

# Lellan SmartTile Ceiling Kit Installation Guide

Version 1.0.0

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## 1 This Guide

This *Ceiling Kit Installation Guide* refers to and builds upon the *Lellan DigitalCanvas Installation Guide*, especially Section 5. Familiarity with the concepts and procedures in the *DigitalCanvas Installation Guide* is assumed.

## 2 Overview

Each Lellan SmartTile Ceiling Kit contains of 4 triangular plastic washers plus 4 stainless steel screws (see Figure 2-1). The kit is to be used whenever a SmartTile is mounted on a ceiling (or any other application where a SmartTiles is mounted face down or nearly face down). When installed, the kit mechanically fixes the SmartTile to its frame, thus preventing the SmartTile from separating unexpectedly from its frame and falling from the ceiling.

Ordinarily, the SmartTile is held magnetically onto its frame. The magnets are designed to keep the SmartTile firmly in place. But a strong jolt or constant vibration can cause the SmartTile to separate from its frame just enough for the magnetic attachment to weaken. When a SmartTile is mounted face down (or nearly face down), the force of gravity can overcome this weakened attachment and cause the SmartTile to fully separate from its frame and fall. Installing the Ceiling Kit prevents this from happening.

Use of the Ceiling Kit requires that certain areas on the back (i.e., the ceiling facing side) of the frame be accessible after the SmartTile is attached to its frame and even after the whole assembly is mounted on the ceiling. This differs from wall-mounting the SmartTile, where the frame is simply attached to the wall and then the SmartTile is placed on the frame to be held in place magnetically.



*Figure 2-1: Contents of the Ceiling Kit*

### 3 Tools Required

Phillips Screwdriver

Drill with 1/8" drill bit

Small hacksaw or a sturdy pair of wire clippers

## 4 Accessibility Requirements

Figure 4-1 shows the back side (i.e., the ceiling facing side) of a SmartTile frame with the four areas that must be accessible shaded in red. These four areas on the back of the frame must be accessible for installation/deinstallation of the Ceiling Kit washers and screws whenever the SmartTile needs to be attached to the frame or detached from the frame (e.g., if maintenance is required).

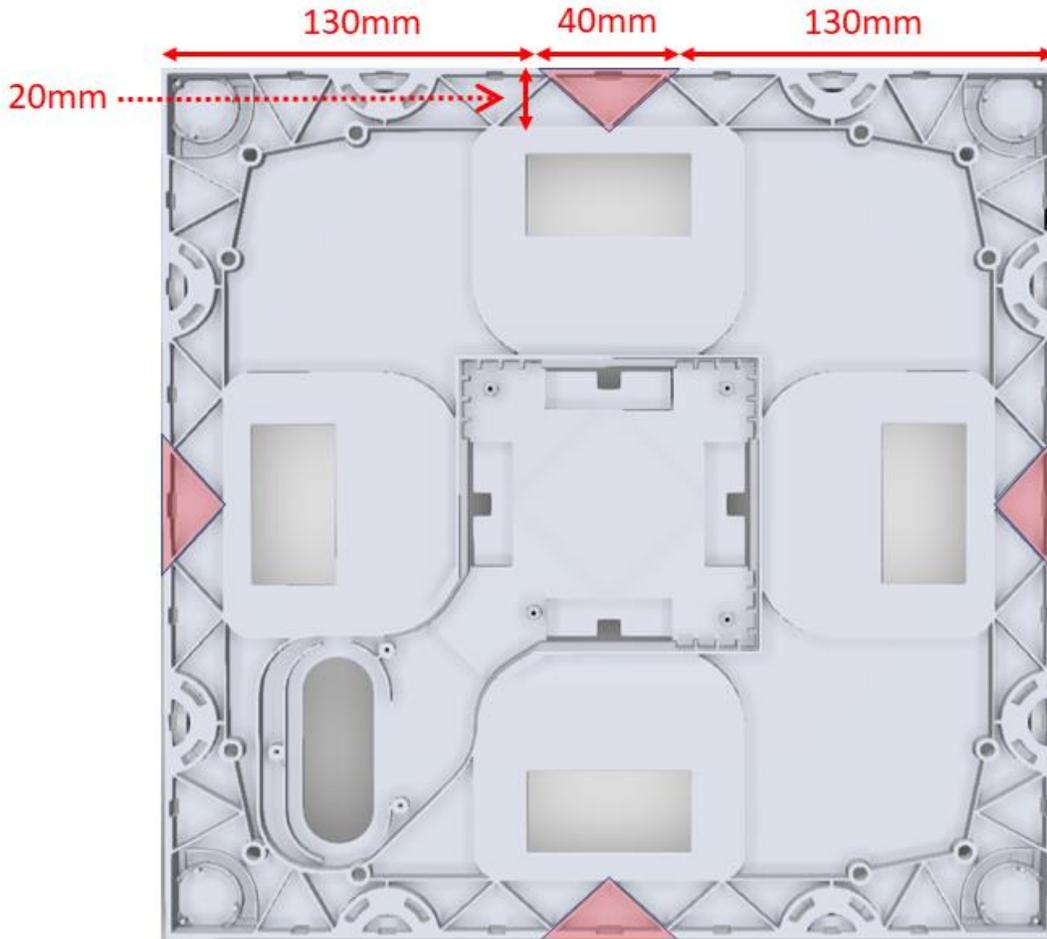


Figure 4-1: Back of frame with areas that need to be accessible shaded in red

## 5 Installation Procedure

General instructions for installing a DigitalCanvas are provided in Section 5 of the *Lellan DigitalCanvas Installation Guide*. Steps 1 thru 5 in Section 5, in particular, cover the procedure for mounting SmartTiles. Before continuing you should familiarize yourself with this procedure. This current section covers only the additional/modified installation steps required when using the Ceiling Kit.

### 5.1 Preparatory Steps

The following steps should be carried out before Step 1 from the *DigitalCanvas Installation Guide*:

#### 5.1.1 Prepare the frames for the Ceiling Kit

For each frame, you will need to drill 4 new holes (one for each of the 4 red-shaded areas shown in Figure 4-1) through the frame to accommodate the screws from the Ceiling Kit. Use a 1/8" bit for drilling these holes. And take extra precaution that the swarf from drilling is completely removed from the frame and, in particular, does not interfere with the contacts on the floating connector (see Figure 5-12 in the *DigitalCanvas Installation Guide*).

To drill each hole, insert one of the triangular washers into the triangular space made by the ribbing in one of the shaded areas shown in Figure 4-1. Using the hole in the washer as a guide, drill a hole through the frame.



*Figure 5-1: Drill a hole through the frame*

#### 5.1.2 Prepare the SmartTiles for the Ceiling Kit

On the back side of each SmartTile to be ceiling mounted, remove the 4 screws circled in Figure 5-2. The removed screws will not be reused for ceiling mounting but should be saved if the SmartTile will ever be used in a non-ceiling mounted installation.

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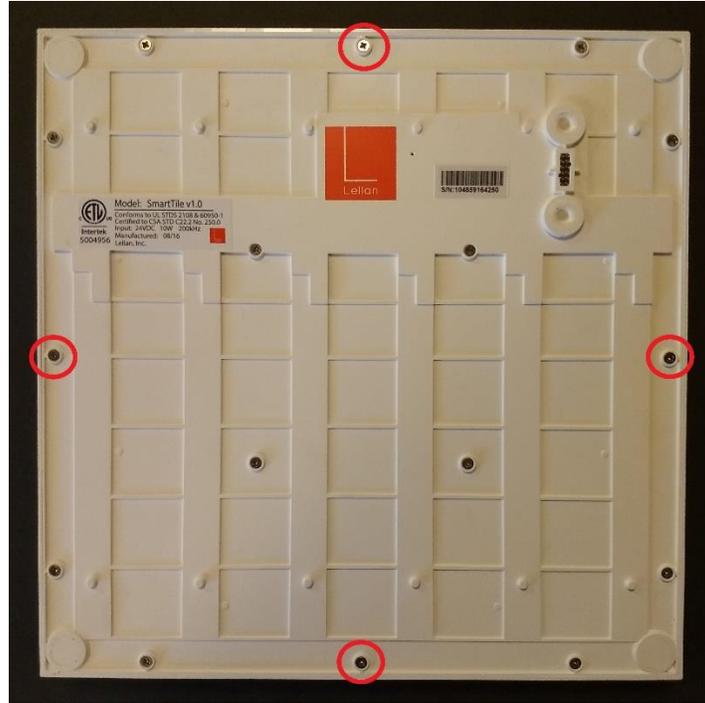


Figure 5-2: Back of SmartTile; the 4 screws to be removed are circled in red

### 5.1.3 Prepare “spacers” for the Ceiling Kit

As described in Steps 2 and 3 of Section 5 in the *DigitalCanvas Installation Guide*, the *edge extenders* along the edges of the frames will need to be removed for any SmartTile where O-Clamps will be installed or where a SmartCable will enter or leave the SmartTile from the side. Figure 5-3, which is reproduced from the *DigitalCanvas Installation Guide*, shows these edge extenders.

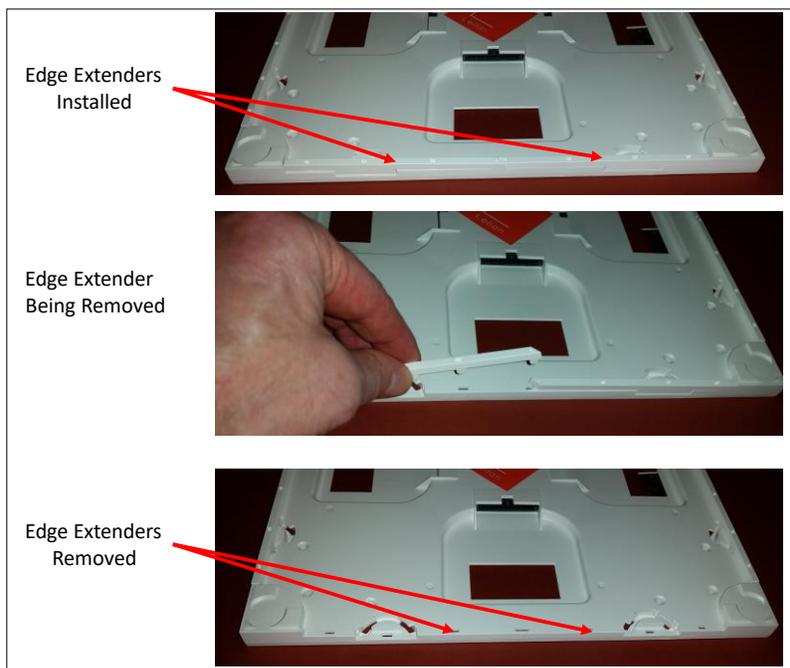


Figure 5-3: Edge Extenders Installed, Being Removed and Removed.

Remove these edge extenders now (instead of in Step 2 and/or 3 as described in the *DigitalCanvas Installation Guide*).

Note that for every frame edge there are two edge extenders. Set one aside. It will not be reused for this installation, but you may want to save it in case the DigitalCanvas is ever reconfigured.

Take the second edge extender and cut it to a length of approximately  $\frac{1}{2}$ " , starting at the "pointed" end (see Figure 5-4).

You can use a hacksaw or a pair of wire cutters to make the cut. Keep the  $\frac{1}{2}$ " piece handy. It will be used as a *spacer* later in this installation. You can throw the remaining piece of the cut edge extender (approximately 4" in length) away.

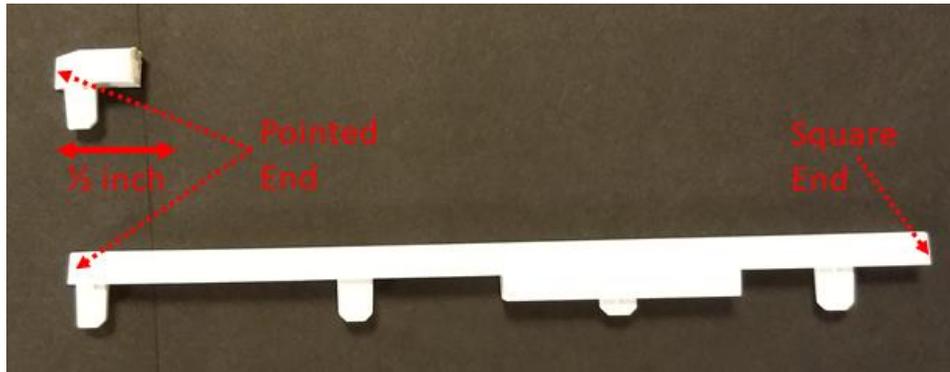


Figure 5-4: Intact and cut edge extenders

## 5.2 Install Frames and Cables

After the Ceiling Kit preparatory steps are complete, follow Steps 1 thru 3 in the *DigitalCanvas Installation Guide* to mount the frames and install the SmartCables.

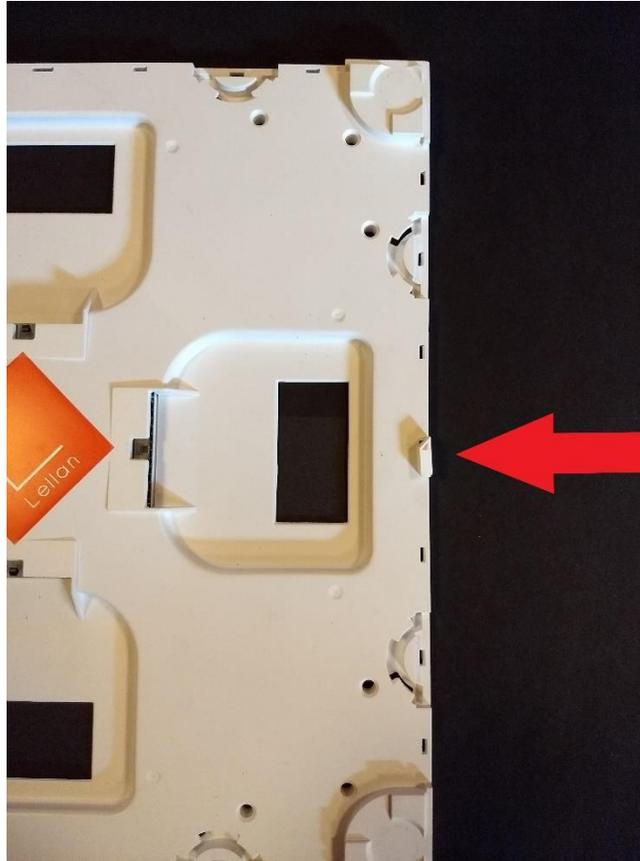
Any SmartCables that will run from a PowerBox to a SmartTile should also be installed onto the frames (i.e., at the SmartTile end) at this point. The rest of Step 4 (*Install the PowerBoxes and SmartHub*), however, can be postponed until after all the Ceiling Kit installation steps are done.

## 5.3 Install the SmartTiles including Ceiling Kit

### 5.3.1 Install the "spacers"

For every frame edge where you removed the edge extenders and created a spacer as per Section 5.1.3, insert the spacer into the center slot along the edge as shown in Figure 5-5. There will be some sideways play as the slot is larger than the tab on the spacer. Adjust the spacer to be as centered along the frame edge as possible.

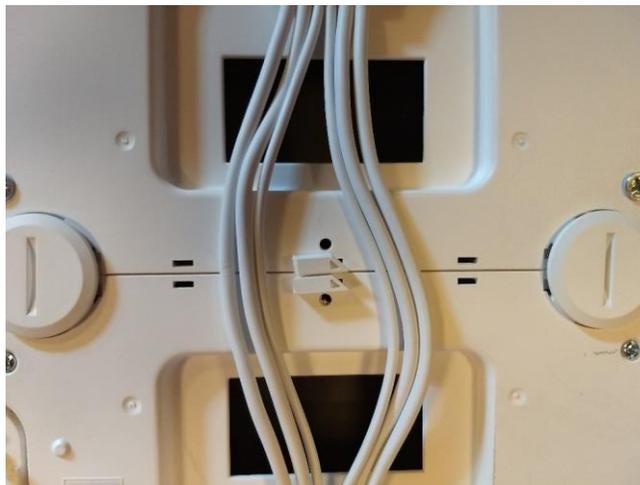
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*Figure 5-5: Spacer installed along edge of frame*

Note that a spacer is required for every frame edge where the edge extenders have been removed, even in cases where two frames abut each other (see Figure 5-6).

You may have to adjust the SmartCable crossing the frame edge to insert the spacer. Usually the best strategy is to “split” the cable, with half of the wires going on one side of the spacer and half on the other as shown in Figure 5-6. The cable wires cannot lay on top of the spacer since the spacer is designed to fill the space between the frame and the SmartTile.



*Figure 5-6: Adjacent frames showing two spacers, routing of SmartCable wires and O-clamps.*

### 5.3.2 Install the SmartTiles

Install the SmartTiles as described in Step 5 in the *DigitalCanvas Installation Guide*. After each SmartTile is magnetically attached to the frame, install the Ceiling Kit for that Tile as follows.

From the back of the frame, insert a triangular washer into the triangular space made by the ribbing in each of the shaded areas shown in Figure 4-1.

For each washer, install a screw through the washer, through the hole drilled into the frame as per Section 5.1.1, and into the screw hole in the back of the SmartTile left open by the removal of the previous screws as per Section 5.1.2. Tighten the screw firmly but do not overtighten as doing so may strip the threads in the SmartTile.

Figure 5-7 shows the installation of the screws. Note that the spacer has been removed in this photo to make the screw visible between the frame and the SmartTile. Figure 5-8 shows a view with the spacer in place.

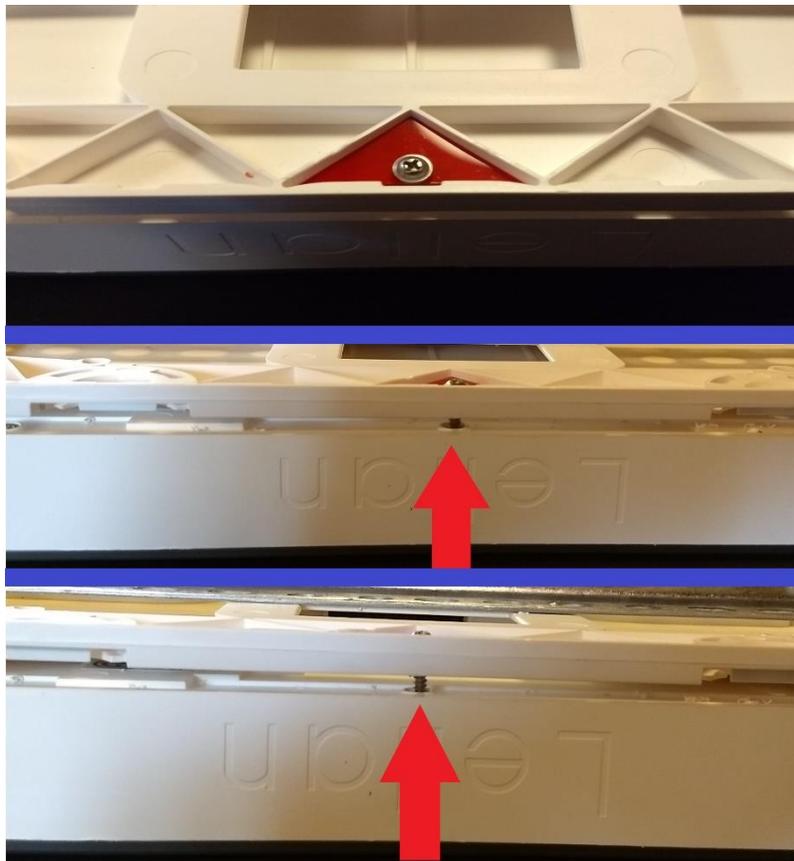


Figure 5-7: Three views of Ceiling Kit installed with spacer removed for illustration



*Figure 5-8: Ceiling Kit installed with spacer in place*

#### 5.4 Complete the Installation of the DigitalCanvas

Complete the installation of the DigitalCanvas starting with Step 4 (if previously postponed) and then Step 6 and beyond as per the *DigitalCanvas Installation Guide*. Note that if any adjustments need to be made to the cabling during troubleshooting, you will need to uninstall the Ceiling Kit from the relevant SmartTiles and then reinstall after the cabling has been adjusted.

## 6 Example Ceiling Installation

Figure 6-1 shows an example of a rig used for ceiling installation of a small DigitalCanvas in the Lellan Test Lab. This rig is designed to be incorporated into a dropped ceiling. As such, the frames/SmartTiles are mounted onto a structure composed from struts which can then be suspended alongside the rest of the dropped ceiling. Figure 6-2 shows the back (i.e., ceiling facing side) of the rig and illustrates how the frames are bolted onto the struts. The incorporation of this rig into the drop ceiling will depend on the exact design of the ceiling.

Since this example involves a very small DigitalCanvas (only 3 SmartTiles), a simple design consisting of just two parallel 14-gauge slotted L-beams was used. For most 'real-world' DigitalCanvases, a more complex rigging made from unistruts will likely be required.



Figure 6-1: DigitalCanvas rig for drop ceilings based on 2 parallel struts onto which the frames are bolted

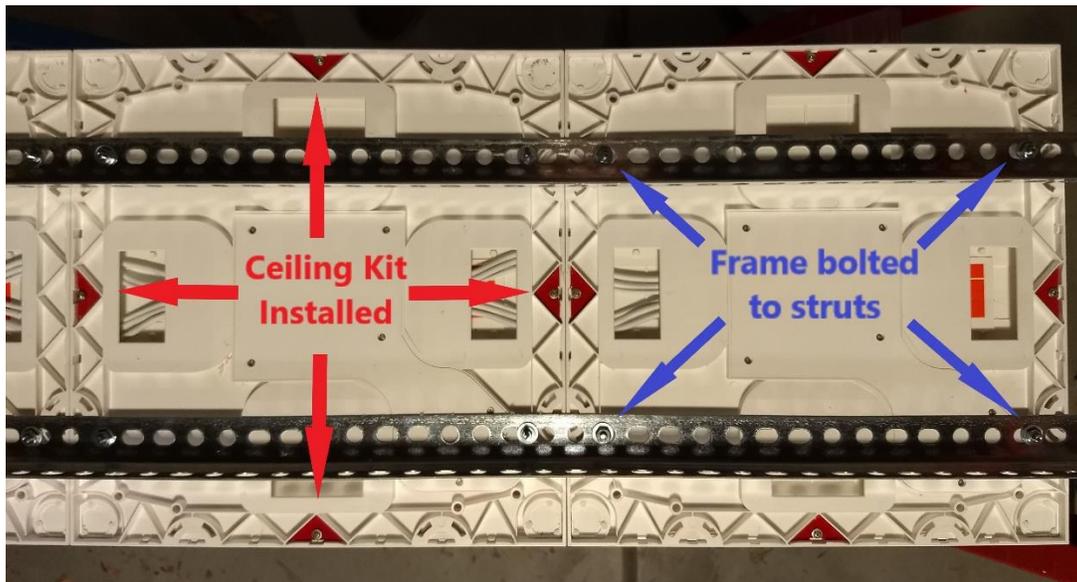


Figure 6-2: Back (i.e., ceiling facing side) of rig for drop ceilings showing installed bolts and ceiling kit