Roku, Inc.
v.
Universal Electronics, Inc.

IPR2019-01612 - IPR2019-01613 - IPR2019-01614

U.S. Patent Nos. 7,589,642 - 8,004,389 - 9,911,325

Petitioner's Demonstratives

Roku EX1037
Roku v. Universal Electronics
IPR2019-01614

Agenda

I. ’642 Patent - IPR2019-01612

II. ’325 Patent - IPR2019-01614

III. ’389 Patent - IPR2019-01613

Introduction to the Challenged Patents

Alleged problem solved by Challenged Patents

Consumers may find it inconvenient to operate their electronic devices using multiple remote control devices. Thus, a consumer may wish to operate multiple electronic consumer devices using a single remote control device. A single remote control device can store many codesets so that the remote control device can control a corresponding large number of different electronic consumer devices. There are, however, thousands of codesets in use in electronic consumer devices today. Manufacturers of remote control devices, however, may wish to limit the memory on their remote control devices to a size that is insufficient to store the thousands of existing codesets.

A system is sought for enabling a remote control device to control a selected one of multiple different electronic consumer devices without requiring the codeset associated with the selected electronic consumer device to be stored on the remote control device.

'642 Patent, EX1001, 1:39-55.

'642 Pet., Paper 2, 4-5; Russ Decl., EX1003, ¶¶28-30.

Introduction to the Challenged Patents

System of the Challenged Patents

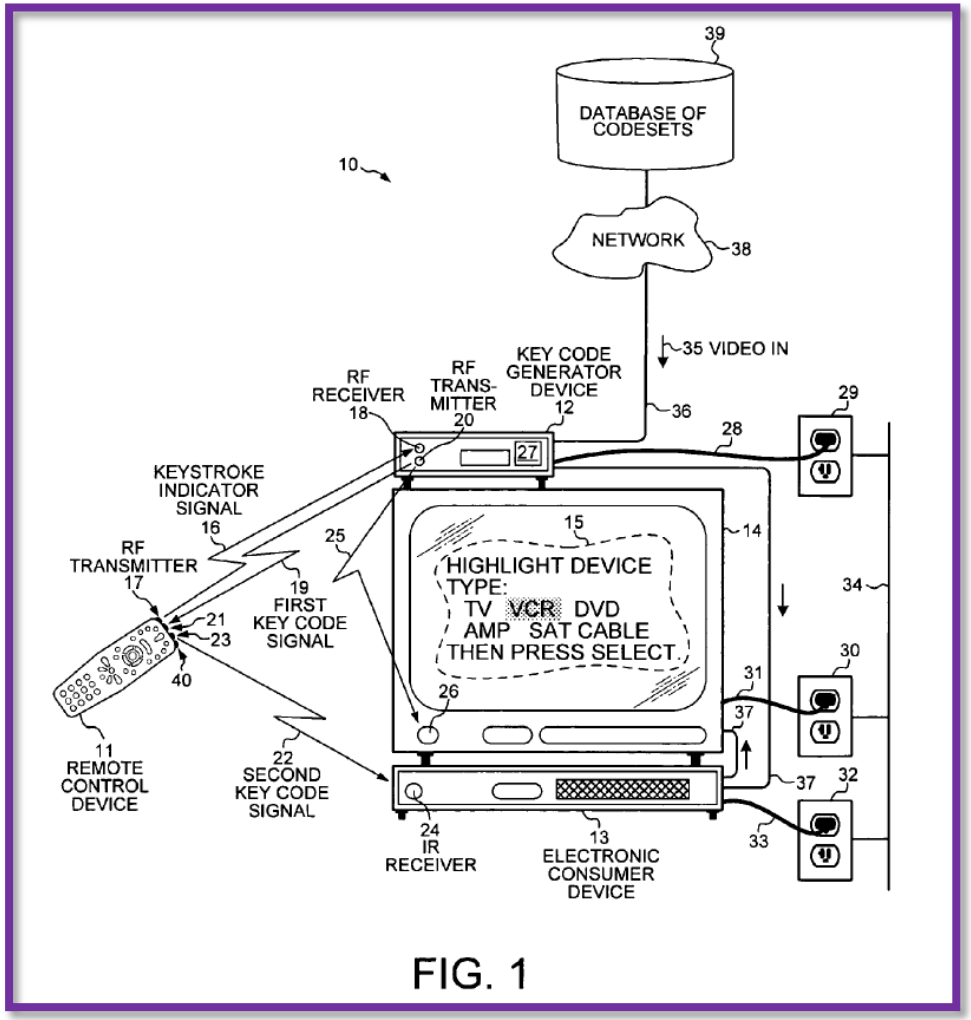


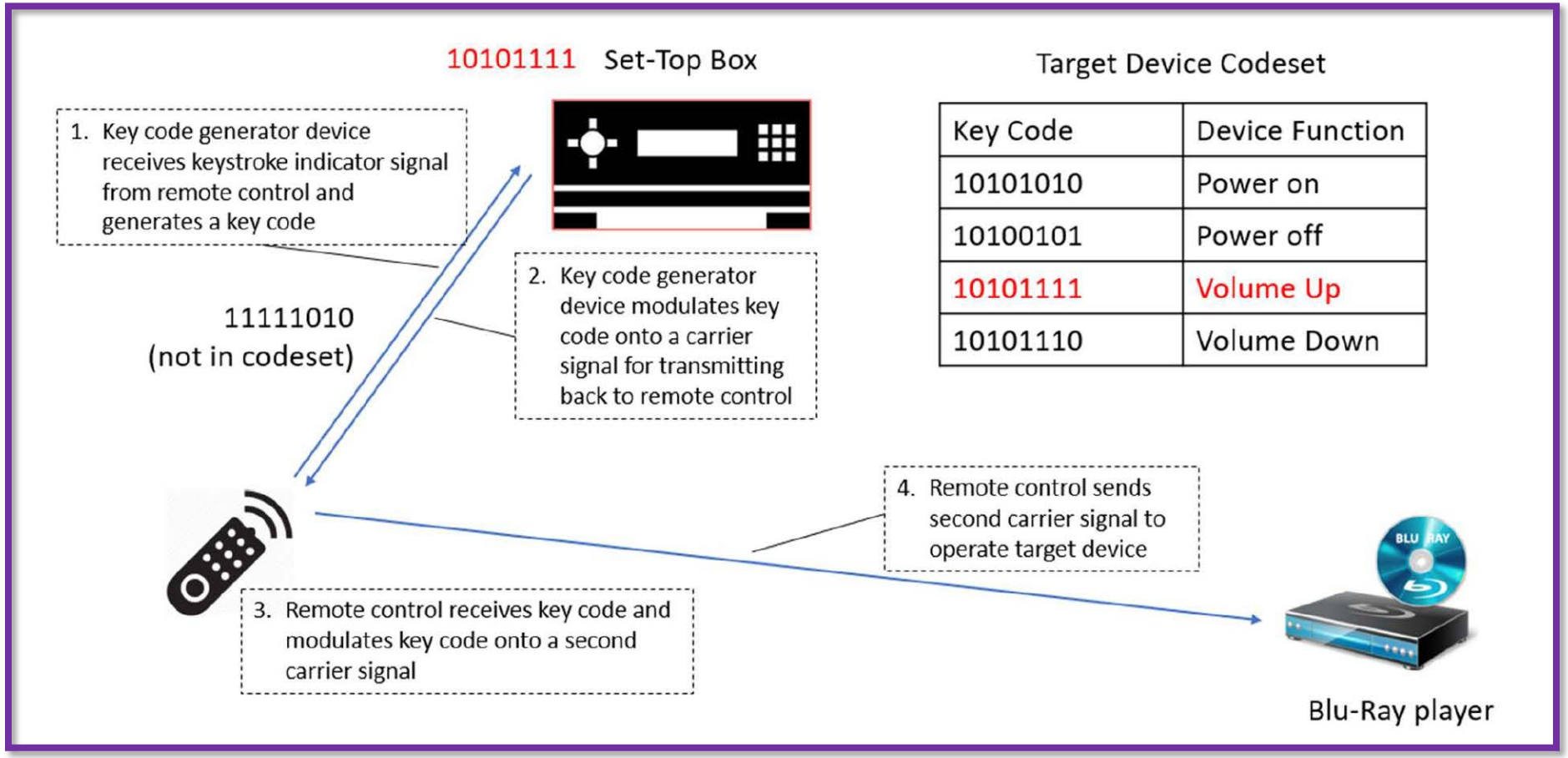
FIG. 1

’642 Patent, EX1001, FIG. 1.

’642 Pet., Paper 2, 5.

Introduction to the Challenged Patents

Embodiment 1: Transmitting a Key Code to the Remote Control



Target Device Codeset

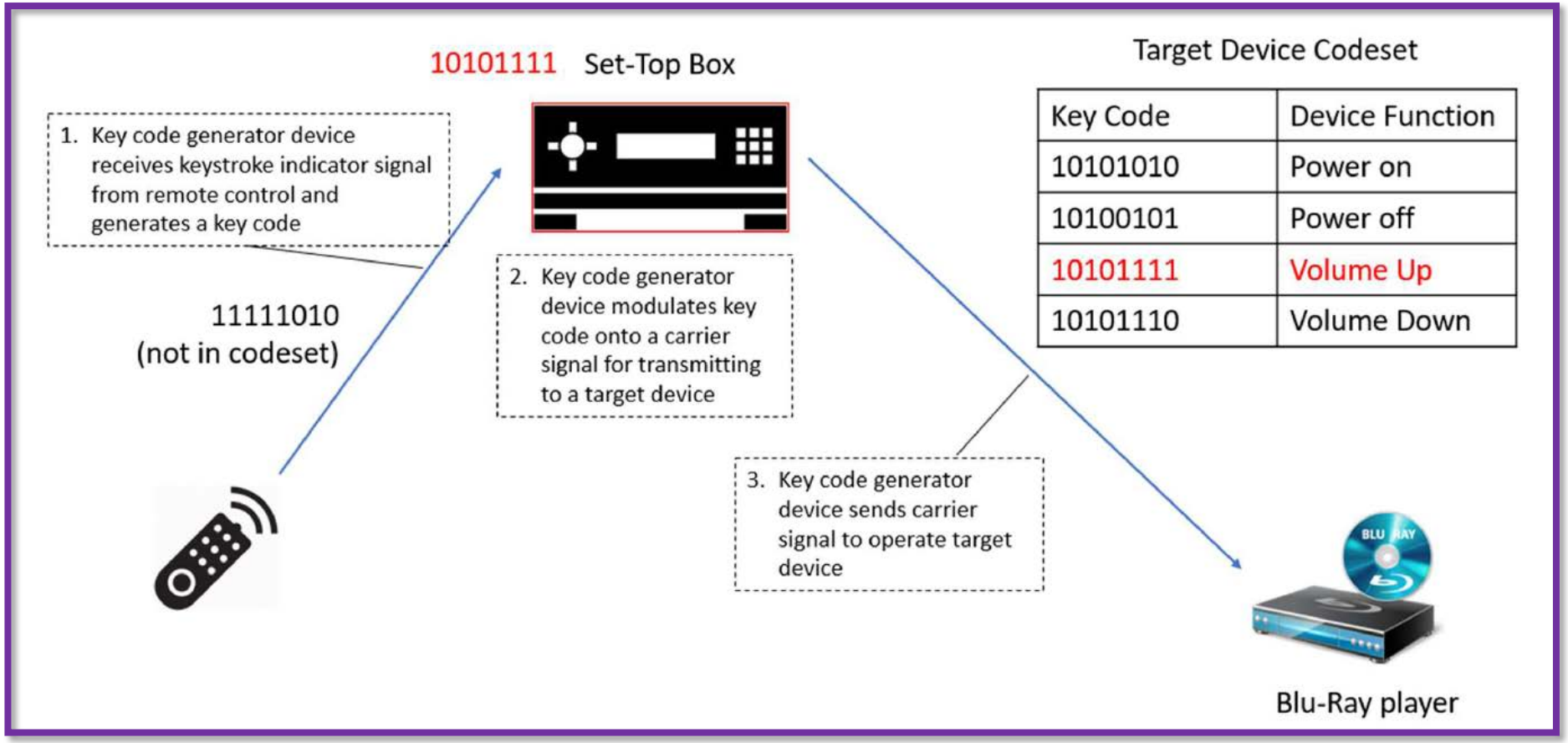
Key Code	Device Function
10101010	Power on
10100101	Power off
10101111	Volume Up
10101110	Volume Down

Sprenger Decl., EX2003, ¶68.

'642 POR, Paper 16, 4-5;
'642 Pet. Reply, Paper 20, 5; Russ Reply Decl., EX1032, ¶¶17-18.

Introduction to the Challenged Patents

Embodiment 2: Transmitting a Key Code to the Target Device



Sprenger Decl., EX2003, ¶70.

'642 POR, Paper 16, 5-6;
'642 Pet. Reply, Paper 20, 5; Russ Reply Decl., EX1032, ¶18.

Instituted Grounds - IPR2019-01612 (’642 Patent)

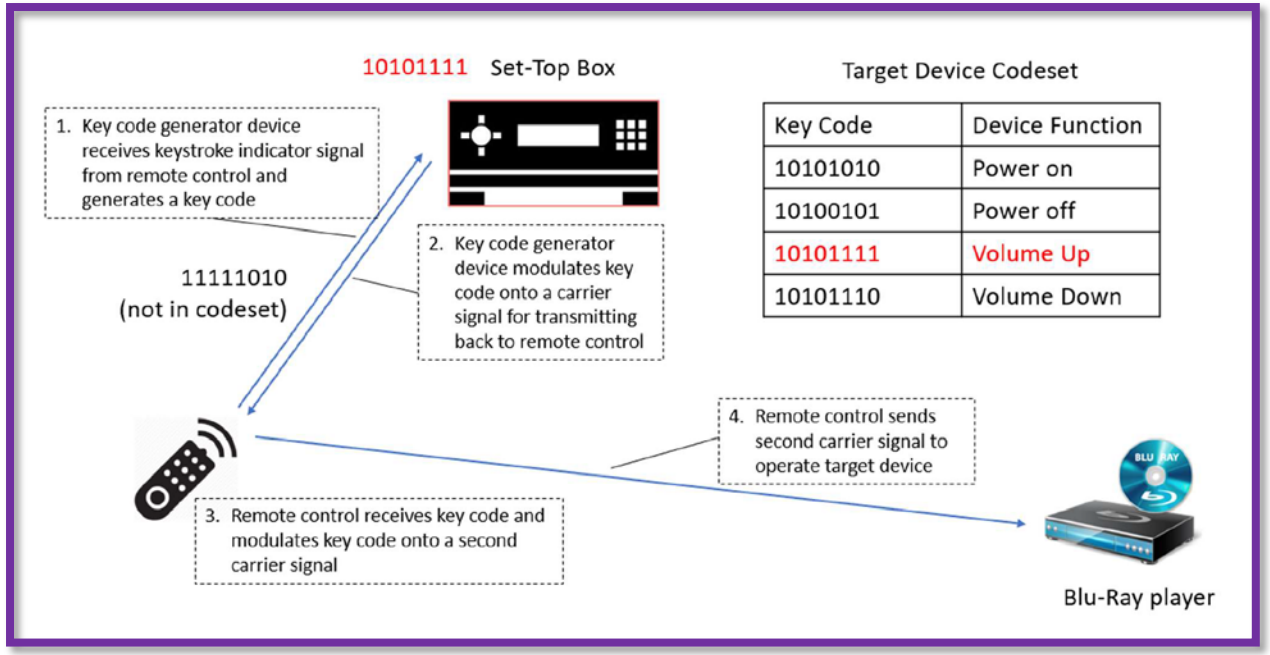
IPR2019-01612 (’642 Patent)		
	Claim(s)	References
Ground 1	1, 3, 4, 6, 8, 9	Mishra (EX1005) and Dubil (EX1006)
Ground 2	2, 22-25	Rye (EX1007) and Dubil
Ground 3	1-4, 6, 8, 9, 22-25	Caris (EX1008) and Skerlos (EX1009)

’642 Pet., Paper 2, 3; ’642 DI., Paper 7, 7, 35.

’642 Patent – Independent Claim 1

Embodiment 1: Transmitting a Key Code to the Remote Control

IPR2019-01612 (’642 Patent) – Claim 1
1. A method comprising:
(a) receiving a keystroke indicator signal from a remote control device, wherein the keystroke indicator signal indicates a key on said remote control device that a user has selected;
(b) generating a key code within a key code generator device using the keystroke indictor signal;
(c) modulating said key code onto a carrier signal, thereby generating a key code signal; and
(d) transmitting said key code signal from said key code generator device to said remote control device.



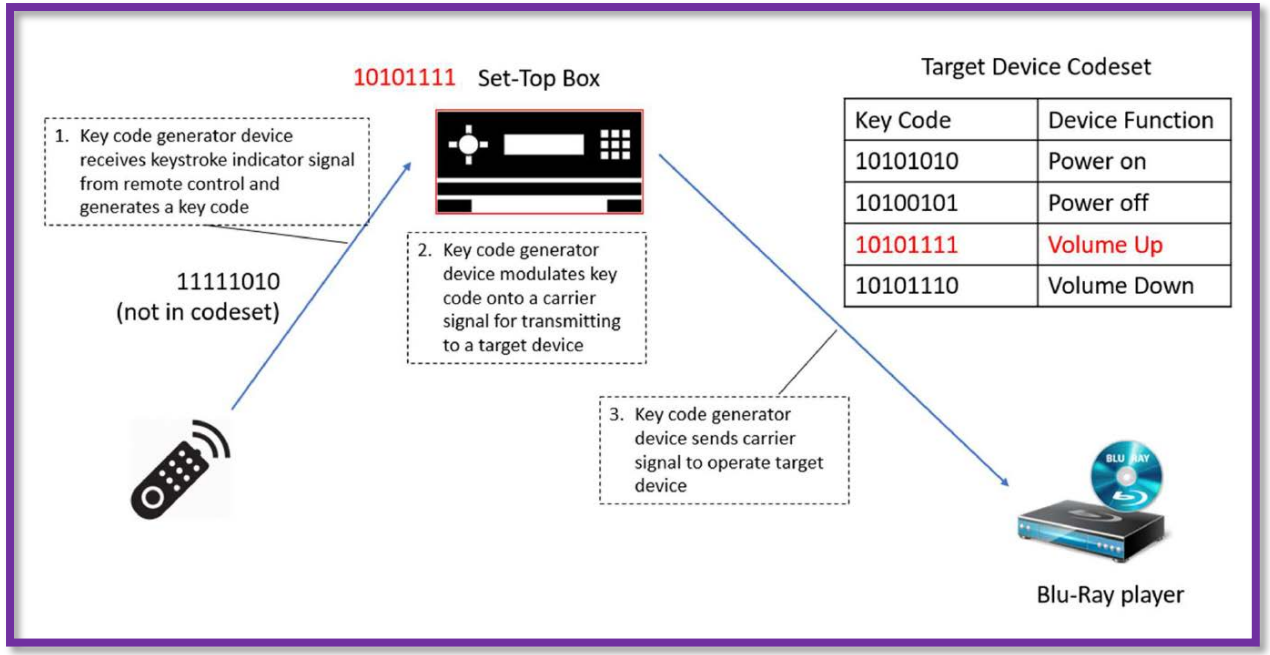
Sprenger Decl., EX2003, ¶68.

’642 Pet., Paper 2, 6-8; Russ Decl., EX1003, ¶¶31-35;
’642 Pet. Reply, Paper 20, 5; Russ Reply Decl., EX1032, ¶¶17-18.

’642 Patent – Independent Claim 2

Embodiment 2: Transmitting a Key Code to the Target Device

IPR2019-01612 (’642 Patent) – Claim 2
2. A method comprising:
(a) receiving a keystroke indicator signal from a remote control device, wherein the keystroke indicator signal indicates a key on said remote control device that a user has selected;
(b) generating a key code within a key code generator device using the keystroke indictor signal;
(c) modulating said key code onto a carrier signal, thereby generating a key code signal; and
(d) transmitting said key code signal from said key code generator device to an electronic consumer device.



Sprenger Decl., EX2003, ¶70.

’642 Pet., Paper 2, 8; Russ Decl., EX1003, ¶¶36-38;
’642 Pet. Reply, Paper 20, 5; Russ Reply Decl., EX1032, ¶18.

Undisputed Claim Constructions

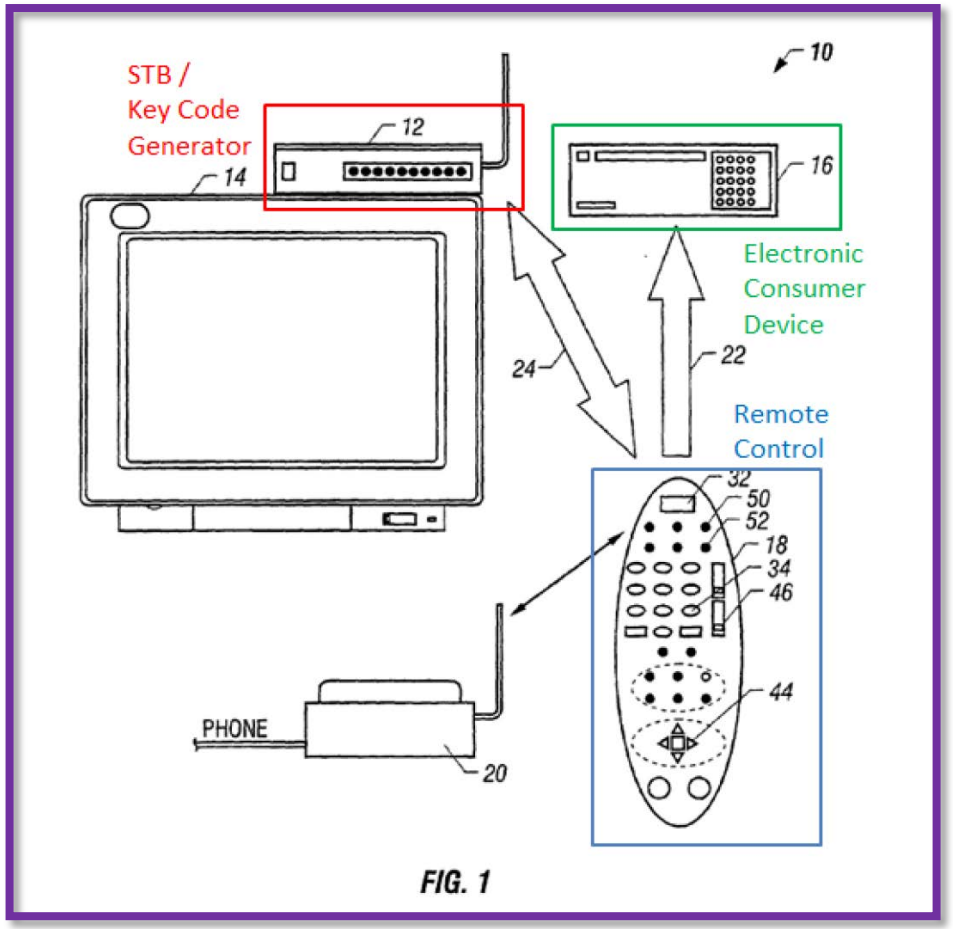
“key code”	“keystroke indicator signal”	“key code generator device”*
“a code corresponding to the function of an electronic device, optionally including timing information”	“a signal, distinct from a key code, corresponding to a pressed key [on a remote control]”	District Court Construction: Subject to 35 U.S.C. § 112(6) **Function**: “generate a key code” **Structure**: “set-top box, television, a stereo radio, a digital video disk player, a video cassette recorder, a personal computer, a set-top cable television box or a set-top satellite box and equivalents thereof.” Performing the steps of: “(1) identifying a codeset usable to communicate with an electronic consumer device” and “(2) identifying the key code corresponding to a pressed key for that codeset.”

*Autoscan will be discussed further with reference to the ’389 patent.

’642 Pet. Reply, Paper 20, 2-4; ’642 POR, Paper 16, 11-14.

Embodiment 1 - Mishra's Overall System

Mishra teaches a remote control receiving a control code from a set-top box and transmitting the control code to an electronic consumer device.



Mishra, EX1005, FIG. 1 (annotated).

'642 Pet., Paper 2, 16-17; Russ Decl., EX1003, ¶¶104-07.

Embodiment 1 – Mishra Teaches "Receiving a Keystroke Indicator Signal"

Mishra's RCU transmits a keystroke indicator signal.

[0037] The RCU **18** may operate in one of at least two different fashions. The RCU may have dedicated buttons that correspond to particular controlled devices. For example, the RCU may contain a button that is labeled "TV." When the TV button is pushed, the appropriate commands are sent to the master informing the master that the user now wishes to control the TV. The next button that is pushed, for example, the channel up button, causes the appropriate command to be sent to the master telling it, for example, that the user wishes to go to the next highest channel. The master in turn sends the RCU the necessary codes to increment the channel on the TV. The RCU then takes these codes and sends them, for example using a unidirectional infrared signal, to the TV using the protocols stored in the RCU's memory.

Mishra, EX1005, ¶37.

[0020] Having received a command signal from the RCU **18**, the system **12** can translate the command into a format appropriate for controlling a particular device **16**. That is, it is not necessary to program the RCU **18** independently. Instead, a variety of codes may be stored in the system **12**. The user may be called upon to indicate the type of devices which need to be controlled. When the RCU transmits a signal corresponding to a known function (which signal may not be particularly adapted to work any particular device), the system **12** can translate that signal and send information back to the RCU **18** to enable the RCU **18** to control the particular device the RCU **18** is to operate.

Mishra, EX1005, ¶20.

'642 Pet., Paper 2, 22; Russ Decl., EX1003, ¶¶117-19.

Embodiment 1 – Mishra Teaches "Generating a Key Code" and Transmitting the Key Code To the Remote Control

Mishra's STB identifies a key code each time a function key is pressed.

[0020] Having received a command signal from the RCU **18**, the system **12** can translate the command into a format appropriate for controlling a particular device **16**. That is, it is not necessary to program the RCU **18** independently. Instead, a variety of codes may be stored in the system **12**. The user may be called upon to indicate the type of devices which need to be controlled. When the RCU transmits a signal corresponding to a known function (which signal may not be particularly adapted to work any particular device), the system **12** can translate that signal and send information back to the RCU **18** to enable the RCU **18** to control the particular device the RCU **18** is to operate.

Mishra, EX1005, ¶20.

[0037] The next button that is pushed, for example, the channel up button, causes the appropriate command to be sent to the master telling it, for example, that the user wishes to go to the next highest channel. The master in turn sends the RCU the necessary codes to increment the channel on the TV. The RCU then takes these codes and sends them, for example using a unidirectional infrared signal, to the TV using the protocols stored in the RCU's memory.

Mishra, EX1005, ¶37.

[0039] The difference between the two approaches is that in the first case, the master feeds the information to the RCU each time the RCU needs information. In the second case, the master feeds the information needed to do all the different controls for a given device initially, and then the device handles those protocols on its own.

Mishra, EX1005, ¶39.

'642 Pet., Paper 2, 22-23; Russ Decl., EX1003, ¶¶120-24;
'642 Pet. Reply, Paper 20, 7-9.

Embodiment 1 – Mishra Teaches Wirelessly Transmitting the Key Code

Mishra's STB wirelessly transmits the key code to the RCU.

[0018] The RCU **18** may communicate with the system **12** using wireless communication such as infrared or radio-frequency links. The infrared link may use the IrDA-C bidirectional signals as one example. The system **12** may communicate with the RCU **18** using a wired or wireless communication of the type described previously.

Mishra, EX1005, ¶18.

[0037] The next button that is pushed, for example, the channel up button, causes the appropriate command to be sent to the master telling it, for example, that the user wishes to go to the next highest channel. The master in turn sends the RCU the necessary codes to increment the channel on the TV. The RCU then takes these codes and sends them, for example using a unidirectional infrared signal, to the TV using the protocols stored in the RCU's memory.

Mishra, EX1005, ¶37.

[0039] The difference between the two approaches is that in the first case, the master feeds the information to the RCU each time the RCU needs information. In the second case, the master feeds the information needed to do all the different controls for a given device initially, and then the device handles those protocols on its own.

Mishra, EX1005, ¶39.

'642 Pet., Paper 2, 26; Russ Decl., EX1003, ¶¶130-31;
'642 Pet. Reply, Paper 20, 7-9.

Embodiment 1 – Dubil Teaches "Modulating the Key Code onto a Carrier Signal"

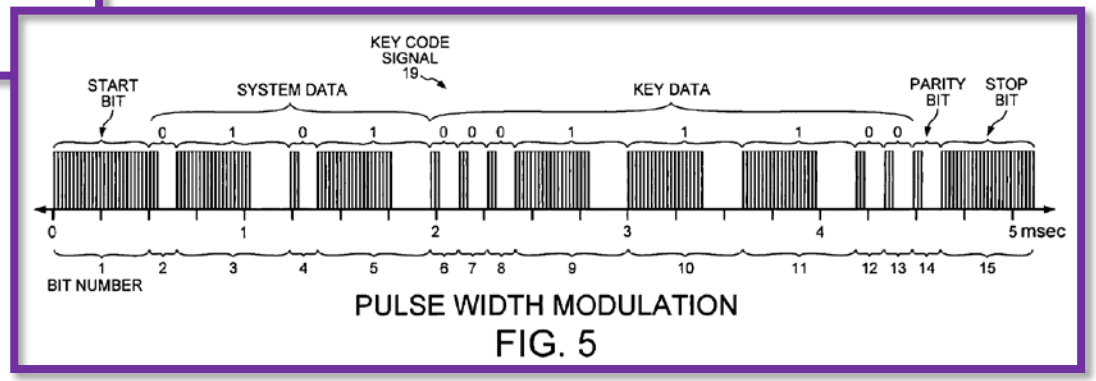
Dubil describes modulation parameters used to wirelessly transmit a key code.

More specifically, the IR or RF codes are described using XML. A number of parameters can be defined using XML tags, for example, carrier frequency, duty cycle, protocol type (FSK, biphase, PWM, etc.), repetition time, on/off times of the signal, bit pattern of the command code, semantic meaning of the code, type of device for which it is intended (CD, VCR, TV, DVD, etc.), the brand name of the specific protocol, etc. Preferably, these data fields are not all used within the remote: only the information required to transmit the actual IR or RF code needs to be stored.

Dubil, EX1006, 2:61-3:8; *see also* Dubil, EX1006, 4:33-47, 4:60-5:5.

Abbreviations
"FSK" = Frequency-Shift Keying Modulation
"biphase" = Biphase Modulation
"PWM" = Pulse Width Modulation

Russ Decl., EX1003, ¶127.



'642 Patent, EX1001, FIG. 5.

'642 Pet., Paper 2, 7, 24-25; Russ Decl., EX1003, ¶¶34-35, 125-29.

Embodiment 1 – The ’642 Patent Admits Modulation Was Well Known in the Background Section

BACKGROUND

A remote control device typically controls a selected electronic consumer device by transmitting infrared key code signals to the selected electronic consumer device. The infrared signals contain key codes of a codeset associated with the selected electronic consumer device. Each key code corresponds to a function of the selected electronic device, such as power on, power off, volume up, volume down, play, stop, select, channel up, channel down, etc. In order to avoid the situation where a remote control device unintentionally operates an electronic consumer device that is associated with a different remote control device, manufacturers sometimes use distinct codesets for the communication between various electronic consumer devices and their associated remote control devices. The codesets can differ from each other not only by the bit patterns assigned to various functions of the associated electronic consumer device, but also by the timing information that describes how the key codes should be modulated onto carrier signals to generate key code signals.

’642 Patent, EX1001, 1:21-38.

’642 Pet., Paper 2, 24, 39; Russ Decl., EX1003, ¶¶109, 112, 127, 156.

Embodiment 1 – Motivation to Combine Mishra and Dubil

108. While Mishra describes the relay transmission via a remote control described in Embodiment 1, Mishra does not explicitly provide operational details explaining how this transmission would occur. While a POSA would have understood that Mishra would accomplish transmissions using a well-known modulation process, Mishra does not explicitly describe the modulation of a control code onto a carrier frequency. If a POSA sought to use Mishra to wirelessly transmit control codes from a set-top box [*key code generator device*] to a television [*electronic consumer device*] via a remote control, the POSA would look to references describing protocols used for wirelessly transmitting control codes. *see* EX1005, ¶37. Dubil is such a reference.

Russ Decl., EX1003, ¶108.

'642 Pet., Paper 2, 18-19, 24-25;
Russ Decl., EX1003, ¶¶108-13, 125-29.

Embodiment 1 – Motivation to Combine Mishra and Dubil

113. Further, implementing the transmission parameters described in Dubil with "system 12" described in Mishra would result in merely combining known elements to yield predictable results. Both Mishra and Dubil describe set-top boxes capable of transmitting control codes to a remote control device similar to the conventional key code generator device described in the '642 patent. EX1005, ¶¶20, 18, 34, 35, 37; EX1006, 5:18-26. Additionally, both Mishra and Dubil describe a set-top box that downloads control codes from an external server and database via the Internet. EX1005, ¶35; EX1006, 4:60-5:17. In this manner, a POSA using the system described in Mishra would have easily implemented and utilized the same parameters described in Dubil to modulate a control code onto an IR or RF carrier frequency and transmit the corresponding signal to a remote control. *See also* EX1005, ¶18. Thus, a POSA would have found it predictable to implement the well-known modulation techniques described in Dubil—and admitted as prior art in the '642 patent—to transmit a control code.

Russ Decl., EX1003, ¶113.

'642 Pet., Paper 2, 18-19, 24-25;
Russ Decl., EX1003, ¶¶108-13, 125-29.

Embodiment 1 – Motivation to Combine Mishra and Dubil

51. When deciding whether to modulate data for transmission, and if so, what type of modulation to use, engineers must consider the cost and complexity of each approach as compared to the requirements of the desired application.

...

Modulation increases the cost and complexity, but may end up ultimately being more effective due to the increased resiliency to signal interference. And modulation using an intermediate carrier frequency may increase the cost and complexity further, but may provide more signal reliability suitable for a particular application.

Sprenger Decl., EX2003, ¶51.

Dr. Sprenger admits a POSA would have been motivated to use modulation.

54. All of these methods were widely known and available in 2003. This broad variety of methods that address the problem of interference in remote control transmission systems demonstrates that a POSITA in 2003 had a range of choices to address remote control transmission in the presence of outside noise. Therefore, when deciding how to transmit data, a POSITA would need to consider all of these available options, the costs and complexity of each approach, the desirable qualities for the application at hand, and determine whether modulation should be used and, if so, what type of modulation.

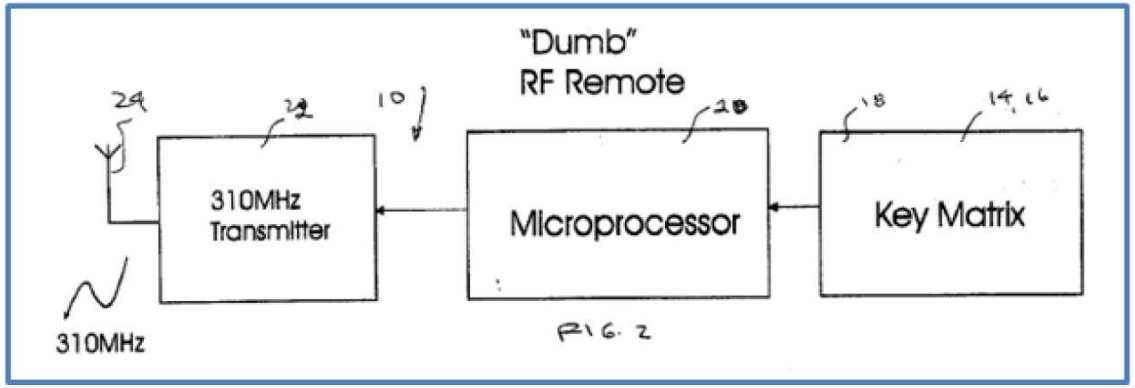
Sprenger Decl., EX2003, ¶54.

'642 Pet. Reply, Paper 20, 2, 9-11, 19-20, 24.

Embodiment 2 - Rye's Overall System

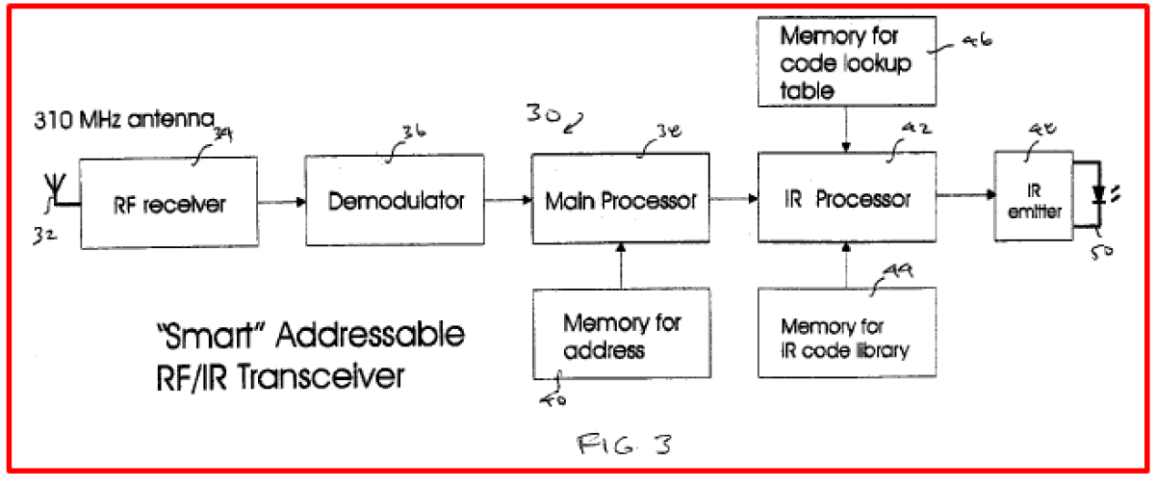
Rye teaches transmitting a control code from a key code generator device to an electronic consumer device.

Remote Control



Rye, EX1007, FIG. 2 (annotated)

Key Code Generator



Rye, EX1007, FIG. 3 (annotated).

'642 Pet., Paper 2, 34-35; Russ Decl., EX1003, ¶¶153-54, 160-62.

Embodiment 2 – Rye Teaches "Receiving a Keystroke Indicator Signal"

Rye's "binary coded signal" teaches the claimed keystroke indicator signal.

[0022] As shown in the schematic diagram of the remote control unit **10** depicted in **FIG. 2**, the unit **10** includes a key matrix **18**, which, in a known manner, in response to the user operation of one of the pushbuttons **14** produces a memory address signal that is applied to a microprocessor **20** in which is stored a plurality of binary control codes corresponding to the various functions of the audiovisual components that are to be controlled by the operation of unit **10**. The binary control codes stored in the microprocessor **20** are generic codes in that they are not specific for any particular brand or model of audiovisual product. The binary coded signal generated by the microprocessor **20**, in response to the user operation of one of the pushbuttons **14**, is applied to a modulator-transmitter **22** in which the microprocessor output binary coded control signal is modulated onto a radio-frequency carrier of e.g., 310 MHz. That radio-frequency binary coded signal is transmitted by an antenna **24** included in unit **10** to an addressable transceiver generally designated **30**, illustrated schematically in **FIG. 3**.

Rye, EX1007, ¶22.

[0023] As therein shown, transceiver **30** receives the binary coded address and function control rf signal from the remote control unit **10**. In overview, those signals are converted in transceiver **30** to corresponding binary coded infrared (IR) signals, which are then transmitted over-the-air to the selected audiovisual component to control its operation.

Rye, EX1007, ¶23.

'642 Pet., Paper 2, 36-37; Russ Decl., EX1003, ¶¶163-65.

Embodiment 2 – Rye Teaches "Generating a Key Code" and Transmitting the Key Code To the Remote Control

Rye's "transceiver" generates a key code by identifying one in its IR code library.

[0024] If an address match is detected in microprocessor **38** its output is applied to one input of an infrared (IR) processor **42**, which receives at another input the contents of a universal IR code library memory **44**. Memory **44** contains the remote control codes for all brands, e.g., Sony and Zenith, and models of commercially available audiovisual components. For example, if the audiovisual component is a television receiver identified on the user's remote control unit as TV 1 is a Sony and a second television receiver in the home identified as TV 2 is a Zenith, memory **44** would store the Sony remote control code for TV 1 and the Zenith remote control code for TV 2. (DAVE, WHERE AND HOW ARE TV1 AND TV 2 IDENTIFIED HERE?) IR microprocessor **42** also receives an input from a memory **46** for the code lookup table. The remote control codes stored in memory **46**, which are derived from code library memory **44** through the microprocessor **42**, may be periodically supplemented or otherwise modified by the user when a new audiovisual component is acquired or a currently owned component is discarded. IR processor **42** looks up the received control code, e.g., "VCR Play", from the IR code library **44**.

Rye, EX1007, ¶24.

[0027] IR processor **42** converts the input control signal so that it is compatible with the operating binary code for the selected audiovisual component whose IR remote control code is obtained from the look-up table **46**. That is, if the control operation that is to be performed is to Play the VCR, the IR processor **42** looks up the "VCR-Play" code from the code library **44** for the user's particular brand of VCR. That control code for "VCR-Play" is selected in IR processor **42** and is then applied to IR emitter **48** to, in turn, cause LED **50** to transmit to the addressed or selected VCR, in the example given, the selected control signal in the form of an IR binary signal that is compatible with the user's brand and model of VCR.

Rye, EX1007, ¶27.

'642 Pet., Paper 2, 37-39, 41; Russ Decl., EX1003, ¶¶166-72, 178-79.

Embodiment 2 – Motivation to Combine Rye and Dubil

155. While Rye describes the transmission of a key code from a key code generator device to an electronic consumer device, such as a VCR, as described in Embodiment 2, Rye does not explicitly provide operational details explaining how this transmission would occur. *See* EX1007, ¶27. For example, Rye does not explicitly describe the modulation of a control code onto a carrier frequency or that control code typically consist of timing information. If a POSA sought to use Rye to wirelessly transmit control codes from a transceiver [*key code generator device*] to a VCR [*electronic consumer device*] via a remote control and did not understand the operational details for performing this transmission (even though such details were widely known as explained above), the POSA would look to references describing protocols used for wirelessly transmitting control codes. Dubil is such a reference.

Russ Decl., EX1003, ¶155.

'642 Pet., Paper 2, 39-41; Russ Decl., EX1003, ¶¶155-59, 173-77.

Embodiment 2 – Motivation to Combine Rye and Dubil

159. Further, implementing the transmission parameters described in Dubil with the transceiver described in Rye would result in merely combining known elements according to known methods to yield predictable results. Both Rye and Dubil key code generator devices that wirelessly transmit control codes. EX1007, ¶25; EX1006, 4:60-5:26. Additionally, both Rye and Dubil describe updating key code generator device with new control codes. EX1007, ¶24; EX1006, 4:60-5:17. In particular, Rye explains that "remote control codes stored in memory 46" within the transceiver "may be periodically supplemented or otherwise modified by the user when a new audiovisual component is acquired…" EX1007, ¶24. In this manner, a POSA using the transceiver described in Rye would have easily implemented and utilized the same parameters described in Dubil to modulate a control code onto an IR carrier frequency using the IR emitter and transmit the corresponding signal to an electronic consumer device. *Id.*, ¶25; *see also* Section VI.D.

Russ Decl., EX1003, ¶159.

'642 Pet., Paper 2, 39-41; Russ Decl., EX1003, ¶¶155-59, 173-77.

Disputed Issues

I. Claim Construction
   A. “key code signal”
   B. “generating a key code … using the keystroke indicator signal”
II. Mishra + Dubil
   A. Mishra Discloses the Claimed “Receiving” and “Generating”
   B. Mishra and Dubil Render Obvious the Claimed “Modulating”
III. Rye + Dubil
   A. Rye Discloses the Claimed “Receiving” and “Generating”
   B. Rye and Dubil Render Obvious the Claimed “Modulating”
IV. Motivation to Combine
   A. Mishra + Dubil
   B. Rye + Dubil

*The Appendix addresses the dependent claims as well as the Caris + Skerlos combination.

’642 POR, Paper 16.

Disputed Issues – Claim Construction "key code signal"

Proposed Construction of "key code signal"		
District Court	**Petitioner**	**Patent Owner**
"a signal containing a modulated key code"	No Construction Needed Patent Owner's Construction is Improperly Narrow	"'a signal containing a modulated key code' excludes a codeset from the same signal"

'642 POR, Paper 16, 12-13; '642 Pet. Reply, Paper 20, 3.

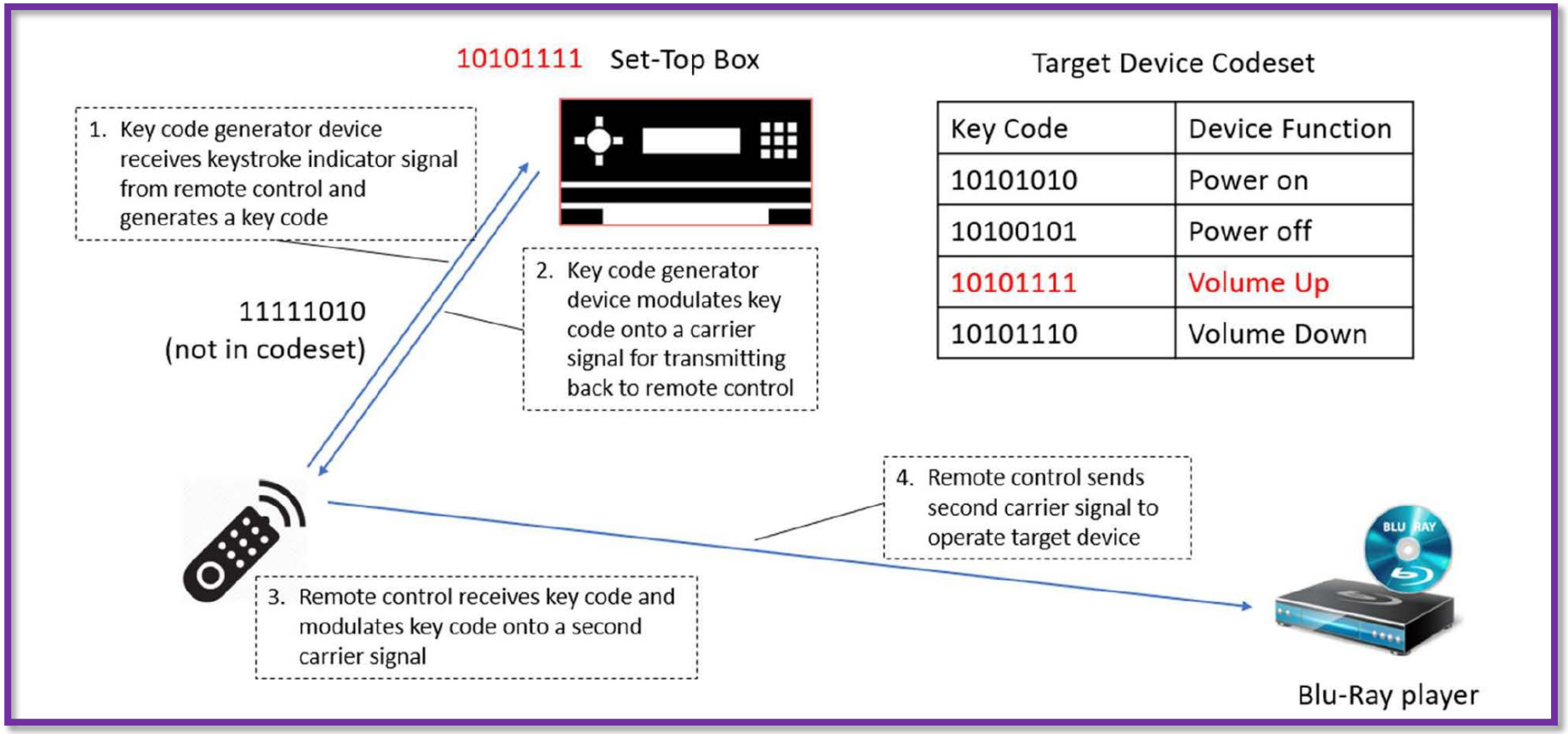
Disputed Issues – Claim Construction
"generating a key code … using the keystroke indicator signal"

Proposed Construction of "generating a key code … using the keystroke indicator signal"	
Petitioner	**Patent Owner**
No Construction Needed Patent Owner's Construction is Improperly Narrow	Plain and Ordinary Meaning but "excludes receiving an appliance control code and merely translating or converting the code into another format, such as an infrared signal"

'642 POR, Paper 16, 15-16; '642 Pet. Reply, Paper 20, 5-7.

Disputed Issues – Claim Construction
"generating a key code … using the keystroke indicator signal"

"Generating a Key Code" includes this embodiment.



Target Device Codeset

Key Code	Device Function
10101010	Power on
10100101	Power off
10101111	Volume Up
10101110	Volume Down

Sprenger Decl., EX2003, ¶68.

'642 Pet. Reply, Paper 20, 5-7; Russ Reply Decl., EX1032, ¶¶16-20.

Disputed Issues – Claim Construction
"generating a key code … using the keystroke indicator signal"

"Generating a Key Code" includes using a lookup table.

Q: To generate the key code, does [the STB] use this table that you've depicted here?

A: … To your question, the key code generator device looks to this table or an equivalent one that it has stored and basically generates a new code that is destined for the target consumer electronics device.

Q: And one way to implement this would be a lookup table; is that right?

A: That's one way to implement it. There may be others.

Sprenger Depo. Tr., EX1033, 177:16-178:18.

A: So the key code generator device generates a new code. And one example is it performs a lookup operation.

Sprenger Depo. Tr., EX1033, 180:12-14.

'642 Pet. Reply, Paper 20, 5-7; Russ Reply Decl., EX1032, ¶¶16-20.

Disputed Issues – Mishra's Keystroke Signal

Mishra's keystroke indicator signal does not already include a key code.

[0020] Having received a command signal from the RCU **18**, the system **12** can translate the command into a format appropriate for controlling a particular device **16**. That is, it is not necessary to program the RCU **18** independently. Instead, a variety of codes may be stored in the system **12**. The user may be called upon to indicate the type of devices which need to be controlled. When the RCU transmits a signal corresponding to a known function (which signal may not be particularly adapted to work any particular device), the system **12** can translate that signal and send information back to the RCU **18** to enable the RCU **18** to control the particular device the RCU **18** is to operate.

Mishra, EX1005, ¶20.

[0037] The RCU **18** may operate in one of at least two different fashions. The RCU may have dedicated buttons that correspond to particular controlled devices. For example, the RCU may contain a button that is labeled "TV." When the TV button is pushed, the appropriate commands are sent to the master informing the master that the user now wishes to control the TV. The next button that is pushed, for example, the channel up button, causes the appropriate command to be sent to the master telling it, for example, that the user wishes to go to the next highest channel. The master in turn sends the RCU the necessary codes to increment the channel on the TV. The RCU then takes these codes and sends them, for example using a unidirectional infrared signal, to the TV using the protocols stored in the RCU's memory.

Mishra, EX1005, ¶37.

'642 Pet. Reply, Paper 20, 7-9; Russ Reply Decl., EX1032, ¶¶21-27.

Disputed Issues – Mishra's Key Code Signal

Mishra is not limited to transmitting an entire codeset.

[0037] The RCU **18** may operate in one of at least two different fashions. The RCU may have dedicated buttons that correspond to particular controlled devices. For example, the RCU may contain a button that is labeled "TV." When the TV button is pushed, the appropriate commands are sent to the master informing the master that the user now wishes to control the TV. The next button that is pushed, for example, the channel up button, causes the appropriate command to be sent to the master telling it, for example, that the user wishes to go to the next highest channel. The master in turn sends the RCU the necessary codes to increment the channel on the TV. The RCU then takes these codes and sends them, for example using a unidirectional infrared signal, to the TV using the protocols stored in the RCU's memory.

Mishra, EX1005, ¶37.

[0038] Alternatively, the RCU may contain sufficient memory that the master may send the RCU both the protocols and the necessary codes to control the devices. The RCU saves this information in its local memory. Then, when the user wishes to change the channel on the TV, the user pushes the TV button and this causes the RCU to enter a mode which controls the TV using the pre-sent protocols.

Mishra, EX1005, ¶38.

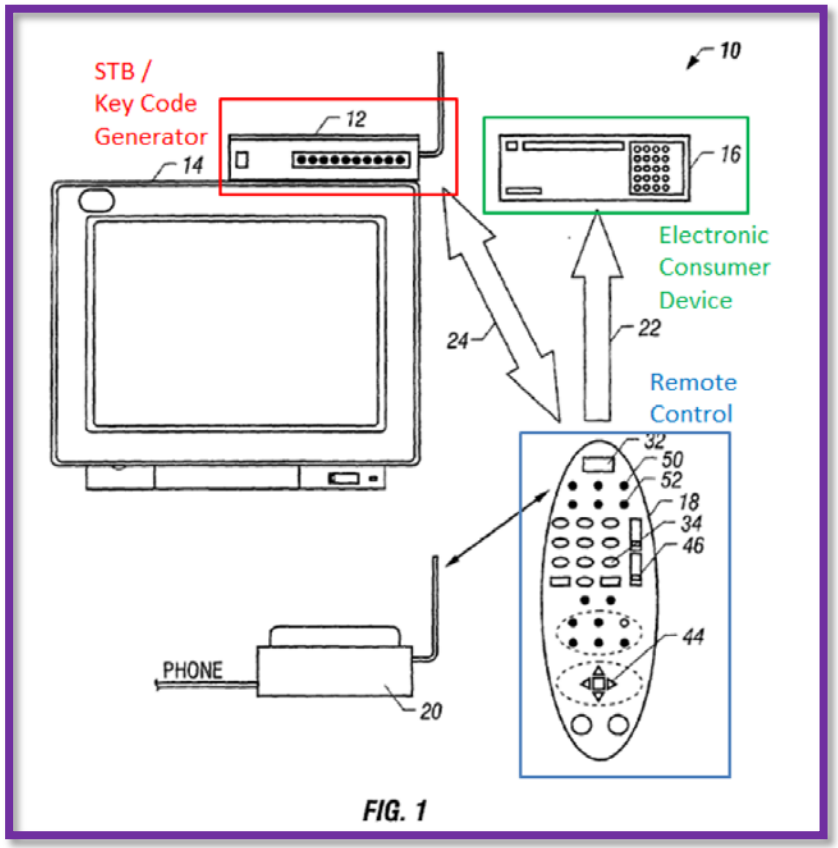
[0039] The difference between the two approaches is that in the first case, the master feeds the information to the RCU each time the RCU needs information. In the second case, the master feeds the information needed to do all the different controls for a given device initially, and then the device handles those protocols on its own.

Mishra, EX1005, ¶39.

'642 Pet. Reply, Paper 20, 7-9; Russ Reply Decl., EX1032, ¶¶21-27.

Disputed Issues – The Combination of Mishra and Dubil

Dubil provides the implementation details for Mishra's wireless transmission of a key code signal.



Mishra, EX1005, FIG. 1 (annotated).

As I previously explained, Mishra already describes the wireless transmission of key codes to its RCU using an IR or RF link. *Id.*, ¶¶125-26; EX1005, ¶¶18, 20, 26, 37. Dubil provides the implementation details for how this wireless transmission would occur. EX1003, ¶¶127-29. As I explained in my previous declaration, Dubil describes well-known parameters that a POSA would have used wireless transmit a key code. *Id.* For example, Dubil describes parameters used to modulate the key code onto a carrier signal. *Id.* UEI does not refute this teaching. Further, Dr. Sprenger has even admitted that modulating a key code onto a carrier signal was a well-known technique. *See* EX2003, ¶¶49-54, 146-50; EX1033, 54:10-55:3. In view of these admissions, even Dr. Sprenger acknowledges that a POSA would have used the modulation techniques and parameters described in Dubil to wirelessly transmit key codes. See EX2003, ¶¶49-54; EX1033, 117:21-118:7, 119:9-18, 121:3-18, 123:8-19.

Russ Reply Decl., EX1032, ¶34.

'642 Pet. Reply, Paper 20, 9-11; Russ Reply Decl., EX1032, ¶¶28-34.

Disputed Issues – The Combination of Mishra and Dubil

Dr. Sprenger confirmed that modulation was well known and used to transmit data.

Q Because the '642 patent did not invent the concept of modulation, right?

A '642 patent did not invent the very concept of modulation. The modulation concept has been known prior to that in various forms of modulation. There are many ways to modulate signals.

Sprenger Depo. Tr., EX1033, 54:19-55:3.

So if a person of ordinary skill in the art wanted to design a wireless communication system, they would first have to select the type of modulation scheme to use, right?

MR. TSUI: Object to form.

THE WITNESS: Among the many things they would have to review and decide upon, one may be a modulation scheme, but there are other factors to consider as well.

Sprenger Depo. Tr., EX1033, 117:21-118:7.

'642 Pet. Reply, Paper 20, 9-11; Russ Reply Decl., EX1032, ¶¶28-34.

Disputed Issues – Rye's Keystroke Signal and Key Code Signal

- Rye's keystroke indicator signal does not already include a key code.
- Rye is not limited to "conversion."

[0022] As shown in the schematic diagram of the remote control unit **10** depicted in **FIG. 2**, the unit **10** includes a key matrix **18**, which, in a known manner, in response to the user operation of one of the pushbuttons **14** produces a memory address signal that is applied to a microprocessor **20** in which is stored a plurality of binary control codes corresponding to the various functions of the audiovisual components that are to be controlled by the operation of unit **10**. The binary control codes stored in the microprocessor **20** are generic codes in that they are not specific for any particular brand or model of audiovisual product. The binary coded signal generated by the microprocessor **20**, in response to the user operation of one of the pushbuttons **14**, is applied to a modulator-transmitter **22** in which the microprocessor output binary coded control signal is modulated onto a radio-frequency carrier of e.g., 310 MHz. That radio-frequency binary coded signal is transmitted by an antenna **24** included in unit **10** to an addressable transceiver generally designated **30**, illustrated schematically in **FIG. 3**.

Rye, EX1007, ¶22.

[0027] IR processor **42** converts the input control signal so that it is compatible with the operating binary code for the selected audiovisual component whose IR remote control code is obtained from the look-up table **46**. That is, if the control operation that is to be performed is to Play the VCR, the IR processor **42** looks up the "VCR-Play" code from the code library **44** for the user's particular brand of VCR. That control code for "VCR-Play" is selected in IR processor **42** and is then applied to IR emitter **48** to, in turn, cause LED **50** to transmit to the addressed or selected VCR, in the example given, the selected control signal in the form of an IR binary signal that is compatible with the user's brand and model of VCR.

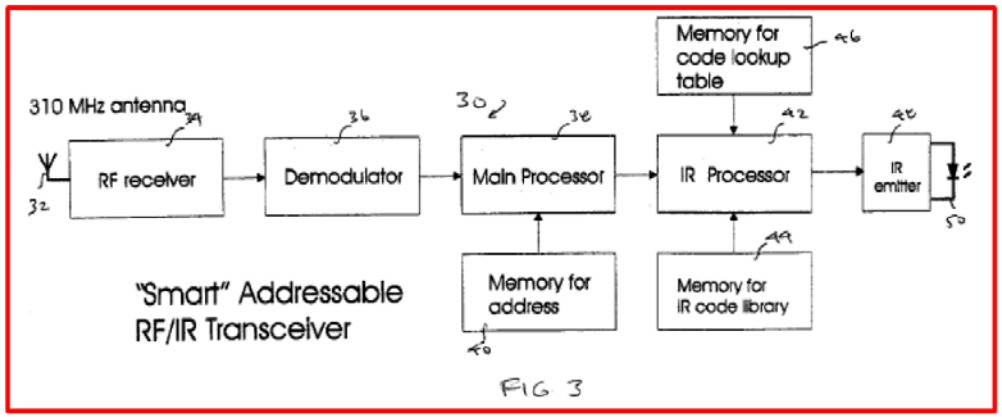
Rye, EX1007, ¶27.

'642 Pet. Reply, Paper 20, 15-16; Russ Reply Decl., EX1032, ¶¶45-50.

Disputed Issues – The Combination of Rye and Dubil

Dubil provides the implementation details for Rye's wireless transmission of a key code signal.

Key Code Generator



Rye, EX1007, FIG. 3 (annotated).

52. UEI also provides the same arguments regarding Dubil as it did for claim 1. POR, 41-43. Like the combination of Mishra and Dubil, UEI also mischaracterizes the combination of Rye and Dubil. *See id.* As I explained in my previous declaration, Rye already describes the wireless transmission of key codes from its IR emitter 48 to an electronic consumer device. EX1007, ¶¶25, 27; EX1003, ¶¶173-77. Dubil provides the implementation details for how this wireless transmission would occur. EX1003, ¶¶173-77. Specifically, Dubil describes parameters used to modulate the key code onto a carrier signal including "carrier frequency, duty cycle, protocol type (FSK, biphase, PWM, etc.), ***repetition time, on/off times of the signal,*** [and] ***bit pattern of the command code*** …." EX1006, 2:61-3:8 (emphasis added), 4:33-47, 4:60-5:5. Again, Dr. Sprenger admits that this modulation was well-known in the art and was often used to wirelessly transmit key code. *See* EX2003, ¶¶49-54; EX1033, 117:21-118:7, 119:9-18, 121:3-18, 123:8-19.

Russ Reply Decl., EX1032, ¶52.

'642 Pet. Reply, Paper 20, 16-17; Russ Reply Decl., EX1032, ¶¶51-52.

Motivation to Combine Mishra and Dubil / Rye and Dubil

Balancing tradeoffs does not negate a motivation to combine references.

Balancing "relative advantages and disadvantages… amounts to an engineering tradeoff – a decision well within the level of ordinarily skilled artisans."

-*In re Mouttet*, 686 F.3d 1322, 1330 (Fed. Cir. 2012).

"[M]ere disclosure of alternative designs does not teach away."

-*In re Mouttet*, 686 F.3d 1322, 1334 (Fed. Cir. 2012).

Dr. Sprenger admits a POSA would have been motivated to use modulation.

51. When deciding whether to modulate data for transmission, and if so, what type of modulation to use, engineers must consider the cost and complexity of each approach as compared to the requirements of the desired application.

…

Modulation increases the cost and complexity, but may end up ultimately being more effective due to the increased resiliency to signal interference. And modulation using an intermediate carrier frequency may increase the cost and complexity further, but may provide more signal reliability suitable for a particular application.

Sprenger Decl., EX2003, ¶51.

'642 Pet. Reply, Paper 20, 21; Russ Reply Decl., EX1032, ¶60.

Motivation to Combine Mishra and Dubil / Rye and Dubil

Mishra, Rye, and Dubil are analogous art.

"Two separate tests define the scope of analogous prior art:

(1) whether the art is from the same field of endeavor, regardless of the problem addressed and,
(2) if the reference is not within the field of the inventor's endeavor, whether the reference still is reasonably pertinent to the particular problem with which the inventor is involved."

-*Airbus S.A.S. v. Firepass Corp.*, 941 F.3d 1374, 1379 (Fed. Cir. 2019).

TECHNICAL FIELD

The present invention relates generally to remote control devices and, more specifically, to relaying key code signals through a remote control device to operate an electronic consumer device.

'642 Patent, EX1001, 1:6-9.

'642 Pet. Reply, Paper 20, 22, 24;
Russ Reply Decl., EX1032, ¶¶61-62, 68.

Motivation to Combine Mishra and Dubil / Rye and Dubil

Mishra, Rye, and Dubil are analogous art.

REMOTELY CONTROLLING ELECTRONIC DEVICES

BACKGROUND

[0001] This invention relates generally to remotely controlling electronic devices.

Mishra, EX1005, ¶1.

RF AUDIOVISUAL COMPONENT REMOTE CONTROL SYSTEM

BACKGROUND OF THE INVENTION

[0001] I. Field of the Invention

[0002] The present invention relates to the remote control of audiovisual components.

Rye, EX1007, ¶¶1-2.

TECHNICAL FIELD

The present invention relates generally to remote control devices and, more specifically, to relaying key code signals through a remote control device to operate an electronic consumer device.

'642 Patent, EX1001, 1:6-9.

1

CONTROL CODES FOR PROGRAMMABLE REMOTE SUPPLIED IN XML FORMAT

FIELD OF THE INVENTION

The invention relates to remote control devices and to a service for enabling the programming of remote controls to be used with consumer electronics (CE) equipment.

Dubil, EX1006, 1:4-9.

'642 Pet. Reply, Paper 20, 22, 24;
Russ Reply Decl., EX1032, ¶¶61-62, 68.

Motivation to Combine Mishra and Dubil / Rye and Dubil

Despite UEI's continuous attempts to characterize the combinations as such, the instituted grounds do not rely on bodily incorporation.

"The test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference … but rather whether a 'skilled artisan would have been motivated to combine the teachings of the prior art references to achieve the claimed invention.'"

-Allied Erecting & Dismantling Co. v. Genesis Attachments, LLC, 825 F.3d 1373, 1381 (Fed. Cir. 2016).

Indeed, Petitioner does not address the fact that Dubil teaches running database queries on a server while Mishra teaches performing similar operations concerning the codeset at a STB (POR at 20-21; EX2003 at ¶ 152). This fundamental incompatibility is the precise reason why Dubil does not simply fill in "operational details" from Mishra (*e.g.*, Petition at 31).

PO Sur-Reply, Paper 23, 18-19.

'642 Pet. Reply, Paper 20, 23-24; Russ Reply Decl., EX1032, ¶63-66.

Motivation to Combine Mishra and Dubil / Rye and Dubil

Despite UEI's continuous attempts to characterize the combinations as such, the instituted grounds do not rely on bodily incorporation.

"The test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference … but rather whether a 'skilled artisan would have been motivated to combine the teachings of the prior art references to achieve the claimed invention.'"

-Allied Erecting & Dismantling Co. v. Genesis Attachments, LLC, 825 F.3d 1373, 1381 (Fed. Cir. 2016).

Petitioner's Reply next accuses UEI of, again, misstating the obviousness standard (Reply at 25). Indeed, the Reply states "[t]he Petition does not advocate for physically combing components such as a server, an XML application, a graphical user interface, and an IR transmitter, with Rye's system" (Reply at 25 (quotations omitted)). Yet, the Petition repeatedly states that Dubil is merely being used to fill in "back-end operational details" (Pet. at 39). The fact is that Dubil teaches away from Rye so that the "operational details" do not actually result in an operating device (POR at 35-37). For this reason, a POSITA would not have been motivated to combine Dubil with the fundamentally incompatible solution described in Rye.

PO Sur-Reply, Paper 23, 20.

'642 Pet. Reply, Paper 20, 23-24; Russ Reply Decl., EX1032, ¶63-66.

’642 Patent – All Elements Disclosed or Obvious

IPR2019-01612 (’642 Patent) – Claim 1
1. A method comprising:
(a) receiving a keystroke indicator signal from a remote control device, wherein the keystroke indicator signal indicates a key on said remote control device that a user has selected;
(b) generating a key code within a key code generator device using the keystroke indictor signal;
(c) modulating said key code onto a carrier signal, thereby generating a key code signal; and
(d) transmitting said key code signal from said key code generator device to said remote control device.

IPR2019-01612 (’642 Patent) – Claim 2
2. A method comprising:
(a) receiving a keystroke indicator signal from a remote control device, wherein the keystroke indicator signal indicates a key on said remote control device that a user has selected;
(b) generating a key code within a key code generator device using the keystroke indictor signal;
(c) modulating said key code onto a carrier signal, thereby generating a key code signal; and
(d) transmitting said key code signal from said key code generator device to an electronic consumer device.

’642 Pet., Paper 2, 1-2, 27; ’642 DI, Paper 7, 35.

Instituted Grounds - IPR2019-01614 (’325 Patent)

IPR2019-01614 (’325 Patent)		
	Claim(s)	References
Ground 1	1, 2, 3, 5, 7	Rye (EX1005) and Skerlos (EX1006)
Ground 2	1-5	Caris (EX1007) and Dubil (EX1008)

’325 Pet., Paper 2, 3; ’325 DI., Paper 7, 8, 36.

’325 Patent – Independent Claim 1

Claim 1 is directed to Embodiment 2, similar to Claim 2 from the ’642 Patent.

IPR2019-01614 (’325 Patent) – Claim 1
1. A first device for transmitting a command to control a functional operation of a second device, the first device comprising:
a receiver;
a transmitter;
a processing device coupled to the receiver and the transmitter; and
a memory storing instructions executable by the processing device, the instructions causing the processing device to:
generate a key code using a keystroke indicator received from a third device in communication with first device via use of the receiver, the keystroke indicator having data that indicates an input element of the third device that has been activated;
format the key code for transmission to the second device; and
transmit the formatted key code to the second device in a key code signal via use of the transmitter;
wherein the generated key code comprises a one of a plurality of key code data stored in a codeset, wherein the one of the plurality of key code data is selected from the codeset as a function of the keystroke indicator received from the third device, wherein each of the plurality of key code data stored in the codeset comprises a series of digital ones and/or digital zeros, and
wherein the codeset further comprises time information that describes how a digital one and/or a digital zero within the selected one of the plurality of key code data is to be represented in the key code signal to be transmitted to the second device.

’325 Pet., Paper 2, 4-6, 13-14; Russ Decl., EX1003, ¶¶104-13.

Additional Disputed Issues

I. Rye in view of Skerlos
   A. Claim 1
   B. Motivation to Combine

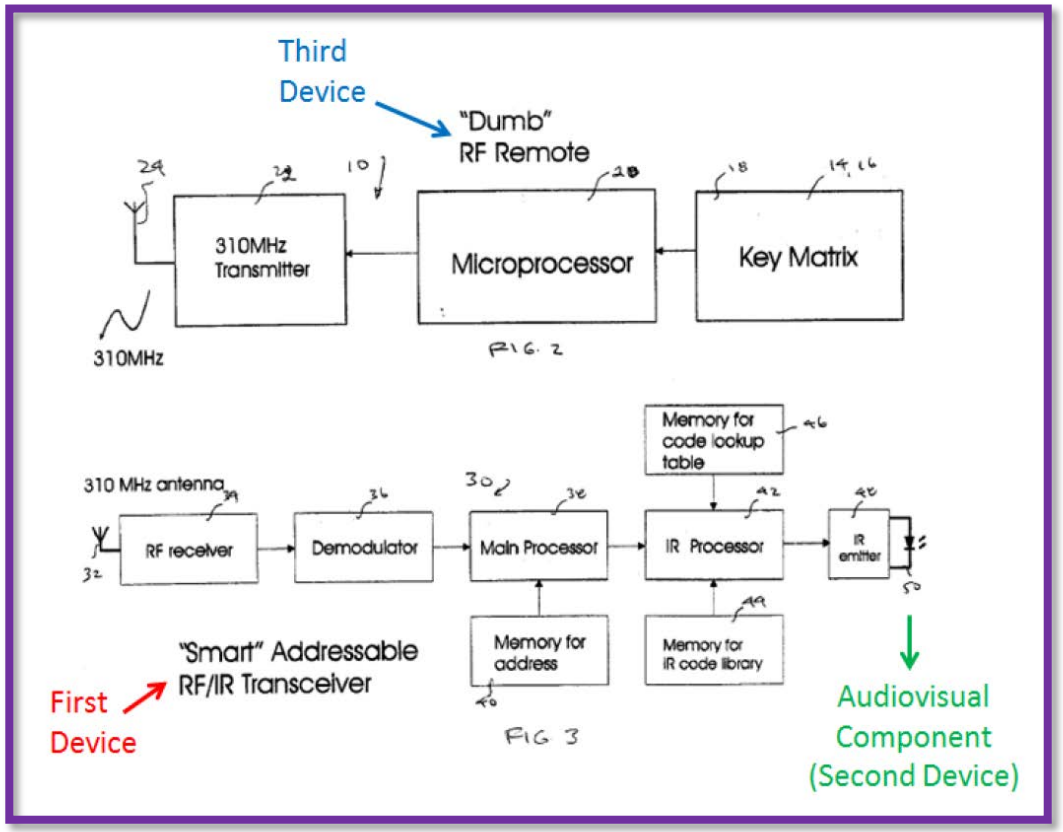
II. Caris in view of Dubil
   A. Claim 1
   B. Motivation to Combine

*The Appendix addresses the dependent claims.

Claim 1 – Rye in View of Skerlos

Rye discloses the claimed First, Second, and Third Devices.

1. A first device for transmitting a command to control a functional operation of a second device, the first device comprising:

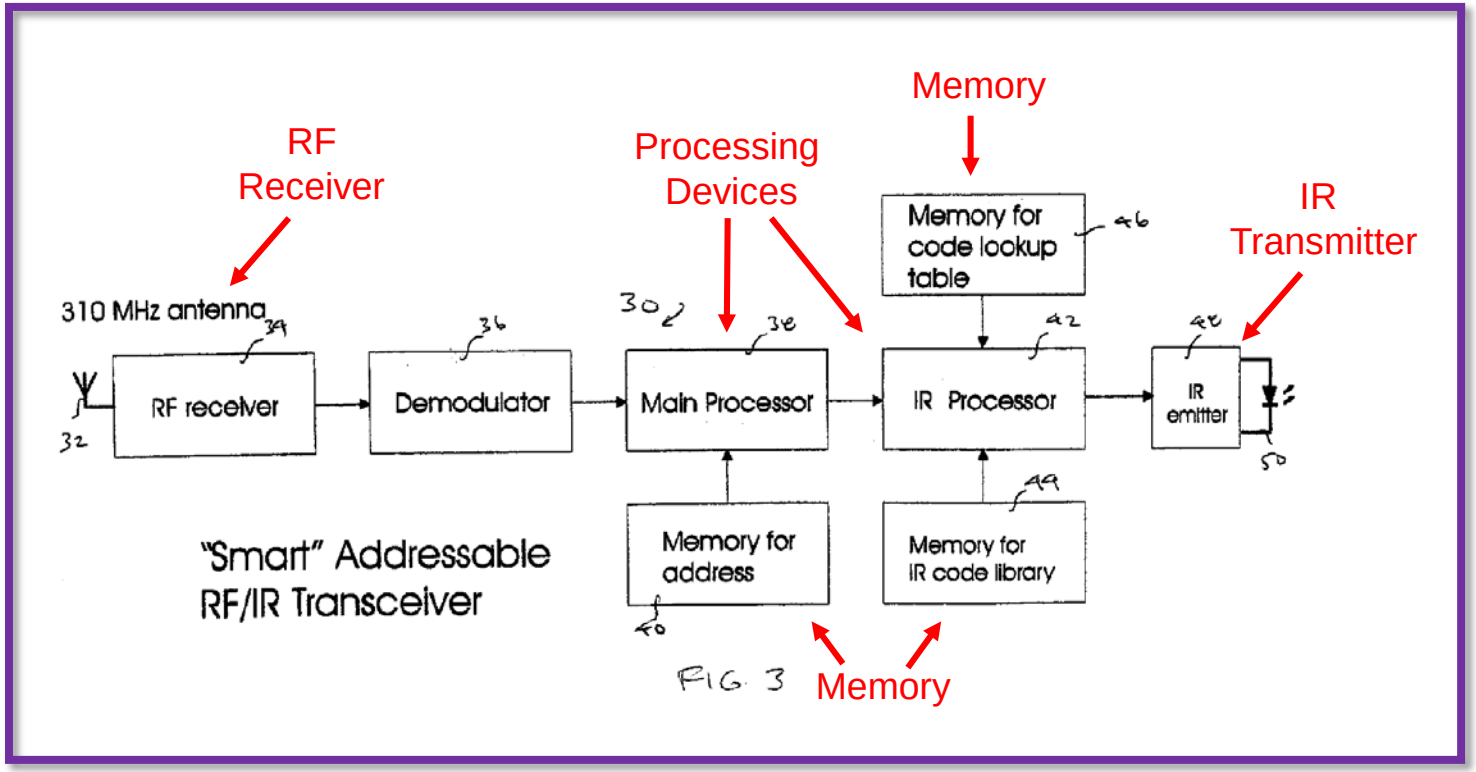


Rye, EX1005, FIGs. 2-3 (annotated).

'325 Pet., Paper 2, 13-32; Russ Decl., EX1003, ¶¶112-56.

Claim 1 – Rye in View of Skerlos

Rye discloses the claimed “Receiver,” “Transmitter,” “Processing Device,” and “Memory.”



Rye, EX1005, FIG. 3 (annotated)

’325 Pet., Paper 2, 13-19; Russ Decl., EX1003, ¶¶112-25.

Claim 1 – Rye in View of Skerlos

Dr. Sprenger admits that it was obvious to implement "memory storing instructions executable by the processing device"

Q So microcontrollers having ROM were -- existed in the market before 2003, right?

A Microcontrollers with existing ROM on chip were just some of the microcontrollers that existed at the time. But to your question, yes, such microcontrollers existed. They are, of course, not the only way to implement such a system or such a remote control.

Sprenger Depo. Tr., EX1031, 215:22-216:7.

THE WITNESS: In order to do that, you would need a number of components, some of which would be like a Zilog Z8. That was a common microcontroller at the time. Some read-only memory. You would, of course, also have to write software that the microcontroller would run.

Sprenger Depo. Tr., EX1031, 214:2-7.

'325 Pet. Reply, Paper 19, 7; Russ Decl., EX1030, ¶¶16-20.

Claim 1 – Rye in View of Skerlos

Rye in view of Skerlos discloses the claimed "Generate," "Format," and "Transmit" steps performed by the "processing device." (*See* Slides 20-22.)

IPR2019-01614 ('325 Patent) – Claim 1
generate a key code using a keystroke indicator received from a third device in communication with first device via use of the receiver, the keystroke indicator having data that indicates an input element of the third device that has been activated;
format the key code for transmission to the second device; and
transmit the formatted key code to the second device in a key code signal via use of the transmitter;

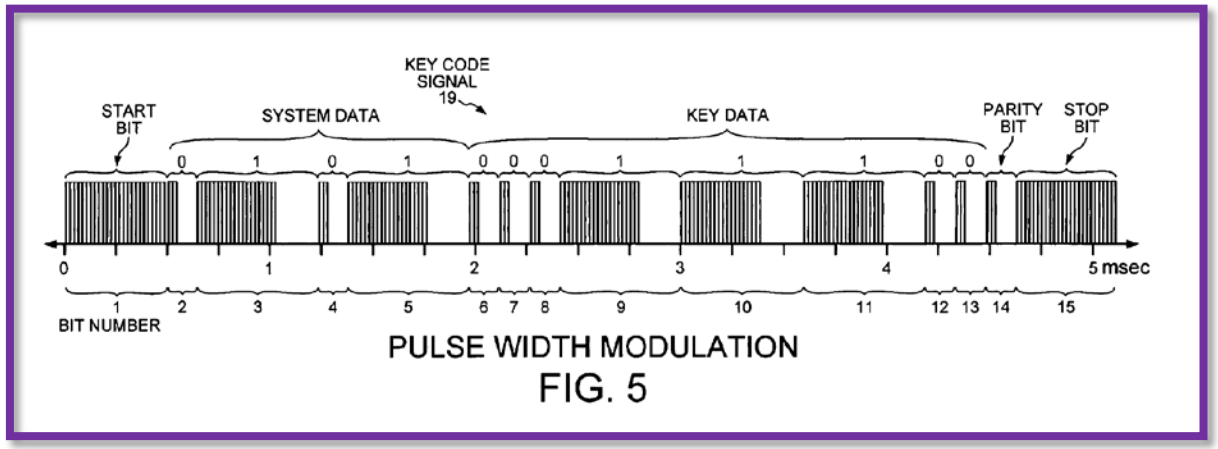
[0027] IR processor **42** converts the input control signal so that it is compatible with the operating binary code for the selected audiovisual component whose IR remote control code is obtained from the look-up table **46**. That is, if the control operation that is to be performed is to Play the VCR, the IR processor **42** looks up the "VCR-Play" code from the code library **44** for the user's particular brand of VCR. That control code for "VCR-Play" is selected in IR processor **42** and is then applied to IR emitter **48** to, in turn, cause LED **50** to transmit to the addressed or selected VCR, in the example given, the selected control signal in the form of an IR binary signal that is compatible with the user's brand and model of VCR.

Rye, EX1005, ¶27; *see also* Rye, EX1005, ¶24.

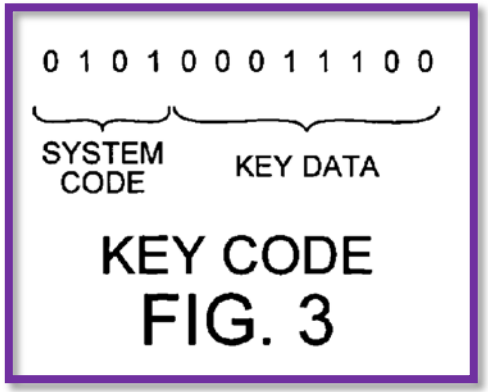
'325 Pet., Paper 2, 19-27; Russ Decl., EX1003, ¶¶126-43.

Claim 1 – Rye in View of Skerlos

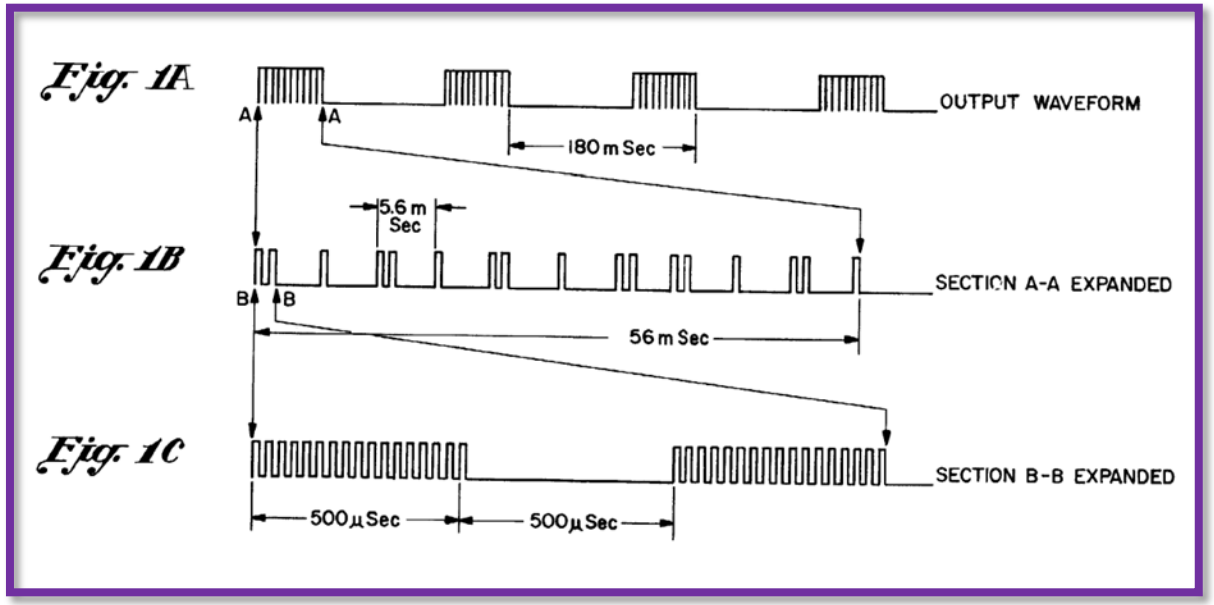
Skerlos discloses formatting the key code, which is inclusive of modulation.



’325 Patent, EX1001, FIG. 5.



’325 Patent, EX1001, FIG. 3.



Skerlos, EX1006, FIGs. 1A-1C.

’325 Pet., Paper 2, 22-26; Russ Decl., EX1003, ¶¶133-42.

Claim 1 – Rye in View of Skerlos

Rye discloses selecting a key code from a codeset in response to receiving a keystroke indicator.

IPR2019-01614 ('325 Patent) – Claim 1
wherein the generated key code comprises a one of a plurality of key code data stored in a codeset, wherein the one of the plurality of key code data is selected from the codeset as a function of the keystroke indicator received from the third device, wherein each of the plurality of key code data stored in the codeset comprises a series of digital ones and/or digital zeros, and

[0024] If an address match is detected in microprocessor **38** its output is applied to one input of an infrared (IR) processor **42**, which receives at another input the contents of a universal IR code library memory **44**. Memory **44** contains the remote control codes for all brands, e.g., Sony and Zenith, and models of commercially available audiovisual components. For example, if the audiovisual component is a television receiver identified on the user's remote control unit as TV 1 is a Sony and a second television receiver in the home identified as TV 2 is a Zenith, memory **44** would store the Sony remote control code for TV 1 and the Zenith remote control code for TV 2. (DAVE, WHERE AND HOW ARE TV1 AND TV 2 IDENTIFIED HERE?) IR microprocessor **42** also receives an input from a memory **46** for the code lookup table. The remote control codes stored in memory **46**, which are derived from code library memory **44** through the microprocessor **42**, may be periodically supplemented or otherwise modified by the user when a new audiovisual component is acquired or a currently owned component is discarded. IR processor **42** looks up the received control code, e.g., "VCR Play", from the IR code library **44**.

Rye, EX1005, ¶24.

'325 Pet., Paper 2, 27-29; Russ Decl., EX1003, ¶¶144-48.

Claim 1 – Rye in View of Skerlos

Rye discloses the key code data being a series of digital ones and/or digital zeros (i.e., binary numbers).

IPR2019-01614 ('325 Patent) – Claim 1
wherein the generated key code comprises a one of a plurality of key code data stored in a codeset, wherein the one of the plurality of key code data is selected from the codeset as a function of the keystroke indicator received from the third device, wherein each of the plurality of key code data stored in the codeset comprises a series of digital ones and/or digital zeros, and

[0027] IR processor **42** converts the input control signal so that it is compatible with the operating binary code for the selected audiovisual component whose IR remote control code is obtained from the look-up table **46**. That is, if the control operation that is to be performed is to Play the VCR, the IR processor **42** looks up the "VCR-Play" code from the code library **44** for the user's particular brand of VCR. That control code for "VCR-Play" is selected in IR processor **42** and is then applied to IR emitter **48** to, in turn, cause LED **50** to transmit to the addressed or selected VCR, in the example given, the selected control signal in the form of an IR binary signal that is compatible with the user's brand and model of VCR.

Rye, EX1005, ¶27.

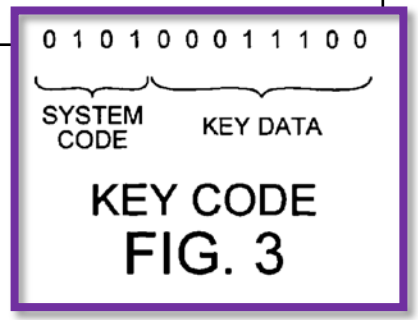
'325 Pet., Paper 2, 27-29; Russ Decl., EX1003, ¶¶144-48.

Claim 1 – Rye in View of Skerlos

Dr. Sprenger admits that a binary code teaches "a series of digital ones and/or digital zeros."

IPR2019-01614 ('325 Patent) – Claim 1

wherein the generated key code comprises a one of a plurality of key code data stored in a codeset, wherein the one of the plurality of key code data is selected from the codeset as a function of the keystroke indicator received from the third device, wherein each of the plurality of key code data stored in the codeset comprises a series of digital ones and/or digital zeros, and



'325 Patent, EX1001, FIG. 3.

THE WITNESS: So if we look at Figure 3 of the '325 patent, it illustrates a key code. A key code is -- consists in this particular example of a system code and what is called the key data.

BY MR. TANG:

Q And that's a binary number, right?

A And the system code and the key data in this particular example are represented by binary numbers.

Q So looking at the claim then, it says, Key code data comprises a series of digital 1s and/or digital 0s, right?

A I'm looking at the words on the '325 printout. Yes, I see what you mean.

Sprenger Depo. Tr., EX1033, 32:3-19.

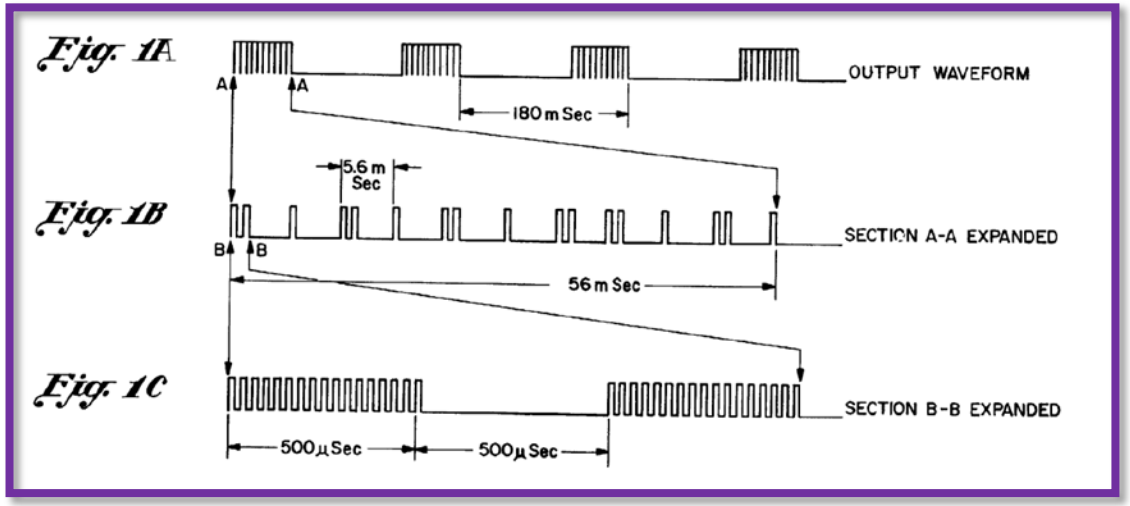
'325 Pet. Reply, Paper 19, 13; Russ Decl., EX1030, ¶39.

Claim 1 – Rye in View of Skerlos

Skerlos discloses timing information used to format the key code signal.

IPR2019-01614 ('325 Patent) – Claim 1

wherein the codeset further comprises time information that describes how a digital one and/or a digital zero within the selected one of the plurality of key code data is to be represented in the key code signal to be transmitted to the second device.



Skerlos, EX1006, FIGs. 1A-1C.

Shown in FIG. 1A is the output wave form of the transmitted IR signal which is repeated every 180 milliseconds. Each series of pulses is pulse code modulated as shown in FIG. 1B wherein an individual pulse train is presented in expanded form to show the coded pulse arrangement of the transmitted pulse groups. The 11 bits of coded information are transmitted in approximately 56 milliseconds. Shown in FIG. 1C is a still expanded view of a single data bit comprised of two pulse trains each 500 microseconds in length. A 500 millisecond interval is incorporated between individual pulse trains. The individual pulses shown in FIG. 1C represent the ON/OFF pulsing of the transmitter's light emitting diodes (LEDs). The LEDs are pulsed on and off in order to permit high current pulses at low duty cycles resulting in high power outputs of the I.R. diodes allowing increased range.

Skerlos, EX1006, 3:20-36.

'325 Pet., Paper 2, 29-32; Russ Decl., EX1003, ¶¶149-56.

Motivation to Combine Rye with Skerlos

104. While Rye describes the transmission of a key code from a key code generator device to an electronic consumer device, such as a VCR, as described in Embodiment 2, Rye does not explicitly provide operational details explaining how this transmission would occur. *See* EX1007, ¶27. For example, Rye does not explicitly describe the formatting of a key code for transmission. A POSA would have understood, however, that the key code transmission would have been performed by modulating the control code onto a carrier frequency using timing information and that this process would teach the claimed formatting. A POSA would have further understood common techniques for doing so, such as RC-5 and NEC, as described above. *See* Section VI.A.

Russ Decl., EX1003, ¶104.

109. If a POSA sought to implement Rye's process of wirelessly transmitting control codes from a transceiver to an audiovisual component, the POSA would have been motivated to find references such as Skerlos describing well-known techniques and parameters used for wirelessly transmitting control codes.

Russ Decl., EX1003, ¶109.

'325 Pet., Paper 2, 22-26; Russ Decl., EX1003, ¶¶104-11, 133-42.

Motivation to Combine Rye with Skerlos

110. Further, implementing the transmission parameters described in Skerlos with the transceiver described in Rye would result in merely combining known elements to yield predictable results. Both Rye and Skerlos describe the transmission of control codes using a wireless IR transmitter. EX1005, ¶25; EX1006, 3:20-36. While Skerlos describes the transmission of the control code from a remote control, a POSA would have easily used the same IR emitter technology described in Rye to transmit a control code in the same manner described in Skerlos. As previously explained, transmitting key codes from devices other than remote controls as well as modulating key codes onto carrier signals were well-known techniques. *See* Sections VI.B, VI.C, VI.D.

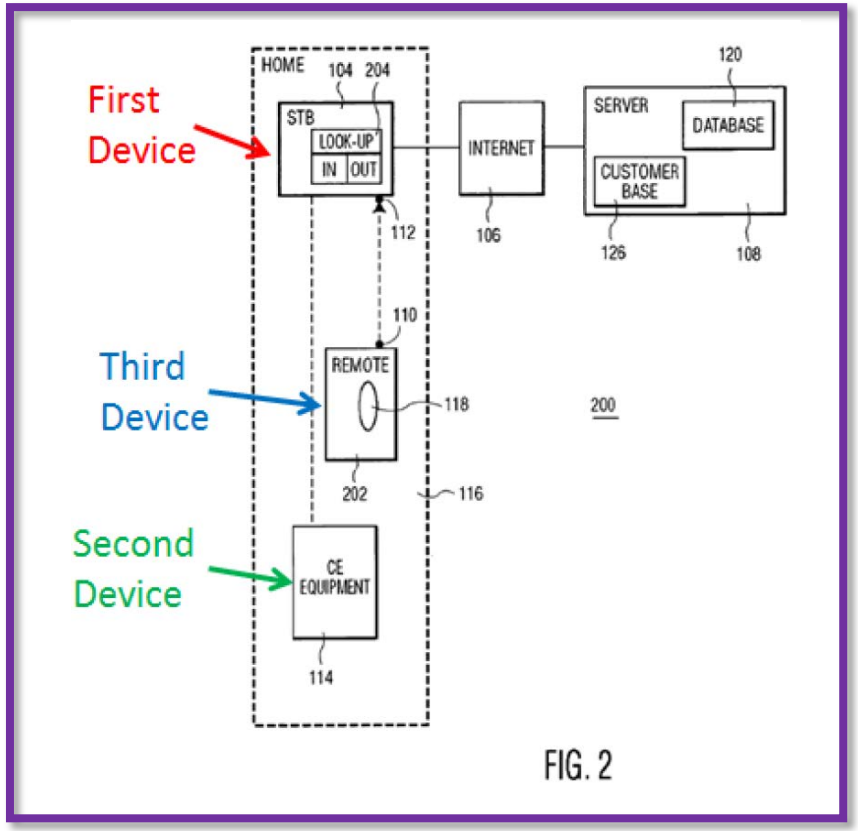
Russ Decl., EX1003, ¶110.

'325 Pet., Paper 2, 22-26; Russ Decl., EX1003, ¶¶104-11, 133-42.

Claim 1 – Caris in View of Dubil

Caris discloses the claimed First, Second, and Third Devices.

1. A first device for transmitting a command to control a functional operation of a second device, the first device comprising:

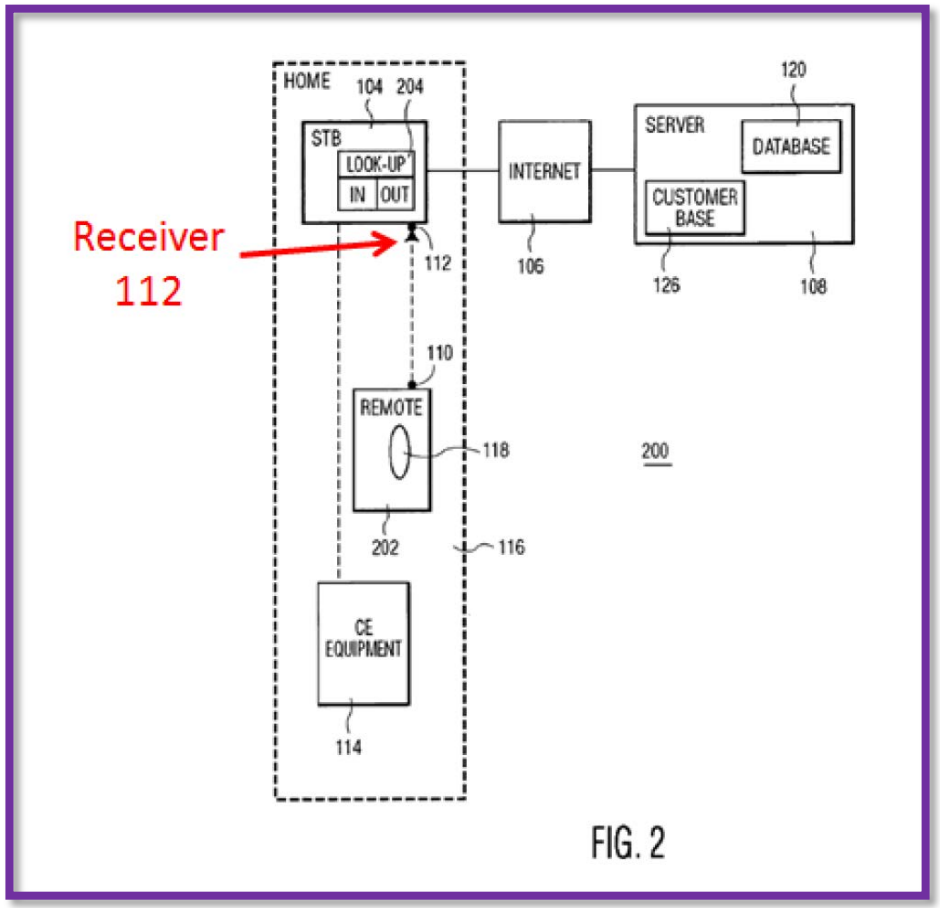


Caris, EX1007, FIG. 2.

’325 Pet., Paper 2, 38-53; Russ Decl., EX1003, ¶¶166-205.

Claim 1 – Caris in View of Dubil

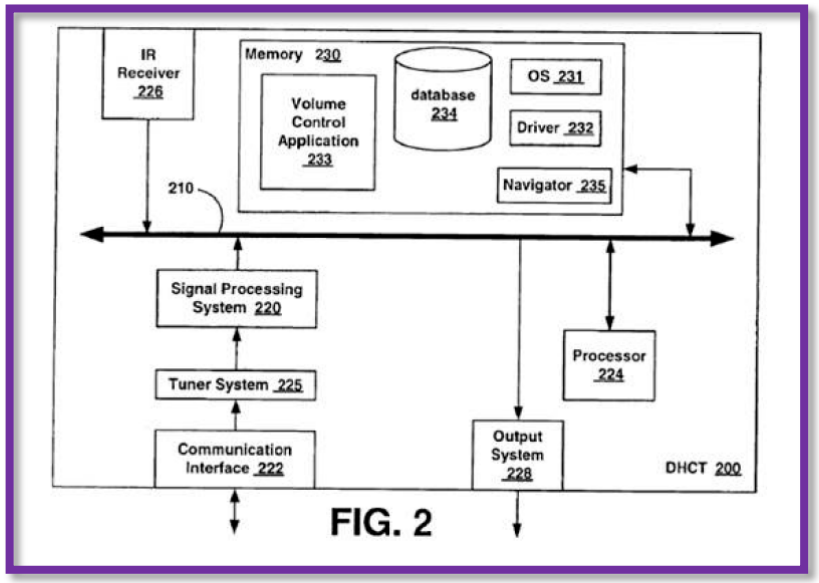
Caris discloses the claimed "receiver," "transmitter," "processing device," and "memory."



Caris, EX1007, FIG. 2.

> Preferably, the STB or other IP-connected equipment is equipped with an IR or RF transmitter in the front bezel and with a range long enough to reach a user on the couch (typically 10 feet from the display screen) to minimize the user's efforts required.

Caris, EX1007, 4:47-51.



Bayley, EX1018, FIG. 2.

'325 Pet., Paper 2, 38-43; Russ Decl., EX1003, ¶¶166-83.

Claim 1 – Caris in view of Dubil

Caris in view of Dubil discloses the claimed "generate," "format," and "transmit" steps performed by the "processing device."

IPR2019-01614 ('325 Patent) – Claim 1
generate a key code using a keystroke indicator received from a third device in communication with first device via use of the receiver, the keystroke indicator having data that indicates an input element of the third device that has been activated;
format the key code for transmission to the second device; and
transmit the formatted key code to the second device in a key code signal via use of the transmitter;

Preferably, remote **102** has a dedicated button **118** for allowing the consumer to connect STB **104** via the Internet **106** to a specific server **108**. The IR or RF code transmitted by remote **102** upon the consumer activating button **118** is interpreted by STB **104** as a request to send a message to server **108**. Server **108** presents a web site on a TV display monitor (not shown) connected to STB **104** that guides the consumer to providing certain information.

Caris, EX1007, 5:44-51.

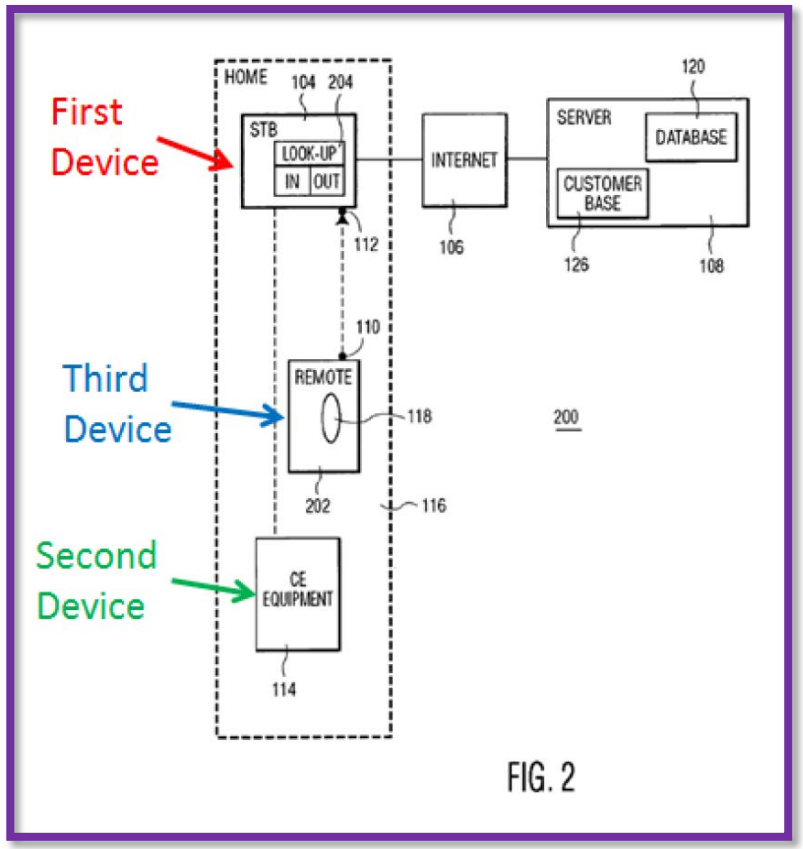
Server **108** runs a query based on the information supplied by the consumer. Upon a match between the information supplied and database **120**, server **108** preferably prompts the consumer to confirm his/her entries as to the specifics of the further equipment and the specific regarding the UI desired. Upon a confirmation by the consumer, server **108** downloads to appliance **104** data representative of a control code and/or UI for being programmed into remote control device **102** via appliance **104**. The downloaded data can be stored locally at STB **104** or is directly forwarded to remote **102**.

Caris, EX1007, 5:60-6:3.

'325 Pet., Paper 2, 44-49; Russ Decl., EX1003, ¶¶184-94.

Claim 1 – Caris in View of Dubil

Caris teaches the claimed "generating" and "transmitting."



Caris, EX1007, FIG. 2.

FIG. **2** illustrates an alternative system **200** according to the invention. System **200** comprises in this example a remote control device **202** that is a pre-programmed. That is, remote **202** uses a fixed protocol to communicate with STB **104** for control of apparatus **114** via STB **104**. STB **104** uses a wired or wireless link with apparatus **114**. In order to use this configuration with any kind of controllable apparatus **114**, the user connects STB **104** to server **108** on the Internet **106** in response to the user activating a dedicated hard button **118** (or softkey **118** if remote **202** has an LCD touch screen functionality such as the PRONTO™) on remote **202**. The user then specifies to server **108** what apparatus **114** he/she would like to control via remote **202**, as in the example mentioned in the description of FIG. **1**. Server **108** then downloads to STB **104** data representative of a control code for control of apparatus **114**, the control being established via STB **102** in operational use. The data gets programmed into a look-up table **204** that associates an input received from remote **202** with an output as programmed. The output is now the data for the control command required for control of apparatus **114** via STB **104**.

Caris, EX1007, 6:53-7:5.

'325 Pet., Paper 2, 44-49; Russ Decl., EX1003, ¶¶184-94.

Claim 1 – Caris in View of Dubil

Dubil discloses formatting the key code, which is inclusive of modulation.

More specifically, the IR or RF codes are described using XML. A number of parameters can be defined using XML tags, for example, carrier frequency, duty cycle, protocol type (FSK, biphase, PWM, etc.), repetition time, on/off times of the signal, bit pattern of the command code, semantic meaning of the code, type of device for which it is intended (CD, VCR, TV, DVD, etc.), the brand name of the specific protocol, etc. Preferably, these data fields are not all used within the remote: only the information required to transmit the actual IR or RF code needs to be stored.

Dubil, EX1008, 2:61-3:8; *see also* Dubil, EX1008, 4:33-47, 4:60-5:5.

'325 Pet., Paper 2, 45-48; Russ Decl., EX1003, ¶¶188-93.

Claim 1 – Caris in View of Dubil

Caris discloses selecting a key code from a codeset in response to receiving a keystroke indicator.

IPR2019-01614 ('325 Patent) – Claim 1
wherein the generated key code comprises a one of a plurality of key code data stored in a codeset, wherein the one of the plurality of key code data is selected from the codeset as a function of the keystroke indicator received from the third device, wherein each of the plurality of key code data stored in the codeset comprises a series of digital ones and/or digital zeros, and

FIG. **2** illustrates an alternative system **200** according to the invention. System **200** comprises in this example a remote control device **202** that is a pre-programmed. That is, remote **202** uses a fixed protocol to communicate with STB **104** for control of apparatus **114** via STB **104**. STB **104** uses a wired or wireless link with apparatus **114**. In order to use this configuration with any kind of controllable apparatus **114**, the user connects STB **104** to server **108** on the Internet **106** in response to the user activating a dedicated hard button **118** (or softkey **118** if remote **202** has an LCD touch screen functionality such as the PRONTO™) on remote **202**. The user then specifies to server **108** what apparatus **114** he/she would like to control via remote **202**, as in the example mentioned in the description of FIG. **1**. Server **108** then downloads to STB **104** data representative of a control code for control of apparatus **114**, the control being established via STB **102** in operational use. The data gets programmed into a look-up table **204** that associates an input received from remote **202** with an output as programmed. The output is now the data for the control command required for control of apparatus **114** via STB **104**.

Caris, EX1007, 6:53-7:5.

'325 Pet., Paper 2, 44-45, 49-51; Russ Decl., EX1003, ¶¶195-200.

Claim 1 – Caris in View of Dubil

Dubil discloses a key code comprising a digital one/digital zero as well as timing information.

IPR2019-01614 ('325 Patent) – Claim 1
wherein the codeset further comprises time information that describes how a digital one and/or a digital zero within the selected one of the plurality of key code data is to be represented in the key code signal to be transmitted to the second device.

More specifically, the IR or RF codes are described using XML. A number of parameters can be defined using XML tags, for example, carrier frequency, duty cycle, protocol type (FSK, biphase, PWM, etc.), repetition time, on/off times of the signal, bit pattern of the command code, semantic meaning of the code, type of device for which it is intended (CD, VCR, TV, DVD, etc.), the brand name of the specific protocol, etc. Preferably, these data fields are not all used within the remote: only the information required to transmit the actual IR or RF code needs to be stored.

Dubil, EX1008, 2:61-3:8; *see also* Dubil, EX1008, 4:33-47, 4:60-5:5

'325 Pet., Paper 2, 52-53; Russ Decl., EX1003, ¶¶201-05.

Motivation to Combine Caris with Dubil

169. A POSA using the STB described in Caris and looking to understand how Caris organizes, formats, and transmits its control codes would have recognized that Dubil provided that understanding. Dubil provides examples of well-known modulation techniques as well as key code formats used to transmit key codes and means and mechanisms for organizing such formats (*viz.* XML). *See* Sections VI.A, VI.B, VI.D. A POSA would have known to look to references like Dubil because both Caris and Dubil describe set-top boxes that retrieve and transmit key codes. EX1007, 6:58-7:5; EX1008, 4:60-5:26. A POSA would have easily implemented and utilized the same well-known transmission techniques described in Dubil to format and modulate a control code onto an IR or RF carrier frequency and transmit the corresponding signal to a remote control without undue experimentation and with a reasonable expectation of success. EX1007, 4:47-48, 4:1-2. These techniques were well-known and often employed in STBs well-before the '325 patent. *See* Sections VI.A, VI.B, VI.D. Implementing the modulation techniques described in Dubil with the STB described in Caris would result in merely combining known elements to yield predictable results.

Russ Decl., EX1003, ¶169.

'325 Pet., Paper 2, 38-39, 45-53; Russ Decl., EX1003, ¶¶166-69.

’325 Patent – All Elements Disclosed or Obvious

IPR2019-01614 (’325 Patent) – Claim 1
1. A first device for transmitting a command to control a functional operation of a second device, the first device comprising:
a receiver;
a transmitter;
a processing device coupled to the receiver and the transmitter; and
a memory storing instructions executable by the processing device, the instructions causing the processing device to:
generate a key code using a keystroke indicator received from a third device in communication with first device via use of the receiver, the keystroke indicator having data that indicates an input element of the third device that has been activated;
format the key code for transmission to the second device; and
transmit the formatted key code to the second device in a key code signal via use of the transmitter;
wherein the generated key code comprises a one of a plurality of key code data stored in a codeset, wherein the one of the plurality of key code data is selected from the codeset as a function of the keystroke indicator received from the third device, wherein each of the plurality of key code data stored in the codeset comprises a series of digital ones and/or digital zeros, and
wherein the codeset further comprises time information that describes how a digital one and/or a digital zero within the selected one of the plurality of key code data is to be represented in the key code signal to be transmitted to the second device.

’325 Pet., Paper 2, 3; ’325 DI., Paper 7, 8, 36.

Instituted Grounds - IPR2019-01613 (’389 Patent)

IPR2019-01613 (’389 Patent)		
	Claim(s)	References
Ground 1	2, 3	Mishra (EX1005), Dubil (EX1006), and Van Ee (EX1013)
Ground 2	4, 7-15	Mishra and Dubil
Ground 3	5	Mishral, Dubil, and Lambrechts (EX1011)
Ground 4	2, 3	Caris (EX1008), Skerlos (EX1009), Van Ee
Ground 5	4, 11	Caris and Skerlos
Ground 6	5, 8	Caris, Skerlos, and Lambrechts (EX1011)
Ground 7	10, 12, 15	Caris, Skerlos, and Yazolino (EX1012)
Ground 8	13, 14	Caris, Skerlos, Yazolino, and Lambrechts

’389 Pet., Paper 2, 3; ’389 DI, Paper 12, 7, 41.

’389 Patent – Independent Claim 2

Claim 2 adds element (e) and removes the destination of the key code signal.

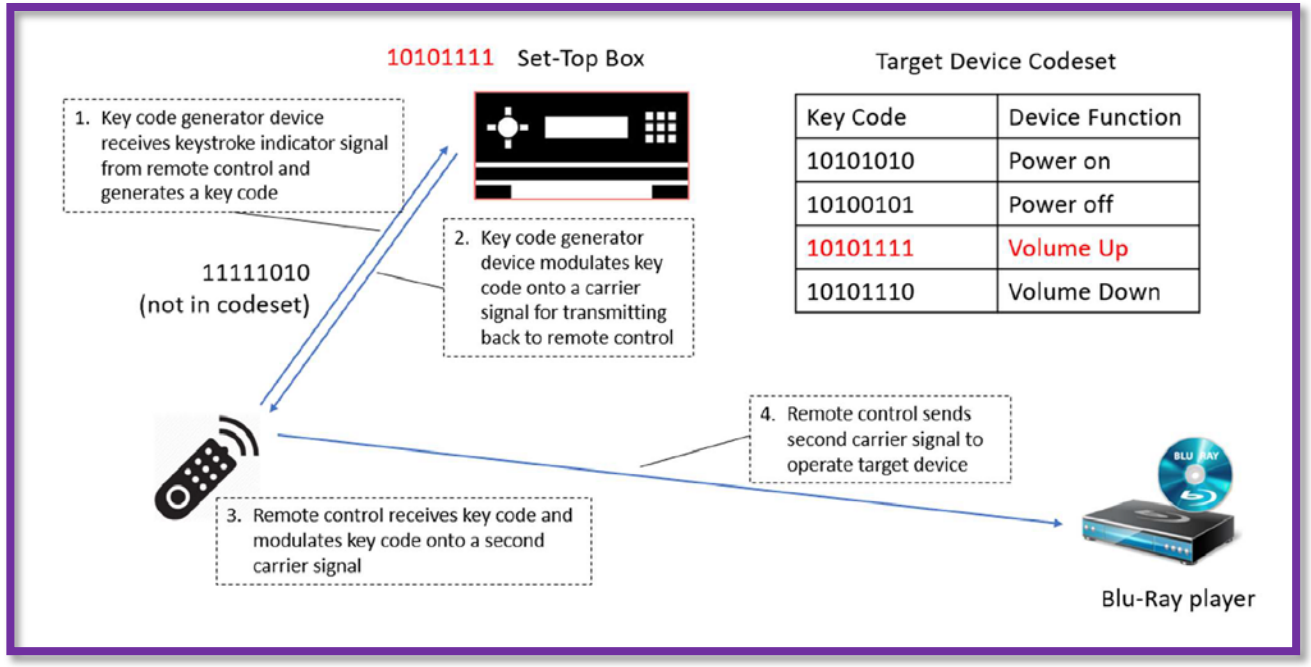
IPR2019-01613 (’389 Patent) – Claim 2
2. A method comprising:
(a) receiving a keystroke indicator signal from a remote control device, wherein the keystroke indicator signal indicates a key on said remote control device that a user has selected;
(b) generating a key code within a key code generator device using the keystroke indicator signal, **wherein said key code is part of a codeset that controls an electronic consumer device**;
(c) modulating said key code onto a carrier signal, thereby generating a key code signal;
(d) transmitting said key code signal from said key code generator device; and
(e) identifying said codeset using input from a user of said remote control device, wherein said codeset is identified when said user stops pressing a key on said remote control device.

IPR2019-01612 (’642 Patent) – Claim 1
1. A method comprising:
(a) receiving a keystroke indicator signal from a remote control device, wherein the keystroke indicator signal indicates a key on said remote control device that a user has selected;
(b) generating a key code within a key code generator device using the keystroke indictor signal;
(c) modulating said key code onto a carrier signal, thereby generating a key code signal; and
(d) transmitting said key code signal from said key code generator device ~~**to said remote control device**~~.

’389 Patent – Independent Claim 4

Claim 4 is directed to a remote control device.

IPR2019-01613 (’389 Patent) – Claim 4
4. A remote control device comprising:
a receiver that receives a first key code signal, wherein said first key code signal is generated by modulating a key code onto a first carrier signal, said first carrier signal falling within a radio frequency band;
a transmitter that transmits a second key code signal, wherein said second key code signal is generated by modulating said key code onto a second carrier signal, said second carrier signal falling within an infrared frequency band; and
a keypad that includes a key that corresponds to said key code, wherein said key code corresponds to a function of an electronic consumer device, and wherein said remote control device is contained within a single structure.



’389 Pet., Paper 2, 25-32; ’389 Pet. Reply, Paper 22, 6, 18-19.

’389 Patent – Independent Claim 12

Claim 12 is similar to claim 4 and also directed to a remote control device.

IPR2019-01613 (’389 Patent) – Claim 12
12. A remote control device comprising:
a keypad;
an RF receiver;
an IR transmitter; and
means for receiving a key code from said RF receiver and for sending said key code to said IR transmitter such that said key code is modulated onto an IR carrier signal, said IR carrier signal with said key code modulated thereon being transmitted from said remote control device by said IR transmitter, wherein said remote control device is contained within a single structure.

IPR2019-01613 (’389 Patent) – Claim 4
4. A remote control device comprising:
a receiver that receives a first key code signal, wherein said first key code signal is generated by modulating a key code onto a first carrier signal, said first carrier signal falling within a radio frequency band;
a transmitter that transmits a second key code signal, wherein said second key code signal is generated by modulating said key code onto a second carrier signal, said second carrier signal falling within an infrared frequency band; and
a keypad that includes a key that corresponds to said key code, wherein said key code corresponds to a function of an electronic consumer device, and wherein said remote control device is contained within a single structure.

’389 Pet., Paper 2, 38-40; ’389 Pet. Reply, Paper 22, 18-19, 21.

Additional Disputed Issues

I. Claim Construction for “Key Code Generator Device” and Autoscan Functionality

II. Mishra Combinations
- A. Mishra + Dubil + Van Ee Render Claim 2 Obvious
- B. Motivation to Combine Mishra + Dubil + Van Ee
- C. Mishra + Dubil Render Claims 4 and 12 Obvious
- D. Claim 12 - Claim Construction for “Means for…”

III. Caris Combinations
- A. Caris + Skerlos Render Claim 4 Obvious
- B. Caris + Skerlos + Yazolino Render Claim 12 Obvious
- C. Motivation to Combine Caris Combinations

*The Appendix addresses additional issues.

’389 POR, Paper 18.

Claim Construction of “Key Code Generator Device”

IPR2019-01613 (’389 Patent) – Claim 2
2. A method comprising:
(a) receiving a keystroke indicator signal from a remote control device, wherein the keystroke indicator signal indicates a key on said remote control device that a user has selected;
(b) generating a key code within a key code generator device using the keystroke indicator signal, wherein said key code is part of a codeset that controls an electronic consumer device;
(c) modulating said key code onto a carrier signal, thereby generating a key code signal;
(d) transmitting said key code signal from said key code generator device; and
(e) identifying said codeset using input from a user of said remote control device, wherein said codeset is identified when said user stops pressing a key on said remote control device.

3. The method of claim 2, wherein said user is prompted by autoscan functionality to press said key on said remote control device.

“key code generator device”

District Court Construction:
Subject to 35 U.S.C. § 112(6)

Function: “generate a key code”

Structure: “set-top box, television, a stereo radio, a digital video disk player, a video cassette recorder, a personal computer, a set-top cable television box or a set-top satellite box and equivalents thereof.”

Performing the steps of:
“(1) identifying a codeset usable to communicate with an electronic consumer device” and
“(2) identifying the key code corresponding to a pressed key for that codeset.”

Markman Order, EX1010, 23-30.

’389 POR, Paper 18, 11-13; ’389 Pet. Reply, Paper 22, 3-4.

Claim Construction of "Key Code Generator Device"

IPR2019-01613 ('389 Patent) – Claim 2
2. A method comprising:
(a) receiving a keystroke indicator signal from a remote control device, wherein the keystroke indicator signal indicates a key on said remote control device that a user has selected;
(b) generating a key code within a key code generator device using the keystroke indicator signal, wherein said key code is part of a codeset that controls an electronic consumer device;
(c) modulating said key code onto a carrier signal, thereby generating a key code signal;
(d) transmitting said key code signal from said key code generator device; and
(e) identifying said codeset using input from a user of said remote control device, wherein said codeset is identified when said user stops pressing a key on said remote control device.

UEI's expert confirms that the district court's construction is not inconsistent.

Q So Step (e) could be performed after Step (d), right?

THE WITNESS: Not necessarily. It does not specify when exactly this occurs. However, some of this information is needed in order for the system to be able to function properly. So Step (e) would have to occur at some point prior to carrying out all the lookup information and things like that, because without having a clear correlation or information of the consumer electronics device that is to be addressed, in my opinion, the Elements (a) through (d) would not make much sense.

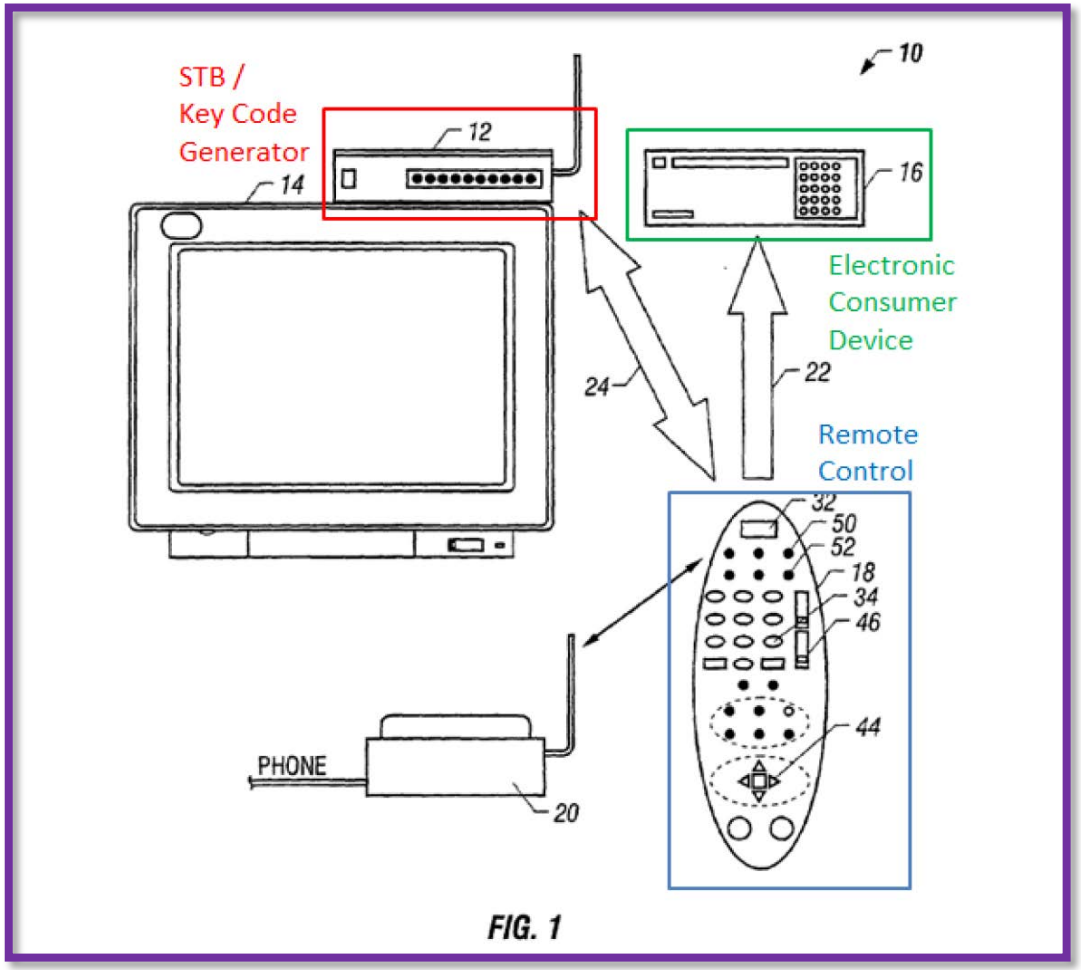
Sprenger Depo. Tr., EX1042, 32:16-33:6.

'389 Pet. Reply, Paper 22, 3-4; Russ Decl., EX1040, ¶10-15.

Claim 2 – Mishra in View of Dubil and Van Ee

Mishra and Dubil render steps (a) through (d) obvious for the reasons explained in Slides 11-19.

IPR2019-01613 ('389 Patent) – Claim 2
2. A method comprising:
(a) receiving a keystroke indicator signal from a remote control device, wherein the keystroke indicator signal indicates a key on said remote control device that a user has selected;
(b) generating a key code within a key code generator device using the keystroke indicator signal, **wherein said key code is part of a codeset that controls an electronic consumer device**;
(c) modulating said key code onto a carrier signal, thereby generating a key code signal;
(d) transmitting said key code signal from said key code generator device; and
(e) identifying said codeset using input from a user of said remote control device, wherein said codeset is identified when said user stops pressing a key on said remote control device.



Mishra, EX1005, FIG. 1 (annotated).

'389 Pet., Paper 2, 16-23; Russ Decl., EX1003, ¶¶119-36.

Claims 2(e) and 3 – Mishra in View of Dubil and Van Ee

The ’389 patent’s description of Step (e) and “autoscan”

IPR2019-01613 (’389 Patent) – Claim 2

(e) identifying said codeset using input from a user of said remote control device, wherein said codeset is identified when said user stops pressing a key on said remote control device.

3. The method of claim 2, wherein said user is prompted by autoscan functionality to press said key on said remote control device.

In another example, the codeset usable to communicate with VCR **13** is identified to key code generator device **12** using autoscan functionality that does not involve key code generator device **12** having a specialized EMI detection circuit. In that case, the user may be prompted by successive screens of on screen display **15** to push the power-on key on remote control device **11** multiple times. Each time the power-on key is pressed, keystroke indicator signal **16** communicates this to key code generator device **12**. Key code generator device **12** in turn generates and transmits a key code signal containing a power-on key code using a different codeset. Each key code signal is relayed through remote control device **11** to the particular electronic consumer device to be controlled. One by one the user is prompted to push the power-on key, and key code generator device **12** in turn generates key codes using different codesets until the electronic consumer device performs a desired function. In this case, first electronic consumer device **13** turns on. The user is prompted not to press the power-on key once the user sees the desired function being performed by first electronic consumer device **13**. In the present example, light emitting diodes (LEDs) on the face of VCR **13** may be illuminated to indicate to the user that VCR **13** has powered on. When the user stops pressing the power-on key, then the key code generator device **12** identifies the codeset of the last transmitted key code to be the codeset used by the electronic consumer device.

’389 Patent, EX1001, 8:1-26

’389 Pet., Paper 2, 21-23; Russ Decl., EX1003, ¶¶129-36.

Claims 2(e) and 3 – Mishra in View of Dubil and Van Ee

Van Ee teaches Step (e) and Claim 3.

To test which of the selected control codes causes the apparatus to be controlled to respond appropriately, the button on user-interface **108** which corresponds to the function of the selected control codes is intermittently pressed. As the button is intermittently pressed, each identifier code and its associated control code in the interleaved control signal are transmitted. An IR receiver of the IR receiver/transmitter circuit **122** of programming means **110** eavesdrops or picks up each identifier code transmitted by the control device **106**. The user stops intermittently pressing the button on user-interface **108** once the apparatus to be controlled responds, e.g., TV set **102** turns on.

Once the user stops intermittently pressing the button on user-interface **108**, interleaver/identifier circuit **120** samples the last identifier code picked up by IR receiver **122**, i.e., the identifier code associated with the control code which caused the apparatus to respond, and converts the sampled signal into a digital word of, e.g., a compressed data format. The compressed data format is then matched with a compressed data format of an identifier code stored within memory **112** to identify the identifier code that caused the apparatus to respond.

IPR2019-01613 ('389 Patent) – Claim 2

(e) identifying said codeset using input from a user of said remote control device, wherein said codeset is identified when said user stops pressing a key on said remote control device.

3. The method of claim 2, wherein said user is prompted by autoscan functionality to press said key on said remote control device.

Programming means **110** then correlates the matched compressed data format of the last identifier code received with its associated control code stored in the database. The associated control code is then transmitted to remote server **118** via Internet **116**. Remote server **118** uses the associated control code to determine to which set of control codes it belongs to and transmits the set to programming means **110**.

Van Ee, EX1013, 6:41-7:2.

'389 Pet., Paper 2, 21-23; Russ Decl., EX1003, ¶¶129-36.

Motivation to Combine Mishra with Dubil and Van Ee

132. Returning to Van Ee, a POSA would have been motivated to combine Van Ee with Mishra and Dubil to provide a user-friendly and automatic way of configuring a remote control. Mishra explains that this automation was desirable to avoid the elaborate and time consuming process of programming a remote control. EX1005, ¶3. In the context of having different communication protocols, Mishra explains that users would often face difficulties attempting to program remote controls to operate and control "legacy" devices especially when many different communication protocols were available at the time. *Id*.

Russ Decl., EX1003, ¶132.

Using Van Ee with Mishra would have aided users in the set-up of Mishra's system as well as provide an intuitive visualization for the user to see that the device to be operated would have actually responded to the control codes being sent. Van Ee's process would have also removed the need for the user to manually program codesets to control appliance and additionally further Mishra's goal of providing quick and easy programming. EX1005, ¶¶5, 20, 36.

Russ Decl., EX1003, ¶134.

'389 Pet., Paper 2, 21-23; Russ Decl., EX1003, ¶¶129-36.

Motivation to Combine Mishra with Dubil and Van Ee

136. Implementing the codeset identification process described in Van Ee would further be merely combining known elements to yield predictable results. For example, both Mishra and Van Ee describe STBs that wirelessly transmit key codes to remote controls. EX1005, ¶18; EX1013, 6:33-40. Further, both references describe the STB receiving data wirelessly transmitted from the remote control. EX1005, ¶¶19-20; EX1013, 6:45-62. In this manner, a POSA using the STB described in Mishra would have implemented and utilized the same codeset identification process described in Van Ee to identify a codeset when a user stops pressing a button. As seen from the "AT2400 AllTouch Remote Control User's Guide" (EX1017), this was a well-known technique used in the art for programming remote controls. Thus, there would have been a reasonable expectation of success and it would have been predictable to implement the well-known identification process described in Van Ee in Mishra's system.

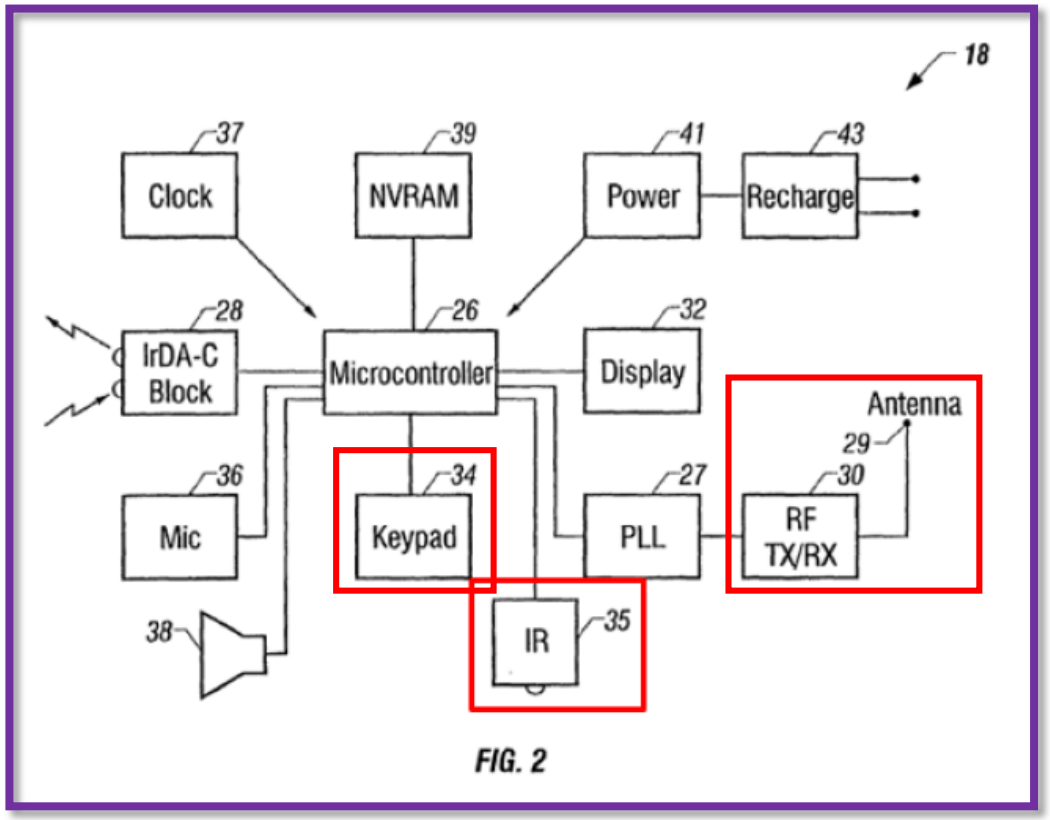
Russ Decl., EX1003, ¶136.

'389 Pet., Paper 2, 21-23; Russ Decl., EX1003, ¶¶129-36.

Claim 4 – Mishra in View of Dubil

Mishra in view of Dubil teaches Claim 4.

IPR2019-01613 ('389 Patent) – Claim 4
4. A remote control device comprising:
a receiver that receives a first key code signal, wherein said first key code signal is generated by modulating a key code onto a first carrier signal, said first carrier signal falling within a radio frequency band;
a transmitter that transmits a second key code signal, wherein said second key code signal is generated by modulating said key code onto a second carrier signal, said second carrier signal falling within an infrared frequency band; and
a keypad that includes a key that corresponds to said key code, wherein said key code corresponds to a function of an electronic consumer device, and wherein said remote control device is contained within a single structure.



Mishra, EX1005, FIG. 2 (annotated).

'389 Pet., Paper 2, 25-32; Russ Decl., EX1003, ¶¶142-58.

Claim 4 – Mishra in View of Dubil

Mishra in view of Dubil teaches Claim 4.

IPR2019-01613 ('389 Patent) – Claim 4
4. A remote control device comprising:
a receiver that receives a first key code signal, wherein said first key code signal is generated by modulating a key code onto a first carrier signal, said first carrier signal falling within a radio frequency band;
a transmitter that transmits a second key code signal, wherein said second key code signal is generated by modulating said key code onto a second carrier signal, said second carrier signal falling within an infrared frequency band; and
a keypad that includes a key that corresponds to said key code, wherein said key code corresponds to a function of an electronic consumer device, and wherein said remote control device is contained within a single structure.

[0037] The RCU **18** may operate in one of at least two different fashions. The RCU may have dedicated buttons that correspond to particular controlled devices. For example, the RCU may contain a button that is labeled "TV." When the TV button is pushed, the appropriate commands are sent to the master informing the master that the user now wishes to control the TV. The next button that is pushed, for example, the channel up button, causes the appropriate command to be sent to the master telling it, for example, that the user wishes to go to the next highest channel. The master in turn sends the RCU the necessary codes to increment the channel on the TV. The RCU then takes these codes and sends them, for example using a unidirectional infrared signal, to the TV using the protocols stored in the RCU's memory.

Mishra, EX1005, ¶37.

[0018] The RCU **18** may communicate with the system **12** using wireless communication such as infrared or radio-frequency links. The infrared link may use the IrDA-C bidirectional signals as one example. The system **12** may communicate with the RCU **18** using a wired or wireless communication of the type described previously.

Mishra, EX1005, ¶18.

'389 Pet., Paper 2, 25-32; Russ Decl., EX1003, ¶¶142-58.

Claim 4 – Mishra in View of Dubil

Mishra in view of Dubil teaches Claim 4.

IPR2019-01613 ('389 Patent) – Claim 4
4. A remote control device comprising:
a receiver that receives a first key code signal, wherein said first key code signal is generated by modulating a key code onto a first carrier signal, said first carrier signal falling within a radio frequency band;
a transmitter that transmits a second key code signal, wherein said second key code signal is generated by modulating said key code onto a second carrier signal, said second carrier signal falling within an infrared frequency band; and
a keypad that includes a key that corresponds to said key code, wherein said key code corresponds to a function of an electronic consumer device, and wherein said remote control device is contained within a single structure.

More specifically, the IR or RF codes are described using XML. A number of parameters can be defined using XML tags, for example, carrier frequency, duty cycle, protocol type (FSK, biphase, PWM, etc.), repetition time, on/off times of the signal, bit pattern of the command code, semantic meaning of the code, type of device for which it is intended (CD, VCR, TV, DVD, etc.), the brand name of the specific protocol, etc. Preferably, these data fields are not all used within the remote: only the information required to transmit the actual IR or RF code needs to be stored.

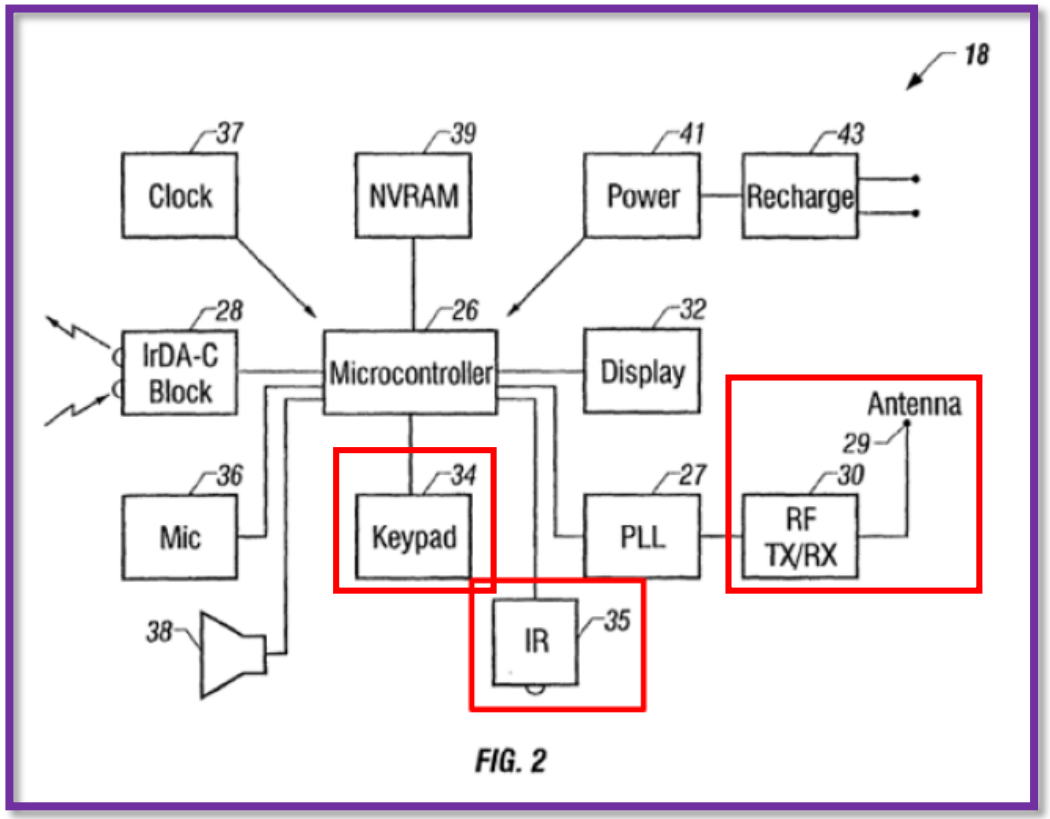
Dubil, EX1006, 2:61-3:8; *see also* Dubil, EX1006, 4:33-47, 4:60-5:5.

'389 Pet., Paper 2, 14-15, 25-32; Russ Decl., EX1003, ¶¶142-58.

Claim 12 – Mishra in View of Dubil

Mishra in view of Dubil renders Claim 12 obvious.

IPR2019-01613 ('389 Patent) – Claim 12
12. A remote control device comprising:
a keypad;
an RF receiver;
an IR transmitter; and
means for receiving a key code from said RF receiver and for sending said key code to said IR transmitter such that said key code is modulated onto an IR carrier signal, said IR carrier signal with said key code modulated thereon being transmitted from said remote control device by said IR transmitter, wherein said remote control device is contained within a single structure.



Mishra, EX1005, FIG. 2 (annotated).

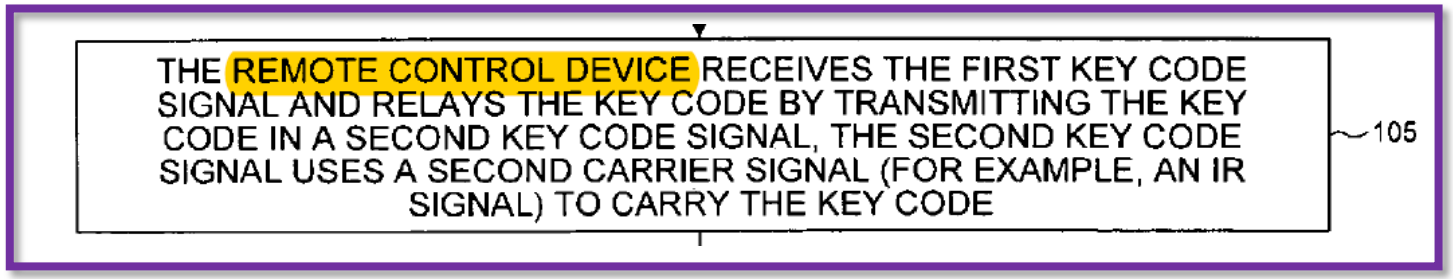
'389 Pet., Paper 2, 38-40; Russ Decl., EX1003, ¶¶160-64.

Claim 12 – Claim Construction "Means For…"

Proposed Construction of "Means For…"	
Petitioner	**Patent Owner**
Function: "receiving a key code from said RF receiver and for sending said key code to said IR transmitter such that said key code is modulated onto an IR carrier signal" Structure: "a microcontroller"	Function: "receiving a key code from said RF receiver and for sending said key code to said IR transmitter such that said key code is modulated onto an IR carrier signal" Structure: "a microcontroller that performs the algorithms described in Step 105 of Fig. 2, as further explained in detail at 5:49-6:4, and equivalents thereof."
Alternatively: Structure: "a microcontroller that performs the algorithm of receiving a key code from an RF receiver that has received a first key code signal and translating the key code so that the key code is modulated onto a infrared carrier signal resulting in a second key code signal"	

'389 Pet., Paper 2, 13;
'389 POR, Paper 18, 14-16;
'389 Pet. Reply, Paper 22, 7-8.

Claim 12 – Claim Construction "Means For…"



'389 Patent, EX1001, FIG. 2.

UEI's construction is flawed because the cited portion refers to the functionality of the remote control – not the microcontroller.

Next (step **105**), remote control device **11** receives first key code signal **19** and relays the key code communicated by first key code signal **19** to VCR **13** in the form of a second key code signal **22**. Remote control device **11** is a slave to key code generator device **12**. Remote control device **11** relays the key code by receiving first key code signal **19** in RF form and translating the communicated key code so that the key code is modulated onto a second carrier signal resulting in second key code signal **22**. In this example, the second carrier signal is an infrared signal with a frequency in the range between three hundred gigahertz and three hundred terahertz. Second key code signal **22** is transmitted by an IR transmitter **23** on remote control device **11** to VCR **13**.

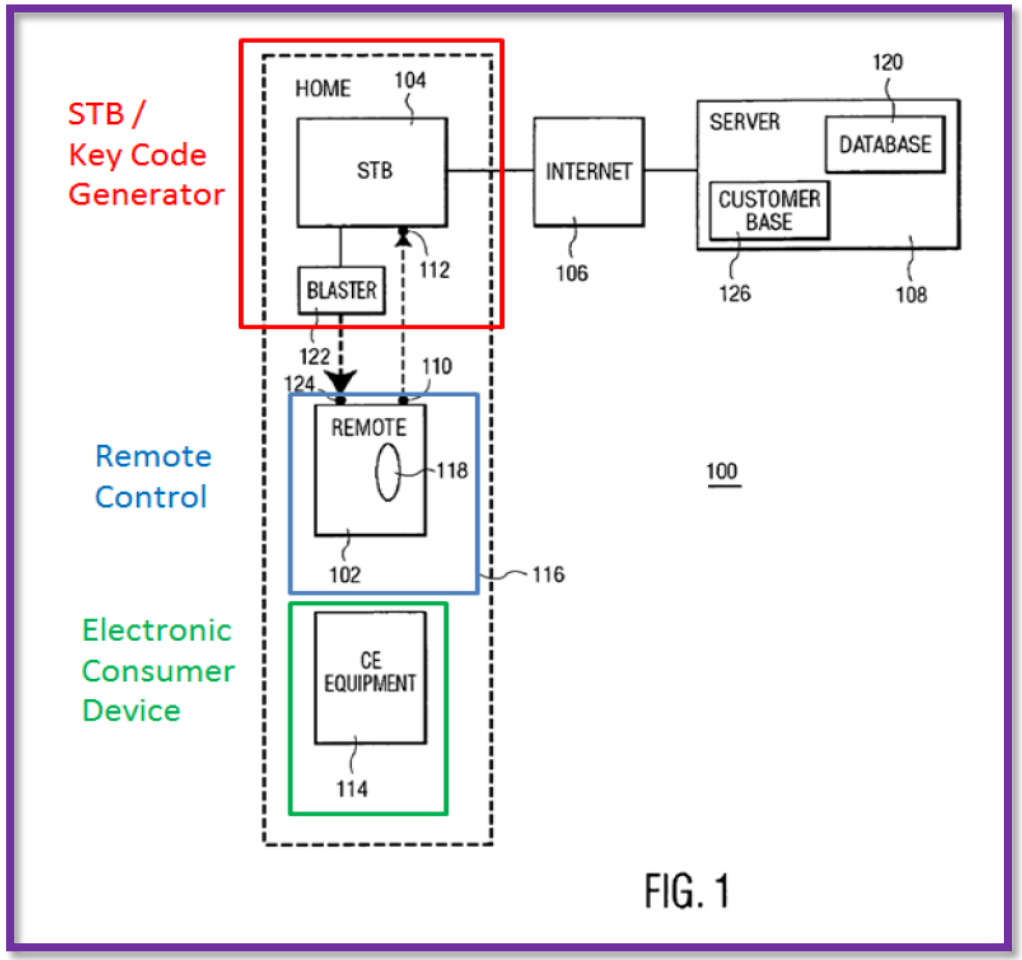
'389 Patent, EX1001, 5:49-61.

'389 POR, 16; '389 Pet. Reply, Paper 22, 7-8; Russ Decl., EX1040, ¶¶21-24.

Claim 4 – Caris in View of Skerlos

Caris in view of Skerlos teaches Claim 4.

IPR2019-01613 ('389 Patent) – Claim 4
4. A remote control device comprising:
a receiver that receives a first key code signal, wherein said first key code signal is generated by modulating a key code onto a first carrier signal, said first carrier signal falling within a radio frequency band;
a transmitter that transmits a second key code signal, wherein said second key code signal is generated by modulating said key code onto a second carrier signal, said second carrier signal falling within an infrared frequency band; and
a keypad that includes a key that corresponds to said key code, wherein said key code corresponds to a function of an electronic consumer device, and wherein said remote control device is contained within a single structure.



Caris, EX1008, FIG. 1 (annotated).

'389 Pet., Paper 2, 55-61; Russ Decl., EX1003, ¶¶213-25.

Claim 4 – Caris in View of Skerlos

Caris in view of Skerlos teaches Claim 4.

IPR2019-01613 ('389 Patent) – Claim 4
4. A remote control device comprising:
a receiver that receives a first key code signal, wherein said first key code signal is generated by modulating a key code onto a first carrier signal, said first carrier signal falling within a radio frequency band;
a transmitter that transmits a second key code signal, wherein said second key code signal is generated by modulating said key code onto a second carrier signal, said second carrier signal falling within an infrared frequency band; and
a keypad that includes a key that corresponds to said key code, wherein said key code corresponds to a function of an electronic consumer device, and wherein said remote control device is contained within a single structure.

Preferably, the STB or other IP-connected equipment is equipped with an IR or RF transmitter in the front bezel and with a range long enough to reach a user on the couch (typically 10 feet from the display screen) to minimize the user's efforts required.

Caris, EX1008, 4:46-51.

FIG. **1** is a block diagram of a system **100** in the invention. System **100** comprises a remote control device **102**, and an appliance **104** that is connected to the Internet **106**. Device **102** comprises a traditional remote control device with hard buttons or a touch screen, LCD-based remote control device. System **100** further has a server **108**. Appliance **104** in this example comprises a STB, that got purchased by the consumer in combination with remote **102** for operating STB **104** via, e.g., IR (infrared) transmitter **110** and receiver **112**. Remote **102** is programmable in order to adopt control codes for other IR- or RF-controllable equipment, e.g., appliance **114**, that the consumer has installed or will install in his/her home **116**.

Caris, EX1008, 5:25-37.

'389 Pet., Paper 2, 55-61; Russ Decl., EX1003, ¶¶213-25.

Claim 4 – Caris in View of Skerlos

Dr. Sprenger admits that modulation techniques were well known and equally applied to Radio Frequency (RF) signals.

IPR2019-01613 ('389 Patent) – Claim 4
4. A remote control device comprising:
a receiver that receives a first key code signal, wherein said first key code signal is generated by modulating a key code onto a first carrier signal, said first carrier signal falling within a radio frequency band;
a transmitter that transmits a second key code signal, wherein said second key code signal is generated by modulating said key code onto a second carrier signal, said second carrier signal falling within an infrared frequency band; and
a keypad that includes a key that corresponds to said key code, wherein said key code corresponds to a function of an electronic consumer device, and wherein said remote control device is contained within a single structure.

Q Are there modulation schemes that adjust the frequency?

A There exists such modulation schemes. One is called, not surprisingly, frequency modulation, FM, as in, for example, FM radio. That's exactly what FM radio does.

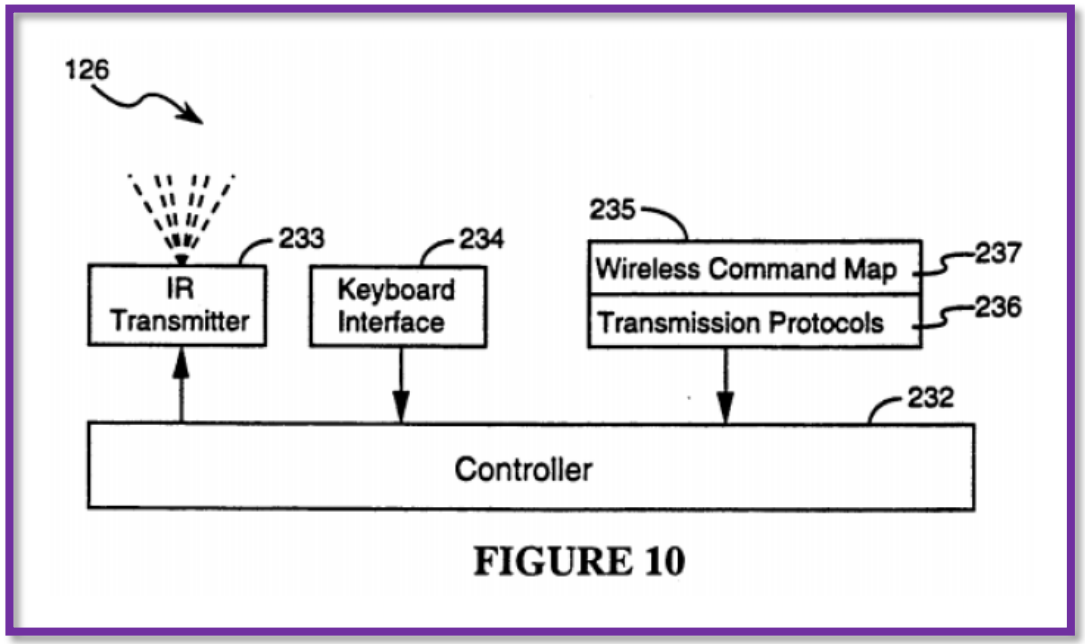
Sprenger Depo. Tr., EX1041, 112:17-20.

'389 Pet. Reply, Paper 22, 23; Russ Decl., EX1040, ¶70.

Claim 12 – Caris in View of Skerlos and Yazolino

Caris in view of Skerlos and Yazolino renders Claim 12 obvious.

IPR2019-01613 ('389 Patent) – Claim 12
12. A remote control device comprising:
a keypad;
an RF receiver;
an IR transmitter; and
means for receiving a key code from said RF receiver and for sending said key code to said IR transmitter such that said key code is modulated onto an IR carrier signal, said IR carrier signal with said key code modulated thereon being transmitted from said remote control device by said IR transmitter, wherein said remote control device is contained within a single structure.



Yazolino, EX1012, FIG. 10.

'389 Pet., Paper 2, 68-70; Russ Decl., EX1003, ¶¶247-53.

Motivation to Combine Caris with Skerlos and Yazolino

243. For the explicit details and understanding behind the wireless transmission of control codes from a remote control, a POSA would have understood that Yazolino provided those details based on the components described in Yazolino. For example, both Caris and Yazolino describe remote control devices that wirelessly transmit key codes using an infrared carrier frequency. *See id.*, 15:16-30; EX1008, 5:46-49. A POSA would have understood that to perform this transmission, the remote control in Caris would utilize the well-known components described in Yazolino. Combining Caris and Yazolino would have been nothing more than combining prior art elements according to known methods and applying a known technique to a known device—yielding predictable results.

Russ Decl., EX1003, ¶243.

'389 Pet., Paper 2, 66-70; Russ Decl., EX1003, ¶¶240-53.

Petitioner's Demonstrative Exhibit
Not Evidence

’389 Patent – All Elements Disclosed or Obvious

IPR2019-01613 (’389 Patent) – Claim 2
2. A method comprising:
(a) receiving a keystroke indicator signal from a remote control device, wherein the keystroke indicator signal indicates a key on said remote control device that a user has selected;
(b) generating a key code within a key code generator device using the keystroke indicator signal, wherein said key code is part of a codeset that controls an electronic consumer device;
(c) modulating said key code onto a carrier signal, thereby generating a key code signal;
(d) transmitting said key code signal from said key code generator device; and
(e) identifying said codeset using input from a user of said remote control device, wherein said codeset is identified when said user stops pressing a key on said remote control device.

IPR2019-01613 (’389 Patent) – Claim 4
4. A remote control device comprising:
a receiver that receives a first key code signal, wherein said first key code signal is generated by modulating a key code onto a first carrier signal, said first carrier signal falling within a radio frequency band;
a transmitter that transmits a second key code signal, wherein said second key code signal is generated by modulating said key code onto a second carrier signal, said second carrier signal falling within an infrared frequency band; and
a keypad that includes a key that corresponds to said key code, wherein said key code corresponds to a function of an electronic consumer device, and wherein said remote control device is contained within a single structure.

IPR2019-01613 (’389 Patent) – Claim 12
12. A remote control device comprising:
a keypad;
an RF receiver;
an IR transmitter; and
means for receiving a key code from said RF receiver and for sending said key code to said IR transmitter such that said key code is modulated onto an IR carrier signal, said IR carrier signal with said key code modulated thereon being transmitted from said remote control device by said IR transmitter, wherein said remote control device is contained within a single structure.

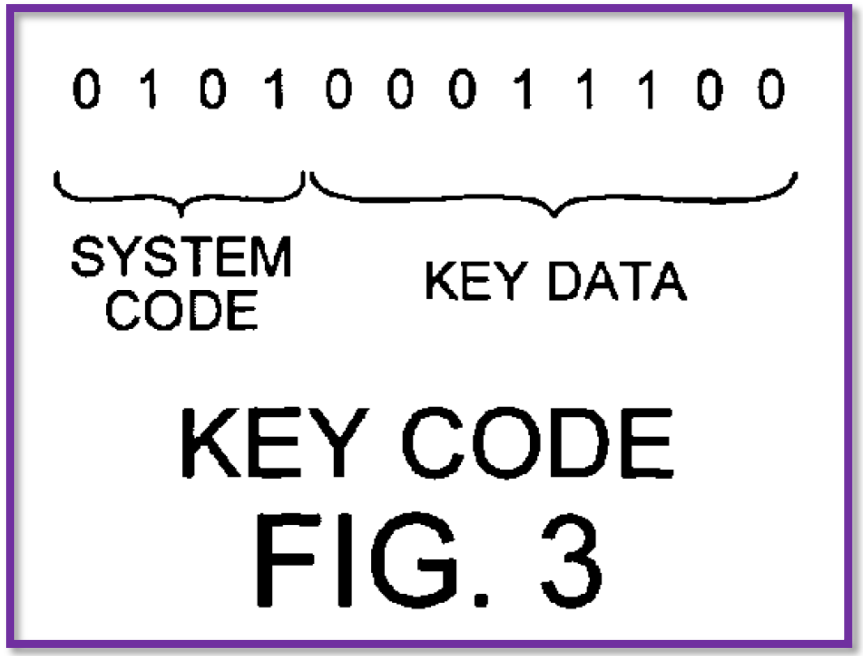
’389 Pet., Paper 2, 3; DI, Paper 12, 7, 41.

Questions?

’642 Patent Appendix Slides

The ’642 Patent’s Description of a Key Code

The ’642 Patent explains that key codes include a “system code” specific to a target device.



’642 Patent, EX1001, FIG. 3.

Multiple electronic consumer devices may have the same key data for a particular function, for example, the power-on function. A key code, however, also contains a system code (see FIG. **3**) that corresponds to a particular type of electronic consumer device. For example, the system code used for a television set will typically be different than the system code used for a video cassette recorder. Thus, different device types that use the same key data for the power-on function will not respond to a key code containing an incorrect system code.

’642 Patent, EX1001, 7:44-52.

’642 Pet. Reply, Paper 20, 15-16; Russ Reply Decl., EX1032, ¶46.

Alleged Prosecution History Disclaimer

The prosecution history suggests that the keystroke indicator signal is distinct from a key code, but both Mishra and Rye also teach keystroke indicator signals that do not include key codes.

The appliance control code that is transmitted by base unit 12 of Pope is not generated within base unit 12. Instead, base unit 12 receives the appliance control codes from handset 10/50. Pope explains:

> "The present invention uses a digital cordless telephone handset to store a variety of appliance control codes. These appliance control codes can be transmitted to a base unit. The base unit can translate the appliance control codes to control signals such as infrared control signals, to control an electrical appliance" (Pope, col. 1, lines 31-36) (emphasis added) *See also* Pope, col. 2, lines 48-52 and 63-65.

The appliance control codes are not generated within the base unit 12 of Pope. Instead, the appliance control codes are transmitted from the handset 10/50 to the base unit 12, where they are translated to control signals. Base unit 12 of Pope does not receive a keystroke indicator and then generate a key code. Pope states, "Once an appliance control code is received by the base unit, the base unit will know to transfer the control code to an appliance" (Pope, col. 4, lines 49-51) (emphasis added).

'642 Patent Pros. Hist., EX1002, 72.

Zilog argues that Pope's appliance control codes transmitted by handset 10, 50 are not a keystroke indicator signal. App. Br. 20-21, Reply Br. 11-12. Zilog urges a narrow interpretation of the term "keystroke indicator signal" to mean an indication of a selected key while precluding a control code. App. Br. 20-21, Reply Br. 11-12. During prosecution, claims are subject to the broadest reasonable interpretation consistent with the specification. Zilog's narrow interpretation is inconsistent with its specification. Zilog's specification describes "[i]n one embodiment, the indication of a pressed key is a keycode . . .". FF 1. Since Zilog's own specification indicates that the keystroke indicator can be a code (i.e. a key code), the finding that Pope's appliance control codes meet the limitation of a keystroke indicator signal is consistent with the broadest reasonable interpretation.

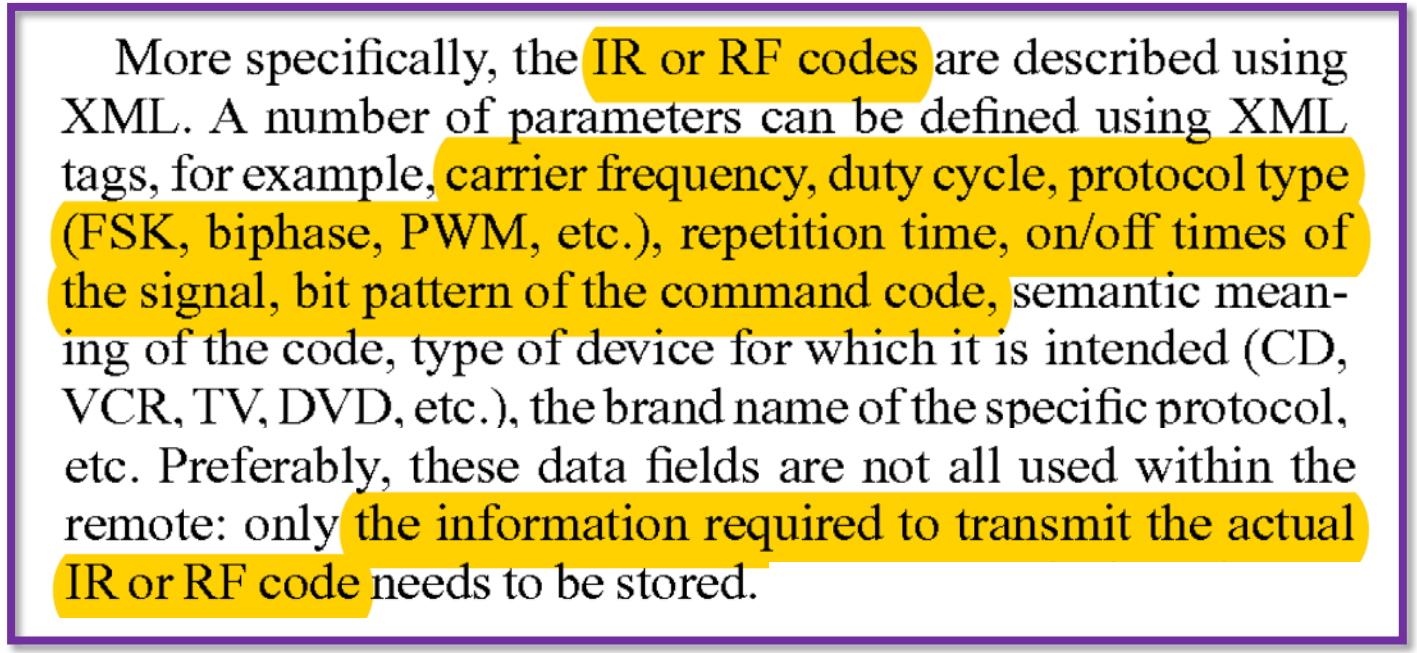
'642 Patent Pros. Hist., EX1002, 311.

'642 POR, Paper 16, 7-9.

Dubil Renders Obvious Claims 3 and 4

Claim 3 – "The method of claim 1, wherein said key code consists of a binary number."

Claim 4 – "The method of claim 1, wherein said key code comprises a binary number and timing information, and wherein said timing information defines how said binary number is modulated in (c) onto said carrier signal."



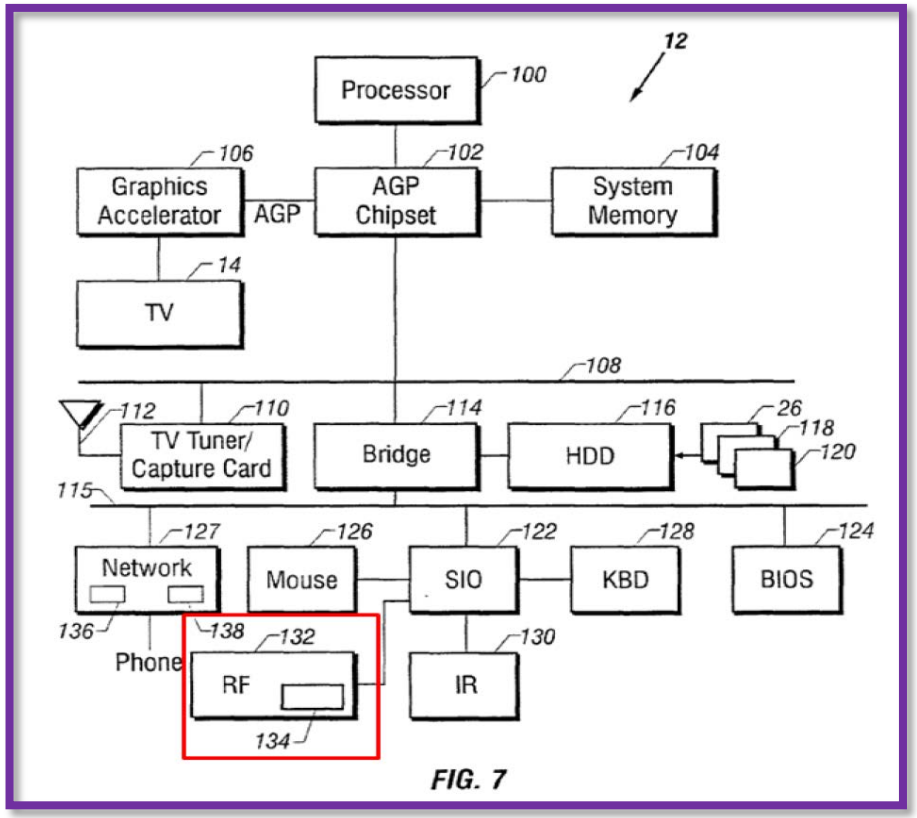
More specifically, the IR or RF codes are described using XML. A number of parameters can be defined using XML tags, for example, carrier frequency, duty cycle, protocol type (FSK, biphase, PWM, etc.), repetition time, on/off times of the signal, bit pattern of the command code, semantic meaning of the code, type of device for which it is intended (CD, VCR, TV, DVD, etc.), the brand name of the specific protocol, etc. Preferably, these data fields are not all used within the remote: only the information required to transmit the actual IR or RF code needs to be stored.

Dubil, EX1006, 2:61-3:8; *see also* Dubil, EX1006, 4:33-47, 4:60-5:5.

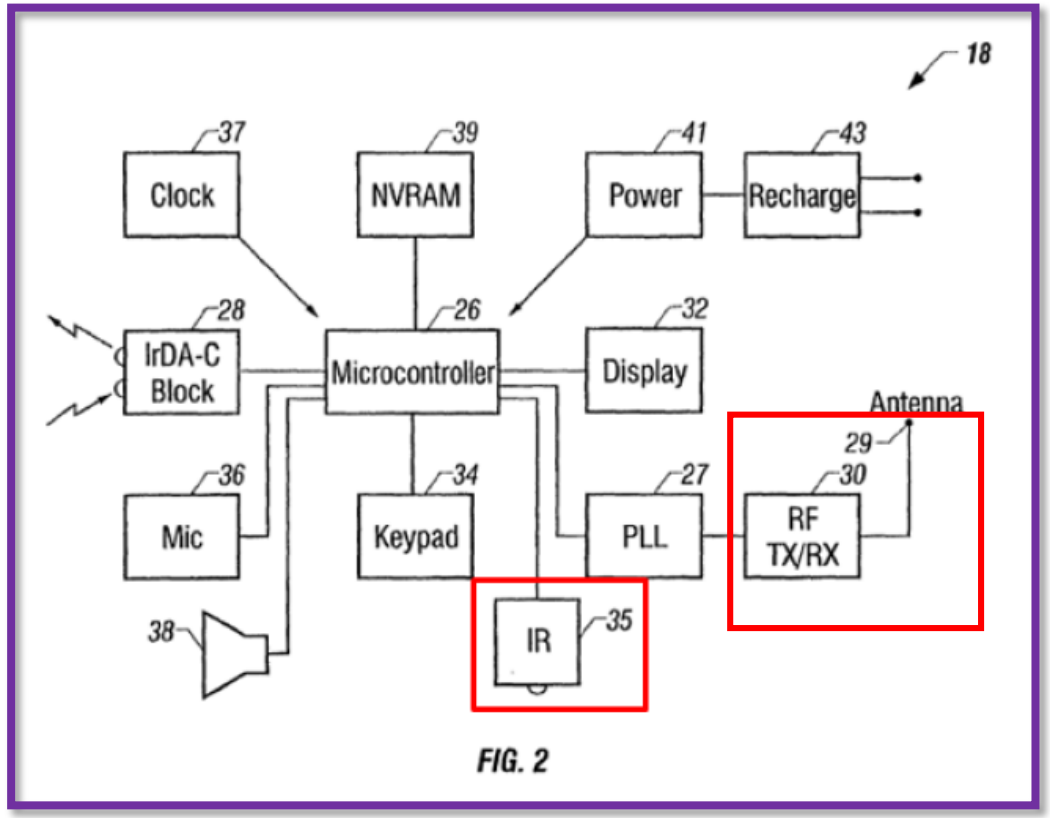
'642 Pet., Paper 2, 26-29; Russ Decl., EX1003, ¶¶132-39.

Mishra/Dubil Renders Obvious Claim 6

Claim 6 – "The method of claim 1, wherein said carrier signal is in a radio frequency band, wherein said key code signal is received by said remote control device, and wherein said method further comprises: (e) modulating said key code onto a second carrier signal, thereby generating a second key code signal, said modulating being performed on said remote control device wherein said second carrier signal is in an infrared frequency band; and (f) transmitting said second key code signal from said remote control device to an electronic consumer device."



Mishra, EX1005, FIG. 7 (annotated).



Mishra, EX1005, FIG. 2 (annotated).

'642 Pet., Paper 2, 29-32; Russ Decl., EX1003, ¶¶140-49.

Mishra/Dubil Renders Obvious Claim 8

Claim 8 – "The method of claim 1, wherein said key code generated in (b) is part of a codeset, and wherein said remote control device does not store said codeset."

[0020] Having received a command signal from the RCU **18**, the system **12** can translate the command into a format appropriate for controlling a particular device **16**. That is, it is not necessary to program the RCU **18** independently. Instead, a variety of codes may be stored in the system **12**. The user may be called upon to indicate the type of devices which need to be controlled. When the RCU transmits a signal corresponding to a known function (which signal may not be particularly adapted to work any particular device), the system **12** can translate that signal and send information back to the RCU **18** to enable the RCU **18** to control the particular device the RCU **18** is to operate.

Mishra, EX1005, ¶20.

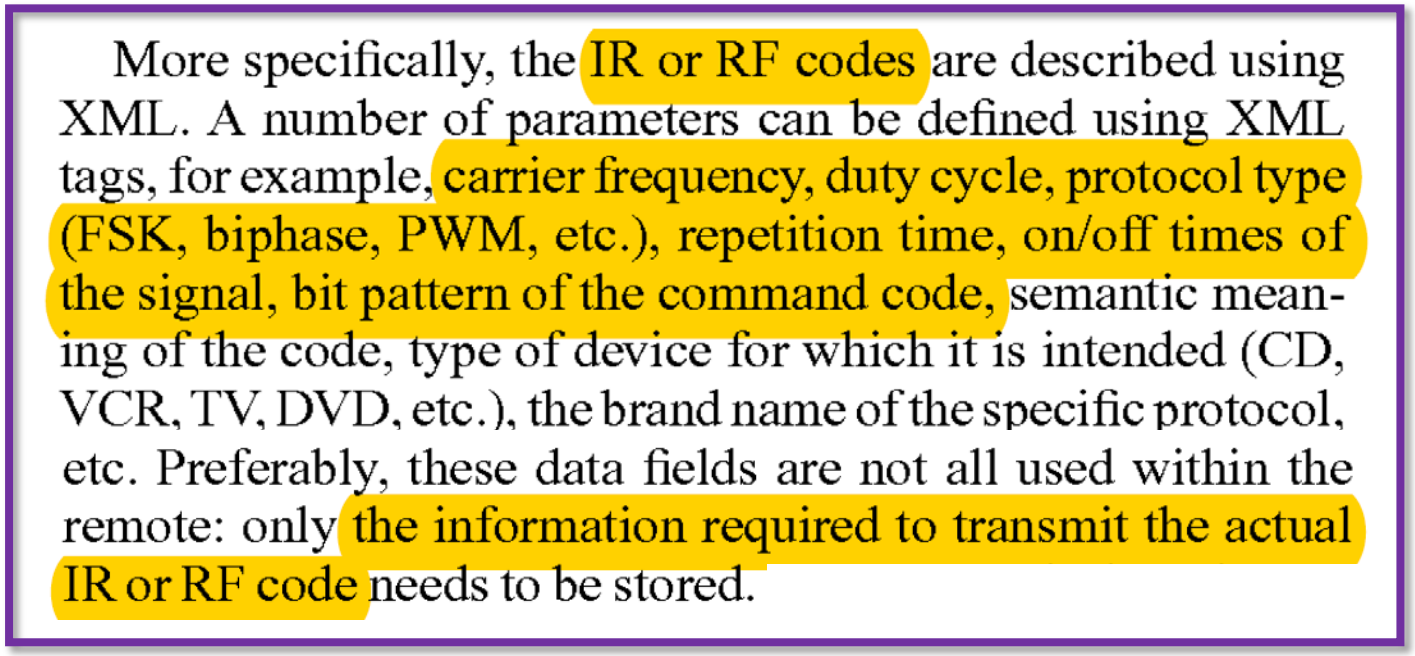
[0021] In this way, it is not necessary to undergo elaborate programming of the RCU **18**, but instead, databases within the system **12** may contain information about how a conventional device **16** may be operated. In addition, the RCU **18** may be used not only to control device **16** but also to answer the telephone **20** as well.

Mishra, EX1005, ¶21.

'642 Pet., Paper 2, 32-33; Russ Decl., EX1003, ¶150.

Mishra/Dubil Renders Obvious Claim 9

Claim 9 – "The method of claim 8, wherein said codeset comprises timing information and a plurality of key codes, and wherein said timing information describes a digital one and a digital zero."



More specifically, the IR or RF codes are described using XML. A number of parameters can be defined using XML tags, for example, carrier frequency, duty cycle, protocol type (FSK, biphase, PWM, etc.), repetition time, on/off times of the signal, bit pattern of the command code, semantic meaning of the code, type of device for which it is intended (CD, VCR, TV, DVD, etc.), the brand name of the specific protocol, etc. Preferably, these data fields are not all used within the remote: only the information required to transmit the actual IR or RF code needs to be stored.

Dubil, EX1006, 2:61-3:8.

'642 Pet., Paper 2, 33; Russ Decl., EX1003, ¶151.

Rye/Dubil Renders Obvious Claim 22

Claim 22 – "The method of claim 2, wherein said key code consists of a binary number."

[0027] IR processor **42** converts the input control signal so that it is compatible with the operating binary code for the selected audiovisual component whose IR remote control code is obtained from the look-up table **46**. That is, if the control operation that is to be performed is to Play the VCR, the IR processor **42** looks up the "VCR-Play" code from the code library **44** for the user's particular brand of VCR. That control code for "VCR-Play" is selected in IR processor **42** and is then applied to IR emitter **48** to, in turn, cause LED **50** to transmit to the addressed or selected VCR, in the example given, the selected control signal in the form of an IR binary signal that is compatible with the user's brand and model of VCR.

Rye, EX1007, ¶27.

[0025] The output of the IR microprocessor **42** is applied to an IR emitter **48**, which provides appropriately binary coded drive signals to an LED **50**, which, in response, transmits correspondingly coded IR control signals to the selected or addressed audiovisual component, as desired. In an otherwise known manner, that component uniquely responds to the received IR coded address and control signal that contains its unique product remote control code.

Rye, EX1007, ¶25.

'642 Pet., Paper 2, 41; Russ Decl., EX1003, ¶¶180-81.

Rye/Dubil Renders Obvious Claim 23

Claim 23 – "The method of claim 2, wherein said key code comprises a binary number and timing information, and wherein said timing information defines how said binary number is modulated in (c) onto said carrier signal."

[0027] IR processor **42** converts the input control signal so that it is compatible with the operating binary code for the selected audiovisual component whose IR remote control code is obtained from the look-up table **46**. That is, if the control operation that is to be performed is to Play the VCR, the IR processor **42** looks up the "VCR-Play" code from the code library **44** for the user's particular brand of VCR. That control code for "VCR-Play" is selected in IR processor **42** and is then applied to IR emitter **48** to, in turn, cause LED **50** to transmit to the addressed or selected VCR, in the example given, the selected control signal in the form of an IR binary signal that is compatible with the user's brand and model of VCR.

Rye, EX1007, ¶27.

More specifically, the IR or RF codes are described using XML. A number of parameters can be defined using XML tags, for example, carrier frequency, duty cycle, protocol type (FSK, biphase, PWM, etc.), repetition time, on/off times of the signal, bit pattern of the command code, semantic meaning of the code, type of device for which it is intended (CD, VCR, TV, DVD, etc.), the brand name of the specific protocol, etc. Preferably, these data fields are not all used within the remote: only the information required to transmit the actual IR or RF code needs to be stored.

Dubil, EX1006, 2:61-3:8.

'642 Pet., Paper 2, 42-44; Russ Decl., EX1003, ¶¶182-88.

Rye/Dubil Renders Obvious Claim 24

Claim 24 – "The method of claim 2, wherein said key code generated in (b) is part of a codeset, and wherein said remote control device does not store said codeset."

[0024] If an address match is detected in microprocessor **38** its output is applied to one input of an infrared (IR) processor **42**, which receives at another input the contents of a universal IR code library memory **44**. Memory **44** contains the remote control codes for all brands, e.g., Sony and Zenith, and models of commercially available audiovisual components. For example, if the audiovisual component is a television receiver identified on the user's remote control unit as TV 1 is a Sony and a second television receiver in the home identified as TV 2 is a Zenith, memory **44** would store the Sony remote control code for TV 1 and the Zenith remote control code for TV 2.

Rye, EX1007, ¶24.

[0038] Transceiver **30** knows, for example, that code 013 identifies an RCA TV and that code 145 identifies a Toshiba VCR; all of these product codes are stored in its code library **44**. Thus when transceiver **30** receives an RF binary coded signal from the remote unit **10** to turn on the user's model of the RCA TV, it recognizes and then sends the correct IR binary coded signal to turn that particular TV receiver "on".

Rye, EX1007, ¶38.

'642 Pet., Paper 2, 44; Russ Decl., EX1003, ¶¶189-91.

Rye/Dubil Renders Obvious Claim 25

Claim 25 – "The method of claim 24, wherein said codeset comprises timing information and a plurality of key codes, and wherein said timing information describes a digital one and a digital zero."

[0024] If an address match is detected in microprocessor **38** its output is applied to one input of an infrared (IR) processor **42**, which receives at another input the contents of a universal IR code library memory **44**. Memory **44** contains the remote control codes for all brands, e.g., Sony and Zenith, and models of commercially available audiovisual components. For example, if the audiovisual component is a television receiver identified on the user's remote control unit as TV 1 is a Sony and a second television receiver in the home identified as TV 2 is a Zenith, memory **44** would store the Sony remote control code for TV 1 and the Zenith remote control code for TV 2.

Rye, EX1007, ¶24.

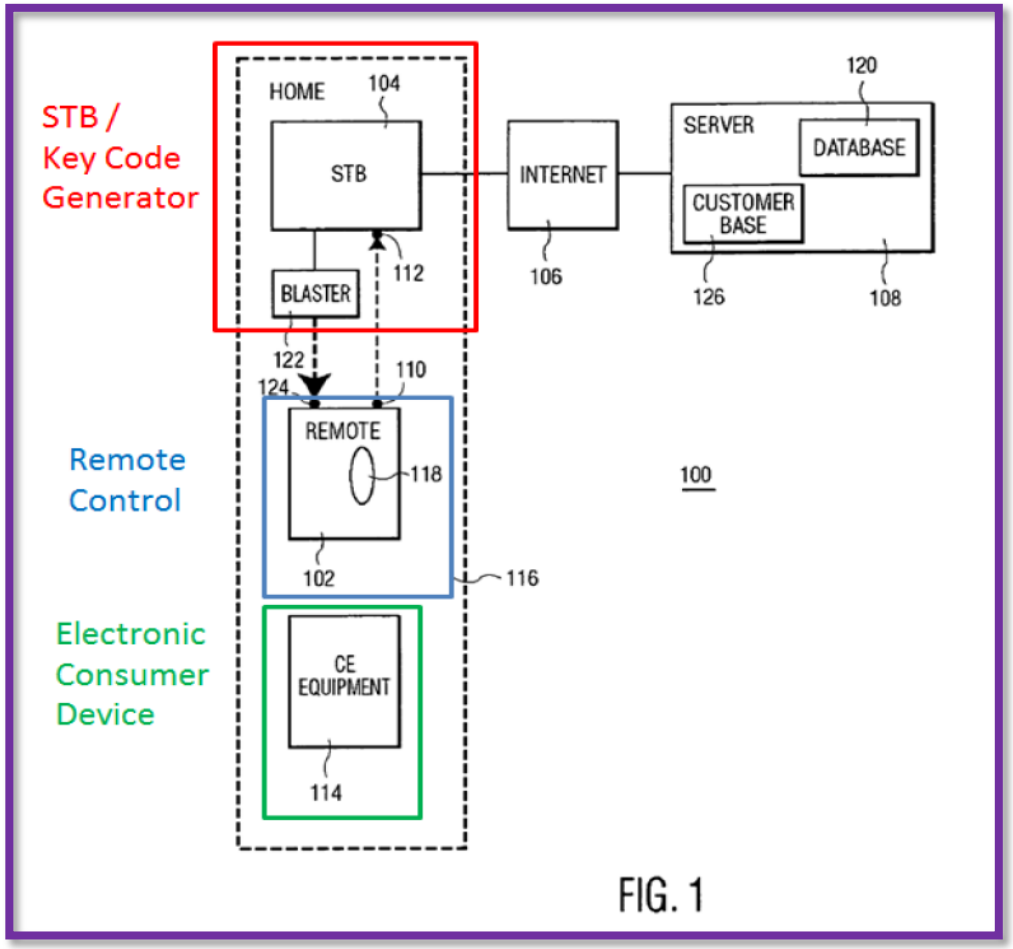
More specifically, the IR or RF codes are described using XML. A number of parameters can be defined using XML tags, for example, carrier frequency, duty cycle, protocol type (FSK, biphase, PWM, etc.), repetition time, on/off times of the signal, bit pattern of the command code, semantic meaning of the code, type of device for which it is intended (CD, VCR, TV, DVD, etc.), the brand name of the specific protocol, etc. Preferably, these data fields are not all used within the remote: only the information required to transmit the actual IR or RF code needs to be stored.

Dubil, EX1006, 2:61-3:8.

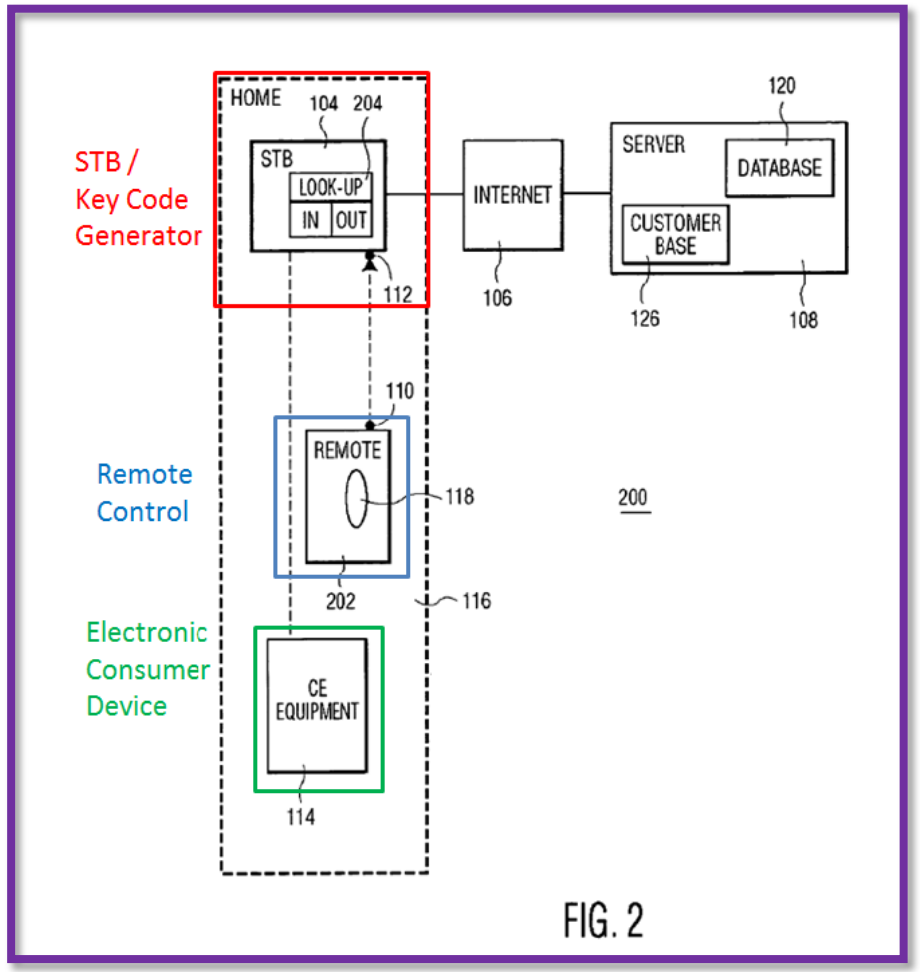
'642 Pet., Paper 2, 45-47; Russ Decl., EX1003, ¶¶192-99.

Caris Separately Discloses Embodiment 1 and Embodiment 2

Caris' FIG. 1 embodiment teaches Embodiment 1 while Caris' FIG. 2 embodiment teaches Embodiment 2.



Caris, EX1008, FIG. 1 (annotated).

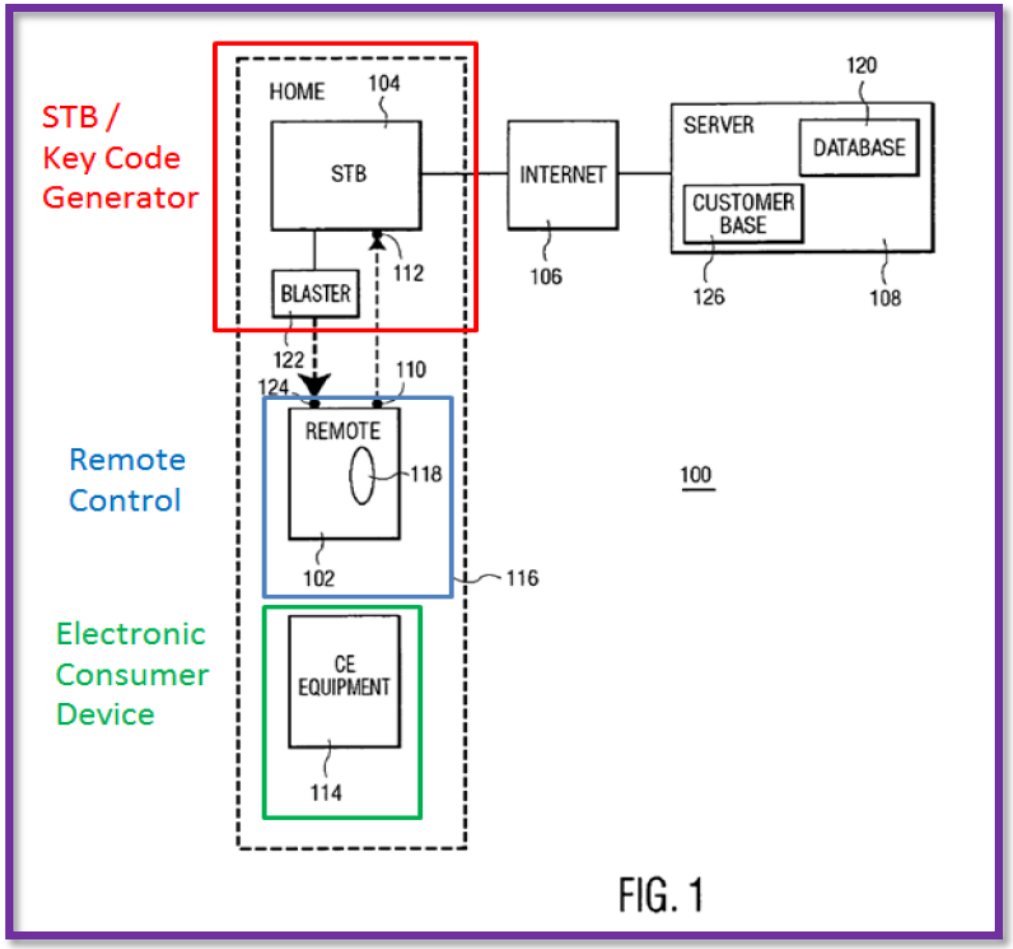


Caris, EX1008, FIG. 2 (annotated).

'642 Pet., Paper 2, 52-58, 66-72;
Russ Decl., EX1003, ¶¶201-13, 214-22, 246-58.

Caris Discloses Embodiment 1

Caris' FIG. 1 embodiment teaches pressing a "SmartConnect (SM) button" and generating control codes.



Caris, EX1008, FIG. 1 (annotated).

Preferably, remote **102** has a dedicated button **118** for allowing the consumer to connect STB **104** via the Internet **106** to a specific server **108**. The IR or RF code transmitted by remote **102** upon the consumer activating button **118** is interpreted by STB **104** as a request to send a message to server **108**. Server **108** presents a web site on a TV display monitor (not shown) connected to STB **104** that guides the consumer to providing certain information.

Caris, EX1008, 5:44-51.

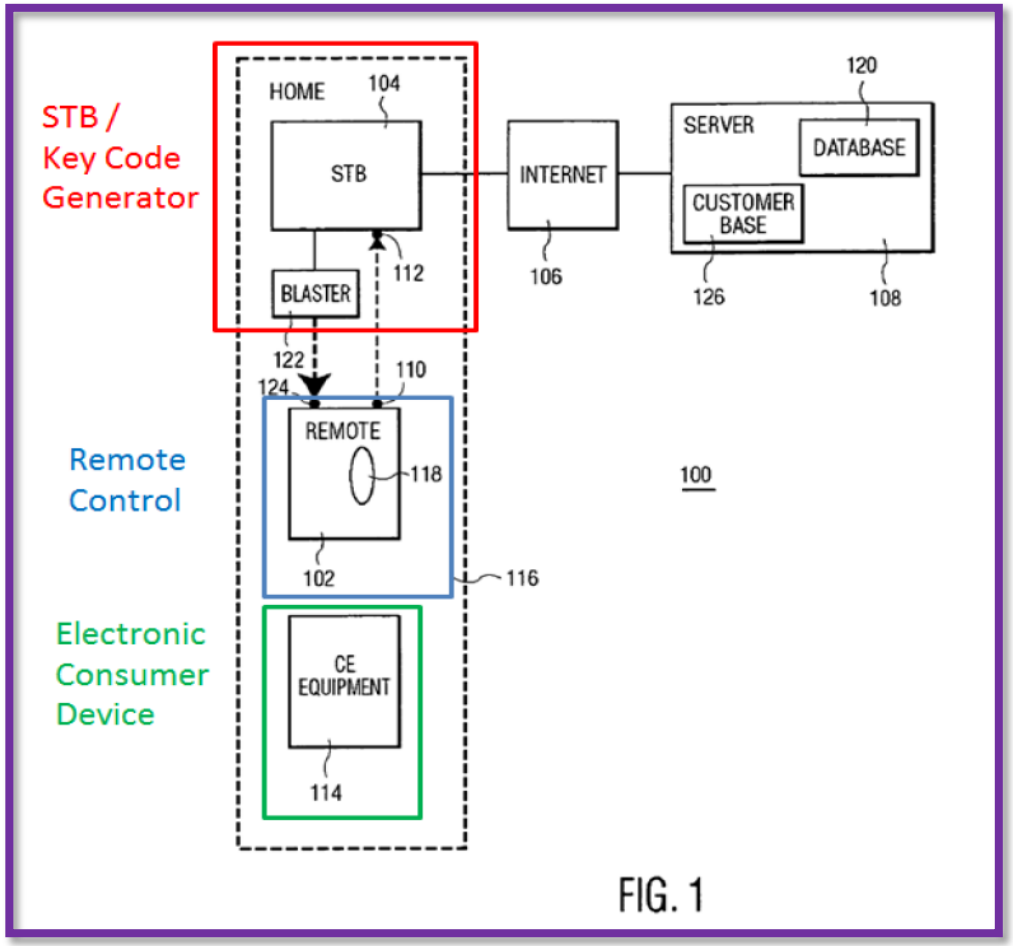
Server **108** runs a query based on the information supplied by the consumer. Upon a match between the information supplied and database **120**, server **108** preferably prompts the consumer to confirm his/her entries as to the specifics of the further equipment and the specific regarding the UI desired. Upon a confirmation by the consumer, server **108** downloads to appliance **104** data representative of a control code and/or UI for being programmed into remote control device **102** via appliance **104**. The downloaded data can be stored locally at STB **104** or is directly forwarded to remote **102**.

Caris, EX1008, 5:60-6:3.

'642 Pet., Paper 2, 52-55; Russ Decl., EX1003, ¶¶214-18.

Caris Discloses Embodiment 1

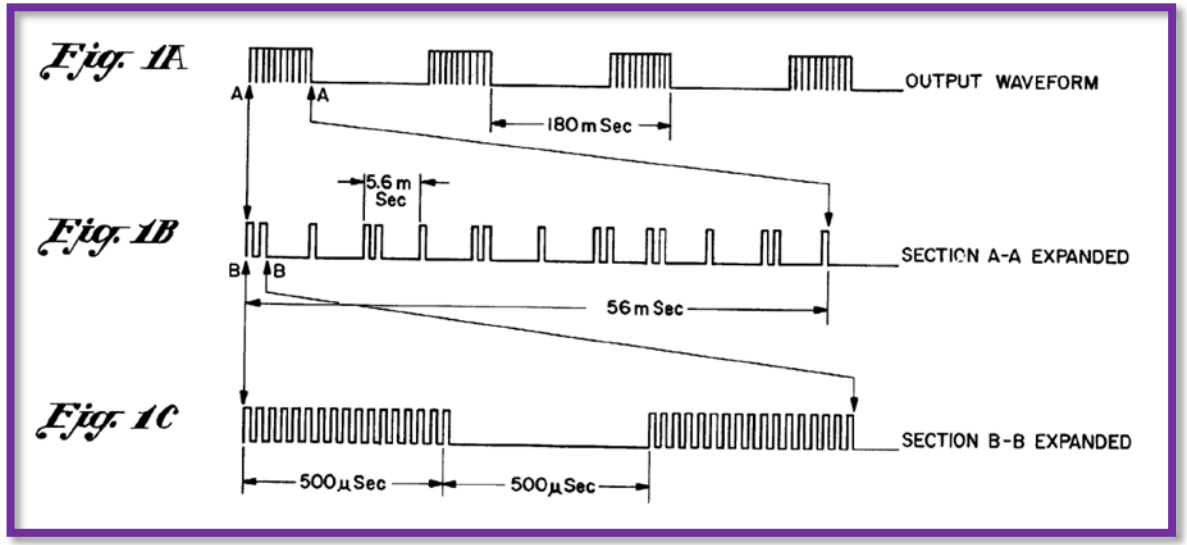
Caris and Skerlos teach “Modulating” and “Transmitting.”



Caris, EX1008, FIG. 1 (annotated)

> The STB enables programming its remote with the downloaded codes and/or UI data, e.g., through an IR or RF transmitter/blaster or a serial cable connecting the STB to a serial port of the remote for unidirectional communication with the STB, or through any other suitable means and procedures.

Caris, EX1008, 2:34-39.

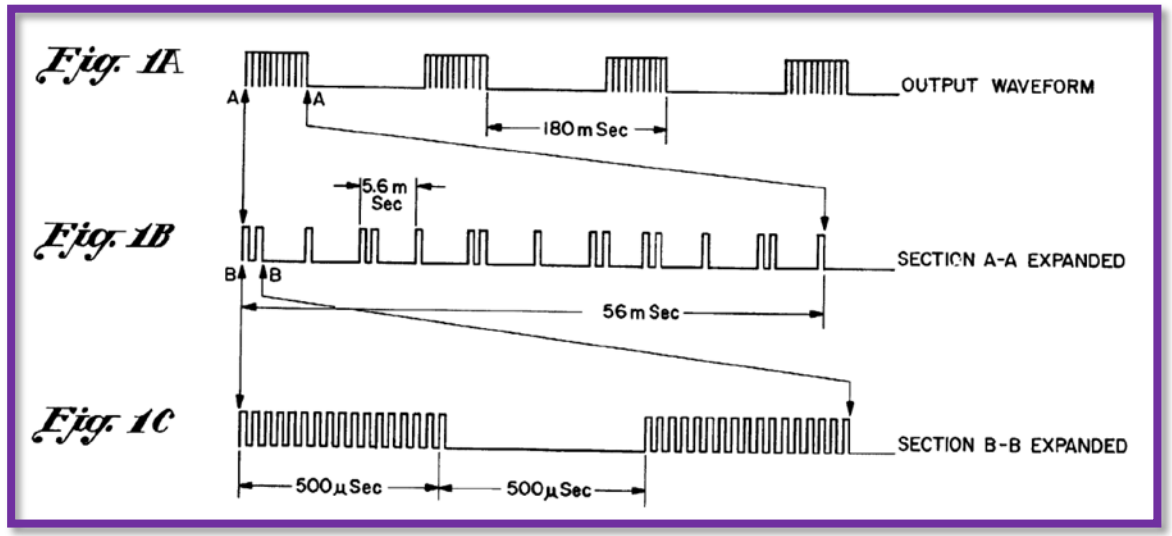


Skerlos, EX1009, FIGs. 1A-1C.

’642 Pet., Paper 2, 55-58; Russ Decl., EX1003, ¶¶219-23.

Caris and Skerlos Render Obvious the Claimed "Modulating"

Skerlos teaches modulating a key code onto a carrier signal



Skerlos, EX1009, FIGs. 1A-1C.

Shown in FIG. 1A is the output wave form of the transmitted IR signal which is repeated every 180 milliseconds. Each series of pulses is pulse code modulated as shown in FIG. 1B wherein an individual pulse train is presented in expanded form to show the coded pulse arrangement of the transmitted pulse groups. The 11 bits of coded information are transmitted in approximately 56 milliseconds. Shown in FIG. 1C is a still expanded view of a single data bit comprised of two pulse trains each 500 microseconds in length. A 500 millisecond interval is incorporated between individual pulse trains. The individual pulses shown in FIG. 1C represent the ON/OFF pulsing of the transmitter's light emitting diodes (LEDs). The LEDs are pulsed on and off in order to permit high current pulses at low duty cycles resulting in high power outputs of the I.R. diodes allowing increased range.

Skerlos, EX1009, 3:20-36.

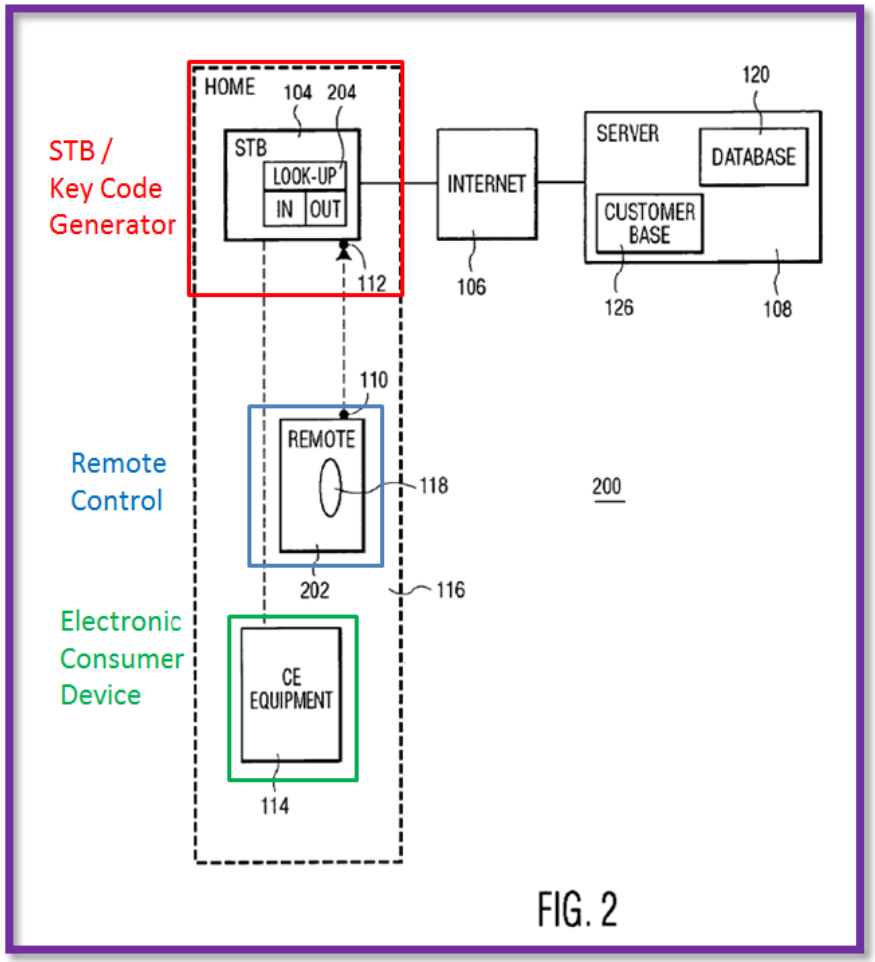
The present invention is intended to overcome the aforementioned limitations of the prior art by providing a remote control system in which a pulse code modulated control signal is used to modulate a second signal so as to transmit the control signal in a more noise free portion of the IR spectrum. The pulse code modulation (PCM) approach provides for an increased number of available codes and associated television receiver control functions.

Skerlos, EX1009, 2:12-20.

'642 Pet., Paper 2, 55-58; Russ Decl., EX1003, ¶¶219-22.

Caris Discloses Embodiment 2

Caris' FIG. 2 embodiment teaches pressing a function button and generating a control code.



Caris, EX1008, FIG. 2 (annotated).

FIG. **2** illustrates an alternative system **200** according to the invention. System **200** comprises in this example a remote control device **202** that is a pre-programmed. That is, remote **202** uses a fixed protocol to communicate with STB **104** for control of apparatus **114** via STB **104**. STB **104** uses a wired or wireless link with apparatus **114**. In order to use this configuration with any kind of controllable apparatus **114**, the user connects STB **104** to server **108** on the Internet **106** in response to the user activating a dedicated hard button **118** (or softkey **118** if remote **202** has an LCD touch screen functionality such as the PRONTO™) on remote **202**. The user then specifies to server **108** what apparatus **114** he/she would like to control via remote **202**, as in the example mentioned in the description of FIG. **1**. Server **108** then downloads to STB **104** data representative of a control code for control of apparatus **114**, the control being established via STB **102** in operational use. The data gets programmed into a look-up table **204** that associates an input received from remote **202** with an output as programmed. The output is now the data for the control command required for control of apparatus **114** via STB **104**.

Caris, EX1008, 6:53-7:5.

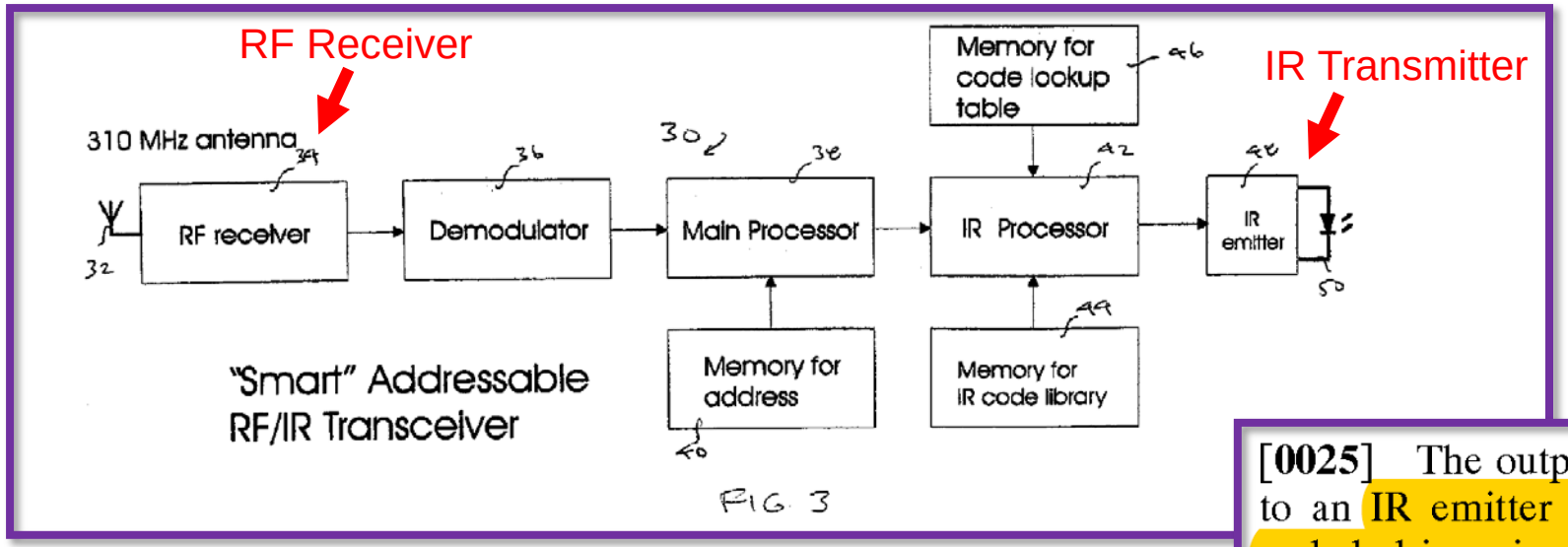
'642 Pet., Paper 2, 55-58; Russ Decl., EX1003, ¶¶219-22.

’325 Patent Appendix Slides

Rye/Skerlos Renders Obvious Claims 2 and 3

Claim 2 – "The first device as recited in claim 1, wherein the receiver comprises an RF receiver."

Claim 3 – "The first device as recited in claim 1, wherein the transmitter comprises an IR transmitter."



Rye, EX1005, FIG. 3 (annotated).

tion. To this end, as shown in **FIG. 3**, transceiver **30** includes an rf antenna **32** whose output is connected to the input of an rf receiver **34**. The output of receiver **34** is coupled to an

Rye, EX1005, ¶23.

[**0025**] The output of the IR microprocessor **42** is applied to an IR emitter **48**, which provides appropriately binary coded drive signals to an LED **50**, which, in response, transmits correspondingly coded IR control signals to the selected or addressed audiovisual component, as desired. In an otherwise known manner, that component uniquely responds to the received IR coded address and control signal that contains its unique product remote control code.

Rye, EX1005, ¶25.

'325 Pet., Paper 2, 33-34; Russ Decl., EX1003, ¶¶157-58.

Rye/Skerlos Renders Obvious Claim 5

Claim 5 – "The first device as recited in claim 1, wherein the formatted key code is transmitted from the first device to the second device via a wireless connection between the first device and the second device."

[0025] The output of the IR microprocessor **42** is applied to an IR emitter **48**, which provides appropriately binary coded drive signals to an LED **50**, which, in response, transmits correspondingly coded IR control signals to the selected or addressed audiovisual component, as desired. In an otherwise known manner, that component uniquely responds to the received IR coded address and control signal that contains its unique product remote control code.

Rye, EX1005, ¶25.

'325 Pet., Paper 2, 34-35; Russ Decl., EX1003, ¶¶159-60.

Rye/Skerlos Renders Obvious Claim 7

Claim 7 – "The first device as recited in claim 1, wherein the generated key code controls at least one of a power on, power off, volume up, and volume down functional operation of the second device."

[0007] The audiovisual component whose operation is to be remotely controlled is typically provided with an infrared detector that receives the coded infrared control or command signal from the hand-held remote control, and converts the received coded command signal to an electrical signal to which the remotely controlled audiovisual component responds by executing the corresponding command, e.g., increase volume or change channel.

Rye, EX1005, ¶7.

[0031] Send an RF code for pushbutton # 1 (power).

[0033] Send an RF code for pushbutton # 3 (Volume up).

[0035] Send an RF code for pushbutton # 1 (power).

Rye, EX1005, ¶¶31, 33, 35.

[0021] Referring to the drawings, there is shown in **FIG. 1** an example of a hand-held remote control unit generally designated **10** that may be used in the remote control system of the present invention. As therein shown, unit **10** includes a housing or case **12** which contains the integrated circuits and other components of the unit, as is conventional. As is also conventional, unit **10** includes an array of pushbuttons **14**, which, when pressed down by the user, actuate the internal circuitry contained in unit **10** to produce the appropriate binary coded commands or control signals that are transmitted from unit **10** to control selectively the audiovisual component, for example, to turn a DVD player "on" or raise the volume.

Rye, EX1005, ¶21.

'325 Pet., Paper 2, 35; Russ Decl., EX1003, ¶161.

Caris/Dubil Renders Obvious Claims 2 and 3

Claim 2 – "The first device as recited in claim 1, wherein the receiver comprises an RF receiver."

Claim 3 – "The first device as recited in claim 1, wherein the transmitter comprises an IR transmitter."

Preferably, remote **102** has a dedicated button **118** for allowing the consumer to connect STB **104** via the Internet **106** to a specific server **108**. The IR or RF code transmitted by remote **102** upon the consumer activating button **118** is interpreted by STB **104** as a request to send a message to server **108**.

Caris, EX1007, 5:44-49.

Preferably, the STB or other IP-connected equipment is equipped with an IR or RF transmitter in the front bezel and with a range long enough to reach a user on the couch (typically 10 feet from the display screen) to minimize the user's efforts required.

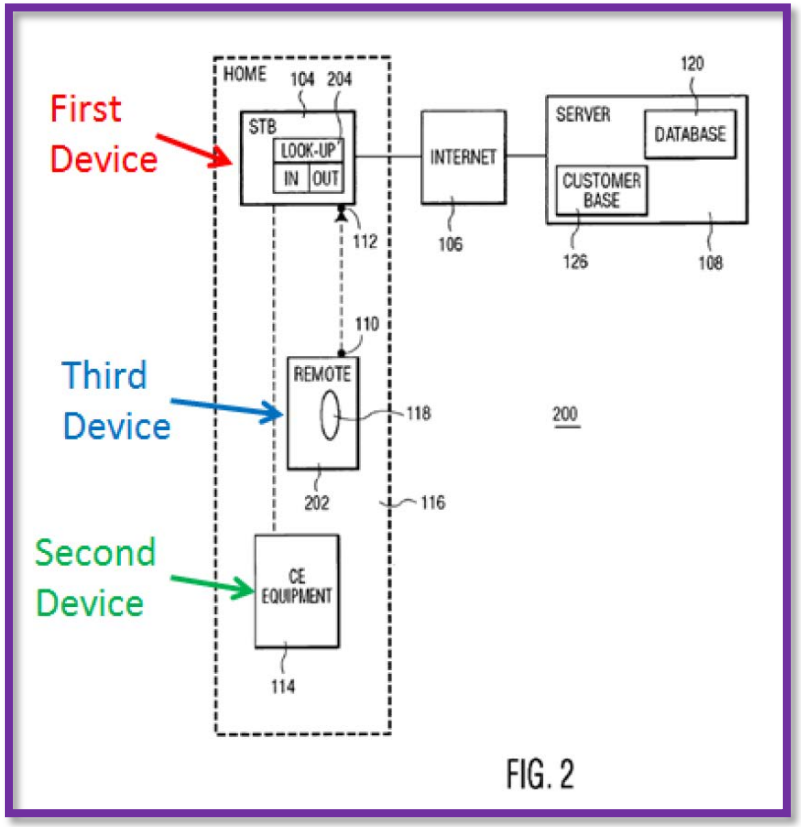
Caris, EX1007, 4:46-51.

'325 Pet., Paper 2, 54; Russ Decl., EX1003, ¶¶206-07.

Caris/Dubil Renders Obvious Claims 4 and 5

Claim 4 – "The first device as recited in claim 1, wherein the formatted key code is transmitted from the first device to the second device via a wired connection between the first device and the second device."

Claim 5 – "The first device as recited in claim 1, wherein the formatted key code is transmitted from the first device to the second device via a wireless connection between the first device and the second device."



Caris, EX1007, FIG. 2.

FIG. **2** illustrates an alternative system **200** according to the invention. System **200** comprises in this example a remote control device **202** that is a pre-programmed. That is, remote **202** uses a fixed protocol to communicate with STB **104** for control of apparatus **114** via STB **104**. STB **104** uses a wired or wireless link with apparatus **114**.

Caris, EX1007, 6:53-58.

'325 Pet., Paper 2, 54-55; Russ Decl., EX1003, ¶¶208-09.

’389 Patent Appendix Slides

Mishra/Dubil Renders Obvious Claims 7, 13, and 14

Claim 7 – "The remote control device of claim 4, wherein said key code is part of a codeset, and wherein said codeset is not stored on said remote control device."

Claim 13 – "The remote control device of claim 12, wherein said key code is not stored on said remote control device immediately prior to said means receiving the key code."

Claim 14 – "The remote control device of claim 12, wherein said key code is part of a codeset, and wherein said codeset is not stored on said remote control device."

[0020] Having received a command signal from the RCU **18**, the system **12** can translate the command into a format appropriate for controlling a particular device **16**. That is, it is not necessary to program the RCU **18** independently. Instead, a variety of codes may be stored in the system **12**. The user may be called upon to indicate the type of devices which need to be controlled. When the RCU transmits a signal corresponding to a known function (which signal may not be particularly adapted to work any particular device), the system **12** can translate that signal and send information back to the RCU **18** to enable the RCU **18** to control the particular device the RCU **18** is to operate.

Mishra, EX1005, ¶20.

[0021] In this way, it is not necessary to undergo elaborate programming of the RCU **18**, but instead, databases within the system **12** may contain information about how a conventional device **16** may be operated. In addition, the RCU **18** may be used not only to control device **16** but also to answer the telephone **20** as well.

Mishra, EX1005, ¶21.

'389 Pet., Paper 2, 32-33, 40-41; Russ Decl., EX1003, ¶¶149, 165-66.

Mishra/Dubil Renders Obvious Claim 8

Claim 8 – "The remote control device of claim 4, wherein said modulating to generate said first key code signal is performed according to a first codeset, and wherein said remote control device stores no codeset other than said first codeset."

Using the identified codeset and the indication of the pressed key, the key code generator device generates a key code and modulates that key code onto a radio frequency carrier signal, thereby generating a first key code signal. The remote control device receives the first key code signal from the key code generator device and modulates the key code onto an infrared frequency carrier signal, thereby generating a second key code signal. The remote control device relays the key code to the selected electronic consumer device in the second key code signal. The key code causes the selected electronic consumer device to perform the desired function. The key code is not stored on the remote control device in a permanent manner, but rather the key code is relayed through the remote control device.

'389 Patent, EX1001, 2:9-24.

[0037] The RCU **18** may operate in one of at least two different fashions. The RCU may have dedicated buttons that correspond to particular controlled devices. For example, the RCU may contain a button that is labeled "TV." When the TV button is pushed, the appropriate commands are sent to the master informing the master that the user now wishes to control the TV. The next button that is pushed, for example, the channel up button, causes the appropriate command to be sent to the master telling it, for example, that the user wishes to go to the next highest channel. The master in turn sends the RCU the necessary codes to increment the channel on the TV. The RCU then takes these codes and sends them, for example using a unidirectional infrared signal, to the TV using the protocols stored in the RCU's memory.

Mishra, EX1005, ¶37.

'389 Pet., Paper 2, 33-34; Russ Decl., EX1003, ¶¶150-53.

Mishra/Dubil Renders Obvious Claim 9

Claim 9 – "The remote control device of claim 4, wherein said key code is part of a codeset that includes a plurality of key codes, wherein each one of said plurality of key codes corresponds to a different function of the electronic consumer device, and wherein no more than a single one of said plurality of key codes is present on said remote control device at any given time."

[0037] The RCU **18** may operate in one of at least two different fashions. The RCU may have dedicated buttons that correspond to particular controlled devices. For example, the RCU may contain a button that is labeled "TV." When the TV button is pushed, the appropriate commands are sent to the master informing the master that the user now wishes to control the TV. The next button that is pushed, for example, the channel up button, causes the appropriate command to be sent to the master telling it, for example, that the user wishes to go to the next highest channel. The master in turn sends the RCU the necessary codes to increment the channel on the TV. The RCU then takes these codes and sends them, for example using a unidirectional infrared signal, to the TV using the protocols stored in the RCU's memory.

Mishra, EX1005, ¶37.

[0039] The difference between the two approaches is that in the first case, the master feeds the information to the RCU each time the RCU needs information. In the second case, the master feeds the information needed to do all the different controls for a given device initially, and then the device handles those protocols on its own. In one embodiment of the invention, the information may be provided from the master to the RCU each time the system is operated so that it is not necessary to discard the information when it is desired to switch controlled devices.

Mishra, EX1005, ¶39.

'389 Pet., Paper 2, 34-35; Russ Decl., EX1003, ¶¶154-56;
'389 Pet. Reply, Paper 22, 12-14, 20.

Mishra/Dubil Renders Obvious Claims 10 and 15

Claim 10 – "The remote control device of claim 4, further comprising: a microcontroller that determines that a user of said remote control device has selected said key and that modulates said key code onto said second carrier signal."

Claim 15 – "The remote control device of claim 12, wherein said means is a microcontroller."

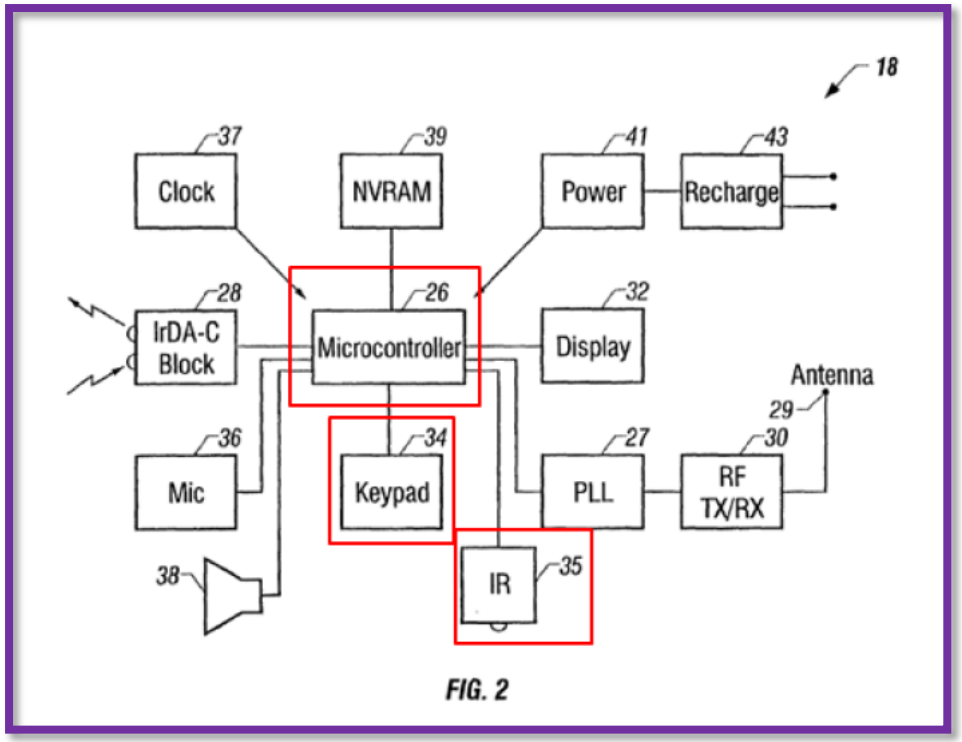


FIG. 2

Mishra, EX1005, FIG. 2 (annotated).

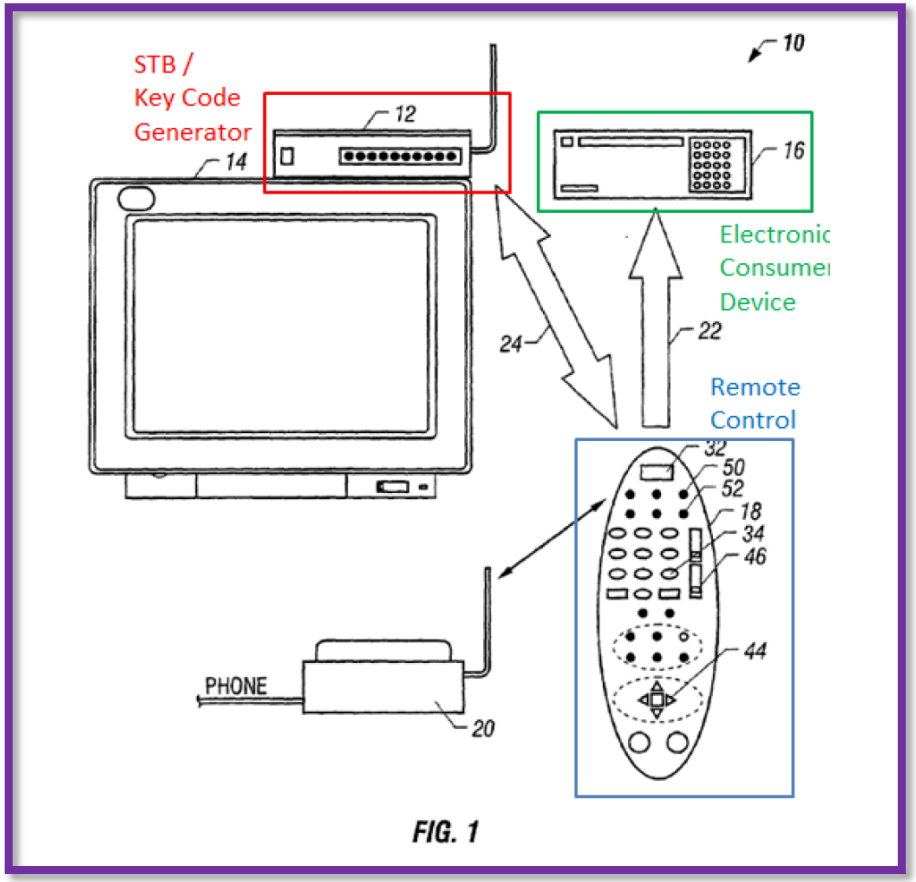
[0022] Referring to **FIG. 2**, the RCU **18** may include a display **32** which in one embodiment of the invention may be a liquid crystal display. It may be useful, for example, for displaying the telephone number dialed from the RCU **18**. A controller **26** may be coupled to a memory **39** and may be responsible for controlling the display **32** as well as an RF transceiver **30**. The controller **26** may be processor-based and may be a microcontroller or a microprocessor, as examples. The RF transceiver **30** may send radio frequency voice information to the telephone base station **20** or to the system **12**. The transceiver, in one embodiment of the invention, uses an internal antenna **29** that may be built into the RCU **18**. The IR transceiver **28** may be used to communicate with the system **12** using a bidirectional infrared protocol such as the IrDA-C protocol in one embodiment of the invention. The IR transmitter **35** may be used to communicate with legacy devices **16** using a unidirectional protocol in one embodiment.

Mishra, EX1005, ¶22.

'389 Pet., Paper 2, 35-36, 41; Russ Decl., EX1003, ¶¶157-58, 167.

Mishra/Dubil Renders Obvious Claim 11

Claim 11 – "The remote control device of claim 4, wherein said modulating said key code onto said first carrier signal is performed by an electronic consumer device taken from the group consisting of: a television, a stereo radio, a digital video disk player, a video cassette recorder, a personal computer, a set-top cable television box and a set-top satellite box."



Mishra, EX1005, FIG. 1 (annotated).

[0014] A control system **10**, shown in **FIG. 1**, includes a processor-based system **12** that communicates with a remote control unit (RCU) **18**. The system **12** may be a so-called set-top computer system that may work together with a conventional television receiver **14**.

Mishra, EX1005, ¶14.

[0047] Referring now to **FIG. 7**, an example of a system for providing the capabilities described previously may involve either a computer, a television receiver, a set-top computer system or another appliance. The illustrated system **12** includes a processor **100** coupled to an accelerated graphics port (AGP) chipset **106**. AGP is described in detail in the Accelerated Graphics Port Interface Specification, revision 2.0, published in 1998 by Intel Corporation of Santa Clara, Calif.

Mishra, EX1005, ¶47.

'389 Pet., Paper 2, 37; Russ Decl., EX1003, ¶159.

Mishra/Dubil/Lambrechts Renders Obvious Claim 5

Claim 5 – "The remote control device of claim 4, wherein said remote control device is taken from the group consisting of: a learning remote control device, a cell phone, an RF-enabled personal digital assistant (PDA), an RF-enabled wrist watch, and an RF-enabled keyboard."

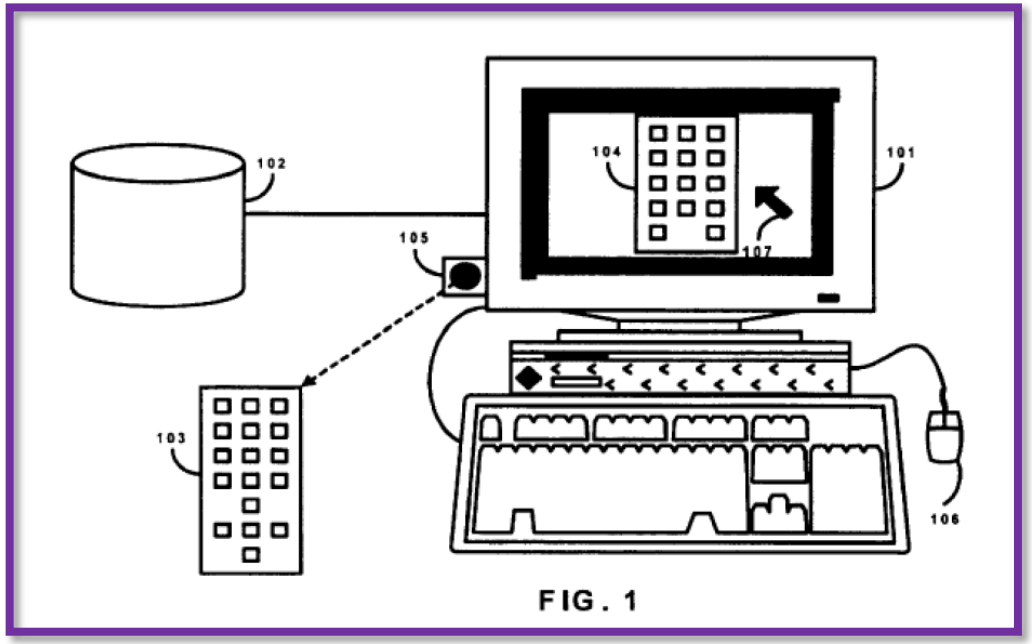


FIG. 1

Lambrechts, EX1011, FIG. 1.

It is further known to provide a universal remote control with learning which allow IR codes of a new appliances to be learned, so that the new device can subsequently be controlled with the universal remote control. IR codes for a specific appliance are entered into a universal remote control by placing the universal remote control and the remote control of the appliance face to face. Generally, the universal remote control must be set to a learning mode and repetitively a key of the universal remote control is selected and a corresponding key of the other remote control is pressed, causing a command code to be transmitted to the universal remote control and associated with the selected key.

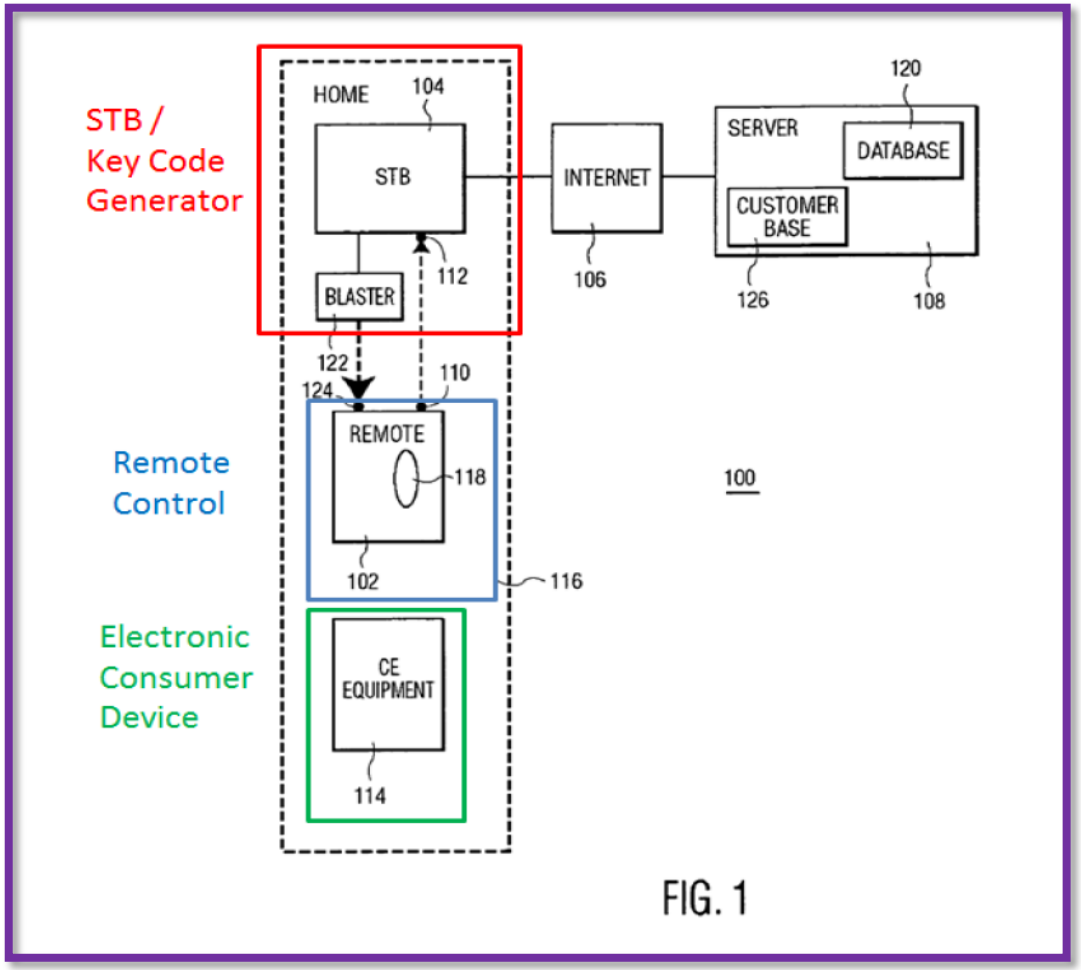
Lambrechts, EX1011, 1:40-52.

'389 Pet., Paper 2, 41-43; Russ Decl., EX1003, ¶¶168-73.

Claim 2 – Caris in View of Skerlos and Van Ee

Caris and Skerlos render steps (a) through (d) obvious.

IPR2019-01613 ('389 Patent) – Claim 2
2. A method comprising:
(a) receiving a keystroke indicator signal from a remote control device, wherein the keystroke indicator signal indicates a key on said remote control device that a user has selected;
(b) generating a key code within a key code generator device using the keystroke indicator signal, wherein said key code is part of a codeset that controls an electronic consumer device;
(c) modulating said key code onto a carrier signal, thereby generating a key code signal;
(d) transmitting said key code signal from said key code generator device; and
(e) identifying said codeset using input from a user of said remote control device, wherein said codeset is identified when said user stops pressing a key on said remote control device.

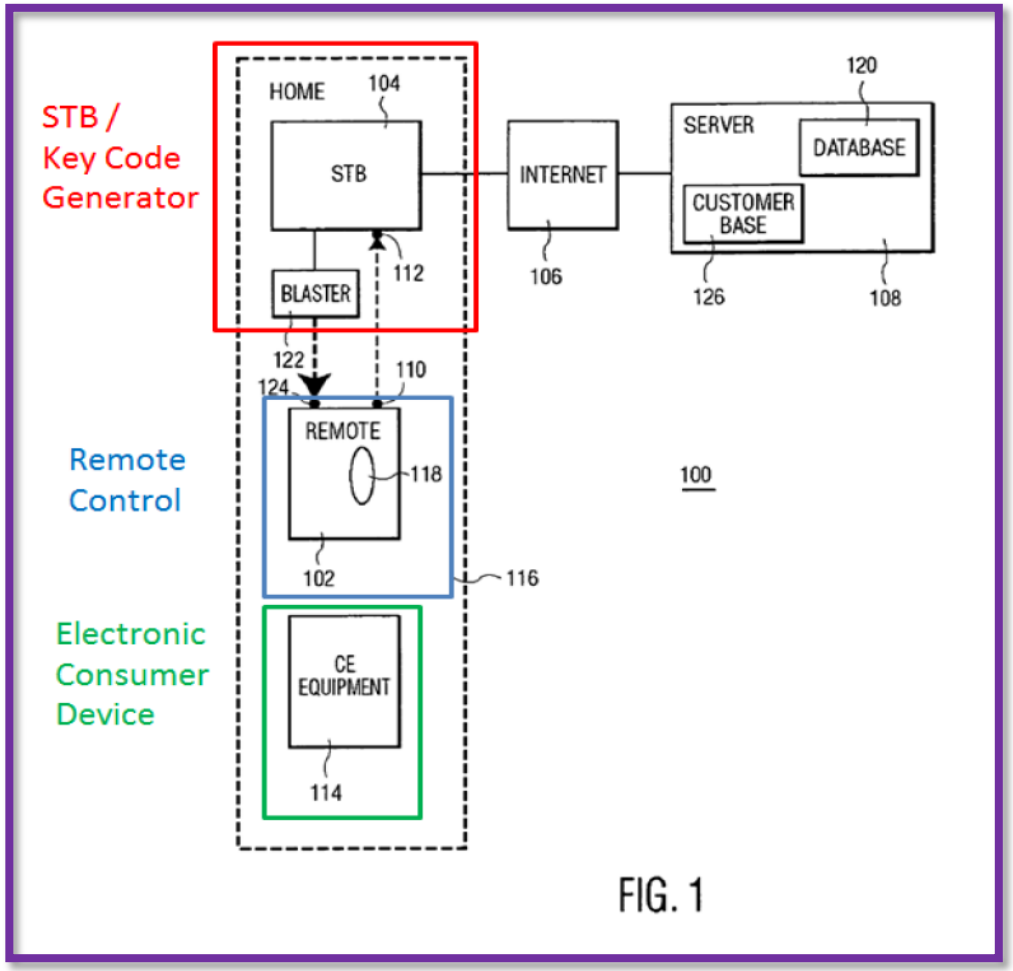


Caris, EX1008, FIG. 1 (annotated).

'389 Pet., Paper 2, 45-51; Russ Decl., EX1003, ¶¶182-95.

Claim 2 – Caris in View of Skerlos and Van Ee

Caris' teaches pressing a "SmartConnect (SM) button" and generating control codes.



Caris, EX1008, FIG. 1 (annotated).

Preferably, remote **102** has a dedicated button **118** for allowing the consumer to connect STB **104** via the Internet **106** to a specific server **108**. The IR or RF code transmitted by remote **102** upon the consumer activating button **118** is interpreted by STB **104** as a request to send a message to server **108**. Server **108** presents a web site on a TV display monitor (not shown) connected to STB **104** that guides the consumer to providing certain information.

Caris, EX1008, 5:44-51.

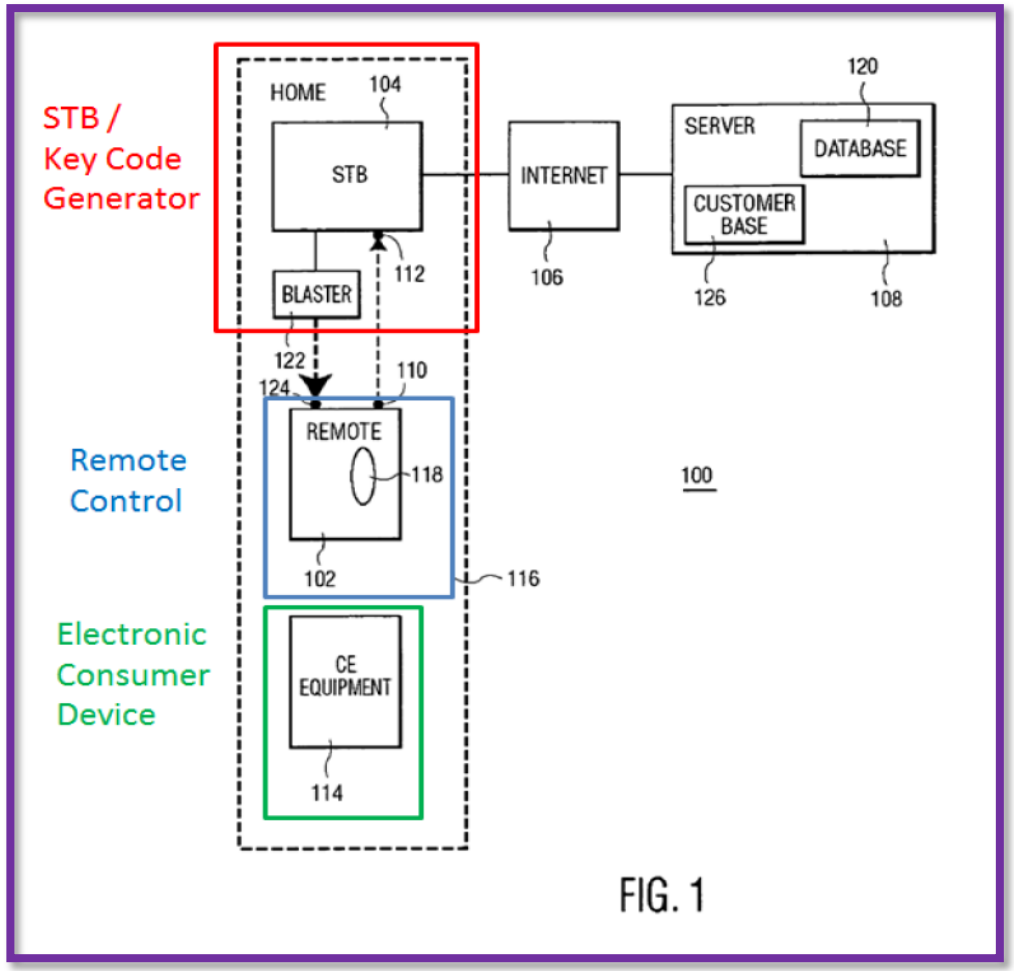
Server **108** runs a query based on the information supplied by the consumer. Upon a match between the information supplied and database **120**, server **108** preferably prompts the consumer to confirm his/her entries as to the specifics of the further equipment and the specific regarding the UI desired. Upon a confirmation by the consumer, server **108** downloads to appliance **104** data representative of a control code and/or UI for being programmed into remote control device **102** via appliance **104**. The downloaded data can be stored locally at STB **104** or is directly forwarded to remote **102**.

Caris, EX1008, 5:60-6:3.

'389 Pet., Paper 2, 45-47; Russ Decl., EX1003, ¶¶182-86.

Claim 2 – Caris in View of Skerlos and Van Ee

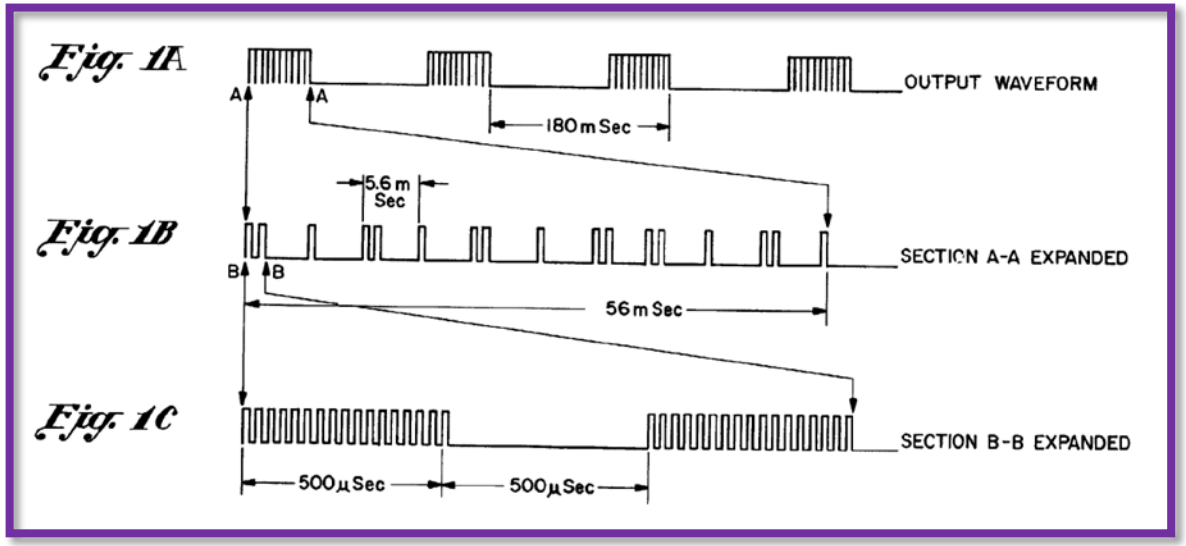
Caris and Skerlos teach "modulating" and "transmitting."



Caris, EX1008, FIG. 1 (annotated).

The STB enables programming its remote with the downloaded codes and/or UI data, e.g., through an IR or RF transmitter/blaster or a serial cable connecting the STB to a serial port of the remote for unidirectional communication with the STB, or through any other suitable means and procedures.

Caris, EX1008, 2:34-39.

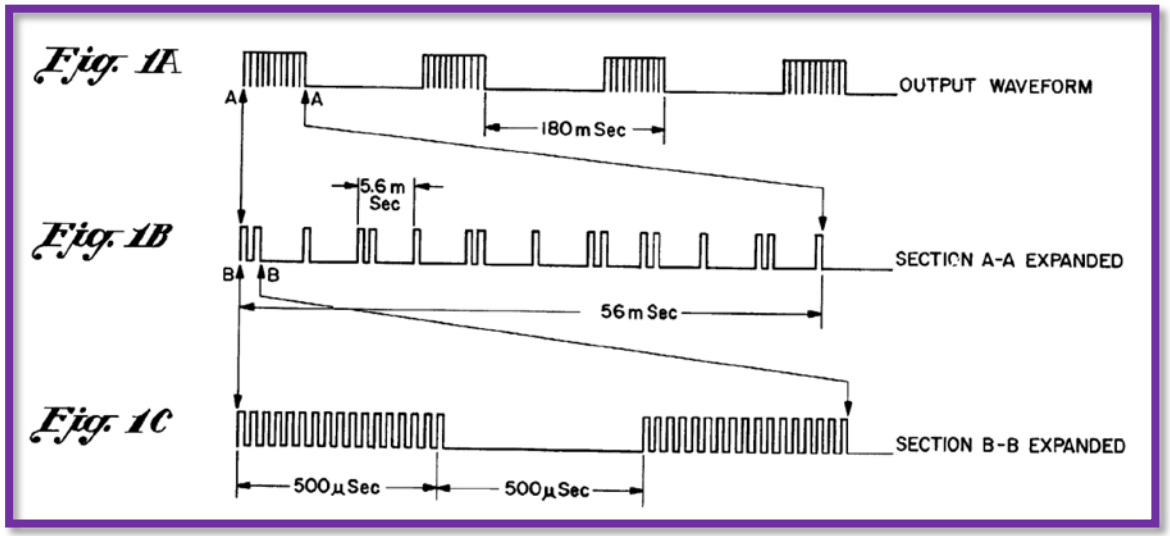


Skerlos, EX1009, FIGs. 1A-1C.

'389 Pet., Paper 2, 47-51; Russ Decl., EX1003, ¶¶187-95.

Claim 2 - Caris and Skerlos Render Obvious the Claimed “Modulating”

Skerlos teaches modulating a key code onto a carrier signal.



Skerlos, EX1009, FIGs. 1A-1C.

The present invention is intended to overcome the aforementioned limitations of the prior art by providing a remote control system in which a pulse code modulated control signal is used to modulate a second signal so as to transmit the control signal in a more noise free portion of the IR spectrum. The pulse code modulation (PCM) approach provides for an increased number of available codes and associated television receiver control functions.

Skerlos, EX1009, 2:12-21.

Shown in FIG. 1A is the output wave form of the transmitted IR signal which is repeated every 180 milliseconds. Each series of pulses is pulse code modulated as shown in FIG. 1B wherein an individual pulse train is presented in expanded form to show the coded pulse arrangement of the transmitted pulse groups. The 11 bits of coded information are transmitted in approximately 56 milliseconds. Shown in FIG. 1C is a still expanded view of a single data bit comprised of two pulse trains each 500 microseconds in length. A 500 millisecond interval is incorporated between individual pulse trains. The individual pulses shown in FIG. 1C represent the ON/OFF pulsing of the transmitter's light emitting diodes (LEDs). The LEDs are pulsed on and off in order to permit high current pulses at low duty cycles resulting in high power outputs of the I.R. diodes allowing increased range.

Skerlos, EX1009, 3:20-36.

’389 Pet., Paper 2, 47-51; Russ Decl., EX1003, ¶¶187-95.

Claims 2(e) and 3 – Caris in View of Skerlos and Van Ee

Van Ee teaches Step (e) and Claim 3.

To test which of the selected control codes causes the apparatus to be controlled to respond appropriately, the button on user-interface **108** which corresponds to the function of the selected control codes is intermittently pressed. As the button is intermittently pressed, each identifier code and its associated control code in the interleaved control signal are transmitted. An IR receiver of the IR receiver/transmitter circuit **122** of programming means **110** eavesdrops or picks up each identifier code transmitted by the control device **106**. The user stops intermittently pressing the button on user-interface **108** once the apparatus to be controlled responds, e.g., TV set **102** turns on.

Once the user stops intermittently pressing the button on user-interface **108**, interleaver/identifier circuit **120** samples the last identifier code picked up by IR receiver **122**, i.e., the identifier code associated with the control code which caused the apparatus to respond, and converts the sampled signal into a digital word of, e.g., a compressed data format. The compressed data format is then matched with a compressed data format of an identifier code stored within memory **112** to identify the identifier code that caused the apparatus to respond.

IPR2019-01613 ('389 Patent) – Claim 2

(e) identifying said codeset using input from a user of said remote control device, wherein said codeset is identified when said user stops pressing a key on said remote control device.

3. The method of claim 2, wherein said user is prompted by autoscan functionality to press said key on said remote control device.

Programming means **110** then correlates the matched compressed data format of the last identifier code received with its associated control code stored in the database. The associated control code is then transmitted to remote server **118** via Internet **116**. Remote server **118** uses the associated control code to determine to which set of control codes it belongs to and transmits the set to programming means **110**.

Van Ee, EX1013, 6:41-7:2.

'389 Pet., Paper 2, 51-54; Russ Decl., EX1003, ¶¶196-211.

Motivation to Combine Caris with Skerlos and Van Ee

204. A POSA would have understood that using the well-known codeset identification technique described in Van Ee would provide advantages to aid in streamlining the remote control programming process. In view of these advantages, a POSA would have been motivated to combine the teachings of Van Ee with Caris to address a clear shortcoming (namely that the SmartConnect process may not always work).

205. It was my experience at Scientific-Atlanta that determining the correct remote-control code set was surprisingly difficult, and so a POSA would have been motivated to use an identification process such as that of Van Ee that would be used as a backup plan if other methods failed. Cable operators would embrace such plans, as they would enable a customer service representative a practical fall-back plan to use if a user could not get the SmartConnect system described in Caris to work. For these reasons, there was a strong motivation to combine the teaching of Van Ee to that of Caris.

Russ Decl., EX1003, ¶¶204-05.

'389 Pet., Paper 2, 51-54; Russ Decl., EX1003, ¶¶196-211.

Motivation to Combine Caris with Skerlos and Van Ee

206. Further, using the teachings of Van Ee would amount to the combination of known techniques, and would be accomplished with a minimal effort, with a full expectation of success, and without undue experimentation. For example, after using the SmartConnect process of Caris, the user could be asked if the programmed remote-control codes were correct. If not, the system could then resort to the method of Van Ee. Additionally, the method of Van Ee could be employed if the SmartConnect process of Caris failed to recognize the identity of the device being controlled.

Russ Decl., EX1003, ¶206.

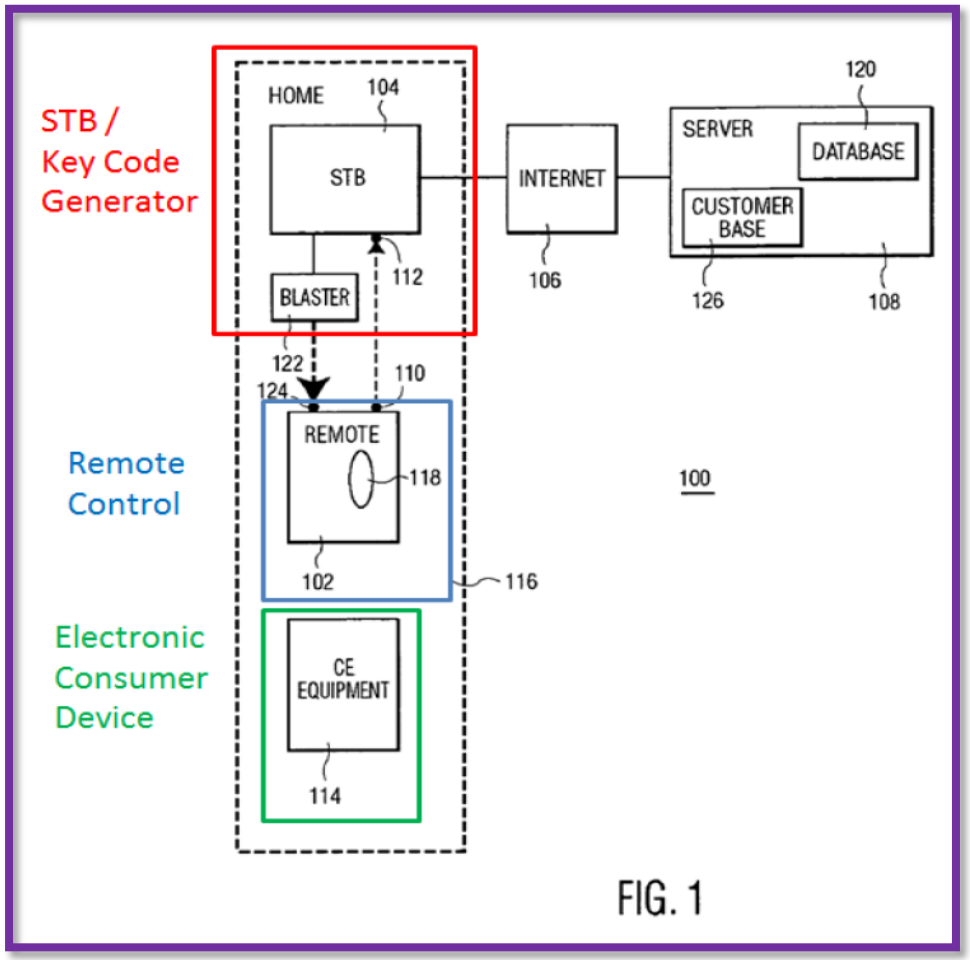
In this manner, a POSA using the STB described in Caris would have easily implemented and utilized the same codeset identification process described in Van Ee to identify a codeset when a user stops pressing a button. Thus, there would have been a reasonable expectation of success and it would have been predictable to implement the well-known identification process described in Van Ee in Caris' system.

Russ Decl., EX1003, ¶207.

'389 Pet., Paper 2, 51-54; Russ Decl., EX1003, ¶¶196-211.

Caris/Skerlos Renders Obvious Claim 11

Claim 11 – "The remote control device of claim 4, wherein said modulating said key code onto said first carrier signal is performed by an electronic consumer device taken from the group consisting of: a television, a stereo radio, a digital video disk player, a video cassette recorder, a personal computer, a set-top cable television box and a set-top satellite box."



Caris, EX1008, FIG. 1 (annotated).

Philips Electronics provides the SmartConnect (SM) service to end-users of CE equipment, especially equipment that is Internet-connected. An implementation of the SmartConnect (SM) service uses a special button on a remote control device that enables the user to directly connect, e.g., via a set top box (STB), to a dedicated SmartConnect (SM) web site. The site provides Philips Electronics with direct contact to the individual end-user, enables warranty registration, alerts the user to additional accessory sales, and provides specific content, advice, services, etc., all supported by the individual user's profile.

Caris, EX1008, 1:17-27.

The STB enables programming its remote with the downloaded codes and/or UI data, e.g., through an IR or RF transmitter/blaster or a serial cable connecting the STB to a serial port of the remote for unidirectional communication with the STB, or through any other suitable means and procedures.

Caris, EX1008, 2:34-39.

'389 Pet., Paper 2, 61; Russ Decl., EX1003, ¶226.

Caris/Skerlos/Lambrechts Renders Obvious Claim 5

Claim 5 – "The remote control device of claim 4, wherein said remote control device is taken from the group consisting of: a learning remote control device, a cell phone, an RF-enabled personal digital assistant (PDA), an RF-enabled wrist watch, and an RF-enabled keyboard."

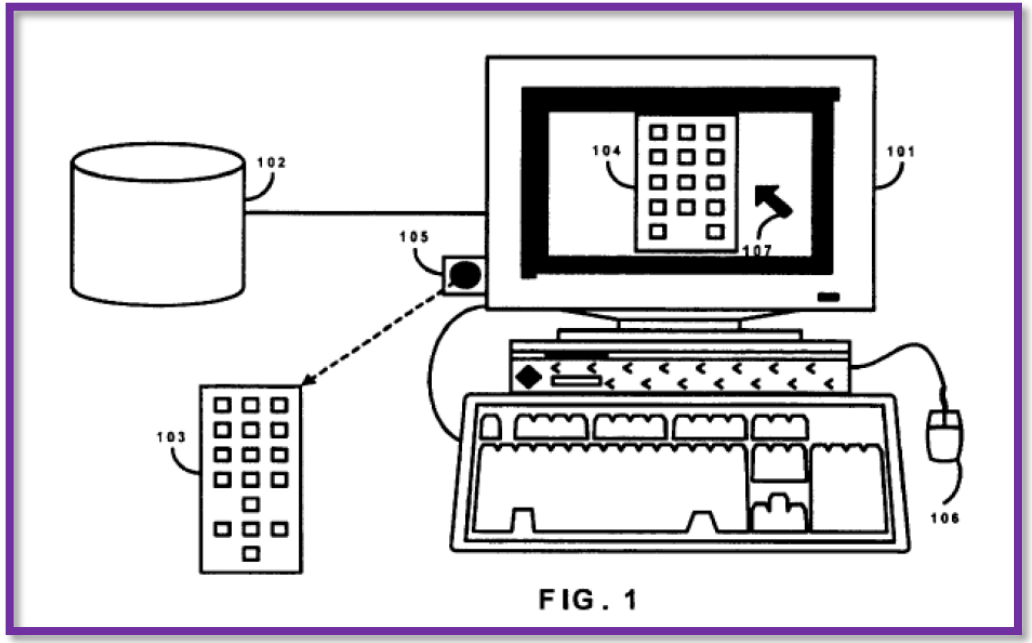


FIG. 1

Lambrechts, EX1011, FIG. 1.

It is further known to provide a universal remote control with learning which allow IR codes of a new appliances to be learned, so that the new device can subsequently be controlled with the universal remote control. IR codes for a specific appliance are entered into a universal remote control by placing the universal remote control and the remote control of the appliance face to face. Generally, the universal remote control must be set to a learning mode and repetitively a key of the universal remote control is selected and a corresponding key of the other remote control is pressed, causing a command code to be transmitted to the universal remote control and associated with the selected key.

Lambrechts, EX1011, 1:40-52.

'389 Pet., Paper 2, 62-64; Russ Decl., EX1003, ¶¶227-34.

Caris/Skerlos/Lambrechts Renders Obvious Claim 8

Claim 8 – "The remote control device of claim 4, wherein said modulating to generate said first key code signal is performed according to a first codeset, and wherein said remote control device stores no codeset other than said first codeset."

Using the identified codeset and the indication of the pressed key, the key code generator device generates a key code and modulates that key code onto a radio frequency carrier signal, thereby generating a first key code signal. The remote control device receives the first key code signal from the key code generator device and modulates the key code onto an infrared frequency carrier signal, thereby generating a second key code signal. The remote control device relays the key code to the selected electronic consumer device in the second key code signal. The key code causes the selected electronic consumer device to perform the desired function. The key code is not stored on the remote control device in a permanent manner, but rather the key code is relayed through the remote control device.

'389 Patent, EX1001, 2:9-24.

The universal remote control may have prestored command codes in a read-only memory (ROM) for controlling one or more predetermined electronic appliances, the learned command codes being additionally stored in a read-write random access memory (RAM). Alternatively, the universal remote control is initially 'empty', i.e. has no prestored command codes, thus requiring all command codes to be learned through the IR receiver. Dependent on the amount of RAM, command codes can be learned for controlling only one electronic appliance at a time or a plurality of electronic appliances simultaneously.

Lambrechts, EX1011, 2:22-33.

'389 Pet., Paper 2, 64-66; Russ Decl., EX1003, ¶¶235-39.

Caris/Skerlos/Yazolino Renders Obvious Claims 10 and 15

Claim 10 – "The remote control device of claim 4, further comprising: a microcontroller that determines that a user of said remote control device has selected said key and that modulates said key code onto said second carrier signal."

Claim 15 – "The remote control device of claim 12, wherein said means is a microcontroller."

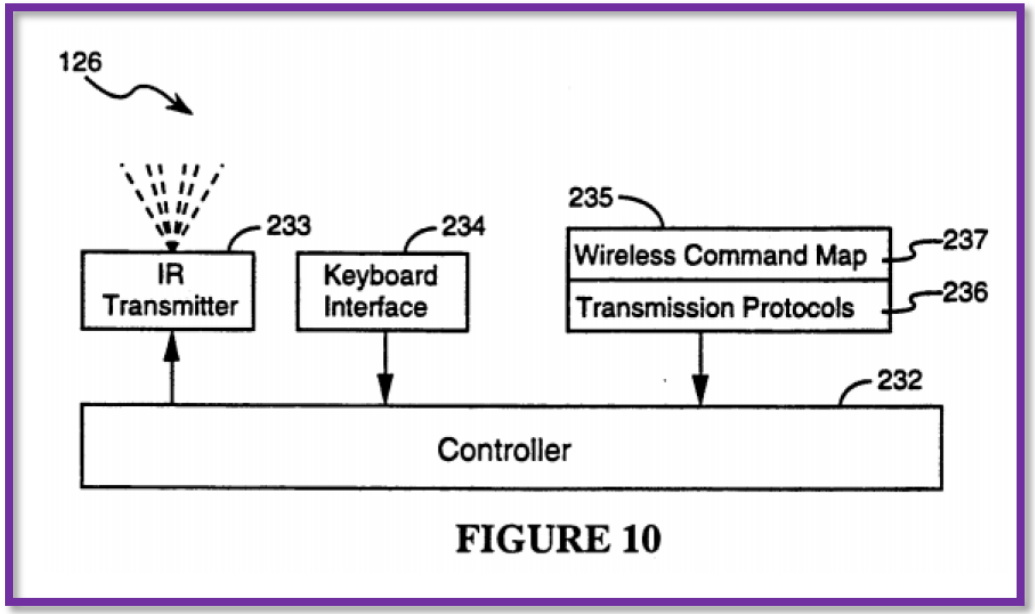


FIGURE 10

Yazolino, EX1012, FIG. 10.

Remote Control of Television and Converter Box

Referring to FIG. **10**, the remote control wand **126** used in the preferred embodiment is a programmable handheld infrared transmitter, similar in function to many commercially available programmable remote control wands. The wand **126** used in the preferred embodiment includes a microcontroller **232**, an infrared signal transmitter **233**, a keyboard interface **234**, and a non-volatile EEPROM memory **235** that stores (A) a set of two transmission protocols **236** that defines the signal format (including carrier frequency and transmission protocol) for two distinct sets of commands, and (B) a wireless command map **237** that indicates the set of wireless commands to be transmitted in response to each button pressed on the keyboard interface.

Yazolino, EX1012, 15:16-30.

'389 Pet., Paper 2, 66-68, 71; Russ Decl., EX1003, ¶¶240-46, 254.

Caris/Skerlos/Yazolino/Lambrechts Renders Obvious Claims 13 and 14

Claim 13 – "The remote control device of claim 12, wherein said key code is not stored on said remote control device immediately prior to said means receiving the key code."

Claim 14 – "The remote control device of claim 12, wherein said key code is part of a codeset, and wherein said codeset is not stored on said remote control device."

SmartConnect (SM) service site on the Web. The SmartConnect (SM) server has a database of control codes for most of the commercially available equipment that can be controlled via a remote. The server can also contain information regarding the remote's user-interface (UI's) to the equipment, e.g., button names, graphical user interface panels for a touch screen remote, and other features that support user-interaction with the remote. The user provides to the server information about further equipment he/she has available and would like to be controllable through a single remote. The database is queried based on the user's input. When the proper code sets and accompanying UI data have been found, the codes and UI data are downloaded to the user's STB. Preferably, the server or STB enables the user to configure the code and data, e.g., for causing a single action at the remote to execute multiple activities of the user's appliances. This configuration can be formed prior to the transfer of the code and UI data to the remote. The STB enables programming its remote with the downloaded codes and/or UI data, e.g., through an IR or RF transmitter/blaster or a serial cable con-

Caris, EX1008, 2:17-36.

The universal remote control may have prestored command codes in a read-only memory (ROM) for controlling one or more predetermined electronic appliances, the learned command codes being additionally stored in a read-write random access memory (RAM). Alternatively, the universal remote control is initially 'empty', i.e. has no prestored command codes, thus requiring all command codes to be learned through the IR receiver. Dependent on the amount of RAM, command codes can be learned for controlling only one electronic appliance at a time or a plurality of electronic appliances simultaneously.

Lambrechts, EX1011, 2:22-33.

'389 Pet., Paper 2, 71-72; Russ Decl., EX1003, ¶¶255-58.