OBLONG ULTRASONIC WAND USER MANUAL

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General information

Scope

This manual describes operation and specifications for the following two products:

Oblong 900MHz Wand
Model No. 0000422
Contains FCC ID: TK5-900MOD

Oblong 2.4GHz Wand
Model No. 0000054
FCC ID: PUQ-0000054

FCC Compliance Statement

This equipment has been tested and found to comply with the limits for a class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

The user is cautioned that changes and modifications made to the equipment without the approval of manufacturer could void the user's authority to operate this equipment.

Safety warnings

- There are no user-serviceable components in the wand. Please do not open the wand cases for any reason.
- Use only the chargers provided by Oblong to recharge the wands. These chargers use power-management techniques specific to the wand batteries. Other chargers do not charge the wands properly and could cause a battery explosion. Never attempt to replace the battery yourself; contact Oblong should this become necessary.
- The wands are intended for indoor use only, at typical room temperatures (15-30C). Do not use in unusually moist, hot, or cold conditions.
- Moisture can damage the wands' microphones and internal circuitry, resulting in failure or battery damage. If a wand is exposed to spilled liquids, please contact Oblong immediately.
- The wand may contain small parts or materials not suitable for children.
- Avoid trapping dirt in the microphones.
- To clean a wand, wipe it with a slightly damp cloth while avoiding the microphones.

Copyright

Patents pending

Introduction

Ultrasonic wand

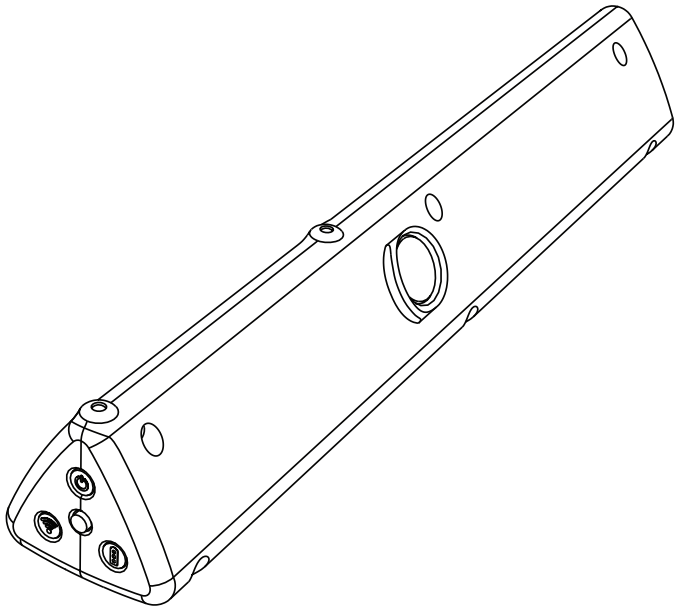
The Oblong ultrasonic wand is a new type of input device uniquely suited to support multi-user, multi-screen, interaction.

The ultrasonic wand is a hybrid ultrasonic and inertial tracking device. It must be used in an environment with fixed ultrasonic emitters; these emitters produce distinct pulses that are detected by four ultrasonic sensors on the body of the wand. The wand also contains an "inertial measurement unit" that provides information on the wand's orientation and motion, and a button press detection circuit. The wand continually sends these data to Mezzanine using radio frequency (RF) signals. Mezzanine then computes the wand's position and orientation in the room and animates interface elements in response.

The wand can be used either as a traditional pointing device, or as a gestural input device, allowing fluid and complex maneuvers to be executed simply. Both the pointing and gestural inputs are enhanced and modified by a single button on the wand to control all application functionality. There are three buttons on the wand, one on each of the three sides of the device, but they are functionally equivalent.

Mezzanine

Oblong's Mezzanine product is a multi-user, multi-screen, multi-device collaborative environment. The ultrasonic wand is the main control device for Mezzanine. Mezzanine software operation and features are not covered by this document.



Wand operation

Control basics

The wand has a distinctive, triangular shape. Each of the three sides has a similar appearance, and one should be positioned upwards while using the wand.

You can pick up a wand resting on a table or accept a wand handed to you without concern for which side faces upwards. All three of the control buttons perform an identical function, but the topmost button should be easiest to press. Pressing two or three buttons simultaneously has the same effect as pressing a single button.

Powering the wand

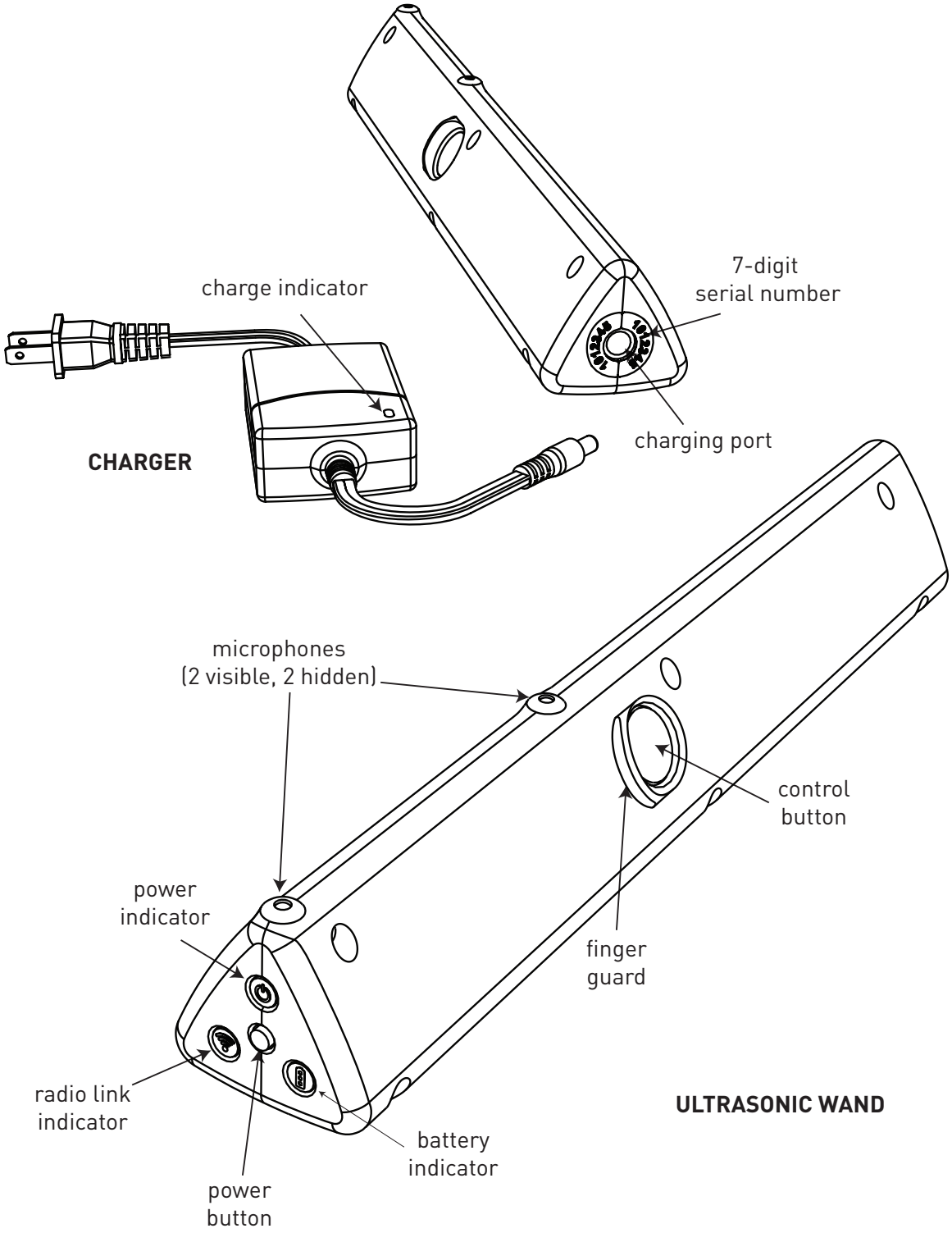
Press the power button once to power on the wand, and press it again to turn power off. The power indicator illuminates when the wand is on.

After the wand is powered, it may take up to 5 seconds for the RF link to be established. During this time, the wand cursor is not visible on the screen. In some circumstances, it may take another 10 seconds for the wand's initial position to be computed. During this period it is best to keep the wand motionless and the microphones unoccluded.

Wand components

power LED (⏻)	• on when wand is powered • off if wand is unpowered, battery is dead, or hardware failure has occurred
RF link LED (📶)	• on when wireless communication is continuous • off or flickering when wireless is dropped due to range, interference, or an unpowered tracking system • flashes during startup and setup operations
battery LED (🔋)	• on when powered and server software pipeline is active • flashes to indicate remaining charge during startup
power button	• turns the wand on and off
control buttons (3)	• used to activate elements of the g-speak user interface. • button color (blue/green) mapped to cursor color
microphones (4)	• ultrasonic sensors that listen to pulses from the fixed emitters
finger guards (3)	• ridge that helps position your thumb on the control buttons
7-digit serial number	• number used to uniquely identify the wand during setup and support
identification label	• lists wand part number and radio type
charging port	• connect battery charger to recharge wand battery
battery charger	• connect to charge wand from 120-240V outlet

Wand components diagram

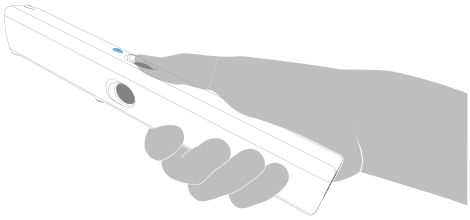


Wand motion gestures

The wand gestures listed below represent a key feature of the Oblong user interface. They work in concert with on-screen feedback in Mezzanine and in other applications.

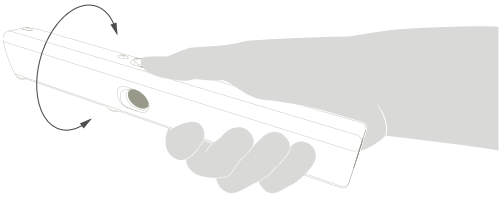
Pointing / Selecting

- pointing the wand towards a location on the screen like a laser pointer
- pressing or holding a control button while aiming to activate interface elements



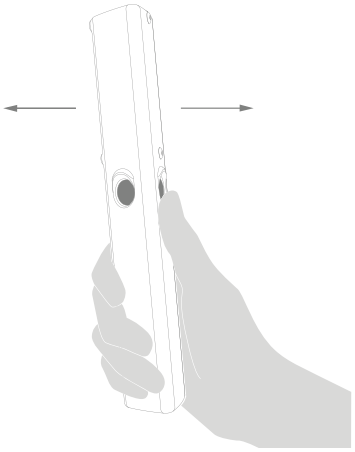
Ratcheting

- rotating a different wand face to the top by twisting or "flipping" the wand in your hand



Pushback

- orienting the wand vertically, holding down a control button, and moving the wand towards or away from the screen



Wand power management tips

Charging the wand

The wand uses an internal rechargeable battery for power. The battery is designed to last for over 10 hours of continuous operation, at which point it must be recharged. The wand cannot be used in a "wired" mode with the charger connected; thus it is important to pay attention to the wand's charge level.

To charge the wand, simply plug in the cable from the included charger. The charger's indicator turns red while charging and green when charging is complete. Charge time for a fully discharged wand is about 4 hours. Charging the wand regularly is recommended.

Automated power-off

To conserve battery power, the wand control software automatically turns off the wand after a present period of inactivity (typicallly several minutes). If the wand is no longer active when you pick it up, press the power button to reactivate it. You may need to wait several seconds for its position to be re-computed.

Checking remaining battery life

When the power button is pressed to turn the wand on, the battery indicator {} flashes a few times to display the charge level. The beeper makes the same indication audibly.

battery LED flashes ( )	approx. hours remaining
4	> 10
3	> 6
2	> 2
1	> 1
0	< 1

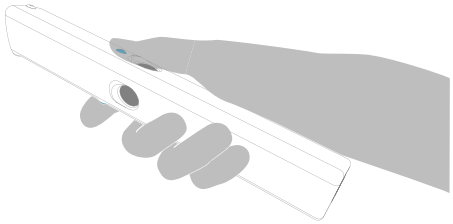
Long-term battery maintenance

Like all rechargeable batteries, the wand's internal lithium-ion battery eventually loses some of its capacity. It should last at least two years under typical use. Note that if a wand is stored without use for a long period, it should be recharged every two months to maintain battery performance. Do not leave the wand connected to the charger during long periods of inuse.

Performance tips

Microphone occlusion

In the diagram below, a thumb is covering one of the wand microphones. Try to avoid this as it reduces tracking performance. In addition, try to avoid blocking ultrasonic signals with your own body. The fixed ultrasonic emitters located on the ceiling or on the displays need a clear line-of-sight to be heard by the wands.



Wireless interference

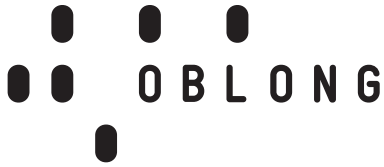
Avoid using wireless devices at close range. Nearby wireless devices that use the 2.4GHz or 900MHz bands may cause wand interference. These include laptops or phones that use the 802.11b/g band for WiFi communication, cordless phones, wireless sensors, and Bluetooth™ peripherals.

Basic troubleshooting

- Check that the battery is charged and that the RF link is active by inspecting the power and RF indicators.
- Use the browser-based wand admin tool to confirm that wand data is being received by the system.
- Check that Mezzanine is running.
- Contact Oblong if these steps fail to resolve the problem.

Wand specifications

dimensions	220 x 34 x 35 mm
weight	97g
radio type	802.15.4, non frequency hopping
radio frequency	2.4 GHz (2400 - 2480 MHz) or 900 MHz (902 - 928 MHz)
operating temperature	15 - 30 C
operating environment	indoor use only, Class A commercial environments
battery type	Li-Ion, 3.7V, 1400mAh
battery life	> 10 hrs
battery charger	4.2V, 100-240VAC, 500mA, supplied separately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