

SMART CARD ACCEPTOR DEVICE

FIELD OF INVENTION

This invention comprises a smart card acceptor device.

BACKGROUND OF INVENTION

Our patent application PCT/NZ96/00038 (WO96/36051) a universal card interface between smart cards and application software controlling vending machines, ATMs and the like.

With many conventional card acceptor devices when the acceptor is damaged through foreign objects being inserted through the face plate slot, the entire card acceptor device must be removed from the vending machine or ATM and taken away for service. Such removal and replacement can involve considerable work on the part of the serviceman and further means that a high inventory of spare card acceptor devices must be maintained.

SUMMARY OF INVENTION

It is an object of the present invention to provide a card acceptor device which goes some way towards meeting or overcoming the abovementioned disadvantage.

In broad terms the invention comprises a smart card acceptor device comprising:

a user visible face plate having a card insertion slot through the face plate,

a programmed controller mounted behind the face plate and having input-output ports,

a card reader which receives and retains an inserted card in an operating position in which electrical connections are made between the reader and the card and which is mounted behind the face plate separately from the controller module, and

disconnectable electrical connection means between the input-output ports of the controller module and the card reader, whereby the card reader may be removed from the acceptor device without removal of the controller module when required.

Preferably the mouth of the card reader is separated from the rear of the face plate by a space therebetween which forms a foreign object clearing space between the face plate and the card reader such that foreign objects of sufficiently small size inserted through the card insertion slot will enter said foreign object clearing space and fall therethrough, and guide means between the rear of the face plate and the card reader for guiding an inserted card across said foreign object clearing space into the card reader.

Preferably the acceptor device including the face plate is dimensioned to replace a standard bill acceptor space, inputs and outputs of the acceptor device are arranged to mimic those of a standard bill acceptor, and the wiring connections are the same as those of a standard bill acceptor. The acceptor device may then be installed to replace a bill acceptor in a vending machine without physical or electronic modification to the vending machine.

BRIEF DESCRIPTION OF DRAWINGS

A preferred form of card acceptor device of the invention is now described with reference to the accompanying drawings in which:

Figure 1 shows a pictorial view of the card acceptor device;

Figure 2 shows a side elevation of the card acceptor device; and

Figure 3 shows a rear view of the card acceptor device.

DETAILED DESCRIPTION OF PREFERRED FORM

Referring to Figure 1, the main mechanical modules of the card acceptor device are a face plate 1, a controller module 2 which is mounted behind face plate 1 and supported by frame 3, and card reader 4, which is mounted behind face plate 1 in registration with a card insertion slot 5, on the underside of frame 3. The preferred form card acceptor device shown is designed for use in vending machines and mounts into the front panel of the vending machine by means of bolts passing through flange 6 of the face plate. The face plate is dimensioned so as to fit within the rectangular aperture normally provided in vending machines to take bill readers. Thus the present card acceptor device can be retrofitted to many existing vending machines.

Referring to Figures 2 and 3, card reader 8, which is of a standard type such as is manufactured by Alcatel and others, is mounted on a printed circuit board 9 to form a separate module which is neither an integral part of controller module 2 nor face plate

1. Tracks on circuit board 9 connect pins on card reader 8 to a surface mount plug unit 10 which plugs into a complementary socket 11 fitted in the controller module 2. This facilitates electrical connection between card reader 8 and the input-output ports of the card acceptor device controller.

As well as providing an electrical connection, plug 10 and socket 11 provide part of the mechanical mounting system for circuit board 9. The circuit board is provided with two holes 18 at opposite sides of the board and these are pushed over two spring-loaded mounts secured to frame 3. Circuit board 9 is thus secured in position by the two mounts 12 and the plug and socket 10/11.

Circuit board 9 is mounted at a position under controller module 2 so as to provide a considerable gap between the mouth 16 of card reader and rear surface 15 of card slot 7. The usefulness of this spacing will be discussed below.

In Figures 2 and 3, the card acceptor device is shown mounted within a frame 17 which forms part of a vending machine intended to be operated by smart cards. To operate the vending machine a smart card 13 is inserted through slot 7 in face plate 1 and into guides 14 which feed the distal end of the card into mouth 16 of card reader 8. Because the card reader is mounted well back from slot 7, a rebate 19 is provided in face plate 1 to allow the proximal end of the card to be properly gripped when the card is fully inserted in the card reader.

In the acceptor device of the invention the reader is separately mounted from the controller module and the face plate so that it is not an integral part of either the controller module or the face plate, and there is a plug and socket connection between

the input-output ports of the controller module and the card reader. This facilitates rapid repairs against damage caused by vandalism, since the reader unit may be easily removed and replaced without the need to remove the entire card acceptor device, from a vending machine for example. A serviceman simply removes circuit board 9 and substitutes a replacement while on site. Owing to the form of mounting used and the fact that the card reader forms a separate module as described, this is an easy task.

Also, if foreign objects such as coins or washers are inserted through slot 7, they will simply fall through the gap provided between surface 15 of face plate 1 and mouth 16 of card reader 8. They will then drop into the bottom of the vending machine.

The foregoing describes the invention including a preferred form thereof. Alterations and modifications as will be obvious to those skilled in the art are intended to be incorporated within the scope hereof.

CLAIMS

1. A smart card acceptor device comprising:

a user visible face plate having a card insertion slot through the face plate,

a programmed controller module mounted behind the face plate and having input-output ports,

a card reader which receives and retains an inserted card in an operating position in which electrical connections are made between the reader and the card and which is mounted behind the face plate separately from the controller module, and

disconnectable electrical connection means between the input-output ports of the controller module and the card reader, whereby the card reader may be removed from the acceptor device without removal of the controller module when required.

2. A smart card acceptor device according to claim 1 wherein the mouth of the card reader is separated from the rear of the face plate by a space therebetween which forms a foreign object clearing space between the face plate and the card reader such that foreign objects of sufficiently small size inserted through the card insertion slot will enter said foreign object clearing space and fall therethrough, and guide means between the rear of the face plate at the card insertion slot and the card reader for guiding an inserted card across said foreign object clearing space into the card reader.



3. A smart card acceptor device according to claim 1 or claim 2 wherein the controller module is surrounded by a protective cover box.
4. A smart card acceptor device according to any one of claims 1 to 3 wherein a part of the disconnectable electrical connection means between the controller module and the card reader is rigidly coupled to the controller module and partially mechanically supports the card reader.
5. A smart card acceptor device according to any one of the preceding claims wherein the controller module is mounted behind the face plate by a bracket having one part fixed to the rear of the face plate and another part which extends at right angles to the face plate behind the face plate with the controller module mounted on the top of said another part of the bracket and the reader unit mounted on the underside of the bracket.
6. A smart card acceptor device according to any one of the preceding claims wherein the acceptor device including the face plate is dimensioned to replace a standard bill acceptor space, inputs and outputs of the acceptor device are arranged to mimic those of a standard bill acceptor, and the wiring connections are the same as those of a standard bill acceptor.
7. A smart card acceptor device substantially as shown in the accompanying drawings and described herein with reference thereto.

