



5NDigital

Tunneling through walls

32 Sylvia Lane, Plainview, NY 11803 USA

+1 (516) 662-2322

tapsight@gmail.com



Lev Neymotin

PhD
N5Digital
President and CEO



Olesya Saprykin

Designer, MA in Product Design and Development
Conceptual Design Division
Member of Russian Association of Designers,
International Council of Societies of Industrial Design (Icsid)
Graduated Ural State Academy of Architecture and Arts
Yekaterinburg, Russia



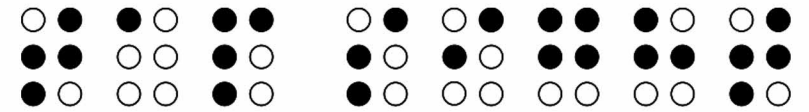
Ilya Saprykin

Designer, MA in Architecture
3D Modeling Division
Graduated Ural State Academy of Architecture and Arts
Yekaterinburg, Russia



Barak Speiser

Film Professional
Film and Media Division



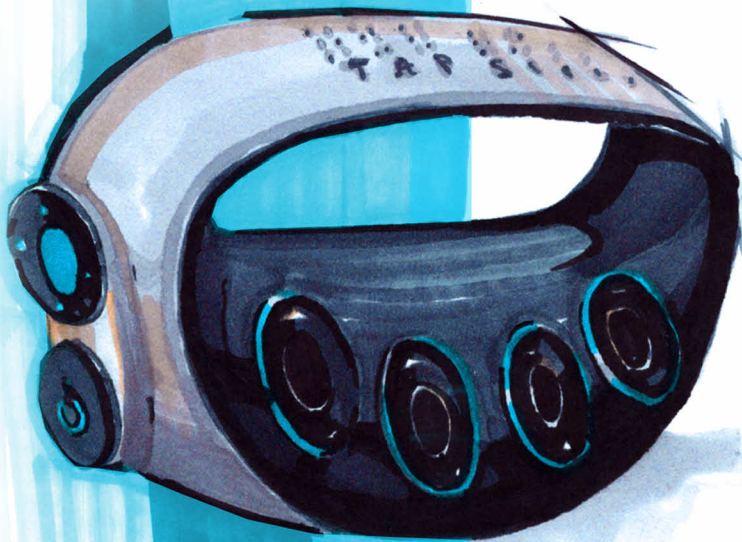
T A P S I G H T

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TapSight: Personal Handheld Braille Two-way Communication and Control Device



Lev Neymotin

project lead



Olesya Saprykin

conception
and design



Ilya Saprykin

design and
3D model
development

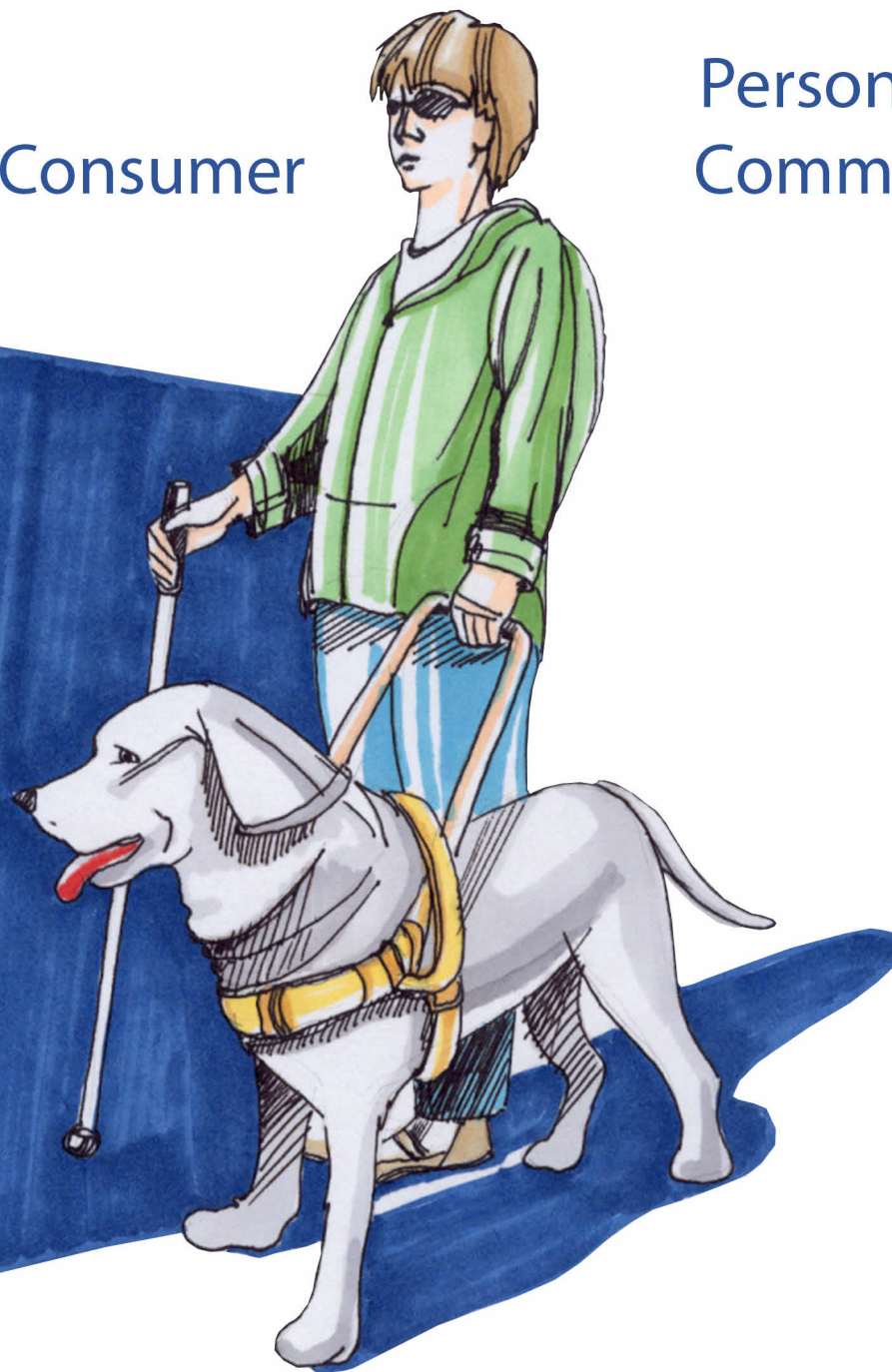


Barak Speiser

media and
development

Goal: Design a miniature handheld wireless two-way communication and control device enabling the visually impaired users to access, control and process text-based information stored on PCs, tablets, cell phones, and other electronic devices, as well as on Internet sites. TapSight can be used by anyone wishing to learn Braille and read Braille-based electronic books or communicate through tactile perception

Consumer

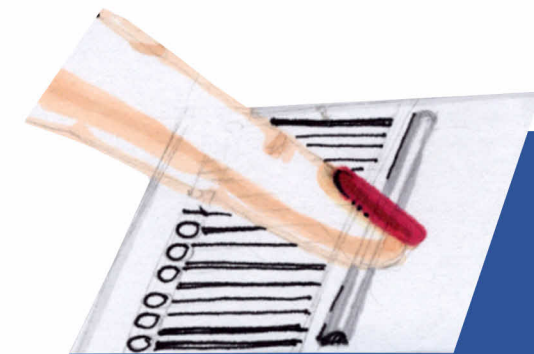


Personal Handheld Braille Two-way
Communication and Control Device



Objective:

Design an electronic device based on use of tactile perceptions for communication and data exchange while reducing reliance on audio interface



Analogue: Concepts of Braille e-book readers



Conceptual design of the Anagraphs e-reader
(development ended due to lack of funding)



These Braille e-readers attracted significant attention when
their development was announced more than five years ago
(similarly, project ended due to lack of funding)



This portable refreshable-screen Braille reader was manufactured
as a functional prototype (supports Excel, Twitter, YouTube, and
Dropbox); however, its cost exceeds \$4,000

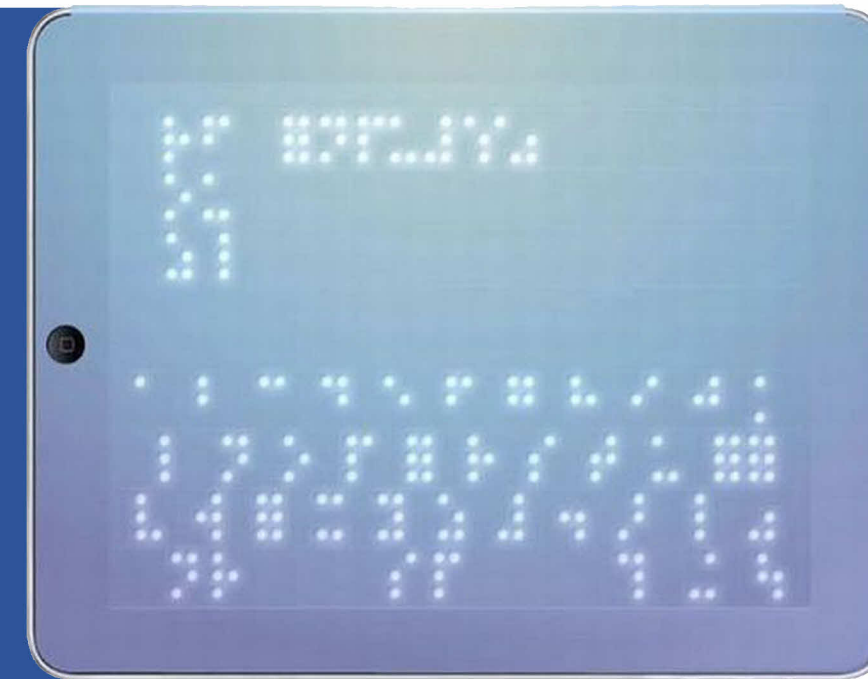
Advantages:

1. ability to read conventional Braille books converted to electronic format and add new books to personal libraries;
2. useful for teaching Braille; to children or people who were born blind or lost their sight;
3. speed of reading limited only by the capability of individual users.

Disadvantages:

1. high production cost and price (may exceed \$2,400 for a 40-character screen);
2. large dimension and weight;
3. mostly table-top or tablet models (limited portability).

Concept of iSense is Apple iPad for Blind Users



Advantages:

1. conceived as a device capable of displaying 3D Braille and conventional text on the same specially designed screen

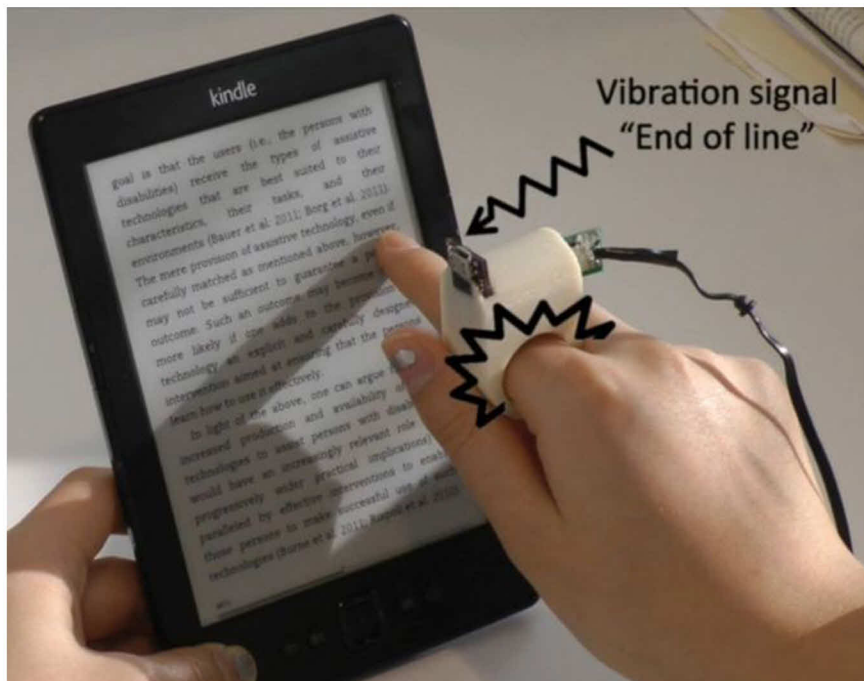
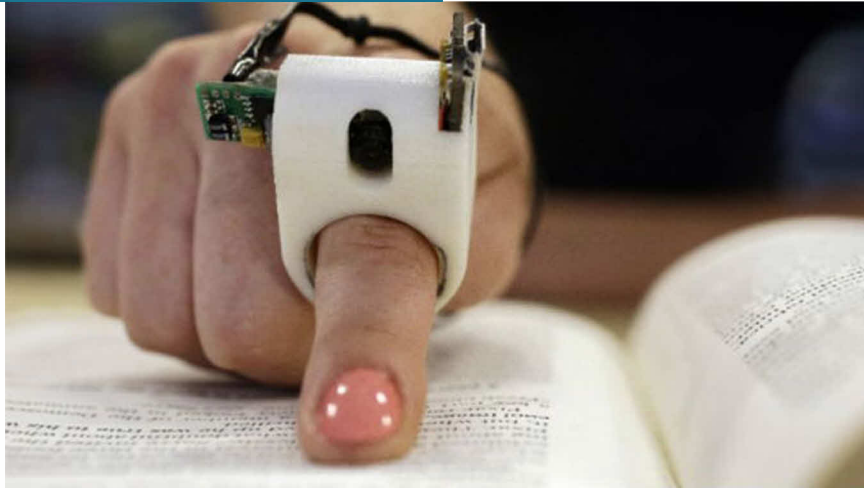
iSense



Disadvantages:

1. use of technology that has not been developed yet;
2. replaced conventional iPad icons with abstract symbols constructed in Braille style – introduces confusion for software developers and users

Analogue: Concept of Finger Reader



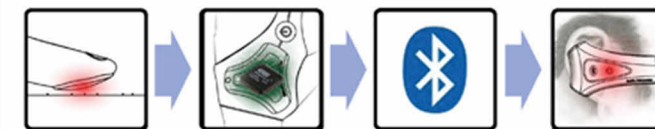
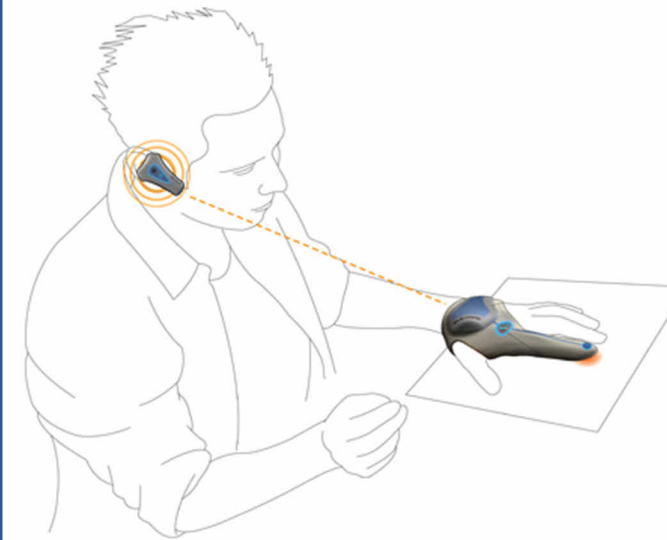
Advantages:

1. provides ability to read conventionally printed books and text which is useful in everyday life;
2. speed of reading is limited only by the ability of individual users;
3. no need to learn Braille since the reader works with usual letters.

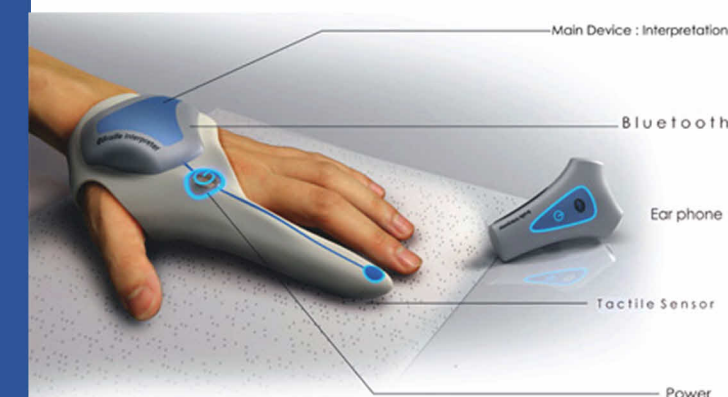
Disadvantages:

1. requirement to use audio: over-reliance on audio can make it harder for blind people to learn spelling of words and structure of the sentences as well as acquiring typing skills;
2. helps users to keep the finger on the line of text by providing a vibration-based guidance, when needed; yet, it still may be challenging to move the finger along the straight line;
3. uses a wired device interface;
4. does not work with touch screen.

Concept of Braille Interpreter



1. Tactile sensor 2. Interpreting 3. Bluetooth 4. Voice
Brille Interpreter is a wearable device that makes blind people who can't read braille interpret it, they can sense it by using tactile sense of index finger. Main device on the back of the hand translates the data from sensor into voice. Earphone delivers voice from main device to a blind by using bluetooth.



Advantages:

1. provides ability to read conventionally printed books and text which is useful in everyday life;
2. speed of reading is limited only by the ability of individual users;
3. no need to learn Braille since the reader works with usual letters;
4. based on Bluetooth technology.

Disadvantages:

1. requirement to use audio: over-reliance on audio can make it harder for blind people to learn spelling of words and structure of the sentences as well as to acquire typing skills;
2. no guidance helping to keep the finger on the line of text;
3. consists of two physical components: optical reader placed on the hand/finger and the earphone;
4. development stopped at the conceptual design level.

TAP SIGHT: Main view

Advantages:

- 1.** Patented method of two-way character data stream transmission using four TapSight's software-activated keys (TapSight Character Streaming);
- 2.** Using the patented method of two-way character data transmission, enable users to participate in active internet-based social life, including email and texting;
- 3.** Ergonomically designed: fits hands and stays on comfortably;
- 4.** Portable, handheld, miniaturized design;
- 5.** Minimized mechanical complexity leading to reduced manufacturing cost and the market price;
- 6.** Wireless capability; can also work by using a wired USB interface;
- 7.** Rechargeable through USB port which can be also used for upgrading firmware, when needed, and for downloading software apps;
- 8.** Adjustable speed of character generation on the tapsight keys;
- 9.** Ability to be used as a controller for interfacing with electronic devices and software;
- 10.** In addition to reading Braille books and other texts in electronic Braille format, provide the user with a possibility to use TapSight in two-way interaction with Internet sites: reading information from the site pages and adding text content to the pages;
- 11.** Convenience for using TapSight for learning Braille;
- 12.** Possibility to expand functionality by adding a camera, microphone, and speaker along with various apps available for download to the TapSight.



TAP SIGHT: Details

Select Button

• USB-A to USB-B cable

USB Power/Charger
Firmware/Apps
Device Interface

• Power Button

• Mode Buttons

• TapSight Keys
(Braille)

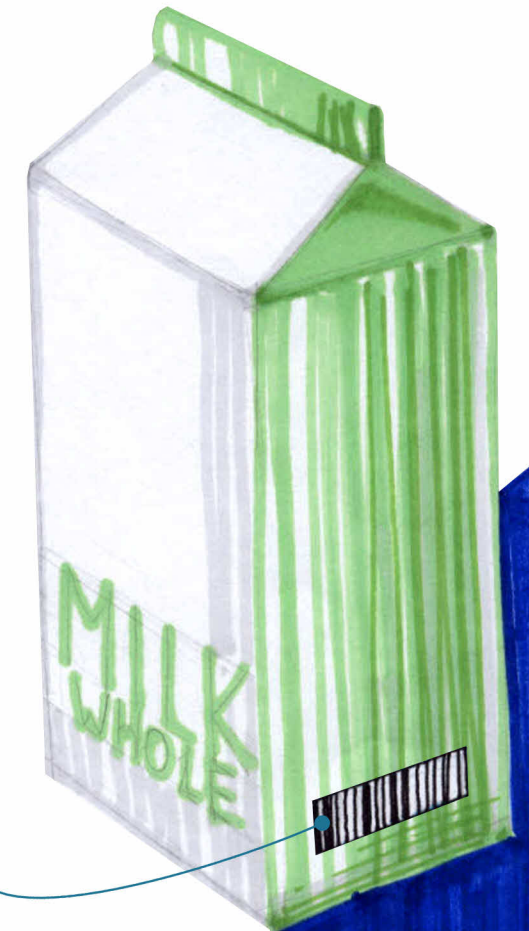
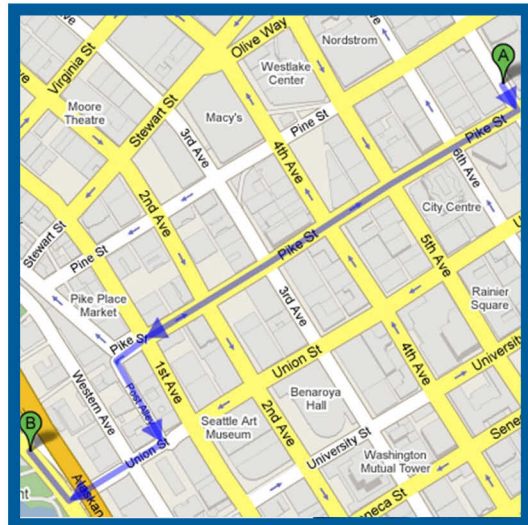


TAP SIGHT: Orthographic projections



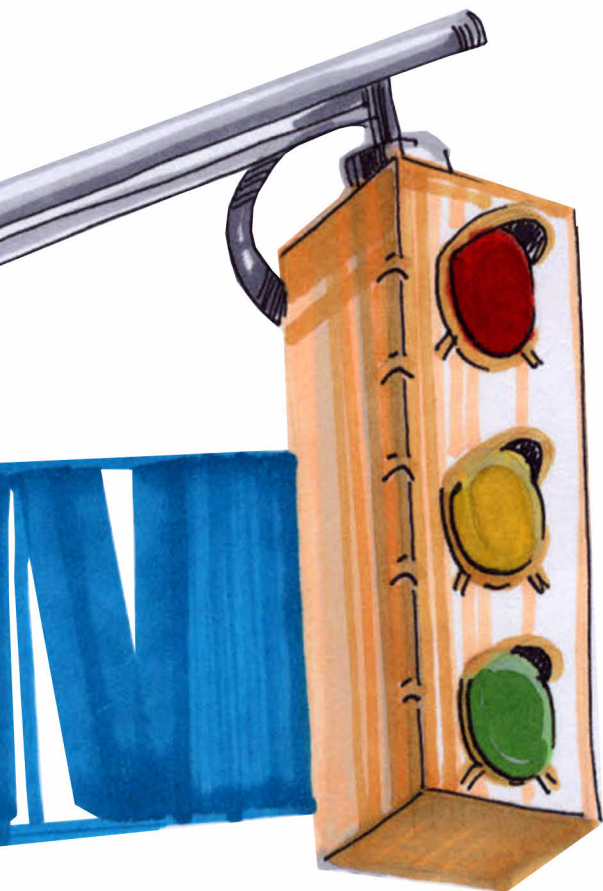
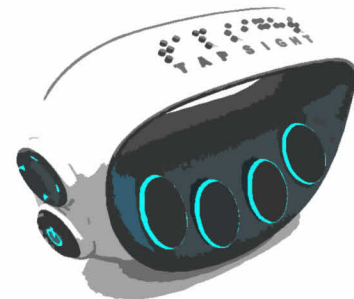
TAP SIGHT: Applications

Using voice commands for different applications such as map and GPS directions, Internet searches, etc.



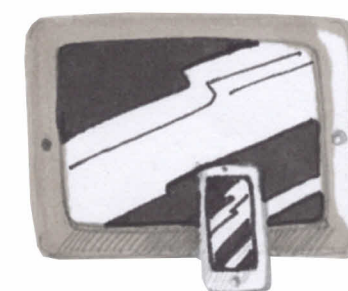
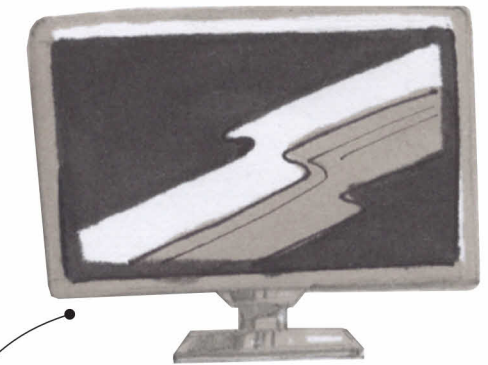
Reading information in barcode format when using printed labels on various products in everyday life

Reading visual signals: for example, street lights



TAP SIGHT: Applications

TapSight serves as a controller for TV, PC, Game Consol, Tablet, Cell phone, etc.

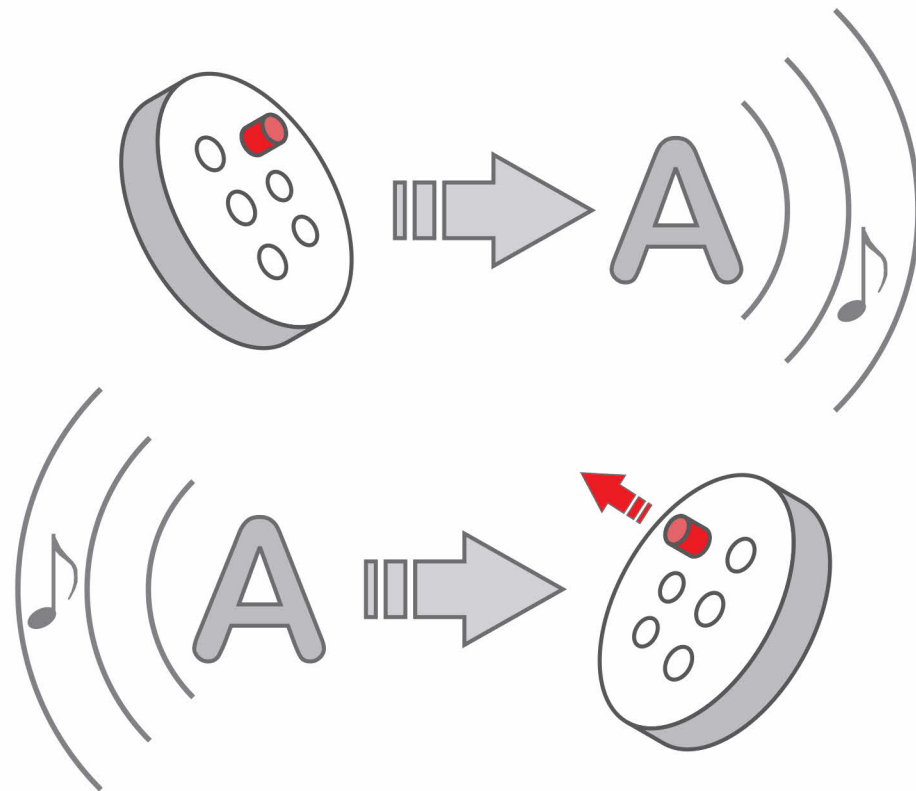


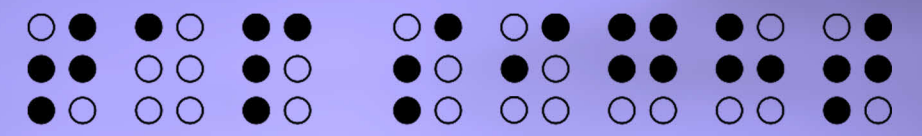
Wi-Fi

Portable, handheld.
User can wear it on a
belt or on the wrist as
a bracelet



Learning Braille:
TapSight facilitates
study of Braille





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1. Letters up/down arrangement on the button
2. Direction of letter flow
3. Send each individual letter sliding going down on each button sequentially?
4. Send letters by groups?
5. Send by 4-letter combinations/words?
6. Timing between changes on the button to provide comfortable time for recognition
7. Functions of the thumb button