"Ocarina"

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https://artful.design/
**Ocarina**

A toyful re-envisioning of an ancient musical instrument, transformed in the kiln of modern technology.

Released in 2008 and designed for the iPhone, Ocarina was one of the very first musical instruments in the emerging landscape of app-based computing.

If the gag with sonic lighter is the absurdity of a practical thing that could never fulfill its intended purpose, then Ocarina is the opposite: a whimsical thing that can function, as an ancient flute-like instrument, on a phone! This joke here, no less absurd, is that it actually works!

Of all the things I have designed, I think Ocarina most concisely embodies the principles of artful design.

It transforms the phone into a flute-like instrument!

It’s physical and virtual, exploring both musical interaction and an expressive social dimension.

For me, it brings together a number of ideas in design.

**Form vs. Function**

- Economy of Design
- Audio
- Visual
- Physicality
- Musical Expression
- Play
- Toy Design
- Social Design
- Human-Computer Interaction
BLOW INTO THE PHONE TO ARTICULATE THE SOUND. BREATH IS TRACKED, PROCESSED, AND MAPPED TO LOUDNESS.

HOLD THE PHONE AS YOU MIGHT A SANDWICH, RESTING THE PHONE ON THE THUMBS AND RING FINGERS, LEAVING THE INDEX AND MIDDLE FINGERS FREE TO MANIPULATE THE TOUCHSCREEN!

IT’S BEST TO BLOW INTO THE MICROPHONE FROM A FEW INCHES AWAY (DON’T EAT THE PHONE!)

THE FINGER HOLES GLOW AND EXPAND ON TOUCH AND RETRACT UPON RELEASE, MAKING THE INTERFACE FEEL ALIVE AND ORGANIC, FUNCTIONALLY, THIS COMPENSATES FOR A LACK OF TACTILE FEEDBACK ON A TOUCHSCREEN AND MAKES IT EASIER TO SEE WHAT YOU ARE PRESSING.

TILTING THE PHONE CONTROLS VIBRATO, ADDING EXPRESSION TO NOTES (ESPECIALLY THE TAIL OF LONGER ONES) AND AN ADDITIONAL DIMENSION OF PHYSICALITY TO THE INTERACTION!

SYNTHESIZED SOUND DYNAMICALLY GENERATED; PARAMETRICALLY CONTROLLED

THE DESIGN SKETCH FOR OCARINA LOOKS SOMETHING LIKE THIS --

IT IS NOT COMPLEX.

BLOW INTO MICROPHONE ARTICULATES THE INSTRUMENT; STRENGTH OF BREATH MAPPED TO LOUDNESS

REAL-TIME MAP DISPLAY (ACCESSIBLE GLOBE DISPLAY) SOCIAL DESIGN FEATURE WHEREBY USERS CAN HEAR OTHERS PLAY AROUND THE WORLD!

ACCELEROMETER
VIBRATO AMOUNT (FRONT/BACK)
VIBRATO RATE (LEFT/RIGHT)

VISUAL FEEDBACK 1
RINGS EXPAND AS FINGERS PRESS DOWN

VISUAL FEEDBACK 2
CONCENTRIC RINGS RADIATE FROM THE BOTTOM, VISUALIZING USER’S BREATH

PITCH IS CONTROLLED THROUGH MULTITOUCH, USING FOUR VIRTUAL FINGER HOLES ON THE TOUCHSCREEN!
**OCARINA** is designed adhering to something I call **inside-out design**, which works outward from available technological ingredients, taking into account their possibilities and constraints!

**In this case, it is about using everything available on the iPhone to design a singular artifact.**

The choice to design an **ocarina** started with the device itself -- by considering its very form and embracing its inherent capabilities. **"As is!"**

For starters, the physical form and size of an iPhone is similar to that of a four-hole "English pendant" ocarina. The onboard sensors (multitouch screen, accelerometers, microphone) seem fitting for the physical interaction of **OCARINA**.

**Inside-out design rejects blunt transfer (or "porting") from other domains; instead it champions an ethos of designing from the ground up, embracing the medium and its constraints, and thinking as broadly as possible about its new potentials!**

**Case in point:** **WHY AN **OCARINA**?** (i.e., why not a violin, guitar, piano, drum, or something else?)

**Principle 2.3** **Sometimes, function follows form**

In designing with new technology, especially commodity devices with mass adoption, this approach offers a useful constraint. It’s about using precisely that which is **already there -- nothing more!** It diverts the mind from wishing "if only there were X..." to asking "what can we do with what we already have?"

**Principle 2.2** **Design inside-out**

**Ocarina was not designed** as a “mobile version” of an ocarina, but as something that is its own experience...

...there is something disarming about engaging an everyday device in an entirely different manner...

...and by appropriating technology in unconventional ways, we imbue a sense of play and delight.

This particular ocarina form can be traced back to ancient cultures, where ocarina-like instruments played an important role in traditions of song and dance.

**Ocarina is similar in form to the xun**, one of the oldest Chinese instruments, dating back 7000 years! The main difference is that the player blows across the top of the xun, whereas a player blows into the ocarina. And the sound of the xun is typically more solemn and mournful than the ocarina sound.

*Pronounced: “shee-yu-en” rolled into one syllable.*
Once the function was determined (it’s an ocarina), my focus went back to the form: an opportunity to consider audio, visual, and physical interaction design in conjunction.

I wanted to craft ocarina as a whimsical, magical artifact -- reflected in the breath mechanism, its look and feel, and in the aesthetic equivalence between communication device and instrument.

Once again, there is a commitment to not adorn the artifact. The aesthetic statement is not “this simulates an ocarina” but rather...

...this is an ocarina!

**Principle 2.4**

**Take advantage of physicality.** Artfully blend the physical with the virtual.

The buttons are designed to feel responsive and as physical as possible on a flat touchscreen -- hence their animated expansion as if pressing somehow flattens them.

Translucent green waves smoothly wash over the screen in response to breath blown to play the instrument. They loosely represent sound waves and the excitement of the instrument. They also signify a transformation from the physical to the virtual.

The sound of ocarina is generated in real time, using a set of audio signal processing elements, controlled from input from the microphone, accelerometers, and touchscreen!

This is a blueprint page. You’ll find others like it sprinkled throughout, containing code and domain-specific technical information.

**Breath Input** (articulation)

- **Bipole** (rough envelope)
- **Step** (secondary envelope)
- **Bipole** (low-pass filter)

**Accelerometers** (vibrato)

- **Seno** (LFO for vibrato)
- **Triosc** (carrier)

**Multitouch** (pitch)

- **Adsr** (on/off envelope)
- **Nrev** (reverberator)

The sound is synthesized using a triangle wave (Triosc), whose frequency is determined by the combination of buttons the user is pressing and the chosen pitch mapping. This frequency is further modulated by a low frequency sine wave (Seno) for vibrato.

Ocarina’s audio implements this basic audio signal chain, written in the Chuck programming language.
Ocarina may be the first instrument that lets its players listen to one another playing around the world...

...a small but authentic sense of connection, that there is "someone, somewhere out there... also doing what you are doing.

It makes you wonder what people are up to right now...

Listening to the world play ocarina, while I eat a sandwich!

I'm blowing into my phone to make music!

Major Tom to ground control. The Earth looks serene from here...

Initiating docking procedures?

Meanwhile, I'll jam, serenading you on my ocarina, to the tune of "Blue Danube"...

Hi everybody!

HAPPY BIRTHDAY TO YOU...

Hey... Shenandoah...

WONDER WHO'S OUT THERE?

Yeah! I love the Legend of Zelda! This is the music I grew up with...

I want to play music with the world!

Perhaps as a nod to Mark Weiser's vision, there is something calming about listening to the world play as if we are floating among the stars and looking back on our homeworld...

Jingle bells, jingle bells...

Hello!
Ocarina's scope aims for a kind of transportive experience, something beyond what a traditional ocarina could do...

Through technology, Ocarina aspires to something human that isn't about technology at all.

You listen to the world, one person at a time. The sound reproduced with clarity like a small voice.

A light column indicates the location where the music comes from.

Two streams of blue particles spiral out of the earth in a DNA-like double helix.

Each note becomes a green circle floating into the stars...

There is something of the universal in the way it makes you feel lonely and connected at the same time.

Let's move to

Design with Technology, to transcend technology.

More than 2 billion breaths have been blown into Ocarina.

Over ten million people have played Ocarina! That's pretty crazy and unexpected!

Ocarina was the app that put smile on the map. But the most gratifying thing was having built something that could speak to people, not in machine tongues but in something more human.

People are awesome!

A reminder that while each day has the capacity to be troubling, it also holds the possibility for greatness, to be more than ourselves.

...Teaching others to play

...In music videos!

...Taking to the internet to perform for the world

...Blinking in the snow

...For others

...With their nose!

...From their homes

People all around the world played...
I'd like to think, for all the technology that made a thing like Ocarina possible, the result was more than the sum of its parts -- reaching toward the human and the sublime...

From an Ocarina user in 2009:

"This is my peace on earth. I am currently deployed in Iraq, and hell on earth is an everyday occurrence. The few nights I may have off I am deeply engaged in this app. The globe feature that lets you hear everybody else in the world playing is the most calming art I have ever been introduced to. It brings the entire world together without politics or war. It is the exact opposite of my life."

-- Deployed U.S. soldier

Technology should create calm

Apps as musical artifacts provoke many interesting questions!

Y'know. Ocarina demonstrated that music truly has the power to move people, give them strength in ways you don't expect, and regardless of the medium!

Indeed!

On China Central Television's series "One Person, One World"...

That's a good question. I am trying to figure it out myself...

These software apps have transformed the mobile phone into something much more than a phone. But what should we make of something like Ocarina? Is it an instrument? Is it a toy?

Guolin Huang
Songwriter

Weiming Chen
Host

Maybe classification isn't so important here, but I tend to think of Ocarina as a type of expressive toy. Like a toy, it invites play and has a low barrier to entry. Yet it affords a kind of expressiveness associated with instruments!

I see. So regardless of what these artifacts may be, they're designed to encourage everyday people to make music, including those who otherwise might not?

That's the hope. Although I also design these things because it's fun and, at the end of the day, it's what I do -- a way to express myself.

Makes sense. Computer music and design is your art!
I'm curious, what does your family think of your work with computer music and apps? I understand they are here today in the studio!

I wonder if he is hungry. He loves to eat!

Will computer-based instruments someday replace traditional instruments?

I certainly hope not.

I get asked that a lot! For some reason, that's how people naturally react to this sort of research. It is certainly not my intention to replace traditional instruments! We are explorers -- not destroyers!

There is a reason we have so many instruments in the world. Each brings something different. For example, nothing is going to be as good at being a cello -- other than a cello!

My family is here indeed! When I was working on Chuck and music programming languages, I wasn't sure if they knew what I was doing. After I started designing music apps, well, for the first time they could see what I was building and why. I'm glad... to be completely honest, I don't know what I'm doing pretty much all the time!

Wow, your grandmother is 98 years old! Has she played any of your apps?

Hi Ge's family!

She plays Ocarina!

Rock on!

Yeah!

There seems to be a lot of versatility with computers and music. So, here is a question for you...

A computer can do a lot and affords new sounds and interactions. But it cannot do everything! I am always more interested in the human in the interaction loop. In designing these computer music instruments, the ethos is to embrace what computers are good at doing, reconciling it with what people are good at doing!

What I am trying to do with Ocarina and computer music design is to add to the musical ecosystem, to find recombinant ways to reconcile familiar elements with new experiences. I mean, it's not like there is an upper limit to how much music can be made in the world, beyond which we'd say, "Oh, that's too much, stop!" Instead, I believe we can always make more. Most certainly we are not making enough...
Well, when designing with new technology, it's a good idea and a responsible thing to step back and examine what is gained, and what is lost.

Music is not an esoteric phenomenon. Humans, across all cultures, have been playing music for thousands of years! They've usually taken advantage of the technology of their times, long before modern technology or even household electricity...

So peaceful the air, so contemplative the music...

This is my favorite part of the day!

Music was made live!

In other words, until only about a hundred years ago, all music was made live!

Ooh! I got this!

Okay, from the top!!

From the Far East...

This zither speaks a language of its own...

To the Western World...

Some will win...

Some will lose...

...some were born to sing the blues!

Word

Amateur

= from Latin Amator

= meaning one who loves

Among other things, amateur musicianship is about personal enrichment. Actively engaging with our favorite music, getting our hands dirty to make music—like playing ukulele in the park, or singing in the rain!

It wasn't long ago when families regularly played music as a form of entertainment. People often learned to play instruments out of interest and so they could say, play the latest tunes. It was a fun pastime. They weren't doing it to "go pro" but did it for themselves, the people around them, and for the joy of making music socially.

If you think about it—before computers, internet, radio, and recording, people had to make music where it was heard!
The Birth of Mass Consumption of Music

Sound Recording: Captures music for playback, performances become timeless.

Radio: Broadcasts music, vast distances no longer an impediment.

Vacuum Tube: Enables technology for analog electronics, like receivers and televisions.

Digital Computer: Offers pristine storage, processing, transmission of music.

The Internet: Distributes personalized mass media, social networking, musical data becomes pervasive, random-access, centralized in computing clouds.

Edison’s wax cylinder recorder/player.

We now have more access to music than ever before, as listeners and consumers!

Yet somehow I feel we are making less music than ever.

That’s a shame, because while listening to music is wonderful, there is a sublime joy in making music -- an activity that enriches simply by happening at all!

Has technology made it so easy to consume music that it no longer seems necessary to make it? Has super-quick access to vast libraries of high-quality recordings of virtuosos somehow intimidated or curbed our desire to make music for ourselves?

Many people’s first reaction is that by delving into computer-based instruments, people like me are threatening traditional musical instruments and practices. However, the inconvenient truth is that music-making is constantly being threatened not by computer music research but rather by the countless “distractions” enabled by modern technology: television, streaming video, internet, video games, etc. There is nothing inherently wrong with these activities, but they do add up and occupy our time! It is so much easier to consume these forms of mass media than to, say, learn to play an instrument.

I want to challenge this trend! If technology unwittingly took away amateur musicianship, perhaps we can use technology to bring it back, in the context of today’s world.

These innovations have altered the relationship between people and music -- for better and for worse -- as side effects of the evolution of technology.
“MUSIC HAS BECOME PART OF AN AESTHETIC ECONOMY DEFINED BY THE PASSIVE AND INCREASINGLY PRIVATE CONSUMPTION OF COMMODOIFIED PRODUCTS RATHER THAN THROUGH THE ACTIVE, SOCIAL PROCESSES OF PARTICIPATORY PERFORMANCE.

IN SHORT, WE SEEM TO HAVE FORGOTTEN THAT MUSIC IS A PERFORMANCE ART AT ALL, AND MORE THAN THAT, WE SEEM TO HAVE CONCEPTUALIZED IT IN SUCH A WAY THAT WE COULD HARDLY THINK OF IT THAT WAY EVEN IF WE WANTED TO...”

-- NICHOLAS COOK

I think there are two reasons why I do what I do. The first is to design musical artifacts, to take us back to a past of personal musical performance by taking advantage of technology as a celebration of music! I want for us to reclaim a sense of playfulness in making music, to get people to play more music!

Music-making is really like the joy of cooking your own food. Most of us who cook aren’t doing it to be professional chefs, but we enjoy it nonetheless! If music is food for the ear and soul — why aren’t we cooking more music for ourselves?!

A second goal in my work is to look to the future, to design and create something that simply has not been possible without technology... to explore what new musical things and experiences await discovery, that we don’t yet have names for, that defy classification. Might we create instruments to be played by a million strangers across the world? What would that sound like? How would it feel to be a part of that?

I became a songwriter and singer because I was following my interests in music. I see you have also followed your interests in design. I wonder where these interests will take us...

Yes! And hopefully it will be a future that embraces varied ways of making music, new and traditional alike! Technology will evolve -- what’s modern today shall become antiquated tomorrow -- but the core human desire to express will still be here. Through artful fashioning of technology, we will seek out new things to see, hear, interact with -- to think and feel with. The instrument may look and sound different, but the song remains the same. Music is still music, regardless of the medium. As the anthem goes, “Rock n’ roll is here to stay!”

And if music is -- as you say -- food for the soul, hopefully computers will add to the menu and palette!

Thank you for being on “One person, one world”!

Thank you for having me!