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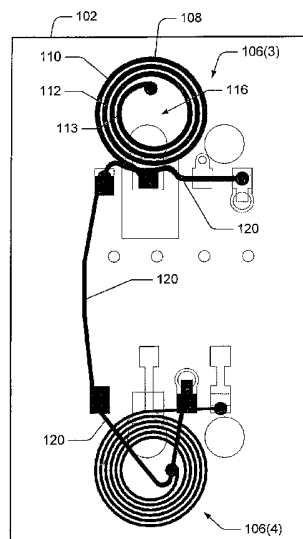
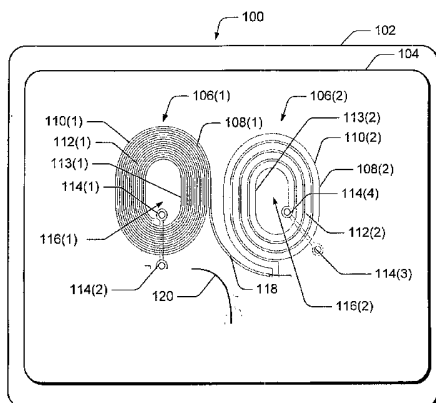
10/113,660	29 March 2002 (29.03.2002)	US
60/373,264	17 April 2002 (17.04.2002)	US
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(54) Title: INDUCTOR AND DECOUPLING STRUCTURES FOR FILTERS AND DESIGN METHOD THEREOF



(57) Abstract: Inductor topologies for filters used in broadband applications are described. In one implementation, an apparatus, such as an interface module includes a printed circuit board (102) and a filter (104). The filter includes a generally circular high Quality factor (Q) value spiral planar inductor (106) etched directly into the printed circuit board (102). The generally circular high Q value spiral planar inductor (106) is configured to operate in a broadband application. Other implementations involve the use of decoupling structures (120) with respect to the planar inductors as well as a design methodology for the filters.

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— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

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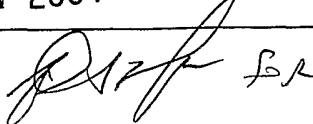
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US CL : 336/180,199,200; 333/185,177,246; 703/14,2 ; 716/2,7 ; 455/307,26.1		
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B. FIELDS SEARCHED		
Minimum documentation searched (classification system followed by classification symbols) U.S. : 336/180,199,200; 333/185,177,246; 703/14,2 ; 716/2,7 ; 455/307,26.1		
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 practicable, search terms used)		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6,175,727 (MOSTOV) 16 January 2001 (16.01.2001), figures 1, 6 and 10b, column 5, line 46 through column 6, line 40.	1 2 4 8 9 11-13 15 18-21 23-25 28 30-32

Y		----- 3 5-7 10 14 16 17 22 26 27 29 33-71
Y	US 5,255,318 (GURUSAMI et al) 19 October 1993 (16.10.1993), figure 5 and column 5, line 55 through column 6, line 40.	3, 14, 35, 48
Y	US 5,697,087 (MIYA et al) 9 December 1997 (09.12.1997), figure 6 and column 2, lines 35-30.	5 16 26 37 50
Y	US 5,745,857 (MAENG et al) 28 April 1998 (28.04.1998), column 5, lines 3-9.	6 17 27 38 51 55
Y	US 6,072,394 (HASEGAWA et al) 06 June 2000 (06.06.2000), column 6, lines 15-20.	7 10 22 29 39 44 65 69
Y	US 6,002,593 (TAYLOR et al) 14 December 1999 (14.12.1993), abstract and column 6, line 14 through column 8, line 8.	33 34 36 40-43 45-47 49 52-54 56-64 66-68 70 71
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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,P	US 6,397,171 (BELK) 28 May 2002 (28.05.2002), abstract.	56-64 66-68 70 71

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Continuation of Item 4 of the first sheet:

INDUCTOR AND DECOUPLING STRUCTURES FOR FILTERS AND DESIGN METHOD THEREOF