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D E C I S I O N
of 10 October 2001

Case Number: T 1144/98 - 3.5.1

Application Number: 90309129.6

Publication Number: 0419047

IPC: H04B 3/54, H04K 3/00

Language of the proceedings: EN

Title of invention:

Spread spectrum communication system using chirp modulation

Applicant:

INTELLON CORPORATION

Opponent:

-

Headword:

Spread spectrum communication/INTELLON

Relevant legal provisions:

EPC Art. 56

Keyword:

"Inventive step (yes, after amendment)"

Decisions cited:

-

Catchword:

-



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Boards of Appeal

Chambres de recours

Case Number: T 1144/98 - 3.5.1

D E C I S I O N
of the Technical Board of Appeal 3.5.1
of 10 October 2001

Appellant: INTELLON CORPORATION
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Decision under appeal: **Decision of the Examining Division of the
European Patent Office posted 15 July 1998
refusing European patent application
No. 90 309 129.6 pursuant to Article 97(1) EPC.**

Composition of the Board:

Chairman: S. V. Steinbrener
Members: R. S. Wibergh
P. Mühlens

Summary of Facts and Submissions

I. This appeal concerns the decision by the Examining Division to refuse European patent application 90309129.6 on the basis that the independent claims of the main request lacked novelty over D3 and the independent claims of the auxiliary request lacked inventive step having regard to D3 combined with D5, these prior art documents being as follows:

D3: *R. A. Piety*, "Intrabuilding data transmission using power-line wiring", Hewlett-Packard Journal 38(5), May 1987, 35-40,

D5: *J. O. Onunga and R.W. Donaldson*, "Personal computer communications on intrabuilding power line LAN's using CSMA with priority acknowledgments", IEEE Journal on Selected Areas in Communications 7(2), February 1989, 180-191.

II. The applicant appealed, requesting that the decision be set aside and a patent granted on the basis of main and auxiliary requests and making an auxiliary request for oral proceedings.

III. In an annex to a summons to oral proceedings the Board stated that it doubted whether the claimed subject matter showed inventive step in the light of D3 and D5.

IV. Oral proceedings were held on 10 October 2001, during which the Appellant filed an amended set of claims.

The independent claims read as follows:

"1. A communication system comprising:

means for generating a plurality of wide band signals, each signal being generated at a plurality of frequencies over a time interval;

a carrier sense communications channel for carrying the signals; and

means for receiving the signals from the communications channel, wherein the means for receiving includes means for synchronizing on each signal of the plurality of the said signals received, and means for achieving a data synchronisation state, said means for receiving allowing carrier sensing before achieving a data stream synchronisation state".

"14. A method of transmitting data on a communications channel to a receiver comprising the steps of:

generating a plurality of wide band signals;

providing the signals to a carrier-sense based communications channel;

receiving the signals at the receiver from the communications channel;

determining a synchronisation for each signal from the said signal received,

achieving a data stream synchronisation state and allowing carrier sensing to be performed before achieving the data stream synchronisation state".

V. The Appellant requested that the decision under appeal be set aside and that a patent be granted on the basis of claims 1 to 20 filed in the oral proceedings.

VI. At the end of the oral proceedings the Chairman announced the Board's decision.

Reasons for the Decision

1. *Amendments*

Independent method claim 14 has been restricted with respect to claim 14 as originally filed essentially in taking up the step of achieving a "data stream synchronisation state" and allowing carrier sensing before achieving the data stream synchronisation state.

The claim thus distinguishes between "synchronisation for each signal" and "data stream synchronisation". This distinction is supported by the original application. The "synchronisation for each signal" is concerned with individual pulses (cf. the shift registers R6 and the network R10 in Figure 2) whereas the "data stream synchronisation" has to do with the window function of the synchronisation and lock circuit R12 (Figure 2; column 13, line 56 to column 14, line 23 of the published patent application). The feature that carrier sensing is allowed before achieving a data stream synchronisation state is based on the description of the "raw data/carrier sense" output R11 and the "synchronization and lock" unit R12 (column 13, lines 48 to 55).

Claim 1 sets out a corresponding communication system. It should be noted that the term "data synchronisation state" in this claim should in fact read "data stream synchronisation state" (Rule 88 EPC applies).

The Board is satisfied that the independent claims 1 and 14 fulfill the requirements of Articles 84 and 123(2) EPC regarding clarity and added subject matter.

2. *Novelty*

2.1 The Board regards D3 as the closest prior art document. D3 reports on the feasibility of using intrabuilding power lines for local data communications with a view to realising LANs (Local Area Networks; see page 35, right column, line 4 from the bottom). In the language of claim 14, D3 discloses (figures 4 and 5) a method of transmitting data comprising the steps of:

- generating a plurality of wide band signals (figure 4 refers to a 3.5 MHz-10.5 MHz spread spectrum output);
- providing the signals to a communications channel (the power line); and
- receiving the signals at the receiver from the communications channel (figure 5);
- determining a synchronisation for each signal from the signal received (this step is performed by the "correlator" in figure 5, apparently a matched filter); and
- achieving a data stream synchronisation state (by the circuits following the correlator).

It can thus be seen that D3, similar to the invention, employs two levels of synchronisation: a first level due to the correlator and a second level due to the post correlation circuits.

The Appellant has argued (paragraph 21 of the grounds of appeal) that in D3, although clock synchronisation

is unnecessary, not all pre-synchronization is unnecessary. The Board agrees, but finds that the same applies to the present invention. Both the invention and the known method involve a digital matched filter in the receiver which employs oversampling. It is stated in D3 (page 38, right column, lines 1 and 2) that the receiver's clock is not synchronized with the transmitter. In other words, the 28 MHz clock in the receiver is not phase-locked to the 28 MHz clock in the transmitter. However some degree of synchronisation is required in both D3 and the application in the limited sense that the frequency of both 28 MHz clocks must be substantially the same.

Hence the subject matter of claim 14 differs from the disclosure of D3 in:

- i. the communications channel being a carrier sense communications channel, and
- ii. allowing carrier sensing before achieving a data stream synchronisation state.

2.2 D5 concerns a LAN based on a CSMA (carrier sense multiple access) protocol which employs spread spectrum techniques. D5 discloses a method of transmitting data comprising the steps of:

- generating a plurality of wide band signals (page 184, right column, line 8 from the bottom refers to direct sequence spread spectrum);
- providing the signals to a carrier-sense based communications channel (a power line; "carrier sensing" is mentioned on page 185, left column,

last line and right column, line 7);

- receiving the signals at the receiver from the communications channel; and
- determining a synchronisation for each signal.

In D5, the synchronisation for each signal is based on the 60 Hz zero crossings (page 184, left column, lines 8 to 10), which means that it cannot be said to be determined "from said signal received". Thus the subject matter of claim 14 differs from the disclosure of D5 in:

- i. determining a synchronisation for each signal from said signal received, and
- ii. achieving a data stream synchronisation state and allowing carrier sensing to be performed before achieving a data stream synchronisation state.

2.3 The subject-matter of claim 14 is consequently novel.

3. *Inventive step*

3.1 D3 mentions the realisation of LANs and D5 concerns an example of a LAN employing carrier sensing together with a spread spectrum technique. Hence the Board sees no reason to differ from the Examining Division's assessment (paragraph 2.2 of the decision) that in constructing a LAN based on D3 it would be obvious to the skilled person to use a carrier sense communications channel.

However, claim 14 now additionally includes the feature

of allowing carrier sensing to be performed before achieving the data stream synchronisation state, thus providing the information about the presence of a carrier needed to handle network protocols in a particular way (see column 13, lines 51 to 55 of the published patent application). The Board is unable to find any hint in the documents on file that a carrier sense signal could be derived directly from the correlator output in figure 5 of D3, ie before the post-correlation circuits shown which implement data stream synchronisation. In order to arrive at the invention the skilled person would thus not only have to combine D3 with D5 but also realise that in such a combined system, carrier sensing - which is mentioned in D5 but not described - may require signal processing not in accordance with Figure 5 of D3. In the Board's view, such further modifications of a system which is only hypothetical were beyond the person skilled in the art.

3.2 Hence, starting from D3, the method of claim 14 shows inventive step.

3.3 If, for the sake of argument, the skilled person were to start from D5 it would be necessary to realise the advantages of adding means for achieving a data stream synchronisation state, but then also to realise that further advantages accrued by forgoing these same advantages during the carrier sensing phase. The Board is unable to see why the skilled person would act in such an apparently contradictory way.

3.4 Hence the Board finds that the subject-matter of claim 14 complies with Articles 52(1) and 56 EPC regarding inventive step. The same conclusion applies

to the corresponding communication system according to claim 1.

4. *Remittal*

Although the subject matter of the independent claims is patentable with respect to the discussed prior art, the dependent claims and description may still be open to objection under the EPC. The Board notes that the claims, including the independent claims, lack reference signs; that in claim 11 the "correlating" of the output of the matched filter to a predetermined signal level might not be supported by the description, "comparing" being presumably intended instead (see column 13, lines 14 to 18); that claims 12, 17 and 18 might also lack support in the description; and that in claim 15 there is no antecedent for "the frequencies".

The Board consequently remits the case to the first instance so that examination can be continued.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the first instance for further prosecution.

The Registrar:

The Chairman:

M. Kiehl

S. V. Steinbrener