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(12) **United States Patent**
Mui

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(54) **RELAYING KEY CODE SIGNALS THROUGH A REMOTE CONTROL DEVICE**

(58) **Field of Classification Search**
CPC G08C 15/04; G08C 17/02; G08C 23/04; G08C 19/28
USPC 340/13.24
See application file for complete search history.

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(73) Assignee: **Universal Electronics Inc.**, Santa Ana, CA (US)

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

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(21) Appl. No.: **15/153,905**

(Continued)

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Primary Examiner — Vernal Brown

(65) **Prior Publication Data**

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(74) *Attorney, Agent, or Firm* — Greenberg Traurig, LLP

Related U.S. Application Data

(57) **ABSTRACT**

(63) Continuation of application No. 13/068,820, filed on May 21, 2011, now Pat. No. 9,355,553, which is a continuation of application No. 12/462,526, filed on Aug. 4, 2009, now Pat. No. 8,004,389, which is a continuation of application No. 10/737,029, filed on Dec. 16, 2003, now Pat. No. 7,589,642.

Upon receiving a keystroke indicator signal from a remote control device, a key code generator device identifies a codeset usable to communicate with a selected consumer device. The keystroke indicator signal contains an indication of a pressed key, which corresponds to a function of the selected consumer device. Using the identified codeset and the key indication, 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 consumer device in the second key code signal. The key code causes the selected consumer device to perform the desired function.

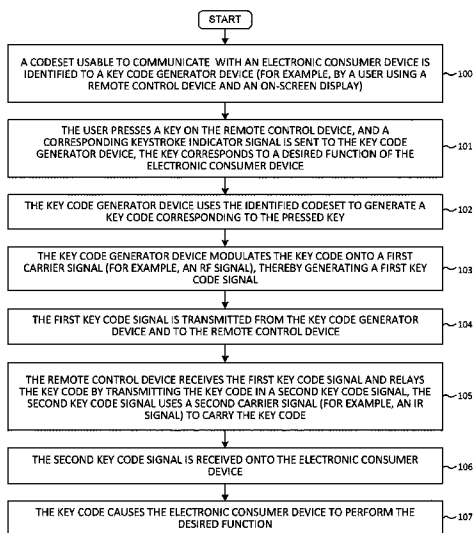
(51) **Int. Cl.**

G08C 23/04 (2006.01)
G08C 17/00 (2006.01)
G08C 15/04 (2006.01)
G08C 17/02 (2006.01)
G08C 19/28 (2006.01)

(52) **U.S. Cl.**

CPC **G08C 23/04** (2013.01); **G08C 15/04** (2013.01); **G08C 17/00** (2013.01); **G08C 17/02** (2013.01); **G08C 19/28** (2013.01)

16 Claims, 4 Drawing Sheets



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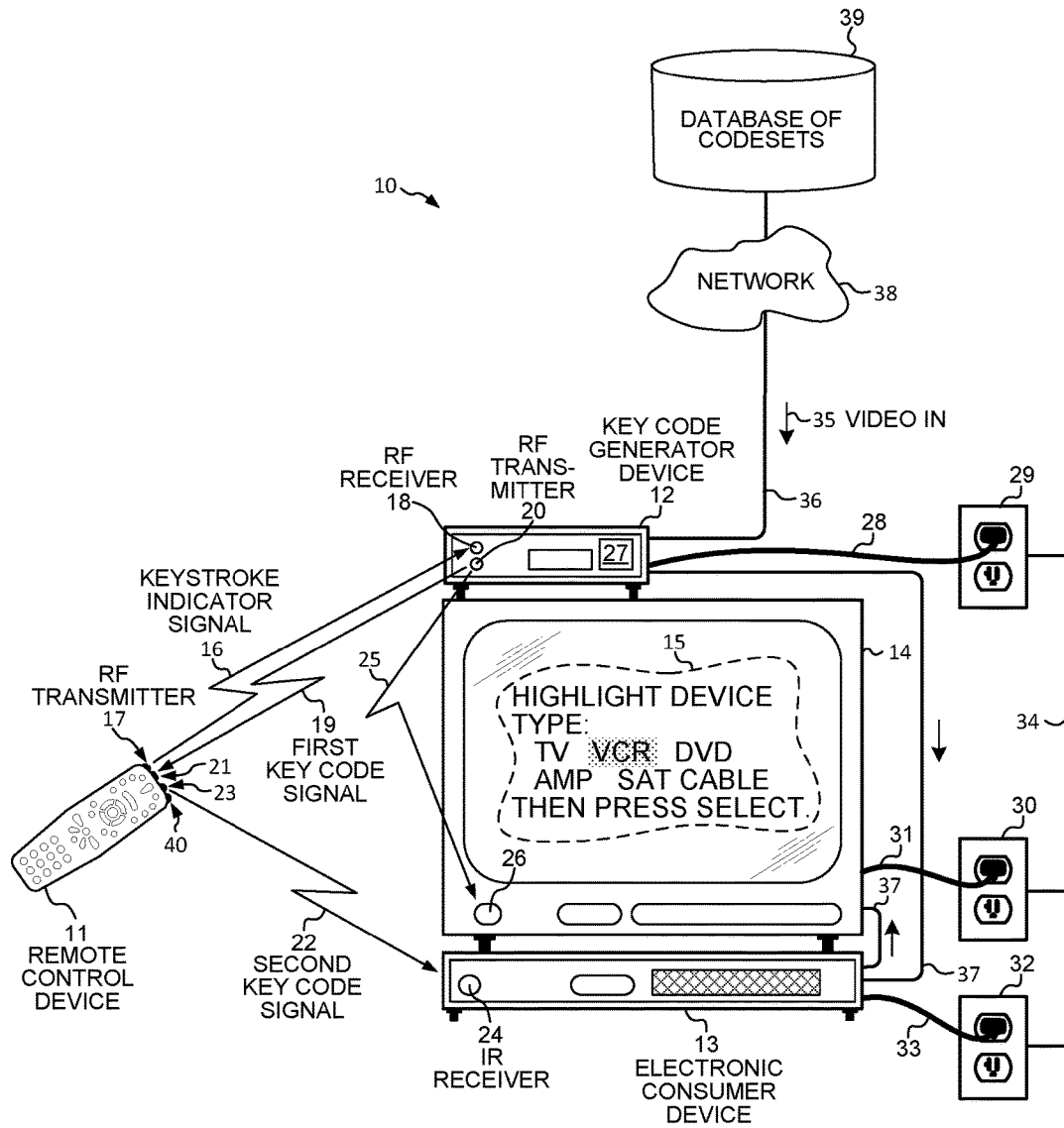


FIG. 1

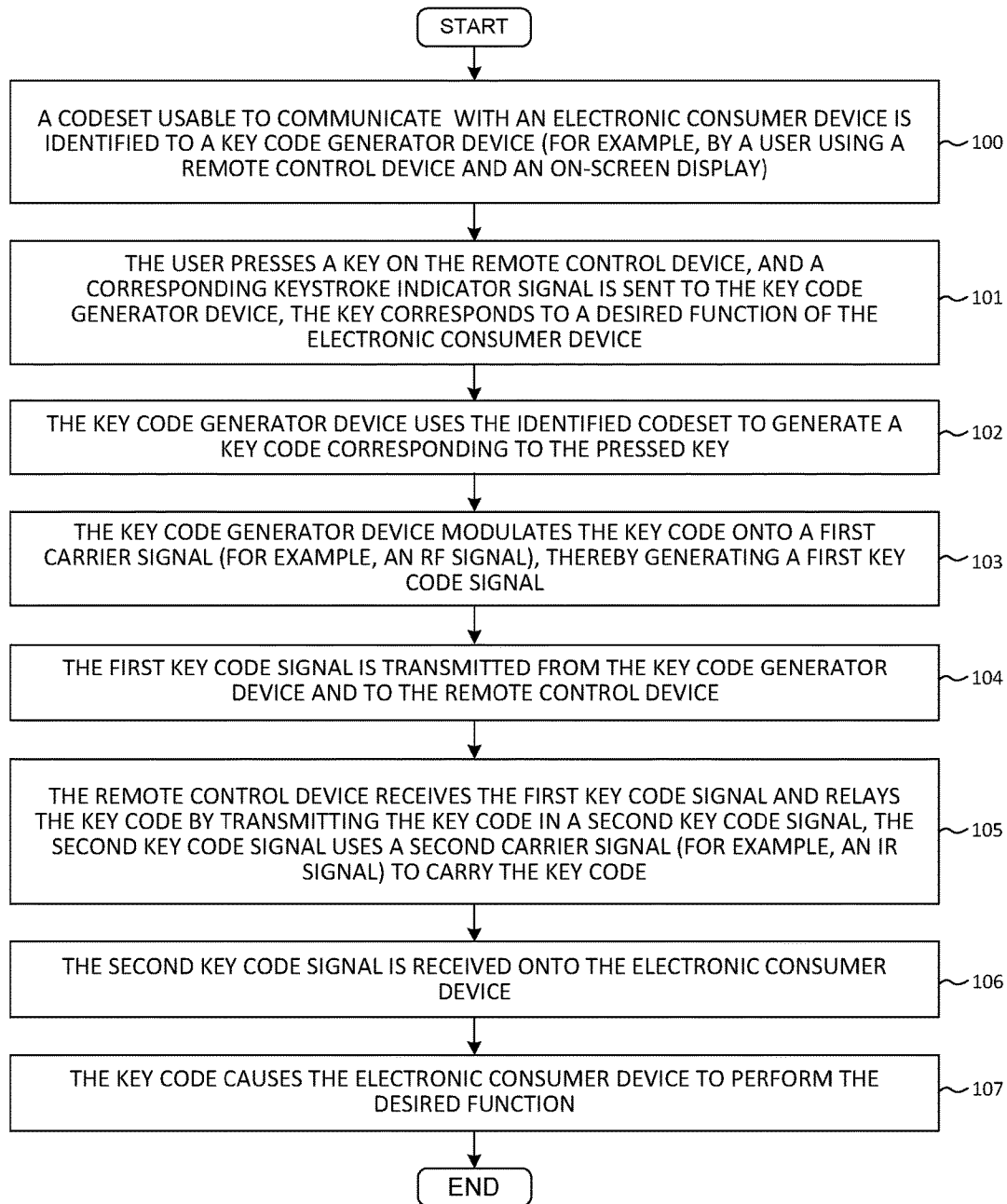


FIG. 2

0 1 0 1 0 0 0 1 1 1 0 0
SYSTEM CODE KEY DATA

KEY CODE
FIG. 3

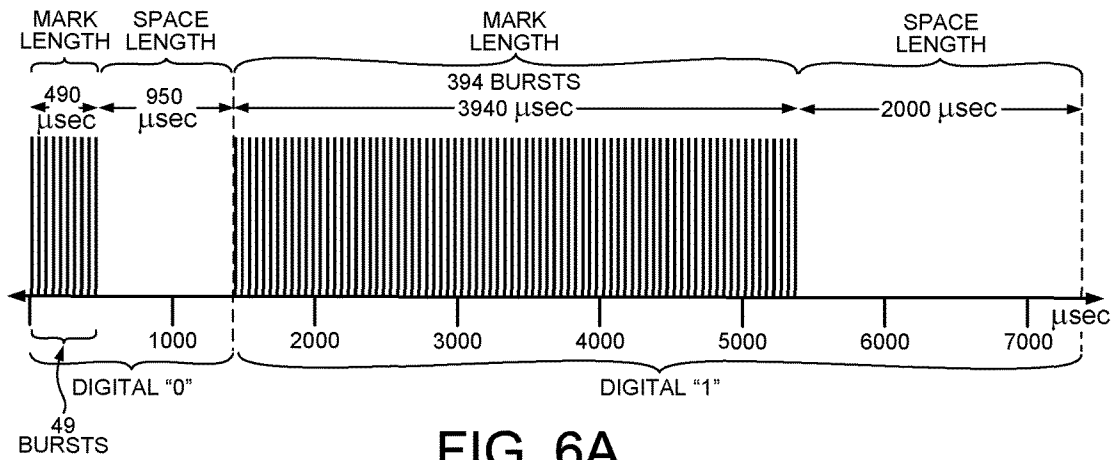


FIG. 6A

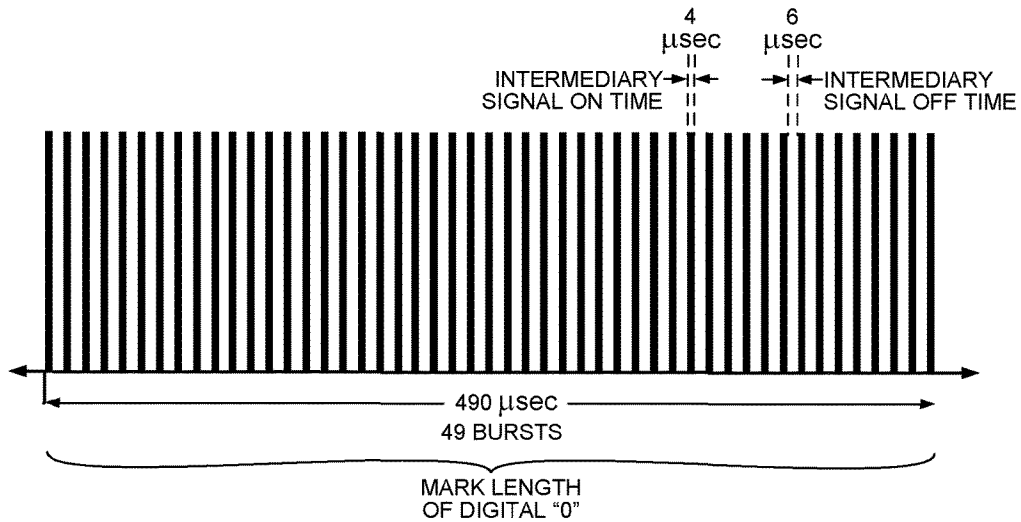


FIG. 6B

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