ALTURA MKII+

Assembly Instructions

MIDI THEREMIN

ZEPPELIN DESIGN LABS

ZEPPELINDESIGNLABS.COM • 2950 N. WESTERN, CHICAGO, IL 60618

ALTURA MKII+
THEREMIN MIDI CONTROLLER

Assembly Manual

INTRODUCTION

The Altura MkII+Theremin MIDI Controller by Zeppelin Design Labs was inspired by the early electronic instrument invented by Russian physicist Léon Theremin. Léon's device uses a pair of antennas that can sense the capacitance of a person's hands. The right antenna affects a voltage controlled oscillator (VCO) circuit. As the player moves his hand closer to this antenna, the device emits a sine wave tone that rises in pitch. The left antenna affects a voltage controlled amplifier (VCA) circuit. As the player moves his left hand farther away from this antenna, the tone becomes louder. The device is very sensitive and can make wonderful, spooky music – but it is very tricky to play. The performer has to play by ear: there are no frets or keys in mid-air!

Alexandra Stepanoff playing the theremin on NBC Radio, 1930

The Altura MkII+ Theremin MIDI Controller makes many improvements on the original Theremin. First, the Altura does not itself make sound; instead, it simply controls synthesizers and computer programs that employ the MIDI protocol (Musical Instrument Digital Interface). Thus any sound that your synthesizer can make the Altura MkII+ can control. Further, you can determine the key and scale (mode) in which to play. You can even build an eight-step arpeggio and save your work in a bank of presets.

HISTORY

In 1920, as Léon Theremin (1896 - 1993) was developing radio equipment for the Soviet government, he heard strange sounds coming from some of his circuitry. He noticed that the frequency (or pitch) of this sound changed with how close his hand was to the circuit. He developed this device into a musical instrument which he initially called the Thereminvox. In 1927 he left the USSR to tour Europe in promotion of his invention, performing to large audiences and receiving mixed reactions. His tour took him to New York where he stayed for the next 10 years; in which time he opened a laboratory and studio, patented the Theremin, licensed its manufacture to RCA, performed with a theremin ensemble at Carnegie Hall, and invented an electronic cello. In 1930 he conducted the first-ever concert of an electronic orchestra. In 1938 Léon Theremin suddenly disappeared – it was said that he had been kidnapped by Soviet agents; and later he was presumed dead.

Through the late 30's, Theremin's protégé Clara Rockmore rose to prominence as the world's pre-eminent thereminist. She preformed with world-class orchestras in large concert halls. These performances established the theremin as a legitimate performance instrument and started to open the public consciousness to electronic instruments and electronic music in general.

In the late 50's, Rockmore visited Moscow and by chance made contact with her old friend Léon Theremin. After 20 years of mysterious silence, she received word to meet Léon on a subway platform, where they spoke for a few minutes.

It seems Theremin's disappearance may have had more to do with the IRS than the KGB. What is certain is that upon Theremin's return to Russia, he was arrested and sent to the labor camps. He landed in a secret Soviet laboratory where he developed spy gear for the KGB. He was released in 1947 but "volunteered" to continue with the KGB until 1966.

In 1991 Léon, now 95 years old, returned to New York where he gave concerts, received awards, and was reunited with Clara Rockmore. It is not clear that he remembered her. He died in Moscow in 1993, aged 97.

As for his namesake invention, the theremin was just too difficult to play to ever achieve wide-spread popularity. The performer needed to have a very good sense of relative pitch, if not perfect pitch. Also, the instrument took a lot of skill to play in a controlled manner. So besides Rockmore, there haven't been many other popular thereminists. But the theremin has never completely gone away. In fact, it has consistently been at the center of a sub-culture passionate about electronic instruments and music, where people are not afraid to blur the line between technology and art. One of our personal heroes, Bob Moog, got his start back in the 1960's designing and selling theremin kits, before he revolutionized popular and electronic music with his modular synthesizers. At Zeppelin Design Labs, with our love of electronic instruments and DIY kits, we hope the Altura MkII+ will continue Léon Theremin's legacy of inspiring both artists and electronics nerds.

HOW IT WORKS

Our MIDI version of Léon's device uses sonar range finders instead of antennas, and rather than producing sound directly, the Altura MkII+ emits discreet packets of digital data that are interpreted by a separate synthesizer or other sound-making device. The Altura's right-hand sensor transmits Note-On/Off messages to play specific notes, thus controlling pitch. The left sensor transmits Channel Volume data, thus controlling volume. But this is just the start! The left sensor can be set to transmit many MIDI functions, like pitch bend, modulation, note velocity, and portamento time. The Portamento function causes one note to glide smoothly to the next, emulating that spooky Theremin sound; but with

this function, the device is always gliding to a specific note within a key and scale you designate. As a result, the Altura always plays in tune! .

The Altura MkII+ was designed as a companion to the Macchiato Mini Synth by Zeppelin Design Labs. There are a few special features that will only work well when paired with the Macchiato. Otherwise, the Altura conforms with General MIDI 1.0 specifications and should easily control any device bearing this mark. Many MIDI devices do not conform to the General MIDI specification. These devices will not necessarily respond to the Altura MkII+ as described herein. In these cases, you may need to fiddle a bit with your synthesizer to get it to behave. Alternatively, you can route your Altura controller through a software application that will enable you to redirect its data as needed.

The Altura MkII+ comes as an easy do-it-yourself kit (soldering required), or assembled and ready-to-use. We hope you enjoy building and using your Altura in creative ways!

Connect with your music…build your own gear!

WHAT'S IN THE BOX

Table 1: Altura MKII+ Theremin MIDI Controller Bill Of Materials (BOM) is a complete parts list of everything that should be present in your kit, followed by photos of each part. Print the BOM and carefully go through the kit, identifying every part. Before removing anything from the silver static-protective bag, please read about the proper handling of IC's in the paragraph "Integrated Circuits (IC's)" on page 35. Note that some of the components may be difficult to tell apart. <u>Compare them carefully with the photos.</u> Besides verifying that nothing is missing, this will acquaint you with the parts and their names. If ANYTHING is missing, first double-check; we double-checked before sealing the box at our lab! If it's still missing, EMAIL US right away at info@zeppelindesignlabs.com. If we goofed and shorted your kit, we will get replacement parts in the mail to you as soon as possible. If you lose or damage anything, we will be glad to sell you replacements. The unusual or custom components can be ordered directly from us (contact info@zeppelindesignlabs.com). For more common parts, like resistors, capacitors, or screws, you may prefer to go to a local electronics or hardware store.

> **TIP:** Empty the parts of the kit into a bowl, NOT onto the cluttered workbench, or onto the living room carpet! This will protect you from losing tiny parts.

Figure 2: What's In The Box

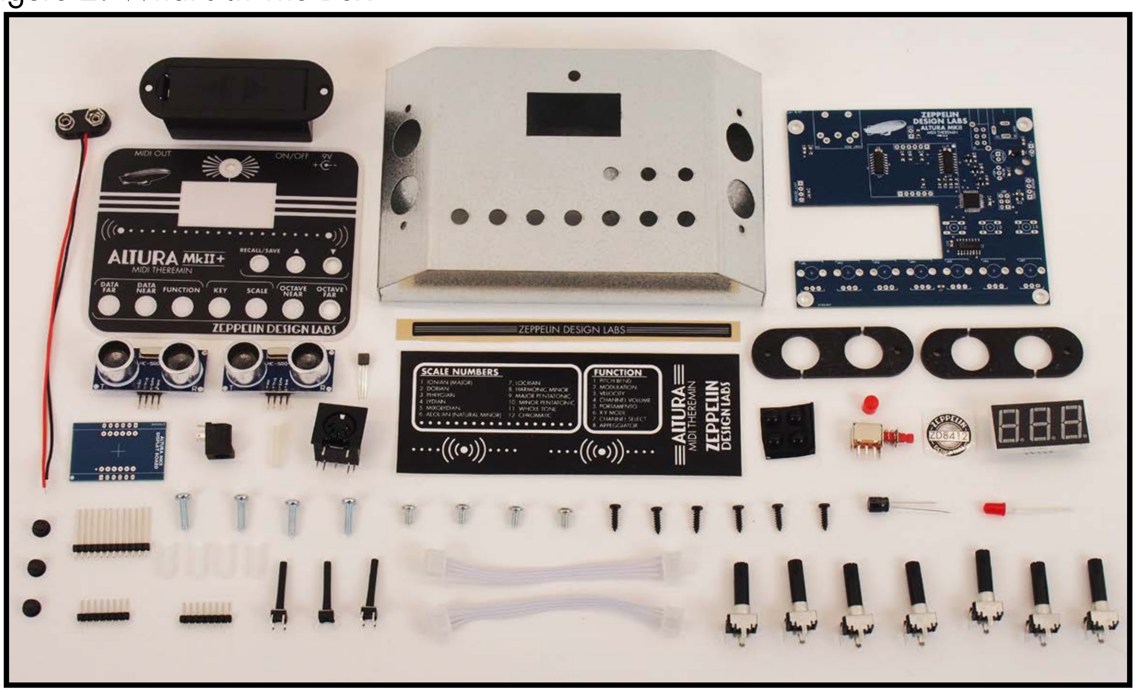


Table 1: Altura MKII Theremin MIDI Controller Bill Of Materials

Part #	Description	Notes	Qty
CB-06-10	4 Pin Header Cable	From PCB to distance sensors	2
HD-10-04	Rubber Adhesive Feet		4
CP-10-08	Electrolytic Capacitor 16V 220uF	C1	1
SW-30-25	Tact Switch	S2,S3,S4	3
SW-60-23	Tact Switch Button Cap - Black		3
HD-05-01	9V Battery Snap		
DI-30-56	5mm Red LED	LED	1
DS-30-37	3 Digit 7-Segment Display	Display	1
CH-77-20	Top Chassis		
CH-77-21	Bottom Chassis		
FA-64-30	Coarse Thread Screw M3x10	For Distance Sensor Holders	4
HD-05-02	9V Battery Box		1
HD-40-10	DC Power Jack	P1	1
HD-40-50	MIDI Jack, Female	P3	1
HD-60-10	Sensor Bracket		2
SN-20-01	Ultrasonic Distance Sensor		2
HE-20-01	12mm Tall Single Row Header - 14 pins -	In one or more pieces	1
HE-20-21	21mm Tall Single Row Header - 12 pins -	In one or more pieces	1
FA-60-32	1/4" Machine Screw		2
FA-60-34	1/2" Machine Screw		2
PC-73-01	Altura MKII+ Main PCB		1
PC-76-03	Altura MKII+ Display PCB		1
ST-60-10	LED Standoff - 5mmx17mm Tall		1
ST-60-12	Standoff - 4mm x 12mm Tall		1
PL-10-76	Altura MKII+ Supplemental Vinyl Label		1
PL-20-76	Altura MKII+ Top Panel Label		1
PL-20-78	Altura MKII+ Front Pinstripe Label		1
PL-10-90	Serial Number Sticker		1
PT-10-10	Potentiometer Linear 100K	VR1 - VR7	7
IC-80-50	Voltage Regulator 5V 100mA 78L05	U5	1
SW-50-30	Pushbutton Switch DPDT	S1	1
SW-60-22	Red Power Switch Cap		1
FA-63-23	Sheet Metal Screw	For the Battery Box	2


CB-06-10
HD-10-04
C1
S2,S3,S4
SW-60-23
BATTERY SNAP
LED
DISPLAY
CH-77-21
CH-77-20
FA-64-30
HD-05-03
P1
P3
HD-60-10
SN-20-01
HE-20-01
HE-20-21
FA-60-34
FA-60-32
PCB
DISPLAY PCB
ST-60-10
ST-60-12
PCB
PL-10-74
PL-10-75
PL-10-90
VR1-VR7
U5
S1
SW-60-22
FA-63-23

WHAT YOU WILL NEED

Here's everything you will need to build The Altura MkII+ Theremin MIDI Controller kit...

TOOLS

1. #2 Philips screw driver
2. Soldering iron (not a soldering gun, or a "cold heat" iron), good quality, 15-50 watt, with a good medium or small-sized tip, conical or chisel shape. One with a temperature control and a stand is best.
3. Damp sponge to clean your soldering iron
4. Wire strippers
5. Flush cutters or small diagonal cutters
6. Clamp or vise to hold the printed circuit board while soldering (optional, but handy)
7. Solder sucker and/or solder braid (optional, but very handy if you have to remove or repair any components!)
8. Ruler or straight edge
9. Hobby knife or X-Acto knife
10. Digital multimeter (not necessary for assembly, but handy for troubleshooting)

SUPPLIES

1. Solder, 60/40 rosin core, the smaller diameter the better (we prefer .032" diameter). Make sure it's good quality; we prefer Kester brand, but most brands will work fine.
2. Hot glue (and hot glue gun)
3. Thick/gel superglue (CA glue)
4. Isopropyl alcohol and a rag or cotton swab

POPULATING THE PRINTED CIRCUIT BOARD

Your work space should be well-lit, well-ventilated, and disposable; that is, don't work on the nice dining room table! Work on a utility surface that you can burn, drill and scratch. A piece of ¼" tempered masonite, or a sheet of MDF, makes an excellent surface if you don't have a utility work bench.

> **CAUTION:** *Solder fumes are not healthy for you. The fumes consist of vaporized flux, which can irritate your nose, lungs, and even your skin. You MUST work in a space where the air drifts away from you as you work, so fumes do not rise straight into your face.*

CAUTION: *Solder residue usually contains lead, which is poisonous if you ingest it. Do not breathe the fumes, do not eat the supplies, wash your hands after you handle solder, and sweep and wipe up your work space after EVERY USE.*

Most of the components in your Altura MkII+ kit will be soldered to the printed circuit board (PCB); only the distance sensors and the display board will be attached to the board via headers. All of the components will be installed from the "component side" of the board, which is the side that has the part labels printed on it. The other side of the board is called the "solder side," which, as the name implies, is the side on which the legs of the components will be soldered. Proper technique for installing and soldering components to a circuit board is demonstrated through several great resources on Instructables and Youtube under the search "PCB soldering tutorial." The general procedure consists of the following:

1. Install the part on the "component side" of the board, by pushing the legs of the components through the appropriate holes in the board. For your convenience, the board has silk screen outlines indicating where the components should be placed, along with text indicating the part number and the component value.

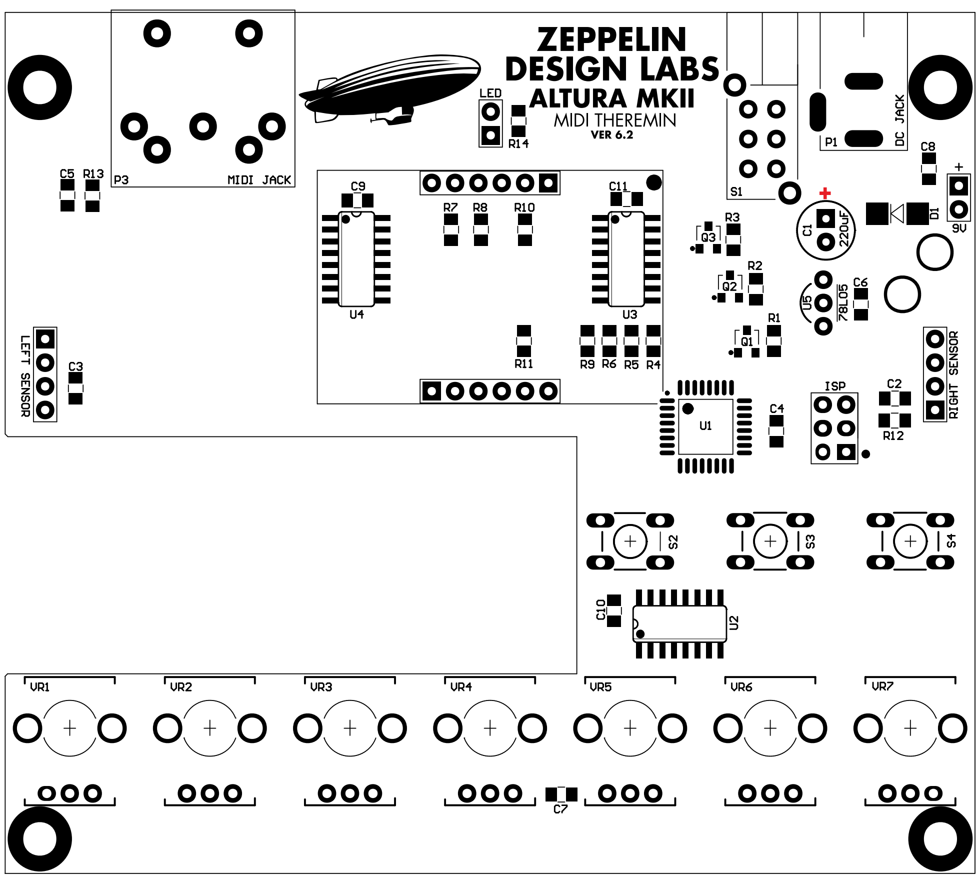
2. Hold the component in place with your finger and turn the board over.

3. Tack one of the component legs on the solder side of the board with a small bit of solder

4. Once the component is secured, thoroughly solder the rest of the legs.

5. Go back to the original leg that was first tacked down and re-solder it.

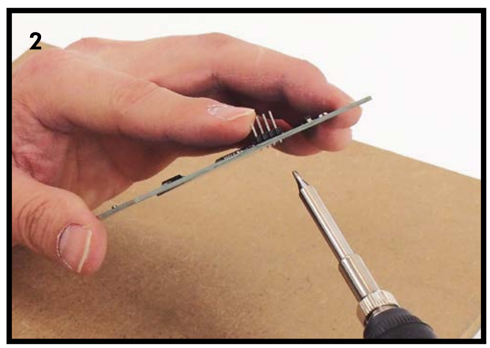
Figure 3: Component Values And Locations

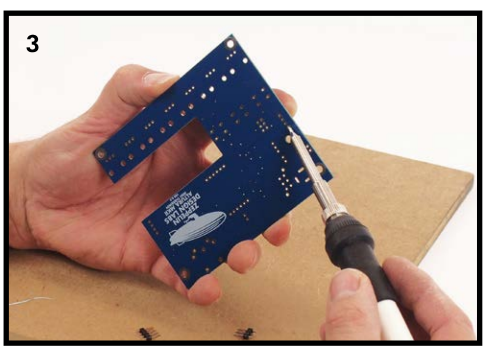


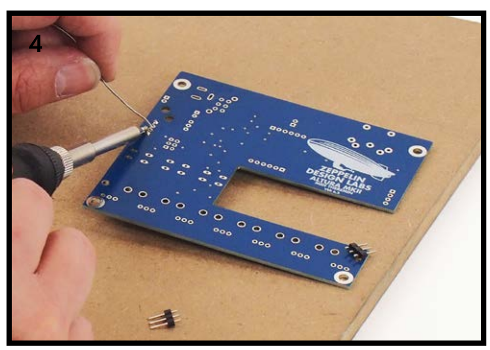
You will notice that we have installed several components on the PCB already. These components are all surface mounted, which are a little more difficult to solder. The pre-assembly of these surface mounted components makes your job of building this kit much easier.

Let's begin!

1. Headers: Your kit includes two kinds of headers: 14 shorter pins (which might come in a few pieces) and 12 longer pins. We will first work with the shorter pins. These will be installed across three different locations on the PCB. You will need to break or cut the headers into two pieces of four pins each, and two pieces of three pins each.
    a. Sensor headers: First, we'll install sensor headers. Carefully break two pieces of 4 pins each from the row of headers. One of the 4-pin pieces goes in the "Right Sensor" position (2). Be sure it is flat against the top of the PCB and solder it the same way as the ISP header: tack a pin down and then solder the rest of the pins (3,4). The other 4-pin piece goes into the "Left Sensor" position.

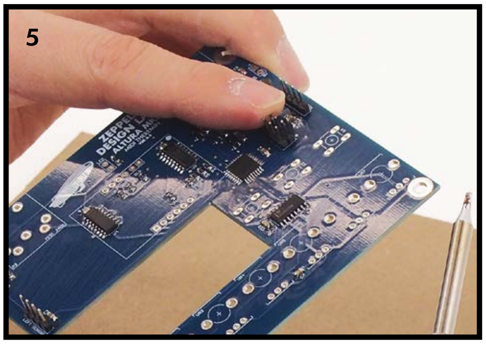


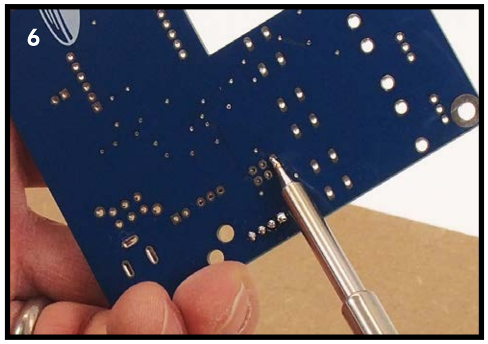


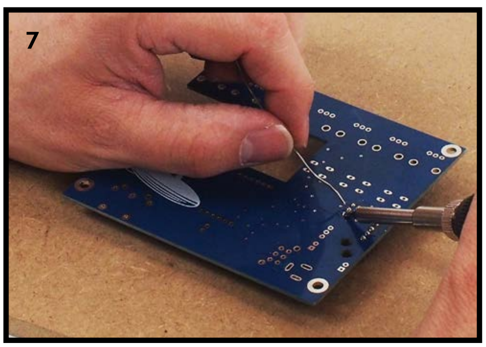


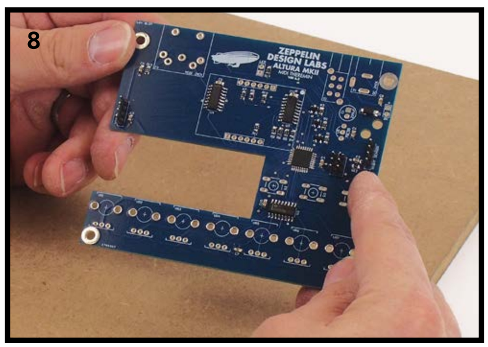
b. ISP headers: Next, we'll install the In-System Programmer (ISP) headers. This is a 2x3 header array that enables the Altura to be "flashed" or programmed with new software.

   Break two pieces of three pins each from the remaining row of headers. Place each of them in the ISP position on the PCB. The short pins go through the board; the long pins point up. Make sure the bottom of the headers are flat against the circuit board (5). Tack one pin on each row down with solder while you hold the header in from the top (6). Once each row has been tacked on, you can solder the other pins in place (7). Remember to properly re-solder the "tacked on" pins.



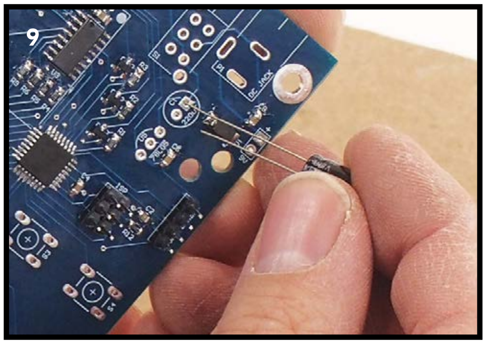


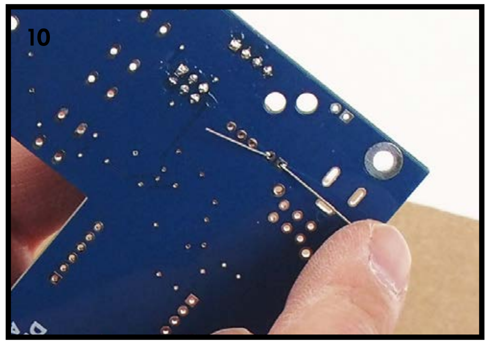


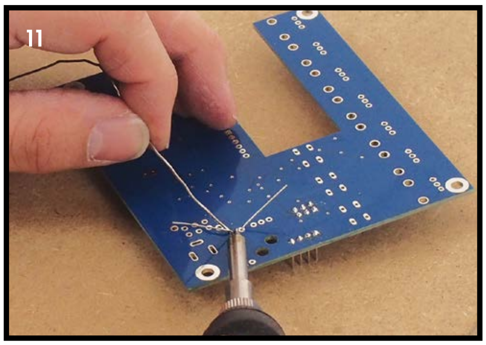


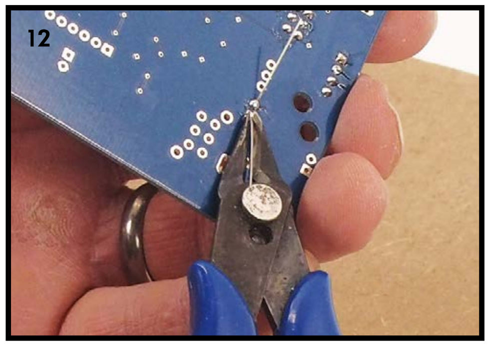
2. 220uF Electrolytic Capacitor (C1)
   This electrolytic capacitor (aka "cap") IS POLARIZED: there is a right way and a wrong way to install it. If you get it wrong, the cap might burst. The white stripe on the case indicates the negative lead of the cap. Notice that one of the leads is longer than the other. The long lead on

the capacitor is the positive lead.
STRIPE = NEGATIVE = SHORT LEAD = ROUND PAD
NO STRIPE = POSITIVE = LONG LEAD = SQUARE PAD
Make sure you orient this cap properly! For reference, Figure 3 has a little red plus sign(+) on the positive pad. Bend out the leads, flip the board over, solder and snip all the leads.

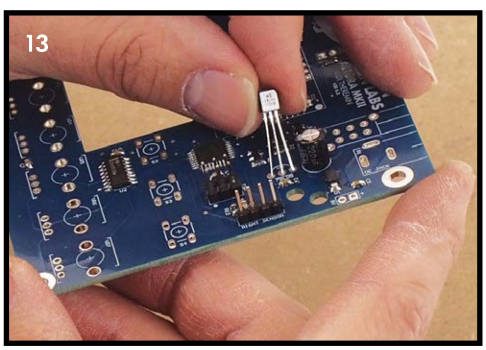


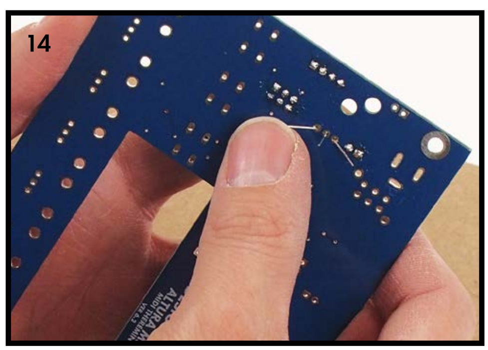


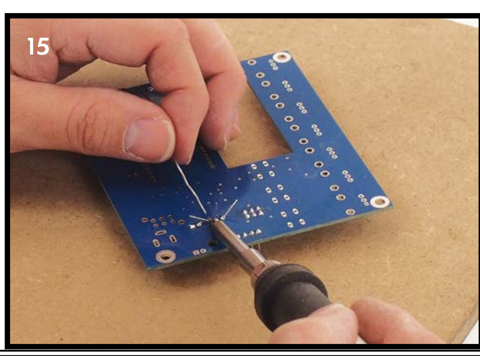


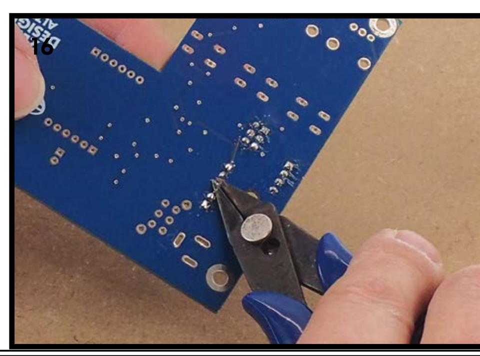


3. Voltage Regulator 78L05 (U5): This component is shaped like a three-quarter moon and is also polarized. Make sure the component is positioned in the same direction as the graphic on the circuit board (13). Thread the three leads through the PCB, and bend the leads out on the other side of the board. Solder and clip the leads

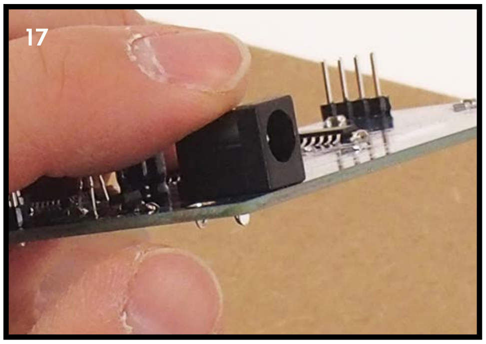




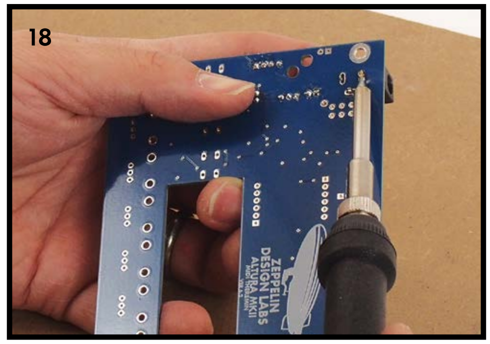




4. Jacks:
   a. Power Jack (P1): Press it snug to the board. Double check that it is sitting flush and square to the edge of the board (17). Solder the pins on the solder side. (18)

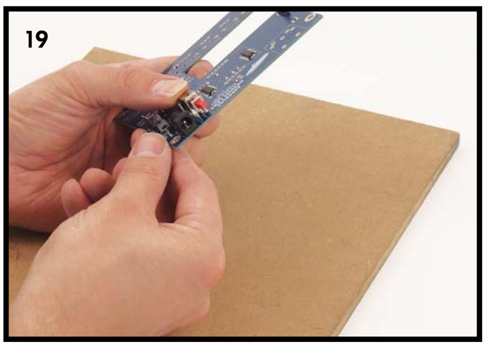


17



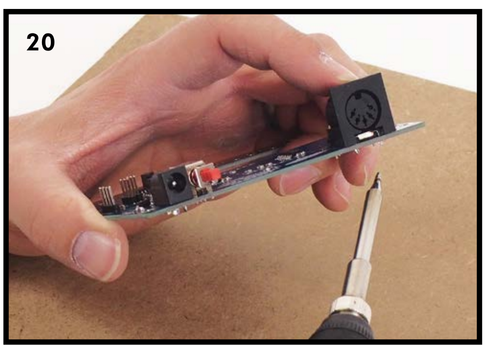
18

   b. Power Switch (S1): Press the switch snug to the board and solder the leads.

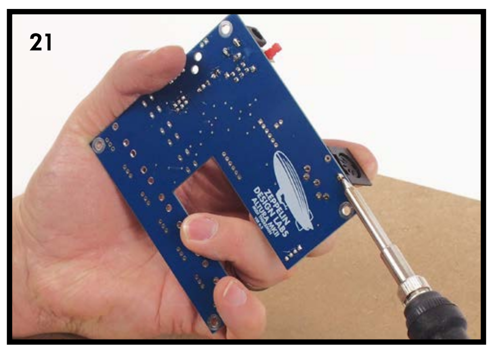


19

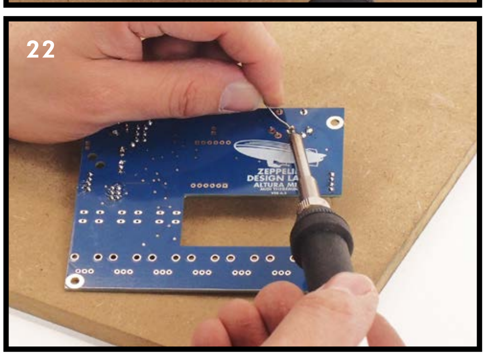
   c. MIDI Jack (P3): Press it snug and flat to the board, and then solder it in.



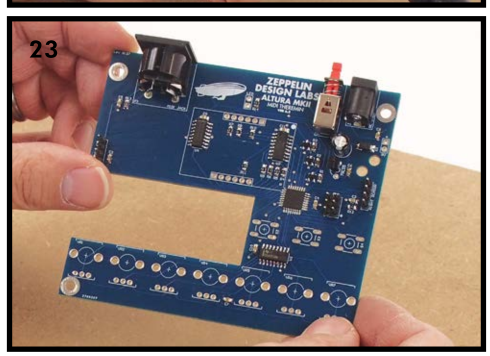
20



21



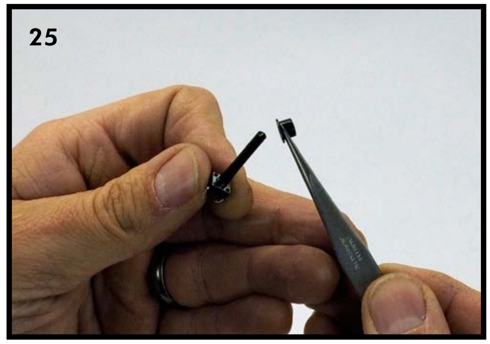
22



23

5. Tact Switches:
    a. Use a tiny drop of super glue to attach the little button caps (part number SW-60-23) to each of the switch actuators (24,25). You don't need much glue, less than a drop each! Make sure each cap is pressed down tight to the tip of the actuator; otherwise it won't fit properly in the case. Let the glue fully set up before you move on with the next step.

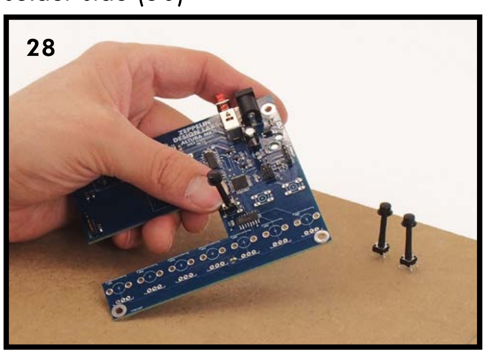
24



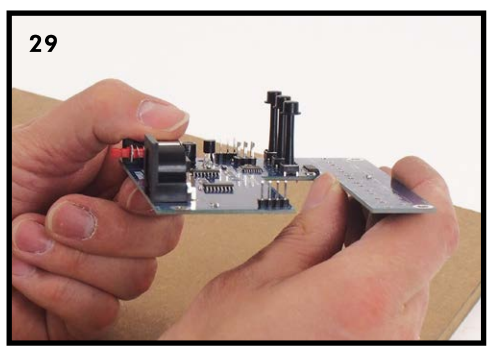
25

26

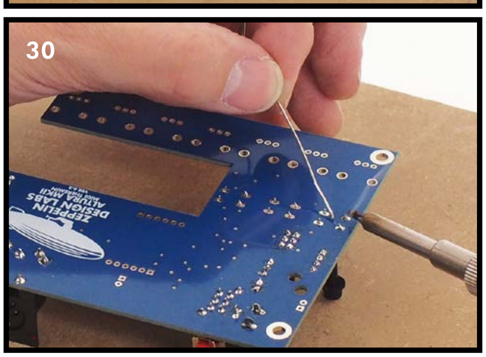
    b. Install/solder tact switches Install the tact switches at S2, S3, S4 (28,29). It doesn't matter which direction they are installed. The pins should snap into place. Solder all the pins on the solder side (30)



28

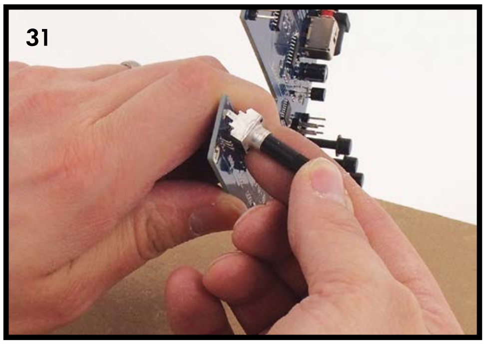


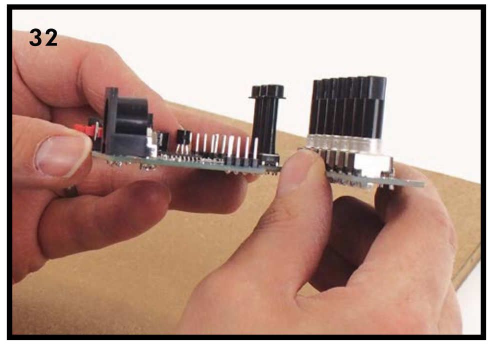
29



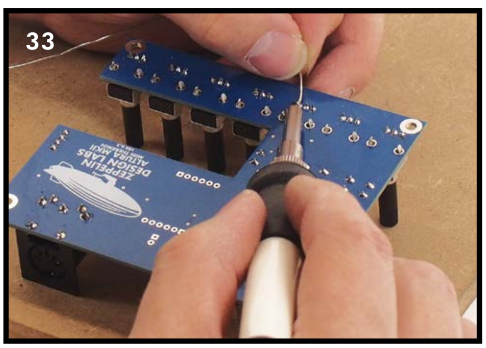
30

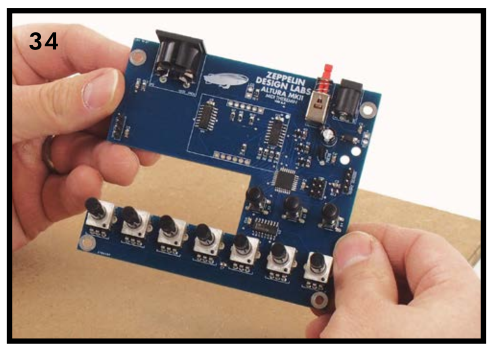
6. Potentiometers:
    a. Install the potentiometers (aka "pots"). Make sure they are all seated securely and flush against the PCB; otherwise the completed board won't fit properly into your Altura's case (31). Double check that the shafts of the pots are all standing at 90 degrees to the board (32)


31

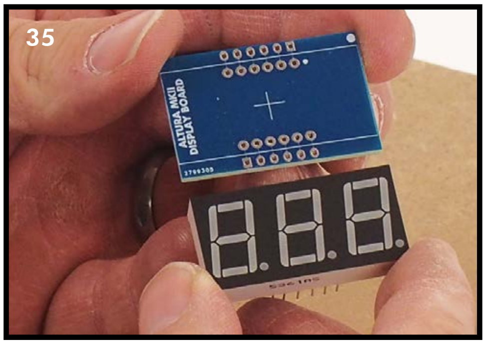

32

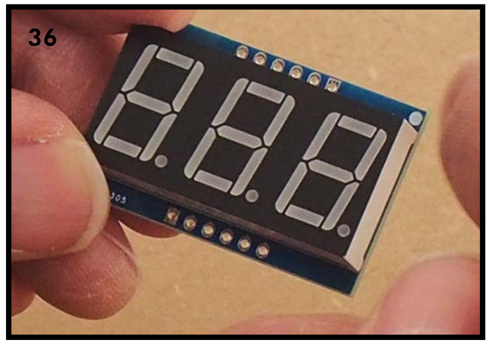
    b. Solder the pots. When soldering do not use too much heat. If you cannot move quickly with your iron, solder one pin on each pot sequentially. This will allow each pot to cool before you solder its next pin (33). Make sure all five pins of each pot are soldered.

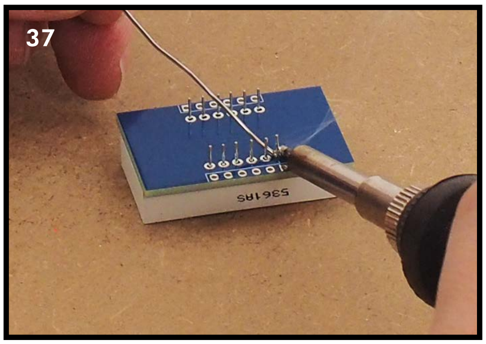

33

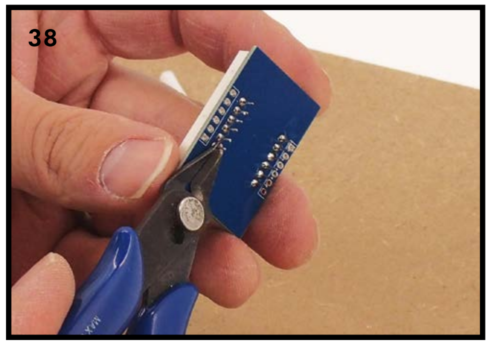

34

7. Display Board:
   a. Seven segment display: Carefully install the seven segment display onto the display board. It is critical to note which direction the display is orientated compared to the dot on the top right of the board: the decimal places should be at the bottom of the display and the dot on the top right of the board (35,36). Do not install the display upside down! Solder and clip the leads (37,38).

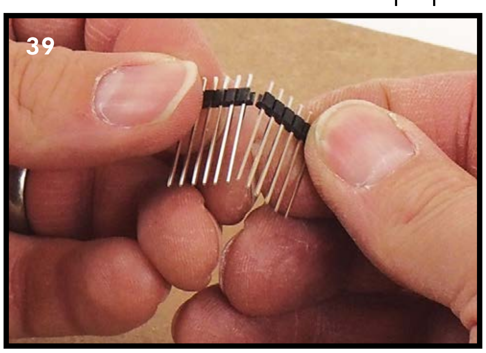


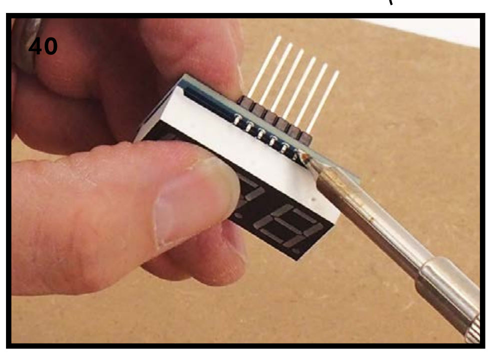


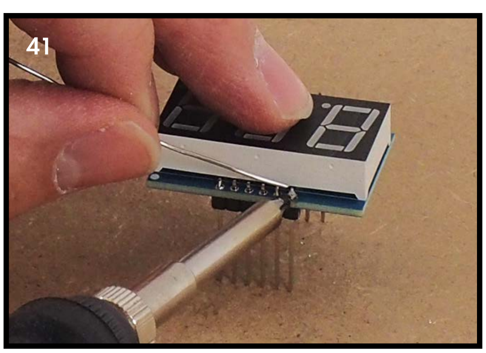


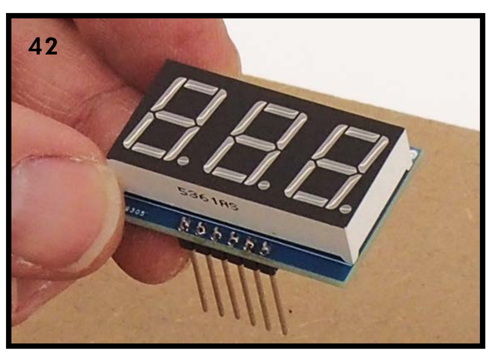


   b. Display board headers: Break the long (21mm) headers into two sets of 6 pieces. Install these headers on the display board as in the photos (40). Use the same technique you used installing the previous, shorter headers…hold one of the pins to the board while tacking the pin to the board with solder (40). Then solder the rest of the pins. Before you solder them, make sure that these headers are perpendicular to the surface of the board (not at an angle).



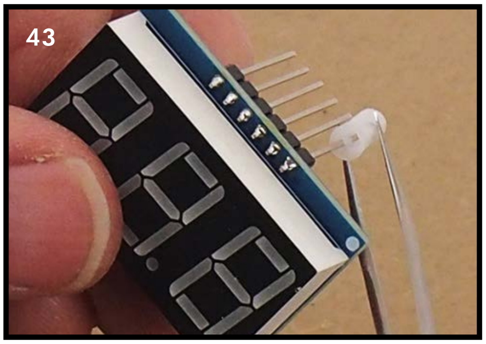


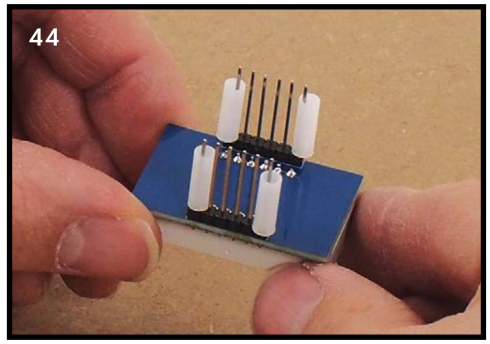




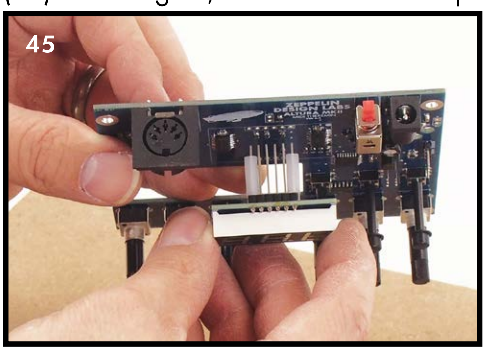
c. Installation on the main board:

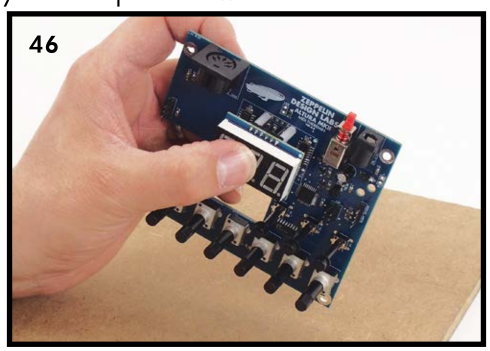
  i. Place one 12mm standoff on each of the corner pins of the headers. Put one of the small holes through the header pin first, so that the small hole side of the header is closest to the display PCB (43,44).


43


44

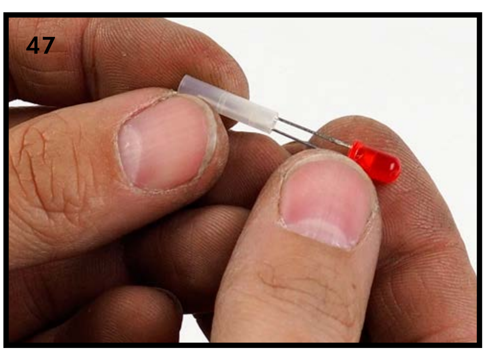
  ii. While holding the display board upside down, so the headers don't fall off the pins, slide the headers into the holes on the main board. This is kind of a tricky process, so it helps to slide in one side (6 pins) of the display board headers at a time. Make sure that the dot on the display board (on the top right) is closest to the dot on the main board (46). Once again, do not install the display board upside down!

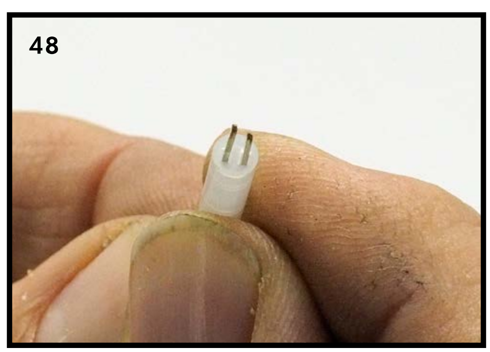

45


46

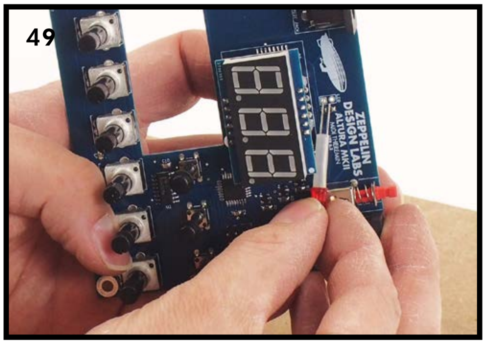
8. Power light (LED)

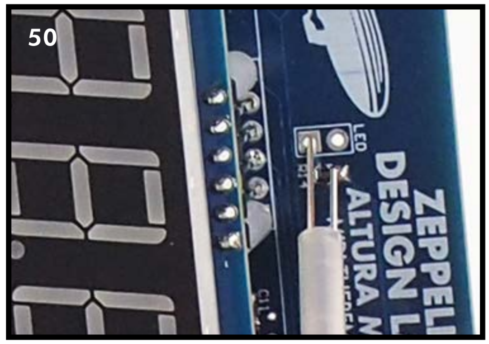
  a. Place the LED in the LED standoff (part#ST-60-10). Feed the leads in through the open end of the standoff, and thread the leads through the two small holes in the other end. The red plastic body of the LED should be up against the open end of the standoff.

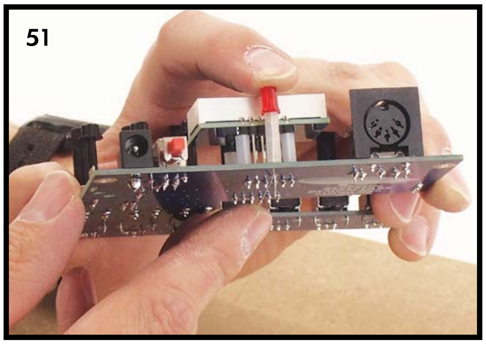

47

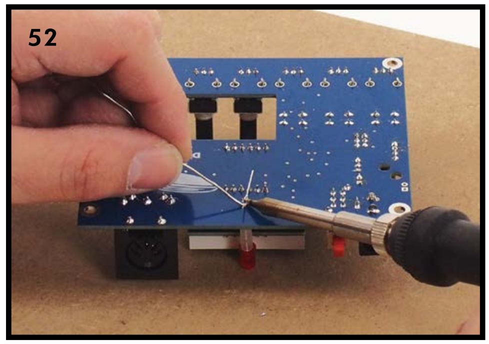

48

b. The LED is installed on the PCB in the spot marked LED. The LED, being a diode, is polarized and must be installed in the correct orientation. If you get it backwards, the light won't work. The long lead goes into the hole with the square pad (49,50). Make sure the standoff is standing straight up. Bend the leads out on the bottom; flip the board over and solder and clip the leads.

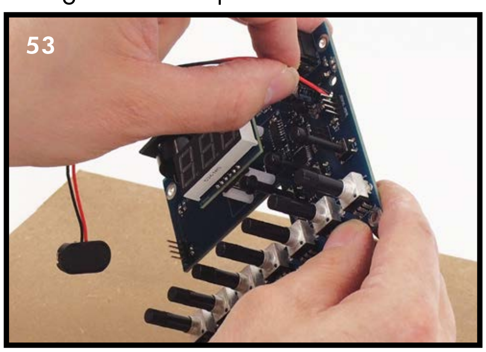

49

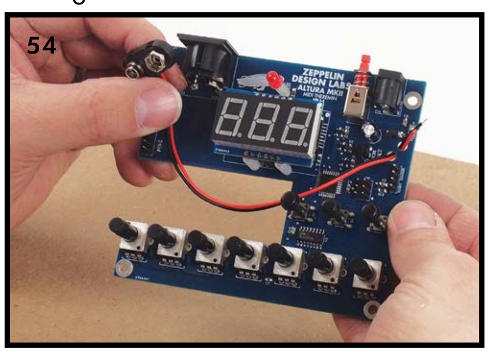

50

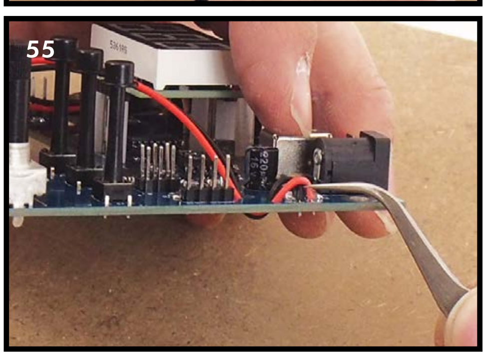

51

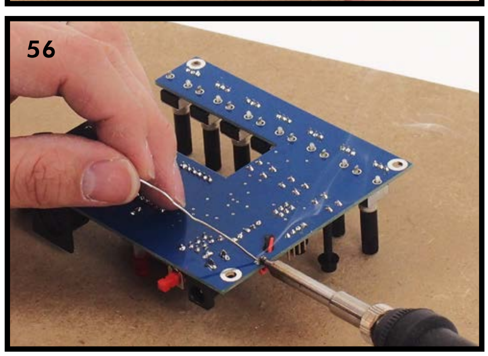

52

9. Battery snap: Feed the battery snap leads through the two holes in the PCB as shown, in the one hole and out the other. This hole configuration acts as a strain relief, so when the battery snap is pulled it won't stress the wire's solder joints. The wires get soldered to the "9V" port. The red wire goes in the square hole and the black wire goes in the round hole.


53


54


55


56

THE CHASSIS

1. Use rubbing alcohol and a rag to clean and de-grease the top chassis and bottom chassis, both outside and inside.

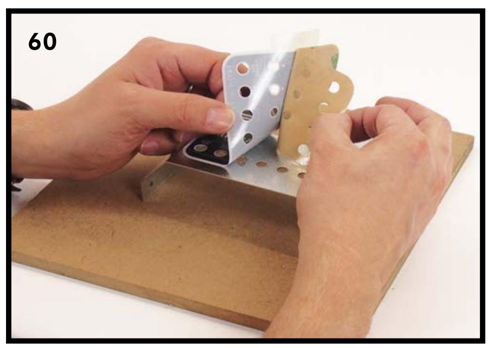

57

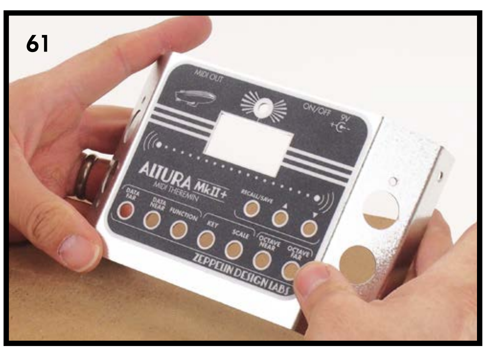

58

2. Attach the labels:

    a. Remove all the punch-outs from the main label (including the rectangle hole for the display). Place the top label onto the top of the chassis and line up all the holes. Try to make sure all the holes in the chassis are in the very center of the label holes(59). Use some tape to hold one side of the label to the top chassis in the proper place. Lift the side of the label that isn't being held down by tape and peel away and cut off about half of the backing (60). Carefully lay and smooth the label back down on the chassis top. Rub it down thoroughly. Remove the tape and remove the remaining backing. Smooth down the other side of the label.

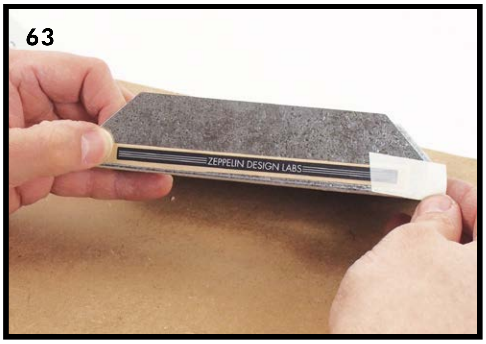
59


60

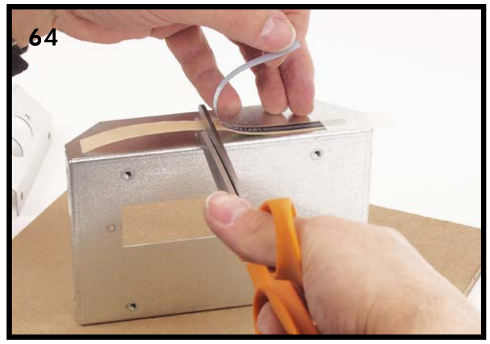


61

b. Attach the pinstripe label to the front (the side without the holes) of the bottom chassis in the same way as the top label. Line up the label where you want it and then tack down one side with tape. Peel and cut half the backing. Attach that half of the label. Remove the tape and do the same thing for the other side.



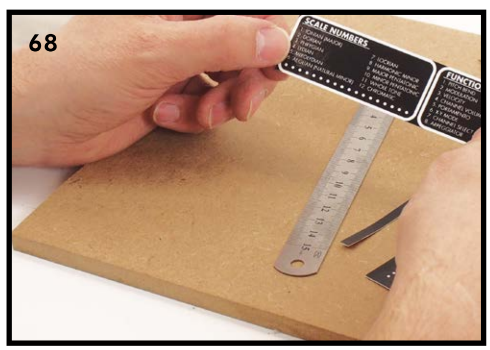
63


64

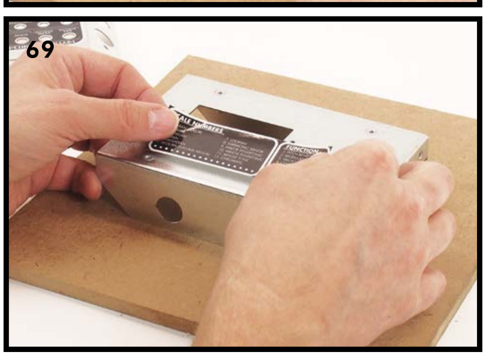
65

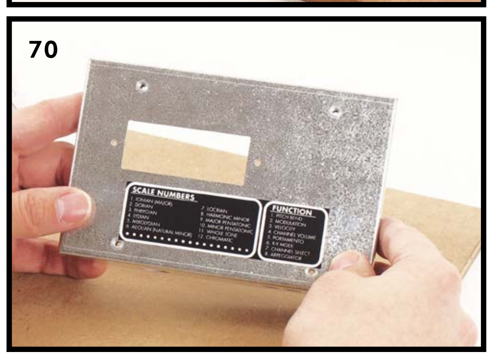
c. Use an X-acto knife (or hobby knife) and ruler to cut the vinyl label. Apply the information label to the bottom of the chassis for ready reference (70). You can place the other parts of the label around the chassis as you like.

67



68


69



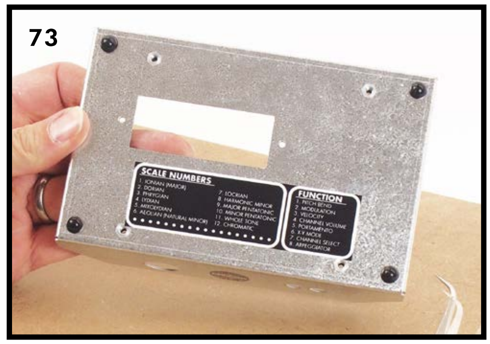
70

d. Attach the serial number label to the back of the bottom chassis.

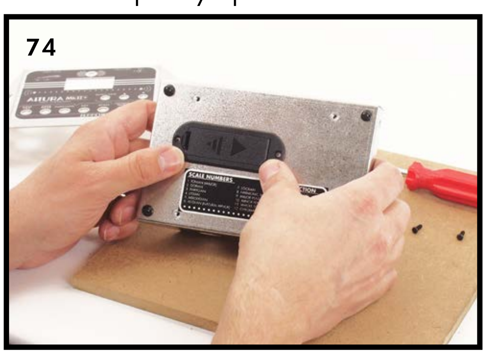

71

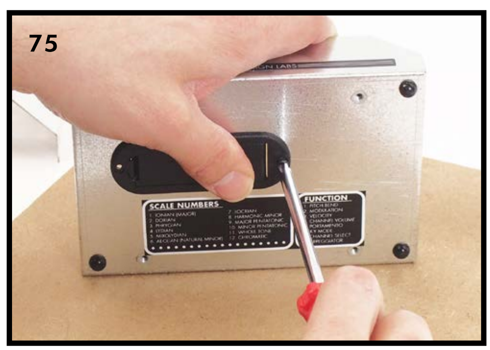
3. Attach the four rubber feet to the corners of the bottom of the chassis.


72

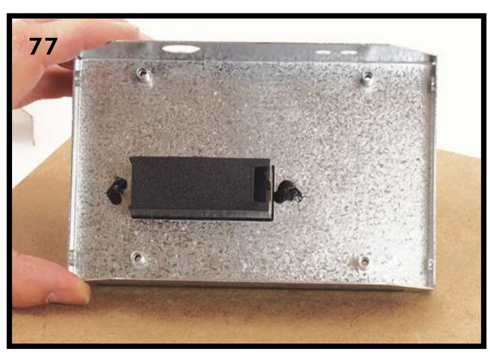

73

4. Battery box (HD-05-02): Use the 2 silver sheet metal screws (FA-63-23) to attach the battery box to the bottom of the chassis. The photos in this manual are using black screws to attach the battery box, but your kit should have silver sheet metal screws. Please note: the hinge on the door of the battery box should be closest to the center of the chassis, as in the picture (74). We like to add a drop of hot glue on these screws to help keep them from loosening over time (76), but it's completely optional.

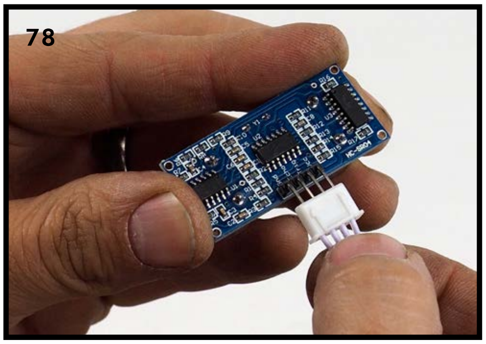

74

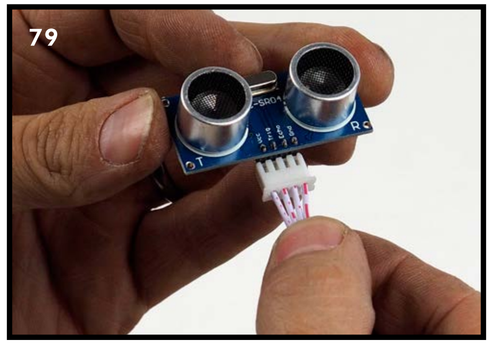

75


76

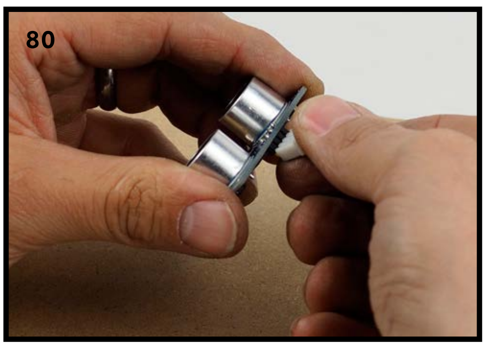

77

5. Distance Sensors (SN-20-01): The distance sensors are connected to the PCB via the 4-wire ribbon cables (Part#CB-06-10).
   a. Slide the 4 pin female header (on the ribbon cable) onto the male header (on the distance sensor). The two ridges on the female header should be facing away from the metal cylinders on the other side of the module (78,79).


78

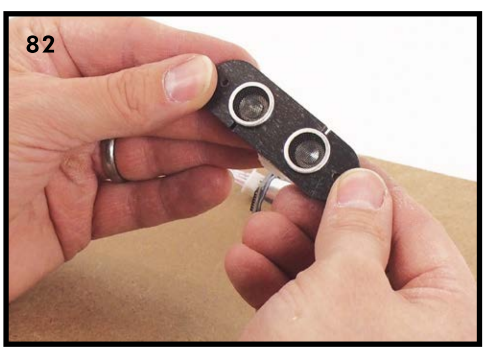

79

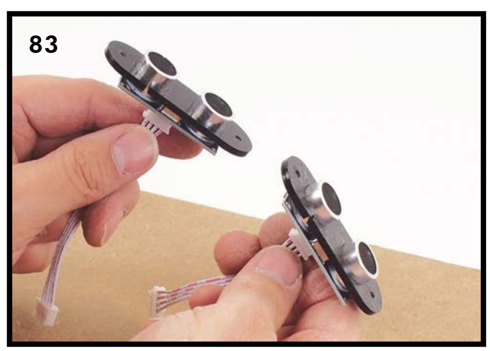
   b. Very gently bend the male header's leads a little over 90 degrees, so it ends up looking like the picture (81). Do the same thing to the other distance sensor.


80

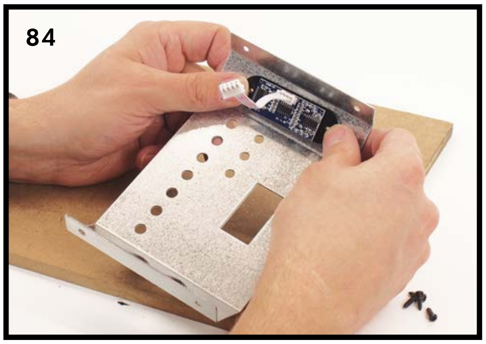

81

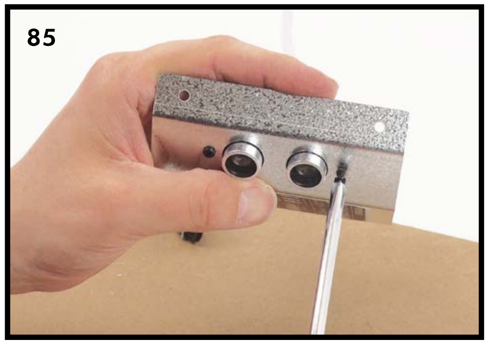
   c. Place the sensor bracket (part #HD-60-10) over the twin metal cylinders. Slide it down snug as far as it will go. Repeat for the other sensor. (83)

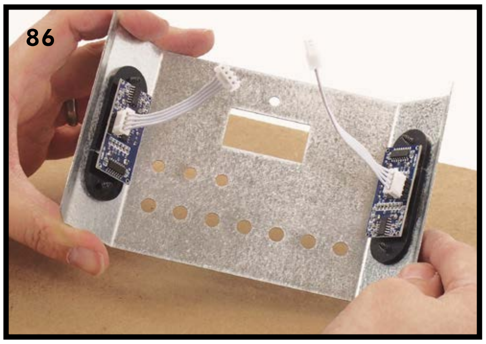

82


83

d. Install the sensors to the inside of the top part of the chassis. Make sure the header on the sensors is pointing away from the top of the chassis. Use a #2 Philips screw driver and two coarse-thread M3x10 screws (part #FA-64-30) to install each sensor into the chassis. Do not over tighten these screws. Tighten them just enough so that the head of the screw is flush with the chassis.

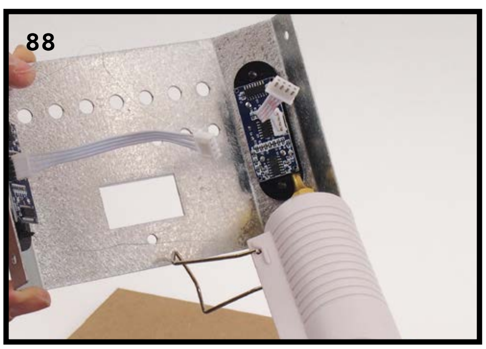

84


85


86

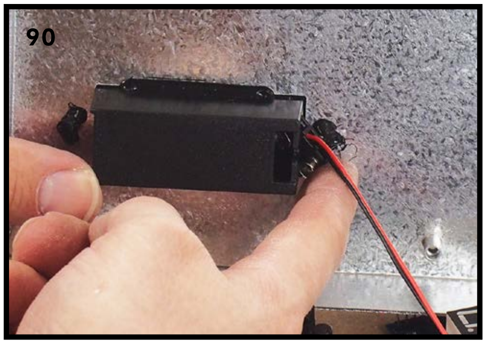
87

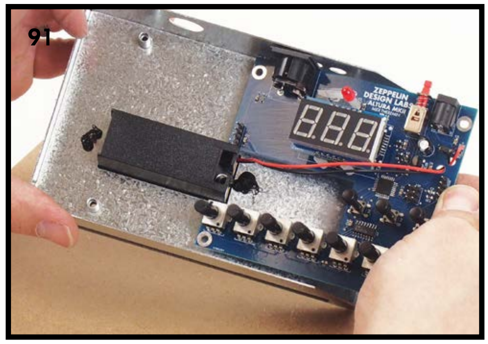
e. Optionally, to keep the sensors from sliding back and forth in their brackets, you can use a drop of hot glue (or even super glue) to tack the sensors to the brackets.


88

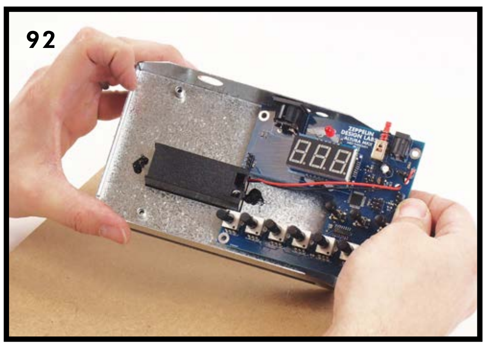
PUTTING IT ALL TOGETHER

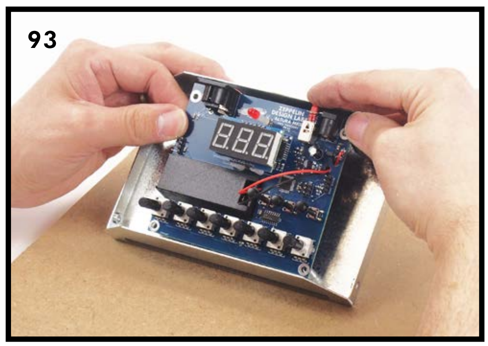
1. Before you install the PCB into the bottom chassis, you need to place the battery snap into the battery box. Slide the snap through the larger opening in the base of the battery box. You may need to push and finagle it around the battery box screw to get it to fit.

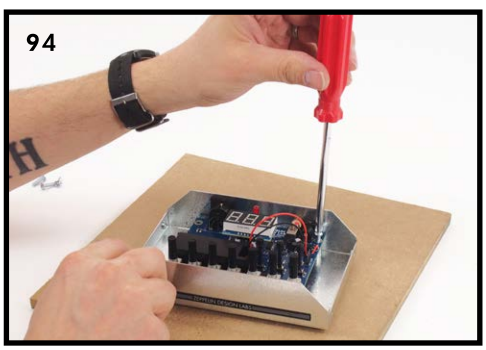

90


91

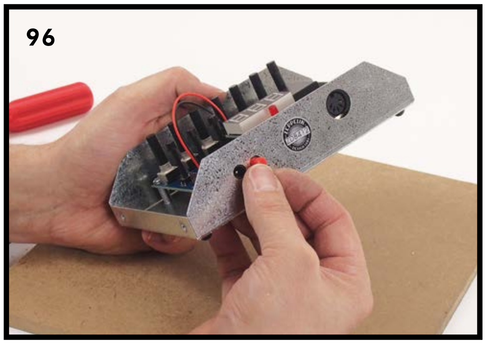
2. Once the battery snap is in the battery box, slide the PCB into place on the bottom chassis. You'll have to depress the power switch to get it to slide all the way into place (93). Align the 4 holes in the corners of the circuit board onto the 4 threaded standoffs in the chassis base. Use the 1/2" screws to attach the board to the chassis (94).


92


93


94

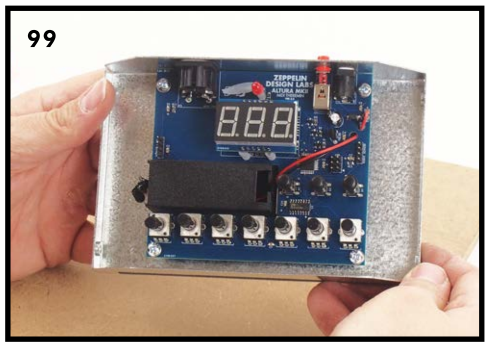
3. Push the little red cap (part #SW-60-22) onto the power switch (96). If the button seems a little loose, add a tiny drop of super glue to the switch shaft before installing the button.


96


97

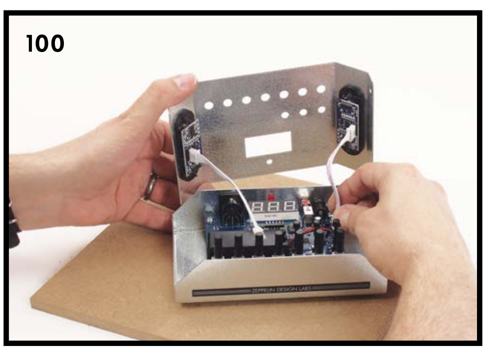
4. Open up the battery holder and pull the battery snap cable all the way into the compartment. This way, the battery snap cable won't get hung up on anything on the circuit board once the chassis is fully assembled.

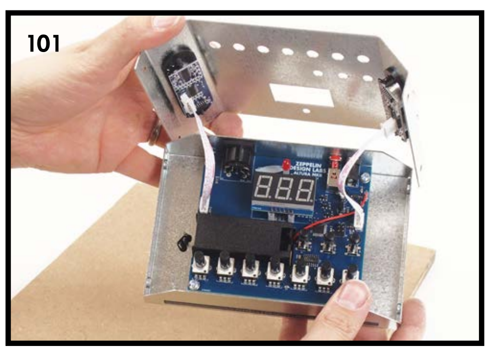

98


99

5. Assembling the chassis:

   a. Bring the two chassis parts together and plug in the ribbon cables to the "Left Sensor" and "Right Sensor" headers on the PCB. Make sure that the ribbon cable is NOT TWISTED. The two ridges on the female header should be facing toward the inside of the board.


100

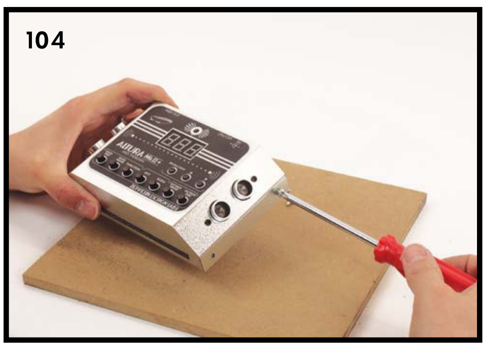

101

b. Carefully place the top chassis onto the bottom chassis. While aligning the switches, pots, and display, slide the two pieces together. You may need to reach in with your finger and adjust the ribbon cables so that they will lay correctly and allow the pieces to slide all the way together.

102

103

c. Use the four ¼″ screws to hold the chassis together.


104

105

6. Testing your Altura: Turn all the knobs to the furthest counter clockwise position. Plug a 9 volt battery or a 9 volt (center negative) power supply into your freshly built Altura. Turn your Altura on by pressing the power button. If everything was put together correctly you should see a 3 digit number on the display, which indicates the software version number.

That's it!

You're now ready to use your Altura. Please see the Altura MkII Quick Start Guide and Reference Manual to get the most out of your new Theremin MIDI Controller.

ZEPPELIN DESIGN LABS