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G06F 21/00 (2006.01) *G08B 13/12* (2006.01)

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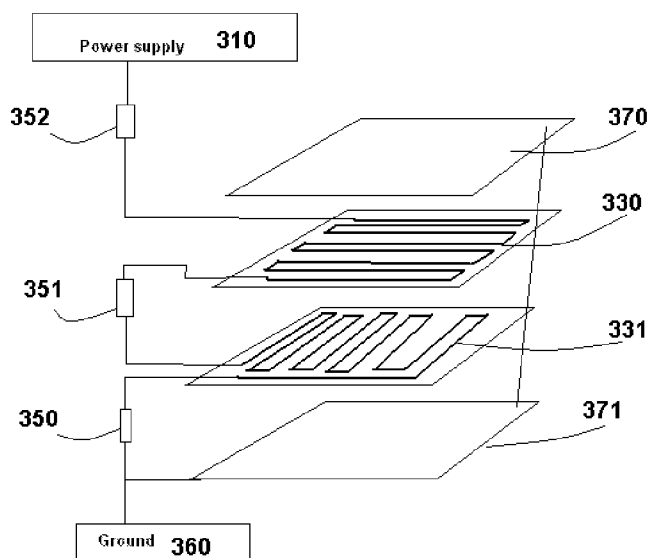
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KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD,

[Continued on next page]

(54) Title: SECURITY TECHNIQUES CARD PAYMENT TERMINAL



(57) **Abstract:** A multi-layer Printed Circuit Board (PCB) holds a number of sections of serpentine track on two or more internal layers of a multi-layer PCB. The sections are connected in series with resistors between each section. One end of each of the resistors a connection to an analogue to digital converter is made. Attempts to drill through the PCB are likely to short the ground plane to one or more of the internal serpentine tracks, which will alter the voltages on the analogue to digital connections. In another embodiment, current flowing through the contacts of the smart card reader due to the presence of a "shim" is detected. Small value resistors are connected in series with either the Power connection or the Ground connection, or both. In another embodiment, circuitry detects wireless transmission of data from the card terminal from illicit transmitting equipment within the terminal. In another embodiments, dummy data wires or PCB tracks are employed that run close to and parallel with the wires or tracks that carry the actual data between the card and the microprocessor and are driven with dummy random data at a similar data rate to that used on the real data track(s) or wire(s).

Figure 4



ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PE, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

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INTERNATIONAL SEARCH REPORT

International application No
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A. CLASSIFICATION OF SUBJECT MATTER

INV. H05K1/02 G06F21/00 G07F7/10 G08B13/12
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

H05K G08B G06K G07F G06F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EP0-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2006/231633 A1 (FAROOQ MUKTA G [US] ET AL) 19 October 2006 (2006-10-19)	1,2
Y	paragraphs [0029] - [0036]; figures 1,5,6 -----	3-10
X	US 3 594 770 A (HAM CONRAD S ET AL) 20 July 1971 (1971-07-20)	1,2
Y	figure 1 -----	3-10
X	US 2004/195001 A1 (FARQUHAR DONALD S [US] ET AL) 7 October 2004 (2004-10-07)	1,2
Y	paragraph [0036]; figure 8 -----	3-10
X	US 4 785 743 A (DALPHIN CLAUDE [FR]) 22 November 1988 (1988-11-22)	1,2,6,7
Y	abstract; figures 3,5 -----	3-5,8-10
	-/--	



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search

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INTERNATIONAL SEARCH REPORT

International application No
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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2008/164320 A1 (GARRIDO-GADEA ENRIQUE [GB] ET AL) 10 July 2008 (2008-07-10) paragraphs [0053] - [0068]; figures 3,4,13 -----	3-10
Y	US 2009/077669 A1 (BUER MARK [US]) 19 March 2009 (2009-03-19) paragraph [0030]; figures 1,2 -----	3-5

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/IB2011/001231

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2006231633 A1	19-10-2006	CN 1855474 A	01-11-2006
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FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-10

printed circuit board with plural serpentine track layers
for tamper detection

2. claims: 11-31

tamper detection in a smart card reader

3. claims: 32-54

radio frequency detection system in a smart card reader

4. claims: 55-62

masking signals in a smart card reader

INTERNATIONAL SEARCH REPORT

International application No.
PCT/IB2011/001231

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of Item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fees.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1-10

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- ☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- ☐ No protest accompanied the payment of additional search fees.