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Integrated circuit card of the dual standard type
having an isolation slot

The invention concerns an integrated circuit card of the dual standard type having an isolation slot.

5 The invention concerns more particularly an integrated circuit card with contact, of the type in which the card (10) has a support (12) which is in the form of a plate according to a first format, and which carries at least one electronic microcircuit (36), and
10 of the type in which the card (10) has a contour line (20) which is formed in the support (12), around an internal portion (18) including the microcircuit (36), for delimiting, within an external portion according to the first format, a minicard (18) according to a second
15 format, the contour line (20) being defined by at least one imposed separation line (32) interrupted or not by at least one contour slot (28).

Integrated circuit cards have in the majority of cases a format which is defined by an international standard and which is that of a credit card.

5 This standard defines, in addition to the external dimensions of the card, the relative position of the microcircuit carried by the card and, where applicable, that of the contact areas which make it possible to connect the microcircuit to an electronic circuit of an appropriate card reader.

10 However, recently, the need to reduce the card format to an appreciable extent has arisen. This has arisen notably for certain applications such as portable telephones.

15 Thus a new standard has been defined in which the same type of microcircuit and the same type of contact area is used but which are this time integrated into a support with a much smaller format.

20 As a result, therefore, these two international standards define two card standards which differ only through the external size of the card support, the thickness of the support being the same in both cases.

25 It has therefore appeared advantageous to propose integrated circuit cards which are able to be used according to one or other of the two formats. Such a card is for example proposed in the document EP-B-0.521.778.

30 Such a card, known as dual standard, therefore has a card support whose external dimensions define the large card format and the bending/torsion strength properties are in accordance respectively with the

standards ISO 7810 and ISO 7816. The card also has the detachable or separable minicard which is in accordance with GSM 11.11. The minicard has a microcircuit and is delimited by a contour line around this microcircuit.

5 So that the user can at his choice use the card according to one or other of the two formats, provision is made for him to be able to separate the card according to the small format from the external portion of the card support. For this purpose, the contour
10 line is produced in the form of a contour slot which is cut through the thickness of the card and which is interrupted at at least one point, in order to form a connecting strap between an internal portion of the card support, to the dimensions of the small format,
15 and an external portion to the dimensions of the large card format.

 Generally, at least one strap is provided, or even more. To use the card according to the small format, the user merely has to break the connecting straps in
20 order to detach the minicard from the external portion of the card support.

 Preferably, in order to facilitate the breaking of the connecting straps, but also in order to correctly control the point where this break is made, the
25 connecting straps are provided with at least one scoring notch which forms an incipient break in the strap.

 In order to ensure a long life for the product and notably bending/twisting conformity with respect to ISO
30 7816, it is necessary for the integrated circuit card

to be able to resist notably repeated bending and twisting stresses imposed on the card body.

These bendings and twistings must of course not be transmitted to the microcircuit, otherwise it may be
5 seriously damaged.

Moreover, the bending and twisting stresses must also not lead to accidental breaking of the connecting straps where the user wishes to use this card in the form of its large format.

10 However, by definition, the connecting straps are fragile areas, even more so when they are provided with a score.

The first object of the invention is therefore to determine a novel design of an integrated circuit card
15 which makes it possible to protect as far as possible the connecting straps of the minicard or breaking places along a contour line of the minicard.

Moreover, for perfect functioning of the card, it is necessary to ensure that it is perfectly flat.
20 However, it has been perceived, notably in cases where the card has only two connecting straps arranged on two opposite edges of the minicard, that a deformation of the internal portion of the card support could arise. Such deformation may notably originate in the
25 machining, in the internal portion of the card, of the cavity intended to receive the microcircuit and/or the production of scoring notches at each of the straps.

This is because asymmetry of the internal stresses due to different processes may arise in the thickness

of the card, these differences in internal stresses resulting in a curvature of the minicard and/or card.

A second object of the invention is therefore to propose means which make it possible to avoid such a deformation.

In order to meet all these problems, the invention therefore proposes an integrated circuit card of the type described above, characterised in that the card also has an isolation slot which extends substantially opposite and in the vicinity of the imposed separation line.

According to other characteristics of the invention:

- the imposed separation line consists of at least one scoring notch;

- the card has at least one strap connecting the minicard to the card support and delimited in width by the said contour slot, the said strap enabling the minicard to be detached from the external portion of the support;

- the isolation slot extends along the contour line at least over the entire extent of the strap;

- the isolation slot extends along the contour line so as to, through its two ends, extend beyond the limits of the adjacent strap;

- the isolation slot extends parallel to the said imposed separation line;

- the isolation slot extends along a straight segment;

- the central part is substantially in the form of an arc of a circle or curves;

- the isolation slot has a central part which is bent in the direction of the strap;

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- the central part is in the shape of a V;

- the contour line has two connecting straps which are arranged on two opposite edges of the minicard and which are each provided with a scoring notch;

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- the isolation slot is provided in the external portion of the support.

Other characteristics and advantages of the invention will emerge from a reading of the following detailed description, for an understanding of which reference should be made to the accompanying drawings, in which:

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- Figure 1 is a plan view of an integrated circuit card according to the teachings of the invention;

- Figure 2 is an enlarged view of a detail of Figure 1;

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- Figure 3 is a view in partial section along the line 3-3 in Figure 2;

- Figure 4 is a partial view in perspective of the card of Figure 1; and

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- Figures 5, 6 and 7 are views similar to Figure 2 illustrating variant embodiments of the invention.

Figure 1 depicts an integrated circuit card 10 which has a card support 12, rectangular in shape with rounded corners, whose contour corresponds to a first format, for example standard. The card support 12 is therefore delimited by two longitudinal edges 14 and

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two transverse edges 16. Inside the card support 12, an internal portion 18 is delimited, whose limits are fixed by a contour line 20.

As can be seen in Figure 2, the internal portion 18 of the card support 12 is intended to form a minicard according to a second format smaller than the first format of the card support 12, the minicard 18 having two longitudinal edges 22 and two transverse edges 24. In addition, the contour line 20 has a cant 26 which is arranged at one of the corners of the minicard 18 and which is intended to allow location thereof.

As can be seen in Figures 1 to 3, the contour line 20 is formed by a contour slot 28 interrupted by two front and rear connecting straps 30 and 32.

In the example embodiment illustrated in the figures, the connecting straps extend solely along transverse edges 24 so that the contour slot 28 extends in an uninterrupted fashion along each of the two longitudinal edges 22 of the minicard, but also along the cant 26 and at each of the two ends of the two transverse edges 24.

As can be seen more particularly in Figure 4, the slot 28 corresponds to a complete cut of the card support in the direction of its thickness. On the other hand, at each of the two connecting straps 30, 32, scoring notches 34 have been formed. In the example embodiment, each connecting strap 30, 32 thus has two notches 34 which can be arranged on all or part of the extent of the strap respectively in the top face

33 and in the bottom face 35 of the card support 12 in order to weaken the connecting strap 30, 32. As depicted in section in Figure 4, the notches 34 have a V-shaped profile and are arranged opposite each other in the direction of the thickness, apex against apex, leaving only a small quantity of material, substantially at the centre of the card in the direction of its thickness.

By virtue of the contour line 20 thus designed, the user can easily detach the minicard 18 with respect to the external portion of the card support 12, simply by pressing with the finger on the internal part 18 of the card support, the straps then being caused to yield at the scoring notches 34 which form an incipient break.

Naturally, the card according to the invention has an electronic module 36 which is carried by the card support, and more precisely by the internal portion 18 thereof.

As can be seen in Figure 3, the electronic module 36 of the embodiment illustrated has for example an electronic microcircuit 38 and contact tracks 40 which are intended to cooperate with contact keys of an electronic circuit of an appropriate reader. However, the invention can also be implemented in the context of so-called contactless integrated circuit cards in which the microcircuit 38 communicates with an appropriate reader by means of electromagnetic waves received and transmitted by an antenna connected to the microcircuit 38.

In a known manner, the electronic module 36 is received in a cavity 42 provided in the thickness of the card and opening out in the top face 33 thereof. The module 36 is arranged in the cavity 42 so that the top face of the contact tracks 40 is arranged at the same level as the top face 33 of the card.

In a known manner, the card body can be produced by plastic moulding, in which case the cavity 42 can be produced directly during the moulding operation. However, the card body can also be produced by lamination, and possibly by the co-lamination of several layers of material, possibly different. Usually, the cavity 42 is produced by machining and the contour line 20, which includes the contour slot 28 and scores 34, is produced for example by punching.

In accordance with the teachings of the invention, the card 10 has an isolation slot 44 arranged close to one of the connecting straps 30, 32, in this case the rear strap 32. The isolation slot 44 is cut over the entire thickness of the card support 12 and extends substantially parallel to the contour line 20, that is to say in this case substantially parallel to the rear transverse edge 24 of the minicard 18. However, the isolation slot 44 is offset longitudinally towards the rear with respect to the transverse edge 24, by a distance which is substantially around twice the width of the contour slot 28.

In the example embodiments illustrated in the figures, the isolation slot 44 is formed in the external part of the support 12, but provision can also

be made for it to be arranged in the internal part 18 thereof, whilst however being adjacent to a connecting strap 30, 32.

5 More precisely, the isolation slot 44 has a central portion 46 and two lateral portions 48. The central portion 46 extends substantially in an arc of a circle which is centred substantially on the midperpendicular of the strap 32, outside the minicard, and whose convex part is turned towards the connecting
10 strap 32. In this way, at its centre, the central part 46 is arranged as close as possible to the strap 32 and its scoring notch 34. On the other hand, the lateral parts 48 of the isolation slot 44 are arranged longitudinally recessed towards the rear with respect
15 to the contour line 20 of the minicard 18, and it can be seen that they each extend opposite a return 52 in the contour slot 28 which corresponds more exactly to the part of the slot 28 which extends at the ends of the corresponding transverse edge of the minicard.

20 The offset of the lateral parts 48 is sufficient to leave, between the corresponding return 52 in the contour slots 28 and the lateral part 48 of the isolation slot 44, a bridge of material 50 which connects the strap 32 to the remainder of the external
25 portion of the card support 12. Thus the bridges of material 50, whose cross-section is very small, make it possible to prevent twisting or bending stresses imposed on the card support being transmitted to the connecting strap 32.

Moreover, the fact that the central part 46 of the isolation slot 44 is arranged very close to the strap 32 enables the latter to deform, in the longitudinal direction, notably because of the crushing of material which occurs at the moment of punching of the score 34, which prevents this punching operation from resulting in the accumulation of internal stresses at the minicard.

It will of course be noted that the isolation slot 44 under no circumstances forms part of the contour line 20 of the minicard 18. It does not act to delimit the perimeter thereof. However, the isolation slot 44 will advantageously be produced at the same time as the contour slot 28, by the same manufacturing method.

The embodiment of the invention illustrated in Figures 1 to 4 is a preferred variant. However, as illustrated in Figures 5 to 7, the isolation slot 44 can have various forms.

Thus, in Figure 5, a card 10 is illustrated which has a rectilinear isolation slot 44, the central part 46 thereof then being in line with the two lateral parts 48. In the example embodiment in Figure 6, the central part 46 is in the form of a V forming a very open angle and whose apex is directed towards the strap 32.

In the three examples which have just been illustrated, the isolation slot 44 has parallel edges so that they have a constant width. However, as illustrated in Figure 7, provision can be made for the isolation slot 44 not to be delimited by parallel

edges. This is because it is the front edge 56 of the slot 44 which mainly determines the technical function of the isolation slot 44. Thus, as in the example in Figure 7, the rear edge 58 can be rectilinear or have yet other shapes. Thus it can be envisaged that the rear edge of the isolation slot 44 is such that the slot is no longer in the form of a slot but rather in the form of an orifice.

In general terms, the isolation slot or slots extend opposite the imposed separation line or lines, notably parallel or aslant, or in an arc of a circle, with respect to them. When there is at least one strap, an isolation slot is caused to extend also opposite the strap. An isolation slot can be composed of several slots offset with respect to each other.

CLAIMS

1. An integrated circuit card with contact, of the type in which the card (10) has a support (12) which is in the form of a plate according to a first format, and which carries at least one electronic microcircuit (36), and of the type in which the card (10) has a contour line (20) which is formed in the support (12), around an internal portion (18) including the microcircuit (36), for delimiting, within an external portion according to the first format, a minicard (18) according to a second format, the contour line (20) being defined by at least one imposed separation line (32) interrupted or not by at least one contour slot (28),

characterised in that the card (10) also has an isolation slot (44) which extends substantially opposite and close to the said imposed separation line.

2. An integrated circuit card according to Claim 1, characterised in that the imposed separation line consists of at least one scoring notch (34).

3. An integrated circuit card according to one of Claims 1 or 2, characterised in that it has at least one strap connecting the minicard (18) to the card support (12) and delimited in width by the said contour slot (28), the said strap enabling the minicard (18) to be detached from the external portion of the support (12).

4. An integrated circuit card according to Claim 3, characterised in that the isolation slot (44)

extends along the contour line at least over the entire extent of the strap.

5 5. An integrated circuit card according to one of Claims 3 to 4, characterised in that the isolation slot (44) extends along the contour line so as to, through its two ends (48), extend beyond the limits of the adjacent strap (30, 32).

10 6. An integrated circuit card according to one of the preceding claims, characterised in that the isolation slot extends parallel to the said imposed separation line.

7. An integrated circuit card according to any one of the preceding claims, characterised in that the isolation slot (44) extends along a straight segment.

15 8. An integrated circuit card according to Claim 5, characterised in that the central part (46) is substantially in the form of an arc of a circle.

20 9. An integrated circuit card according to any one of Claims 1 to 6, characterised in that the isolation slot (44) has a central part (46) which is bent in the direction of the strap (32).

10. An integrated circuit card according to Claim 9, characterised in that the central part (46) is in the shape of a V.

25 11. An integrated circuit card according to Claims 3 to 10, characterised in that the contour line (20) has two connecting straps (30, 32) which are arranged on two opposite edges (24) of the minicard (18) and which are each provided with a scoring notch (34).

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12. An integrated circuit card according to any one of the preceding claims, characterised in that the isolation slot (44) is provided in the external portion of the support (12).