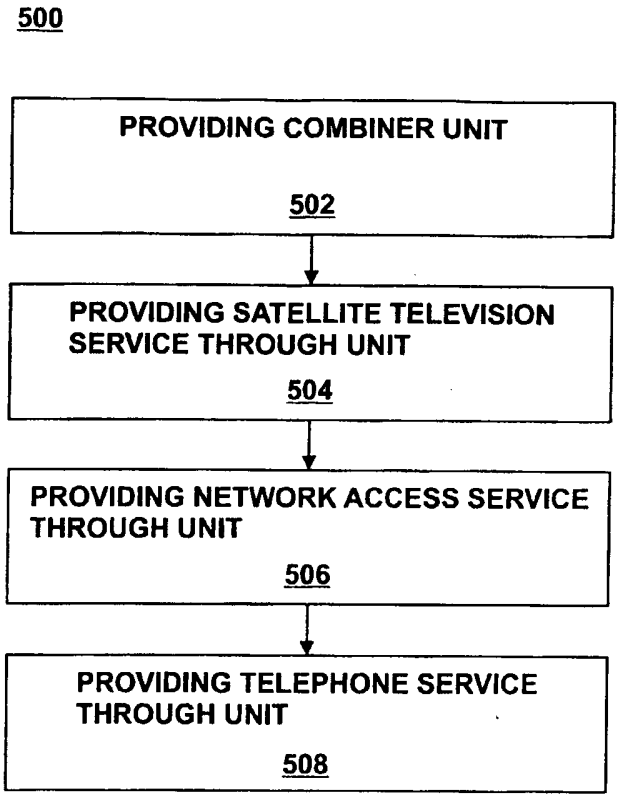
500
PROVIDING COMBINER UNIT
502
PROVIDING SATELLITE TELEVISION SERVICE THROUGH UNIT
504
PROVIDING NETWORK ACCESS SERVICE THROUGH UNIT
506
PROVIDING TELEPHONE SERVICE THROUGH UNIT
508

FIG. 5