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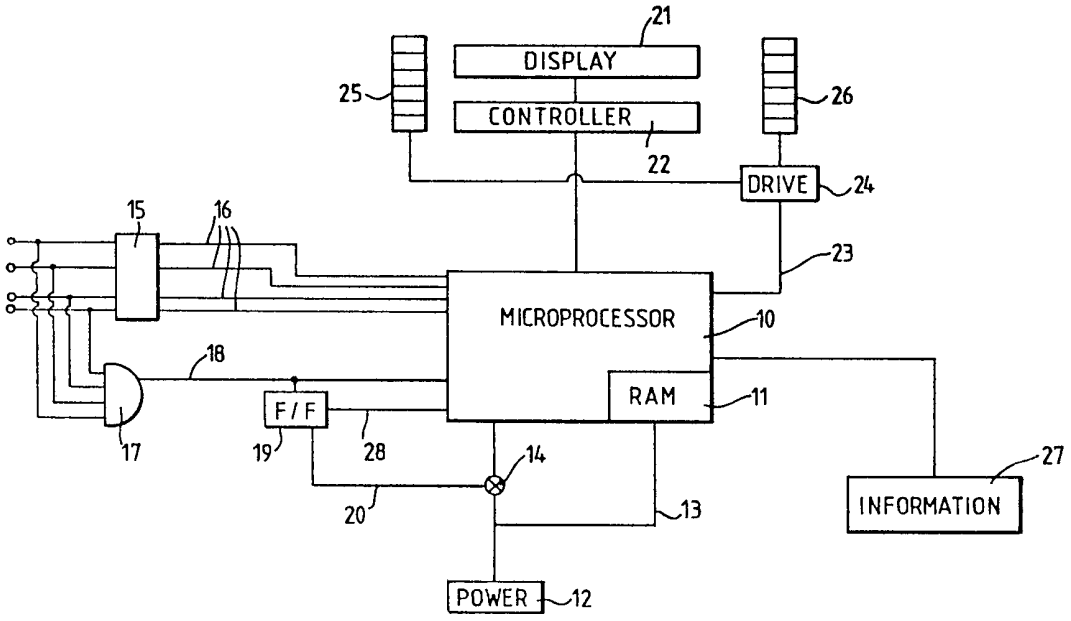
# (54) Parking metres

(57) An electronic parking meter comprises an electrically maintained display 21 controlled by a microprocessor 10. The microprocessor is arranged to at least partially power down during predetermined periods to reduce power drain.

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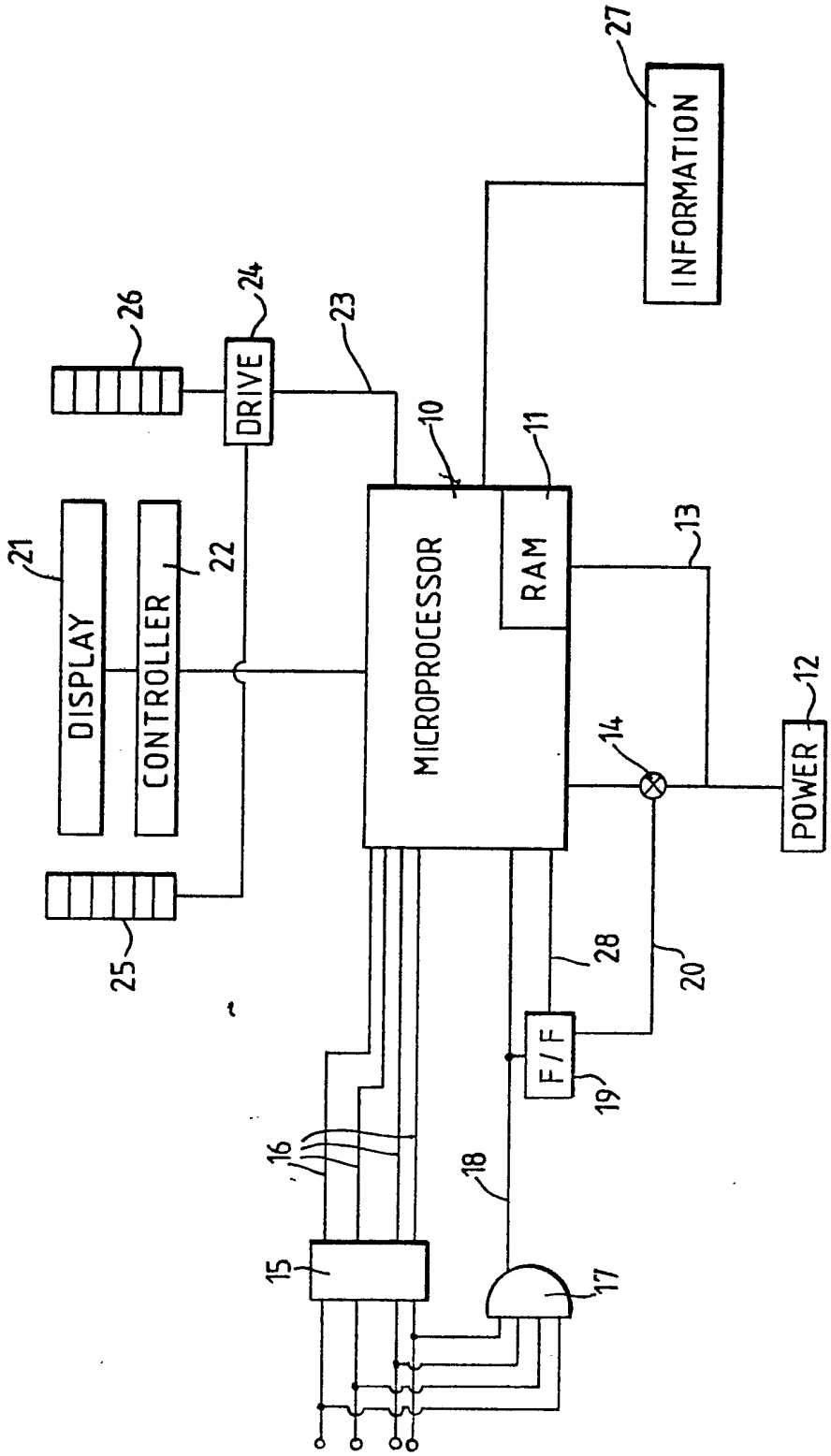
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INFORMATION
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DRIVE
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DISPLAY
CONTROLLER
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POWER
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SPECIFICATION

## Parking meters

The invention relates to parking meters and particularly to electronic parking meters.

Mechanical parking meters, normally operated by clockwork, are well known, but they do have disadvantages, a major disadvantage being that the clockwork mechanism has to be rewound periodically by appropriate personnel. As a consequence electronic parking meters have been developed, the idea behind these meters being that they will run for long periods of time from batteries. However in order to ensure that the meters can run for long periods of time, it is important to ensure that the drain on the batteries is as low as possible. It is possible to ensure that battery drain is relatively low by using appropriate circuitry and by using a display which requires relatively low power, for example a liquid crystal display.

Nevertheless a liquid crystal display does require some power but it has occurred to us that there is a way in which the drain produced by the display can be minimised.

According to the invention, an electronic parking meter is provided comprising an electronic control system which is arranged to at least partially power down during predetermined periods to reduce power drain.

Preferably the control comprises a microprocessor.

The electronic parking meter may have an electrically maintained display, for example for displaying the amount of parking time that has been purchased by a user.

The electrically maintained display may include a liquid crystal display.

Existing electronic parking meters display excess charges or penalties on the same display that displays parking time, for example a liquid crystal display. We have appreciated that if a second, non-electrically maintained display, for example using coloured discs, is used, this not only makes it easier for an official to see if an excess charge or a penalty has been incurred, but it also enables power drain to be reduced in two ways. It is no longer essential for the electrically maintained display to be in operation at the same time, and it is not necessary for all the functions of en electrical control system such as a microprocessor to be active when the second display is in use. Since parking meters may well be in the excess charge or penalty mode for long periods of time, for example overnight, the savings in power drain that can be made are not unappreciable.

By way of example, a specific embodiment of the invention will now be described, with reference to the accompanying drawing, which is a diagrammatic illustration of the principal components of an embodiment of electronic parking meter according to the invention.

The components illustrated diagrammatically in the Figure will be housed within a generally conventional parking meter body having one or more slots for the reception of coins and having a window through which a user can see the amount of time that the insertion of his particular coinage has purchased.

The parking meter is controlled by a microprocessor 10 which incorporates a random access memory 11. Power from a power supply in the form of batteries 12 is permanently supplied to the random access memory via a line 13 but is only supplied to the remainder of the microprocessor via a switch 14.

The coin input mechanism 15, which is conventional and will not be described in detail, comprises, in essence, a series of switches which indicate to the microprocessor, via four lines 16, what coins have been inserted by a user of the device. Insertion of coinage also causes signals to be transmitted to a gate 17 which is connected to the microprocessor via a line 18. Connected between the line 18 and the microprocessor is a flip-flop 19 and this flip-flop controls the switch 14 via a line 20.

The microprocessor 10 is connected to a liquid crystal display 21 via a controller 22 for the display 21. The display 21 is visible to the user of the device.

The microprocessor 10 is also connected via a line 23 and drive unit 24 to a set of excess charge displays 25 and a set of penalty displays 26. The displays 25 comprise six yellow flags positioned at spaced-apart locations around the body of the meter where they will be readily visible to an official passing the meter. The penalty displays 26 are identical flags, except that they are coloured red, and are arranged, when in use, to appear at the same locations as the yellow flags of the display 25.

When the parking meter is not in use, as will happen during the night, the display 21 will be switched off and the red flags of the display 26 will be visible on the meter. The switch 14 will be switched off and no power will be supplied to the microprocessor, except for its random access memory 11. The random access memory 11 is arranged to store all the information which will be required by an official making an audit of the meter, for example the various denominations of coins that have been inserted, and the numbers of each denomination of coin that have been inserted.

When the meter is first put into use by the insertion of coinage, this causes a signal to pass along line 18 which changes the state of the flip-flop 19. This change of state causes the switch 14 to be switched on and power is supplied to the microprocessor. The microprocessor then reads the input on lines 16 and, dependent upon the value of coinage inserted, causes the controller 22 to activate

the display 21 to display a time period which is appropriate for the coinage inserted. The microprocessor makes its calculation to decide what time period should be displayed on the basis of information provided from a bank of setting switches 27 which are only accessible to authorised officials. These switches are used to provide the microprocessor with information such as the amount of time that will be allowed for a given denomination of coinage, the amount of time for which the excess charge flag should be displayed, and also information relating to penalties.

At the same time as the time which has been purchased is illustrated on the display 21, the red flags of the display 26 are moved by the drive 24 into the position in which they are not visible. The yellow flags of the display 25 are not visible at this stage either.

The microprocessor 10, which has an internal clock, then begins to count down towards zero from the time initially displayed. If for example the user of the device has purchased a parking time of thirty minutes, then thirty minutes will initially be displayed on the display 21 but this display may be reduced periodically by a predetermined period of time. The microprocessor may for example be arranged to reduce the display by one unit for every minute of elapsed time.

When the counter reaches nought the counter of the microprocessor then begins to count up, to calculate the excess charge period and the drive 24 is activated to cause the yellow flags of the display 25 to move into visible position. The drive 24 only requires momentary actuation and once the yellow flags are in their visible position there is no further power drain required by this display. The liquid crystal display 21 may be arranged also to give a visual indication of excess charge or it may be switched off completely.

Once the count recorded by the microprocessor reaches the maximum permissible amount before a penalty is to be incurred the counter is reset to nought and starts counting again to record the penalty time. The drive 24 is once again momentarily activated to move the yellow flags of the display 25 out of their previous position and replace them with the red flags of the display 26.

Once a further predetermined period of time has elapsed, determined by the switches 27, the microprocessor causes the flip-flop 19 to return to its original state, via a line 28. This causes the switch 14 to be closed so the whole of the microprocessor is powered down again, except for the random access memory 11. Thus, except when the parking meter is in active use, the only power drain is to the random access memory 11.

When an official desires to audit a particular meter, he can plug in to the microprocessor an audit unit which incorporates a printer so that the audit information contained within the random access memory 11 can be printed out by the printer for audit use.

Parts of the microprocessor are arranged to power down as soon as the excess charge flags of the display 25 are in operation.

The parking meter may be readily adapted to accept information from an input other than the coin operated input 15. The microprocessor may for example be coupled to a unit which reads information from a credit card or other machine-readable input provided by a user, for example a machine-readable ticket purchased in advance.

The batteries 12 are preferably rechargeable and they may be replaced by or provided in conjunction with solar powered batteries or other units to further increase the period of time for which the parking meter will operate without attention.

Our co-pending application No. 8309823 discloses an electronic parking meter comprising a first, electrically maintained didplay, and a second display which is non-electrically maintained, thus reducing power drain.

CLAIMS

1. An electronic parking meter comprising an electrical control system which is arranged to at last partially power down during predetermined periods to reduce power drain.

2. An electronic parking meter as claimed in claim 1, in which the control system comprises a microprocessor.

3. An electronic parking meter as claimed in claim 2, in which an audit unit incorporating a printer can be connected to the microprocessor so that the audit information contained within the microprocessor can be printed out by the printer for audit use.

4. An electronic parking meter as claimed in claim 3, in which the electrically maintained display is arranged to display the amount of parking time that has been purchased by a user.

5. An electronic parking meter as claimed in claim 3 or claim 4, in which the electrically maintained display includes a liquid crystal display.

6. An electronic parking meter as claimed in claim 4 or claim 5, in which the electrically maintained display includes a liquid crystal display.

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