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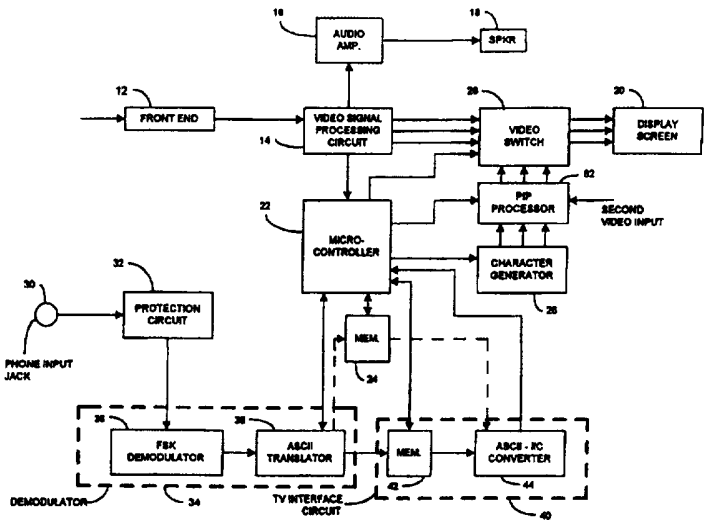

(57) Abstract

A television receiver includes a Caller-ID feature in which a circuitry is included for receiving and demodulating Caller-ID data included between the first and second rings of an incoming telephone call. The television receiver then stores this Caller-ID data, compares it with previously stored data relating to the Caller-ID number, including the name of the originator of the call, the area of the country from which the call originated, based on the area code, and then displays the information on the television screen as, for example, On-Screen display (OSD) graphics, or in a separate PIP window display.

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TELEVISION RECEIVER WITH CALLER ID FEATURE

BACKGROUND OF THE INVENTION

Field of The Invention

The subject invention relates to a television receiver having an input for receiving television signals, a video signal processor for processing the received television signals into video signals, a display coupled to the video signal processor for displaying the video signals, a character generator for selectively generating characters for display on the display, means for alternatively applying to the display the characters from the character generator instead of the video signal, and a microcontroller for controlling the video signal processor, the display, the character generator, and the means for alternatively applying the characters.

Description of The Related Art

Local telephone companies are beginning to offer a new service to their customers known as "Caller-ID". This service, described in U.S. Patent 4,551,581 to Doughty, which is hereby incorporated by reference, permits the recipient of an incoming phone call to monitor the phone number of the caller prior to, or without, actually answering lifting the receiver and answering the call. It also enables the telephone customer to monitor the originating phone number of unwanted of nuisance phone calls and, if necessary, report them to the authorities, and also permits the keeping of an accurate list of incoming calls.

Currently, phone companies are marketing advanced telephone devices which enable the customer to receive and demodulate the digital code information describing the details of the incoming phone call. The incoming phone number is then displayed on a minimal display such as a one line LCD display. This type of device is generally described in U.S. Patent 4,582,956 to Doughty, which is hereby incorporated by reference. More advanced devices also permit the customer to pre-program a name list with respective phone numbers so as to provide a name instead of, or in addition to, the displayed incoming phone number. Some newer available equipment will even audibly announce the name of the caller using a speech synthesizer.

CONFIRMATION COPY

Television receivers are now present in most homes where there are telephones. While present day television receivers include a display, memory and processing power capable for this purpose, a consumer must nonetheless acquire one of the above devices and, if the consumer is watching the television when his/her telephone rings, the consumer must leave the television receiver to find out what is being displayed on the device.

U.S. Patent 5,054,055 discloses a telephone system and method for the intelligent use of individual calling line identification (ICLID) information, in which the ICLID information is extracted and stored in a computer for instant display on the monitor of the computer or to be processed by the computer to generate related information which may be displayed on the computer monitor.

SUMMARY OF THE INVENTION

It is therefore the object of the invention to take advantage of the expanded availability of digital information over the telephone and the digital processing and display technology available in newer television receivers and to synergistically combine these heretofore unrelated products.

This object is achieved in a television receiver as set forth in the opening paragraph, characterized in that the television receiver is further capable of displaying messages in the form of frequency shift keying signals present on a telephone line relating to as specific telephone number indicative of data describing at least a telephone number of a telephone line from which a telephone call to the specific telephone number originated, said television receiver further comprising means for coupling the television receiver to the telephone line relating to said specific telephone number, means for detecting a presence of said FSK signals on said telephone line, means for demodulating said FSK signals into standard ASCII characters, processor means coupled to said demodulating means for decoding the ASCII characters to recover the data describing at least an originating telephone number; and memory means coupled to said processor for storing said data, wherein said processor means is coupled to said microcontroller to indicate the reception of said data, and said character generator is coupled to said memory means for selectively displaying on said display said data contained in said memory means under control of said microcontroller.

The present day television receiver includes significant data processing capabilities which are primarily used to digitally process video signals. By utilizing this data processing capabilities, the television receiver of the subject invention may, in addition to those features provided by the stand-alone device, decode and display time and date stamps

on each of the incoming calls. One feature of the invention is to provide a the viewer with information about incoming calls by displaying the Caller-ID information superimposed on the main television display or in a picture-in-picture (PIP) window. In addition, particularly with regard to frequently received telephone calls, each received telephone number may be captioned with the name and address of a calling party. Furthermore, a listing of all area codes may be stored in the television receiver and the incoming call may be matched to this listing thereby giving the consumer a general location of where the incoming call originated.

The following detailed description of the invention in conjunction with the accompanying figures is not meant to limit the scope of the invention to the embodiment illustrated. Other embodiments will be readily apparent to one skilled in the art and are to be included within the province of the claims below.

BRIEF DESCRIPTION OF THE DRAWINGS

With the above and additional objects and advantages in mind as will hereinafter appear, the invention will be described with reference to the accompanying drawings, in which:

Fig. 1 describes, in block diagram form, a preferred embodiment of the invention;

Figure 2 shows a flowchart describing the operation of Caller-ID;

Fig. 3 shows a flowchart describing how the Caller-ID data is processed by the television receiver; and

Fig. 4 shows a block diagram of a modification of the embodiment shown in Fig. 1.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Figure 1 describes, in block diagram form, a television receiver 10 comprising the invention. The television receiver 10 includes a front end 12 for receiving and demodulating television signals. While Figure 1 show an antenna connected to the front end 12, other sources for the television signals include cable, a VCR, a VLP, a digital video disc player, a video camera, etc. The front end 12 is coupled to a video signal processing circuit 14 for processing the television signals to provide audio signals, to be amplified in an audio signal amplifier 16 and reproduced through a speaker 18, and video signals for display on a display screen 20. The video signal processing circuit 14 further provides synchronizing signals (not shown) for controlling the display screen 20. The television

receiver also includes a microcontroller 22 having a memory 24 coupled thereto for controlling the various components in the television receiver 10, including the video signal processing circuit 14.

Most present day television receivers provide for on-screen display, and therefore include a character generator 26 coupled to the microcontroller 22 for generating messages, for example, the current channel, the time of day, etc., for display on the display screen 20, and a video switch 28 coupled to the outputs of the video signal processing circuit 14 and the character generator 26 for selectively switching from the video signals to the output of the character generator 26 for application to the display screen 20.

In order to provide the Caller-ID feature, the television receiver further includes a phone input jack 30, which may be connected in parallel to other telephone jacks in the user's residence. Connection is made via phone jack 30 to the Tip and Ring of the user's telephone line. A protection circuit 32 is provided to isolate the telephone line from the television receiver circuitry to provide over-voltage protection thereby minimizing damage to the television receiver caused by voltage spikes on the telephone line. The isolated telephone line connection from protection circuit 32 is coupled to a demodulator 34, consisting of a frequency shift keying (FSK) demodulator 36 in series with an ASCII data translator 38.

The demodulator 34 is used to demodulate the Caller ID data signals which are present between the first and second rings of an incoming telephone call. The FSK data stream is demodulated in FSK demodulator 36 and then converted into standard ASCII characters at a data rate of 1200 baud, in ASCII data translator 38.

The ASCII data is then fed to a TV interface circuit 40 consisting of a storage device 42 and an ASCII-I^2C converter 44. It should be understood that the storage device 42 may be dispensed with and the memory 24 used instead. The output from the TV interface circuit 40 is coupled to microcontroller 22 for further processing and for selective application to the character generator 26.

In order to determine whether a Caller-ID message has been received, the microcontroller 22 polls the ASCII data translator 38. If a message has been received, the microcontroller 22 causes the transfer of the stored message from the storage device 42 (or memory 24) to the ASCII-I^2C converter 44 from which the converted information is applied back to the microcontroller 22.

Fig. 2 shows a flowchart describing the operation of Caller-ID as provided in the demodulator 34 and the TV interface circuit 40. In block 50, an incoming

telephone call is detected. Then, in block 52, it is determined whether the incoming call contains Caller-ID data. If not, the system reverts back to block 50 to detect another incoming call. If Caller-ID data is found, block 54 directs the demodulator 34 to demodulate and translate the Caller-ID data. In block 56, this detected/translated Caller-ID data is stored in memory 42. In block 58, the system waits until it receives a read command from the microcontroller 22, or a new incoming call. In block 60, it is determined which type of input the system received. In the event of a new call, the system reverts to block 50. In the event of a read command, in block 62, the Caller-ID data is transferred to the microcontroller 22.

Fig. 3 shows a flowchart of the operation of the television microcontroller 22. In block 70, the microcontroller 22 initiates the Caller-ID subsystem, the operation of which having been described above in relation to Fig. 2. In block 72, the microcontroller 22 polls the data in the ASCII translator 38 (which is also temporarily stored in memory 42). At block 74, it is determined whether Caller-ID data was received. If not, the program reverts to block 72. If there is Caller-ID data, in block 76, the microcontroller 22 then reads the output from the ASCII-I^2C converter 44, and stores the same in the memory 24. In block 78, the microcontroller 22 matches the Caller-ID number (read from the ASCII-I^2C converter 44) and matches this number with associated database information, for example, a name, previously stored by the user, associated with the number, the area of the country (the memory 24 containing an area-code map) based on the area code in the Caller-ID number, etc. In block 80, the microcontroller 22 applies this information to the character generator 26, the output from the character generator 26 being applied to the video switch 28, which, under control of the microcontroller 22, causes the output from the character generator 26 to be displayed over an active TV video in the form of an On-Screen display.

Fig. 4 shows a modification of the embodiment shown in Fig. 1, in which the Caller-ID information is shown in a Picture-In-Picture (PIP) window formed on a portion of the display screen 20. In particular, a second video input signal is applied to a PIP processor 82 and the output from the PIP processor 82 is then applied to the video switch 28, for forming a PIP window on the display screen 20 within the main picture being displayed. In addition to the above, the output from the character generator 26 is also applied to the PIP processor 82. Under control of the microcontroller 22, the Caller-ID information is applied to the PIP processor 82 which applies its PIP signal video to the video switch 28 which then, also under control of the microcontroller 22, causes the PIP video signal to overlay the main video signal in the form of a PIP window.

Numerous alterations and modifications of the structure herein disclosed will present themselves to those skilled in the art. However, it is to be understood that the above described embodiment is for purposes of illustration only and not to be construed as a limitation of the invention. All such modifications which do not depart from the spirit of the invention are intended to be included within the scope of the appended claims.

CLAIMS

1. A television receiver having an input for receiving television signals;

a video signal processor for processing the received television signals into video signals;

a display coupled to the video signal processor for displaying the video signals;

a character generator for selectively generating characters for display on the display;

means for alternatively applying to the display the characters from the character generator instead of the video signal; and

a microcontroller for controlling the video signal processor, the display, the character generator, and the means for alternatively applying the characters to the display;

characterized in that the television receiver is further capable of displaying messages in the form of frequency shift keying signals present on a telephone line relating to as specific telephone number indicative of data describing at least a telephone number of a telephone line from which a telephone call to the specific telephone number originated, said television receiver further comprising:

means for coupling the television receiver to the telephone line relating to said specific telephone number;

means for detecting a presence of said FSK signals on said telephone line;

means for demodulating said FSK signals into standard ASCII characters;

processor means coupled to said demodulating means for decoding the ASCII characters to recover the data describing at least an originating telephone number; and

memory means coupled to said processor for storing said data; wherein said processor means is coupled to said microcontroller to indicate the reception of said data, and said character generator is coupled to said memory means for selectively displaying on said display said data contained in said memory means under control of said microcontroller.

2. The television receiver as claimed in claim 1, characterized in that said

microcontroller automatically activates said character generator and said alternate applying means upon reception of said data.

3. The television receiver as claimed in claim 1, wherein said television receiver further comprises means for receiving a further video signal, and picture-in-picture (PIP) processing means coupled to said means for receiving a further video signal, said PIP processing means generating a PIP display for selectively overlying a portion of a picture representing said television signals being displayed on said display, characterized in that said television receiver displays said data in a PIP display.

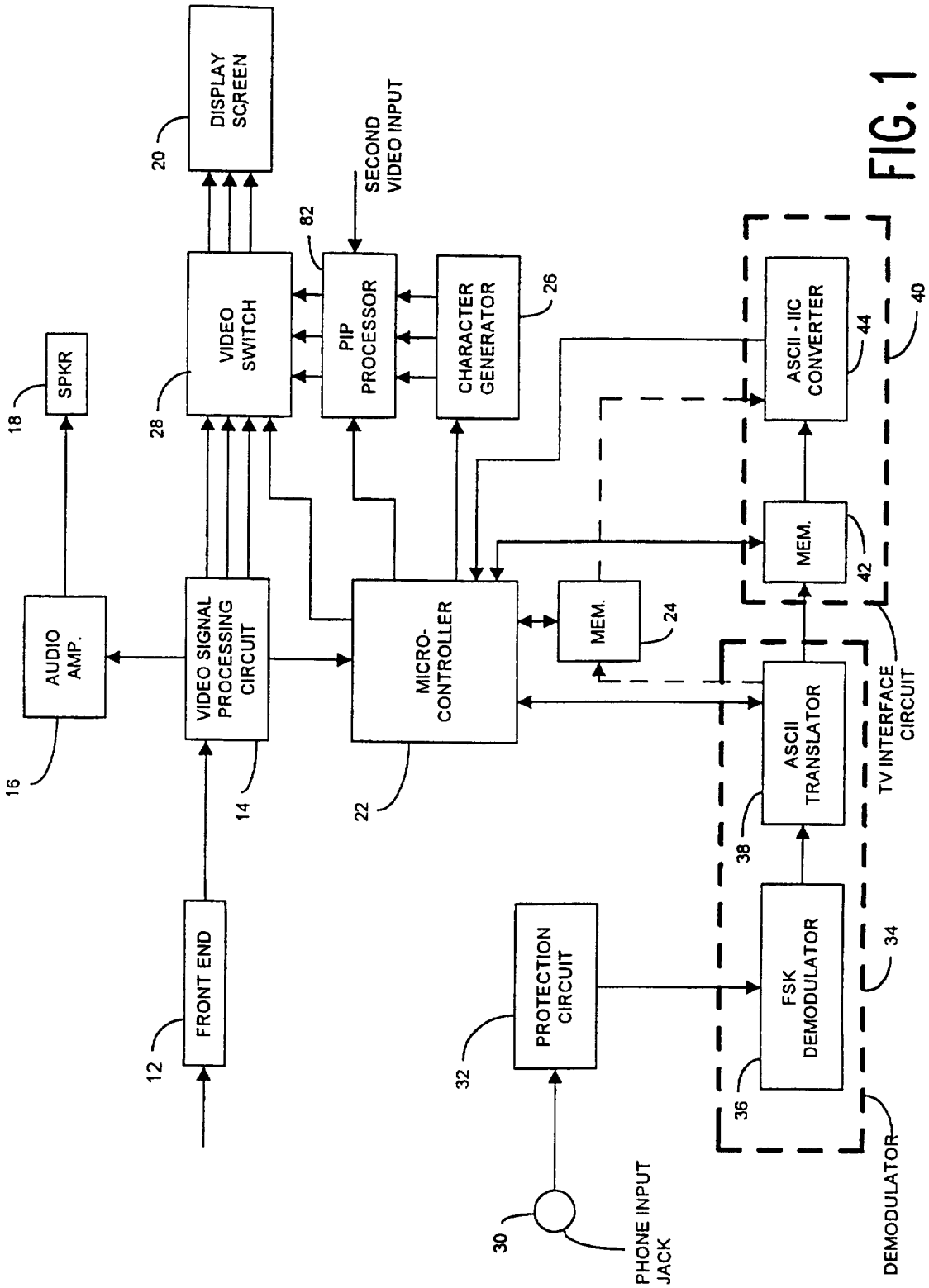
DISPLAY SCREEN
20
SECOND VIDEO INPUT
82
VIDEO SWITCH
28
PIP PROCESSOR
CHARACTER GENERATOR
26
ASCII - IIC CONVERTER
44
40
SPKR
18
MEM.
42
AUDIO AMP.
16
VIDEO SIGNAL PROCESSING CIRCUIT
14
MICRO-CONTROLLER
22
MEM.
24
ASCII TRANSLATOR
38
TV INTERFACE CIRCUIT
FRONT END
12
PROTECTION CIRCUIT
32
FSK DEMODULATOR
34
36
DEMODULATOR
30
PHONE INPUT JACK

FIG. 1

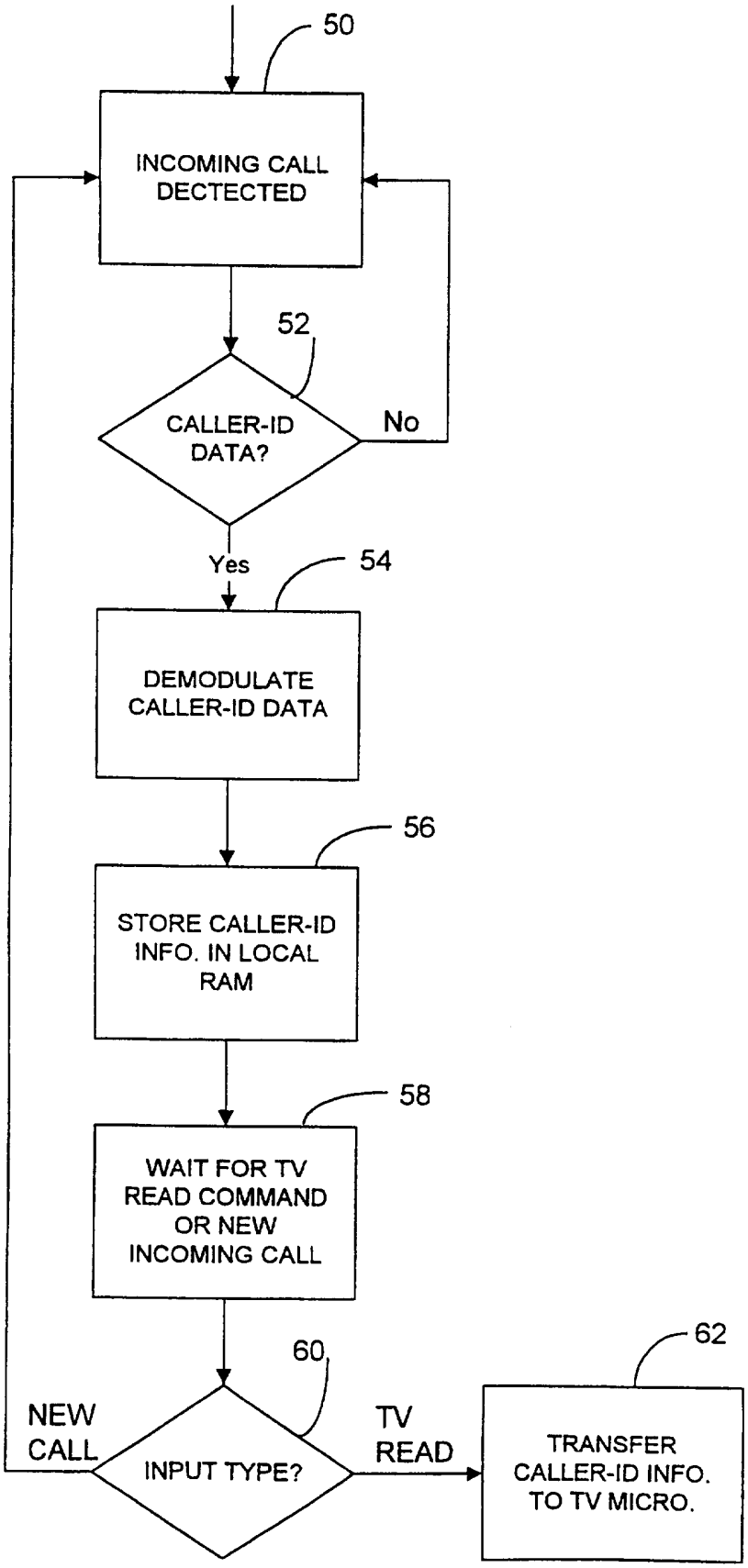
50
INCOMING CALL DECTECTED
52
CALLER-ID DATA?
No
Yes
54
DEMODULATE CALLER-ID DATA
56
STORE CALLER-ID INFO. IN LOCAL RAM
58
WAIT FOR TV READ COMMAND OR NEW INCOMING CALL
60
NEW CALL
INPUT TYPE?
TV READ
62
TRANSFER CALLER-ID INFO. TO TV MICRO.

FIG. 2

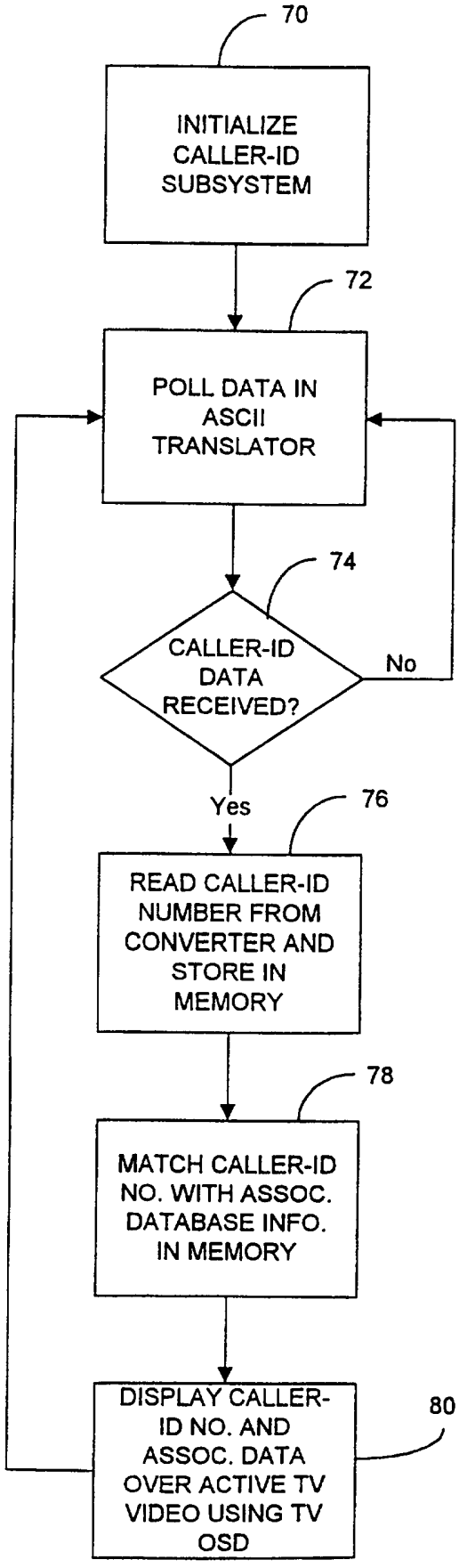
70
INITIALIZE CALLER-ID SUBSYSTEM
72
POLL DATA IN ASCII TRANSLATOR
74
CALLER-ID DATA RECEIVED?
No
Yes
76
READ CALLER-ID NUMBER FROM CONVERTER AND STORE IN MEMORY
78
MATCH CALLER-ID NO. WITH ASSOC. DATABASE INFO. IN MEMORY
DISPLAY CALLER-ID NO. AND ASSOC. DATA OVER ACTIVE TV VIDEO USING TV OSD
80

FIG. 3

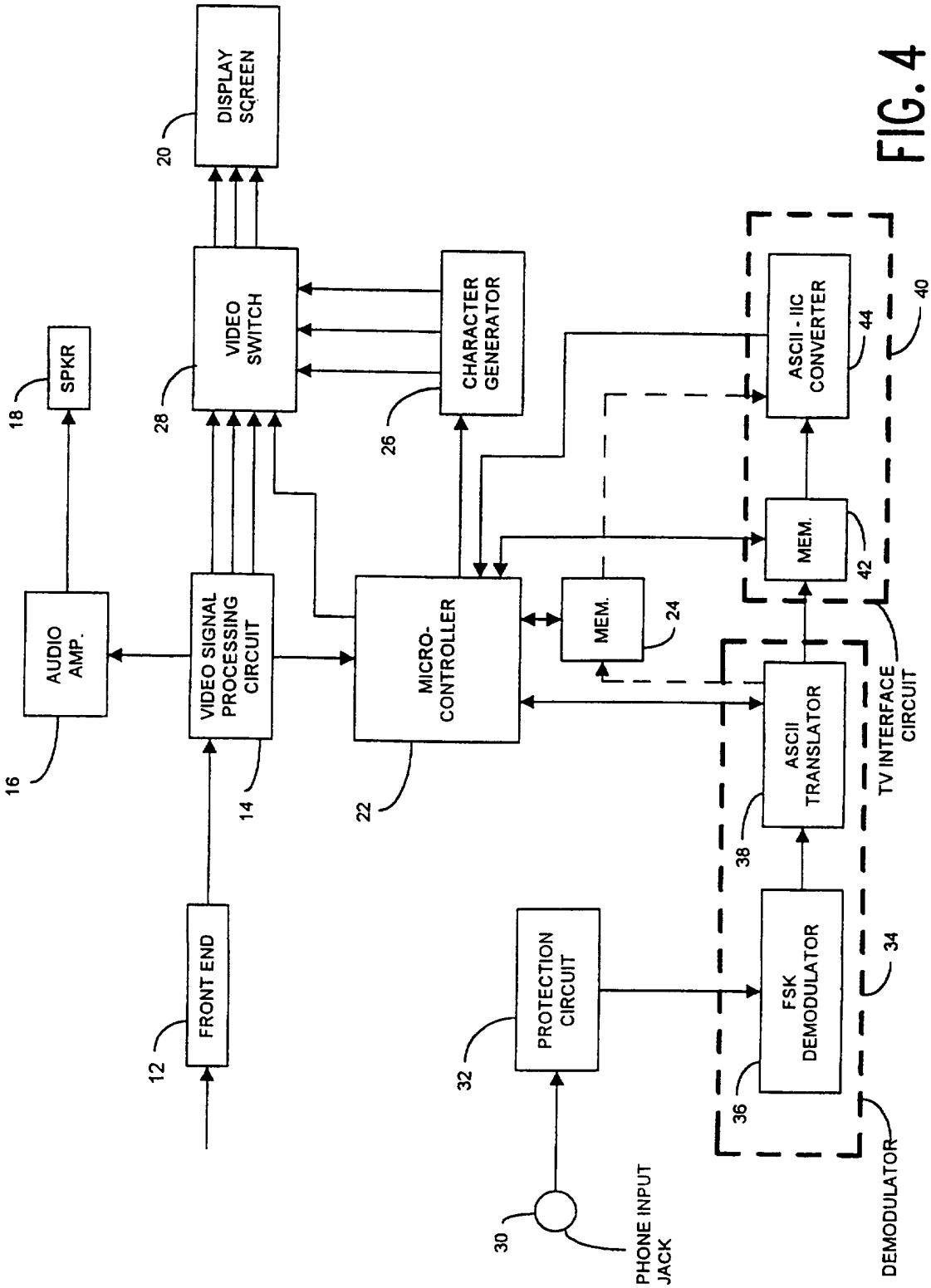
DISPLAY SCREEN
20
VIDEO SWITCH
28
CHARACTER GENERATOR
26
SPKR
18
AUDIO AMP.
16
VIDEO SIGNAL PROCESSING CIRCUIT
14
MICRO-CONTROLLER
22
MEM.
24
ASCII - IIC CONVERTER
44
MEM.
42
40
TV INTERFACE CIRCUIT
ASCII TRANSLATOR
38
FRONT END
12
PROTECTION CIRCUIT
32
FSK DEMODULATOR
34
36
DEMODULATOR
PHONE INPUT JACK
30

FIG. 4

INTERNATIONAL SEARCH REPORT

International application No.
PCT/IB 96/01184

A. CLASSIFICATION OF SUBJECT MATTER

IPC6: H04M 1/57, H04N 5/445 // H04N 7/14
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC6: H04M, H04N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

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C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 1685 93 (SOUTHWESTERN BELL TECHNOLOGY RESOURCES, INC), 21 January 1993 (21.01.93), page 2, line 1 - line 3; page 15, line 23 - page 16, line 7, abstract	1-3
	--	
X	US 5349638 A (PITRODA ET AL), 20 Sept 1994 (20.09.94), column 2, line 23 - line 33, abstract	1,2
A	column 6, line 45 - line 61; column 7, line 39 - line 65	3
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A	EP 0436345 A2 (CANON KABUSHIKI KAISHA), 18 December 1990 (18.12.90)	1-3
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[X] Further documents are listed in the continuation of Box C. [X] See patent family annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
17 February 1996	25 -02- 1997
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INTERNATIONAL SEARCH REPORT

International application No.
PCT/IB 96/01184

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 4356509 A (SKERLOS ET AL), 26 October 1982 (26.10.82) --	1-3
A	Patent Abstracts of Japan, Vol 15,No 323, E-1101, abstract of JP,A,3-120938 (NEC CORP), 16 August 1991 (16.08.91) --	1-3

INTERNATIONAL SEARCH REPORT

Information on patent family members

03/02/97

International application No.
PCT/IB 96/01184

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO-93- 1685	21/01/93	NONE	
US-A- 5349638	20/09/94	NONE	
EP-A2- 0436345	18/12/90	JP-A- 4132358	06/05/92
		US-A- 5305097	19/04/94
		JP-A- 3191648	21/08/91
US-A- 4356509	26/10/82	NONE	