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(54) **Device for a non-intrusive detection of a recording operational mode status of a video cassette recorder**

(57) The device of the invention for non-intrusive detection of a recording operational mode status of a video cassette recorder comprises a coil (Co) attached to an outer surface of a recorder back-panel close to a recorder erase head. An amplified coil signal is mixed with a signal generator output signal in a mixing circuit (MC) and then low-pass filtered. The low-pass filter (LPF) has a peak-

frequency of 1 kHz. The frequency of a signal generator output is adjusted in a way that the frequency of the output signal of the mixing circuit is within a low-frequency pass band of the filter. The frequency of the output signal of the signal generator (SG) is adjustable to frequencies in the range between 13 kHz and 119 kHz.

The device is applicable to a video cassette recorder of any type. It is mounted in a simple way.

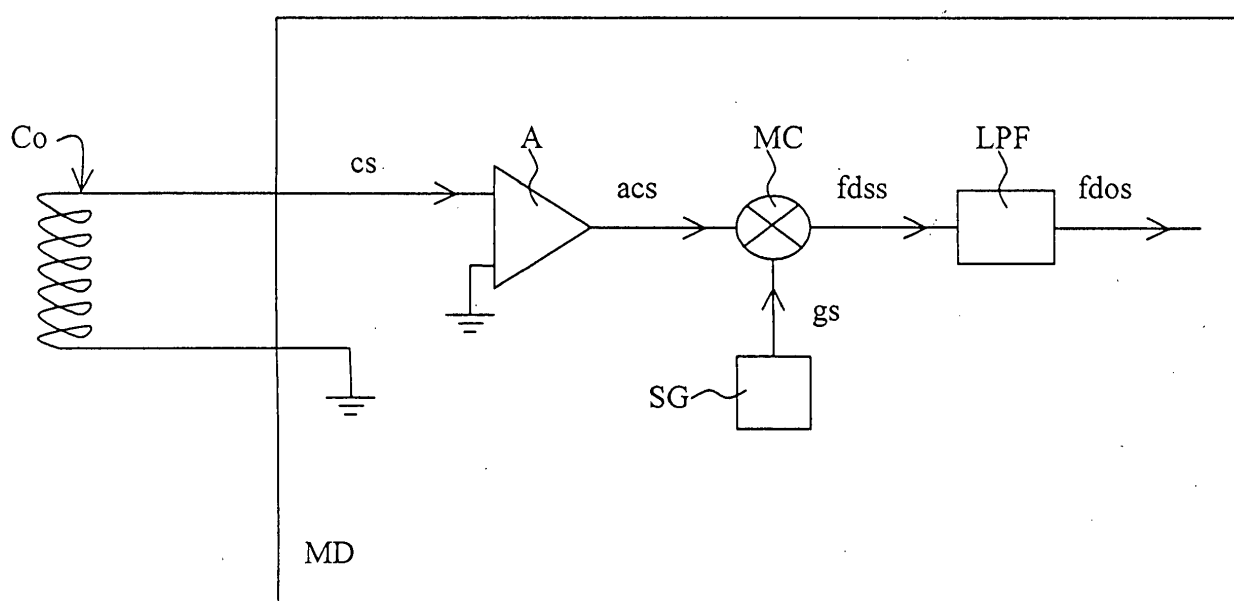


Fig. 1

Description

[0001] The invention relates to a device for a non-intrusive detection of a recording operational mode status of a video cassette recorder whereat the device comprises an inductive sensor sensing a magnetic field radiated by an erase head in the recording operational mode status of said video cassette recorder. The proposed device is layed out as part of a telemetric system for monitoring television rating in households.

[0002] Said device as part of a telemetric system for monitoring television rating in households makes it possible to detect the recording operational mode status of a video cassette recorder, i. e. of a recorder recording video images on a magnetic tape.

[0003] It is agreed that any viewed telecast is recorded. Recording by means of the video cassette recorder is carried out in that the erase head erases the magnetic tape, on which a telecast content is recorded subsequently.

[0004] In order to erase the magnetic tape the erase head generates an alternating magnetic field, which is also detected in the vicinity of the erase head as a strong magnetic signal with a frequency ranging from 30 kHz to 100 kHz, said frequency varying in video cassette recorders produced by various manufacturers. All video cassette recorders are provided with a plastic back-panel, which does not shield off the magnetic field.

[0005] Said device detects whether the video cassette recorder is in the recording operational mode status by determining whether a strong alternating magnetic field is present in the vicinity of its erase head. Said detection is carried out in a non-intrusive way since there is no need for said device to intrude into the video cassette recorder; the device does not need to be connected to the video cassette recorder.

[0006] A device for detecting an operational mode status of a video cassette recorder is known (US 5.165.069). A sensor of said device detects a magnetic signal radiated by a recorder erase head when erasing the magnetic tape. A sensor probe tuned to a frequency of 70 kHz is placed in the vicinity of the video cassette recorder. An amplified and digitized detected signal is processed in a microprocessor. The device is adapted to the video cassette recorder of a specific type. A person installing such devices must therefore be supplied with various sensor probes for the work in the field, as he comes across video cassette recorders of various manufacturers.

[0007] The technical problem of the invention is to propose such device for a non-intrusive detection of a recording operational mode status of a video cassette recorder that prior to digitalization an output signal of the proposed device will be within an intended low-frequency band, irrespective of the frequency spectrum of the magnetic field of an erase head within the video cassette recorder of an arbitrary type possessed by television viewers, and a sensor sensing said radiated magnetic field should be mounted in a simple way with respect to said

erase head.

[0008] Said technical problem is solved by the device of the invention for a non-intrusive detection of a recording operational mode status of a video cassette recorder as characterized by the features of the characterizing portion of the first claim. Dependent claims characterize the variants of its embodiment.

[0009] The device of the invention for a non-intrusive detection of a recording operational mode status of a video cassette recorder represents a rather inexpensive technical solution applicable to a video cassette recorder of any type possessed by television viewers. The output signal favourably lies within a low-frequency band whereby sensitivity to environmental electromagnetic interferences is reduced. A device sensor for sensing an alternating magnetic field is mounted onto an outer surface of a recorder back-panel quickly, aesthetically and in a simple way.

[0010] The invention will now be explained in more detail by way of a description of an embodiment of the device of the invention for a non-intrusive detection of a recording operational mode status of a video cassette recorder and with reference to the accompanying drawing representing in

Fig. 1 a circuitry of the device of the invention in a schematic way.

[0011] The device of the invention for a non-intrusive detection of a recording operational mode status of a video cassette recorder is a component of a meter device MD for telemetric monitoring of television rating.

[0012] An inductive sensor Co, which senses an alternating magnetic field radiated by its erase head in operation, is connected to an amplifier A in a known way (Fig. 1).

[0013] According to the invention it is proposed that the inductive sensor is a coil Co.

[0014] The coil Co having an inductance of 3.5 mH is made as a flat coil with a diameter of 22 mm and a height of 1 mm with 700 turns. It is provided with a resistor having a resistance of 16 k Ω to reduce the influence of the parasitic capacitance of a connecting cable.

[0015] An output of said amplifier A is connected to a first input of a mixing circuit MC. An output of a signal generator SG is connected to a second input of the mixing circuit MC. From the mixing circuit MC there exits a signal fdss, a frequency spectrum of which signal comprises a difference and a sum of the frequencies of the signals at the inputs of the mixing circuit MC.

[0016] Frequency fg of an output signal gs from the signal generator SG is adjusted in a way that the frequency df of the output signal fdss from the mixing circuit MC, which frequency equals a difference of the frequencies of the signals at the inputs of the mixing circuit MC, is within a low-frequency pass band of the low-pass filter LPF.

[0017] The output signal fdss is resistant to environmental electromagnetic interferences, as only a narrow frequency band around the frequency of the alternating

magnetic field radiated by the erase head of the video cassette recorder is comprised each time.

[0018] A peak-frequency f_p of said low frequency pass band of the low-pass filter LPF equals 1 kHz, whereas its upper and lower edge frequencies are 2 kHz and 0,39 kHz, respectively.

[0019] Frequency f_g of the output signal g_s from the signal generator SG is adjustable in steps of 0.414 kHz within a frequency range from 13 kHz to 119 kHz.

[0020] In each case frequency f_g of the output signal g_s from the signal generator SG is adjusted in the relevant video cassette recorder in a way that said frequency df , which equals the difference of the frequencies of the signals at the inputs of the mixing circuit MC, of the signal $fdss$ at the output of the mixing circuit MC equals 1 kHz.

[0021] The output of the mixing circuit MC is connected through a low-pass filter LPF to a circuit for further conditioning of the signal. A filtered output signal $dfos$ with a frequency within said low-frequency band is first digitized and then processed in said circuit of a larger meter device MD for telemetric monitoring of television rating.

[0022] The coil Co is mounted on the video cassette recorder by sticking onto an outer surface of a recorder back-panel close to said recorder erase head. The back-panel of all known video cassette recorders is made of plastic.

[0023] The device for a non-intrusive detection of the recording operational mode status of the video cassette recorder is adjusted as follows.

[0024] The video cassette recorder is run in the recording operational mode. The coil Co is placed close to the recorder erase head. Frequency f_g of the output signal g_s from the signal generator SG is varied in order to find out the highest response frequency. If the magnetic field generated by the erase head is rather weak, a cassette compartment lid is lifted and the coil Co is put close to the erase head in order to determine the frequency of the alternating magnetic field generated by the erase head. The output signal cs of the coil Co is amplified that much that the amplified signal acs is appropriate for further conditioning. Finally, the coil Co is glued onto the outer surface of the back-panel of the video cassette recorder.

a recorder back-panel close to said recorder erase head

that an output of the amplifier (A) is connected to a first input of a mixing circuit (MC),

that an output of a signal generator (SG) is connected to a second input of the mixing circuit (MC),

that an output of the mixing circuit (MC) is connected through a low-pass filter (LPF) to a circuit for further signal conditioning

and that the frequency (f_g) of an output signal (g_s) of the signal generator (SG) is adjusted in a way

that the frequency (df) of the output signal ($fdss$) of the mixing circuit (MC), which frequency equals a difference of the frequencies of the signals at the inputs of the mixing circuit (MC),

is within a low-frequency pass band of the low-pass filter (LPF).

2. The device as recited in claim 1, **characterized in** that a peak-frequency (f_p) of said low-frequency pass band of the low-pass filter (LPF) equals 1 kHz.

3. The device as recited in claim 1, **characterized in** that the frequency (f_g) of the output signal (g_s) of the signal generator (SG) is adjustable to frequencies in the range between 13 kHz and 119 kHz.

Claims

1. A device for a non-intrusive detection of a recording operational mode status of a video cassette recorder,

which device comprises an inductive sensor (Co), which senses an alternating magnetic field radiated by its erase head in the recording operational mode status of the video cassette recorder and an output of which inductive sensor is connected to an amplifier (A), **characterized in**

that said sensor (Co) is a coil,

that the coil (Co) is attached at an outer surface of

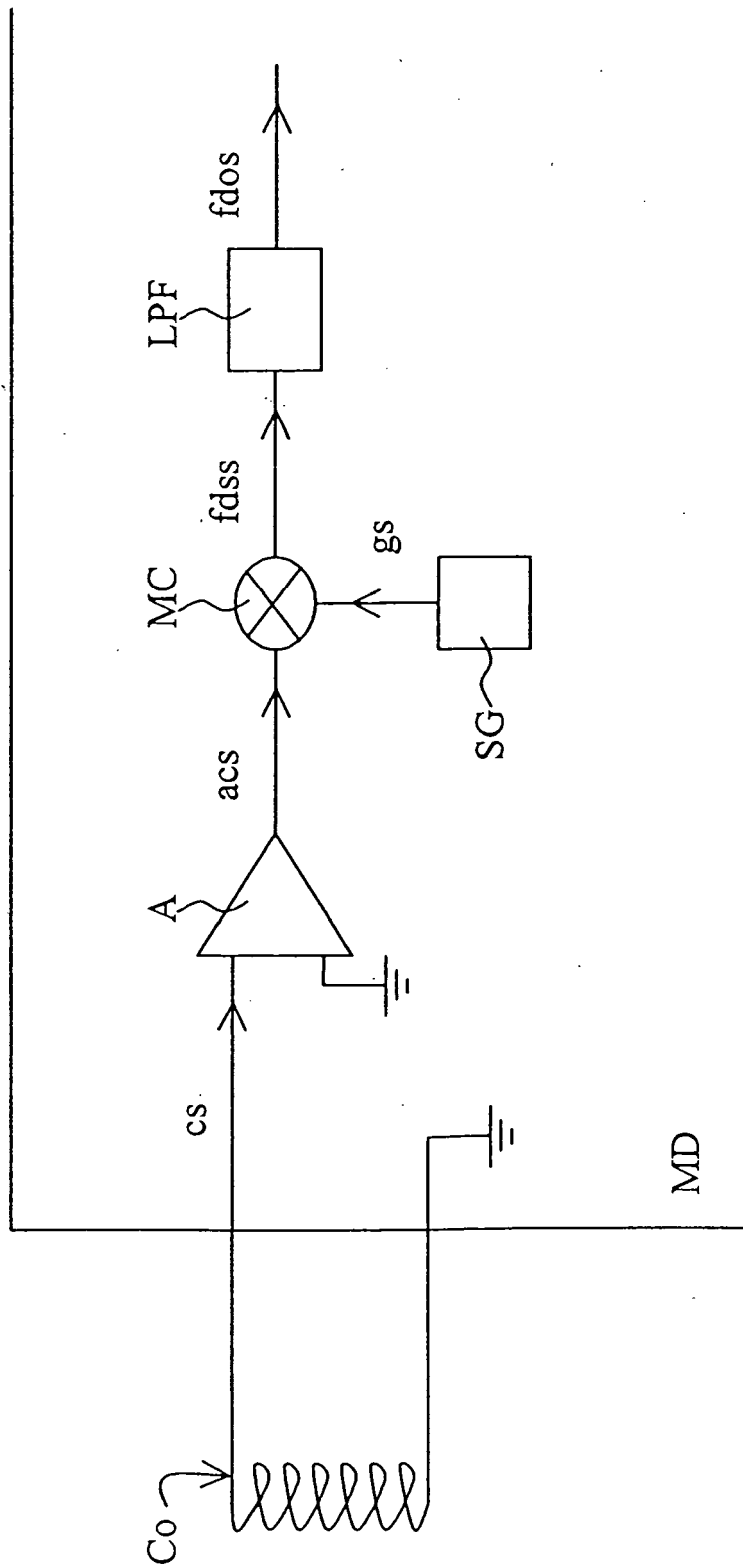


Fig. 1



EUROPEAN SEARCH REPORT

Application Number
EP 11 46 8005

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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			H04H
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 28 January 2013	Examiner Torcal Serrano, C
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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