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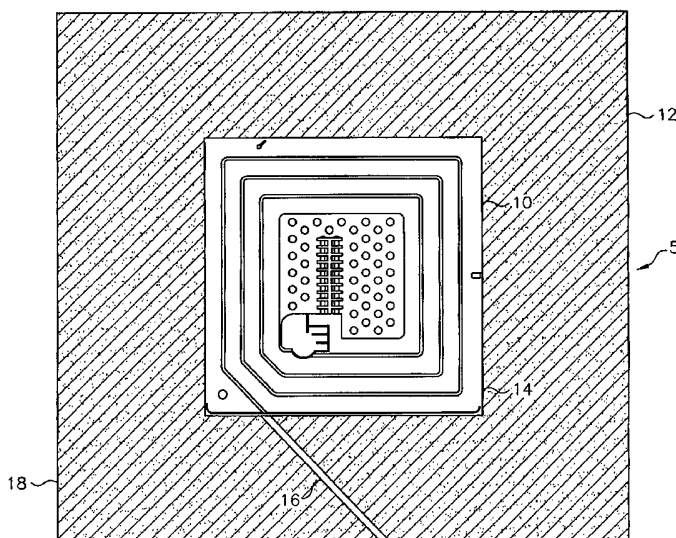
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(54) Title: LC RESONANT CIRCUIT WITH AMPLIFICATION DEVICE



(57) Abstract: A security tag includes a combination of a resonant frequency circuit (10) with an adjacent amplification shield (12) for enhancing output signal amplitude. The amplification shield is located adjacent to the resonant frequency circuit and is preferably in the same or substantially the same plane as the resonant frequency circuit or is in a close, generally parallel plane. In an exemplary embodiment, the resonant frequency circuit includes an inductor electrically coupled to a capacitor. The resonant frequency circuit has a center frequency and is arranged to resonate in response to exposure to electromagnetic energy at or near the center frequency, providing an output signal having an amplitude. The amplification shield is arranged to direct a portion of the electromagnetic energy to the resonant frequency circuit to amplify the amplitude of the output signal from the resonant frequency circuit.



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## INTERNATIONAL SEARCH REPORT

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## A. CLASSIFICATION OF SUBJECT MATTER

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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)

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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)

EPO-Internal, PAJ, WPI Data

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 794 520 A (CHECKPOINT SYSTEMS INC) 10 September 1997 (1997-09-10) figures 1,3,4 column 2, lines 50-53 column 5, lines 12-16,45-50 column 6, lines 18,31-49 column 7, lines 57-59 column 8, lines 32-36,45-49 column 9, lines 4-8 -----	1-13,18, 19
X	PATENT ABSTRACTS OF JAPAN vol. 1998, no. 10, 31 August 1998 (1998-08-31) -& JP 10 145267 A (HITACHI LTD), 29 May 1998 (1998-05-29) abstract; figures 4,6,7 ----- -/--	1-3,9, 12,18,19



Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

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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.
P,X	EP 1 347 533 A (MITSUBISHI MATERIALS CORP) 24 September 2003 (2003-09-24)  figures 1-4 abstract page 2, lines 15-17 page 4, lines 10-14	1-3,9, 10,12, 18,19
X	& WO 02/50951 A (MITSUBISHI MATERIALS CORP ; ENDO TAKANORI (JP); YAHATA SEIRO (JP); YON) 27 June 2002 (2002-06-27) -----	1-3,9, 10,12, 18,19
P,X	PATENT ABSTRACTS OF JAPAN vol. 2003, no. 12, 5 December 2003 (2003-12-05) -& JP 2003 249813 A (TECDIA KK), 5 September 2003 (2003-09-05) abstract -----	1-9,12, 18,19
X	US 6 320 509 B1 (MOSKOWITZ PAUL ANDREW ET AL) 20 November 2001 (2001-11-20) abstract; figures 1A-7 column 2, lines 19-24,35,36 -----	1,2,18, 19
X	US 4 021 705 A (LICHTBLAU GEORGE JAY) 3 May 1977 (1977-05-03) abstract figures 1,2,5,12,14,15 column 1, lines 63-66 column 2, lines 10-15 -----	1,2,18, 19

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

US/US2004/013209

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 0794520	A	10-09-1997	US 5754110 A	19-05-1998
			AT 207645 T	15-11-2001
			AU 707913 B2	22-07-1999
			AU 1018997 A	11-09-1997
			BR 9701224 A	25-08-1998
			CA 2199097 A1	07-09-1997
			CN 1170919 A ,B	21-01-1998
			DE 69707528 D1	29-11-2001
			DE 69707528 T2	08-05-2002
			DK 794520 T3	18-02-2002
			EP 0794520 A1	10-09-1997
			ES 2166480 T3	16-04-2002
			IL 120038 A	31-08-2000
			JP 11003476 A	06-01-1999
			NZ 314069 A	24-06-1997
			TW 392132 B	01-06-2000
JP 10145267	A	29-05-1998	NONE	
EP 1347533	A	24-09-2003	JP 2002290131 A	04-10-2002
			EP 1347533 A1	24-09-2003
			US 2004075616 A1	22-04-2004
			CN 1489806 T	14-04-2004
			WO 0250951 A1	27-06-2002
			EP 1439608 A1	21-07-2004
			WO 03030300 A1	10-04-2003
WO 0250951	A	27-06-2002	JP 2002290131 A	04-10-2002
			CN 1489806 T	14-04-2004
			EP 1347533 A1	24-09-2003
			WO 0250951 A1	27-06-2002
			US 2004075616 A1	22-04-2004
			EP 1439608 A1	21-07-2004
			WO 03030300 A1	10-04-2003
JP 2003249813	A	05-09-2003	NONE	
US 6320509	B1	20-11-2001	US 6441740 B1	27-08-2002
			US 6329915 B1	11-12-2001
			US 6281794 B1	28-08-2001
US 4021705	A	03-05-1977	NONE	