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Patent Application No. 10/667,207  
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Attorney Docket No. ALPH.P010X	Patent
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Atty. Docket No. ALPH.P010X

PATENT

**IN THE UNITED STATES PATENT OFFICE**

In Re Patent Application of:	)	
Gregory C. Burnett, et al.	)	Examiner: Lun S. Lao
	)	Art Unit: 2615
Application No.: 10/667,207	)	
	)	
Filed: September 18, 2003	)	
	)	
For: VOICE ACTIVITY DETECTION (VAD)-BASED	)	
MULTIPLE-MICROPHONE ACOUSTIC NOISE	)	
SUPPRESSION	)	

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

**RESPONSE TO OFFICE ACTION UNDER 37 C.F.R. § 1.111**

Sir:

This is in response to the Office action mailed February 7, 2007. Please enter and consider the following amendments and Remarks.

Attorney Docket No. ALPH.P010X

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*Patent Application No. 10/667,207*

## IN THE CLAIMS

- 1 1. (Currently amended) A method for removing noise from acoustic signals,  
2 comprising:  
3 receiving a plurality of acoustic signals, wherein receiving the plurality of  
4 acoustic signals includes receiving using a plurality of independently located  
5 microphones;  
6 receiving information on the vibration of human tissue associated with human  
7 voicing activity;  
8 generating at least one first transfer function representative of the plurality of  
9 acoustic signals upon determining that voicing information is absent from the plurality of  
10 acoustic signals for at least one specified period of time; and  
11 removing noise from the plurality of acoustic signals using the first transfer  
12 function to produce at least one denoised acoustic data stream.
- 1 2. (Original) The method of claim 1, wherein removing noise further comprises:  
2 generating at least one second transfer function representative of the plurality of acoustic  
3 signals upon determining that voicing information is present in the plurality of acoustic  
4 signals for the at least one specified period of time; and  
5 removing noise from the plurality of acoustic signals using at least one  
6 combination of the at least one first transfer function and the at least one second transfer  
7 function to produce at least one denoised acoustic data stream.
- 1 3. (Original) The method of claim 1, wherein the plurality of acoustic signals  
2 include at least one reflection of at least one associated noise source signal and at least  
3 one reflection of at least one acoustic source signal.
- 1 4. (Original) The method of claim 1, wherein receiving the plurality of acoustic  
2 signals includes receiving using a plurality of independently located microphones.

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1 5. (Original) The method of claim 2, wherein removing noise further includes  
2 generating at least one third transfer function using the at least one first transfer function  
3 and the at least one second transfer function.

1 6. (Original) The method of claim 1, wherein generating the at least one first  
2 transfer function comprises recalculating the at least one first transfer function during at  
3 least one prespecified interval.

1 7. (Original) The method of claim 2, wherein generating the at least one second  
2 transfer function comprises recalculating the at least one second transfer function during  
3 at least one prespecified interval.

1 8. (Original) The method of claim 1, wherein generating the at least one first  
2 transfer function comprises use of at least one technique selected from a group consisting  
3 of adaptive techniques and recursive techniques.

1 9. (Original) The method of claim 1, wherein information on the vibration of human  
2 tissue is provided by a mechanical sensor in contact with the skin.

1 10. (Original) The method of claim 1, wherein information on the vibration of human  
2 tissue is provided via at least one sensor selected from among at least one of an  
3 accelerometer, a skin surface microphone in physical contact with skin of a user, a human  
4 tissue vibration detector, a radio frequency (RF) vibration detector, and a laser vibration  
5 detector.

1 11. (Original) The method of claim 1, wherein the human tissue is at least one of on a  
2 surface of a head, near the surface of the head, on a surface of a neck, near the surface of  
3 the neck, on a surface of a chest, and near the surface of the chest.

1 12. (Currently amended) A method for removing noise from electronic signals,  
2 comprising:

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3 detecting an absence of voiced information during at least one period, wherein  
4 detecting includes measuring the vibration of human tissue, wherein detecting the  
5 plurality of acoustic signals includes detecting using a plurality of independently located  
6 microphones;

7 receiving at least one noise source signal during the at least one period;

8 generating at least one transfer function representative of the at least one noise  
9 source signal;

10 receiving at least one composite signal comprising acoustic and noise signals; and

11 removing the noise signal from the at least one composite signal using the at least  
12 one transfer function to produce at least one denoised acoustic data stream.

1 13. (Original) The method of claim 12, wherein the at least one noise source signal  
2 includes at least one reflection of at least one associated noise source signal.

1 14. (Original) The method of claim 12, wherein the at least one composite signal  
2 includes at least one reflection of at least one associated composite signal.

1 15. (Original) The method of claim 12, wherein the human tissue is at least one of on  
2 a surface of a head, near the surface of the head, on a surface of a neck, near the surface  
3 of the neck, on a surface of a chest, and near the surface of the chest.

1 16. (Original) The method of claim 12, wherein detecting includes use of a  
2 mechanical sensor in contact with the human tissue.

1 17. (Currently amended) The method system of claim 12, wherein detecting includes  
2 use of a sensor selected from among at least one of an accelerometer, a skin surface  
3 microphone in physical contact with a user, a human tissue vibration detector, a radio  
4 frequency (RF) vibration detector, and a laser vibration detector.

1 18. (Original) The method of claim 12, wherein receiving includes receiving the at  
2 least one noise source signal using at least one microphone.

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