



Recorder including a phase detector for the drive mechanism

The invention relates to a recorder in accordance with the first part of claim 1.

In conventional recorders having write/read heads, hereinafter called heads, which are disposed around the periphery of a rotating head drum for the recording and/or reproduction of signals in accordance with the helical scan process, such as in video recorders for example, it is known to employ electronically commutatable motors for driving the head drum and for driving a tape-like recording medium that is wrapped around the head drum. In the case of the motor driving the recording medium, the motor shaft is formed as a capstan. The other motor, together with the head drum, forms a mechanical entity whereby its motor shaft establishes a phase locked relationship between the rotor of the motor and the head wheel carrying the heads. Both of the motors are respective parts of rotational speed and/or phase regulating circuits which, with the help of a reference signal, couple the two drive mechanisms together in a logical manner and produce the optimum reference position conditions for the heads, the signals that are to be recorded and/or the signal tracks that are to be scanned, in accordance with the relevant norm for the recorder.

In a video recorder, the basic reference signals are the frame pulses to which all of the other auxiliary synchronisation signals produced in the recorder are adjusted.

For example, for the VHS standard, it is laid down that the recording medium should be wrapped around a head drum having a first and a second write/read head by somewhat more than 180° . A field is recorded in or scanned from a track over a wrap region of 180° by each write/read head that is in engagement with the recording medium, whereby the first field is associated in each case with the first head and the second field is associated in each case with the second head. The two head gaps exhibit a respective, mirror image, azimuthal angle of approximately 6° relative to the central axis of the head. The wrap region of



approximately 7° extending beyond 180° is provided for the succeeding lines of the next field, so that there results an overlapping zone of two adjacently located tracks. The location of this overlapping zone, at its central co-ordinate, is laid down as being 6.5 ± 1.5 lines before the arrival of a vertical synchronisation pulse. This is also the switching position for the change over of the heads during the reproduction process.

Furthermore, in the recording mode, it is known to regulate the phase of the head drum drive mechanism whereas the capstan drive mechanism is regulated in respect of its rotational speed. This is reversed in the reproduction mode. It is usual to use microprocessors for the regulating processes of this type as well as for controlling the two drive mechanisms in dependence on the kind of mode. At least one position indicating sensor is disposed in the vicinity of the head drum for instantaneously detecting the phase angle for the purposes of obtaining the control values and the regulating values for regulating the phase of the one or the other drive mechanism. In known manner, the control value for regulating the phase of the two drive mechanisms is obtained with the help of a reference tape and is stored in the recorder so that its compatibility with recorders using a similar system and with externally recorded tapes is also established. Thereby, the control value may also be stored in a microprocessor used for regulating and controlling the drive mechanism as described for example in PS 35 28 452.8.

For the purposes of regulating the rotational speed, electronically commutable motors for driving head drums of this type are known from the TECHNICAL PUBLIKATION integrierte Motorschaltkreise (Typenbezeichnung: TDA 514x) (TECHNICAL PUBLIKATION integrated switching circuits for motor switching circuits - Type Number: 514x) published by PHILIPS in 1990. The regulating values required for regulating the rotational speed are derived from tacho signals which are obtained from the commutation process by detecting and evaluating the zero crossings of the induced reverse voltages when switching off the winding phases. Moreover, control signals for power amplifiers working in the switching mode in this motor switching circuit,



to which the winding phases are connected, are produced in this motor switching circuit in correspondence with the result of the evaluation. The precision of the motor drive mechanism is determined however by the manufacturing tolerances of the winding phases and the rotor. Consequently, a phase regulation derived from markings on the rotating parts is additionally used for the high precision motor drive mechanisms in recording and reproduction equipment.

These days, bifurcated light barriers or Hall elements or inductive magnetic sensors, which are coupled to the rotor of the head drum motor, are usually used as the position indicating sensors. Such position indicators are relatively expensive and, furthermore, require some manual actions when placing them in position.

The object of the invention is to reduce the expense involved in the phase detection process for the rotating heads in a circuit arrangement for regulating the phase of the drive mechanism for the head drum and/or the tape using such a motor switching circuit.

This object is achieved by the invention defined in claim 1 and 7. Advantageous developments are specified in the appendant claims.

The idea underlying the invention is to produce, with the help of the commutation cycle of the electronically commutable, static winding phases of the head drum motor, a reference relationship between the rotating heads, the signals that are to be recorded, the signal tracks that are to be scanned and a reference signal e.g. the frame pulse in a video recorder, the control and regulating values for effecting a phase regulation of the drive mechanism for the head drum and/or the capstan being derivable from said reference relationship in order to produce the standardised reference position conditions mentioned hereinabove for the rotating heads, the signals that are to be recorded and the signal tracks that are to be scanned.



Basically, one of the winding phases of the head drum motor is used for detecting the phase of the head drum drive mechanism instead of a separate position indicating sensor. A signal is thereby derived from the commutation of the winding phase, referred hereinafter as a commutation signal, which signal is then related to the reference signal in order to obtain therefrom the control values for regulating the phase of the drive mechanism for the head drum and/or the capstan. To this end, the difference between the instantaneous position of the rotor and a zero phase angle, which the rotor should have relative to the reference signal, is measured. An unambiguous phase determination, which takes into account both the instantaneous position of the rotor as well as the tolerances of the mechanical system of the motor, is thereby ensured. Due to this, the commutation signal detected from at least one winding phase can also be used, in advantageous manner, for regulating the phase of precision drive mechanisms using a motor switching circuit of the type of the said TDA 514x.

The following facts and items of knowledge are utilised for the invention. A commutation only ever takes place at the point where the rotor or its field magnets is in a position relative to the winding phases which is favourable for forming the required torque. However, the number of commutations per winding phase and revolution of the rotor, and hence the frequency of such a commutation signal with respect to one revolution of the rotor and one winding phase, is dependent on how many poles a winding phase has or on how many individual coils, referred to hereinafter as stator coils, are in each case interconnected to form a winding phase. This means that certain phase angles of the rotor, and hence a plurality of phase angles of the heads coupled in phase locked manner to the rotor, are associated with the commutation signal derived from a winding phase.

Due to the frequency of occurrence of such a commutation signal per revolution of the rotor, the problem arises of how, with the help of such a commutation signal and in accordance with the norm for the recorder, to mutually associate the heads and the signals to be recorded or the signal tracks to be scanned.



The problem is solved by an initialisation process that is provided for the recorder and which is carried out each time at the beginning of each recording and reproduction mode. Hereby, the control value for the co-operation - this being predetermined by the recorder norm - of the two drive mechanisms is determined in each case from the commutation and reference signals using the signals that are to be recorded or the signal tracks that are to be scanned.

During the initialisation process for the recording mode, a modulated, so-called initialisation signal, whose trace signal thereby left behind on the recording medium is subsequently read, is initially supplied, in accordance with the invention, to one of the rotating heads during a certain amount of the angular rotation of the head drum whilst the recording medium is static. The length of this signal track is dependent on which of the rotor locations that are detectable by the commutation signal forms the zero phase with respect to the reference signal at the beginning of the recording. The length of the signal track as well as its location in terms of phase with respect to the reference signal can be evaluated by a microprocessor for example in order to produce both the head/signal association in accordance with the norm by means of an appropriate regulation of the phase of the head drum drive mechanism as well as to determine the control value for the co-operation of the two drive mechanisms with the signals that are to be recorded. The reading period is limited in time in order to prevent a track remnant, which per chance succeeds the initialisation signal track e.g. from an external recording, leading to a false interpretation during the scanning process.

The invention can be utilised for differing tape wrap angles due to the fact that the period for which the initialisation signal is supplied and the reading period can be matched to the tape wrap angle of the head drum.

The difference between the instantaneous position of the rotor and the zero phase is only determined once, at the beginning of



each recording mode, and can then be used as a constant control value for the total duration of the recording.

The existing recording is used for the initialisation process for the reproduction mode of the recorder since the head/signal association and the control value can be obtained from its signal tracks. Here, the establishment of the head/signal association and the determination of the control value are effected by detecting a complete signal track using one of the rotating heads. For the purposes of determining or detecting a complete signal track, the tape is driven at a speed which differs from the normal speed of reproduction during the initialisation process.

A rotor position, with which the control value is ascertained, can also be determined with the help of a simple conductive loop which may be part of a supply lead for the head drum motor and which is disposed outside the head-tape contact region and forms a position indicating sensor with one of the rotating heads. The conductive loop can be switched off or short-circuited following the detection of the rotor position and the storing of the zero phase association of a corresponding commutation signal relative to the reference signal.

The invention will be explained hereinafter by means of embodiments with the help of the drawings. Therein:

Fig. 1 schematically shows a head drum of a conventional video recorder having an electronically commutable motor for driving the head drum,

Fig. 2 a sequence diagram for the commutation sequence of a winding phase of the head drum motor in accordance with Fig. 1,

Fig. 3 a circuit arrangement for regulating the drive mechanism for a head drum and a tape in a first embodiment of the invention,



Fig. 4 sequence diagrams of the detectable rotor positions for determining the phase angle of the write/read heads in the circuit arrangement in accordance with Fig. 3,

Fig. 5 a circuit arrangement in accordance with Fig. 3 for regulating a head drum and a tape in a second embodiment of the invention.

Fig. 1 schematically shows a rotating head drum 1 having two oppositely located write/read heads K1, K2 for scanning or recording signals in grassless helical tracks of a tape-like recording medium 2, referred to hereinafter as a tape, which is wrapped around the head drum 1 by somewhat more than 180°. Here, the drive for the head drum 1 or the head wheel carrying the heads K1, K2 is effected by a motor 3 which forms a mechanical entity with the head drum 1 and preferably consists of a twelve pole stator and an eight pole rotor 31. The direction of rotation of the head wheel coupled to the rotor 31 is identified by an arrow.

Basically, eight field magnets, which rotate about twelve stator coils X1 - X4, Y1 - Y4, Z1 - Z4 arranged in the form of a ring, form the rotor 31, whereby 4 respective stator coils X1 - X4; Y1 - Y4; Z1 - Z4 form an electronically commutatable winding phase X; Y; Z (Fig. 3 and Fig. 5). The winding phases X, Y, Z are preferably connected in star formation. The respective stator coils X1 - X4, Y1 - Y4, Z1 - Z4 and the magnetic north N and south S poles of the rotor are disposed so as to be evenly distributed. The actual precision of the arrangement is however determined by the manufacturing tolerances. The rotor position, in which the said switching over of the heads occurs during the reproduction mode, is indicated by the head K1 that is immersed in the wrapped tape.

In accordance with the invention, one of the winding phases, the winding phase X as shown by the head drum motor 3 in Fig. 3 and Fig. 5 for example, is used for the purposes of obtaining the control and regulating values for regulating the phase of the drive mechanism for the head drum and/or the tape as well as a



control value for producing the head/signal association or the head/signal-track association in accordance with the norm during the said initialisation of the circuit arrangement for regulating the drive mechanism for the head drum and the tape. A pulse-like commutation signal I, which appears at certain positions of the rotor - as is apparent from the voltage waveform on the winding phase X for one revolution of the rotor that is shown in Fig. 2, is used as the position indicating signal. The commutation sequence of the winding phase X for one revolution of the rotor is illustrated in Fig. 2. The voltage waveform is predetermined by the combination of the motor 3 and a motor switching circuit 31 of the type of said motor switching circuit TDA 514x. The respective switch-on periods T1 and switch-off periods T2 of the winding phase X can be perceived. The shape of the commutation signal I, which repeats with alternating positive and negative polarity relative to the reference line, is caused by reverse current diodes integrated into the motor circuit 31, in that, these diodes are switched through by the counter EMF which is produced on each occasion by virtue of the induction in the winding phase X each time the winding phase X is switched off as a result of the commutation process. Two such reverse current diodes are respectively associated with each of the winding phases X, Y, Z. Preferably, only the commutation signals I of one polarity are used for determining the position of the rotor for providing the head/signal association or the head/signal-track association in accordance with the norm. Commutating signals I of this type are produced in each of the winding phases X, Y, Z.

The control variable for the instantaneous regulation of the drive mechanism for the head drum 1 is determined by the amount of the voltage +U or -U which is applied to the winding phases X, Y, Z during their switched on periods T1.

Fig. 3 and Fig. 5 respectively show the principle of a circuit arrangement for regulating the drive mechanism for a head drum and a tape, whereby a second embodiment of the invention is illustrated in Fig. 5 and the arrangement in accordance with



Fig. 1, and also the diagram in accordance with Fig. 2, will be used as the basis for the further description.

Fig. 3 shows a block circuit diagram of a circuit arrangement for regulating the drive mechanism for a head drum and a tape with the winding phase X used for detecting the phases of the heads K1, K2. Basically, the circuit arrangement has the following electronic circuits: a motor control circuit 41 for a capstan motor 4 for driving the tape 2, a motor switching circuit of the type TDA 514x used as the motor control circuit 32 for the head drum motor 3, a pulse detector 5 connected to the winding phase X for detecting the commutation signal I from the winding phase X, a detector circuit 6 that is connectable to the head K1 for detecting the initialisation signal and a microprocessor μP , as well as a switching unit 7 which comprises a head change-over switch 72 that is controllable by the microprocessor μP via a flip-flop 73 as well as switches controlled by the microprocessor μP via a multi-wire lead 71 for switching over the signal paths contingent on the operating mode and the initialisation process. Connections from the switching unit 7 to the not-illustrated circuits of the recorder, which process the recording and reproduction signals, are indicated by a lead 9. The microprocessor μP is connected over a data bus 10 to the not-illustrated operating device of the recorder. The microprocessor μP receives instructions over the data bus 10 and announces their execution, such as, that the initialisation process for the circuit arrangement has been completed for example.

The circuit arrangement will be described hereinafter on the basis of the initialisation processes for the recording and reproduction modes. The differing regulating and control processes for the drive mechanism for the head drum and tape described thereby are effected by the microprocessor μP by means of appropriate controlling actions on the motor control circuits 32; 41 over the leads 33; 42.



Recording mode

In the case of a static tape 2 and a head drum motor 3 that is regulated at a reference speed, a zero phase relative to a reference signal 20 (Fig. 4) of the video signal that is to be recorded is associated by the microprocessor μP with an arbitrary commutation signal I of positive polarity which is detected by the pulse detector 5 and supplied to the microprocessor μP from the output of the pulse detector 5. Here, the microprocessor μP derives the regulating value for the regulation of the rotational speed of the motor 3 from tacho signals which are supplied to it over a connection 34 and which are obtained by the motor control circuit 32 in the manner explained hereinabove. The frame pulse of the video signal is used as the reference signal 20 which is supplied to the microprocessor μP over a lead 8. The zero phase is one control value and consists of a predetermined time and/or phase difference between the front edge of the commutation signal I and the front edge of the reference signal 20 that is contingent on the arrangement. The control value is stored in the microprocessor μP .

Thereafter, an initialisation signal 21 (Fig. 4) is supplied via the switching unit 7 just to the head K1 for the duration of one half revolution of the head drum. The video signal or its frequency transposed recorded signal is used as the initialisation signal 21. Following a further half revolution of the head drum, at the beginning of which the supply of the initialisation signal is interrupted by means of the switching unit 7 and at the end of which the self-same head K1 is connected to the input of the detector circuit 6 by means of the switching unit 7, the signal track that was recorded with the initialisation signal 21 is scanned by the same head K1. The signal 22 (Fig. 4) detected thereby by the detector circuit 6 is supplied to the microprocessor μP for processing. The duration of the connection of the detector circuit 6 to the head K1 thereby likewise amounts to a half revolution of the head drum or revolution of the rotor, whereby the connection is likewise interrupted by means of the switching unit 7.



The length of the detected signal 22 or the length of the signal track and its location in terms of phase relative to the reference signal 20 are a measure as to the position of the rotor with which the microprocessor μP had associated the zero phase relative to the reference signal 20.

The relationship between the position of the rotor, the length and the location of the signal 22 is illustrated with the aid of the diagrams A - D in Fig. 4. Diagram A shows the association of the zero phase of such a commutation signal I relative to the reference signal 20 in the case of the correct position of the rotor. Diagram B shows the association of the zero phase in the case of a leading 90° positioning of the rotor. Diagram C shows the association of the zero phase in the case of a lagging 90° positioning of the rotor. Diagram D shows the association of the zero phase in the case of a 180° positioning of the rotor in which a signal 21 cannot be recorded and, as a result, cannot be scanned. The scale E corresponds to one and a half revolutions of the rotor.

The microprocessor μP evaluates the length of the detected signal 22 and its location in terms of phase relative to the reference signal 20 and associates the zero phase relative to the reference signal 20 with an appropriate commutation signal I in the case of an evaluation result corresponding to the diagram B, C or D. The correct positioning of the rotor for the recording mode is thereby produced by regulating the phase of the drive mechanism for the head drum. At the same time, the drive mechanism for the tape is switched on and the signal paths for the normal recording mode are established in the switching unit 7 by appropriately controlling the switching unit 7 and the recording process is begun. The tape 2 is thereby driven at a constant speed. The microprocessor μP obtains the regulating value for the tape drive mechanism from the tacho signals from the capstan motor 4. The tacho signals are supplied to the microprocessor μP over a lead 43.



Reproduction mode

In the case of the initialisation process for the reproduction mode, the recorded tape 2 is driven at a speed which deviates from the normal speed in the reproduction mode e.g. at 0.8 to 0.9 times the normal speed so that the head K1 can detect a signal track associated with it, in full, within the course of a few revolutions of the rotor even in the most unfavourable case, this action being recognised by the microprocessor μP with the help of the detector circuit 6. Here, the input of the detector circuit 6 is connected permanently to the head K1 via the switching unit 7. Since the signal track can only be detected in full in the case of an appropriate association of the head/signal-track, and thus only in the case of a correct positioning of the rotor, the zero phase relative to the reference signal 20 of the recorded tape 2 is associated with the appropriate commutation signal I taking into account the deviation of the speed of the tape drive mechanism as soon as the signal track has been completely detected and there is then a switch to the play mode. The switching sequence and the change over time point for half switching over the heads K1, K2 are also determined by this commutation signal I and, by appropriately controlling the switching unit 7, the signal paths are established in the switching unit 7 for the reproduction mode. The switching signals for the head changing switch 72, which are thereby required for the reproduction mode, are generated with the help of the flip-flop 73 that is controlled by the microprocessor μP . Their association with this commutation signal I is determined by delay times that are stored in the microprocessor μP and that result from a matching process for the recorder effected with the help of a tape 2 which includes signals recorded in accordance with the norm for example. The flip-flop 73 may be integrated into the microprocessor μP .

The envelope detector which is already available in the recorder for special operating modes, such as still pictures for example, is used as a detector circuit 6.



The pulse detector 5 may be integrated into the motor control circuit 32.

The head K1 and the winding phase X providing the instantaneous commutation signal I thus form a position indicating sensor with which the corresponding phase angles of the heads K1, K2 can be detected.

As already mentioned, the invention is in no way limited just to recorders in which the tape wrap angle of the recording medium amounts to 180° . One proceeds accordingly in the case of recorders having other wrap angles e.g. 270° .

Fig. 5 shows a circuit arrangement in accordance with Fig. 3 including a conductive loop 11 which is disposed in fixed manner outside the region of tape-head contact on the fixed part of the rotating head drum 1 and which can be connected, preferably in series, with one of the winding phases (X, Y, Z) by a switch 12 which is controlled by the microprocessor μP . It represents a second embodiment of the invention.

The detection of the position of the rotor, with which the control value is determined in that the zero phase relative to the reference signal 20 is associated with the front edge of the corresponding commutation signal I, occurs in this circuit arrangement using a magnetic field which is produced by the conductive loop 11 and can be detected, for example, by the rotating head K1 in the case of an appropriate positioning of the rotor. To this end, the conductive loop 11 is switched on so that it is traversed by the current from the winding phase Z that is provided for this purpose for example, and can thus produce the magnetic field which induces in the head K1 a voltage which is supplied to the microprocessor μP for determining the position of the rotor. Thereby, the supply preferably occurs via a threshold detector 61 which is connected to the head K1 via a switch 13 that is controlled by the microprocessor μP . Following the detection of the position of the rotor and the storage of the zero phase association of a corresponding commutation signal I relative to the reference



signal 20, the connection of the input of the threshold detector 61 to the head K1 as well as the current in the conductive loop 11 can be switched off. The threshold detector 61 may be an operational amplifier operating as a comparator for example.

In this circuit arrangement, the conductive loop 11 and the head K1 thus form the position indicating sensor with which the phase angle of the heads K1, K2 can be detected.

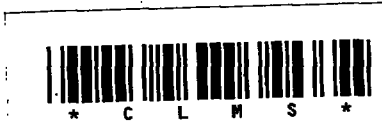
The on and off switching of the current in the conductive loop 11 and the connection of the threshold detector 61 to the head K1 may be effected on each occasion in dependence on the motor current e.g. only during the starting phase of the motor 3. The detection of the position of the rotor also occurs during this time.

The switches 12, 13 and the threshold detector 61 may be integrated into the motor control circuit 32. The conductive loop 11 may be implemented as part of the motor supply lead and be adhered to the outside of the fixed part of the head drum 1.

The conductive loop 11 may also be implemented as a part, which can be switched on and off, of the central point conductor which connects the star point of the winding phases X, Y, Z to the motor control circuit 32.

The invention is especially suitable for video recorders and camcorders.

The invention is not just intended for motors whose winding phases form a star circuit.



Claims



1. Recorder including a rotating head drum (1) for the recording and/or reproduction of signals in the helical tracks of a tape-like recording medium (2) that is drivable by a capstan motor (4) in accordance with the helical scan process, including a motor (3) which directly drives the head drum (1) and whose winding phases (X, Y, Z) are commutated electronically, and including a circuit arrangement for regulating the phase of the drive mechanism for the head drum and/or the tape using a motor control circuit (32) which is connected to the winding phases (X, Y, Z) and by means of which control signals for commutating the winding phases (X, Y, Z) are produced, the signals being derived from commutation signals (I) which, in each case, are caused as a result of the induction in the winding phases (X, Y, Z) as they are switched-off during each switch over of the winding phases for the production of the motor torque as a result of the commutation process, characterised in that, for detecting the phase of the write/read heads (K1, K2) which are disposed on the periphery of the rotating head drum (1) and for the purposes of obtaining control and regulating values for regulating the drive mechanism for the head drum and/or the tape, there is provided a position indicating sensor which is formed by a winding phase (X, Y, Z) that provides at least one commutation signal (I) and one of the write/read heads (K1, K2), in that, during an initialising process for the circuit arrangement which is carried out on each occasion at the beginning of each recording or reproduction mode, a commutation signal (I) is determined by means of a microprocessor (μP) and a signal that is detected during the respective initialising process by one of the write/read heads (K1, K2), with which commutation signal (I) there is associated a zero phase relative to the reference signal (20) of the signal that is to be recorded or is being reproduced and that, the microprocessor (μP) is provided for the purposes of obtaining the control and regulating values for regulating the phase of the drive mechanism for the head drum and/or the tape from the commutation signal (I).



2. Recorder in accordance with Claim 1, characterised in that, the circuit arrangement comprises at least one phase regulating device which consists of at least one winding phase (X, Y, Z) that provides a commutation signal (I) and a regulating path that is connected to this winding phase.

3. Recorder in accordance with Claim 1, characterised in that, the signal detected by one of the write/read heads (K1, K2) during the initialising process for the recording mode is a signal (22) that is stored on the recording medium (2) and is obtained by an initialising signal (21) which is supplied to one of the write/read heads (K1, K2) for a predetermined duration or for a predetermined amount of angular rotation of the head drum when the recording medium (2) is static and whose signal track, which is thereby left behind, is thereafter read by the self-same write/read head and evaluated by the microprocessor (μ P) for determining the phase angle of the write/read heads (K1, K2), whereby the length of the respective signal track that has been left behind, in combination with its location in terms of phase relative to the reference signal (20), is, on each occasion, a measure for the phase angle of the write/read heads (K1, K2).

4. Recorder in accordance with Claim 3, characterised in that, the angular rotation of the head drum is provided for the duration of the supply of the initialising signal (21) in correspondence with the angle by which the tape is wrapped around the head drum (1) or in correspondence with the standard track length.

5. Recorder in accordance with Claim 3 or 4, characterised in that, a recording signal of the recorded signal, which is appropriately transposed in the frequency domain, is provided as the initialising signal (21).

6. Recorder in accordance with Claim 1, characterised in that, the determination of the commutation signal (I) during the initialisation of the reproduction mode is effected by detecting the complete length of the track of a signal track of the



existing recording and that, for the purposes of detecting a signal track using one of the write/read heads (K1, K2), the drive speed of the recording medium (2) deviates from the normal speed of reproduction during the initialisation process.

7. Recorder including a rotating head drum (1) for the recording and/or reproduction of signals in the helical tracks of a tape-like recording medium (2) that is drivable by a capstan motor (4) in accordance with the helical scan process, including a motor (3) which directly drives the head drum (1) and whose winding phases (X, Y, Z) are commutated electronically, and including a circuit arrangement for regulating the phase of the drive mechanism for the head drum and/or the tape using a motor control circuit (32) which is connected to the winding phases (X, Y, Z) and by means of which control signals for commutating the winding phases (X, Y, Z) are produced, the signals being derived from commutation signals (I) which are, in each case, caused as a result of the induction in the winding phases (X, Y, Z) as they are switched-off during each switch over of the winding phases for the production of the motor torque as a result of the commutation process, characterised in that, for detecting the phase of the write/read heads (K1, K2) which are disposed on the periphery of the rotating head drum (1) and for the purposes of obtaining control and regulating values for regulating the drive mechanism for the head drum and/or the tape, there is provided a position indicating sensor with which a commutation signal (I) is determined and the microprocessor (μP) derives the control and regulating values for regulating the drive mechanism for the head drum and/or the tape from said signal, and the position indicating sensor is formed by one of the rotating write/read heads (K1, K2) and a conductive loop (11) through which there is a flow from at least one of the winding phases (X, Y, Z), whereby the loop produces a magnetic field and the loop is disposed in fixed manner outside the region of tape-head contact on a fixed part of the head drum (1).

8. Recorder in accordance with Claim 7, characterised in that, the position indicating sensor is a position indicating sensor



with which the phase detection process is immediately carried out during the starting phase of the head drum motor (3).

9. Recorder in accordance with Claim 7 or 8, characterised in that, the conductive loop (11) is implemented as part of the motor supply lead and is adhered to the outside of the fixed part of the head drum (1).

10. Recorder in accordance with any of the Claims 7 - 9, characterised in that, a switch (12) is arranged for switching off the current flow in the conductive loop (11) following the detection of the phase and the storage of the zero phase association of a commutation signal (I) relative to the reference signal (20).

11. Recorder in accordance with Claim 10, characterised in that, the switch (12) for switching off the current flow in the conductive loop (11), which is used for detecting the phase of the write/read heads (K1, K2), is a controllable switch (12) which is connected in series with one of the winding phases (X, Y, Z) and is disposed in parallel with the conductive loop (11).