Cc: F. Cohen   *G723_1-15*   *PB*

FACSIMILE COVER SHEET

DSP GROUP, INC.

3120 Scott Boulevard
Santa Clara, CA 95054

Serdar Yurdakul

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To: _Fabio Bigi_   **Date:** _5/13/97_
Cc: _____   **Number of pages:** _6_

Fax Number: _011 - 41 - 22 - 730 - 5853_

Notes:

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Date:        05.06.97 02:09:16
From:        serdar yurdakul
Subject:     Re: Rec. G.723.1 patents
To:          Frank COHEN +41 22 730 5896
```

Dear Mr. Cohen,

Thank you for your email with very useful details.

As you may know AudioCodes (ACL) and DSP Group contributed
significantly to the G.723.1 technology standardization process in the
ITU-T SG 15 with Research & Development efforts. The subject standard
was created based on these two essential patents as indicated in my
earlier letter.

DSP Group and ACL have also signed and provided ITU with commitment to
follow non-discriminatory and fair licensing policies as required by
the ITU. (I can provide you a fax copy of this document as I am
travelling and out of the office this week. I believe Mr. Imre Varga
has already have a copy as well).

Our option is 2.2 as described below :
"2.2 The patent holder is not prepared to waive his rights but would
be willing to negotiate licenses with other parties on a
non-discriminatory basis on reasonable terms and conditions. Such
negotiations are left to the parties concerned and are performed
outside the ITU-T."

Please let me know if this is satisfactory and what we need to do to
make sure that our patents are listed, accordingly.

Thank you again for your clarifying email and let me know if I can be
of further assistance.

Best Regards

Serdar Yurdakul
DSP Group

_____ Reply Separator _____
Subject: Rec. G.723.1 patents
Author: Frank COHEN +41 22 730 5896 <FRANK.COHEN@ITU.CH> at SMTPLINK
Date: 6/3/97 12:49 AM

Dear Mr. Yurdakul

I have received the letter which you sent to Mr. Fabio Bigi of the
Telecommunication Standardization Bureau giving two patents associated with the
ITU-T Recommendation G.723.1. In order to enter those two patents in the TSB
Patent Statements Database, I need to know which patent statement option you
are choosing for these patents out of the three possible options given in
section 2 of the "Statement on TSB patent policy" (ie 2.1, 2.2 or 2.3). For
your convenience I give this "Statement" below.

Thank you for the information.

Regards

Frank Cohen

Telecommunication Standardization Bureau
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Place des Nations
1211 Geneva 20
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"Statement on TSB patent policy

Over the years, the TSB has developed a "code of practice" regarding
intellectual property rights
(patents) covering, in varying degrees, the subject matters of ITU-T
Recommendations . The rules

Dear Mr. Yurdakul

Thank you for your response. I will enter now your patent information into our database. However, would you please fax the document you mentionned below which you provided to ITU. We don't seem to have a record of that here. Did you sent it to Mr. Bigi or the Director Mr. Irmer or was it given to a Rapporteur? In any case, it's necessary that we have a signed paper copy on file.

Many thanks

Frank Cohen

Telecommunication Standardization Bureau
International Telecommunication Union
Place des Nations
1211 Geneva 20
Switzerland
Tel: +41 22 730 5896
Fax: +41 22 730 5853
email: frank.cohen@itu.int

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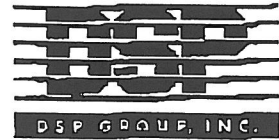> outside the ITU-T."
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> Thank you again for your clarifying email and let me know if I can be
> of further assistance.
>
> Best Regards
>
> Serdar Yurdakul
> DSP Group
>
>

Serdar Yurdakul
DSP Group, Inc.
3120 Scott Blvd.
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Tel # 408-986-4480
Fax # 408-986-4490

May 14, 1997

Dear Fabio,

Please correct the following mistake on my fax regarding the TSB listing of the DSP Group/AudioCodes patents. I mistakenly gave you the old email address for Shabtai.

Correct email address : sai@audiocodes.com

Thank you and Regards

Subject Patents :

1. "A Pitch Post Filter," Bialik, Leon and Flomen, Felix, Or Yehuda, Israel. US Application number: 08/235,765 (April 29, 1994). US Patent number 5,544,278 (granted August 6, 1996).

2. "A Multi-Pulse Analysis Speech Processing System and Method," Bialik, Leon and Flomen, Felix, Or Yehuda, Israel. US Application number: 08/236,764 (April 29, 1994). US Patent number 5,568,588 (granted October 22, 1996).
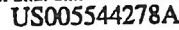
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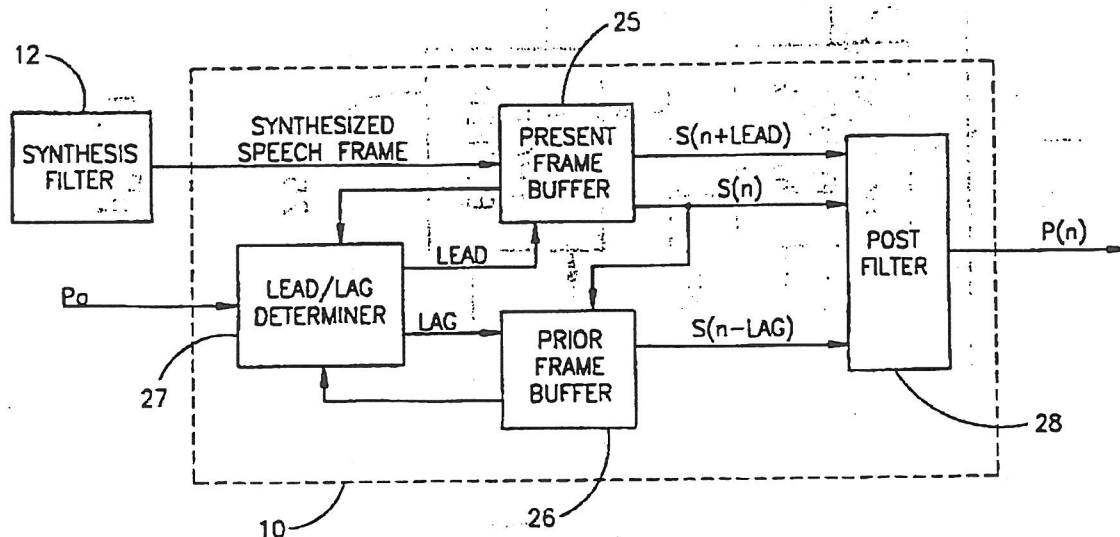email: syurdakul@dspg.com

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          Sai

US005544278A

United States Patent [19]

Bialik et al.

[11] Patent Number: 5,544,278

[45] Date of Patent: Aug. 6, 1996

[54] **PITCH POST-FILTER**

[75] Inventors: **Leon Bialik; Felix Flomen,** both of Rishon LeZion, Israel

[73] Assignee: **Audio Codes Ltd.,** Or Yehuda, Israel

[21] Appl. No.: **235,765**

[22] Filed: **Apr. 29, 1994**

[51] Int. Cl.^{6} G10L 3/02
[52] U.S. Cl. 395/2.77; 395/2.2
[58] Field of Search 381/36–39, 40, 381/49, 50; 395/2, 2.12–2.18, 2.2, 2.25–2.37, 2.67, 2.76–2.78

[56] **References Cited**

U.S. PATENT DOCUMENTS

4,969,192	11/1990	Chen et al.	395/2.31
5,293,449	3/1994	Tzeng	395/2.29
5,307,441	4/1994	Tzeny	395/2.31

OTHER PUBLICATIONS

Kroon et al., "A Class of Analysis–by–Synthesis Predictive Coders for High Quality Speech Coding at Rates Between 4.8 and 16 Kbits/s," IEEE Journal on Selected Areas in Commo., vol. 6, No. 2, Feb. 1988, pp. 353–363.

Primary Examiner—David D. Knepper
Attorney, Agent, or Firm—Skjervan, Morrill, MacPherson, Franklin & Friel; Forrest E. Gunnison

[57] **ABSTRACT**

A filter utilizes future and past information for at least some of the subframes. Specifically, the filter receives a frame of synthesized speech and, for each subframe of the frame of synthesized speech, produces a signal which is a function of the subframe and of windows of earlier and later synthesized speech. Each window is utilized only when it provides an acceptable match to the subframe.

10 Claims, 5 Drawing Sheets

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US005568588A

United States Patent [19]

Bialik et al.

[11] Patent Number: 5,568,588

[45] Date of Patent: Oct. 22, 1996

[54] MULTI-PULSE ANALYSIS SPEECH PROCESSING SYSTEM AND METHOD

[75] Inventors: **Leon Bialik; Felix Flomen**, both of Rishon LeZion, Israel

[73] Assignee: **AudioCodes Ltd.**, Israel

[21] Appl. No.: **236,764**

[22] Filed: **Apr. 29, 1994**

[51] Int. Cl.^{6} G10L 5/06

[52] U.S. Cl. 395/2.32; 395/2.3

[58] Field of Search 395/2.1, 2.21, 395/2.3, 2.31, 2.32, 2.28, 2.29, 2.34

[56] **References Cited**

U.S. PATENT DOCUMENTS

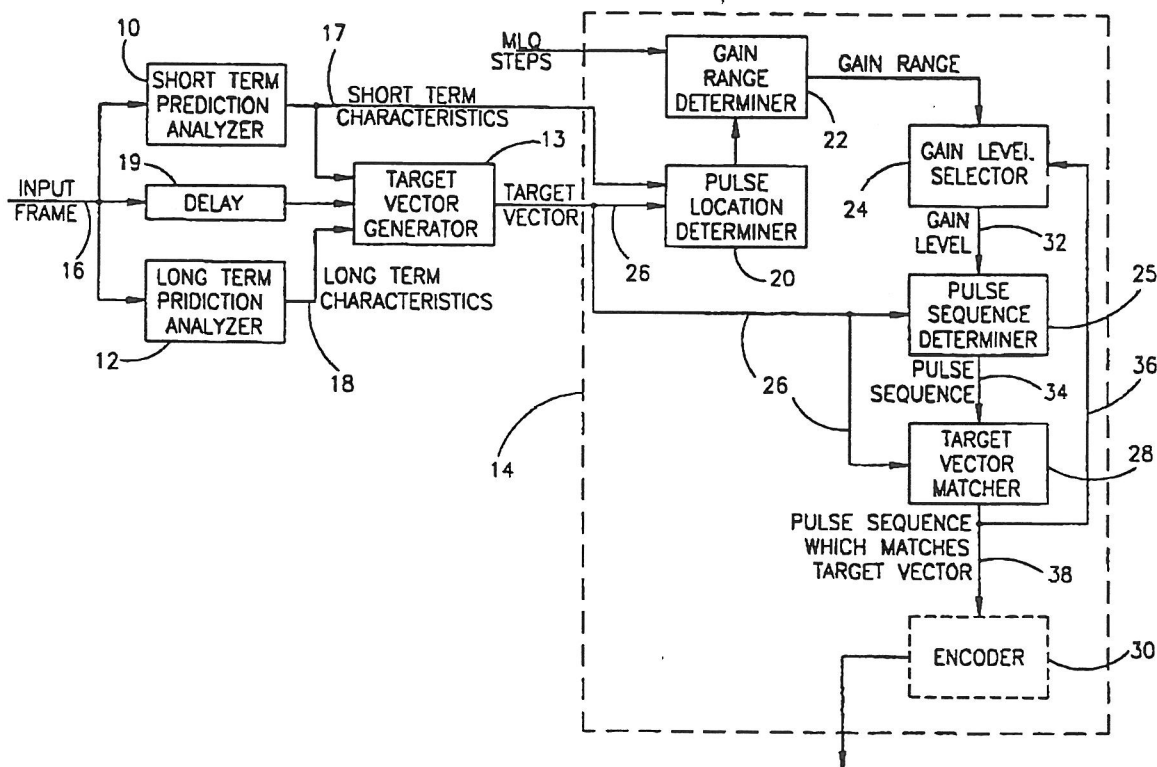|			
4,710,959	12/1987	Feldman et al.	395/2.16
4,932,061	6/1990	Kroon et al.	395/2.32
5,007,094	4/1991	Hsuen et al.	395/2.35
5,060,269	10/1991	Zinser	381/38

OTHER PUBLICATIONS

Digital Speech Processing, Synthesis and Recognition by Sadaoki Furui, Marcel Dekker, inc., New York, NY 1989, section 6.4.2 1989.

Primary Examiner—Allen R. MacDonald
Assistant Examiner—Thomas J. Onka
Attorney, Agent, or Firm—Skjervan, Morrill, MacPherson, Franklin & Friel; Forrest E. Gunnison

[57] **ABSTRACT**

A speech processing system and method are disclosed. In one embodiment of the present invention, the system includes at least a maximum likelihood quantization (MLQ) multi-pulse analysis unit operating on a target vector. The MLQ multi-pulse analyses unit typically determines an initial gain level for the multi-pulse sequence and performs single gain multi-pulse analysis (MPA) a number of times, each with a different gain level. The pulse sequence which most closely represents the target vector is provided as an output signal. In another embodiment, the system includes at least a pulse train multi-pulse analysis unit wherein the target vector is modeled as a series of pulse trains. Each pulse train comprises a plurality of single gain pulses, wherein each pulse is at a position which is a pitch value distance apart from the previous pulse in the pulse train. Combinations of maximum likelihood analyses with pulse trains are also part of the present invention.

17 Claims, 10 Drawing Sheets

Facsimile Cover Sheet

To: Mr. Frank Cohen
Company: ITU
Phone: +41-22-730-5896
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From: Serdar Yurdakul
Company: DSP Group
Phone: 408-986-4480
Fax: 408-986-4490

Date: June 9, 1997
Pages including this cover page: 3

Dear Frank,

Just got back from my business trip and catching up on my emails and faxes ...

I happened to check the TSB database and have seen that the two patents are in the list already. Thank you for getting this done so quickly. I have one more favor to ask of you. If you can modify the company name as ACL/DSP Group instead of just DSP Group, it'll be more accurate and I don't get into trouble with our partner AudioCodes (!).

Enclosed is the copy of letter for your records that was submitted to ITU.

Please let me know if I can be of further assistance and thank you again

Best Regards

May 10, 1995

Mr. Th. Irmer
Director of Telecommunication Standardization Bureau
ITU
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CH-1211 Geneva
Switzerland
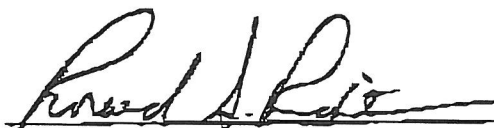
RE: Patent Licensing Policy

DSP Group Inc. and AudioCodes Ltd. hereby declares that it is prepared to license its patents, both granted and pending, which are necessary to manufacture and sell implementations of the proposed Recommendation G.723.

DSP Group Inc. and AudioCodes Ltd. hereby declares that they are aware of the rules governing inclusion of patented items in ITU-T Recommendations, as described the ITU-T code of practice regarding intellectual property rights, and in particular that they are willing to grant a license to an unlimited number of applications throughout the world under reasonable terms and conditions that are demonstrably free of unfair competition.

Sincerely,

Ronald S. Richter
Director of Technology Licensing
DSP Group, Inc.

Shabtai Adlersberg
President
AudioCodes, Ltd.

DSP GROUP, INC.

■   ■   ■

3855 Kifer Road. Suite 200
Santa Clara. CA 95061
Tel: 408 898.4300
Fax: 408 986.4323

March 28, 1994

ITU-TS

SG 15 Experts Group on Low Bit Rate Videophone

Source: DSP Group, Inc. and AudioCodes Ltd.

Title: Submission of DSP Group's and AudioCodes' MP-MLQ Variable Rate
         Speech Coder as a Speech Coder Candidate for the Low Bit Rate
         Videophone Standard

DSP Group, Inc. and AudioCodes Ltd. (Israel) would like to submit a MP-MLQ variable
rate speech coder for the Low Bit Rate speech coder part of the Visual Telephony
standard. A 6.4 Kbps version of this coder was submitted for testing on February 28,
1994.

Both DSP Group and AudioCodes have patents pending and patent applications in the
process of filing which are essential to the submission for the low bit rate speech coder
portion of the standard. In case that the MP-MLQ variable rate speech coder is selected
for incorporation in the standard, AudioCodes and DSP Group will make available
licenses under such patents to any applicant on reasonable terms and conditions that are
demonstrably free of unfair discrimination.