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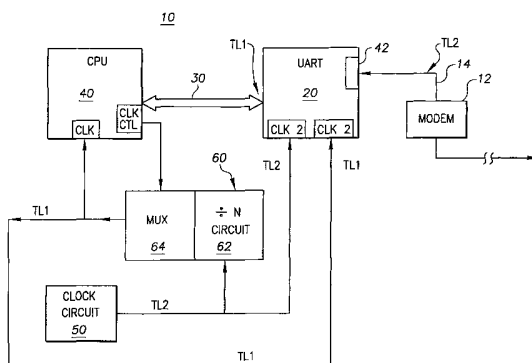
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- For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

(54) Title: A POWER FREQUENCY ADJUSTABLE UART DEVICE



(57) Abstract: The present invention embodiment comprises an arrangement of integrated circuits with a UART device that is configurable to operate in a power-reduced mode while the clock frequency of serial data communication remains constant. In one example embodiment, an arrangement of a plurality of integrated circuit devices includes a first integrated circuit device driven by a first clock signal at a first clock rate. The arrangement contains a parallel data bus coupled to communicate with the first integrated circuit device in response to the first clock signal. The arrangement also includes a universal asynchronous receiver/transmitter (UART) chip with a serial communication circuit adapted to communicate serial data at a second rate defined by a second clock signal. The UART chip also encompasses a parallel bus interface circuit responsive to the first clock signal and adapted to pass data between the parallel data bus and the serial communication circuit. The UART chip also houses a data-storage-register circuit adapted to output status data to the parallel data bus, the status data being indicative of states of at least one of the serial communication circuit and the parallel bus interface circuit. The arrangement of integrated circuit devices further includes a clock control circuit adapted to reduce the first clock rate in response to a clock control signal. By reducing the first clock rate, the UART chip is configured to operate in a power-reduced mode while the serial communication circuit concurrently communicates serial data at the second rate.

INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 G06F13/38

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, 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	US 5 832 207 A (LIU SHYUN ET AL) 3 November 1998 (1998-11-03) figures 2,4 column 7, line 58 -column 8, line 17 column 8, line 49 - line 60	1-3,5-10
Y	---	4
Y	US 5 661 751 A (JOHNSON SCOTT C) 26 August 1997 (1997-08-26)	4
A	abstract; figure 1 column 2, line 10 - line 22 column 4, line 40 - line 63 column 10, line 12 -column 11, line 62 column 18, line 29 - line 37 column 22, line 49 -column 23, line 16 --- -/--	1-3,5-10

☒ 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.
A	<p>US 5 903 601 A (ELNASHAR KHODOR S ET AL) 11 May 1999 (1999-05-11) the whole document</p> <p>-----</p>	1-10

INTERNATIONAL SEARCH REPORT

Intern Application No
PCT/IB 02/01970

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5832207	A	03-11-1998	US 6219789 B1 17-04-2001
			US 2001011353 A1 02-08-2001
			AU 6502896 A 18-02-1997
			AU 6761996 A 18-02-1997
			AU 6762196 A 18-02-1997
			AU 6762296 A 18-02-1997
			EP 0852032 A1 08-07-1998
			EP 0850440 A1 01-07-1998
			EP 0839344 A1 06-05-1998
			WO 9704395 A1 06-02-1997
			WO 9704376 A1 06-02-1997
			WO 9704377 A1 06-02-1997
			WO 9704378 A1 06-02-1997
			US 5998858 A 07-12-1999
			US 5850450 A 15-12-1998
US 5661751	A	26-08-1997	EP 0666529 A1 09-08-1995
			JP 7307765 A 21-11-1995
US 5903601	A	11-05-1999	NONE