

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
20 September 2007 (20.09.2007)

PCT

(10) International Publication Number
WO 2007/106540 A3

(51) International Patent Classification:
H01P 1/213 (2006.01)

(21) International Application Number:

PCT/US2007/006502

(22) International Filing Date: 14 March 2007 (14.03.2007)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:

60/782,387	15 March 2006 (15.03.2006)	US
60/830,971	14 July 2006 (14.07.2006)	US
11/599,541	14 November 2006 (14.11.2006)	US

(71) Applicant (for all designated States except US):
M/A-COM, INC. [US/US]; 1011 Pawtucket Blvd.,
Lowell, MA 01854 (US).

(72) Inventor; and

(75) Inventor/Applicant (for US only): **CALLEWAERT,**
Clyde, Maynord [US/US]; 3827 Oakfield Court, Shelby
Twp, MI 48316 (US).

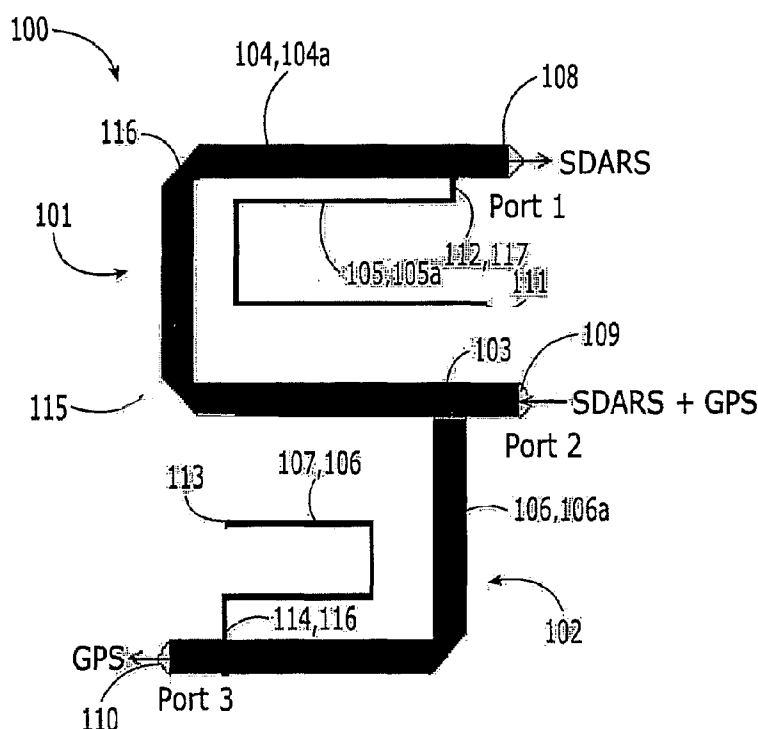
(74) Agents: **OAKES, Brian, C.** et al.; Tyco Technology Re-
sources, 4550 New Linden Hill Road, Suite 140, Wilming-
ton, DE 19808 (US).

(81) Designated States (unless otherwise indicated, for every
kind of national protection available): AE, AG, AL, AM,
AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN,
CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI,
GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS,
JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS,
LT, LU, LY, MA, MD, MG, MK, MN, MW, MX, MY, MZ,
NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU,
SC, SD, SE, SG, SK, SL, SM, SV, SY, TJ, TM, TN, TR,
TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every
kind of regional protection available): ARIPO (BW, GH,
GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM,
ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),
European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI,
FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, PL,
PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM,
GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

[Continued on next page]

(54) Title: SPLITTER/COMBINER CIRCUIT



(57) Abstract: A circuit (100, 800) for combining/splitting first and second RF signals having different wavelengths of x and y , respectively, the circuit comprising: (a) first and second transmission portions (101, 102) coupled at an intersection (103), the first transmission portion (101) comprising at least two intersecting transmission lines (104, 105), each having a length which is an odd multiple of about $1/4 y$, the second transmission portion (102) comprising at least two intersecting transmission lines (106, 107), each having a length which is an odd multiple of about $1/4 x$; and (b) first, second and third ports (108, 109, 110), the first port (108) located at the first transmission portion (101), the second port (109) located at the intersection (103) of the first and second transmission portions (101, 102), and the third port (110) being located at the second transmission portion (102), the first and second ports (108, 109) being electrically coupled, and the second and third ports (109, 110) being electrically coupled.

WO 2007/106540 A3



Published:

- *with international search report*
- *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(88) Date of publication of the international search report:

8 November 2007

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2007/006502

A. CLASSIFICATION OF SUBJECT MATTER
INV. H01P1/213

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)
H01P

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2003/030508 A1 (WANGSVICK CHAD M [US] ET AL) 13 February 2003 (2003-02-13) paragraph [0026] - paragraph [0033]; figure 1	1-21
X	FR 2 532 120 A3 (THOMSON BRANDT [FR]) 24 February 1984 (1984-02-24) page 4, line 28 - page 6, line 14; figure 2	1-6, 11-13, 17-21
X	WO 97/10621 A (QUALCOMM INC [US]) 20 March 1997 (1997-03-20) page 5, line 15 - line 27; figure 2	1-10, 17-21
X	DE 829 318 C (PATELHOLD PATENTVERWERTUNG) 24 January 1952 (1952-01-24) figure 1	1-3, 17-21

☐ 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

21 August 2007

Date of mailing of the international search report

17/09/2007

Name and mailing address of the ISA/

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Kaleve, Abraham

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2007/006502

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 2003030508	A1	13-02-2003	EP 1461576 A2 JP 2004538735 T WO 03015492 A2	29-09-2004 24-12-2004 27-02-2003
FR 2532120	A3	24-02-1984	NONE	
WO 9710621	A	20-03-1997	AU 701323 B2 AU 6974896 A BR 9606630 A CA 2204377 A1 CN 1165587 A EP 0791232 A1 FI 971759 A IL 119238 A JP 10509856 T US 5652599 A ZA 9607264 A	28-01-1999 01-04-1997 06-01-1998 20-03-1997 19-11-1997 27-08-1997 08-07-1997 31-08-2000 22-09-1998 29-07-1997 04-03-1997
DE 829318	C	24-01-1952	CH 272719 A FR 1019335 A	31-12-1950 20-01-1953