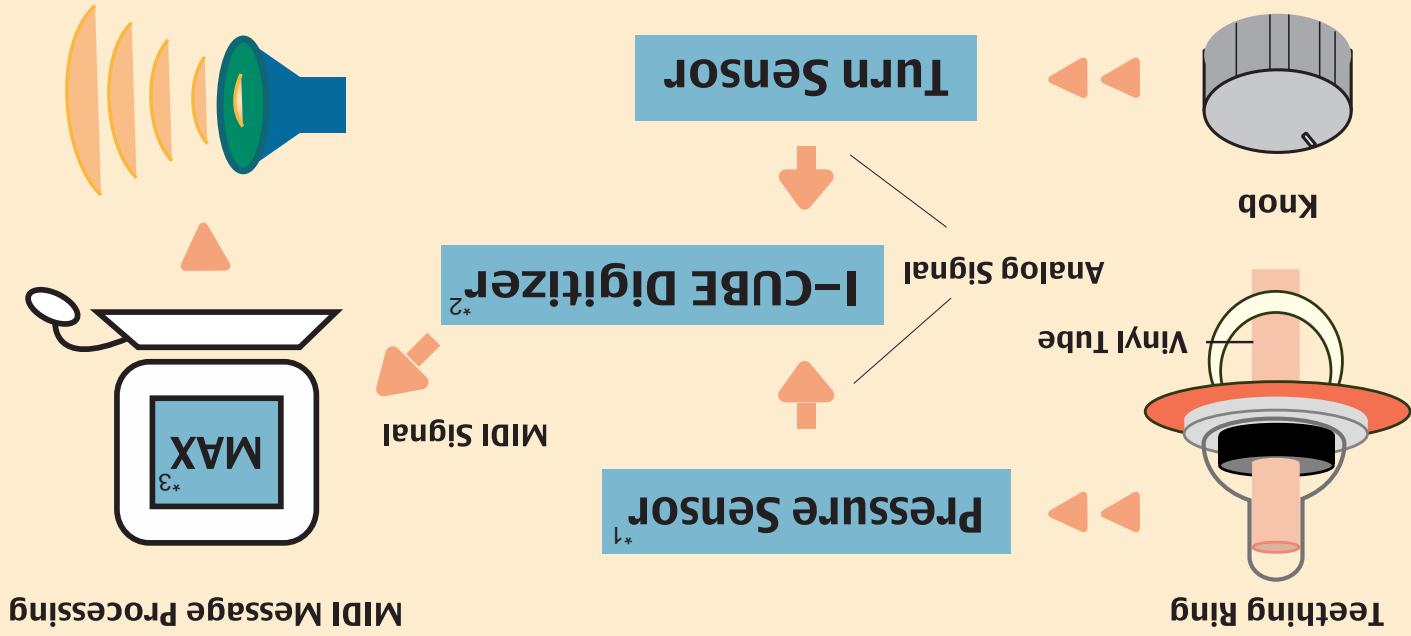


# SYSTEM



The TSI system consists of a teething ring, a knob, an I-Cubex Digitizer and a computer running MAX. By dividing the operation into the teething ring and the knob, the TSI encourages interaction between the parent and baby.

**\*1** The pressure sensor detects change of the air pressure in the tube when the baby is sucking the nipple.

**\*2** The I-Cubex Digitizer translates analog voltages (generated by sensors) to MIDI signals.

URL: <http://www.infusionsystems.com>

**\*3** MAX processes the MIDI messages and generates the sound.

URL: <http://www.cycling74.com/index.html>

**TSI (Teething ring Sound Instrument)** is a new sound instrument given to baby which consists of teething ring, knob, I-Cubex Digitizer and computer which processes MIDI message.

It brings music experience to baby with the sucking motion using the reflex movement, and the relation of parents produced the joy making sound by both parents and baby.

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# APPLICATION

## HARMONIC The target age is over 0-year-old.

This application consists of a "basic part" composed simple 3 note C-major chord and an "expansion part1~5" changes with every suck. Both pitches correspond to the change of the sucking pressure. When the teething ring is strongly sucked, a higher note rings.

Expansion Part 1  
Expansion Part 2  
Expansion Part 3  
Expansion Part 4  
Expansion Part 5  
Basic Part

## MELODIC The target age is over 1-year-old.

This application is when the baby begins to suck, a melody with the simple rhythm begins to sound, and stops when the sucking motion is finished.

### MELODIC 1

Part 1  
Part 2  
Part 3

MELODIC 1 consists of 3 parts. All parts ring when baby begin sucking.

### MELODIC 2

sucking start ▶▶ continue sucking

Part 1  
Part 2  
Part 3  
Part 4

MELODIC 2 consists of 4 parts. First, part1 and part 2 ring, next part 3 join, finally part 4 rings. When all parts ring, this melody is perfected.

## RHYTHMIC The target age is over 1-year-old.

This application consists of 5 rhythm pattern. When the baby begins to suck, a rhythm pattern assigned by knob begins to sound and stops when the sucking motion is finished.

Tempo and level of all rhythm pattern correspond to the change of the sucking pressure. When the teething ring is strongly sucked, tempo becomes faster and louder notes ring.

pattern 1  
pattern 2  
pattern 3  
pattern 4  
pattern 5

Switch 5 rhythm pattern by turning knob.

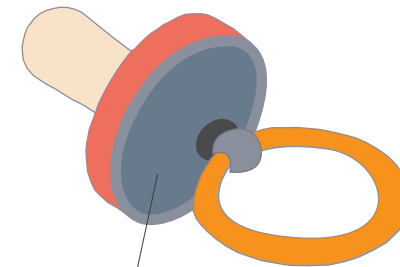
### EXAMPLE

Expansion Part 1 + Basic Part  
Expansion Part 2 + Basic Part  
Expansion Part 3 + Basic Part

first sucking    second sucking    third sucking    continue..

## FUTURE WORK

This is the future form of the TSI. We dream downsizing and lightweightization. But we have to consider safety for the baby. That's the problem with which we are faced now.



It include pressure sensor, speaker and battery,

We wish following things.

- The TSI helps baby's development of sense organs and faculty of perception.
- Babies of all over the world use the TSI.
- By playing with the TSI, babies enjoy the interaction with their parents, particularly father.

## Q & A

### Q Why did the TSI design teething ring form?

A The TSI is designed to bring music experience to baby with the movement of the baby's reflex sucking motion. Sucking motion urges development of a jaw, gives a stimulus to a brain and makes the foundation of development of language.

### Q Why is an interaction important for baby?

A Baby change undifferentiated structure of concepts (things, space, numbers, causality, etc.) to more differentiated and organized cognitive structure. By doing it baby accomplishes developmental change.

### Q How was the target age of HARMONIC decided?

A The change of the notes can be enjoyed even by the reflexive sucking motion. Therefore, this is ideal for use from the baby's initial stage of growth.

### Q How was the target age of MELODIC & RHYTHMIC decided ?

A These application, are intended for the young, somewhat cultured child accustomed to a certain degree to Western tonal music. Over 1-year-old is the age to acquire the tonality schema so that the perception of a rhythm or a melody can be performed pertinently.

