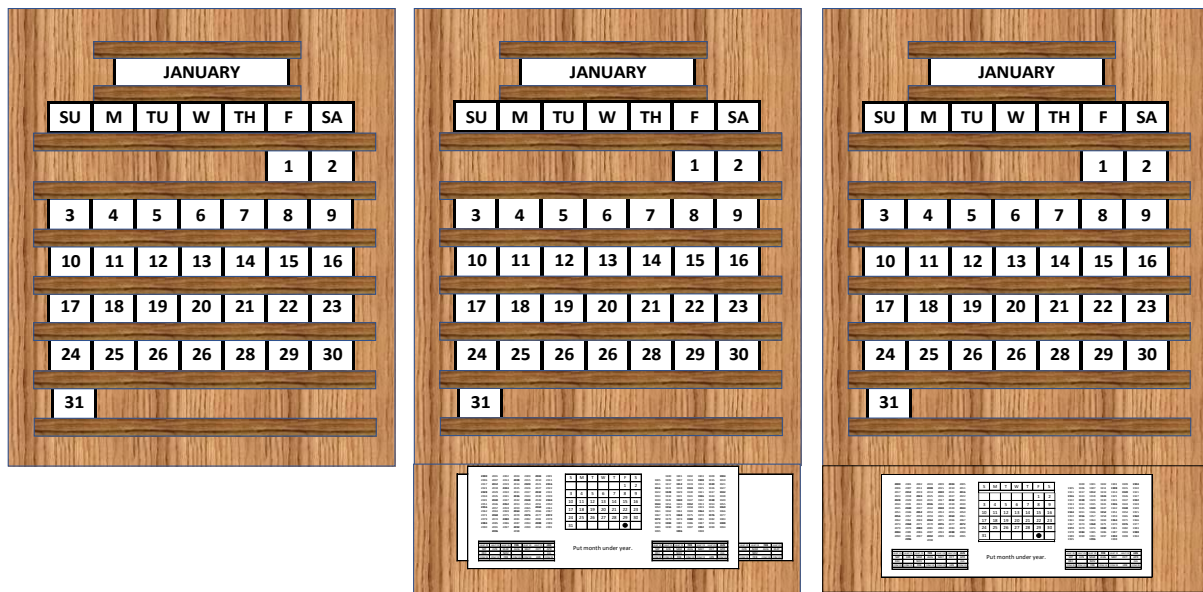


Tile Perpetual Calendar Improvements



Introduction

One of the most common display type perpetual calendars is the tile type. The far-left picture above shows the conceptual design. In this calendar, 31 numbered tiles are re-arranged every month to make a display similar to the month sheet on a conventional calendar. Many artistic designs are available for sale online. Although these calendars are beautiful and easily seen from a distance, the need to refer to a conventional calendar to set them or to verify which month of which year is displayed limits their usefulness. The purposes of this instructable are:

1. To show how to build a small standalone perpetual calendar that can be attached to the base of an existing tile perpetual calendar.
2. To show how to incorporate a small standalone perpetual calendar into a new tile calendar.

The centre picture above shows the add-on to an existing tile calendar. To make construction simple, the calendar is surface mounted and the ends of the slider can be seen. The far-right picture shows the incorporation of a standalone perpetual calendar into a new tile calendar. The calendar is mounted behind a window in a panel so the ends of the slider are hidden. The construction is more difficult, but for a new design a more pleasing appearance is wanted.

The designs of the standalone perpetual calendars in the centre and the far-right pictures are very similar. Both cover two centuries. Depending on the amount of framing around them, between three and five inches are added to the height of the tile calendar. My previous instructable “Perpetual Calendar Breakthrough” (<https://www.instructables.com/Perpetual-Calendar-Breakthrough/>) describes the operating concepts of the standalone perpetual calendars. To the best of my knowledge, no calendar using these simple and practical concepts has been patented or manufactured. My book “Practical Perpetual Calendars – Innovative, Convenient and Green” by James R. Saltvold describes these concepts in detail and includes many design ideas.

My previous instructable shows how to build a desk calendar that has a year table covering one hundred years below the day-of-month table. This calendar is six and a half inches wide by four inches high, which is a nice size for desk calendar. For the tile calendar, eight inches or more width is available, but minimizing height is desirable. Therefore, the year table is placed beside the day-of-month table. There is room for a year table on each side, so this calendar can cover two hundred years.

The details in this instructable show how to build the standalone perpetual calendar part of the add-on to the existing tile calendar, and the extra component of the new calendar. Essential information is provided on fonts that have proven to work, how to use Excel to make the tables, and on critical fabrication details. The instructable includes pdf files that can be printed to copy my designs. As well as showing the face and slider that are used in making the calendar, these files show an edge view and list all the parts.

Parts of the Standalone Perpetual Calendar

The parts are the face, the slider, the back, the upper track and the lower track. The tracks provide a surface for the slider to move on, and also separate the face and the back. To enable easy movement of the slider, its height is slightly less than the space between the tracks, and its thickness is less than the space between the face and the back. See below for figures that show the face and slider alone, and the face with the slider behind it when the first of the month falls on a Friday. There are two year tables, a day-of-week table (SWTWTFSS) and three windows on the face. There are two month tables and a day-of-month table (numbers 1 to 31) on the slider. All commercially available slider calendars that I am aware of have a face with a day-of-week table and one window, and a slider with a day-of-month table. Like the tile calendar, they are not standalone. The unique features of my standalone perpetual calendar are the year table and the month table.

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To set the calendar, move the slider to put the month of interest under the year of interest. When the ends of the slider are exposed, this is done by pushing the ends. When the ends of the slider are hidden, there is a push pin in the dot below the number 29. For the year 2024, the setting in the figure above applies to March and November. In the month tables on the slider, the top row applies to January and February of a leap year, the middle two rows apply to March to December of all years, and the bottom row applies to January and February of a common year. To bring attention to leap years, JAN and FEB are in bold in the top row and leap years are also in bold in the year table. The calendar always displays 31 days for the month, with 29, 30 and 31 to be ignored as applicable.

If you imagine that the columns in a year table are labeled Sunday to Saturday from left to right, common years are under the day of the week that January 1 falls on and leap years are under the day of the week after the day that January 1 falls on. In a month table, the months are in columns that the day of the week that first of the month falls on relative to the day of the week that the first of January falls on.

To reduce the height of the year tables, there are no empty cells. Thus, the first three rows in the left-hand year table are:

2000	2001	2002	2003	2009	2004	2005
2006	2007	2013	2008	2015	2010	2011
2017	2012	2019	2014	2020	2021	2016

If there were empty cells, the table would be

2000	2001	2002	2003		2004	2005
2006	2007		2008	2009	2010	2011
	2012	2013	2014	2015		2016
2017		2019		2020	2021	

Finding a year in a compacted table is a little more difficult than in a table that is consecutive with blanks. However, keeping the height of the standalone perpetual calendar at the bottom as low as possible enhances the overall appearance of the improved tile calendar.

The following are enlargements of the tables in the above figures.

Left Year Table

2000	2001	2002	2003	2009	2004	2005
2006	2007	2013	2008	2015	2010	2011
2017	2012	2019	2014	2020	2021	2016
2023	2018	2024	2025	2026	2027	2022
2028	2029	2030	2031	2037	2032	2033
2034	2035	2041	2036	2043	2038	2039
2045	2040	2047	2042	2048	2049	2044
2051	2046	2052	2053	2054	2055	2050
2056	2057	2058	2059	2065	2060	2061
2062	2063	2069	2064	2071	2066	2067
2073	2068	2075	2070	2076	2077	2072
2079	2074	2080	2081	2082	2083	2078
2084	2085	2086	2087	2093	2088	2089
2090	2091	2097	2092	2099	2094	2095
	2096		2098			

Right Year Table

	1900	1901	1902	1903	1909	1904
1905	1906	1907	1913	1908	1915	1910
1911	1917	1912	1919	1914	1920	1921
1916	1923	1918	1924	1925	1926	1927
1922	1928	1929	1930	1931	1937	1932
1933	1934	1935	1941	1936	1943	1938
1939	1945	1940	1947	1942	1948	1949
1944	1951	1946	1952	1953	1954	1955
1950	1956	1957	1958	1959	1965	1960
1961	1962	1963	1969	1964	1971	1966
1967	1973	1968	1975	1970	1976	1977
1972	1979	1974	1980	1981	1982	1983
1978	1984	1985	1986	1987	1993	1988
1989	1990	1991	1997	1992	1999	1994
1995		1996		1998		

Day-of-Week Table

S	M	T	W	T	F	S
---	---	---	---	---	---	---

Day-of-Month Table

						1	2	3	4	5	6	7
2	3	4	5	6	7	8	9	10	11	12	13	14
9	10	11	12	13	14	15	16	17	18	19	20	21
16	17	18	19	20	21	22	23	24	25	26	27	28
23	24	25	26	27	28	29	30	31				
30	31					●						

Left and Right Month Tables

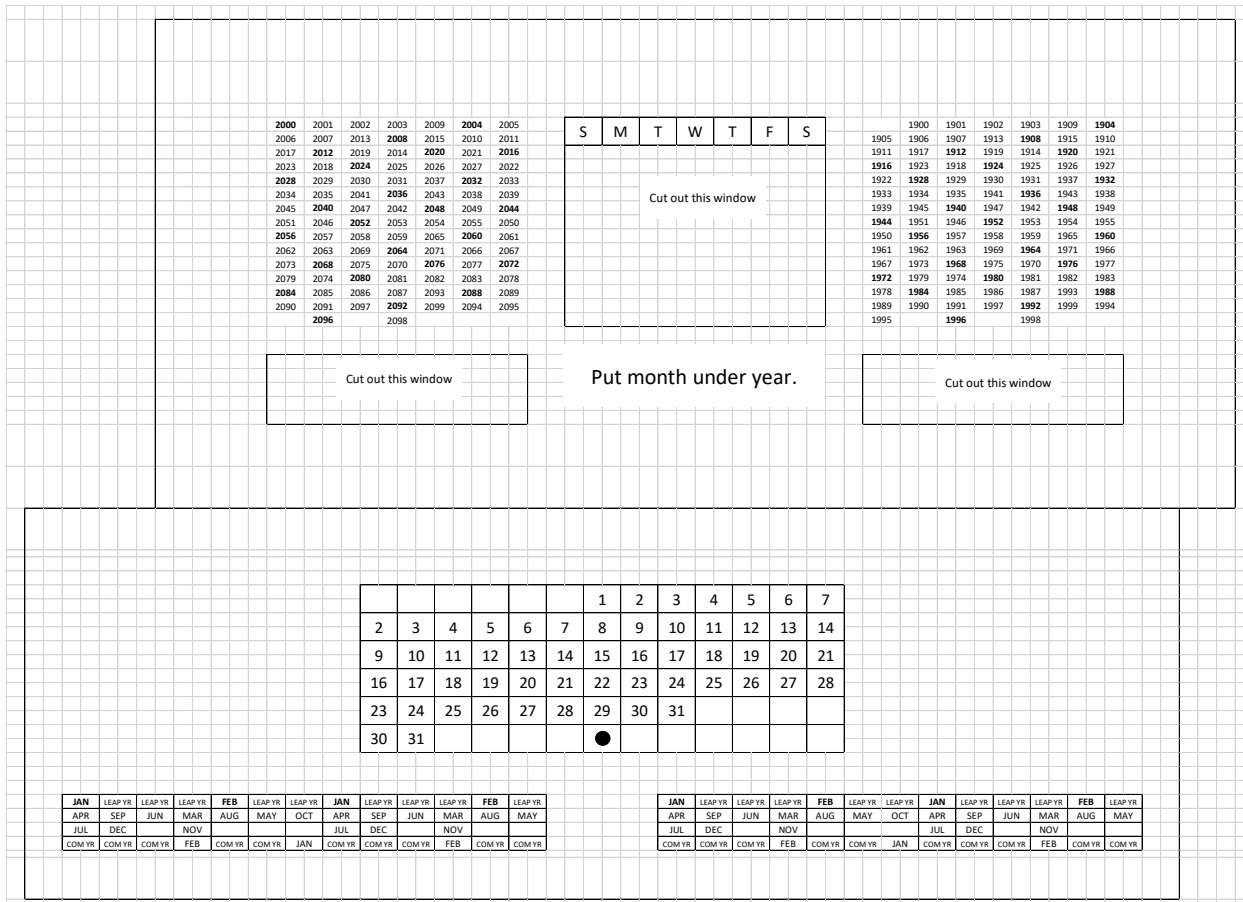
JAN	LEAP YR	LEAP YR	LEAP YR	FEB	LEAP YR	LEAP YR	JAN	LEAP YR	LEAP YR	LEAP YR	FEB	LEAP YR
APR	SEP	JUN	MAR	AUG	MAY	OCT	APR	SEP	JUN	MAR	AUG	MAY
JUL	DEC		NOV				JUL	DEC		NOV		
COM YR	COM YR	COM YR	FEB	COM YR	COM YR	JAN	COM YR	COM YR	COM YR	FEB	COM YR	COM YR

Using Excel to Make Graphics

This section explains how to use Excel to make the graphics for the face and slider. You can skip this section if you plan to print my files without modification.

I use Excel to make my graphics. It is certainly not a powerful graphics program, but it is widely available and easy to use. Excel features that are useful for making perpetual calendar tables include: a wide range of fonts available, the capability to draw borders around selected cells, the capability to scale the document when printing, the capability to change row heights and column widths, and the capability to merge cells. A disadvantage of Excel is that row heights are usually set as points, where 1 point = 1/72 inches, and column widths are usually set as the number of zero characters ("0") that will fill the cell. The website <https://www.officetuto.com/column-width-and-row-height-units-in-excel/> describes a procedure for changing the units to inches or centimeters, but it is complicated. By adjusting cell heights and widths in the usual way and by scaling, I am able to obtain piece sizes close what I would make them if I were able to set exact dimensions.

The figure below shows the Excel graphics for the face and slider in the standalone perpetual calendar that is part of the new tile calendar.



All column widths in this graphic are 3. Most row heights are 15. If making a graphic from scratch, start with all column widths set to 3 and all row heights set to 15. Then adjust row heights as required. The important row heights in the face and slider as follows:

Face

Rows	Height	Notes
7	45	For the top track/spacer, height is 0.25 inches when printed at 40%
8	45	For blank space at the top
9	15	For blank space at the top
10 & 11	15	Two rows of year tables and day-of-week table (SMTWTFS)
12 to 24	15	Remainder of year tables & 13 rows for day-of-month window
25 & 26	15	For blank space between year tables and bottom windows
27 to 31	15	5 rows for month windows
32	45	To put top of bottom track/spacer 0.25 inches below the windows
33	45	For bottom track/spacer

Slider

Rows	Height	Notes
34	45	For blank space at top
35	7.5	To make height of slider one 15 high row less than the space between the tracks
36 & 37	15	For blank space at top
38 to 49	15	12 rows for day-of-month table (window is 13 rows)
50 to 52	15	For blank space between tables
53 to 56	15	4 rows for month tables (window is 5 rows)
57	7.5	To raise month tables and day-of-month tables so they are centred in their windows
58	45	To account for the bottom track being 0.25 inches below the month windows

A comparison of the face and slider tables shows that the windows have one more row than the information which is displayed on the slider. This is to avoid having to make the vertical dimensions of the face and the sliders to tight tolerances. An extra column is not required for horizontal tolerances because the edge of a column is always lined up with the edge of a window.

The locations and fonts of the features on the face and slider are below

Feature	Cell Locations		Font	Note
	Upper Left	Lower Right		
Face Outline	J17	BO33	None	
Left Year Table	P10	AB24	Calibri 11	1
Day-of-Week Table	AF10	AR10	Calibri 18	2
Right Year Table	AV10	BH24	Calibri 11	1
Day of Month Window	AF12	AS24	None	
Left Month Window	P27	AC31	None	
Right Month Window	AV27	BI31	None	
Slider Outline	C34	BL58	None	
Day-of-Month Table	U38	AS48	Calibri 18	3
Left Month Table	E53	AC56	Calibri 9	
Right Month Table	AK53	BI56	Calibri 9	4

Notes

1. The years are in two merged horizontal cells. Thus, the year **2000** in the upper left corner of the left year table is in merged cells P10 and Q10.
2. The day-of-week letters are in four merged cells (two horizontal and two vertical). Thus the letter "S" for Sunday is in merged cells AF10, AG10, AF11 and AG11.
3. The numbers for the day-of-month are in four merged cells similar to the day-of-week letters.
4. The months are in two merged horizontal cells similar to the year numbers.
5. The wording "Put month under year" is Calibri 24 font in a text box that is 9.92 cm wide by 2.36 cm high. (These dimensions are before printing at 40%.)
6. The dot below the 29 in the day-of-month table is 0.55 cm in diameter. When printed at 40%, it is 0.22 cm or just under 3/32 inches in diameter.

7. All lines on the face and slider are made by drawing borders around cells. Borders are used in the following areas:
 - The outlines of the face and slider
 - Tables for day-of-week, day-of-month, and month

Printing Parameters

1. Orientation: Landscape
2. Scaling: 40% of normal size
3. Margins: All are 0.5
4. Header and Footer: 0
5. Gridlines and row and column headings are disabled

Using the above information, the Excel spreadsheet graphics for the standalone perpetual calendar component of the new tile calendar can be made from scratch. The graphics for the standalone perpetual calendar that is for attaching to the bottom of an existing tile calendar has the following differences.

1. The 0.25-inch top and bottom rows of the face, which provide an area for gluing to the back of the panel, are deleted.
2. Three columns at each end of the face, which provide an area for gluing to the back of the panel, are deleted.
3. The 0.25-inch top and bottom rows of the slider, which are needed for the additional height, are deleted.
4. With these changes, the top of the bottom track is level with the bottoms of the month windows.

Supplies

The following supplies are needed:

Cardstock, see Note 1 below

Mod Podge or white glue

Double-sided tape (optional)

Empty cereal box or very thick cardstock

1/4-inch square dowel (for new tile calendar only), see Note 2 below

1/8-inch hardboard (for new tile calendar only)

1/16-inch diameter nail (for new tile calendar only)

Notes

1. I suggest using 80 lb. or heavier glossy cardstock and having the printing done at a shop. Only one 8.5 by 11-inch sheet is needed for each calendar that you want to make. A print shop should be able to supply suitable cardstock. If you need cardstock, a product you might consider purchasing is Hammermill HAM120023 Color Copy Digital Cover Paper. Most home printers cannot handle thicker paper than 60 lb cardstock. If you use this lighter cardstock, I suggest covering the sheet with an Avery 76293 or equivalent self-adhesive laminating sheet. For more information on cardstock, see <https://finocardstock.com/topic/cardstock-weight-guide/>.
2. I obtained square dowel from Lowes (changing to Rona+ in Canada). Square dowel can be made from lumber or plywood using a table saw.

Make the Add-On for an Existing Tile Calendar

Step 1: Print the Face and Slider

FILE #1 is a pdf document that can be printed on cardstock. The face of the calendar printed from this file is six inches wide by two and a half inches high. When the slider is at the extremes of its travel, the working width is eight and a half inches.

Step 2 Cut Out the Cardstock Parts

If the parts are printed on 60 lb cardstock, cover with a self-adhesive laminating sheet before cutting out any parts. Use a utility knife and straight edge for cutting. A metal straight edge is preferred. Plastic will work but it is more easily damaged if the utility knife slips. Put an old magazine under the cardstock before cutting. Self-healing cutting mats are available, but I have found that an old magazine works quite well. Cut out the windows first, then cut out the face and the slider.

Step 3 Cut out the Slider Stiffener and Glue it to the Back of the Slider

Make a piece of thick cardstock or cereal box the same size as the slider and glue to the back of the slider. Double sided tape can be used instead of glue. Be sure that the bottom edges line up. You can make the stiffener slightly larger than the slider and trim the ends and top with a scissors after gluing.

Step 4 Make the Top and Bottom Tracks

Each track is 0.25 inches wide and the length of the face, which is about six inches. The thickness has to be slightly greater than that of the slider after the stiffener has been glued to it. I suggest making them from two layers of thick cardstock or cereal box that are glued together. Two single layer 0.25-inch-wide strips can be glued together, or a 0.25-inch-wide strip can be cut from two layers that have been glued together. When two single layers are glued after cutting, care must be taken to line up the edge that the slider will sit on. I prefer cutting after gluing to avoid having to line up edges. Cutting two layers requires a bit of force and the piece may have to be taped, glued or clamped to a surface before cutting. The cutting can be done in two or more passes.

After the double thickness 0.25-inch strips are made, cut them to length and glue them to the back side of the face on the top and bottom. Make sure that the top edge of the bottom track lines up with the bottoms of the month table windows. When the tracks are glued in place, check that the slider moves freely between them. If it does not, trim the top edge. Also check that the tables are clearly displayed in the windows. If the tables are not parallel to the windows, or their top and bottom edges are too close to the edges of the windows, trimming the bottom edge of the slider may fix the problem. However, a complete rebuilding of the calendar may be required.

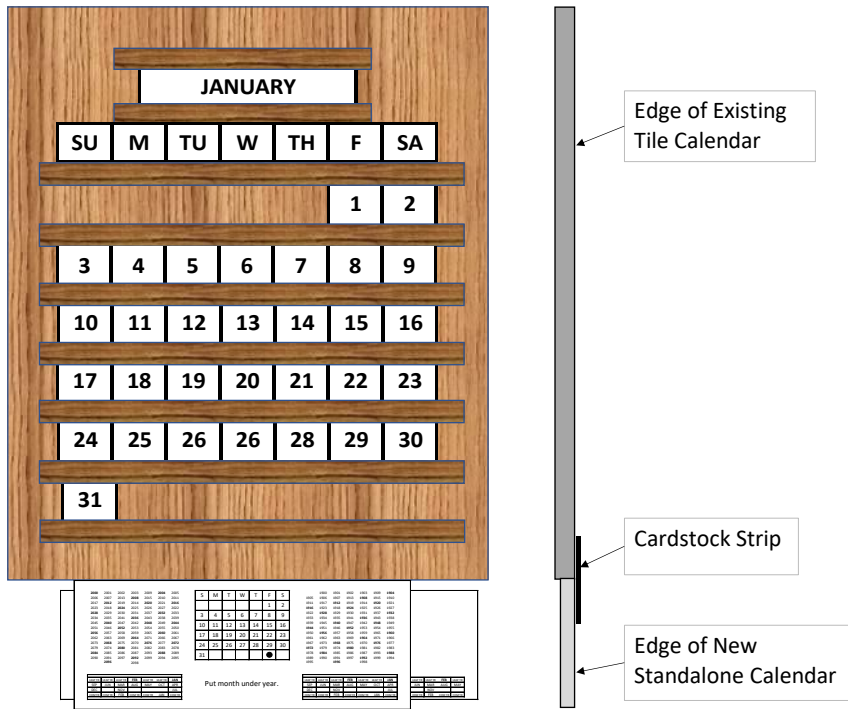
Step 5 Make the Back

The back is the same size as the face, but does not have any windows. Make the back from thick cardstock or a cereal box. After the back is cut to size, glue it to the edges of the top and bottom tracks. Apply the glue with care so that no glue gets on the surface of the track where the slider makes contact. I suggest doing the gluing without the slider installed.

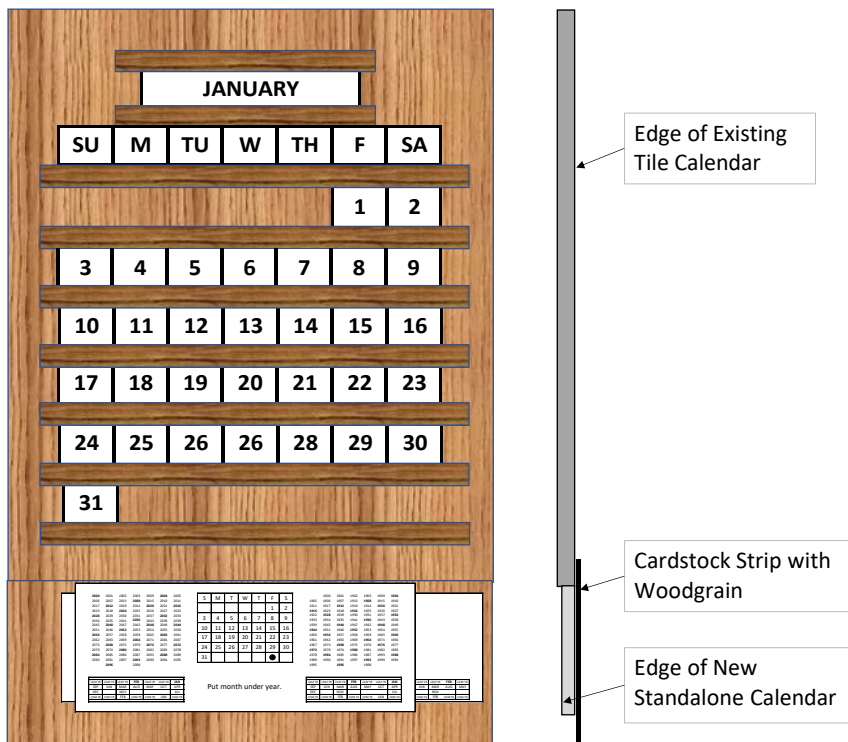
Instead of making the back the same size as the front, it can be made the same width and two inches higher. The extra height provides a tab for gluing to the back of an existing tile calendar

Step 6 Attach to the Existing Tile Calendar

The simplest way of attaching the standalone perpetual calendar to the existing tile calendar is to not have any background behind the standalone calendar. The figure below shows front and side views. A cardstock strip joins the two pieces together. Instead of a separate strip, the back of the standalone calendar can be made higher as mentioned above. Using this method, the only added height to the tile calendar is the face height, which is two and a half inches as noted above.

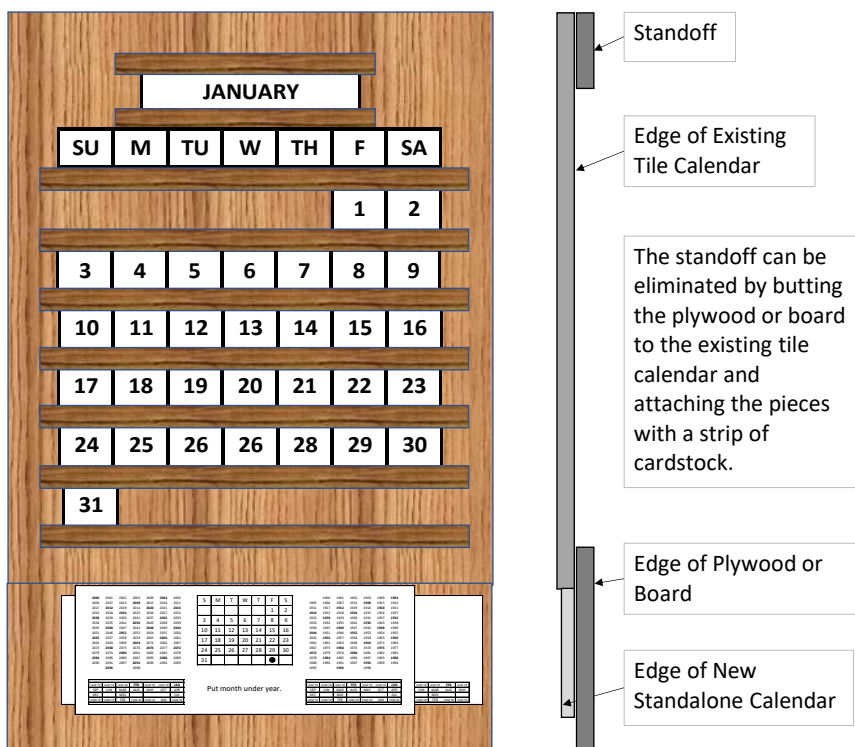


A second way of attaching is to print a woodgrain background on a piece of cardstock. The figure below shows front and side views. To make a woodgrain background on an Excel spreadsheet, draw a rectangle and select a woodgrain from the texture fill options. Some versions of Excel do not have a woodgrain texture option. To work around this, draw a rectangle in a version of Word that has this option and paste into Excel. The rectangle can be resized and rotated in Excel as required.



The third way of attaching is to glue the standalone tile calendar to a piece of plywood or board that has a similar finish as the existing tile calendar. The figure below shows front and side views. The plywood or board is thicker than cardstock and a standoff has to be added to the back of the existing tile calendar at the top. The standoff can be eliminated by butting the plywood or board to the existing tile calendar and attaching the two pieces with a strip of cardstock. With the second and third methods of attachment, about an inch of wood grain is needed below the calendar to have a good appearance. Depending on the existing tile calendar, zero to one inch of wood grain may be needed above the calendar. Using these methods, the added height to the tile calendar is the face height of two and a half inches plus one to two inches.

If you do the work of mounting on a piece of plywood or board, you may not want a standalone perpetual calendar with exposed slider ends. In this case, make the standalone calendar that is for building into a new tile calendar, and make modifications as required to attach it to an existing calendar.



Make the Design for a New Tile Calendar

Step 1: Print the Face and Slider

FILE #2 is a pdf document that can be printed on cardstock. The face of the calendar printed from this file is six and a half inches wide by three inches high. These dimensions are half an inch greater than the dimensions of the add-on calendar to allow for a quarter inch band all around for gluing to the back of the new tile calendar. The size of the window in the face of the new tile calendar is six inches wide by two and a half inches high, which is the same as the face of the add-on calendar. When the slider is at the extremes of its travel, the working width is eight and a half inches. The new calendar has to be at least this wide if the ends of the slider are always to be hidden. If an inch of woodgrain border is wanted above and below the standalone perpetual calendar, it adds three to four inches to the height.

Step 2 Cut Out the Cardstock Parts

If the parts are printed on 60 lb cardstock, cover with a self-adhesive laminating sheet before cutting out any parts. Use a utility knife and straight edge for cutting. A metal straight edge is preferred. Plastic will work but it is more easily damaged if the utility knife slips. Put an old magazine under the cardstock before cutting. Self-healing cutting mats are available, but I have found that an old magazine works quite well. Cut out the windows first, then cut out the face and the slider.

Step 3 Cut out the Slider Stiffener and Glue it to the Back of the Slider

The stiffener is a piece of 1/8 inch thick hardboard. Corrugated cardboard can be used but, as discussed below, may have to be attached with double-sided tape instead of glue. Cut a piece of hardboard or cardboard to the same size as the slider. If using hardboard, either glue or double-sided tape can be used for attaching. I tried gluing corrugated cardboard and found that the surface rippled due to the glue soaking in differently on top of the corrugations than between them. Double sided tape does not have this problem. Use three strips of tape, with one at the top, one at the bottom and one in the middle. When attaching the two pieces, be sure that the bottom edges line up.

Step 4 Make the Top and Bottom Track

Each track is 0.25-inch square dowel or equivalent cut to the length of the face. After the dowels are cut to length, glue them to the back side of the face on the top and bottom. Make sure that the top edge of the bottom track is parallel with the bottoms of the month table windows and a quarter inch below them. When the tracks are glued in place, check that the slider moves freely between the tracks. If it does not, trim the top edge. Also check that the tables are clearly displayed in the windows. If the tables are not parallel to the windows, or their top and bottom edges are too close to the edges of the windows, trimming the bottom edge of the slider may fix the problem. However, a complete rebuilding of the calendar may be required.

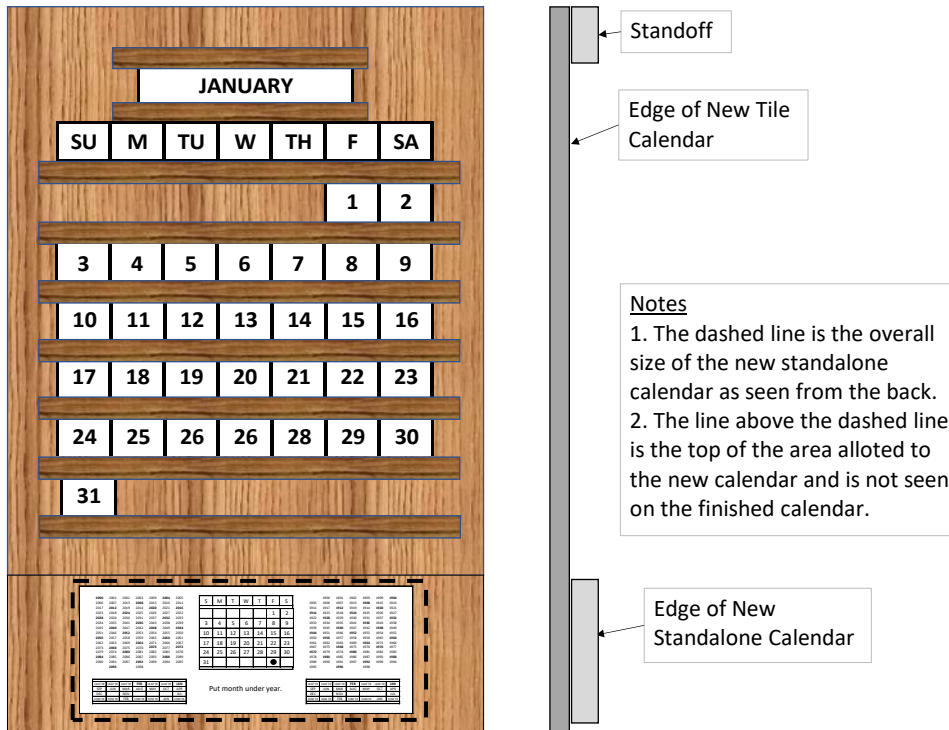
Step 5 Make the Back

The back is the same size as the face, but does not have any windows. Make the back from thick cardstock or a cereal box. After the back is cut to size, set it aside.

Step 6 Cut out the Window at the Bottom of the New Tile Calendar

This step has to be coordinated with making the rest of the new tile calendar. The following is what needs to be done to locate the window, cut it out, and locate where the standalone perpetual calendar is glued on the back. The face is approximately 6.5 inches wide by 2.75 inches high. There is room for a 0.25-inch strip for gluing all around, so the window can be 6.0 inches wide by 2.25 inches high. For appearance, a decision is made to have the bottom of the window 1.0 inches above the bottom of the calendar.

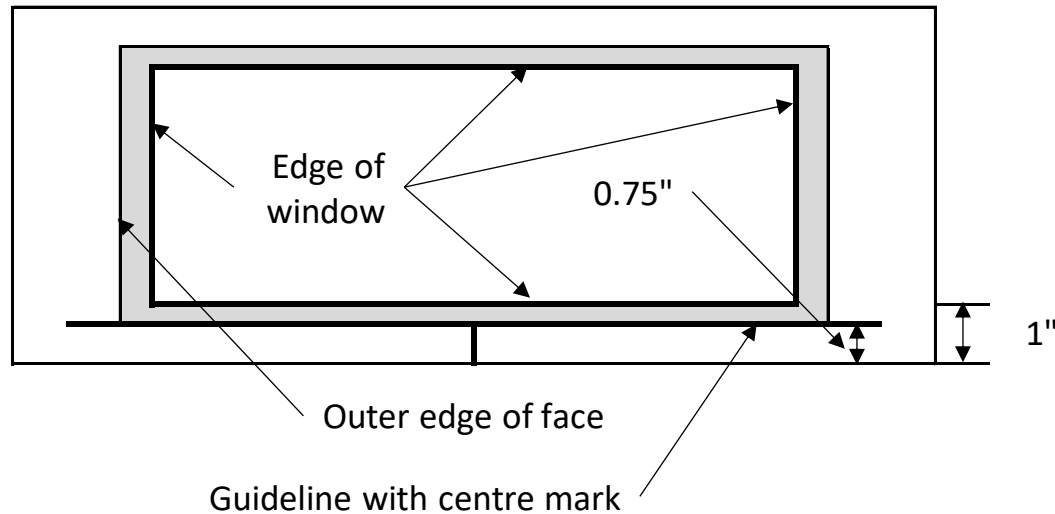
The figure below shows front and side views of the new tile calendar. The window for the standalone calendar is centred horizontally. It has to be marked out on face of the new tile calendar before cutting it out. Use a handheld electric jig saw or a scroll saw for cutting out the window. Follow standard craft and safety procedures. File the edges as needed. The window can be up to 0.125 inches smaller on all edges. Being larger is not desirable as this reduces the area available for gluing. For appearance, the corners have to be 90 degrees and the bottom has to be parallel to the bottom of the calendar. Achieving this requires considerable skill.



Step 6 Glue the Face of the Calendar to the Back

The figure below shows the back of the bottom of the new tile calendar when the window has been cut out and a guideline with centre mark for gluing has been drawn. The steps for gluing are as follows:

1. On the bottom edge of the standalone perpetual calendar face put a mark to indicate the horizontal centre of the face.
2. On the back of the new tile calendar draw a guideline $\frac{3}{4}$ above the bottom edge. Put a centre mark on this line.
3. Use Mod Podge glue rather than standard white glue for better adherence to a glossy surface. Do the gluing without the back or slider installed.
4. Apply glue to the back of the new tile calendar and not to the face of the standalone perpetual calendar. The gray area, which is about 0.25 inches on all sides of the window, is where glue is to be applied. Apply beyond the 0.25-inch boundary to be sure that all of the face that is not seen will be in contact with glue.
5. Hold the face, which from Step 4 above has the top and bottom tracks glued to it, at an angle of about 45 degrees from the back of the new tile calendar. Carefully line up the centre mark on the bottom edge of the face with the centre mark on the guideline, and the bottom edge of the face with the guideline. Tip the face into place and move around if necessary to achieve good alignment with the guideline and centre marker. Press down along all edges to make sure that the face makes good contact with the glue. Masking tape can be used to hold the ends down until the glue sets. A book can be placed across the tracks to hold them down.



Step 7 Install a Push Pin in the Slider

The dot below the 29 in the month table on the slider is for a pin for pushing the slider. Make the push pin from a small nail that is about 1/16 inch in diameter. If you do not have a small nail or tack, I suggest buying a package of assorted nails rather than a package of all one size. The ideal diameter of the nail is about 14 gauge, but a slightly larger diameter is suitable. Use a flat head nail and not a finishing nail. Using a plier or a hacksaw, cut the nail to a length of between 1/4 and 3/8 inches. File the end to make it smooth and square after cutting.

Use a pointed punch or a nail to make an indentation in the middle of the dot. Drill a 1/16-inch diameter hole from the front. Push the cut-off nail in from the back. Ideally a small piece would be glued on top of the dot instead of using a nail. A piece no larger than about 1/8 inch in diameter or square is hard to find or make, and also hard to glue in place. If success is achieved in obtaining a suitable piece and gluing it in place, the glue joint could break in the future. A nail fits the size requirements and will always stay in place.

Step 8 Glue the Back On

The steps are as follows.

1. Lay the new tile calendar face down on top of two books that have a small gap between them.
2. Move the calendar around so that the gap is below the line where the push pin will move.
3. Lay the slider between the top and bottom tracks.
4. Apply glue to the surfaces of the tracks that face up. Take care that no glue runs onto the surfaces of the track where the slider contacts. Also take care that no glue will be pushed onto these surfaces when the back is placed on top of the tracks.
5. Lay the back on top of the tracks and press down on all edges.
6. Push the ends of the slider to make sure that it moves slowly.
7. A book can be placed on top of the back to hold it down while the glue sets.