

Recording and/or reproducing system and cassette for such a system.

The invention relates to a recording and/or reproducing system, comprising at least one recording and/or reproducing apparatus and at least one cassette which can be loaded selectively into an apparatus in two positions which are inverted relative to an axis of reversal, which cassette accommodates a record carrier and, for the storage of data associated with the cassette, an electrically operable solid-state memory device, which device has at least one storage section for each of the two positions of the cassette and which, for a data transfer to and from the solid-state memory device, comprises signal terminals with a given assignment of signals and, for the power supply to the solid-state memory device, power-supply terminals with a given assignment of potentials, the signal terminals of the solid-state memory device being connected to data-transfer contacts on the cassette, which are accessible from the exterior of the cassette, and which when a cassette is loaded into the apparatus mate with data-transfer complementary contacts in the apparatus, which are connected to data-transfer signal terminals of a read-in/read-out device in the apparatus, the assignment of signals to the signal terminals being the same as for the data-transfer signal terminals of the solid-state memory device, which read-in/read-out device serves for reading data into and out of the storage sections of the solid-state memory device assignable to the two positions of the cassette, and the power-supply terminals of the solid-state memory device being connected to power-supply contacts on the cassette which are accessible from the exterior of the cassette and, when a cassette is loaded into the apparatus mate with power-supply complementary contacts in the apparatus which are connected to power-supply terminals of the apparatus, the assignment of potentials to said power-supply terminals being the same as for the power-supply terminals of the solid-state memory device, the apparatus comprising a detector device for detecting the instantaneous position of the cassette loaded into the apparatus.

Such a system is known from DE-PS 29 43 409. In this known system every cassette of the system comprises a solid-state storage device in the form of a semiconductor memory, whose terminals are connected to a total of seven contacts of a set of contacts provided on the cassette and accessible from the exterior of the cassette. Depending on the position of the cassette in an apparatus in accordance with the system

these seven contacts of the set of contacts on the cassettes engage with seven complementary contacts of one of two identical complementary-contact sets provided in the apparatus in mirror symmetrical arrangement relative to the axis of reversal of the cassette to establish a connection *via* which the data transfer to and from the semiconductor memory and the power supply to the semiconductor memory is effected. In order to detect the instantaneous position of a cassette loaded into an apparatus there is provided a detector device comprising on the cassette an additional eighth contact in the contact set on the cassette and comprising in the apparatus an additional eighth complementary contact in each of the two complementary-contact sets, which eighth complementary contact comprises two contact members which are both engageable with the additional eighth contact of the contact set on the cassette to form an electrical connection. Depending on the position of a cassette in the apparatus the two contact members of one of the two eighth complementary contacts are electrically interconnected, which is detected by means of a detection circuit for detecting the instantaneous position of a cassette. Thus, for detecting the instantaneous position of a cassette the prior-art system comprises an additional contact both in the contact set on the cassette and in the two complementary-contact sets on the apparatus, which is in conflict with the requirement to minimize the number of contacts.

It is an object of the invention to enable the instantaneous position of a cassette in an apparatus to be detected without the provision of additional contacts on the cassette and in the apparatus. To this end the invention is characterized in that the assignment of signals and potentials to the contacts on the cassette concurs when the cassette is loaded into the apparatus in one position of the cassette and does not concur in the other position of the cassette, at least for some of the contacts, with the assignment of signals and potentials to the complementary contacts in the apparatus which mate with the contacts on the cassette, in that the apparatus can be set to a data-transfer test mode in which a data transfer between the read-in/read-out device and the solid-state memory device is attempted, in that for detecting the instantaneous position of the cassette the detector device comprises a data-transfer detector stage to detect a correct data transfer between the read-in/read-out device and the solid-state memory device, which data-transfer is possible in the test mode when the assignments of signals and potentials to the mating contacts and complementary contacts concurs, and in that depending on the detection result obtained by means of the data-transfer detector stage

in the test mode the detector device supplies one of two detection signals which each characterize one of the two positions of the cassette. In this way it is achieved that the instantaneous position of a cassette in an apparatus can be detected simply with the aid of the contacts and complementary contacts which are present anyway on the cassette and on the apparatus, so that no additional contacts are required for the purpose of the detection, enabling the number of contacts to be minimized, which is advantageous for a simple and compact construction and a high reliability.

In this respect it is found to be advantageous if the detection signals supplied by the detector device can be applied to an indicator device for indicating the detected instantaneous position of the cassette. In this way the instantaneous position of the cassette is directly indicated to the user of the system, which indication may be effected optically or acoustically.

In a system in accordance with the invention, in which a cassette loaded into an apparatus is selectively operable in each of two mutually inverted positions but must be used in only one predetermined position, as for example in the well-known telephone-answering systems and language-teaching systems, it is possible, after detection in accordance with the invention and, if applicable, indication that the instantaneous position of the cassette loaded into the apparatus is not the specified position, in which case the contacts on the cassette and the complementary contacts in the apparatus which have engaged with these contacts to establish a connection exhibit non-corresponding signal and potential assignments and, consequently, no data transfer between the read-in/read-out device and the solid-state memory device is possible, to remove the cassette from the apparatus and re-insert it into the apparatus in its reversed position, after which the contacts and complementary contacts have corresponding signal and potential assignments and, consequently, a correct data transfer between the read-in/read-out device and the solid-state memory device is guaranteed. A system in accordance with the invention, in which a cassette is operable in both positions in the apparatus, however, is characterized in that the complementary contacts, whose assignment does not concur with the assignment to the contacts on the cassette which mate with said complementary contacts when the cassette is loaded into the apparatus in one position of the cassette, can be driven *via* a switching device for changing the complementary-contact assignment, which device in the case that the assignment to said complementary contacts and the assignment to the contacts mating therewith do not

concur after loading of the cassette into the apparatus enables the connections to said complementary contacts to be changed in such a way that the assignments to said complementary contacts and to the contacts mating therewith concur. Thus, in such a system in accordance with the invention similar signal and potential assignments to the contacts on the cassette and to the complementary contacts in the apparatus can be achieved in both positions of the cassette, so that in both positions of a cassette a correct data transfer between the read-in/read-out device and the solid-state memory device is guaranteed.

The switching device can be controlled, for example, by hand. However, it is found to be advantageous if the switching device is electrically controllable and is controlled by the data-transfer detector stage depending on the detection result obtained in the test mode. In this way it is achieved that depending on the instantaneous result of the detection by the data-transfer detector stage the switching device is automatically set to the switch position required for a correct data transfer between the read-in/read-out device and the solid-state memory device.

In a system in accordance with the invention it is found to be advantageous if the cassette comprises two contact sets which are arranged in a mirror-inverted configuration relative to the axis of reversal of the cassette and whose contacts are connected to the terminals of the solid-state memory device, the contacts of one contact set, when the cassette is loaded into the apparatus in one position, mating with a single set of complementary contacts in the apparatus which are arranged to be offset relative to the axis of reversal of the cassette, and the contacts of the other contact set mating with said complementary contacts in the other position of the cassette, in that the assignments of the signals to the data-transfer contacts of both contact sets are not mutually mirror-inverted relative to the axis of reversal of the cassette and the assignments of the potentials to the power-supply contacts of both contact sets are mutually mirror-inverted relative to the axis of reversal of the cassette, and in that the data-transfer complementary contacts of the complementary-contact set are connected to the data-transfer signal terminals of the read-in/read-out device via a switching device and the power-supply complementary contacts of the complementary-contact set are connected directly to the power-supply terminals on the apparatus. In this way the desired result is obtained by means of a single set of complementary contacts on the

apparatus and, in addition, a very simple construction is obtained for the power supply to the solid-state memory device.

In a system in accordance with the invention it is also found to be advantageous if the cassette comprises a single contact set whose contacts are connected to the terminals of the solid-state memory device, the data-transfer contacts and the power-supply contacts of this contact set being each in a mirror-inverted arrangement relative to the axis of reversal of the cassette and the contacts of this set mating with the complementary contacts of a single complementary-contact set in the apparatus when the cassette is loaded into the apparatus in both positions of the cassette, and in that both the data-transfer complementary contacts of the complementary-contact set and the power supply complementary contacts of the complementary contact set are connected to the data-transfer signal terminals of the read-in/read-out device and to the power-supply terminals of the apparatus *via* a switching device. In this way it is achieved that only a single contact set on the cassette and only a single complementary-contact set in the apparatus are needed, which is very simple and cheap.

A system of the above type may comprise a special solid-state memory device having protection facilities to protect it from being damaged by an incorrectly poled supply voltage. It is found to be very advantageous, however, if a diode is arranged between at least one power-supply terminal of the solid-state memory device and the contact of the contact set on the cassette connected to said terminal to provide protection against polarity reversal. Such a diode provides a protection against an incorrectly poled supply voltage, allowing the use of any conventional solid-state memory device not having an internal protection facility against polarity reversal.

In a system in accordance with the invention it is further found to be advantageous if the cassette comprises a single contact set having its contacts connected to the terminals of the solid-state memory device and arranged to be offset relative to the axis of reversal of the cassette, which contacts mate with the complementary contacts of one of two complementary-contact sets of the apparatus when the cassette is loaded into the apparatus depending on the position of the cassette, which complementary-contact sets are arranged in a mirror-inverted configuration relative to the axis of reversal of the cassette, and in that the data-transfer complementary contacts of one complementary-contact set, whose signal assignment concurs with the signal assignment to the mating contacts when a cassette is loaded into the apparatus in one

position, are connected directly to the signal terminals of the read-in/read-out device, and the data-transfer complementary contacts of the other complementary-contact set, whose signal assignment does not concur with the signal assignment to the mating contacts when the cassette is loaded into the apparatus in the other position, are

5 connected to the signal terminals of said read-in/read-out device *via* the switching device, the power-supply complementary contacts of the two complementary-contact sets being connected directly to the power-supply terminals on the apparatus. Thus, it is achieved that the cassette comprises only one contact set and at the same time the power-supply to the solid-state memory device is realized in a very simple manner.

10 The solid-state memory device may comprise, for example, one or a plurality of semiconductor memories for parallel read-in and read-out of data signals or a plurality of semiconductor memories for serial read-in and read-out of data signals. However, it is found to be very advantageous if the solid-state memory device is constituted by a single semiconductor memory for serial read-in and read-out of data
15 signals, having two data-transfer signal terminals formed by one signal terminal for serial data signals and one signal terminal for a clock signal, and having two power-supply terminals, and in that the cassette comprises at least one contact set having four contacts connected to the four terminals of the semiconductor memory, which four contacts mate with four complementary contacts of one complementary-contact set in
20 the apparatus when a cassette is loaded into the apparatus. In this way it is achieved that each of the required contact sets on the cassette comprises a minimal number of contacts, *i.e.* only four contacts.

The invention also relates to a cassette for use in a system in accordance with the invention, which can be loaded into an apparatus in two positions which are
25 inverted relative to an axis of reversal, which accommodates a record carrier, and which for storing data associated with the cassette comprises an electrically operable solid-state memory device having at least one storage section for each of the two positions of the cassette, and which comprises signal terminals having a given signal assignment for data-transfer to and from the solid-state memory device and power-
30 supply terminals having a specific potential assignment for the power supply of the solid-state memory device, the signal terminals of the solid-state memory device being connected to data-transfer contacts on the cassette which are accessible from the exterior of the cassette, and the power-supply terminals of the solid-state memory device being

connected to power-supply contacts on the cassette which are accessible from the exterior of the cassette.

Such a cassette is known from the above cited DE-PS 29 43 409. In this cassette the assignment of signals and potentials to the contacts on the cassette
5 connected to the terminals of the solid-state memory device and the assignment of signals and potentials to the complementary contacts connected to the terminals of the read-in/read-out device and the power-supply terminals of the apparatus is the same in both positions of the cassette. Since the assignment of signals and potentials to the contacts and complementary contacts is the same in both positions of the cassette a
10 detection of the instantaneous position of the cassette by means of the contacts on the cassette connected to the terminals of the solid-state memory device is not possible.

However, a cassette in accordance with the invention is characterized in that the cassette comprises two contact sets which are arranged in a mirror-inverted configuration relative to the axis of reversal of the cassette and whose contacts are
15 connected to the terminals of the solid-state memory device, and in that the assignments of the signals to the data-transfer contacts of both contact sets are not mutually mirror-inverted relative to the axis of reversal of the cassette and the assignments of the potentials to the power-supply contacts of both contact sets are mutually mirror-inverted relative to the axis of reversal of the cassette. In such a cassette in accordance with the
20 invention the assignments of signals and potentials to the contacts on the cassette and to the complementary contacts in the apparatus which are engageable with said contacts correspond in only one position of the cassette and in the other position of the cassette do not correspond for at least some of the contacts and the complementary contacts engageable therewith, which provides a criterion enabling the instantaneous position of
25 the cassette to be detected without the use of separate contacts or other means on the cassette being required for this purpose. Providing two contact sets on the cassette, whose contacts are connected to the terminals of the solid-state memory device, has the advantage that while the contacts of one of these two contact sets mate with the complementary contacts of the complementary-contact set on the apparatus it is possible
30 at the same time to connect a test device to the contacts or the other one of the two contact sets to determine the fault cause in the event of an incorrect data transfer towards and from the solid-state memory device. Moreover, such a cassette having two contact sets each corresponding to one of the two cassette positions, only one contact set

being connected to the complementary-contact set of the apparatus in each position of the cassette, provides a longer life of the contacts on the cassette.

A further cassette in accordance with the invention is characterised in that the cassette comprises a single set of contacts connected to the terminals of the solid-state memory device, of which the data-transfer contacts and the power-supply contacts are both arranged in a mirror-inverted configuration relative to the axis of reversal of the cassette. In such a cassette in accordance with the invention the assignments of signals and potentials to the contacts on the cassette and to the complementary contacts in the apparatus which are engageable with said contacts correspond in only one position of the cassette and in the other position of the cassette do not correspond for at least some of the contacts and the complementary contacts engageable therewith, which provides a criterion enabling the instantaneous position of the cassette to be detected without the use of separate contacts or other means on the cassette being required for this purpose. Such a cassette comprises only one set of contacts and, as a result of their mirror-inverted arrangement relative to the axis of reversal of the cassette, the contacts of this set can have comparatively large contact areas, which has the advantage that contact making is immune to tolerances.

In such a cassette it is found to be very advantageous if a diode is arranged between at least one power-supply terminal of the solid-state memory device and the contact of the contact set on the cassette connected to said terminal to provide protection against polarity reversal. Such a diode provides protection against an incorrectly poled supply voltage for the solid-state memory device, allowing any conventional solid-state memory device not having an internal polarity protection facility to be used in such a cassette.

In a cassette in accordance with the invention it is found to be very advantageous if the solid-state memory device is constituted by a single semiconductor memory for the serial read-in and read-out of data signals, having two data-transfer signal terminals comprising a signal terminal for serial data signals and a signal terminal for a clock signal, and having two power-supply terminals for the voltage supply, and in that the cassette comprises at least one contact set comprising four contacts connected to the four terminals of the semiconductor memory. In this way it is achieved that at least one contact set on the cassette comprises a minimal number of contacts, *i.e.* only four contacts.

Embodiments of a recording and/or reproducing apparatus for the system in accordance with the invention are defined in the Claims relating to the recording and/or reproducing apparatus.

The invention will be described in more detail hereinafter with reference to four exemplary embodiments which are shown in the drawings and to which the invention is not limited. Fig. 1 shows diagrammatically a first embodiment of a recording and reproducing system in accordance with the invention, in which an apparatus of the system comprises only one complementary-contact set in an offset arrangement relative to the axis of reversal of a cassette of the system and in which the cassette comprises two contact sets in mirror-inverted arrangement relative to the axis of reversal, the assignments of signals to the data-transfer contacts of the two contact sets not being mirror-inverted relative to the axis of reversal of the cassette. Fig. 2 is a diagrammatic plan view of a cassette of the system shown in Fig. 1, comprising a solid-state memory device in the form of a single semiconductor memory. Fig. 3 shows the cassette of the system shown in Fig. 2 with its two contact sets in a diagrammatic side view taken on the line III-III in Fig. 2. Fig. 4 is a flow chart of a program performed by a microprocessor in the apparatus of the system shown in Fig. 1 to detect the instantaneous position of a cassette loaded into the apparatus. Fig. 5 shows the waveforms of a serial data signal and a clock signal, which can be transferred between a read-in/read-out device of the apparatus of the system shown in Fig. 1 and the semiconductor memory in the cassette of the system shown in Fig. 1, the data being transferred between the read-in/read-out device and the semiconductor memory in accordance with a given protocol *via* a system comprising two lines. Fig. 6 shows diagrammatically a second embodiment of a recording and reproducing system in accordance with the invention, in which the apparatus of the system comprises only one complementary contact set and a cassette of this system comprises only one contact set, the contacts and complementary contacts for data transfer and the contacts and complementary contacts for the power supply both being mirror-inverted relative to the axis of reversal of the cassette. Fig. 7 shows a third embodiment of a recording and reproducing system in accordance with the invention, in which the apparatus of the system comprises two complementary-contact sets in mirror-inverted arrangement relative to the axis of reversal of the cassette, and in which the cassette of the system comprises only one contact set in an offset arrangement relative to the axis of reversal

of the cassette, the assignments of signals to the data-transfer complementary contacts of the two complementary-contact sets on the apparatus not being mirror-inverted relative to the axis of reversal of the cassette. Fig. 8 shows a fourth embodiment of a recording and reproducing system in accordance with the invention, in which the apparatus of the system comprises two complementary-contact sets in mirror-inverted arrangement relative to the axis of reversal of the cassette, and in which the cassette of the system comprises only one contact set in offset arrangement relative to the axis of reversal of the cassette, the assignments of the potentials to the power-supply complementary contacts of the two complementary contact sets of the apparatus not being mirror-inverted relative to the axis of reversal of the cassette.

Fig. 1 shows the relevant parts of a recording and reproducing system 1, which comprises a recording and reproducing apparatus 2 and a cassette 3, which can be loaded into the apparatus 2 in two positions which are inverted relative to an axis of reversal 4 of the cassette 3 and which can be used in both positions in the apparatus. The two inverted positions of the cassette are symbolically indicated by A and B in Fig. 1, the cassette shown in solid lines in Fig. 1 occupying its position A in the apparatus 2 and the cassette shown in dash-dot lines being shown adjacent the apparatus in its position B, which is inverted relative to the position A.

The cassette 3 accommodates a record carrier in the form of a magnetic tape 5 which extends between two juxtaposed rotatable reel hubs 6 and 7 and on/from which information signals, for example speech signals, can be recorded and reproduced by means of magnetic heads of the apparatus. The information signals are recorded and reproduced in/from one of two tracks on the magnetic tape 5, depending on whether the cassette is in position A or position B, each track corresponding to a respective position A or B of the cassette.

For the storage of data relating to the cassette, for example data relating to the total recording capacity of the magnetic tape, the length of magnetic tape utilised in any position of the cassette, or the location of specific passages on the magnetic tape in any position of the cassette, for example the ends of dictations recorded successively on the magnetic tape, the cassette 3 comprises a solid-state memory device 8, which is constituted by a single non-volatile semiconductor memory, constructed for serial read-in and read-out of data signals. The semiconductor memory 8 has storage locations which can be allocated to one of the two positions A or B of the cassette during data

entry. The semiconductor memory 8 has two signal terminals 9 and 10 with a given signal assignment for data transfer towards and from said memory, comprising a signal terminal 9 for serial data signals D and a signal terminal 10 for a clock signal C. Consequently, the data signals D are assigned to the signal terminal 9 and the clock signal C is assigned to the signal terminal 10. The semiconductor memory 8 further comprises two power-supply terminals 11 and 12 to which given potentials are assigned for the power supply to this memory. The power-supply terminal 11 is intended for the positive potential + of a d.c. supply voltage and the power supply terminal 12 is intended for the negative potential - of a d.c. supply voltage. The non-volatile semiconductor memory may be, for example, the EEPROM device available from the Applicant under the type designation PCF 8582 or the EEPROM device available from Messrs. Xicor under the type designation X 2402.

The cassette 3 comprises two contact sets 13 and 14 in a mirror-inverted arrangement relative to the axis of reversal 4 of the cassette, whose contacts 15, 16, 17, 18 and 19, 20, 21, 22 are connected to the terminals 9, 10, 11 and 12, respectively, of the semiconductor memory 8. As can be seen in Fig. 1, the assignments of the signals D and C to the data-transfer contacts 15, 16 and 20, 19, respectively, of the two contact sets 13 and 14, which contacts are in a mirror-inverted arrangement relative to the axis 4 of the cassette, are selected to be not mirror-inverted relative to the axis of reversal 4 of the cassette, and the assignments of the potentials + and - to the power-supply contacts 17, 18 and 21, 22 of the two contact sets 13 and 14, which contacts are in a mirror-inverted arrangement relative to the axis 4 of the cassette, are selected to be mirror-inverted relative to the axis 4 of the cassette.

In position A of the cassette the contacts 15, 16, 17 and 18 of the contact set 13 and in the other position B of the cassette the contacts 20, 19, 21 and 22 of the other contact set 14 mate with the complementary contacts 23, 24, 25 and 26 of a single complementary-contact set 27 of the apparatus 2, which complementary-contact set is offset relative to the axis of reversal 4 of the cassette. As already stated, the assignment of the signals D and C and the potentials + and - to contacts of the two sets 13 and 14 on the cassette, concurs when the cassette 3 is loaded into the apparatus in the position A and does not concur in the other position B of the cassette, at least for some of the contacts, with the contact assignment of the complementary contacts in the apparatus which mate with the contacts on the cassette. In the present case the assignment of the

signals D and C does not concur only for the contacts 20 and 19 and the complementary contacts 23 and 24 provided for data transfer, the assignment of the potentials + and - concurring for the contacts 21 and 22 and the complementary contacts 25 and 26 provided for power supply. However, alternatively in position B of the cassette the assignments of the potentials + and - to the contacts 21 and 22 and the complementary contacts 25 and 26 for the power supply may not be concurrent, either in conjunction with non-concurrent assignments of the signals D and C, or concurrent assignments of the signals D and C to the contacts 20 and 19 and the complementary contacts 23 and 24 provided for data transfer. In position B of the cassette, however, the signal and potential assignments to one data-transfer contact and one power-supply contact and to the two complementary contacts mating with these two contacts may alternatively be selected to be non-concurrent.

The apparatus 2 comprises a microprocessor 28, for example the microprocessor available from the Applicant under the type number PCB 80C51. As is shown diagrammatically in Fig. 1, the microprocessor 28 is used to realise a control device 29, a read-in/read-out device 30, a switching device 31, and a data-transfer detector stage 32. The microprocessor 28 also performs further functions which are not described because they are not relevant to the present invention.

The read-in/read-out device 30 serves to read data into and out of the storage locations of the semiconductor memory 8 in the cassette 3 which correspond to the two positions A and B of the cassette. The read-in/read-out device 30 comprises two signal terminals 33 and 34 to which the signals D and C are assigned in the same way as to the data-transfer terminals 9 and 10 of the semiconductor memory 8. The signal terminals 33 and 34 are connected to the data-transfer complementary contacts 23 and 24 of the set 27. The complementary contacts 23 and 24, for which the assignment of the signals D and C does not concur with the assignment of the signals D and C to the contacts 20 and 19 on the cassette mating with these complementary contacts 23 and 24 when the cassette 3 is loaded into the apparatus 2 in the position B of the cassette, can be driven *via* the electrically controllable switching device 31. The switching device 31 serves to change the assignment of the signals D and C to the complementary contacts 23 and 24. In the case of non-concurrent assignments of the signals D and C to the complementary contacts 23 and to the contacts 20 and 19 mating therewith after the cassette has been loaded into the apparatus the connections between the signal terminals

33 and 34 of the read-in/read-out device 30 and the complementary contacts 23 and 24 can be changed by means of the switching device 31 to obtain concurrent assignments of the signals D and C to the complementary contacts 23 and 24 and to the contacts 20 and 19 mating therewith. Before a first data-transfer attempt between the read-in/read-out device 30 and the semiconductor memory 8 and also before the cassette is loaded into the apparatus the electrically controllable switching device 31 is set to the position shown in solid lines in Fig. 1 by means of the control device 29 *via* a control connection 35. The operation of the read-in/read-out device 30 can be controlled by the control device 29 *via* a control connection 36.

10 The apparatus 2 comprises a direct voltage source +V. It provides the direct voltage supply to the microprocessor 28. The positive potential + of the direct voltage source +V is connected to a first power-supply terminal 37 of the apparatus and its negative potential - is connected to a second power-supply terminal 38 of the apparatus. The two power-supply terminals 37 and 38 are connected to the two power-supply complementary contacts 25 and 26 of the complementary-contact set 27, the assignment of the potentials + and - to these contacts being the same as to the power-supply terminals 11 and 12 of the semiconductor memory 8.

 The apparatus 2 comprises a detector device 39 for determining the instantaneous position A or B of a cassette 3 loaded into the apparatus, the device comprising, as already stated, the data-transfer detector stage 32. To determine the instantaneous position A or B of the cassette 3 after the cassette has been loaded into the apparatus 2 the detector device 39 in the apparatus can start a data-transfer-test mode, in which it is attempted to carry out a data transfer between the read-in/read-out device 30, which in the test mode forms part of the detector device 39, and the semiconductor memory 8. In the test mode it is tested, for example, whether the read-in/read-out device 30 can read a basically arbitrary data signal into the semiconductor memory 8. In order to start the process of detecting the instantaneous position of the cassette the detector device 39 comprises a key 40, whose actuation is detected and interpreted by the control device 29, which in the test mode also forms part of the detector device 39.

25 After actuation of the key 40 the control device 29 enables the read-in/read-out device 30, *via* the control connection 36, to perform the test-mode data transfer to the semiconductor memory 8. The process of detecting the instantaneous position of the cassette can also be started automatically by inserting a cassette into the apparatus.

A correct data transfer between the read-in/read-out device 30 and the semiconductor memory 8, which is possible in the test mode when the assignments of the signals D and C and the potentials + and - to the mating contacts and complementary contacts concur, can be detected by means of the data-transfer detector stage 32, as will be described in more detail hereinafter. In the present case the data-transfer detector stage 32 has three outputs 41, 42 and 43. Depending on the detection result in the test mode the data-transfer detector stage 32 supplies one of the two detection signals S1 and S2 characterizing the positions A and B of the cassette to the two outputs 41 and 42. Depending on the detection result in the test mode the data-transfer stage 32 supplies a further detection signal S3 to the third output 43 to characterize the presence of a non-compatible cassette not comprising a semiconductor memory, or the absence of a cassette in the apparatus. The detection signals S1, S2 and S3 supplied by the data-transfer detector stage 32 are direct voltage signals having positive potentials. The detection signals S1, S2 and S3 can also be generated in a separate detection-signal generation stage of the detector device 39, which stage is controlled depending on the detection result obtained by means of the data-transfer detector stage 32 in the test mode and is realised by means of the microprocessor 28.

The detection signals S1, S2 and S3 are applied to an indicator device 44 to indicate the detected instantaneous position A or B of the cassette and the presence of a cassette which is not compatible with the system or the absence of a cassette. In the present case the indicator device 44 comprises optical display elements, shown symbolically, for example light-emitting diodes, which are connected to the outputs 41, 42 and 43 of the data-transfer detector stage 32.

Between the data-transfer detector stage 32 and the switching device 31, which in the data-transfer test mode also forms part of the detector device 39, a control connection 48 is arranged *via* which the switching device 31 can be controlled by the data-transfer detector stage 32 depending on the detection result obtained in the test mode. If the data-transfer detector stage 32 detects a correct data transfer between the read-in/read-out device 30 and the semiconductor memory 8 the switching device 31 is not changed over *via* the control connection 48. However, if the data-transfer detector stage 32 has detected that a correct data transfer is not possible in the test mode, the switching device 31 is changed over *via* the control connection 48.

As already stated, the system may comprise the microprocessor, for example type PCB 80C51 available from the Applicant and a semiconductor memory Xicor type X 2402. These electronic devices are connected to each other *via* a data-transfer line system comprising two lines, data transfer being effected in conformity with a given protocol. As is illustrated in Fig. 5, this protocol prescribes that prior to every data transfer from a master to a slave the master should set the signal terminal for the data signals D of the slave from a high potential H to a low potential L a predetermined time interval T before this is effected for the signal terminal for the clock signal C of the slave. The slave detects whether this requirement is met and accepts the data transferred to it from the master only if the result of this detection by the slave is positive, the slave applying an acknowledge signal to the master after acceptance. If said requirement is not met by the slave, which is for example the case if the master supplies the data signals D to the signal terminal of the slave intended for the clock signal C and the master supplies the clock signal C to the signal terminal of the slave intended for the data signals D, this will lead to a negative detection result in the slave. Owing to this negative detection result the slave will not send an acknowledge signal to the master. This acknowledgement signal thus indicates whether a correct data transfer has taken place between the master and the slave. In the system shown in Fig. 1 the appearance of the acknowledge signal, which is applied from the slave, formed by the semiconductor memory 8, to the master, formed by the read-in/read-out device 30, is monitored by the data-transfer detector stage 32, which is connected to the read-in/read-out device 30 *via* a connection 49. This acknowledge signal appears only if the signal and potential assignments to the contacts on the cassette and to the complementary contacts in the apparatus concur and it does not appear even if the assignments do not concur for only some of the contacts and complementary contacts, because a correct data transfer is then impossible.

Hereinafter, a program performed by the microprocessor 28 of the apparatus 2 of the system 1 in order to detect the instantaneous position A or B of a cassette 3 will be described with reference to a flow chart given in Fig. 4. This program is started in block 50. Subsequently, in block 51 the control device 29 checks whether the key 40 for starting the process of detecting the instantaneous position of the cassette has been actuated. If this is not the case, the program proceeds with block 52, which represents a plurality of further program steps. After block 52 the program returns to

block 51. If it is detected in block 51 that the key 40 has been actuated the control device 29 will set the switching device 31 to the position shown in solid lines in Fig. 1 via the control connection 35 in block 53 if this switching device does not yet occupy this position. Subsequently, in block 54 the control device 29 enables the read-in/read-out device 30, via the control connection 36, to test a data transfer to the semiconductor memory 8, the read-in/read-out device 30 attempting to read a data signal into the semiconductor memory 8. Subsequently, by monitoring of the aforementioned acknowledge signal from the semiconductor memory 8 in block 55, the data-transfer detector stage 32 checks whether a correct data transfer is possible between the read-in/read-out device 30 and the semiconductor memory 8. If this is the case, which means that assignments of the signals D and C and the potentials + and - to the contacts on the cassette and to the complementary contacts in the apparatus concur, i.e. the cassette loaded into the apparatus occupies position A, the data-transfer detector stage will supply the detection signal S1 to its output 41 in block 56, causing the optical display element 45 to light up. When the display element 45 lights up this indicates that the cassette loaded into the apparatus occupies position A. After block 56 the program is terminated in block 57.

If in block 55 the data-transfer detector stage 32 has detected that the semiconductor memory 8 has not supplied an acknowledge signal, i.e. a correct data transfer is not possible, the data-transfer detector stage 32 sets the switching device 31 to the position shown in dash-dot lines in Fig. 1 in block 58, depending on the previously obtained negative detection result, so that the assignment of the signals D and C to the complementary contacts 23 and 24 is changed. After this, in block 59, the data-transfer detector stage 32, via the connection 49, again enables the read-in/read-out device 30 to perform a data-transfer test. Subsequently, in block 60, the data transfer detector stage 32 again checks whether a correct data transfer between the read-in/read-out device 30 and the semiconductor memory 8 is possible. If this is possible, in which case the assignments of the signals D and C and the potentials + and - to the contacts on the cassette and to the complementary contacts in the apparatus concur, i.e. the cassette loaded into the apparatus occupies position B, the data-transfer detector stage 32 subsequently supplies the detection signal S2 to its output 42 in block 61, causing the optical display element 46 to light up. Lighting up of the display element 46 indicates

that the cassette loaded into the apparatus occupies position B. After block 61 the program is again terminated in block 57.

If in block 60 the data-transfer detector stage 62 detects that a correct data transfer is not possible the cassette loaded into the apparatus is not a cassette in accordance with the system, having a semiconductor memory and contacts connected to the terminals of this memory, but a similarly constructed cassette without a semiconductor memory and not having its contacts connected to the terminals of this memory, or the apparatus does not contain a cassette. In block 62 the data-transfer detector stage 32 then supplies the detection signal S3 to its output 43, causing the display element 47 to light up. When the display element 47 lights up this indicates that the cassette loaded into the apparatus is not a cassette in accordance with the system, or that no cassette has been loaded into the apparatus.

The detection signals S1, S2 and S3 supplied by the data-transfer detector stage 32 are applied not only to the display elements 45, 46 and 47 but also to further devices of the apparatus, such as the microprocessor 28 itself in order to control or influence these devices of the apparatus in dependence on the detected instantaneous position of a cassette loaded into the apparatus. In this respect it is to be noted that when data corresponding to only one position of the cassette is read into the semiconductor memory the data to be entered should be provided with an identification to indicate that the data to be entered corresponds to the relevant position of the cassette. Two such identifications are needed, each corresponding to one of the two positions of the cassette. These identifications can be generated, for example, in the read-in read-out device 30 of the microprocessor 28 depending on the two output signals S1 and S2 of the data-transfer detector stage 32, *i.e.* depending on the detected instantaneous position A or B of the cassette.

In the system shown in Fig.1 the devices required for detecting the instantaneous position of a cassette in the apparatus of the system form part of a microprocessor already present in the apparatus, so that hardly no additional devices are required for the detection of the cassette position. The two contact sets on the cassette and the complementary-contact set in the apparatus only comprise the contacts and complementary contacts necessary for a data transfer and for the power supply, so that the assignment, in accordance with the invention, of the signals to the data-transfer contacts of the two contact sets on the cassette, which in one position of the cassette

concurr and, in the other position of the cassette does not concur with the assignment of the signals to the data-transfer complementary contacts of the complementary-contact set, provides a criterion by means of which the instantaneous position of the cassette can be detected without separate contacts on the cassette and complementary contacts in the apparatus being required for this purpose, which has the advantage that the number of contacts of the two sets of contacts and the set of complementary contacts can be minimized. The provision of two sets of contacts on the cassette has the advantage that it enables a test device to be simply connected to the contact set which is not connected to the complementary-contact set on the apparatus, in order to determine the fault cause when a correct data transfer is not possible. The apparatus comprises only one set of complementary contacts, which has the advantage that it simplifies the construction of the apparatus. The direct voltage source in the apparatus is connected directly to the power-supply complementary contacts of the complementary-contact set via the power-supply terminals, which has the advantage that the power supply to the semiconductor memory is very simple.

In the recording and reproducing system 1 shown in Fig. 6 the cassette 3 comprises a single contact set 13, whose contacts 15, 16, 17 and 18 are connected to the terminals 9, 10, 11 and 12 of the semiconductor memory 8, whose data-transfer contacts 15 and 16 and whose power-supply contacts 17 and 18 are both arranged in a mirror-inverted configuration relative to the axis of reversal 4 of the cassette 3. The contacts 15, 16, 17 and 18 of the contact set 13 on the cassette mate with the complementary contacts 23, 24, 25 and 26 of a single complementary-contact set 27 in the apparatus when a cassette is loaded into the apparatus in positions A and B of the cassette, the data-transfer complementary contacts 23 and 24 as well as the power-supply complementary contacts 25 and 26 being also arranged in a mirror-inverted configuration relative to the axis of reversal 4 of the cassette 3. In this case the assignment of the signals D and C and the potentials + and - to the contacts 15, 16, 17 and 18 of the contact set 13 on the cassette when the cassette is loaded into the apparatus in position A concurs and when the cassette is loaded in the other position B of the cassette does not concur with the assignment of the signals D and C and the potentials + and - to the complementary contacts 23, 24, 25 and 26 of the complementary contact set 27 in the apparatus for all the mating contacts 15, 16, 17 and 18 of the contact set 13. Since the assignments of the signals D and C and the potentials

+ and - to the contacts and complementary contacts concur when the cassette is loaded into the apparatus in position A and do not concur in position B this provides a criterion, in a similar way as in the system shown in Fig. 1, thereby enabling the instantaneous position A or B of the cassette in the apparatus to be detected. Detection of the instantaneous position of the cassette in the system shown in Fig. 6 can proceed in exactly the same way as described in detail for the system shown in Fig. 1.

Since the assignment of the potentials + and - to the power-supply contacts 17 and 18 on the cassette and to the complementary contacts 25 and 26 in the apparatus does not concur when a cassette 3 is inserted into the apparatus 2 in position B an incorrectly poled supply voltage will be applied to the power-supply terminals 11 and 12 of the semiconductor memory 8 unless special steps are taken. Therefore, a diode 63 is arranged between the power-supply terminal 11 of the semiconductor memory 8 and the contact 17 of the contact set 13 on the cassette connected to this terminal in order to provide protection against polarity reversal, so that the semiconductor memory is not damaged when an incorrectly poled supply voltage is applied to the power-supply terminals 11 and 12 of the semiconductor memory 8.

In the apparatus 2 of the system shown in Fig. 6 the control device 29, the read-in/read-out device 30, and the data-transfer detector stage 32 are realised by means of the microprocessor 28. In contradistinction to the system in Fig. 1 the switching device 31 in the system shown in Fig. 6 is not realised by means of the microprocessor 26 but is constructed as a separate device. In the apparatus 2 of the system shown in Fig. 6 the data-transfer complementary contacts 23 and 24 of the set 27 as well as the power-supply complementary contacts 25 and 26 of the set 27 are connected to the data-transfer signal terminals 33 and 34 of the read-in/read-out device 30 and the power-supply terminals 37 and 38 of the apparatus. This enables both the assignment of the signals D and C to the data-transfer complementary contacts 23 and 24 and the assignment of the potentials + and - to the power-supply complementary contacts 25 and 26 to be changed, so that both in positions A and B of the cassette the assignments of the signals B and C and of the potentials + and - to the contacts 15, 16, 17 and 18 on the cassette and to the complementary contacts 23, 24, 25 and 26 in the apparatus can be made to concur.

The apparatus 2 of the system shown in Fig. 6 comprises an acoustic indicator device 44 for indicating the detected instantaneous position A or B of the

cassette. The indicator device 44 comprises three signal generators 64, 65 and 66 for generating sinewave signals of different frequencies, which become available depending on the detection signals S1, S2 and S3 supplied by the data-transfer detector stage 32. The sinewave signals from the signal generators 64, 65 and 66 are applied to a
5 loudspeaker 67 of the indicator device 44 for acoustic reproduction, the detected instantaneous position A or B of the cassette and the presence of a non-compatible cassette in the apparatus or the absence of a cassette in the apparatus being signalled by difference pitches of the tones thus reproduced.

In the above described system shown in Fig. 6 the cassette comprises only
10 one contact set and the apparatus comprises only one set of complementary contacts, which is very simple and cheap. Since the contacts on the cassette and the complementary contacts in the apparatus are arranged in a mirror-inverted configuration relative to the axis of reversal of the cassette, the centre-to-centre distances between the contacts and between the complementary contacts can be comparatively large and the
15 contacts and complementary contacts can have comparatively large contact areas, which has the advantage that the contacts and the complementary contacts can mate in a reliable tolerance-independent manner.

In the recording and reproducing system shown in Fig. 7 the cassette 3 suitably comprises only one contact set 13, whose contacts 15, 16, 17 and 18 are
20 connected to the terminals 9, 10, 11 and 12 of the semiconductor memory 8 and which is offset relative to the axis of reversal 4 of the cassette 3. Depending on whether the cassette is loaded into the apparatus 2 in position A or B the contacts 15, 16, 17 and 18 of the contact set 13 on the cassette 3 mate with the complementary contacts 23, 24, 25, 26 and 68, 69, 70, 71 respectively of two complementary-contact sets 27 and 72 in the
25 apparatus, which are arranged in a mirror-inverted configuration relative to the axis of reversal 4 of the cassette. In the present case the assignment of the signals D and C and the potentials + and - to the contacts 15, 16, 17 and 18 of the contact set 13 on the cassette 3 when the cassette is loaded into the apparatus in position A concurs and, when the cassette is inserted in the other position B, does not concur with the
30 assignment of the signals D and C and the potentials + and - to the complementary contacts 68 69, 70 and 71 of the complementary-contact set 72 in the apparatus which mate with the contacts 15, 16, 17 and 18 of the contact set 13, i.e. for the data-transfer contacts 15 and 16. Since the assignment of the signals D and C to the contacts 15 and

16 and to the complementary contacts 23, 24 and 68, 69, respectively, provided for data transfer concurs when the cassette is loaded into the apparatus in position A and does not concur in position B a criterion enabling the instantaneous position A or B of the cassette in the apparatus to be detected is obtained, in the same way as in the systems shown in Figures 1 and 6. In the system shown in Fig. 7 the instantaneous position A or B of the cassette can be detected in the same way as described in detail for the system shown in Fig. 1.

As a result of the above assignments to the contacts on the cassette and to the complementary contacts in the apparatus of the system shown in Fig. 7 the data transfer contacts 23 and 24 of the complementary-contact set 27 in the apparatus, for which the assignment of the signals D and C when a cassette 3 is loaded into the apparatus in position A concurs with the assignment of the signals D and C to the mating contacts 15 and 16 of the set 13, are connected directly to the signal terminals 33 and 34 of the read-in/read-out device 30, and the data-transfer complementary contacts 68 and 69 of the other complementary-contact set, for which the assignment of the signals D and C when a cassette is loaded into the apparatus in the other position B does not concur with the assignment of the signals D and C to the mating contacts 15 and 16 of the contact set 13, are connected to said terminals of the read-in/read-out device 30 via the switching device 31. The power-supply complementary contacts 25 and 26 as well as 70 and 71 of the two complementary-contact sets 27 and 72 are connected directly to the power-supply terminals 37 and 38 on the apparatus, so that the power supply to the semiconductor memory 8 is very simple.

In the apparatus 2 of the system shown in Fig. 7 the indicator device 44 is constructed as an alphanumeric display device which is driven by the detection signals S1, S2 and S3 supplied by the data-transfer detector stage 32 to indicate the detected position A or B of the cassette and the presence of an incompatible cassette or the absence of a cassette in the apparatus by means of letters or digits.

The recording and reproducing system 1 shown in Fig. 8 is a modification of the system shown in Fig. 7. In the system shown in Fig. 7 the assignments of the signals D and C to the contacts 15 and 16 and the complementary contacts 68 and 69 provided for data transfer do not concur but in the system shown in Fig. 8 the assignments of the potentials + and - to the contacts 17 and 18 and the complementary contacts 70 and 71 provided for power-supply does not concur when a cassette 3 is

inserted into the apparatus 2 in position B. In this case the semiconductor memory 8 cannot function in position B of the cassette because the supply voltage is poled incorrectly for the semiconductor memory so that a correct data transfer between the read-in/read-out device 30 and the semiconductor memory 8 is not possible when the
5 cassette is loaded into the apparatus in the position B, whereas in position A of the cassette 3 such a transfer is possible because assignments of the signals D and C and the potentials + and - to the mating contacts and the complementary contacts concurs, which again provides a criterion enabling the instantaneous position A or B of the cassette in the apparatus to be detected. In the system shown in Fig. 8 detection of the
10 instantaneous position A or B of the cassette in the apparatus can proceed in exactly the same way as described in detail for the system shown in Fig. 1.

The invention is not limited to the exemplary embodiments described above. A cassette may also comprise more than one semiconductor memory. Instead of a non-volatile semiconductor memory the cassette may comprise a volatile
15 semiconductor memory, in which case the cassette in addition comprises a power-supply source, for example a battery, to sustain the power supply to the volatile semiconductor memory when this memory is not energised via the power-supply terminals of the apparatus. A semiconductor memory cannot only be constructed effectively as a static but also as a dynamic memory. The solid-state memory device may also be a bubble
20 memory or a charge-transfer device. The data-transfer detector stage may also be based on another operating principle and can detect a correct data transfer in the data-transfer test mode, for example, on the basis of special code signals, which are transferred from a read-in/read-out device to the solid-state memory device and which are returned from the solid-state memory device to the read-in/read-out device. The embodiments
25 described in the foregoing relate to systems for recording and reproducing information signals. However, the inventive steps may also be applied to systems which serve exclusively for recording or exclusively for reproducing information signals.

CLAIMS:

1. A recording and/or reproducing system (1), comprising at least one recording and/or reproducing apparatus (2) and at least one cassette (3) which can be loaded selectively into an apparatus (2) in two positions (A, B) which are inverted relative to an axis of reversal (4), which cassette accommodates a record carrier (5) and, for the storage of data associated with the cassette, an electrically operable solid-state memory device (8), which device has at least one storage section for each of the two positions of the cassette and which, for a data transfer to and from the solid-state memory device, comprises signal terminals (9, 10) with a given assignment of signals (D, C) and, for the power supply to the solid-state memory device, power-supply terminals (11, 12) with a given assignment of potentials (+, -), the signal terminals (9, 10) of the solid-state memory device being connected to data-transfer contacts (15, 16, 19, 20) on the cassette, which are accessible from the exterior of the cassette, and which when a cassette is loaded into the apparatus mate with data-transfer complementary contacts (23, 24; 68, 69) in the apparatus, which are connected to data-transfer signal terminals (33, 34) of a read-in/read-out device (30) in the apparatus, the assignment of signals (D, C) to the signal terminals (33, 34) being the same as for the data-transfer signal terminals (9, 10) of the solid-state memory device, which read-in/read-out device serves for reading data into and out of the storage sections of the solid-state memory device assignable to the two positions of the cassette, and the power-supply terminals (11, 12) of the solid-state memory device being connected to power-supply contacts (17, 18, 21, 22) on the cassette which are accessible from the exterior of the cassette and, when a cassette is loaded into the apparatus mate with power-supply complementary contacts (25, 26; 70, 71) in the apparatus which are connected to power-supply terminals (37, 38) of the apparatus, the assignment of potentials to said power-supply terminals being the same as for the power-supply terminals (11, 12) of the solid-state memory device, the apparatus comprising a detector device (39) for detecting the instantaneous position of the cassette loaded into the apparatus, characterized in that the assignment of signals (D, C) and potentials (+, -) to the contacts (15 to 22) on the



cassette concurs when the cassette is loaded into the apparatus in one position (A) of the cassette and does not concur in the other position (B) of the cassette, at least for some of the contacts, with the assignment of signals (D, C) and potentials (+, -) to the complementary contacts (23 to 26; 68 to 71) in the apparatus which mate with the contacts (15 to 22) on the cassette, in that the apparatus can be set to a data-transfer test mode in which a data transfer between the read-in/read-out device (30) and the solid-state memory device (8) is attempted, in that for detecting the instantaneous position of the cassette the detector device (39) comprises a data-transfer detector stage (32) to detect a correct data transfer between the read-in/read-out device (30) and the solid-state memory device (8), which data-transfer is possible in the test mode when the assignments of signals (D, C) and potentials (+, -) to the mating contacts (15 to 20) and complementary contacts (23 to 26; 68 to 71) concurs, and in that depending on the detection result obtained by means of the data-transfer detector stage (32) in the test mode the detector device (39) supplies one of two detection signals (S1, S2) which each characterize one of the two positions of the cassette.

2. A system as claimed in Claim 1, characterized in that the detection signals (S1, S2) supplied by the detector device (39) can be applied to an indicator device (44) for indicating the detected instantaneous position of the cassette.

3. A system as claimed in Claim 1 or 2, in which a cassette (3) is operable in each of two mutually inverted positions (A, B), characterized in that the complementary contacts (23, 24; 23, 24, 25, 26; 68, 69; 70, 71), whose assignment does not concur with the assignment to the contacts (20, 19; 16, 15, 18, 17; 15, 16; 17, 18) on the cassette which mate with said complementary contacts when the cassette is loaded into the apparatus in one position of the cassette, can be driven via a switching device (31) for changing the complementary-contact assignment, which device in the case that the assignment to said complementary contacts and the assignment to the contacts mating therewith do not concur after loading of the cassette into the apparatus enables the connections to said complementary contacts to be changed in such a way that the assignments to said complementary contacts and to the contacts mating therewith concur.

4. A system as claimed in Claim 3, characterized in that the switching device (31) is electrically controllable and is controlled by the data-transfer detector stage (32) depending on the instantaneous detection result obtained in the test mode.



5. A system as claimed in any one of the preceding Claims, characterized in that the cassette comprises two contact sets (13, 14) which are arranged in a mirror-inverted configuration relative to the axis of reversal of the cassette and whose contacts (15 to 22) are connected to the terminals (9, 10, 11, 12) of the solid-state memory device (8), the contacts of one contact set, when the cassette is loaded into the apparatus in one position (A), mating with a single set (27) of complementary contacts in the apparatus (2) which are arranged to be offset relative to the axis (4) of reversal of the cassette, and the contacts (19, 20, 21, 22) of the other contact set (14) mating with said complementary contacts (23, 24, 25, 26) in the other position (B) of the cassette, in that the assignments of the signals (D, C) to the data-transfer contacts (15, 16, 20, 19) of both contact sets (13, 14) are not mutually mirror-inverted relative to the axis of reversal of the cassette and the assignments of the potentials (+, -) to the power-supply contacts (17, 18, 21, 22) of both contact sets are mutually mirror-inverted relative to the axis of reversal of the cassette, and in that the data-transfer complementary contacts (23, 24) of the complementary-contact set (27) are connected to the data-transfer signal terminals (33, 34) of the read-in/read-out device (30) via a switching device (31) and the power-supply complementary contacts (25, 26) of the complementary-contact set (27) are connected directly to the power-supply terminals (37, 38) on the apparatus.
6. A system as claimed in any one of the Claims 1 to 4, characterized in that the cassette comprises a single contact set (13) whose contacts (15 to 18) are connected to the terminals (9 to 12) of the solid-state memory device (8), the data-transfer contacts (15, 16) and the power-supply contacts (17, 18) of this contact set being each in a mirror-inverted arrangement relative to the axis (4) of reversal of the cassette (3) and the contacts (15 to 18) of this set mating with the complementary contacts (23 to 26) of a single complementary-contact set (27) in the apparatus when the cassette is loaded into the apparatus in both positions (A, B) of the cassette, and in that both the data-transfer complementary contacts (23, 24) of the complementary-contact set (27) and the power supply complementary contacts (25, 26) of the complementary contact set (27) are connected to the data-transfer signal terminals (33, 34) of the read-in/read-out device (30) and to the power-supply terminals (37, 38) of the apparatus via a switching device (31).
7. A system as claimed in Claim 6, characterized in that a diode (63) is arranged between at least one power-supply terminal (11) of the solid-state memory



device (8) and the contact (17) of contact set (13) on the cassette connected to this terminal to provide protection against polarity reversal.

8. A system as claimed in any one of the Claims 1 to 4, characterized in that the cassette (3) comprises a single contact set (13) having its contacts (15 to 18) connected to the terminals (9 to 12) of the solid-state memory device (8) and arranged to be offset relative to the axis (4) of reversal of the cassette, which contacts (15 to 18) mate with the complementary contacts (23 to 26, 68 to 71) of one of two complementary-contact sets (27, 28) of the apparatus when the cassette is loaded into the apparatus depending on the position of the cassette, which complementary-contact sets are arranged in a mirror-inverted configuration relative to the axis of reversal of the cassette, and in that the data-transfer complementary contacts (23, 24) of one complementary-contact set (27), whose signal assignment (D, C) concurs with the signal assignment (D, C) to the mating contacts (15, 16) when a cassette is loaded into the apparatus in one position, are connected directly to the signal terminals (33, 34) of the read-in/read-out device (30), and the data-transfer complementary contacts (68, 69) of the other complementary-contact set (72), whose signal assignment (D, C) does not concur with the signal assignment (D, C) to the mating contacts (15, 16) when a cassette is loaded into the apparatus in the other position (B), are connected to the signal terminals (33, 34) of said read-in/read-out device (30) via a switching device (31), the power-supply complementary contacts (17, 18, 70, 71) of the two complementary-contact sets (27, 72) being connected directly to the power-supply terminals (37, 38) on the apparatus.

9. A system as claimed in any one of the preceding Claims, characterized in that the solid-state memory device (8) is constituted by a single semiconductor memory for serial read-in and read-out of data signals, having two data-transfer signal terminals (9, 10) formed by one signal terminal (9) for serial data signals (D) and one signal terminal (10) for a clock signal (C), and having two power-supply terminals (11, 12), and in that the cassette (3) comprises at least one contact set (13, 14) having four contacts (15 to 22) connected to the four terminals (9 to 12) of the semiconductor memory, which four contacts (15, 16, 17, 18; 19, 20, 21, 22) mate with four complementary contacts (23, 24, 25, 26; 68, 69, 70, 71) of one complementary-contact set (27, 72) in the apparatus when a cassette is loaded into the apparatus.



10. A cassette for a system as claimed in Claim 5, which can be loaded selectively into an apparatus (2) in two positions (A, B) which are inverted relative to an axis (4) of reversal, which accommodates a record carrier (5), and which for storing data associated with the cassette (3) comprises an electrically operable solid-state memory device (8) having at least one storage section for each of the two positions (A, B) of the cassette, and which comprises signal terminals (9, 10) having a given signal assignment (D, C) for a data transfer to and from the solid-state memory device (8) and power-supply terminals (11, 12) having a specific potential assignment (+, -) for the power supply of the solid-state memory device, the signal terminals (9, 10) of the solid-state memory device being connected to data-transfer contacts (15, 16, 19, 20) provided on the cassette and accessible from the exterior of the cassette and the power-supply terminals (11, 12) of the solid-state memory device being connected to power-supply contacts (17, 18, 21, 22) provided on the cassette and accessible from the exterior of the cassette, characterized in that the cassette comprises two contact sets (13, 14) which are arranged in a mirror-inverted configuration relative to the axis of reversal of the cassette and whose contacts (15 to 22) are connected to the respective terminals (9, 10, 11, 12) of the solid-state memory device (8), and in that the assignments of the signals (D, C) to the data-transfer contacts (15, 16, 20, 19) of both contact sets (13, 14) are not mutually mirror-inverted relative to the axis (4) of reversal of the cassette and the assignments of the potentials (+, -) to the power-supply contacts (17, 19, 21, 22) of both contact sets are mutually mirror-inverted relative to the axis of reversal of the cassette.

11. A cassette for a system as claimed in Claim 6, which can be loaded selectively into an apparatus (2) in two positions (A, B) which are inverted relative to an axis (4) of reversal, which accommodates a record carrier (5), and which for storing data associated with the cassette (3) comprises an electrically operable solid-state memory device (8) having at least one storage section for each of the two positions (A, B) of the cassette, and which comprises signal terminals (9, 10) having a given signal assignment (D, L) for a data transfer to and from the solid-state memory device (8) and power-supply terminals (11, 12) having a specific potential assignment (+, -) for the power supply of the solid-state memory device, the signal terminals (9, 10) of the solid-state memory device being connected to data-transfer contacts (15, 16, 19, 20) provided on the cassette and accessible from the exterior of the cassette, and the power-



supply terminals (11, 12) of the solid-state memory device being connected to power-supply contacts (17, 18, 21, 22) provided on the cassette and accessible from the exterior of the cassette, characterized in that the cassette (3) comprises a single set (13) of contacts connected to the terminals (9 to 12) of the solid-state memory device (8), of which data-transfer contacts (15, 16) and power-supply contacts (17, 18) are both arranged in a mirror-inverted configuration relative to the axis (4) of reversal of the cassette (3).

12. A cassette as claimed in Claim 11, characterized in that a diode (63) is arranged between at least one power-supply terminal (11) of the solid-state memory device (8) and the contact (17) of the contact set (13) on the cassette connected to this terminal to provide protection against polarity reversal.

13. A cassette as claimed in any one of the Claims 10 to 12, characterized in that the solid-state memory device (8) is constituted by a single semiconductor memory for serial read-in and read-out of data signals, formed by one signal terminal (9) for serial data signals (D) and one signal terminal (10) for a clock signal (C), and having two power-supply terminals (11, 12), and in that the cassette comprises at least one contact set (13, 14) having four contacts (15 to 22) connected to the four terminals (9 to 12) of the semiconductor memory.

14. A recording and/or reproducing apparatus for a system as claimed in any one of the Claims 1 to 9, for cooperation with at least one cassette (3) which can be loaded selectively into the apparatus in two positions (A, B) which are inverted relative to an axis of reversal, which cassette accommodates a record carrier (5) and, for the storage of data associated with the cassette, an electrically operable solid-state memory device (8), which device has at least one storage section for each of the two positions of the cassette, and which comprises contacts (15, 16, 19, 20) for a data transfer to and from the solid-state memory device, and contacts (17, 18, 21, 22) for the power supply to the solid-state memory device-supply terminals (11, 12), the apparatus having complementary contacts (23 to 26; 68 to 71) adapted to mate with the contacts of the cassette when the cassette is loaded into the apparatus, having a read-in/read-out device (30) for reading data into and out of the storage sections of the solid-state memory device assignable to the two positions of the cassette, and having a detector device (39) for detecting the instantaneous position of the cassette loaded into the apparatus, characterized in that the apparatus can be set to a data-transfer test mode to attempt a



data transfer between the read-in/read-out device (30) and the solid-state memory device (8), in that for detecting the instantaneous position of the cassette the detector device (39) comprises a data-transfer detector stage (32) to detect a correct data transfer between the read-in/read-out device (30) and the solid-state memory device (8), which
5 data-transfer is possible in the test mode when the assignments of signals (D, C) and potentials (+, -) to the mating contacts and complementary contacts concurs, and in that depending on the detection result obtained by means of the data-transfer detector stage (32) in the test mode the detector device (39) supplies one of two detection signals (S1, S2) which each characterize one of the two positions of the cassette.

10 15. A recording and/or reproducing apparatus as claimed in Claim 14, characterized in that the detection signals (S1, S2) supplied by the detector device (39) can be applied to an indicator device (44) for indicating the detected instantaneous position of the cassette.

16. A recording and/or reproducing apparatus as claimed in Claim 14 or 15,
15 for operating a cassette in two mutually inverted positions, characterized in that the complementary contacts (23, 24; 23, 24, 25, 26; 68, 69; 70, 71) can be driven *via* a switching device (31) for changing the assignment to these complementary-contacts.

17. A recording and/or reproducing apparatus as claimed in Claim 16,
characterized in that the switching device (31) is electrically controllable and is
20 controlled by the data-transfer detector stage (32) depending on the instantaneous detection result obtained in the test mode.

18. A recording and/or reproducing apparatus as claimed in any one of the Claims 14 to 17, for cooperation with a cassette comprising two contact sets (13, 14) which are arranged in a mirror-inverted configuration relative to the axis of reversal of
25 the cassette and whose contacts (15 to 22) are connected to the terminals (9 to 12) of the solid-state memory device (8), the contacts (15 to 18) of one contact set (13), when the cassette is loaded into the apparatus in one position (A), mating with a set (27) of complementary contacts in the apparatus (2), and the contacts (19 to 22) of the other contact set (14) mating with said complementary contacts (23 to 26) in the other
30 position (B) of the cassette, characterised in that set of complementary contacts is arranged in the apparatus so as to be offset relative to the axis of reversal of the cassette, and in that the data-transfer complementary contacts (23, 24) of the complementary-contact set (27) are connected to the data-transfer signal terminals (33,



34) of the read-in/read-out device (30) *via* a switching device (31) and the power-supply complementary contacts (25, 26) of the complementary-contact set (27) are connected directly to the power-supply terminals (37, 38) on the apparatus.

19. A recording and/or reproducing apparatus as claimed in any one of the
5 Claims 14 to 17, for cooperation with a cassette comprising a single contact set (13) whose contacts (15 to 18) are connected to the terminals (9 to 12) of the solid-state memory device (8), the data-transfer contacts (15, 16) and the power-supply contacts (17, 18) of this contact set being each in a mirror-inverted arrangement relative to the axis (4) of reversal of the cassette (3) and the contacts (15 to 18) of this set mating with
10 the complementary contacts (23 to 26) of a single complementary-contact set (27) in the apparatus when the cassette is loaded into the apparatus in both positions (A, B) of the cassette, characterised in that both the data-transfer complementary contacts (23, 24) of the complementary-contact set (27) and the power supply complementary contacts (25, 26) of the complementary contact set are connected to the data-transfer signal terminals
15 (33, 34) of the read-in/read-out device (30) and to the power-supply terminals (37, 38) of the apparatus *via* a switching device (31).

20. A recording and/or reproducing apparatus as claimed in any one of the Claims 14 to 17, for cooperation with a cassette comprising a single contact set (13) having its contacts (15 to 18) connected to the terminals (9 to 12) of the solid-state
20 memory device (8) and arranged to be offset relative to the axis (4) of reversal of the cassette, which contacts (15 to 18) mate with the complementary contacts (23 to 26, 68 to 71) of one of two complementary-contact sets (27, 28) of the apparatus when the cassette is loaded into the apparatus depending on the position of the cassette, characterised in that the complementary-contact sets are arranged in a mirror-inverted
25 configuration relative to the axis of reversal of the cassette, and in that the data-transfer complementary contacts (23, 24) of one complementary-contact set (27), whose signal assignment (D, C) concurs with the signal assignment (D, C) to the mating contacts (15, 16) when a cassette is loaded into the apparatus in one position (A), are connected directly to the signal terminals (33, 34) of the read-in/read-out device (30), and the
30 data-transfer complementary contacts (68, 69) of the other complementary-contact set (72), whose signal assignment (D, C) does not concur with the signal assignment (D, C) to the mating contacts (15, 16) when a cassette is loaded into the apparatus in the other position (B), are connected to the signal terminals (33, 34) of said read-in/read-out



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device (30) *via* a switching device (31), the power-supply complementary contacts (17, 18, 70, 71) of the two complementary-contact sets (27, 72) being connected directly to the power-supply terminals (37, 38) on the apparatus.