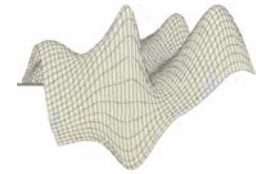


VOICEDUCER[®]



Tomorrow's technology in today's world.



Future Technology Industry Limited

Technology Overview



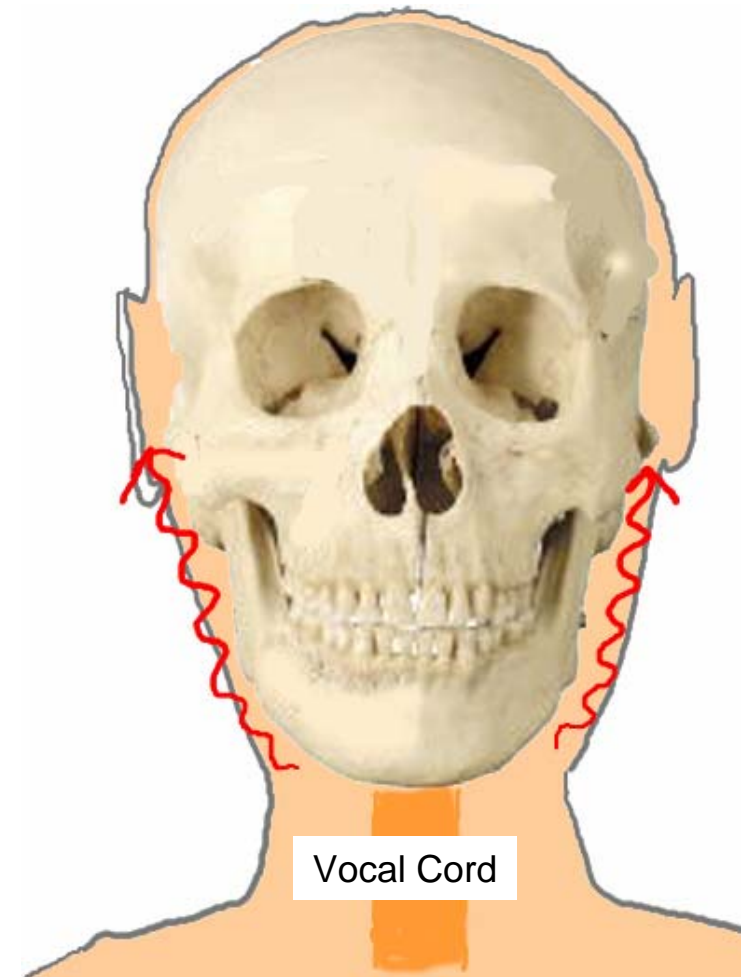
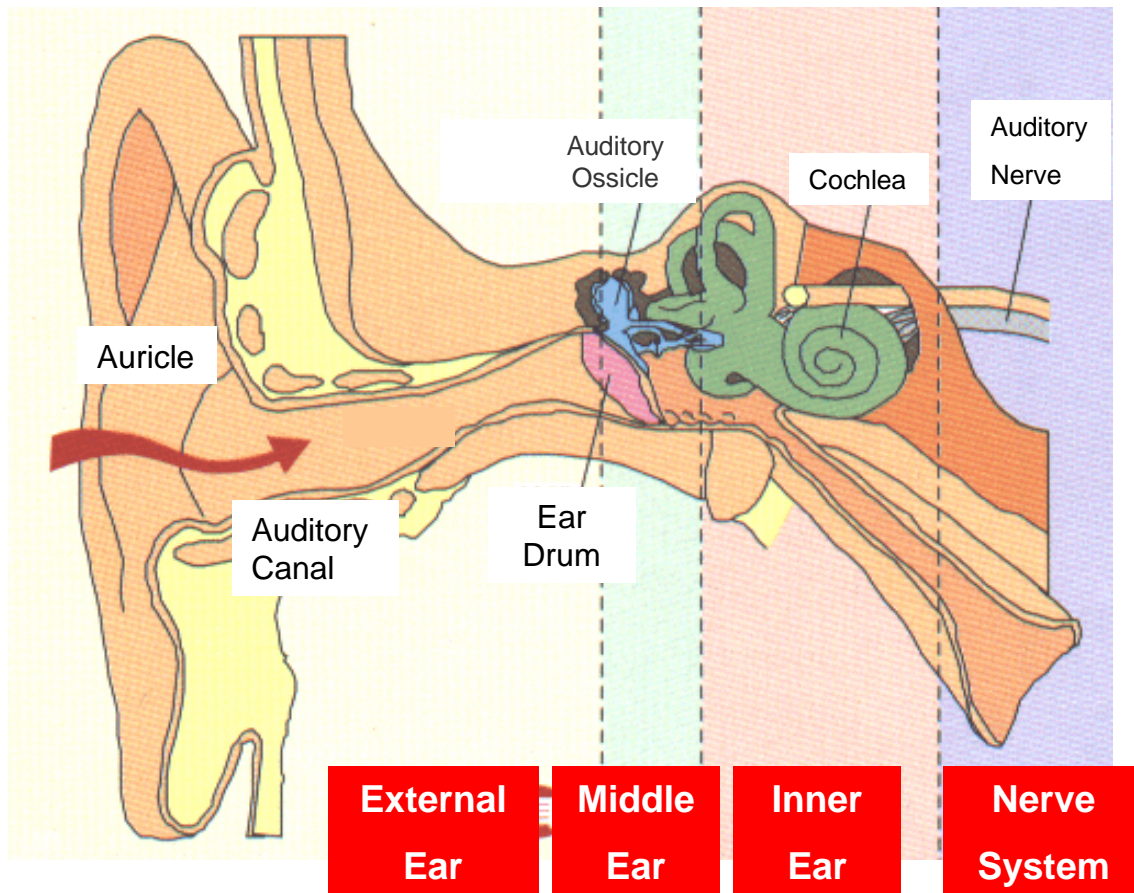
- Capable of designing high quality Audio Electrical Transducers.
Speakers and microphones with desired frequency response, directivity, anti-noise (incl. wind noise) capabilities
- On top of sound pressure type of speakers/microphones, we designs/manufactures Bone Vibration speakers/microphones (*patented*).
- Same engineering designs the sp and mic housing for the maximum performance of those devices.
- With its electrical and mechanical engineering, we developed a number of different communication equipment and audio peripherals.
- Understanding int'l technical specifications such as FCC, UL, CE, IEC, MIL.
- **Patents** and **Trade Marks**

Patents	USA: 5	Japan: 11	Other: 9
Pat. Pending	USA: 14	Japan: 27	Other: 27
Trade Mark	USA: 3	Japan: 7	

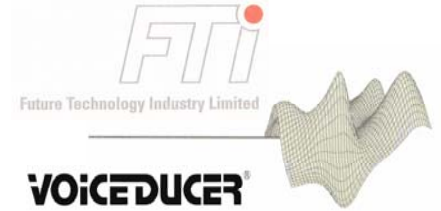
VOICEDUCER® is a trademark of Temco Japan Co., Ltd.

Technology Overview

1. Physiological transducers (Bone vibration / conduction)



Technology Overview



2. BoneKnocker (Bone Vibration Speaker)

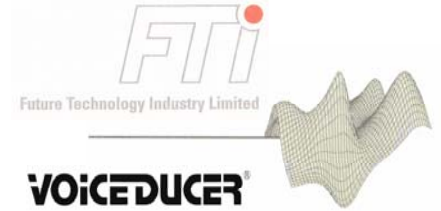
Pros

- Leaves the ears open completely (situational awareness)
- Flexibility on speaker location
- Plugging the ears for hearing protection increases the intelligibility of incoming audio
- Same headset for both noisy and quiet environment
- Easy water-proofing (works under water)

Cons

- Narrower dynamic range compared to sound pressure speakers
- Requires more power to drive

Technology Overview



3. Bone Vibration Microphone

Pros

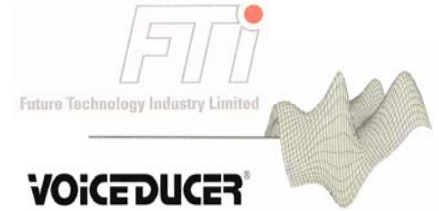
- Leaves the mouth open completely
- Flexibility on microphone location
- Superb anti-noise capability
- Easy water-proofing (works under water)

Cons

- Narrower dynamic range compared to sound pressure microphones
- Frequency response is different

Note: Our engineers also have the extensive experiences in sound pressure type of speakers and microphones.

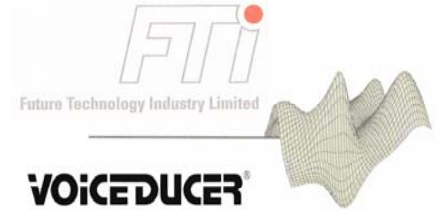
Technology Overview



4. Electrical Design

- Audio Frequency (AF) circuit for maximum performance of bone vibration speakers and microphones
- Extensive know-how in designing Radio Frequency (RF) circuit
 - Wireless by RF, Infra-red, Ultra Sonic, Bluetooth
- Digital Voice Processing by DSP
 - Algorithm to detect the sound generated by human vocal cord from the rest of the noise.
 - Digitally canceling the noise other than the voice
 - High performance echo/howling canceller
 - Digitally enhancing the voice signal picked up by bone vibration microphone
- Voice Recognition & Voice/Speech Synthesis

Technology Overview



5. Mechanical Design

- Housing bone vibration (& sound pressure) microphones and speakers for maximum performance
- ALT: Accelerated Life Test
Simulating 5 year of normal use in one month
- [Waterproof housing/casing](#)
- Capable of designing [Connectors/Plugs](#)
- Human Factors Engineering (HFE)

Note: Our engineers also have the extensive experiences in designing various types of audio/communication equipment.

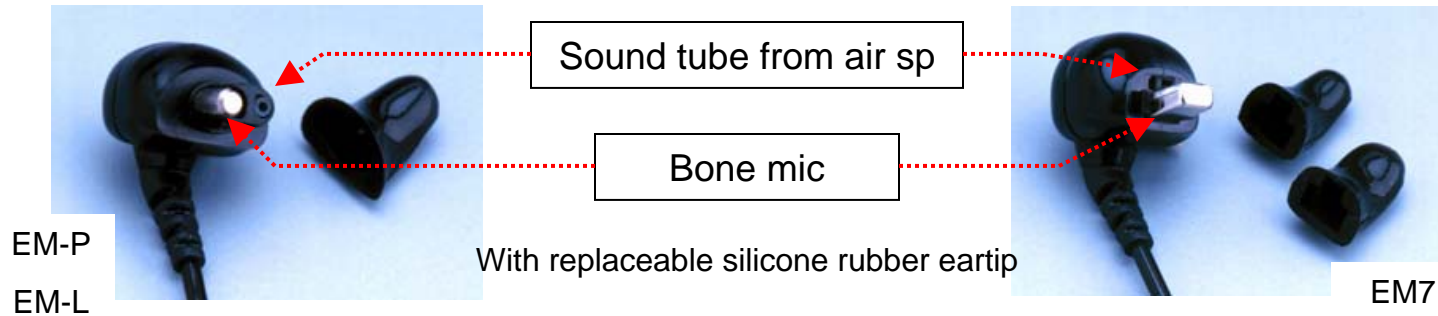
Products



1. Headsets

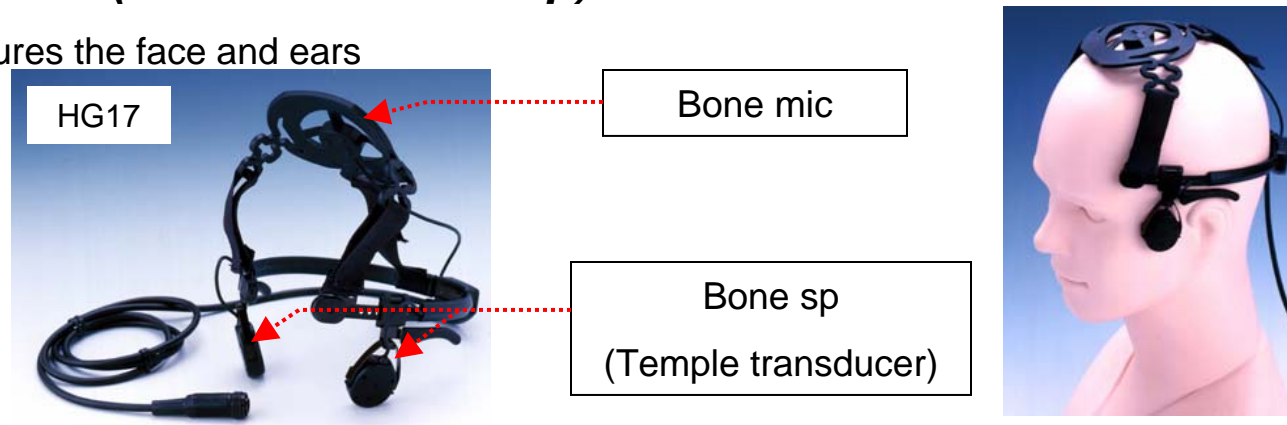
A) Ear Microphone (bone mic + air sp)

Looks like an ordinary earpiece, but capable of two-way audio communication

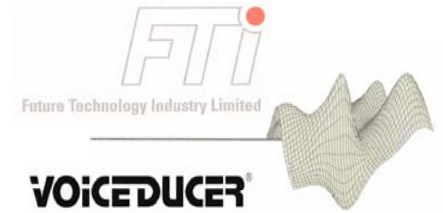


B) Headset 1 (bone mic + bone sp)

Nothing obscures the face and ears



Products



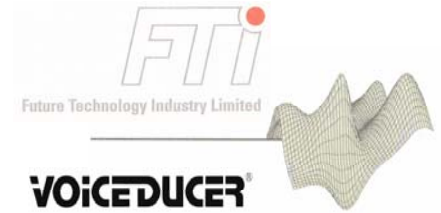
C) Headset 2 (air mic + bone sp)



D) Headset 3 (bone mic + bone sp)



Products



2. Interface Modules (I/M)

A) *Connecting Ear Microphone and two-way portables*

Provides equalizing and amplification to ear microphone as well as external PTT function



RD
(VOX/PTT)



RB
(PTT)



SD
(VOX/PTT)



SB
(PTT)

Products



B) Connecting Various Headsets and two-way portables

Can accommodate different types of mic (bone/air) and sp (bone/air)



BM8

- Large PTT button
- Long switch stroke
- Good tactile
- Smart PTT (w/auto shut-off)
- Waterproof (IP67)



DM19

- DSP VOX
- DSP Noise Canceling
- Lithium ion battery



DM1

- DSP VOX and Noise Canceling
- NiCd (Telario) or AAA bat.
- Switchable connector cable

Products



C) *Connecting Various Headsets and Cellular Phones*



HP1

- Connects HG20/HG21 to cellular phones
- Boosts sp output from the phones to drive BoneKnocker

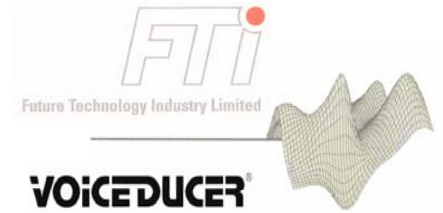
HP2

- Connects EM7 to cellular phones
 - Prevents howling (audio feedback)
- (Not by DSP)

DM3 (Looks the same as DM1)

- Connects HG17 to full duplex radios and cellular phones
- Prevents howling (audio feedback) by DSP

Products



3. ShellShocker, Helmet Communication System

Bone Vibration Speaker on the helmet surface turns it into speaker.



Kit for Cellular Phone



For Two-way Portable Radios

Products



4. Kikuchan, Assistive Listening Device (ALD)

Hearing Aid

- For GENERAL listening situation
Trying to catch ALL the sound reaching the ear
- Microphone is placed at the ear
- For hearing impaired person only



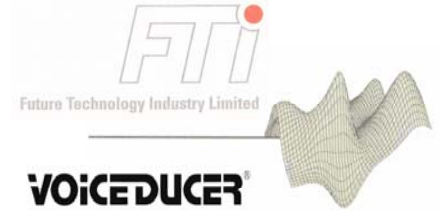
ALD

- For SPECIFIC listening situation
Trying to emphasize the ONLY sound the user is interested
- Microphone is placed close to the sound source
- For the hearing impaired and the people interfacing them



Medical equipment certificate in Japan : 21300BZY00587000

Major Customers



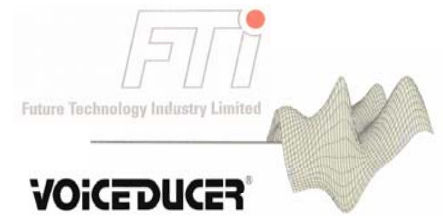
1. U.S. Army

Temco has been working with U.S. Armed Forces, especially Army, for more than 15 years. Past projects are listed below.

- U.S. Army, Objective Force Warrior Program
- U.S. Army TSM Soldier, Project No. D668, Ear Transducer VOX System
- U.S. Army SOCOM, Directorate of Combat Developments, Communications Branch
- U.S. Army STEPO, (Self-Contained Toxic Exposure Protective Outfit)
- U.S. Army SIPE, (Soldier Integrated Protective Ensemble)
- U.S. Army Research Laboratory (USARL), Cooperative Research & Development Agreement (CRADA)
- U.S. Army Advanced Bomb Suit Program
- MedTeams Program: Team Coordination for Emergency Care
- University of Maryland, Shock Trauma Center, Mobile Wireless Communications
- Madigan Army Medical Center, IRED

Our bone sp/mic will be a part of standard infantry helmet to be deployed from 2003.

Major Customers



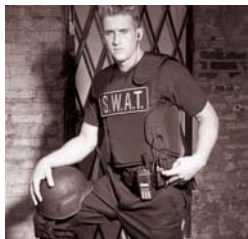
U.S. Army



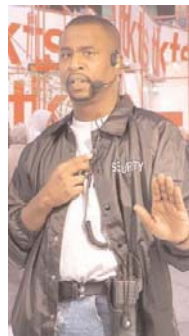
Fire Brigade



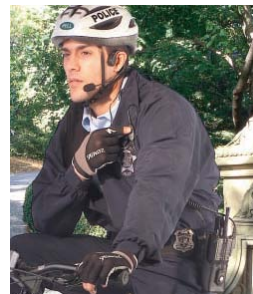
S.W.A.T



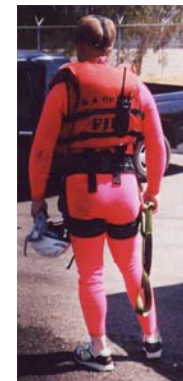
Secret Service



Police



U.S. Coast Guard



Major Customers



2. Cellular Phone Manufactures

Nokia and several other cell phone manufacturers in Japan are interested in using Temco BoneKnocker for their cell phones.

3. Toyota

Toyota is interested in incorporating bone sp/mic into the headrest of the car seat.

4. Tokyo Electric and Power Co. (TEPCO)

Remote power control of electrical equipment will be in service in the second half of 2003.

5. Universal Studio Japan (USJ)

Combination of BoneKnocker and Ir wireless equipment will be used as a navigation system for the visually impaired as well as multi language Broadcast.