Learn to Solder

with ArduTouch Music Synthesizer kit

and make music, sound, and noise!

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cornfield electronics

Syllabus

- Intro to ArduTouch music synthesizer kit
- Live demo of ArduTouch
- Intro to music synthesis / Digital Signal Processing
- How to solder
- How to program ArduTouch with Arduino software

Soldering Workshops / kits

















ArduTouch Music Synthesizer











Great for learning

to solder



Solder it together

And you can also program your own synthesizers

– and it works!



Solder it together

And you can also program

You can also learn

- and it works!

your own synthesizers

Digital Signal Processing



Live demo

Some Types of Synthesizers Analog





Some Types of Synthesizers Analog



Modular Analog Synthesizer:

- Basic waveform oscillators
- Filters (to muck with sound)

g Synthesizer: n oscillators k with sound)

Digital



Some Types of Synthesizers Digital

- Break things into little bits (or create little bits) ightarrow
- Mess with it ightarrow
- Put it back together again \bullet

Analog waveform



To record it digitally

First slice it (equal time slices)



To record it digitally

First slice it Then get the values



To record it digitally

First slice it Then get the values



To record it digitally

First slice it Then get the values Then store the values



Sample #	Digitized Value
0	0.0
1	7.8
2	11.9
3	10.5
4	4.0
5	-4.0
6	-10.3
7	-11.9
8	-7.8
9	0.0

To record it digitally

First slice it Then get the values Then store the values *This is called: "Sampling"*



Sample #	Digitized Value
0	0.0
1	7.8
2	11.9
3	10.5
4	4.0
5	-4.0
6	-10.3
7	-11.9
8	-7.8
9	0.0



To record it digitally

First slice it Then get the values Then store the values Waveform is: "Digitized"



Memory loc	Memory contents
0	0.0
1	7.8
2	11.9
3	10.5
4	4.0
5	-4.0
6	-10.3
7	-11.9
8	-7.8
9	0.0

Samples stored in Memory



memory loc	memory co
0	0.00
1	0.25
2	0.50
3	0.95
4	0.76
5	0.27
6	-0.20
7	-0.45
8	-0.55
9	-0.50
10	-0.26
11	0.00
12	etc
13	

Digitized waveform can be any soundwave





Analog to Digital Conversion:

sampling an analog waveform to store it in digital memory

ry loc	memory contents
	0.00
	0.25
	0.50
	0.95
	0.76
	0.27
	-0.20
	-0.45
	-0.55
	-0.50
0	-0.26
L	0.00
2	etc
3	



A/D

sampling an analog waveform to store it in digital memory

ry loc	memory contents
	0.00
	0.25
	0.50
	0.95
	0.76
	0.27
	-0.20
	-0.45
	-0.55
	-0.50
D	-0.26
1	0.00
2	etc
3	

How do we play back a digitized waveform?





Digital to Analog Conversion: Playing back the Digitized waveform





Digital to Analog Conversion: Playing back the Digitized waveform



D/A Playing back the Digitized waveform

How do you do D/A ?

D/A chip (expensive)

or

PWM

5 MMd



Square Wave: ON half the time / OFF half of the time

5 MWd

Square Wave: ON half the time / OFF half of the time (half the energy of ON all the time)

5 MWd



Pulse Wave: ON and OFF at any ratio you like This waveform: ON for 25% of the time / OFF for 75% of the time





Pulse Wave: ON and OFF at any ratio you like

5 MWd



PWM Pulse Width Modulation



D/A Using PWM for playing back the Digitized waveform

Kind of complicated to code

So, my ArduTouch software makes it easy

- Create "oscillators" with a couple lines of code
- Create "dynamics" with a couple lines of code

"Dynamics" make the sound interesting es of code es of code
Some "Oscillators":





Some "Dynamics":

- ADSR
- Tremolo
- Portamento
- Envelopes
- Filters
- Effects











Some "Dynamics":

- ADSR
- Tremolo constant changing volume
- Portamento
- Envelopes •
- Filters
- Effects



Some "Dynamics":

- ADSR
- Tremolo constant changing volume
- Portamento glide between notes
- Envelopes
- Filters
- Effects

ing volume en notes

Some "Dynamics":

- ADSR
- Tremolo constant changing volume
- Portamento glide between notes
- Envelopes *beyond ADSR*
- Filters
- Effects

ing volume en notes

Some "Dynamics":

- ADSR
- Tremolo constant changing volume
- Portamento glide between notes
- Envelopes *beyond ADSR*
- Filters like bass & treble subtle to crazy
- Effects

Some "Dynamics":

- ADSR
- Tremolo constant changing volume
- Portamento glide between notes
- Envelopes *beyond ADSR*
- Filters like bass & treble subtle to crazy
- Effects mess with the sound!

ing volume en notes

- subtle to crazy Ind!

ArduTouch Arduino-Compatible

∞ _01_Empty_Synth Arduino 1.8.5		×
<u>File Edit Sketch Tools H</u> elp		
		ø
_01_Empty_Synth		
<pre>#include "ArduTouch.h"</pre>	// use the ArduTouch library	
<pre>// the following line is required for every</pre>	ArduTouch sketch	
<pre>about_program(Empty Synth, 1.00)</pre>	<pre>// specify sketch name & version</pre>	
class EmptySynth : public Synth	// define your synthesizer	
// this synthesizer has no contents and	therefore makes no sound	
} mySynth;		
<pre>// every ArduTouch sketch has only one line // with a pointer to your synthesizer in</pre>	in the setup() section this case: mvSvnth	
<pre>void setup()</pre>		
ardutouch_setup(&mySynth);	<pre>// initialize ArduTouch resources</pre>	
1		
// every ArduTouch sketch has exactly this	loop() section	
void loop()		
<pre>{ ardutouch_loop();</pre>	// perform ongoing ArduTouch tasks	
3		_

With Tutorial examples

ArduTouch Arduino-Compatible

∞ _01_Empty_Synth Arduino 1.8.5	- 0	×
Eile <u>E</u> dit <u>S</u> ketch <u>T</u> ools <u>H</u> elp		
		ø
_01_Empty_Synth		
<pre>#include "ArduTouch.h"</pre>	<pre>// use the ArduTouch library</pre>	· · · · ·
<pre>// the following line is required for ever</pre>	y ArduTouch sketch	
<pre>about_program(Empty Synth, 1.00)</pre>	<pre>// specify sketch name & version</pre>	
class EmptySynth : public Synth	// define your synthesizer	
// this synthesizer has no contents and	therefore makes no sound	
} mySynth;		
<pre>// every ArduTouch sketch has only one lin //</pre>	e in the setup() section	
// with a pointer to your synthesizer 1	n this case: mysynth	- 1
void setup()		
<pre>{ ardutouch_setup(&mySynth);</pre>	<pre>// initialize ArduTouch resources</pre>	
}		
<pre>// every ArduTouch sketch has exactly this</pre>	loop() section	
{ (
ardutouch_loop();	<pre>// perform ongoing ArduTouch tasks</pre>	
1		

With Tutorial exan

Tutorial examplesFollow examples01 through 09to easily learnto code your ownsynthesizers

ArduTouch Arduino-Compatible

∞ _06_OneVoxSynth Arduino 1.8.5		×	
File Edit Sketch Tools Help			
		ø	
_06_OneVoxSynth			
<pre>#include "ArduTouch.h"</pre>	// use the ArduTouch library		
<pre>about_program(OneVoxSynth, 1.00)</pre>	// specify sketch name & version		
<pre>class SawToothSynth : public OneVoxSynth { public:</pre>	// output a sawtooth waveform using a OneVoxSynth		
<pre>// newOsc() is called by the system du // This is where you specify what osci // In this example we use a SawTooth.</pre>	ring setup. llator to use.		
<pre>Osc* newOsc(byte nth) {</pre>	<pre>// (the argument "nth" isn't really used here, but is useful for when we have more than one voi</pre>	ce)	
<pre>return new SawTooth(); }</pre>	// use a SawTooth oscillator		
} mySynth;	// instantiate synthesizer		
<pre>void setup() { ardutouch_setup(&mySynth); }</pre>	// initialize ArduTouch resources		
<pre>void loop() { ardutouch_loop(); }</pre>	// perform ongoing ArduTouch tasks		~

With extensive **Arduino library** for ArduTouch

> to make it easy to create your own synths

ArduTouch

∞ _06_OneVoxSynth Arduino 1.8.5				×
File Edit Sketch Tools Help				
				ø
_06_OneVoxSynth				
<pre>#include "ArduTouch.h"</pre>	// use the ArduTouch library			^
<pre>about_program(OneVoxSynth, 1.00)</pre>	// specify sketch name & version			
<pre>class SawToothSynth : public OneVoxSynth { public:</pre>	// output a sawtooth waveform using a OneVoxSynth			
<pre>// newOsc() is called by the system du // This is where you specify what osci // In this example we use a SawTooth.</pre>	llator to use.			
Osc* newOsc(byte nth)	// (the argument "nth" isn't really used here, but is useful for when we have more	than c	one voj	.ce)
<pre>turn new SawTooth(); }</pre>	// use a SawTooth oscillator			
} mySynth;	// instantiate synthesizer			
<pre>void setup() { ardutouch_setup(&mySynth); }</pre>	// initialize ArduTouch resources			
<pre>void loop() { ardutouch_loop(); }</pre>	// perform ongoing ArduTouch tasks			~
	Arduir	no/Genuin	o Uno on	сомз

Complete code for:
sawtooth waves
play with keyboard
change octaves
volume control

ArduTouch

∞ _06_OneVoxSynth Arduino 1.8.5				×
File Edit Sketch Tools Help				
				ø
_06_OneVoxSynth				
<pre>#include "ArduTouch.h"</pre>	// use the ArduTouch library			^
<pre>about_program(OneVoxSynth, 1.00)</pre>	// specify sketch name & version			
<pre>class SawToothSynth : public OneVoxSynth { public:</pre>	// output a sawtooth waveform using a OneVoxSynth			
<pre>// newOsc() is called by the system du // This is where you specify what osci // In this example we use a SawTooth.</pre>	ring setup. llator to use.			
<pre>Osc* newOsc(byte nth) { return new SawTooth():</pre>	<pre>// (the argument "nth" isn't really used here, but is useful for when we have more // use a SawTooth oscillator</pre>	than o	ne voi	ce)
<pre>} mySynth;</pre>	// instantiate synthesizer			
<pre>void setup() { ardutouch_setup(&mySynth); }</pre>	// initialize ArduTouch resources			
<pre>void loop() { ardutouch_loop(); }</pre>	// perform ongoing ArduTouch tasks			~
	Arduir	no/Genuin	o Uno on (сомз

Easy to add: Tremolo Portamento • Envelopes Filters Effects Other waveforms

ullet

 \bullet

ullet

ArduTouch



ArduTouch is an Arduino-compatible music synthesizer kit. Build it, and it works! Way low cost (target price per kit is \$25.) It comes with a pre-programmed music synthesizer that makes way cool sounds and music and noise. An ArduTouch library is available for programming in more super nice synthesizer features. For those who want to learn more,... - Edit

P 7 commits	پ ۶ 1 branch	∾ 0 releases		<u>\$8</u> 1	contributor
Branch: master - New pull request		Create new file	Upload files	Find file	Clone or download 🗸
maltman23 update to PCB v1.2 rev C &	DuoPoly v2.05			Latest co	mmit b5109e5 on Jul 10
🛅 Arduino	update to PCB v1.2 rev C & DuoPoly v2.05				5 months ago
AssemblyInstructions	ArduTouch assembly instructions				7 months ago
BOM	ArduTouch BOM				7 months ago
🛅 Eagle	update to PCB v1.2 rev C & DuoPoly v2.05				5 months ago
Chematic	update to PCB v1.2 rev C & DuoPoly v2.05				5 months ago
gitattributes	Added .gitattributes & .gitignore files				7 months ago
.gitignore	Added .gitattributes & .gitignore files				7 months ago
README.md	Create README.md				7 months ago

Open Hardware – everything is on Github maltman23





Tools







The following photos will show you how to solder.

But feel free to download the "Soldering Is Easy" comic book for free!

(In many different languages.)

Learn To Solder

download for free at: http://mightyohm.com/soldercomic





SOLDERING IS EASY HERE'S HOW TO DO IT

BY: MITCH ALTMAN (SOLDERING WISDOM)

ANDIE NORDGREN (COMICS ADAPTATION)

JEFF KEYZER (LAYOLIT AND EDITING)



download for free at:

http://mightyohm.com/soldercomic

Learn To Solder







SOLIDER C'EST FACILE VOICI COMMENT FAIRE



TELECHARGEZ CETTE BO ET PARTAGEZ LA AVEC VOS AMIS ! HTTP://MIGHTYOHM.COM/SOLDERCOMIC

DE: MITCH ALTMAN (MAITRE SOUDEUR)

> ANDIE NORDGREN (ADAPTATION BD)

JEFF KEYZER (EDITION, MISE EN PAGE)

SNOOTLAB (TRADLICTION FR.)





SOLDAR ES FÁCIL! APRENDE CÓMO HACERLO



POR: MITCH ALTMAN (SABIDURÍA EN SOLDADO)

ANDIE NORDGREN (ADAPTACIÓN A COMIC)

JEFF KEYZER (DISEÑO Y EDICIÓN)



DISTRIBULYE AMPLIAMENTE!

Learn To Solder







NO



The board we'll solder the parts to



The tools you'll need:

So So Coo

- soldering Iron (35W or less) (0.7 mm)
- solder (60/40 Sn/Pb, rosin core, 0.031" diameter or less) (63/37 is also good)
- soldering iron stand
- cellulose kitchen sponge (not plastic!)

20000

Our first part

R1: Brown, Black, Orange

(not Brown, Black, Red)



Some parts, such as resistors, need their leads bent first

If necessary, Bend leads before inserting the part into the board

wires coming out from parts are called "leads" – they lead to the part





R1 – this is how it will look before inserting it into the board





R1 – this is where it goes







the circles with holes in them are called "pads"

there is one "pad" per lead for each part

LEDI

ATTINY25V-10PU

C2 100uF

witch

CE LED

FD2

5

Push part down all the way



Upside down/

Wires bent half way out (only half way) like a "V"

so that the part won't fall out while soldering it





R1 – inserted into the board



How to hold a soldering iron

(Like a pencil – held from underneath)



Importani

The perfect kind of solder for electronics: (63/3) is 9/50 9/50 90000 60/40 rosin core, 0.031" (0.7mm) diameter (or smaller) Important:

> Use solder WITH lead (Pb) !! lead-free solder has very poisonous fumes!

3 Safety Tips...

Safety Tip #1:

Hot !!

(When you touch the tip, you *will* let go quickly every time!)


Safety Tip #2:

Lead (Pb) is toxic But it easily washes off your hands with soap and water

Safety Tip #3:

(coming soon)

2 secrets to good soldering...



Secret #1: Clean the tip! (before every solder connection) Bang (lightly) 3 times, Swipe, Rotate, Swipe (on the sponge): Keep the tip shiny silver!

othe

Lay clean tip across half of the pad, touching the pad and lead for 1 second



Do this quickly (slowly doesn't work well) – solder in & out in about 1 second

Push solder in, over the pad, and under the tip

Make sure solder melts on the <u>underside</u> of the soldering iron tip (not the side or top of the soldering iron tip)!





Do this quickly (slowly doesn't work well) – solder in & out in about 1 second



Make sure solder melts on the <u>underside</u> of the soldering iron tip (not the side or top of the soldering iron tip)!



Pull solder away, But keep holding soldering iron down for 1 more second





Secret #2:

Keep hot tip down 1 second for solder to flow !!





A Little Bump of Solder



Perfect !!

If you can see any of the pad, or the hole, you need more solder - so, just do all the steps again to make it perfect.





The Rhythm ! and speed (about 1 second per step) Clean the tip





Tip Down





Solder In





Solder Out







WAIT!

Lift Tip







The Rhythm ! and speed (about 1 second per step) Clean the tip





Tip Down





Solder In





Solder Out







WAIT!

Lift Tip





Solder all of the leads of the part to the board



For this part, there are two leads Here you can see two good solder connections



Now cut the leads short

Hold the lead while cutting it all the way down to the little bump of solder

Cutting with the tip of the wire cutter gives you more control

Safety Tip #3:

Hold or cover the lead!

(or it will fly into your eye!) (They like doing that – so please hold or cover the lead when you cut.)



All done !

No wires sticking out





R1 soldered to the board

Notice that:



each connection is a small bump (not flat) you cannot see any pad (it's totally covered with solder) you cannot see the hole (it's totally covered with solder)

One part at a time



Till all the parts are soldered



Then put in the batteries, Turn it on, And it works!

(Or you start debugging.)

Let's start!



If you haven't done so already, solder R1: brown, black, orange
R1: R2, R3, R4, R5: R6, R7: R8, R9: R13, R14, R15:



10K: Brown, Black, Orange
22M: Red, Red, Blue
270: Red, Violet, Brown
4.7K: Yellow, Violet, Red
1K: Brown, Black, Red



U1: microcontroller socket



proper





U1: microcontroller socket: inserted correctly





U1: microcontroller socket



bend pins down on two corners,







U1: microcontroller socket



All 28 leads soldered to the board: \rightarrow Notice that each has a little bump of solder (not flat). \leftarrow









C1, C2, C4, C5

C3, C8: 100uF



Different than C3, C8 ! C6, C7: 1uF





C3, C8: 100uF





C3, C8: Long Lead "+"





C3, C8: 100uF – soldered to board



C6, C7: 1uF





C6, C7: _ong Lead "+"







C6, C7: 1uF – soldered to board

LED1, LED2, LED3: Long Lead "+"





We'll use them for the speaker



LED1, LED2, LED3 Green, Red, Blue – soldered to board







long leads

J1

short leads

Short leads into board



 \rightarrow long leads sticking out from board

J1

short leads

go into the board

J1





S1: black Reset button

Note: The color of this switch is not important (some kits may have different colors).



S2, S3: Red buttons

Note: The color of these switches is not important (some kits may have different colors).







X1

The orientation of X1 does not matter.

Note: X1 may be yellow or blue.



J2

Pin 1



Note: Your chip may be marked differently, but "386" will be printed on it somewhere.

Note: Your chip may or may not have the indented half-moon at the left, it may have a black indented dot at the lower-left corner showing Pin 1.

U2



When chips are new, their pins are bent out.

J2

We need the pins bent straight and parallel. Use your work table to (gently) bend the leads.

U2

Gently bend leads so they're straight and parallel





U2: audio amp chip

Indented black dot Pin 1 proper orientation

Note: Your chip may or may not have the indented half-moon at the left, it may have a black indented dot at the lowerleft corner showing Pin 1.



U2: inserted correctly

Indented black dot Pin 1

U2



bend pins down on two corners,



U2 – soldered to board

R10: volume control



When new, the pins point straight down.



R10: volume control



We need to bend them out a little to fit into the board.



R10: volume control



If necessary, rotate the white top so that it looks like this photo (rotated half-way)

J3: headphone / output jack







U1: microcontroller

U1



When chips are new, their pins are bent out.

Note: Your kit's U1 chip may or may not have its pins already bent straight and parallel. If not, you need to bend them, as shown in the next picture.
Note: Your kit's U1 chip may or may not have its pins already bent straight and parallel. If not, you need to bend them, as shown in this picture.



We need the pins bent straight and parallel. Use your work table to (gently) bend the leads.



U1: microcontroller These pins must be straight and parallel



proper



U1: microcontroller



U1: microcontroller

make sure each pins rests in its hole in the socket \rightarrow with the proper orientation

Use two thumbs to push microcontroller into the socket

Make sure all 28 pins are in place, and push it into its socket.

(This is actually way easier with 2 thumbs.)



U1: microcontroller



U1: microcontroller

Inspect all pins, and be sure each went into its hole in the socket – not bent.

If any pins are bent, (gently) pry out chip, straighten pins, and insert again.



R11 & R12: potentiometers





R11 & R12: potentiometers





Speaker

Some kits have a speaker that looks like this



Speaker

We'll add leads to the speaker



Speaker

from the LEDs

Tin one side of each lead

(i.e., cover with thin film of melted solder)



Speaker



Solder one lead to speaker

Notice the correct place to solder the wire





Solder next lead to speaker

Speaker

Notice the correct place to solder the wire

Some kits have a speaker that looks like this



Notice the correct place to solder the wires

Speaker



Insert speaker into board and solder both leads to board.



Speaker

Note: Some battery pack wires have thicker red and black plastic coatings.

lf so, you can widen the these two holes by gently rotating a scissors or small knife or small Phillips screwdreiver on the top and bottom of these two holes.



Push battery pack leads through holes.

Make sure Red and Black go through their correct holes!

Battery pack



Loop one lead into its pad, and solder. Then loop the other lead into its pad, and solder.

Battery pack



Done!



Let's make noise!



Please Remember:

\mathbf{TO} Wash your hands after soldering



Let's make noise!

Your ArduTouch comes pre-programmed with a really cool synthesizer, called "Thick".

"Thick" plays 4 sawtooth waves at once.

- the left and right buttons change octaves
- long press the left and right buttons to change sounds •
- the Bottom knob controls the glide rate •
- the Top knob controls how each of the 4 notes glide separately •
- Try playing with these and see! •



Let's make noise!

Your ArduTouch comes pre-programmed with a really cool synthesizer, called "Thick".

If you are happy playing with "Thick" then no need to re-program your ArduTouch.

But if you want to program other synths into your ArduTouch, the next pages show you how...



Re-programming the ArduTouch

We have written several way cool synthesizers for ArduTouch! Each is unique, and each way different than the others.

To program in a new synth in your ArduTouch, you will need:

- the Arduino software http://arduino.cc •
- a USB-Serial adapter cable (such as an FTDI, or equivalent) a nice one is available at <https://cornfieldelectronics.com/cfe/products/buy.php?productId=usbcable>
- a synth sketch and the ArduTouch Arduino library •

<http://cornfieldelectronics.com/cfe/projects.php#ardutouch>



Arduino

Arduino is a very powerful tool! But it is very easy to use. It was designed for total beginners to use successfully.

I won't give a complete tutorial here – just some basics. For more info, there are many good Arduino tutorials online. A good place to start is:

<https://www.arduino.cc/en/Tutorial/HomePage>







Intro to Arduino



Arduino For Total Newbies workshop

Day 3 Tuesday 29-December, 13:00 to 16:30

 \rightarrow \rightarrow *Right-click on this link, and open in a new window* Arduino For Total Newbies workshop room on Big Blue

NOTE: You do NOT need to register to take this works Just show up before the start time at the Big Blue Button room, given above.

Learn Arduino using TV-B-Gone as an example project (no materials required)



Arduino For Total Newbies workshops

Arduino

First: Download and install the Arduino software < http://arduino.cc >





Re-programming the ArduTouch

Second:

Download and install the ArduTouch Arduino library <http://cornfieldelectronics.com/cfe/projects.php#ardutouch>

(details on this soon)





Re-programming the ArduTouch

Third:

Download ArduTouch synth sketches <http://cornfieldelectronics.com/cfe/projects.php#ardutouch>

Store them on your computer anywhere you like.

(details on this soon)





Connecting your ArduTouch to your computer **USB-Serial adapter cable**

Ones available from Cornfield Electronics look like this:

<https://cornfieldelectronics.com/cfe/products/buy.php?productId=usbcable>





Connecting your ArduTouch to your computer **USB-Serial adapter cable**

Ones available from Cornfield Electronics look like this:

<https://cornfieldelectronics.com/cfe/products/buy.php?productId=usbcable>



You may need to download and install a driver for your Operating System (Windows, MacOS, or Linux):

<https://ftdichip.com/drivers/vcp-drivers/>





Connecting your ArduTouch to your computer



IMPORTANT: Make sure the battery pack on your ArduTouch is OFF



Connecting your ArduTouch to your computer

This shows a few more details:



IMPORTANT: Make sure the battery pack on your ArduTouch is **OFF**





Connecting your ArduTouch to your computer **USB-Serial adapter cable**

Old ones from Cornfield Electronics looked like this:





Connecting your ArduTouch to your computer **USB-Serial adapter cable**

Old ones from Cornfield Electronics looked like this:



You may need to download and install a driver for your Operating System (Windows, MacOS, or Linux):

<https://www.silabs.com/products/development-tools/software/usb-to-uart-bridge-vcp-drivers>





Connecting your ArduTouch to your computer



IMPORTANT:

Make sure the battery pack on your ArduTouch is OFF





(Old ones)




After you download and install the Arduino software start it, and you will see a screen that looks like this:

Sketch_may ra Arduno IDE 2.1.0	
File Edit Sketch Tools Help	
Arduino Uno -	
sketch_may1a.ino	
<pre>1 void setup() {</pre>	
2 // put your setup code here, to run once:	
3	
1 4 }	
5	
<pre>6 void loop() {</pre>	
<pre>7 // put your main code here, to run repeatedly:</pre>	
Q 8	
9 }	
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The first time you start your Arduino software you need to do two things to set things up

(1) **Choose "Uno"** as the Board

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(Your **ArduTouch board** acts just like an Arduino Uno board)

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The first time you start your Arduino software you need to do two things to set things up

(2) Choose the Port (this will be different depending on your Operating System)

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The first time you start your Arduino software you need to do two things to set things up

(2) Choose the Port (this will be different depending on your Operating System)

<u>(After installing</u> <u>the driver for</u> <u>your USB-Serial cable</u> <u>and plugging it in</u> <u>your operating system</u> <u>will see a serial port</u> <u>and it appears here.)</u>

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Your Arduino software is almost ready

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The first time you start your Arduino software you need to set things up

(3) Install the ArduTouch library



around us. TV-B-Gone® universal remote control is the first fruit of our technical savvy, embodying our belief in empowerment, and sense of humor. This universal remote control fits in your pocket and allows you to discreetly turn TVs off wherever you go. TV-B-Gone fans around the world are using it for a variety of practical, philosophical, and humorous purposes. Imagine the possibilities..

Years in the making NeuroDreamer sleep mask is another of our personal empowerment inventions. We all need rest, but we don't always get it in our busy lives. NeuroDreamer sleep mask lets you use your own brainwayes to

bring you the rest you need. And with the lucid dreaming model, you can take control of your dreams.

Want to learn electronics? We make way cool, fun, intriguing, educational kits that anyone can make! Our most POPULAR kits are: ArduTouch music synthesizer kit and TV-B-Gone kit!

We make truly useful technological solutions that put you in charge.

Welcome to our better world!

NOTE: As of 14-Feb-2023 Cornfield Electronics is a sole proprietorship of Mitch Altman

legal notices & privacy policy



The first time you start your Arduino software you need to set things up

(3) Install the ArduTouch library



legal notices & privacy policy



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The first time you start your Arduino software you need to set things up

(3) Install the ArduTouch library



DO-IT-YOURSELF PROJECTS

by <u>Mitch Altman</u>, and friends. Last modified: 5-Oct-2022

You Can Make Cool Things With Electronics!

The projects on this page were all created for total beginners, with no experience, so everyone can complete them successfully at my workshops, or at home, or anywhere!

All you need is:

a desire, a handful of parts, a soldering iron (with stand and sponge), a wire-cutter, a wirestripper, solder, and an afternoon.



<u>Here</u> is a really nice tutorial on how to solder -- for total beginners! <u>Soldering Tutorial for total beginners</u>

Open Hardware!

Everything on this page (and everything I do) is free and open source! (That's *free* as in *freedom*.)

(But everything here is free to download -- and that is free as in beer.) If you have any questions on anything, please feel free to email me: Transferring data from cornfieldelectronics.com... ch AT CornfieldElectronics DOT com





The first time you start your Arduino software you need to set things up

(3) Install the ArduTouch library







The first time you start your Arduino software you need to set things up

(3) Install the ArduTouch library



click this link to download the ArduTouch library



The first time you start your Arduino software you need to set things up

(3) Install the ArduTouch library

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Designed for non-geeky artists



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Arduino/Genuino Uno on COM9

"Sketch": an Arduino program

The first time you start your Arduino software you need to set things up

(4) Download an ArduTouch "sketch"



click link to download a synth "sketch"







Check it out! Also available for each synth: • Demo Videos • Instructions

You can open an ArduTouch synth sketch from: File → Open...

(I opened "Arpology here)

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Arduino/Genuino Uno on COM9

Your Arduino software is now ready to program your ArduTouch !

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Arduino/Genuino Uno on COM9

With the USB-Serial cable connected to your ArduTouch board press the Upload button

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Compiling sketch



While uploading, you will see a progress bar...

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...and when it's completed successfully, it says: "Upload done"

Arduino/Genuino Uno on COM9

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ArduTouch

Disconnect your ArduTouch board from the USB-Serial cable,

turn on your battery pack,

And...

Let's make new noise!





Please Remember:

\mathbf{TO} Wash your hands after soldering



Learn to Solder

with ArduTouch Music Synthesizer kit

and make music, sound, and noise!

Mitch Altman

Chief Scientist, Cornfield Electronics, San Francisco, CA Inventor of TV-B-Gone universal remote controls Co-founder of 3Ware (successful Silicon Valley startup) Pioneer of VR (in the mid-1980s) Founding mentor at HAX (1st and biggest hardware accelerator) Co-founder of Noisebridge (San Francisco hackerspace)

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Rev 3. 28-lun-2023

cornfield electronics