BOXLIGHT®

MimioFrame

Assembly, Installation, and Calibration

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Introduction

MimioFrame is a retrofit interactive touch board kit that turns any compatible whiteboard and projector combination into a 10-touch interactive digital classroom in minutes!

Whiteboard Requirements

Most whiteboards are compatible with MimioFrame. The appendix to this document provides details and two methods to test candidate whiteboards. The quick version is that the whiteboard must be no more than 5mm convex at any point. A slightly concave board, in the 3-8mm range, is usually fine. See the details in the appendix.

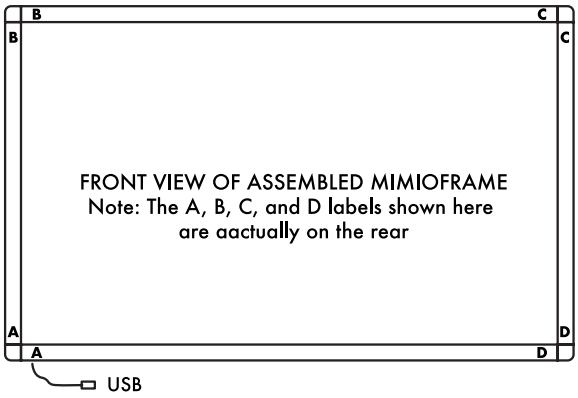
The Pieces

MimioFrame consists of:

QTY	NAME	DESCRIPTION
1	USB Cable	USB cable_3m
1	Screwdriver	Phillips screwdriver_Φ3*100mm
2	Stylus	Pen_Φ8mm
1	Double-sided tape	18 strips for attaching MimioFrame to the whiteboard. 14 to be used, 4 spares
3	Corner	Top cover-20.61*20.61
1	Corner	Top cover-USB outlet-20.61*20.61
3	Corner	Bottom cover-21.77*21.77
1	Corner	Bottom cover-USB outlet-21.77*21.77
10	Screw	PM3*10
6	Screw	Cross countersunk-head screw KM2.5*7
6	Screw	Cross countersunk-head screw KM2.5*4
2	Screw	Cross thin-head screw_CM2.5*2.5
3	FFC	FFC = Flat Flexible Cable
1	"Pusher" piece of PCB	Used to push PCB out of the frame sides for attaching FFC

The End Result

Once completed MimioFrame touch board kit will look like this:

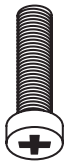


1 The appendix to this document explains the requirements of the whiteboard

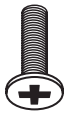
Assembly Process

Before starting it is essential to have a flat, non-scratch surface at least as large as the finished MimioFrame. A carpeted floor is an excellent choice. Working on a smaller space risks MimioFrame falling over the edge because it is open in the middle. Such a mishap could severely damage MimioFrame and is not covered by warranty.

Gather the Components



PM3*10
10 PCS



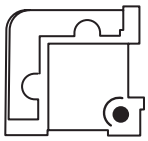
KM2.5*7
6 PCS

PM2.5*4
6 PCS

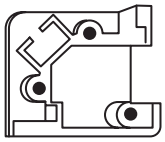
CM2.5*2.5
2 PCS

CORNER
TOP
3 PCS

CORNER
USB TOP
1 PC

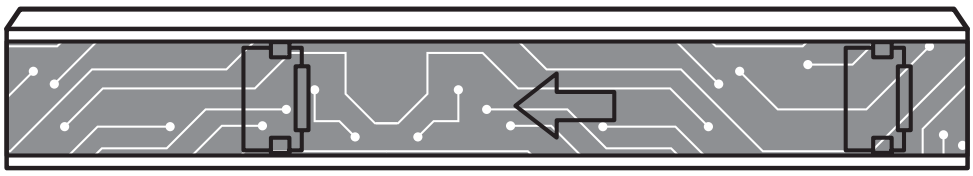


CORNER
BOTTOM
3 PCS

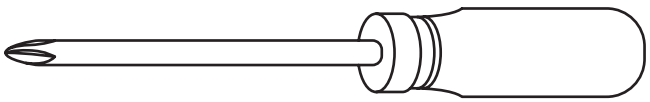


CORNER
USB
BOTTOM
1 PC

FLEXIBLE CABLE
2 PCS



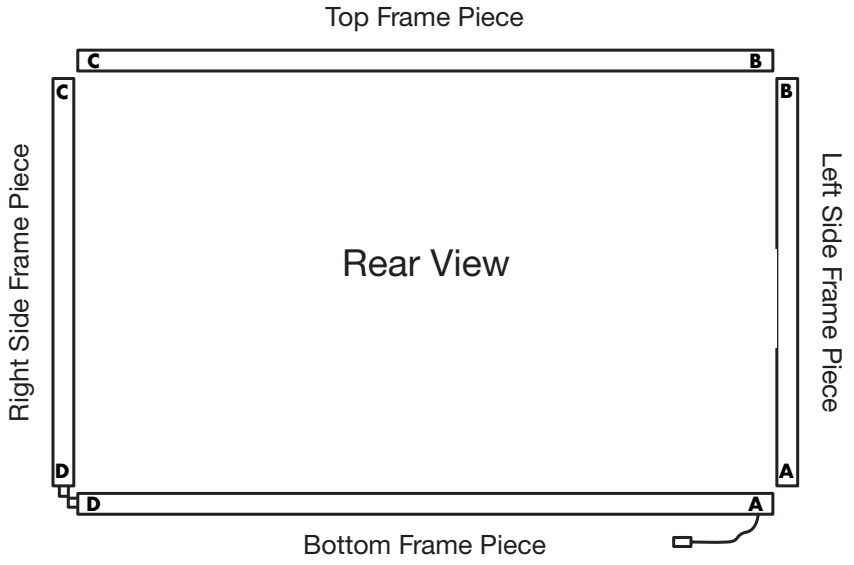
PIECE OF PRINTED CIRCUIT BOARD -
PUSHER



PHILLIPS SCREWDRIVER
Φ3*100MM

Lay out the four sides of MimioFrame

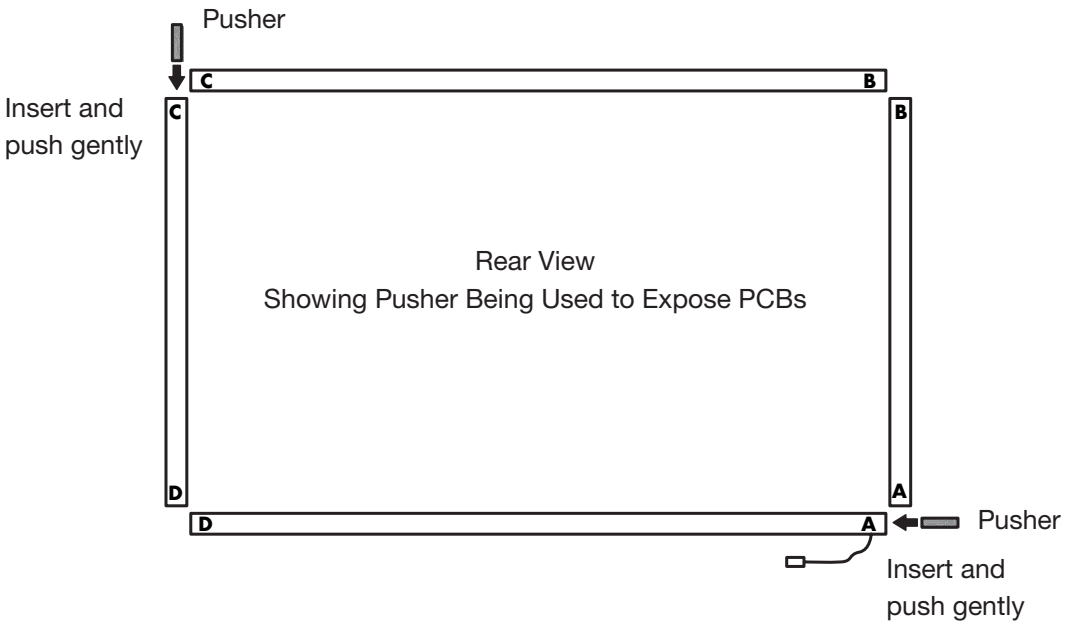
Frame pieces arranged for assembly.



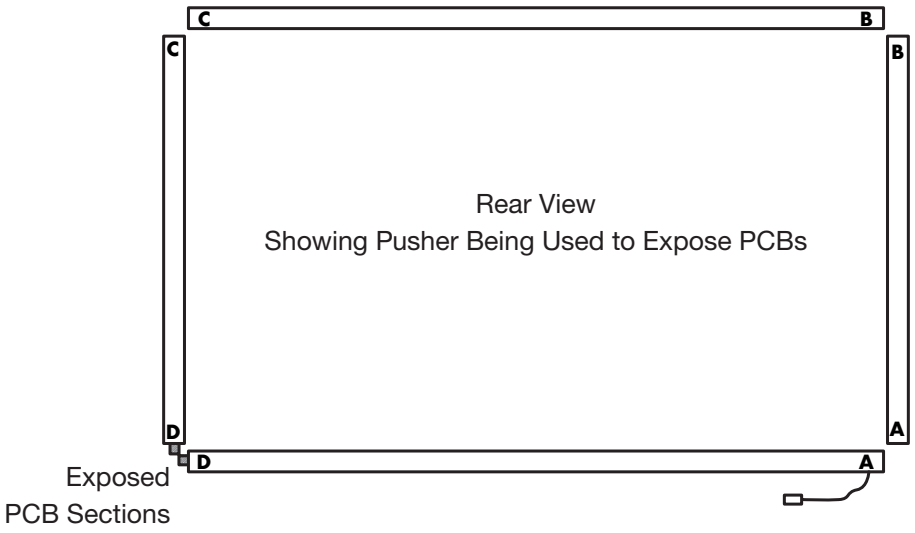
Electrically connect the PCBs Using the Flat Connector Cables (FFC)

1. Expose the PCB connectors at D.

   a. Insert the “pusher” at the C end of the Right-Side Frame Piece (shown here on the left because this is a rear view) to expose approximately 2” (50mm) of the PCB at point B.



b. Repeat by inserting “pusher” at the A end of the Bottom Frame Piece to expose approximately 2” (50mm) of the PCB at point D.



2. Attach connector cable at “D”.
3. The easiest way to do this is to roll the right-side rail and the bottom frame piece so the letters of those two pieces temporarily face down onto the table. This makes it easy to see the connector.

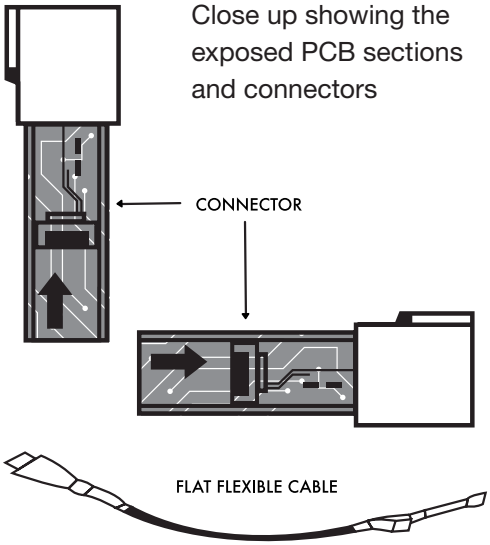


FIGURE 1

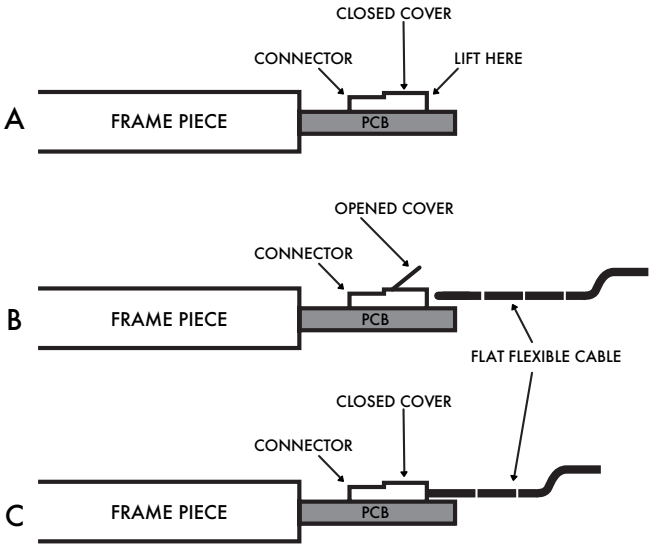


FIGURE 2

a. The connectors at the end of each PCB will initially be closed as shown in Figure 2 above.

b. Gently lift the connector cover at the point shown in “A” above.

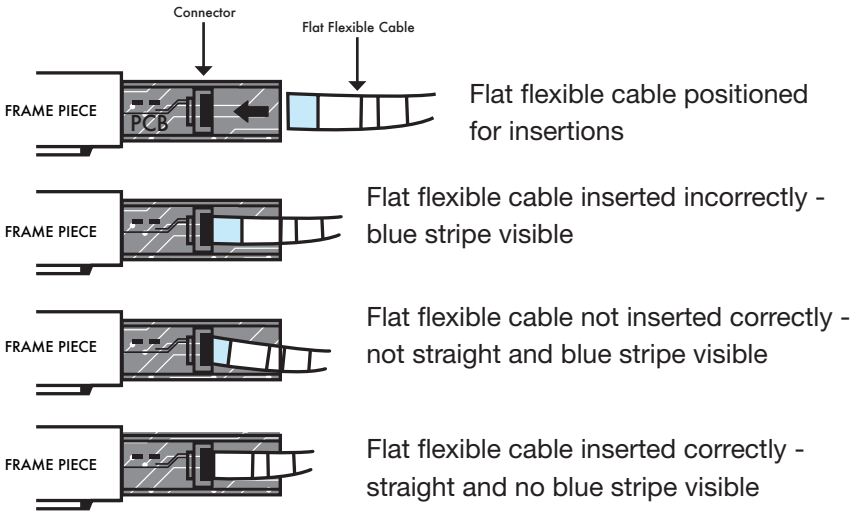
c. Figure 2 shows the connector cover open and the Flat Flexible Cable positioned for insertion.

d. Slide the Flat Flexible Cable into the opening and then very gently close the cover—a slight “click” will be felt.

e. IMPORTANT: the blue portion of the Flat Flexible Cable will be very slightly exposed, approximately 1/64” (1 mm) once the cover is closed.

f. Roll the two frame pieces back over so the letters are again facing.

Top View of Frame Piece and PCB



4. Repeat the above process for “B”

   a. Insert “Pusher” to expose approximately 2” (50mm) of the PCBs in the left-side and top frame pieces.

   b. Roll the two rails over so the labels face downward onto the table to make it easier to see the connectors.

   c. Attach the Flat Flexible Cable.

   d. Roll the rails back over so the letters again face upwards.

5. Repeat the above process for Area “A”

   a. Insert “Pusher” to expose approximately 2” (50mm) of the PCBs in the right-side and bottom frame pieces.

   b. Roll the two rails over so the labels face downward onto the table to make it easier to see the connectors.

   c. Attach the Flat Flexible Cable.

   d. Roll the rails back over so the letters again face upwards.

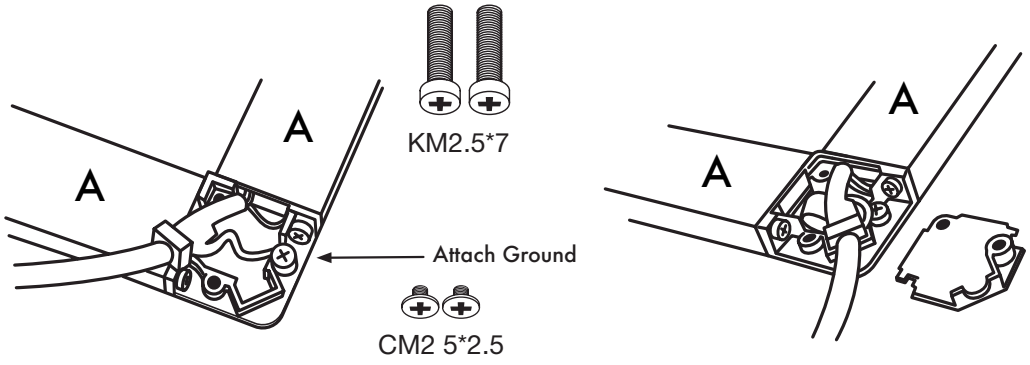
6. Please note, there are no connections at Point C

Mechanically Connect the Frame Pieces

1. Attach corner bottom at “A”.

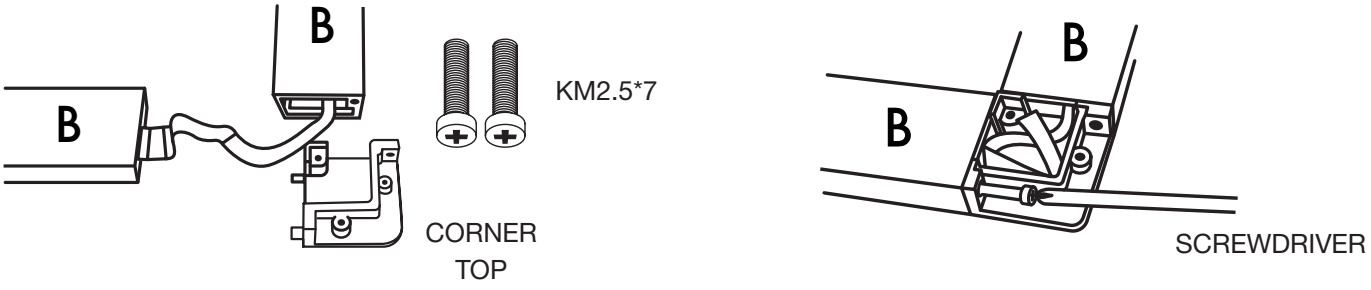
   a. Use PM3*10 bolts. NOTE that this piece has a rectangular recess to hold the rubber grommet of the USB cable.

   b. Attach ground wire as shown below using CM2.5*2.5 bolt.



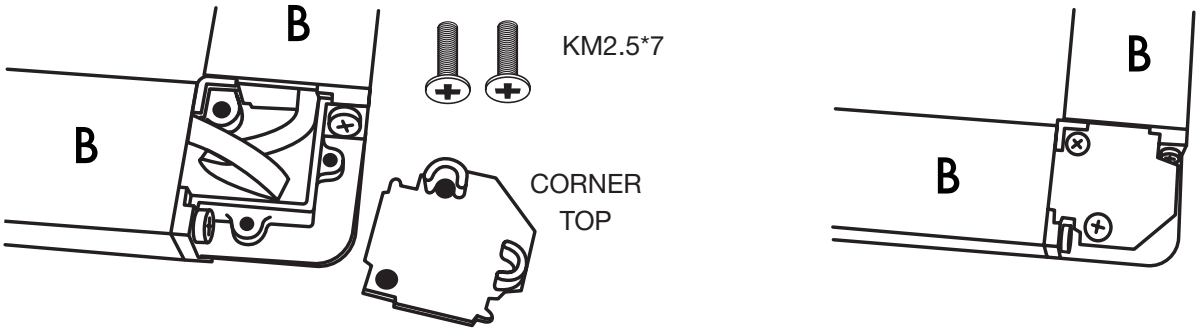
   c. Attach Corner-USB top using two KM2.5*7 bolts. NOTE that this piece has a rectangular recess to anchor the rubber grommet of the USB cable.

2. Attach corner bottom at “B” sections.



   a. Attach Corner Bottom at both “B” sections using two PM3*10 bolts.

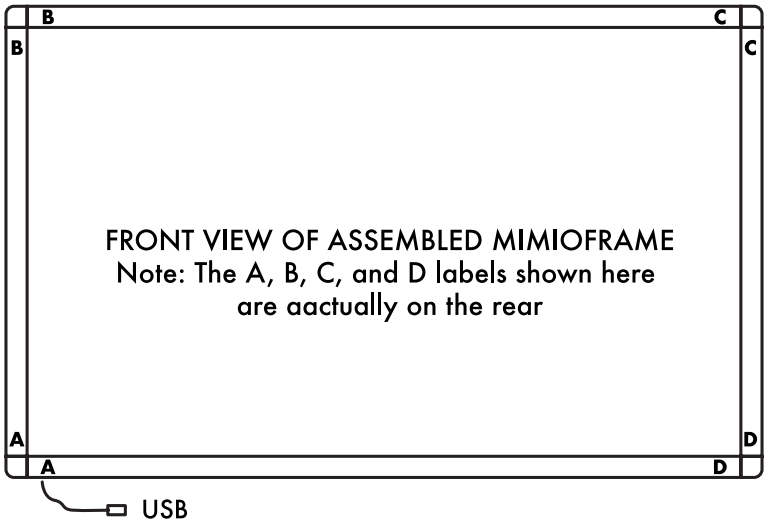
   b. Fold the FFC into the recess.



   c. Attach Corner Top using two KM2.5*7 bolts.

3. Repeat for areas C and D.
    a. Attach Corner Bottom.
    b. Fold FFC into the recess.
    c. Attach the Corner Top.

    The completed assembly is shown below



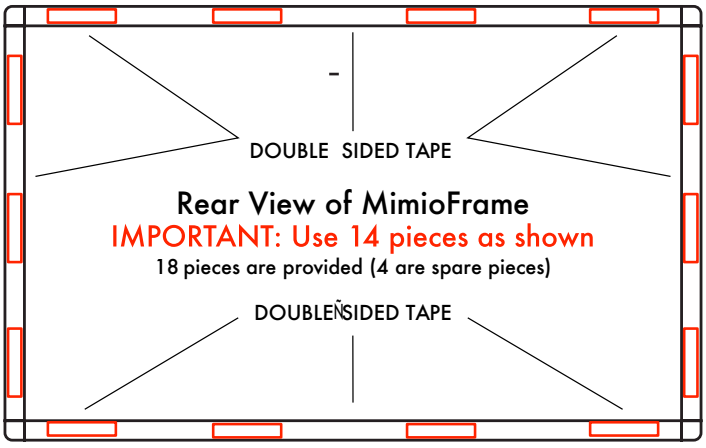
Attaching MimioFrame to the Whiteboard

- Before starting this process, it is suggested to have available:
    - Six foot (2m) step ladder.
    - Whiteboard cleaner—the real product so the board is very clean, which will help the double-sided industrial-strength tape adhere.
    - Paper towels for cleaning the whiteboard surface.
    - Whiteboard marker in a very easy to see color—black, purple, or red work great. The marker is for setting alignment marks when mounting MimioFrame into final position.
    - A roll of dental floss—not dental picks, a roll of floss. Yes, really. This is explained below.

- BEFORE attaching the industrial-strength double-sided tape to the back of MimioFrame, run a quick test fitting by lifting the assembled system into position around the projected image.

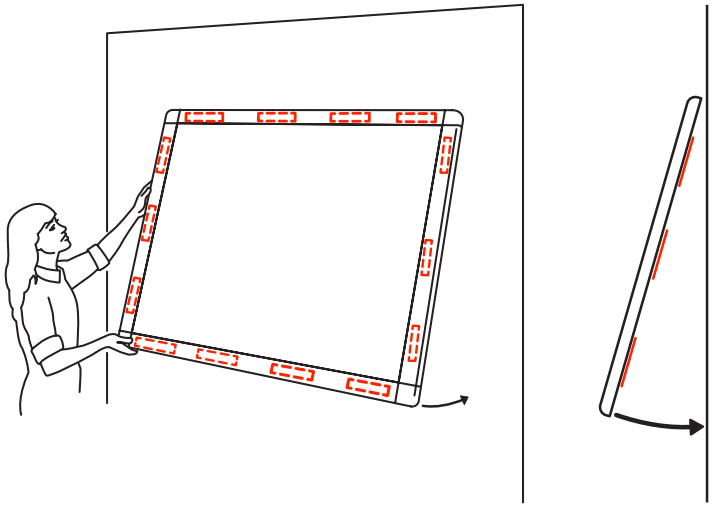
- Thoroughly clean the entire whiteboard using actual whiteboard cleaner so the double-sided tape will adhere properly, do not use window cleaner.
- It is wise to use dry erase markers to mark the intended position of MimioFrame as shown below.

- Lay MimioFrame on a flat surface and thoroughly clean the rear surface of the frame pieces. Then, attach the industrial-strength double-sided tape as below. Only peel the plastic backing from one side of the tape at this stage!



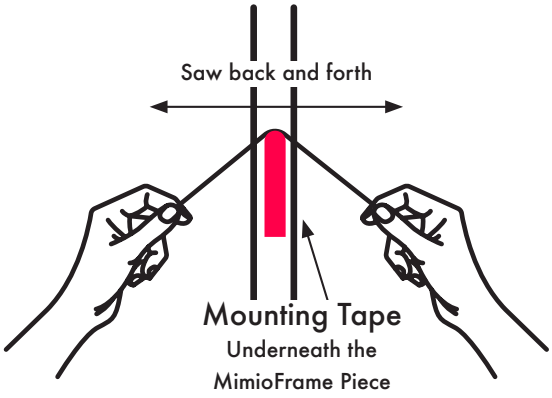
- It is STRONGLY recommended to use ONLY the supplied industrial-strength double-sided tape. It was carefully chosen for its holding strength in a wide range of temperature and humidity conditions. Be sure to use all 14 pieces.

- Peel the plastic backing from what is now the outer side of the tape.
- See diagram at right before proceeding, then carefully lift MimioFrame into position.
- Holding MimioFrame at an angle, position the top between the reference marks, and then guide the bottom of MimioFrame into position between its reference marks.



In case MimioFrame ends up mis-positioned:

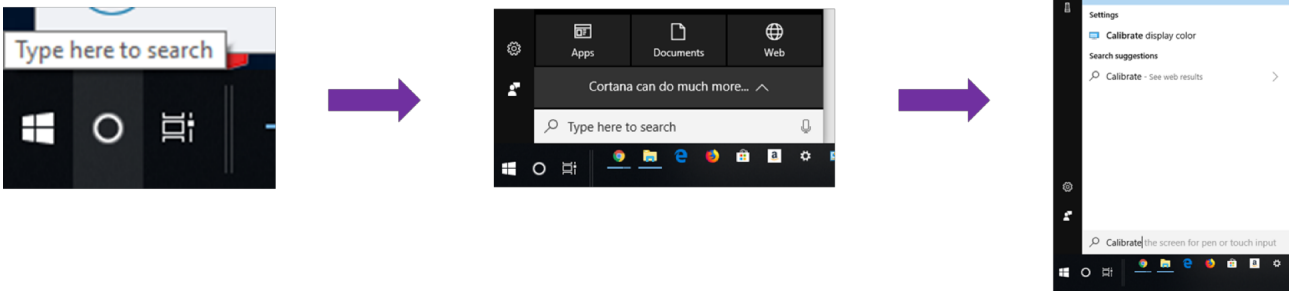
- If MimioFrame ends up in the wrong position, do not try to pull it off the board. While not fragile, MimioFrame can be broken or bent—neither of which is covered by the warranty, of course.
- Carefully peel the industrial-strength double-sided tape from the whiteboard or MimioFrame, whichever side peels more easily, until MimioFrame is freed.
- If the tape will not peel off, this is where the dental floss comes in.
  - Pull off 12-18”.
  - Slide the floss behind the frame piece above where the tape starts.
  - Gently saw back and forth while pulling downward.
  - Repeat as needed until all the tape has been separated.



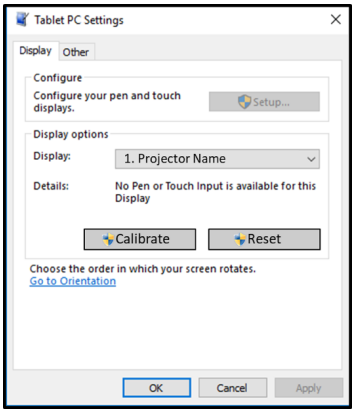
Calibration

Once MimioFrame has been installed, the calibration process for Windows is as follows:

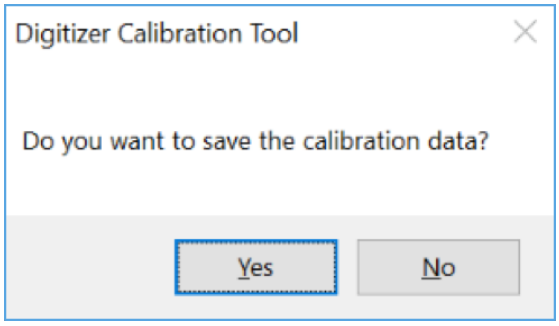
- Note that this description assumes the output of a properly configured Windows computer projected and properly positioned onto the whiteboard in a resolution with a 16:10 aspect ratio.
- In the lower left corner of the Windows Task Bar click the circle to open the search function and enter as much of this text “Calibrate for touch or pen input” until the result at right below appears.



- Click “Calibrate the screen for touch or pen input” which will bring up this dialog box.
- The Calibrate and Reset buttons should both be active (meaning not “grayed out”).
- Always click “Reset” first if it is active (there are a few circumstances when it will be grayed out.
- Then click “Calibrate” which will bring up a screen like this with instructions displayed:



- Use a finger to click on the cross-hair in the red circle (the red circle does not appear on the display, it is in the image above to add clarity). Just a quick click.
- The cross-hair will move one step to the right like this:
- Continue clicking the cross-hair to step through all 16 calibration points.
- After the last point has been clicked this window will appear—say "Yes".
- NOTE: until the calibration data has been explicitly saved, the calibration has not actually taken effect. That is why it sometimes seems impossible to touch "Yes." In that case, use the computer's mouse to click the "Yes" button.



Just in case, a bit of background:

- Occasionally the calibration process steps backwards—this is because the data is not clear enough for it. Follow the cross-hair until the process concludes after the 16th touch point, even if it does step backwards.

- If the calibration process is stepping backwards many times, it is suggested to turn off the room lights and close the curtains. Both steps reduce ambient light, which might be the issue.

Boxlight Customer Support

The first one or two MimioFrame units will usually involve a learning curve. After that, the assembly, installation, and calibration process typically requires 15 minutes or so. If things go awry, Boxlight Customer Support is available to assist at 877.696.4646 ext. 1 or CustomerCare@boxlight.com.

Appendix

Whiteboard Flatness Requirement for MimioFrame

MimioFrame has been designed to accommodate a wide range of existing whiteboards. Each whiteboard should be tested PRIOR TO INSTALLING MimioFrame.

Background Information

The four drawings below each show a side view of MimioFrame mounted on a whiteboard—a “cut-away” view.

- The MimioFrame Infrared Emitter is shown on the left side, the MimioFrame Infrared Receiver is shown on the right. The MimioFrame Infrared Emitter emits an invisible infrared (IR) beam roughly 4 mm (a bit more than 1/8”) above the surface of the board.
- The beam is received or “seen” by the MimioFrame Infrared Receiver.
- There are hundreds of emitters in the left-side piece of MimioFrame and hundreds more in the top piece. The right-side piece and bottom piece each contain corresponding numbers of receivers.
- If the IR beams were visible, the surface of the whiteboard would look like a very fine-grain piece of graph paper.
- When a finger or stylus is inserted into the IR field, it breaks one or more of the vertical and horizontal beams. An embedded micro-controller, a tiny computer, within MimioFrame uses signals from the receivers to detect which beam(s) have been broken and turns that data into positioning information. The positioning information is sent out the USB connector to the MimioStudio software running on the teacher computer, which turns raw position data into an interactive experience.

The Four Cases

- *Perfectly Flat Whiteboard Surface: The* top drawing shows a cut-away of a perfectly flat whiteboard. The invisible IR beam passes across perfectly level—it is 4mm above the whiteboard surface all the way across. Obviously, this is the ideal case.
- *Concave Whiteboard Surface: Drawing 2* shows a concave whiteboard surface. This is a somewhat common occurrence because many school whiteboards

have been glued to the classroom wall using construction adhesive. When the adhesive dries, it shrinks and pulls the center of the board towards the wall, resulting in a slightly concave surface. A slightly concave surface is usually fine. The only effect of a concave surface is that the IR field is deeper in the center than at the edges. That can sometimes cause retrace errors when the user does not draw the finger or stylus quite far enough out of the IR field.

- *Slightly Convex Whiteboard Surface: Drawing* 3 shows a slightly convex whiteboard surface, only 1-3 mm. In this case, the IR beam is still passing all the way across the whiteboard. If the board becomes any more convex, it could then fall into the Overly Convex status described next.
- *Overly Convex Surface: Drawing* 4 shows what happens when the whiteboard is too convex—the "bump" in the middle blocks the IR beam. The micro-controller detects that some of the IR beams are not being received, because they are blocked by the bump. Since the touch tracking system works by detecting broken beams, it "thinks" people are continuously touching the board in many places. This whiteboard must be replaced.

Testing Whiteboards for Flatness

Boxlight recommends either of the two approaches. The first uses a modified carpenter's level and is very fast to perform. The second takes a bit longer, but only requires some dark string, a ruler, and a bit of tape.

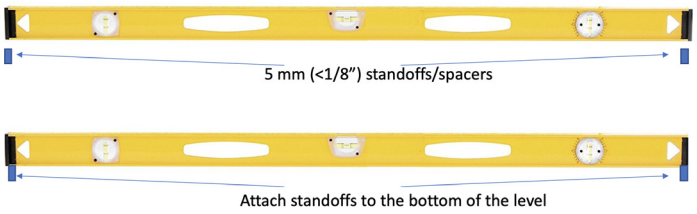
The Carpenter's Level Flatness Tester

A Do-It-Yourself (DIY) Whiteboard Flatness Tester is shown below. It is an off-the-shelf 7'(2.1mm) carpenter's level that costs around $50. Five-millimeter (5mm) spacers, sometimes called standoffs, are permanently attached at each end. This combination of the 7' carpenter's level and the spacers is a complete whiteboard flatness tester.

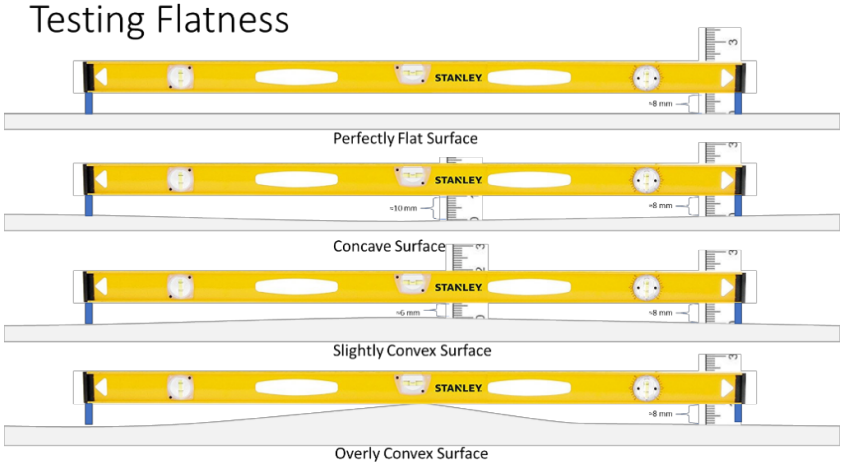
The length is important—a shorter carpenter's level will not properly span the available space and will thus give false readings. The 7' version is readily available, and it is strongly recommended to use that length.

One might ask, why not use a straightedge? The answer is that straightedges are almost always flexible and will bend when used on a horizontal surface, producing inaccurate readings. A carpenter's level is structurally stable, it will not bend, and will provide accurate data.

DIY Flatness Tester

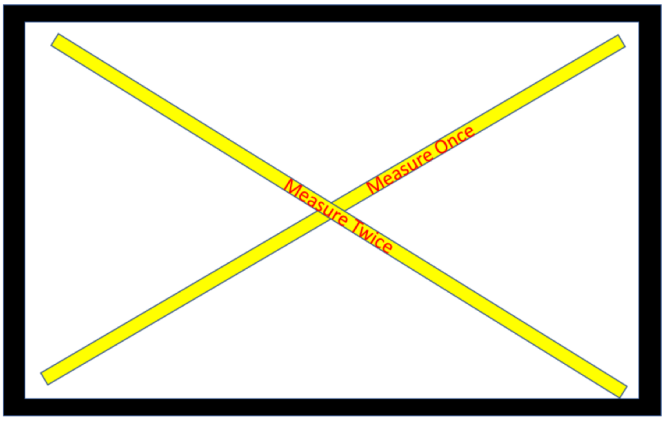


Testing Flatness



The test is fast and easy—lay the DIY Whiteboard Flatness Tester on the whiteboard once in each diagonal shown below and compare it to the diagrams above.

The Flatness Test



The String Method Flatness Tester

A taut string can also be used to test flatness, though this method is not as precise or consistent. It is better suited to performing a quick pass/fail check.

In this method, tape one end of a piece of dark string to the upper left corner of the whiteboard being tested. Then stretch that string to the lower left corner and be

certain it is taut. Use a ruler to measure the distance from the whiteboard surface to the string. Take the reference measurement in either corner, then slide the ruler along the length of the string. If the distance between the surface and the string gets greater, the board is concave. If it becomes less, the board is convex.

Then repeat the test after moving the string to the other diagonal

As mentioned above, this is a faster method and does not require a carpenter's level with spacers attached. But it is much less accurate. It is best used as a disqualifier—an overly convex whiteboard will show up easily using this method. But that does not provide assurance the board is truly suitable.

The Suitable Whiteboard

The ideal whiteboard is perfectly flat. Many whiteboards will be fine as long as they are:

- No more concave than 5mm
- No more convex than 3mm

Boxlight Customer Support

The Boxlight Customer Support team cannot actively assist in verifying the flatness of candidate whiteboards. However, they can assist with general questions, technical background, and general information. Boxlight Customer Support can be reached at 877.696.4646 ext. 1 or CustomerCare@boxlight.com.