

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
11 October 2001 (11.10.2001)

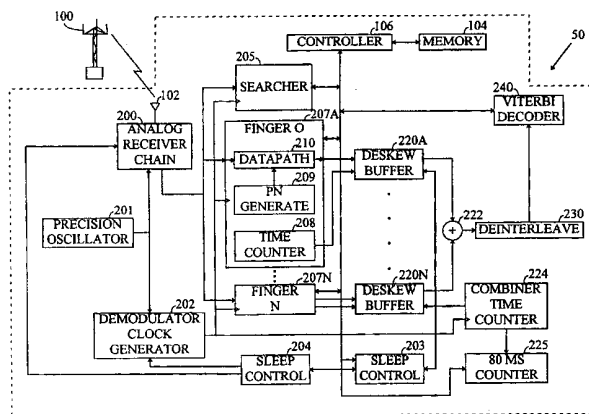
PCT

(10) International Publication Number
WO 01/76089 A3

- (51) International Patent Classification⁷: H04B 1/707
- (21) International Application Number: PCT/US01/40426
- (22) International Filing Date: 2 April 2001 (02.04.2001)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
09/540,302 31 March 2000 (31.03.2000) US
- (71) Applicant: QUALCOMM INCORPORATED [US/US];
5775 Morehouse Drive, San Diego, CA 92121-1714 (US).
- (72) Inventor: NEUFELD, Arthur; 12161 Middlebrook
Square, San Diego, CA 92128 (US).
- (74) Agents: WADSWORTH, Philip, R. et al.; Qualcomm In-
corporated, 5775 Morehouse Drive, San Diego, CA 92121-
1714 (US).
- (81) Designated States (*national*): AE, AG, AL, AM, AT, AU,
AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU,
CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM,
HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK,
LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX,
MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL,
TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW.
- (84) Designated States (*regional*): ARIPO patent (GH, GM,
KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian
patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European
patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE,
IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF,
CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).
- Published:
— with international search report
- (88) Date of publication of the international search report:
20 June 2002

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.

(54) Title: SYMBOL COMBINER SYNCHRONIZATION AFTER A JUMP TO A NEW TIME ALIGNMENT



(57) **Abstract:** A method and apparatus whereby a remote unit (10A, 10B and 10C) in a slotted mode wireless communication system may calculate accurate time throughout its entire active state. In the remote unit (10A, 10B and 10C) a "wall clock time" is calculated from a modulo 80 counter called a combiner time counter (224). When a remote unit (10A, 10B and 10C) enters its inactive state, counters within the remote unit (10A, 10B and 10C), including the combined time counter, are deactivated. When the remote unit (10A, 10B and 10C) reenters its active state, the value in the combiner time counter (224) may not be correct in relationship to slotted mode time. A controller (106) in the remote unit (10A, 10B and 10C) forces the combiner time counted to the correct phase resulting in the combiner (224) being within 26.66 of the correct value. The controller (106) then determines a combiner offset to compensate for any remaining error in the combiner time counter (224). The control (106) may then use the combiner time counter (224) and the combiner offset to calculate accurate wall clock time. When convenient, such as at a slot boundary, the remote unit (10A, 10B and 10C) may reset the combiner counter (224) to a correct value, and set combiner offset to zero.



WO 01/76089 A3

INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 01/40426

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 H04B1/707

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)
IPC 7 H04B

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, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 392 287 A (TIEDEMANN EDWARD G JR ET AL) 21 February 1995 (1995-02-21) column 1, line 63 -column 2, line 45; figures 1,2,4	1-3,7,9,10,14,19
A	US 5 915 216 A (LYSEJKO MARTIN) 22 June 1999 (1999-06-22) column 2, line 15-25; figure 17	1-19

Further documents are listed in the continuation of box C.

Patent family members are listed in 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

1 February 2002

Date of mailing of the international search report

08/02/2002

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

Amorotti, M

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 01/40426

Patent document cited in search report	Publication date	Patent family member(s)	Publication date			
US 5392287	A	21-02-1995	AU 688706 B2 12-03-1998			
			AU 1482897 A 15-05-1997			
			AU 678151 B2 22-05-1997			
			AU 3790693 A 05-10-1993			
			BG 61745 B1 30-04-1998			
			BG 99025 A 30-04-1996			
			BR 9306033 A 18-11-1997			
			CA 2130663 A1 06-09-1993			
			CN 1082272 A , B 16-02-1994			
			EP 0629324 A1 21-12-1994			
			FI 944057 A 02-09-1994			
			HU 71650 A2 29-01-1996			
			IL 104911 A 04-08-1996			
			JP 3193380 B2 30-07-2001			
			JP 7505030 T 01-06-1995			
			KR 179402 B1 15-05-1999			
			MX 9301231 A1 29-04-1994			
			RU 2114511 C1 27-06-1998			
			SK 105394 A3 08-03-1995			
			WO 9318596 A1 16-09-1993			
			US 5509015 A 16-04-1996			
			ZA 9301406 A 04-01-1994			
			US 5915216	A	22-06-1999	GB 2301751 A 11-12-1996
						AU 2245799 A 20-05-1999
						AU 2245899 A 27-05-1999
						AU 710839 B2 30-09-1999
AU 5972896 A 18-12-1996						
AU 5973296 A 18-12-1996						
AU 5973396 A 18-12-1996						
AU 5973796 A 18-12-1996						
AU 5973896 A 24-12-1996						
AU 5974896 A 18-12-1996						
AU 5975096 A 18-12-1996						
AU 5975896 A 18-12-1996						
AU 5977896 A 18-12-1996						
AU 5984896 A 18-12-1996						
AU 5985396 A 18-12-1996						
AU 6032896 A 18-12-1996						
AU 6033896 A 18-12-1996						
AU 6034896 A 18-12-1996						
AU 6034996 A 18-12-1996						
AU 6037696 A 18-12-1996						
AU 6037796 A 18-12-1996						
AU 6044296 A 18-12-1996						
AU 6148996 A 18-12-1996						
AU 705738 B2 03-06-1999						
AU 6475896 A 18-12-1996						
BR 9608335 A 05-01-1999						
BR 9608346 A 05-01-1999						
BR 9608347 A 05-01-1999						
BR 9608656 A 18-05-1999						
BR 9609300 A 15-06-1999						
BR 9609468 A 02-03-1999						
CA 2222705 A1 05-12-1996						
CA 2222734 A1 05-12-1996						
CN 1194071 A 23-09-1998						
CN 1191045 A 19-08-1998						

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No.

PCT/US 01/40426

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5915216	A	CN 1192831 A	09-09-1998
		DE 69601795 D1	22-04-1999
		DE 69604584 D1	11-11-1999
		DE 69606710 D1	23-03-2000
		DE 69606710 T2	31-08-2000
		DE 69609867 D1	21-09-2000
		DE 69609968 D1	28-09-2000
		EP 0829150 A1	18-03-1998
		EP 0829174 A1	18-03-1998
		EP 0834123 A1	08-04-1998
		EP 0830763 A1	25-03-1998
		EP 0830748 A1	25-03-1998
		EP 0830749 A1	25-03-1998
		EP 0830750 A1	25-03-1998
		EP 0872026 A1	21-10-1998
