



## Introduction

An old modelling technique, the use of printed card, has taken on a new life in the last two decades with the popularisation of photorealistic textures. Clever Models LLC of the USA produces high quality photorealistic card kits and has a long list of inexpensive models (mostly

structures) and textures, available for immediate download or on CD via mail.

Since these models come as pdf files to print on your own computer they are easily modified to create unique models. This modification of a commercial kit, whether in printed card or more common modelling materials, is "kitbashing".



This kitbashed low profile background model (flat) is based on the full size O scale steel mill building from Clever's Steel Industrial CD. It's only 2 scale feet deep but that's enough depth to give a credible view through the open doors into the minimally detailed interior. The published kit had only one central structure, this kitbash simply duplicates the central building and retains the wings on either side. The signs, pallets and stacks of bagged material were all sourced from the web.

Kitbashing can be as simple as changing the colour of a building or its signage to using one or more kits' parts to create a new model.

Scratchbuilders generally use styrene or timber building materials, cast doors and windows, etc., and finish the model with paints and weathering materials. Card model scratchbuilders use comparable photorealistic components printed on cardstock, often with the weathering included in the printed texture.

Kitbashing has some similarity to scratchbuilding but bashing primarily reconfigures recognisable components from the kit(s) used rather than starting from "scratch".

I have both kitbashed and scratchbuilt printed

photorealistic card models to represent Queensland type structures and rolling stock. While I've only kitbashed Clever's structures, similar techniques work for rolling stock, etc.

I like my models to be different. Just as when I was building other commercial kits, my Clever kits weren't built exactly as designed.

Starting with minor kit modifications, sometimes just superdetailing (ie adding extra details beyond what was in the kit), I eventually gained enough experience to create my own models. My scratchbuilt models frequently used Clever's textures, photorealistic textures from other sources, and some created from my own photos.

This note focuses on the computer techniques

necessary to make changes to a Clever kit, often making low profile background models from a full structure kit. Superdetailing adds to a model, rather than substantially changing it, but you may use some of the same techniques to create the add-on components.

However you may not need anything other than the kits as shipped by Clever: combine two or more kits, or two or more copies of the same kit, to make a more complex structure; or leave off parts of a kit for a simpler model.

### Preparation and Tools

**Photorealism:** Photorealism refers to the photo-like appearance of model components. The surface images, or textures, started as photographs of a real item, but they have often been modified and extended (copy-paste-blend) into a workable size, such as an A4 sheet.

A model's photorealistic surface appearance may not even have come from the item being modelled. Clever uses the computer to create their models on individual layers, one of which is likely the equivalent of a scale drawing (outline) of the kit component, making it possible to finish the model with any appropriate texture.

This allows Clever to easily provide several versions of the same model, varying only in their surface finish (texture). Alternatively you can simply replace one colour with another.



Clever provided two different paint schemes for O Scale McElder's Cycles on the Wood Frame Industrials CD (a version without signs is on the later Jackson 5 CD). Door and window units are identical for all versions.

**Research:** Kitbashing and scratchbuilding require similar "imagineering" before we start on the model. The scratchbuilder will likely start by researching a prototype building or building type, make a number of sketches and drawings, and use that to design the desired structure.

The kitbasher starts with an existing model kit that appears to have the potential for alteration, expansion or repurposing. Again there's a need for research, sketches and drawings, and notes on what is required for the desired structure.

The design process is made easier as all of the kit components are already in digital form and can be easily resized, cut apart and reassembled on the computer. A "proof of concept" model can be roughed out to ensure that everything fits and nothing forgotten. When all is well the finished model can be printed and assembled.

It's also useful at this time to decide how much extra detail you'll be adding to the model. For example, I almost always add exposed studs and other timber work as overlays to ensure a better 3d appearance. The extra copies of the overlay material required are often easier to generate by planning early in the development process. And the extra thickness of several layers of overlay may require changes in the dimensions of related/mating parts.

**Software Required:** I've used Photoshop for more than two decades and am still using a 2003 version since it does everything that I need in my work. Someday I'll likely have to upgrade and will be looking for (1) an inexpensive program that (2) works in layers and has a variety of tools for (3) isolating parts of an image and (4) modifying/replacing (colour, intensity, saturation, resizing, merging, etc.) the parts as well as the overall image.

In other words, what's desirable is an application that works in layers and has a variety of tools for modifying all or part of each layer. The app on your telephone or tablet that lets you resize an image or remove "red eye" isn't good enough but you don't need an expensive professional product.

**Extracting Files:** The ability to extract/export pdf pages as image files is the key to modifying Clever's kit components. There are other tools that will work, but I use Adobe Acrobat to "export" the pages that I want from the kit files. Usually Clever's pages export to 300dpi tiff files which can be modified using your image manipulation tools.

After opening the resulting image file I normally convert the locked "background" image into a

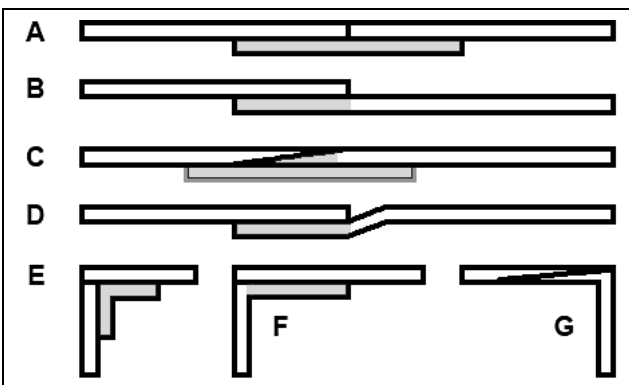
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"layer" and delete all of the white area surrounding the model elements using the "magic wand" tool. This lets me easily select and copy a needed element into another layer or file of its own for modification.

**Glue Tabs:** In my experience the how, why and where of using glue tabs comes down to personal preference and I often ignore Clever's provided tabs in preference for the way I assemble a model.

You do need to leave enough room around any model component to provide an overlap for gluing, but advance planning and experience will tell you which kind of joint will work best. And sometimes the best joint is to trim material from a tab AND/OR the back of a matching component to make a splice, rather than a conventional joint.

Tapering joints this way requires patience and an understanding of cardstock's structure. Hard paper and some card can be sanded to a taper, but most multi-layer card must be trimmed layer by layer to make an acceptable taper.



**Tab/Join Options:** **A:** Butt joint, bracing behind, useful for long wall sections. **B:** Overlap, noticeable joint, useful for vertical overlapping wall sheets. **C:** Tapered splice for minimising joint, bracing optional. **D:** Overlap, surface aligned, not normally recommended. **E:** Corner butt with back brace. **F:** Corner butt with tab join. **G:** Tapered corner splice, minimum exposure, useful when interior is also being modelled, bracing optional.

### Simple Modifications

Some changes can be made by simply pasting a new component (door, window, etc.) onto Clever's model and printing the result. Adding extra windows or doors to the long side of a building, or replacing one type of door with another of the same or larger size, would fall

into this category.

Other changes can be made by cloning, ie replacing part of the model's texture with an existing area of the model, as I did with the sign below.



The original rusted sign for the kit (left) had its lettering 'cloned' out (center) and replaced with my text (right). The similarly modified sign on the other side of the building indicates its Capricorn Sugar ownership.



This O scale Maintenance Shed was a Clever free download c 2009, and printed darker than it looks here under photographic lighting. The single weight card used for the walls warped, indicating a need for more bracing. The well-braced roof with its roofing paper overlays remains unwarped.

This was my first Clever model and was built with timber rafters/eaves as I wasn't convinced about the utility of the cardstock version. More appropriate signage replaced the kit signs and the chimney was eliminated as heating is not needed in a sugar growing region.

Its real significance for me is that I learned how to extract modifiable image files from the kit's downloaded pdf files. Looking back over eight years of card modelling it's also just about the only kit where I haven't applied individual boards for the siding material.

### Isolating Textures

When scratchbuilding I always start with an outline drawing, similar to an architect's drawing, except that all of the door, windows, etc., will be on their own floating layers for repositioning as needed. The textures are then floated underneath each element on its own separate layer.



Clever's models are usually more subtle, and do not necessarily contain as clearly defined a drawing and it may be necessary to create your own outline drawings on a layer floating above the texture. This can then be used to create a "mask" for modifying parts of the texture layer.

Some components are regular enough that their textures can be isolated (and/or deleted) using marquee-type tools.

The fettle's gate below worked the opposite way: I started with a straightened and resized photograph and created a scale drawing. I then fit two other gate photos under the same outline to create the three different gates required for my project.



Scratchbuilt rolling gate using original photo images. The photo of the gate (upper left quarter and behind the right half of the image) has been straightened and resized, and a drawing made on a separate layer (lower left quadrant) using the photo as a template. The two are combined (right half) for printing and cutting. Two other gate photos were also resized to fit the drawing. Shown full size 1:48.

### Recolouring Textures

As noted above, some Clever kits include duplicate pages with alternate colour/material finishes, letting you make the kit in your preferred form. But what if you want a different colour?



My notes say this 1:48 4" timber board example started as a Clever texture, likely resized from a sheet of wider boards. The original sun-weathered floor boards (left) were lightened to represent lightly weathered white painted V-Joint boards (center), and changed again (layer "overlay" with medium cool brown (see inset) in Photoshop) for a weathered brown.

The answer is to use your image software to adjust the colour. We're starting with photo-realistic components, so with care we can adjust only the significant colour(s), leaving the realistic detail intact.

My 2003 version of Photoshop has at least six different ways of modifying colours. The example above shows the use of a coloured overlay to change an overall colour. Other tools can modify discrete colours or colour ranges. You need to become familiar with your own software to achieve the results you want.

It helps to either gather all parts of the same colour together before changing colours to avoid needing to make copious notes as you go along. Otherwise you'll end up with mismatched colours as you try to remember exactly how you modified an adjacent component.



This "painted" sign is a layer superimposed on the rusted corrugated iron front facade of the low profile background model kitbashed from the O scale Small Forge on the Bricks and Mortar CD. The sign started as text and was converted to an image layer before being lightened and weathered. Weathering the sign to show the CI weathering is quite important as otherwise the sign would partially obliterate the CI texture.

### Altering Signs or Details

Clever undoubtedly began the Wood Shed wall as a plain timber wall and added the Cabinetry sign in the same manner as I added the Capricorn Sugar sign above. However kitbashing sometimes requires removing a sign, window, door or other detail.

One option is to use the software's "clone" tool to carefully obliterate the lettering. Alternatively I could find an area of similar timber elsewhere on the model (or one of Clever's texture sheets) and do a "copy/paste" to cover the unwanted area. I suspect that is what I did with the side of my Wood Shed kitbash below.

Obviously there is a need to carefully match colours, shading, board widths, etc. I often use a four pixel "feather" on my marquee tool to make the placement and matching easier.



Partially completed kitbash of Wood Shed from the Wood Frame CD with original kit wall inset. The original sign has been removed, likely through a combination of image "cloning" and "cut and paste" from an area without the sign.

The O scale Quonset hut from the Steel Industrial CD has a pedestrian door and a single window on one end, with a garage-type roller door and two windows on the other end. It also has a sidebay fitted to the curve of the roof.



The unmodified end from the Quonset Hut kit.

My kitbash simply replaced one pedestrian door for another, added an extra window on the one end and left the other end untouched. The corru-

gated ironwork is identical on each end, as can be seen from the two photos, but it will never be noticed since you cannot look at both ends of the building at the same time.



A minimalist kitbash using a second copy of the original end (above) with a change of doors and the addition of a second window. The new door was sized to fit exactly in the same space as the original and the new window is merely a copy of the first window placed at the same height.

Clever's O scale Adult Book Shop "freebie" c 2013 provides another kitbash for the Quonset Hut with a painted timber false front that attaches to the front of the original kit. A similar modification could be used for an auto repair or other service business and is easily created from existing Clever textures, doors, etc., with your own signage. The same basic principle would work to turn any small building into a shop.



This O scale Adult Book Shop "freebie" c 2013 is a replacement front for the front wall of Clever's O scale Quonset Hut. In Australia such a false front would likely be at least four scale feet taller and is more likely to be the front of a vertical sided shed, but the principle is the same.

### Low Profile Background Flats

I don't really have a home layout but the micro-



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layouts and dioramas I've built for display have often required low profile, or low relief, background flats rather than more conventional buildings. Photorealistic card models are ideal for this purpose because of their detail at normal viewing distance and ease of kitbashing from one or more kits if the background flats included on Clever's CDs are not suitable.



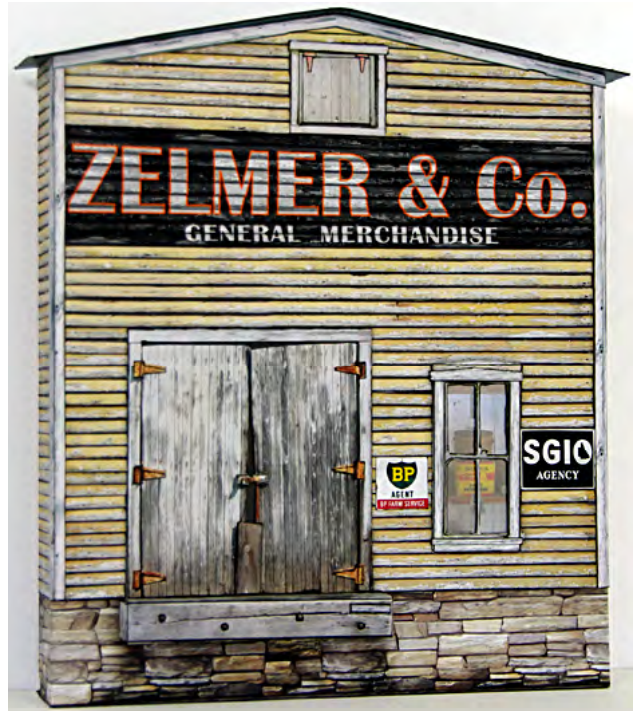
This O scale warehouse flat (see page 1 for details) has enough depth for open warehouse doors and a black box interior with a pallet of bagged sugar. Another time I might replace the office windows with transparent or translucent material and add lighting in the office.

I do have an aversion for front side only flats, so all of my background models have at least two scale feet of modelled depth. This has allowed me to experiment with minimalist interior detailing, including the pallet of bags in the previous photo and the office interior below.



Detail visible through the window of O scale Zelmer & Co flat. The counter and display shelves are a photo roughly 2 scale feet behind the window with a battery operated LED light shining from above. The weather beaten door's realism is enhanced by the black recess behind.

The use of the lighted photo in Zelmer & Co was inspired by the use of backlit transparencies for interior views common in the 1960s.



This two scale feet deep flat was kitbashed from the O scale Zelmer & Co warehouse on the Waterfront CD. With individual board construction, corrugated iron roof and lighted interior detail visible through the window it's an eye catching model.

The Zelmer & Co flat was fairly straightforward, using the back wall of the kit. A similar building in Central Queensland would likely have had a concrete foundation and I attempted a suitable texture, complete with marks from the original timber cribbing, but I wasn't satisfied with the result and stuck with the stone foundation. However I did spend several hours modifying the corner stones.



A reconstructed corner with the foundation stones extending around two sides (corner fold is faint white line, added to this detail image only). Appropriate stones were selected from the existing foun-



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dation and fitted over the corner-broken stones, with lots of added cloning and drawing with the pencil tool.

While real stones have two visible faces the kit's foundation stones start and stop at each corner. The clone tool and copy/paste worked wonders, especially for this flat where the side walls were only two scale feet deep so both front and side walls (and wrap around the back glue tabs) were printed as a single wrap-around.

If I was making a full building I would extend the foundation texture around every corner, making the join a few scale feet from the corner where it would be less visible.

### Thinking outside the box

It's very easy getting stuck inside the box, assuming something should be done one way just because that's the way it's been done before.

I had purchased several Clever CDs, for inspiration as well as the kits themselves. When I was building the Capricorn Sugar diorama I decided that I wanted a small brick building to represent a very small distillery.



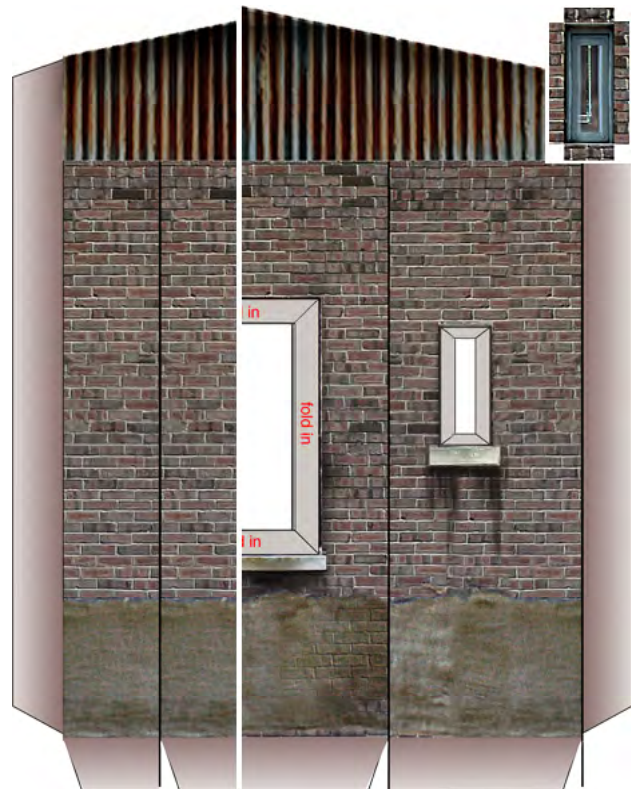
The O scale Small Forge kit from the Bricks and Mortar CD appeared to have some potential for a small brick structure representing a distillery for my Capricorn Sugar diorama.

The ducting attracted me to the O scale Small Forge kit. I wanted a background flat but it would have to be deep enough to accommodate the galvanised iron ducting and chimney...

I finally settled on a model that was deeper (4 scale feet) on one side than the other (2 scale feet). The deeper side has both the ducting and a compressed window to suggest even more length on that side.

I also changed the roof design to somewhat better reflect local construction practice and generally built the structure as if it is the back

side of a substantial building.



Texture segments for the two side walls of the 1:48 brick structure. The left side is the 2 foot deep side plus a small sample of the front wall (the vertical black line extending the glue tabs is the building's corner/fold line). The right side is the 4 foot wide side wall plus a slightly wider portion of the front wall. Note the narrow side window, foreshortened to increase the apparent length of the wall, and the window texture itself in the inset.



The model uses one wall from the kit but adds a peaked roof to give the model a little more character than the rectangle it would have been with a straight roof. Creating the signage is described on page 5.

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The model is otherwise fairly straightforward. I decided to make a jog in the eave to accommodate the ducting, rather than having the ducting base extend far enough out to miss the roof. In retrospect locating the duct further from the building would have negated the visual compression which makes the model work.

Getting square/hard corners on the ducting was a challenge when the model was being built but the result was worth the extra effort.

### Superdetailing

Photorealistic card models are so easy to build, as kits, kitbashed or scratchbuilt, and so inexpensive, that it's worth attempting some level of superdetailing on every model you build.

It doesn't have to be a lot, perhaps adding an air conditioner or power panel, or appropriate health and safety signage for models intended as part of a modern layout/display. The first couple of card models I built didn't make use of individual board overlays but now I do it with most models and even considered individual stones for Zelmer & Co's foundation.

I've been questioned about this practice, especially as it's often difficult to see the gaps between side-by-side boards unless I'm modelling a gapped surface. However there is a significant difference in appearance between a simple photorealistic print and the same print material cut into individual boards (with cut edges coloured appropriately) and applied to the model.

And overlapped individual board siding (wall cladding) has to be seen to be believed. Remember to leave a padding strip on the top side of siding boards for the board above to overlap.



Completed Wood Shed kitbash with individual board overlaid on exterior walls and interior floor, posts and other framing overlaid on interior, and the standing seam roofing layered.

In the case of the standing seam roofing above, the narrow overlays were carefully cut, pains-

takingly edge coloured and glued in place using a small steel rule as a guide. And because of the nature and location of the material, the 3d effect is very visible.

One caveat, adding the overlays doubles (or triples or quadruples) the thickness of the model component, making it harder to bend at corners and potentially difficult to fit in tight locations. This wasn't a problem with the Wood Shed's exterior boards or roofing material but did require some advance planning for the interior posts and framing.

### Getting to know your tools/materials takes lots of practice

Working with the computer isn't any more difficult than working with other modelling tools but at least for me kitbashing Clever's kits and using Clever's textures for scratchbuilding provided me with unique models and improved my research and planning, computer and modelling skills.

### Copyright and Responsibility

Finally, Clever's models and textures are all copyrighted and that copyright remains even when you've made extensive modifications to kit or texture.

In other words, you are encouraged to make modifications, that's what kitbashing is all about, but you must give credit to Clever Models LLC when sharing photos of the models or modification files, etc., and you cannot sell the results.

You are also encouraged to share your experiences with other Clever modellers via Clever's web site.

### Acknowledgments and References

Clever Models LLC: [www.clevermodels.net](http://www.clevermodels.net)

Modelling the Railways of Queensland Convention: [Qldrailheritage.com/mrqc](http://Qldrailheritage.com/mrqc)

Narrow Gauge Down Under magazine has published a number of articles on my photorealistic model building with additional examples and detailed notes on techniques.