(11) Application No. AU 2003204056 A1

(19) AUSTRALIAN PATENT OFFICE

(54) Title
Electronic circuitry or electronic circuit with several selectable functions or states

(51)[6] International Patent Classification(s)
H04L 017/00

(21) Application No: 2003204056 (22) Application Date: 2003.05.05

(30) Priority Data

(31) Number	(32) Date	(33) Country
10221 088.8	2002.05.11	DE

7

(43) Publication Date : 2003.11.27

(43) Publication Journal Date : 2003.11.27

(71) Applicant(s)
Braun GmbH

(72) Inventor(s)
Not Given

(74) Agent/Attorney
Davies Collison Cave, GPO Box 3876, SYDNEY, NSW, 2001

ABSTRACT

The invention relates to electronic circuitry (30) comprising at least one input (80; 90) and at least one output (10; 20) for selecting a state of the electronic circuitry. During an initialisation phase, the electronic circuitry (30) transmits a characteristic signal to at least one output (10; 20) and compares this characteristic signal with the signal which is present at at least one input (80; 90). The state of the electronic circuitry (30) is set by a control circuit (8), depending on the result of the comparison. After the initialisation phase, the inputs (80; 90) and/or outputs (10; 20) can be used for inputting or outputting other signals.

(Figure)

Our Ref:7817893

P/00/011
Regulation 3:2

AUSTRALIA

Patents Act 1990

ORIGINAL
COMPLETE SPECIFICATION
STANDARD PATENT

Applicant(s):	Braun GmbH Frankfurter Strasse 145 D-61476 Kronberg im Taunus Germany
Address for Service:	DAVIES COLLISON CAVE Patent & Trade Mark Attorneys Level 10, 10 Barrack Street SYDNEY NSW 2000
Invention Title:	Electronic circuitry or electronic circuit with several selectable functions or states

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

5020

ELECTRONIC CIRCUITRY OR ELECTRONIC CIRCUIT WITH SEVERAL SELECTABLE FUNCTIONS OR STATES

The invention relates to electronic circuitry or an electronic circuit which can assume several selectable states and can carry out functions which correspond to the respective state at the time, and comprises at least one input for selecting the functions or states, and at least one output.

From US 6,188,273 B1, integrated circuits with a contact-making point for selecting an operating mode of the integrated circuit are known. The contact-making point can alternately be connected to one of two different supply potentials of the integrated circuit. The integrated circuit comprises a control device which is connected to the contact-making point and detects which of the two supply potentials is present at the contact-making point, with said control device generating a corresponding operating mode signal. In this way, it is only possible to select between two different operating modes of the integrated circuit.

However, if an electronic circuit is to be able to assume more than two operating modes, it must either comprise further inputs for selecting the operating mode, such as is for example known from US 6,157,051, or more than two supply potentials must be provided which must be able to be differentiated from the inputs. For example, if the electronic circuit comprises N inputs, each of which can be set to either low potential or high potential, 2^N different operating modes can be selected. If the electronic circuit is for example accommodated, in a standard housing, in the form of a user-specific integrated circuit, the required number of inputs can however often be implemented only by selecting a larger and more

expensive housing with an accordingly greater number of connections. The provision of further supply potentials is also expensive.

Such electronic circuits, which depending on their external connection assume different states or permit different operating modes, are preferably used in electrical appliances of which there are several appliance variants which for example only differ in some performance or comfort features. For, in such a case, all appliance variants can be equipped with the same electronic circuit, in particular an application-specific integrated circuit or a microcontroller, wherein the individual performance or comfort features can be activated by way of externally connecting the electronic circuit.

It is the object of the present invention to disclose electronic circuitry which can assume a multitude of different states, or can permit a multitude of different operating modes, which in a simple way can be selected by means of at least one input.

Electronic circuitry according to the invention comprises at least one input and at least one output by means of which a state of the electronic circuitry can be selected. In this application, the terms 'input' and 'output' always refer to an input or output which is suitable for selecting a state. If the electronic circuitry according to the invention comprises one or several outputs, then, at least in an initialisation phase, it outputs a characteristic signal each, preferably a bit pattern, to these outputs, wherein all output signals differ from one another. If the electronic circuitry according to the invention comprises one or several inputs, then, at least in the initialisation phase, it compares the signals which are

present at the inputs with the output signals. If the electronic circuitry comprises N inputs and M outputs, in this case M^N various states can be set. In particular after the initialisation phase, the inputs and outputs can additionally also be used for other purposes, i.e. in a way which is known per se, they can be used for inputting or outputting all kinds of signals.

The desired state of electronic circuitry according to the invention is thus determined by the external connection of the electronic circuitry, i.e. by the presence or absence of a connection between at least one output and at least one input of the electronic circuitry. The desired state is set by the electronic circuitry, depending on the result of the comparison(s). In this way, it is easily possible to select a particularly large number of different states, as will be explained below. The term 'initialisation phase' refers for example to starting up the electronic circuitry when the supply voltage is applied (power up), or to restarting after a reset, or more generally, to the time segment or time segments during which an input signal is compared to a characteristic output signal, if need be several times in sequence, and the desired state is set.

In a preferred embodiment of an electronic circuit according to the invention, at least during the initialisation phase, the signals present at the inputs are compared to the supply potentials of the electronic circuitry, in particular a low and/or a high signal and/or the characteristic signals output by the outputs. If the electronic circuitry comprises N inputs and M outputs, and if L supply potentials are available, then $(L+M)^N$ different states can be set.

The electronic circuitry comprises a control circuit to which each input of the electronic circuitry is connected, with said control circuit setting the desired state or the desired functions of the electronic circuitry. This includes for example the setting of so-called flags which control branches in a sequence program stored in the electronic circuitry, activating or deactivating of parts of the electronic circuitry for example by controlling an electronic switch or the like.

Below, the invention is described by means of one exemplary embodiment of electronic circuitry which comprises two inputs and two outputs, which are diagrammatically shown in the sole figure. Further embodiments are provided in the description.

The electronic circuitry 30 shown in the figure comprises a circuit 3 which, depending on its respective state at a given time, can carry out different functions. The electronic circuitry 30 comprises two outputs 10, 20 which are connected to the outputs of the circuit 3, as well as two inputs 80, 90. Furthermore, the electronic circuitry 30 comprises a first and a second memory 1, 2 in which two different bit patterns are stored, four comparators 4, 5, 6, 7 and a control circuit 8 which is connected to the outputs of the comparators 4, 5, 6, 7. The first input 80 of the electronic circuitry 30 is connected to one input each of the comparators 4, 5. The other input of the comparator 4 is connected to the output of the first memory 1, while the other input of the comparator 5 is connected to the output of the second memory 2. The other input 90 of the electronic circuitry 30 is connected to one input each of the comparators 6, 7. The other input of the comparator 6 is connected to the output of the first memory 1, while the other input of

the comparator 7 is connected to the output of the second memory 2. The first and second memories 1, 2 and the control circuit 8 are connected to the circuit 3 by way of a control line 9.

Below, the function of the electronic circuitry according to the invention is described in brief.

In the initialisation phase of the electronic circuitry 30 according to the invention, i.e. preferably at the time of starting up the electronic circuitry by applying the supply voltage (power up) or at the time of a restart after a reset, by way of control line 9 the circuit 3 controls the first and second memories 1, 2 and the control circuit 8. After this, the bit sequences stored in the memories 1, 2 are read out and conveyed to the outputs 10, 20 of the electronic circuitry 30 and to the comparators 4, 5, 6, 7. The comparators 4, 5, 6, 7 compare the signals which are present at the inputs 80, 90 of the electronic circuitry 30 with the bit sequences. The comparison results depend on which input 80, 90 is connected to which output 10, 20, if there is a connection at all. The comparison results are conveyed to the control circuit 8 which derives a control signal from them which is conveyed to the circuit 3 and which determines the state of the electronic circuitry 30. Thus, by means of the external connection of the electronic circuitry 30, the desired functions are selected which the electronic circuitry 30 is to carry out.

In another embodiment of electronic circuitry according to the invention, at each input the electronic circuitry comprises at least an additional comparator for comparing the input level with the L supply potentials. The outputs of the additional comparators are also connected to the control circuit. Preferably,

the input level present at a particular input of the electronic circuitry is compared to all supply potentials and all bit patterns, wherein a particular output of the electronic circuitry can also be connected to several inputs of the electronic circuitry so as to be able to select the largest possible number of different states.

Throughout this specification and the claims which follow, unless the context requires otherwise the word "comprise", or variations such as "comprises" or "comprising", will be understood to imply the inclusion of a stated integer or step or group of integers or steps but not the exclusion of any other integer or step or group of integers or steps.

The reference to any prior art in this specification is not, and should not be taken as an acknowledgment or any form of suggestion that, that prior art forms part of the common general knowledge in Australia.

The reference numerals in the following claims do not in any way limit the scope of the respective claims.

The claims defining the invention are as follows:

1. An electronic circuitry or an electronic circuit which can assume several selectable states and can carry out functions which correspond to the respective state at the time, and which comprises at least one input for selecting a state, and at least one output,
characterised in that
it comprises a comparator (4; 5; 6; 7) which can compare a signal present at the input (80; 90) with a characteristic signal output by the output (10; 20).

2. The electronic circuitry according to claim 1,
characterised in that
it comprises several outputs (10, 20) and in each instance at a particular output (10, 20) can output a characteristic signal, wherein all characteristic signals differ from one another, and in that it can compare the signals present at the inputs (80, 90) with the signals output by the outputs (10, 20).

3. The electronic circuitry according to claim 1 or 2,
characterised in that
the comparator (4; 5; 6; 7) can compare the signals present at the inputs (80; 90) with supply potentials, in particular a low and a high signal.

4. The electronic circuitry according to any one of the preceding claims,
characterised in that
it assumes one of several defined states, which state depends on the result of the comparisons of the signal present at its input (80; 90) or at its

inputs (80, 90) with the signal output by the output (10; 20) or the signals output by the outputs (10, 20) and/or the supply potentials.

5. The electronic circuitry according to any one of the preceding claims,
characterised in that
the signal output by at least one output is a bit pattern.

6. The electronic circuitry according to any one of the preceding claims,
characterised in that
outputting a characteristic signal and comparing the signal present at an input and setting a particular state of the electronic circuitry take place during an initialisation phase.

7. The electronic circuitry according to claim 6,
characterised in that
the inputs (80; 90) and/or outputs (10; 20) for setting the states of the electronic circuitry (30) after the initialisation phase are useable for inputting or outputting signals other than the characteristic signals used for setting the states of the electronic circuitry (30).

8. The electronic circuitry according to any one of the preceding claims,
characterised in that
it comprises a control circuit (8) which can set the state of the circuitry (30).

9. An electronic circuit, substantially as herein described with reference to the accompanying drawing.

DATED this 5th day of May, 2003

BRAUN GMBH

By Their Patent Attorneys

DAVIES COLLISON CAVE

1 / 1