



## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

<p>(51) International Patent Classification <sup>5</sup> : H04M 11/06</p>	<p>A1</p>	<p>(11) International Publication Number: <b>WO 92/10047</b> (43) International Publication Date: 11 June 1992 (11.06.92)</p>
<p>(21) International Application Number: PCT/FI91/00354 (22) International Filing Date: 26 November 1991 (26.11.91) (30) Priority data: 905822 26 November 1990 (26.11.90) FI (71) Applicant (for all designated States except US): NOKIA MATKAPUHELIMET OY [FI/FI]; P.O. Box 86, SF- 24101 Salo (FI). (72) Inventors; and (75) Inventors/Applicants (for US only) : TERHO, Mikko [FI/ FI]; Kierikankatu 8 C 19, SF-33700 Tampere (FI). ROS- SI, Markku [FI/FI]; Takapelto, SF-25130 Muurila (FI). (74) Agent: BERGGREN OY AB; P.O. Box 16, SF-00101 Hel- sinki (FI).</p>		<p>(81) Designated States: AT (European patent), BE (European patent), CH (European patent), DE (European patent), DK (European patent), ES (European patent), FI, FR (European patent), GB (European patent), GR (European patent), IT (European patent), JP, LU (European patent), NL (European patent), SE (European patent), US.  <b>Published</b> <i>With international search report.</i> <i>With amended claims.</i> <i>In English translation (filed in Finnish).</i></p>
<p>(54) Title: ARRANGEMENT FOR THE CONNECTION OF A COMPUTER TO AN INDIVIDUAL ANALOG TELEPHONE</p>		
<p>The diagram illustrates a connection between a cellular telephone and a laptop computer. On the left, a box labeled 'Cellular telephone' is connected to an antenna symbol above it. A line labeled '1' extends from the bottom of this box. This line connects to a larger box on the right labeled 'Laptop-computer'. Inside the laptop box, a dashed-line rectangle represents a 'modem card' labeled '5'. A line labeled '4' extends from the bottom of the laptop box, and another line labeled '5' extends from the bottom of the modem card. A horizontal line connects the 'Cellular telephone' box to the 'Laptop-computer' box.</p>		
<p>(57) Abstract</p> <p>In order to connect a computer (4) to an individual analog telephone (1), the computer is provided with a modem card (5) including a modem function, telephone audio bus adapter, a gate adapted for a digital control bus of the telephone, connections for the control and audio buses, and software, which is able to convert the digital modem instructions into telephone instructions and vice versa. The telephone (1) is preferably a cellular telephone and the computer (4) can be a portable PC. It is also possible to arrange the modem card to be connected to other immobile telephone network equipment, such as a telefax terminal.</p>		

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<sup>+</sup> Any designation of "SU" has effect in the Russian Federation. It is not yet known whether any such designation has effect in other States of the former Soviet Union.

**Arrangement for the connection of a computer to an individual analog telephone**

5 The subject matter of the present invention is an arrangement for the connection of a computer to an individual analog telephone, the computer being provided with a modem card realised in one or more parts and including a modem and connections for the audio and control buses of the  
10 telephone.

Such arrangement is well-known in connection with a conventional telephone.

15 In connection with a cellular phone, an arrangement according to figures 1 and 2 is known. Here, the chain includes, as is seen in the figure, a telephone 1 that may be a cellular telephone, an adapter 2, a two-wire connection from the adapter to a modem 3, and finally a computer 4.

20 The blocks of the adapter 2 and the modem 3 are described in more detail in figure 2. The adapter includes a UART unit, 21, a microprocessor, 22, an analog amplifier, 23, and a telephone adapter, 24. The modem 3 correspondingly  
25 includes a microprocessor, 32, an analog IC, 33, a telephone adapter, 34, and an external serial bus, e.g. an adapter, 35, for a bus of the V.24 type.

30 The impractical form of the system is a drawback of this known arrangement, as it has three or four individual units with cables between them. A drawback is also the unnecessary mechanics, which leads to costs, and moreover the useless combination of the DTMF transmitter and the DTMF receiver units.

35 In the known system the modem converts a telephone number into DTMF tones based on a call set up instruction from the

computer. The tones are transmitted from the modem, from  
which they are connected to a data-adaptor, whose DTMF-  
receiver again converts the sequence into a digital  
sequence. This number sequence is added to a control mess-  
5 age sent further to the telephone, the message causing the  
telephone to call the number in question.

Naturally it would be possible to put all units described  
here in the same housing, but in that case the telephone  
10 and the computer could not be purchased or used individu-  
ally and the whole combination always had to be carried  
along.

The object of the present invention is to provide an  
15 arrangement, in which the above mentioned drawbacks are  
avoided and in which the system will be both simplified and  
cheaper. In order to achieve this, the invention is charac-  
terized in that the telephone is an individual analog  
cellular telephone and that the modem card further in-  
20 cludes, as an integrated part or otherwise connected  
thereto, a telephone audio bus adapter, a port adapted for  
the digital control bus of the telephone, and software,  
which converts the digital modem instructions into tele-  
phone instructions, and vice versa.

25 The modem card may also be adapted to be connected to an  
immobile telephone network, whereby the card also will  
include a telephone adapter. Then it is also possible to  
connect it to other equipment, such as a telefax terminal,  
30 of the immobile telephone network.

The invention is described in more detail below and with  
reference to the accompanying drawings, in which  
figures 1 and 2 show a known arrangement described above,  
35 figure 3 shows as a block diagram of an arrangement  
according to the invention,

figure 4 shows in more detail an implementation of the modem part, and figure 5 shows an alternative implementation of the modem part.

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Thus, according to the invention the computer itself includes a modem card taking care of the control and audio service between the computer and the modem. In comparison with the prior system you now need only a telephone, which may be a cellular telephone, and a computer equipped with a modem card of the new type according to the invention.

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When the telephone is a cellular telephone, the modem card may e.g. be in accordance with figure 4. In other words, the modem card includes a gate 51 adapted for the digital control bus of the telephone, a microprocessor 52, and an analog IC-circuit, that is the actual modem 53 functioning as a kind of D/A-converter, correspondingly A/D-converter between the microprocessor 52 and a telephone. The modem card further includes an adapter 55 for the PC-bus and an audio bus adapter 56 between the modem and the audio connections of the telephone. In the arrangement according to the invention the modem's call set up instruction is converted directly and digitally by the modem card into a digital control message for the telephone. As is seen in the figure 4, the modem card has a direct connection to the audio and control buses of the cellular telephone. Part of the gate 51 can be constituted by an adapter situated in the connection piece to the telephone. Also the audio bus adapter 56 can be situated in a connection piece outside the card itself.

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The control instructions for the cellular telephone are located in the program memory of the modem card microprocessor 52 and not in the individual data adapter as in prior arrangements.

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It is also possible to realize the modem card so that it can be connected to immobile telephone network equipment, such as a telefax terminal. Figure 5 shows such an expanded arrangement. It includes the parts 51, 52, 53, 55 and 56 in  
5 the same way as a modem card in accordance with figure 4, and further a telephone adapter 54 for the above mentioned interface.

The arrangement according to the invention is thus smaller  
10 than the prior one, and it contains fewer cable connections. The DTMF-circuits can be omitted from the system, which of course will reduce manufacturing costs. The telephone and the computer can be purchased and used  
15 individually. The best implementation due to its versatility could be that of figure 5, where the modem card is connected to the PC, to a cellular telephone and to a terminal of the immobile network.

Claims

1. Arrangement for the connection of a computer (4) to an individual analog telephone (1), the computer being provided with a modem card (5) realized in one or more parts and including a modem (53) and interfaces for the audio and control buses of the telephone (1), **characterized** in that the telephone (1) is an individual analog cellular telephone and that the modem card further includes, as an integrated part or otherwise connected thereto, a telephone audio bus adapter (56), a gate (51) adapted for a digital control bus of the telephone, and software, which converts the digital modem instructions into telephone instructions and vice versa.
2. Arrangement in accordance with claim 1, **characterized** in that the modem card (5) is arranged to be connected to an immobile telephone network, whereby the card (5) also includes a telephone adapter (54).
3. Arrangement in accordance with claim 2, **characterized** in that the modem card (5) is arranged to be connected also to other immobile telephone network equipment, such as a telefax terminal.
4. Arrangement in accordance with claim 1, **characterized** in that the computer (4) is a portable PC.

## AMENDED CLAIMS

[received by the International Bureau on 24 April 1992 (24.04.92);  
original claim 1 amended;  
remaining claims unchanged  
(1 page)]

1. Arrangement for the connection of a computer (4) to an individual telephone (1), the computer being provided with a modem card (5) realized in one or more parts and including a modem (53) and interfaces for the audio and control buses of the telephone (1), characterized in that the telephone (1) is an individual cellular telephone and that the modem card further includes, as an integrated part or otherwise connected thereto, a telephone audio bus adapter (56), a gate (51) adapted for a digital control bus of the telephone, and software, which converts the digital modem instructions into telephone instructions and vice versa.
2. Arrangement in accordance with claim 1, characterized in that the modem card (5) is arranged to be connected to an immobile telephone network, whereby the card (5) also includes a telephone adapter (54).
3. Arrangement in accordance with claim 2, characterized in that the modem card (5) is arranged to be connected also to other immobile telephone network equipment, such as a telefax terminal.
4. Arrangement in accordance with claim 1, characterized in that the computer (4) is a portable PC.



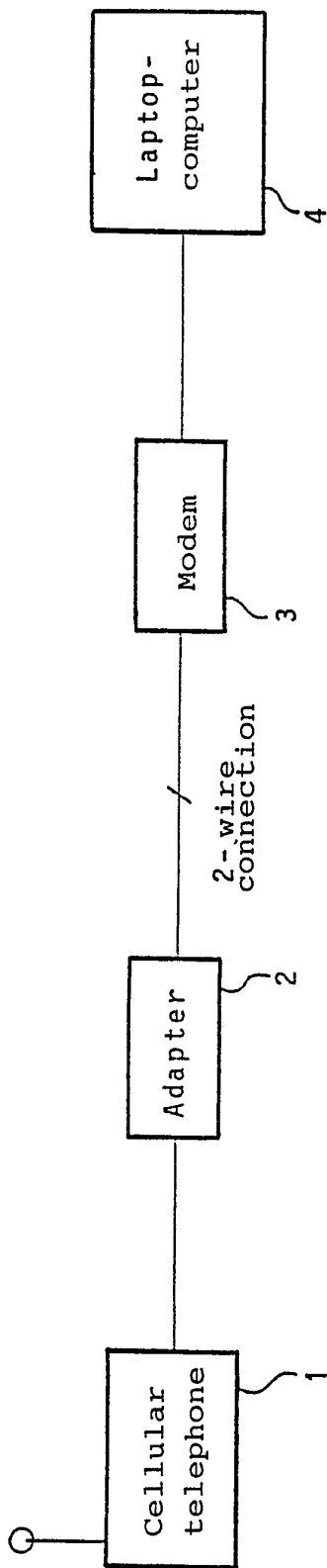


FIG. 1

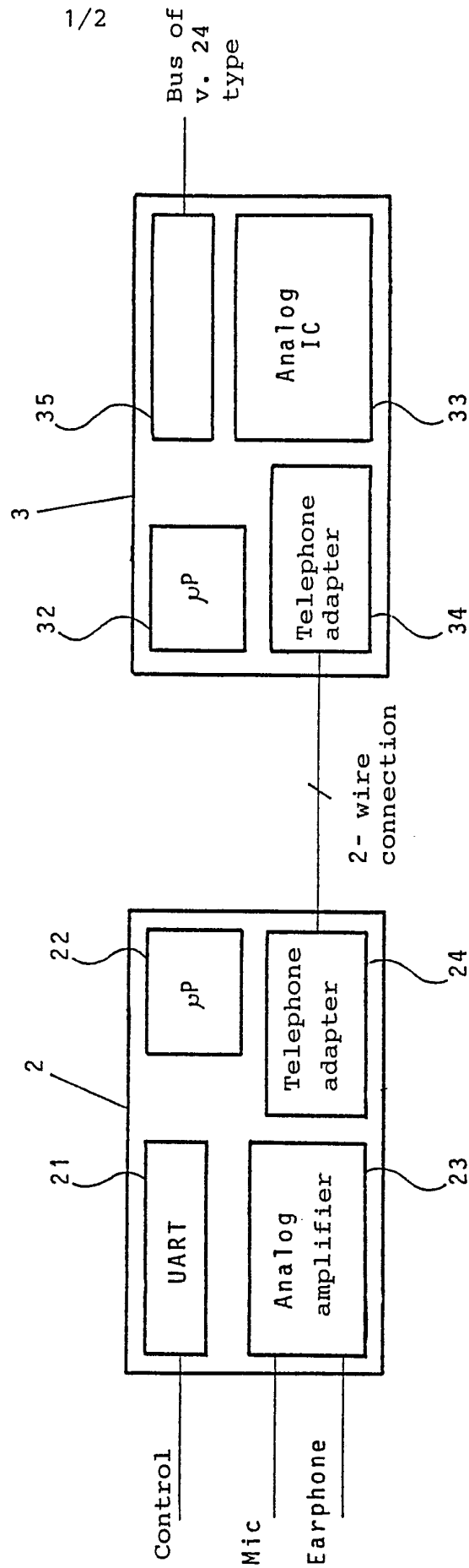


FIG. 2

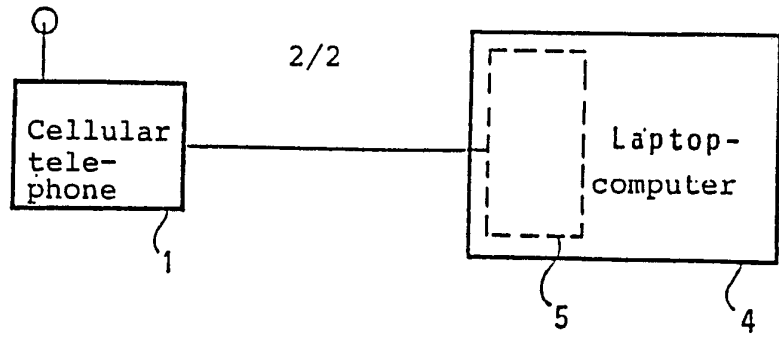


FIG. 3

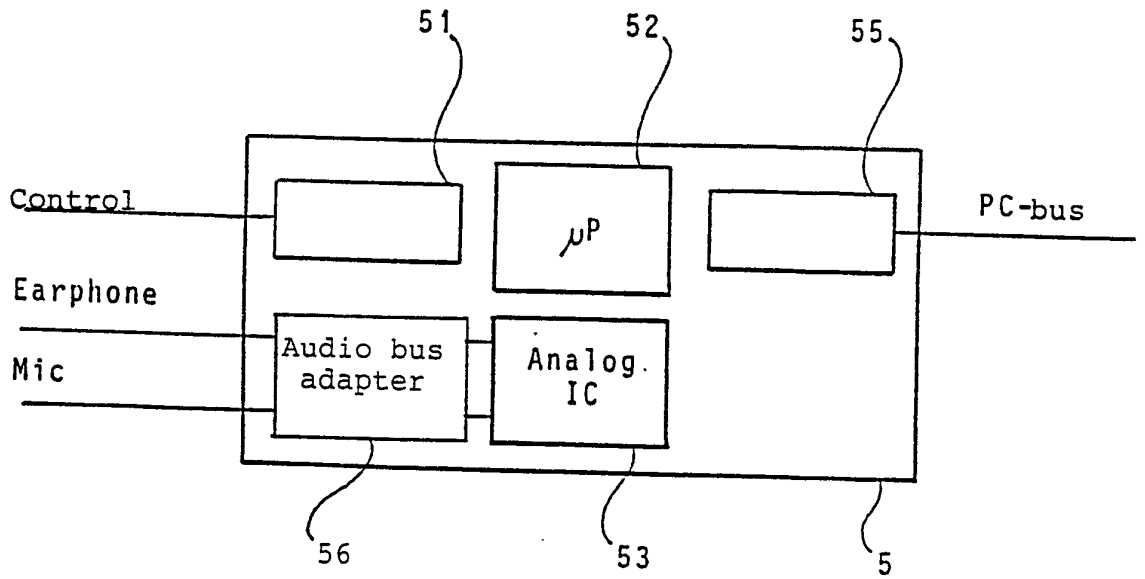


FIG. 4

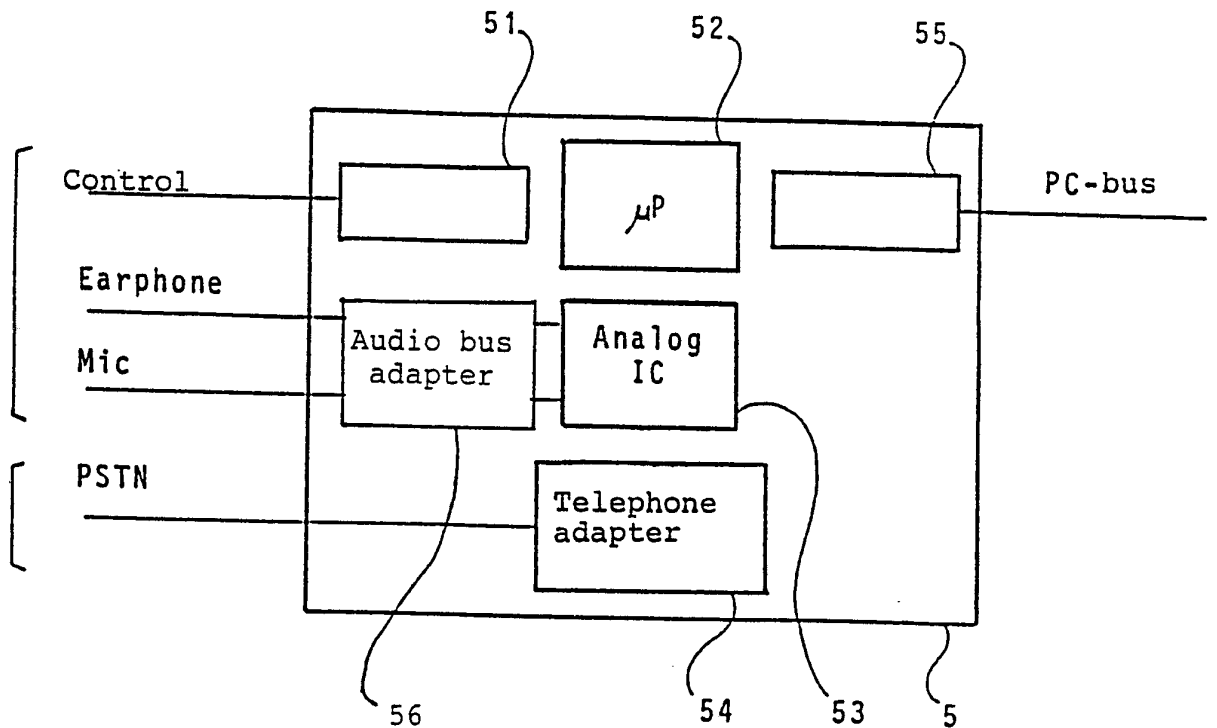
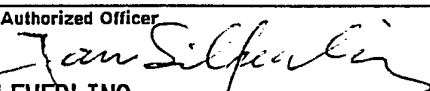


FIG. 5

# INTERNATIONAL SEARCH REPORT

International Application No PCT/FI 91/00354

<b>I. CLASSIFICATION OF SUBJECT MATTER</b> (if several classification symbols apply, indicate all) <sup>6</sup>		
According to International Patent Classification (IPC) or to both National Classification and IPC		
IPC5: H 04 M 11/06		
<b>II. FIELDS SEARCHED</b>		
Minimum Documentation Searched <sup>7</sup>		
Classification System	Classification Symbols	
IPC5	H 04 M	
Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in Fields Searched <sup>8</sup>		
SE,DK,FI,NO classes as above		
<b>III. DOCUMENTS CONSIDERED TO BE RELEVANT<sup>9</sup></b>		
Category *	Citation of Document, <sup>11</sup> with indication, where appropriate, of the relevant passages <sup>12</sup>	Relevant to Claim No. <sup>13</sup>
X	WO, A1, 9003076 (INTELLIGENCE TECHNOLOGY CORPORATION) 22 March 1990, see the whole document --	1-4
A	WO, A1, 8802206 (STANDARD TELEPHONES AND CABLES PTY. LTD ET AL) 24 March 1988, see the whole document --	1-4
A	US, A, 4571456 (D. C. PAULSEN ET AL) 18 February 1986, see the whole document --	1-4
A	GB, A, 2166024 (DATA GENERAL CORPORATION) 23 April 1986, see the whole document -- -----	1-4
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<b>IV. CERTIFICATION</b>		
Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report	
21st February 1992	1992 -02- 25	
International Searching Authority	Signature of Authorized Officer	
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**ANNEX TO THE INTERNATIONAL SEARCH REPORT  
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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO-A1- 9003076	90-03-22	AU-D- 4310289	90-04-02
		EP-A- 0387338	90-09-19
		US-A- 4991197	91-02-05
WO-A1- 8802206	88-03-24	AU-B- 606358	91-02-07
		AU-D- 7964687	88-04-07
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US-A- 4571456	86-02-18	DE-A- 3337321	84-05-24
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		JP-A- 59091524	84-05-26
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