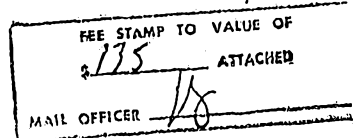
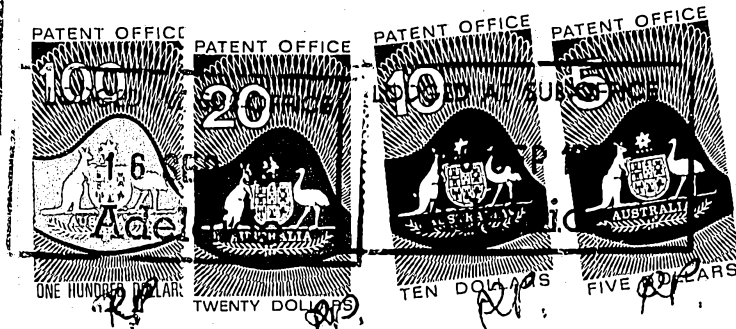


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Adelaide



595930

APPLICATION ACCEPTED AND AMENDMENTS
ALLOWED 12-2-90

COMMONWEALTH OF AUSTRALIA

Patents Act 1952-1966

CONVENTION APPLICATION FOR A PATENT

INSTRUCTIONS

Full name(s) of
applicant(s).

1/We M/A-COM GOVERNMENT SYSTEMS, INC., a California
Corporation, and CABLE/HOME COMMUNICATION CORP.,
a Delaware Corporation,

Address(es) of
applicant(s).

of 3033 Science Park Road, San Diego, California 92121,
and 6262 Lusk Boulevard, San Diego, California 92121,
respectively, both of the United States of America.

hereby apply for the grant of a Patent for an invention entitled

Title of invention.

"COLOR BURST REGENERATION"

which is described in the accompanying complete specification. This application is a Convention
application and is based on the following application or applications for a patent or patents or
similar protection made in the following country or countries.

Country(ies) in which
basic application(s) was/
were made and date and
number(s) of basic
application(s).

in.....U.S.A..... on.....19..September,.....19.86..... No....909,511.....

in..... on.....19..... No.....

in..... on.....19..... No.....

4/Our address for service is care of R. K. MADDERN and ASSOCIATES, Patent Attorneys.

97 King William Street, Adelaide, South Australia 5000.

345

Dated this 16th day of September, 19 87.

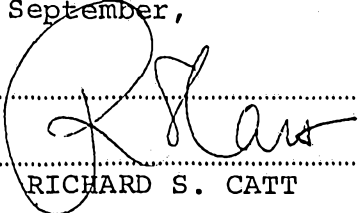
May be signed by
Australian Patent
Attorney.

M/A-COM GOVERNMENT SYSTEMS, INC.

and

CABLE/HOME COMMUNICATION CORP.

By their Patent Attorneys
R.K. MADDERN & ASSOCIATES


RICHARD S. CATT

AUSTRALIA

FORM 7.

(Note: To be signed by the applicant(s), or if a Company, to be signed by a person on its behalf. Parts inappropriate to a particular application should be cancelled.)

Bemerkung. Zu unterschreiben vom Anmelder, oder im Falle einer Gesellschaft von einer bevollmaechtigten Person. Nicht zutreffende Teile muessen gestrichen werden.

COMMONWEALTH OF AUSTRALIA

Patents Act 1952-1966

**DECLARATION IN SUPPORT OF A CONVENTION APPLICATION
FOR A PATENT OR PATENT ADDITION**

**INSTRUCTIONS
INSTRUKTIONEN**

Insert No. if available.

Wenn moeglich, Nummer anfuehren.

Full name(s) of applicant(s).
Voller Name oder Namen des/der Anmelders/der Anmelder(s).

Title of Invention.
Name der Erfindung.

Full name(s) of declarant(s).
Voller Name oder Namen des/der Deklaranten.

Address(es) of declarant(s).
Adresse des/derselben.

Country in which first basic application was filed, and date, and full name(s) of basic applicant(s).
Name des Landes in dem die Grundanmeldung zuerst gebucht wurde, ebenso das Datum derselben und der/die volle(n) Namen des/der Grundanmelder.

Full name(s) of actual inventor(s).
Voller Name des/der direkten Erfinders/der Erfinders.

Address(es) of actual inventor(s).
Adresse des/derselben.

Recite manner in which applicant(s) derive(s) title from actual inventor(s).
e.g., the applicant(s) is/are the assignee(s) of the actual inventor(s).

Angebe durch welchen Umstand der/die Anmelder beauftragt sind den Titel der Erfindung von dem eigentlichen Erfinder zu erhalten.
z.B. Der Anmelder ist der Bevollmaechtigte des/der eigentlichen Erfinders/der Erfinders.

Paragraph 4—strike out if reverse side of sheet applicable.

Paragraph 4 aus zustreichen wenn Rueckseite zutrifft.

Signature(s) of declarant(s).

Unterschrift(en) des/der Deklaranten.

(Note. No attestation or other signature is required).
Bemerkung. Beglaubigung der Unterschrift ist nicht benoetigt.

In support of the Convention application made by

M/A-COM Government Systems, Inc., a corporation of the State of California, U.S.A.
and Cable/Home Communication Corp., a corporation of the State of Delaware, U.S.A.

for a patent/~~patent of addition~~ for an invention entitled...

"COLOR BURST REGENERATION"

~~I~~/We Edward D. Schmidt

Jerrold A. Heller

and

of 3033 Science Park Road
San Diego, California 92121
U.S.A.

6262 Lusk Boulevard
San Diego, California 92121
U.S.A.

do solemnly and sincerely declare as follows:—

~~XXXXXX I am/We are the applicant(s) for the patent/patent of addition~~

(or, in the case of an application by a body corporate)
(oder im Falle einer Anmeldung einer juristischen Person)

1. ~~I am~~/We are authorized by the abovementioned applicant(s) for the patent/~~patent of addition~~ to make this declaration on ~~its~~/their behalf.

2. The basic application(s) as defined by section 141 of the Act was/~~were~~ made in the following country or countries on the following date(s) by the following applicant(s) namely:—

in United States of America on September 19, 1986
by Ron D. Katznelson

in on 19
by

in on 19
by

3. ~~XXXXXX I am/We are the actual inventor(s) of the invention referred to in the basic application~~

~~XXXXXX Ron D. Katznelson of 3919 Caminito Del Mar Surf, San Diego, California 92130, U. S. A.~~

Ron D. Katznelson of 3919 Caminito Del Mar Surf, San Diego, California 92130,
U. S. A.

of

is/~~are~~ the actual inventor(s) of the invention and the facts upon which the applicant(s) ~~is~~/are entitled to make the application are as follows:— By virtue of an assignment between the Inventor and M/A-COM Government Systems, Inc., and an assignment between M/A-COM Government Systems, Inc., and Cable/Home Communication Corp.

4. The basic application(s) referred to in paragraph 2 of this Declaration was/~~were~~ the first application(s) made in a Convention country in respect of the invention the subject of the application.

Declared at San Diego, California this

31 day of August 1987

Edward D. Schmidt

Edward D. Schmidt
Corporate Secretary

Jerrold A. Heller
Jerrold A. Heller
Executive Vice President

M/A-COM Government Systems, Inc. Cable/Home...Communication ...Corp.

(12) PATENT ABRIDGMENT (11) Document No. AU-B-78458/87
(19) AUSTRALIAN PATENT OFFICE (10) Acceptance No. 595930

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COLOR BURST REGENERATION
- International Patent Classification(s)
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- (21) Application No. : **78458/87** (22) Application Date : **16.09.87**
- (30) Priority Data
- (31) Number (32) Date (33) Country
909511 19.09.86 US UNITED STATES OF AMERICA
- (43) Publication Date : **24.03.88**
- (44) Publication Date of Accepted Application : **12.04.90**
- (71) Applicant(s)
M/A-COM GOVERNMENT SYSTEMS, INC.; CABLE/HOME COMMUNICATION CORP.
- (72) Inventor(s)
RON D. KATZNELSON
- (74) Attorney or Agent
R.K. MADDERN & ASSOCIATES
- (56) Prior Art Documents
AU 565477 56024/86 H04N 17/02, 9/455, 9/44; H03L 7/08
AU 579917 52557/86 H04N 9/45; H03L 7/18
AU 551601 91167/82 H04N 9/46, 5/06
- (57) Claim

1. A system for regenerating a standard-length color burst signal from a less-than-standard-length color burst information signal of a given frequency and phase, comprising

means for generating a system clock signal from the color burst information signal, with said clock signal having a clock frequency related to and at least twice the given frequency of the color burst information signal;

means for sampling and storing phase information from the color burst information signal, wherein said sampling is clocked by the system clock signal; and

means for regenerating a standard-length color burst signal at the given frequency and in phase with the color burst information signal by retrieving and extrapolating the stored phase information, wherein said retrieval is clocked by the system clock signal.

COMMONWEALTH OF AUSTRALIA

PATENTS ACT 1952-62

COMPLETE SPECIFICATION

(ORIGINAL)

FOR OFFICE USE:

Application Number:
Lodged:

Class

Int. Class

Complete Specification Lodged:
Accepted:
Published:

Priority:

Related Art:

59 59 30

This document contains the
amendments made under
Section 49 and is correct for
printing.

TO BE COMPLETED BY APPLICANT

Name of Applicant: M/A-COM GOVERNMENT SYSTEMS, INC., a California Corporation,
and CABLE/HOME COMMUNICATION CORP., a Delaware Corporation,Address of Applicant: 3033 Science Park Road, San Diego, California 92121, and
6262 Lusk Boulevard, San Diego, California 92121,
respectively, both of the United States of America.

Actual Inventor: RON D. KATZNELSON

Address for Service: R.K. Maddern & Associates, of 345 King William Street,
Adelaide, State of South Australia, Commonwealth of
Australia.

Complete Specification for the invention entitled:

"COLOR BURST REGENERATION"

The following statement is a full description of this invention, including the best method of performing it
known to me. US.

COLOR BURST REGENERATION

ABSTRACT OF THE DISCLOSURE

A system for regenerating a standard-length color burst signal from a less-than-standard-length color burst information signal of a given frequency and phase. The system includes a phase-locked loop for generating a system clock signal from the color burst information signal, with the clock signal having a clock frequency related to and at least twice the given frequency of the color burst information signal. The phase information from the color burst information signal is sampled and stored in a RAM. The sampling is clocked by the system clock signal. A standard-length color burst signal is regenerated at the given frequency and in phase with the color burst information signal by retrieving the stored phase information and extrapolating the standard-length signal in accordance with the retrieved phase information. Such retrieval is clocked by the system signal. The phase-locked loop is a digital phase-locked loop; and the color burst information signal is converted into a digital color burst information signal for processing by the phase-locked loop and for sampling and retrieval of the phase information. Upon retrieval and extrapolation of the phase information samples, the retrieved and extrapolated phase information samples are converted into an analog sample information signal, which is converted into a regenerated sinusoidal standard-length color burst signal by a low pass filter.

COLOR BURST REGENERATION

BACKGROUND AND SUMMARY OF THE INVENTION

The present invention generally pertains to television signal processing and is particularly directed to regeneration of a color burst signal.

5 In order to conserve transmission bandwidth, it may be desirable to transmit a less-than-standard-length color burst information signal with a video information signal in lieu of a standard-length color burst signal. For example, when transmitting a scrambled television signal, an original standard-format video signal, as shown in Figure 1A, containing a sinusoidal color burst signal 10 preceding the video information 12 in each horizontal line is converted into a format, such as shown in Figure 1B, wherein a color burst information signal 14 of less than standard length, but phase coincident with the color burst signal 10 in the original video signal (Figure 1A) is positioned between segments of audio and/or control information 16 and video information 18. Typically the less-than-standard length color burst information signal 14 in the converted signal is formed by truncating the color burst signal 10 in the original video signal and thus has the same frequency and phase as the standard-length color burst signal in the original video signal.

The present invention provides a system for regenerating a standard-

length color burst signal from a less-than-standard-length color burst information signal of a given frequency and phase. The system of the present invention includes means for generating a system clock signal from the color burst information signal, with the clock signal having a clock frequency related to and at least twice the given frequency of the color burst information signal; means for sampling and storing phase information from the color burst information signal, wherein said sampling is clocked by the system clock signal; and means for regenerating a standard-length color burst signal at the given frequency and in phase with the color burst information signal by retrieving and extrapolating the stored phase information, wherein said retrieval is clocked by the system clock signal.

Additional features of the present invention are described with reference to the description of the preferred embodiment.

BRIEF DESCRIPTION OF THE DRAWING

Figure 1A illustrates a standard-length color burst signal in an original standard-format video signal.

Figure 1B illustrates a less-than-standard-length color burst information signal in a scrambled video signal, together with the sampling of such color burst information signal.

Figure 1C illustrates the regeneration of a color burst signal from

retrieved phase information that was stored upon sampling the color burst information signal of Figure 1B.

Figure 1D illustrates a reconstructed video signal including a regenerated color burst signal.

5

Figure 2 is a block diagram of a preferred embodiment of the color burst regeneration system of the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to Figure 2, a preferred embodiment of the color burst regeneration system includes a digital phase-locked loop 20, a reconstruction unit 22, an analog-to-digital (A/D) converter 24, a random access memory (RAM) 26, an access control unit 28, a system timing unit 30, a digital-to-analog (D/A) converter 32 and a low pass filter 34. The digital phase-locked loop 20 includes a digital signal processor 36, a D/A converter 38 and a voltage-controlled oscillator (VCXO) 40.

10

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A color burst information signal 42, such as shown in Figure 1B, is converted to a digital color burst information signal 44 by the A/D converter 24. The digital phase-locked loop 20 processes the digital color burst information signal 44 to provide a system clock signal 46. The digital signal processor 36 compares the phase of the system clock signal 46 to the phase of the digital color burst information signal 44 and generates an error signal 48 that is converted into

20

a voltage signal 50 by the D/A converter 38. The VCXO 40 responds to the voltage signal 50 by generating the system clock signal. THE VCXO 40 defines the frequency of the system clock signal 46 to be four times the frequency of the color burst information signal 42.

5 The system clock signal 46 is used to clock the operation of the reconstruction unit 22, the A/D converter 24, the RAM access control unit 28, the system timing unit 30, the D/A converter 32, and the D/A converter 38.

10 The RAM access control unit 28 is clocked by the system clock signal 46 for controlling the storage of information in and the retrieval of information from the RAM 26. The RAM access control unit 28 causes the digital color burst information signal 44 to be sampled for storing phase information derived from the color burst information signal 42 in the RAM 26 four times over each cycle of the color burst information signal 42. Exemplary sampling points $S_1, S_2, \dots, S_8$ are shown in Figure 1B. These samples are clocked by the system clock signal ^{46.}~~42~~.

15 The system timing unit 30 responds to a vertical reference signal 52 for determining when during each received scrambled video signal line (Figure 1B) the color burst information signal 42 should be present and when during each reconstructed video signal line the regenerated color burst signal is to be inserted, and gates the RAM access control unit 28 accordingly for controlling when phase
20 information is stored in and retrieved from the RAM 26.

Retrieval of the phase information from the RAM 26 is gated in advance



of the time when the regenerated color burst signal is to be inserted in each reconstructed video line so as to allow adequate time for regeneration of a standard-length color burst signal. The reconstruction unit 22 processes the retrieved samples of phase information taken during the less-than-standard-length color burst information signal and extrapolates the sampled phase information over the duration of a standard-length color burst signal. The reconstruction unit 22 provides a full-length extrapolated samples signal 54 to the D/A converter 32 which provides a reconstructed analog color burst sample signal 56, as shown by the sample points S_n ($n=1$ to 8) in Figure 1C, to the low pass filter 34. It should be noted that the signal shown in Figure 1C is not coincident in time with the signal shown in Figure 1B.

The analog color burst sample signal 56 is passed through the low pass filter 34 to provide a regenerated sinusoidal color burst signal 58, as shown by the sinusoidal waveform in Figure 1C. The low pass filter 34 provides a sinusoidal signal from the sample points in the sample signal 56 in accordance with Nyquist's sampling theorem, which states that at least two samples per cycle will completely characterize a band-limited signal.

The regenerated standard-length color burst signal 58 is inserted in the reconstructed video signal at the appropriate time, as shown in Figure 1D.

The Claims defining the invention are as follows:

1. A system for regenerating a standard-length color burst signal from a less-than-standard-length color burst information signal of a given frequency and phase, comprising

means for generating a system clock signal from the color burst
5 information signal, with said clock signal having a clock frequency related to and at least twice the given frequency of the color burst information signal;

means for sampling and storing phase information from the color burst information signal, wherein said sampling is clocked by the system clock signal;
and

10 means for regenerating a standard-length color burst signal at the given frequency and in phase with the color burst information signal by retrieving and extrapolating the stored phase information, wherein said retrieval is clocked by the system clock signal.

2. A system according to Claim 1, wherein the clock signal generation means comprises

a phase-locked loop for locking the system clock signal to the color burst information signal.

3. A system according to Claim 2, wherein

the phase-locked loop is a digital phase-locked loop;

the system further comprises means for converting the color burst information signal into a digital color burst information signal;

5 the sampling and storage means sample the digital color burst information signal, and includes a RAM for storing the sampled phase information; and

the color burst signal regeneration means include means for converting the retrieved extrapolated phase information into an analog signal.

4. A system according to Claim 3, wherein the color burst signal regeneration means further includes

a low pass filter for generating the color burst signal as a sine wave from the analog signal containing the retrieved and extrapolated phase information.

5. A system according to Claim 1, wherein the color burst signal regeneration means includes

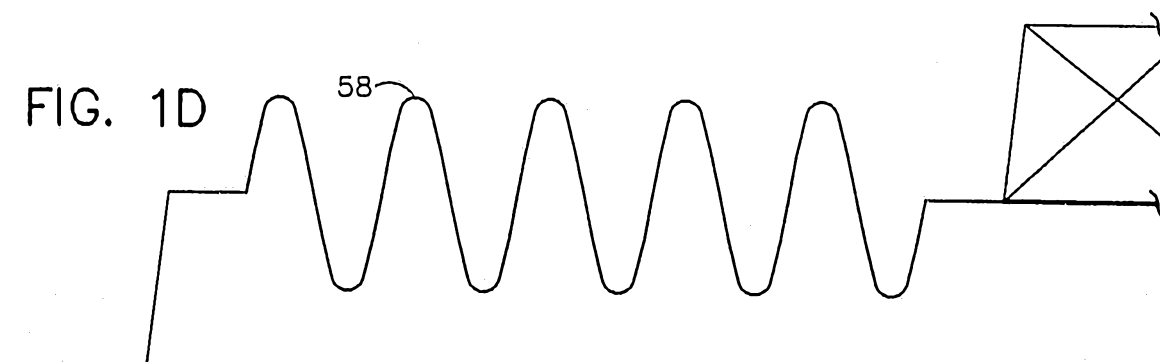
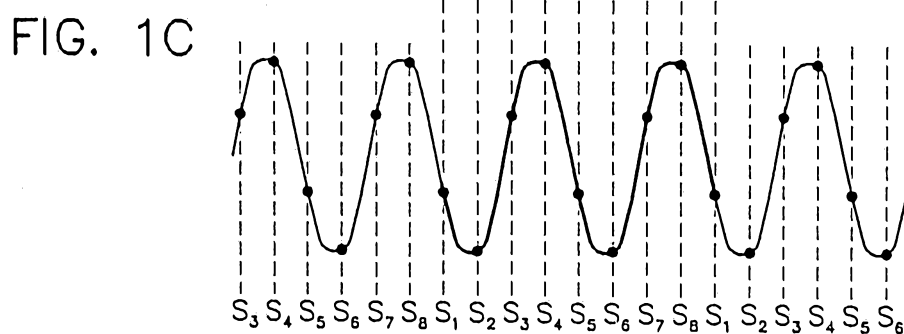
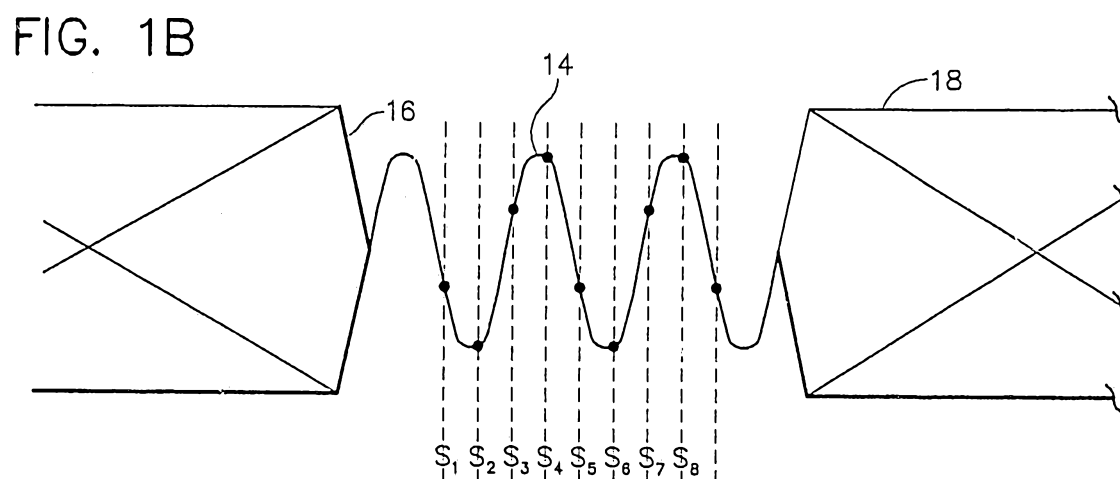
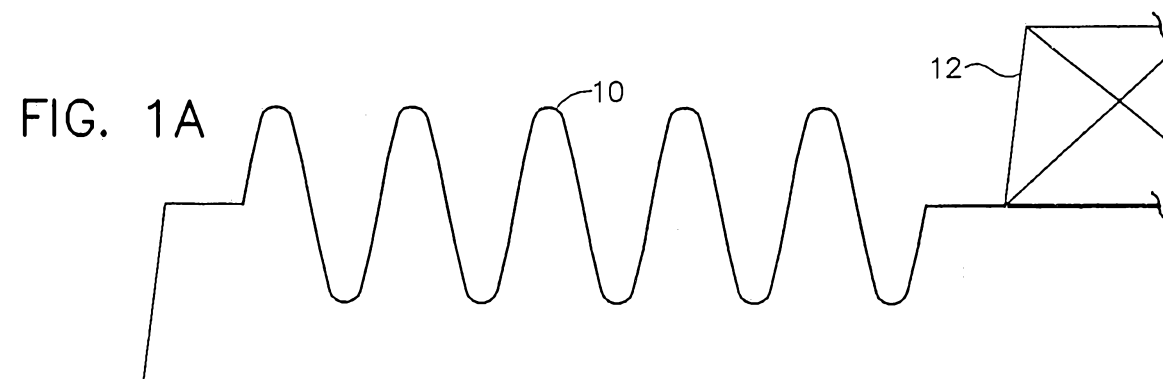
a low pass filter for generating the color burst signal as a sine wave from the retrieved and extrapolated phase information.

DATED THIS 16th day of September, 1987.

M/A-COM GOVERNMENT SYSTEMS, INC.
and
CABLE/HOME COMMUNICATION CORP.

By their Patent Attorneys
R.K. MADDERN & ASSOCIATES





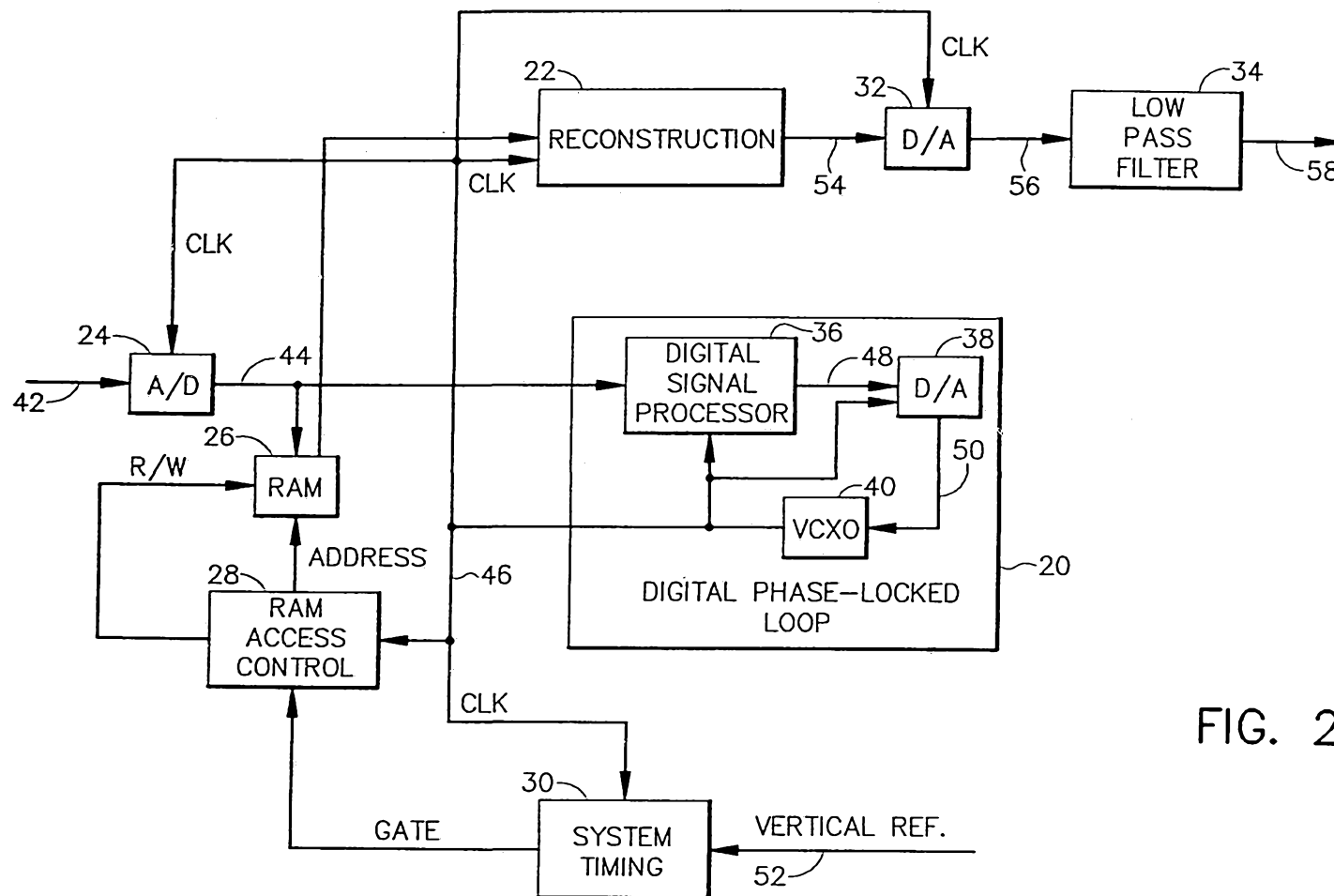


FIG. 2