

Model Railroad Design Secrets

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Table of Contents

Model Railroad Design Secrets	3
Planning Your Layout.....	3
The Basic Building Blocks.....	4
Going Beyond the Basics	4
Modifying Your Simple Model Railway.....	4
The Point-to-Point Layout.....	4
The Out-and-Home Layout.....	5
Adding Switches and More to Your Oval Layout.....	6
How to Make Your Oval Track More Interesting	9
Going Beyond A 4' x 6' Layout.....	15

Model Railroad Design Secrets

Planning Your Layout

The layout is the heart of your railroad system. The arrangement of the tracks, switches, crossings, and uncouplers determines what you can do with your trains to make their operation a source of never-ending fascination.

You can make the rails curve, go straight ahead, lead into a siding, branch into an alternate route, tunnel through mountains, pass over bridges, circle through an earth cut, or thread through a maze of switches at a terminal or freight yard.

Where your train goes and what it does is up to you, and you're limited only by the space at your disposal. Even if your space is quite small, you can make your train duplicate almost everything that real trains do.

Choosing a layout is really a personal matter. No one else can tell you how to arrange your model railway. All that can be done is to show the meaning of various space limitations and to suggest some of the many possibilities that you'll adapt and combine, according to your own wishes.

Never hesitate to try out your ideas to see if they will work, even if you can't find them in the layout diagrams in any book.

Before you are through you'll without a doubt choose several layouts, discarding or changing one to make another that appeals to you more.

And you won't be satisfied with that one for very long...

You'll invent a new plan or will become more interested in one aspect of railroading than another and change your layout to suit that interest.

You may prefer switching operations, running multiple trains, or timetable scheduling -- and you'll plan your railroad accordingly.

You will add another table, an extension of some kind that increases the potential immensely.

The Basic Building Blocks

Along with your train set you have at least a circle of track, consisting of twelve curved sections. In S gauge this is forty inches in diameter, so you will need a space at least forty by forty inches.

Whether that space is on the floor, on a sheet of plywood or on a tabletop will be up to you.

Some train sets also have a few sections of straight track to make an oval, which is really just a lengthened circle. If you have two sections of straight track and put them in your circle at opposite points, you will have an oval forty by fifty inches.

Four straight sections, two on each side, will give you an oval forty by sixty. Six straight sections, along with the twelve curved, make the longest oval you can put on a 4' x 6' board.

Going Beyond the Basics

Now, a simple circle or oval doesn't really imitate a real railroad all that well. After all, a real railroad's reason for existing is to travel from point-to-point, not simply to go around in circles.

Modifying Your Simple Model Railway

The Point-to-Point Layout

Real railroads go from one place to another place. They may have sidings, branch lines, and other subsidiary systems, but the main line starts at one point, travels to another point, and stops.

Trains are turned around at terminals by means of extensive yards, wyes, loops, and turntables, but the main line, whether double-track or single-track, goes from point to point. There are switches and yards at one end, and a turnaround of some sort at the other.

Despite the point-to-point model railroad's resemblance to real railroad lines, it isn't very successful on a model railroad.

True, in some very large model systems the point-to-point plan has been used, but in most cases the model railroad cannot possibly approximate the distance traveled by a real railroad.

If you had the entire Madison Square Garden for your layout, you still wouldn't be able to duplicate, in scale mileage, a reasonable point-to-point railroad. In normal model railroads, the train hardly leaves one terminal before it has arrived at the end of the line.

No time is allowed for switching operations at the terminals for freight trains to perform their normal functions, while the express is speeding from terminal to terminal.

In a good-sized layout, scenery can handle part of this problem. The express can rush into a tunnel, where the operator stops it. He then carries on other railroad business to his heart's content and, when it is completed, makes his express rush out of the other end of the tunnel as if it had been traveling hundreds of miles all the time.

A small layout, however, cannot adopt even this illusion because a small railway has no room for two genuine terminals.

The Out-and-Home Layout

The out-and-home layout solves part of this problem - it has only one terminal. This is really a point-to-point system doubled back on itself.

You have a terminal. You send the train out and it travels through farmland and forest, through villages and mountains, and finally arrives at a terminal. It just happens to be the same terminal it started from, but you can easily pretend that it isn't.

This system gives you a little more mileage between terminals than the point-to-point system, but in most model railroads the train arrives back home before you have been able to do much, unless you use the tunnel or other method of hiding the train that is supposed to be traveling.

While more adaptable to model railroads than point-to-point, it still presents many problems except on very large layouts.

Both point-to-point and out-and-home layouts can be combined with continuous pikes, in large layouts, to offer variety and realism--and this is precisely the procedure used by experienced model railroaders with plenty of space.

For the vast majority, however, the continuous layout is not only best but also essential for interesting and varied train movements. With a clever use of buildings and scenery it can also create the many little deceptions that bring a realistic flavor to the operation of your railroad.

Adding Switches and More to Your Oval Layout

Let's see what you can do with an oval on a 4' x 6' board. The first step toward variety of train operation is a pair of switches. They usually come in pairs, a right-hand and a left-hand switch.

You can tell which is which by looking at one from the end that shows only two rails. If the curved section turns out to your right, it is a right-hand switch, if to the left, it is a left-hand switch.

Some switches are made to work by hand, with small throwing levers on each switch. Others are actuated electrically by a control lever any distance away--on a control panel, for example.

Remote-control switches are more expensive than manual switches and are worth the extra cost when a single operator must handle everything on a pike, including switches at some distance from his train control on the transformer.

If switches are within reach of the transformer, however, they can just as well be manually controlled. If in addition to the "engineer" there is always a "switchman" available, he can handle manual switches at some distance from the transformer.

If you buy, in addition to your long oval, a pair of switches, two more curved sections of track, and four straight sections, you can make the layout shown in Figure 1:

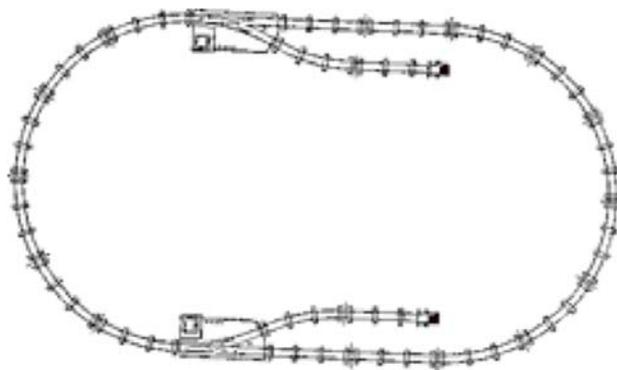


Figure 1

With this layout you can have two freight stations on the sidings, with cars sitting on them waiting to be picked up by the locomotive.

If you attach uncouplers to the sidings, you can detach cars without touching them--just by pushing a button on a control box placed near your transformer. Uncouplers can be attached to either straight or curved track with two-rail S-gauge trains.

If you like switching operations, you can buy another pair of switches, two curved sections of track, and two half-length straight sections, and make the layout shown in Figure 2:

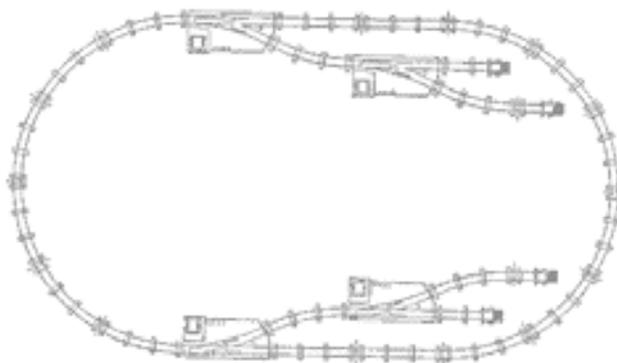


Figure 2

The shortest sidings here are not very long, but they can hold a freight car or two, which will make for complications -- and complications are what make model railroading interesting. (That's just another way of saying that there is a great deal to do!)

At the risk of appearing a bit ridiculous but for the purpose of showing just how much switching you can go in for on a 4' x 6' layout, Figure 3 is presented for those who think a small layout is dull. Examine it and choose what you wish among the various sidings.

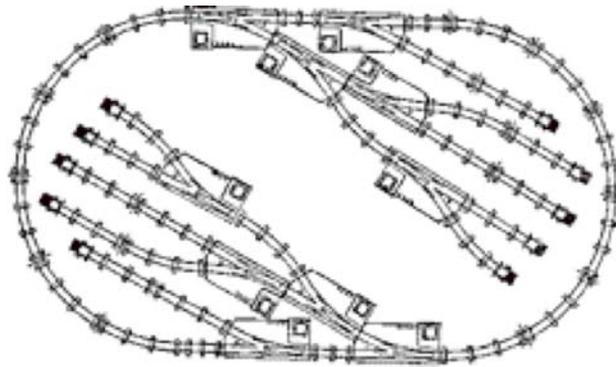


Figure 3

Sidings are not, after all, the be-all and end-all of railroading. You can use your first pair of switches, if you wish, to make an inner curve on your oval, like Figure 4:

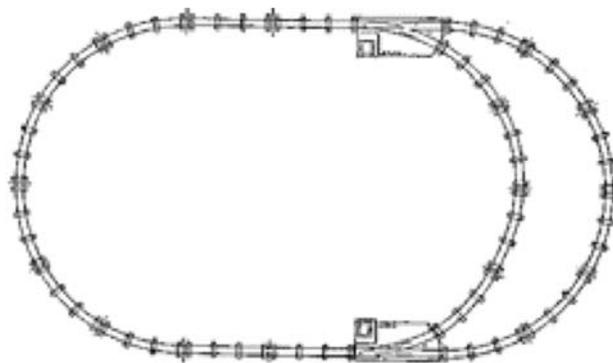


Figure 4

But you would like some sidings? Then add them to the oval with the inner curve, as in the layout in Figure 5:

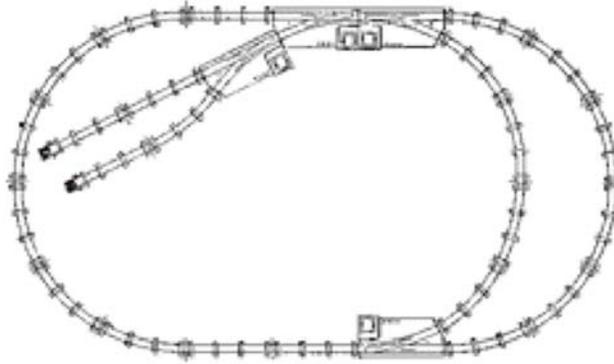


Figure 5

Or you can add a second inner curve--making an oval within an oval (Figure 6):

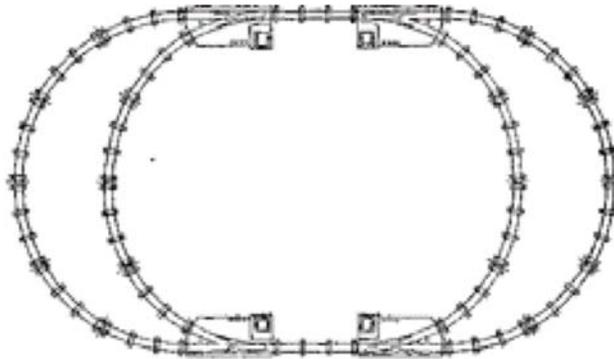


Figure 6

These are a few ideas for things you can do with a simply oval layout to make it more interesting, while keeping the space required to a minimum.

How to Make Your Oval Track More Interesting

Perhaps the oval, no matter how you extend or alter it, appears too fixed and static for you.

You can make a distorted oval, and place stations or other buildings at the curved portions so the curves will be meaningful, as in Figure 7:

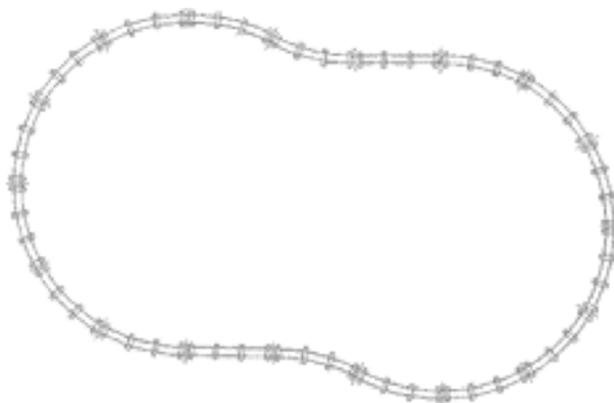


Figure 7

No real railroad curves without a reason, and you can always make your layout more realistic by giving your track a good reason to curve.

The distorted oval, without additions, takes 16 curved sections of track and two straight, and it fits neatly on a 4' x 6' board.

Even this layout needs a siding or two for interest. In Fig. 8 you have two, both requiring right-hand switches. Choose one or both.

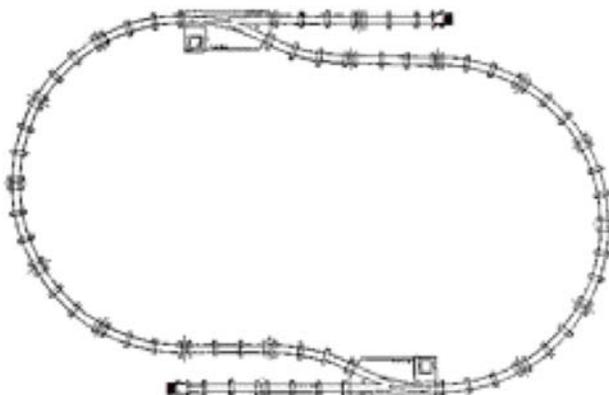


Figure 8

With the distorted oval, you can even make a passing siding and an inside siding or two (only one is shown in Fig. 9).

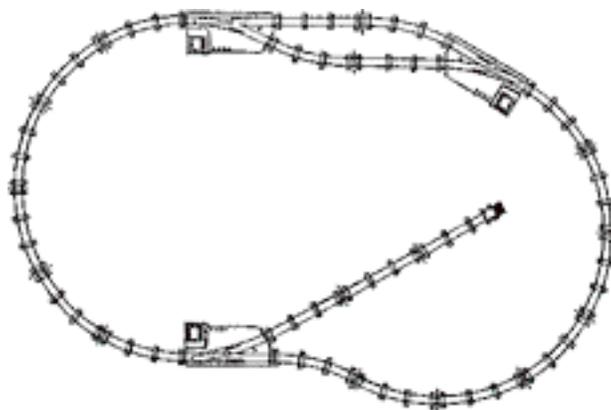


Figure 9

You can actually make, from this plan, the bent oval with a passing siding, an outside siding, and two inside sidings, each with a short second siding attached.

All layout suggestions offered so far have not even used the full capacity of a 4' x 6' board. The full width, or close to it, can be taken advantage of by adding two half-length sections of straight track, one at each end of the oval. (Track comes in $\frac{1}{2}$ straight sections and $\frac{1}{2}$ curved sections.)

With this broadened oval you can handle every layout given up to this point and a good many more. With it you can place a complete circle or small oval within the large oval – and still have room for some sidings.

One advantage of this type of layout is that you can operate two trains at once, even if you have only one transformer. The better switches for S-gauge trains are equipped with small button switches that enable you to adjust them for two-train operation or for regular operation.

In regular operation, current flows to all rails so that trains move no matter what track they are on. With two-train operation, current flows only into the loop for which the switches are set and not into the loop that is cut off by the switches.

Thus, if you have switches set for the outside loop, any train on that loop will move but a train on the inside loop will stop.

When switches are changed, the train on the outside loop will automatically stop and the train on the inside loop will move. Fig. 10 shows an oval with a circle inside, and two possible dead-end sidings:

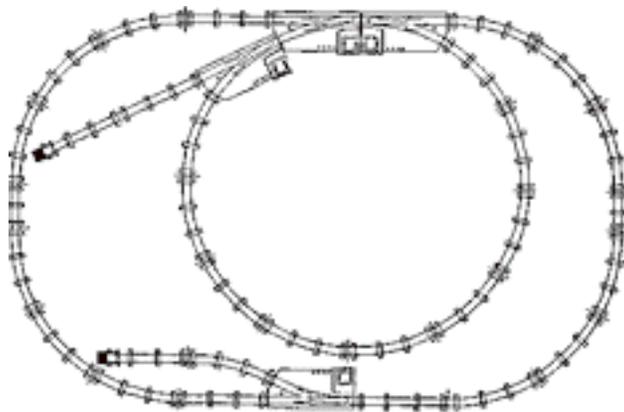


Figure 10

This layout, without sidings, takes 22 curved sections, 4 straight sections, 2 half-straight sections, and a pair of switches. The sidings shown would add another pair of switches, 1 curved, and 3 straight sections of track.

This layout can be varied by making the inner circle into an oval. This enables you to construct a crossover from the outside to the inside oval.

Incidentally, some manufacturers confuse the terms crossover and crossing. A cross-over is a combination of switches which enables a train to pass from one track to another track running parallel with it.

A crossing, on the other hand, is an accessory by which one track actually crosses another--usually at right angles--without trains being able to pass from one to the other.

The layout in Fig. 11 shows an oval within an oval, with a crossover between the two ovals at the bottom. It takes 22 curved sections, 3 straight, 2 half-straight, and four switches.

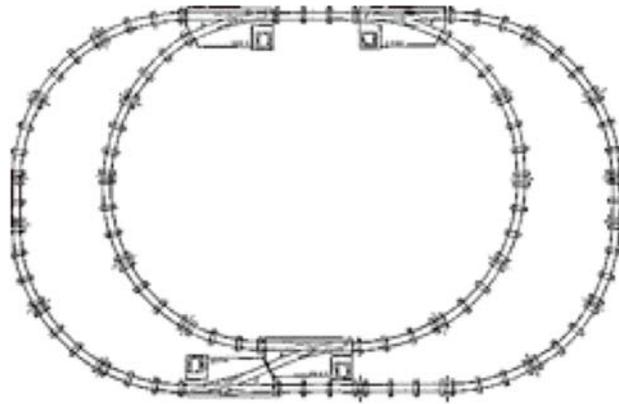


Figure 11

Another variation of the broadened oval (Fig. 12) gives you an inside curve which can be made, through proper switching, to lead into a dead-end siding. Or the train can move onto the siding directly from the outside oval.

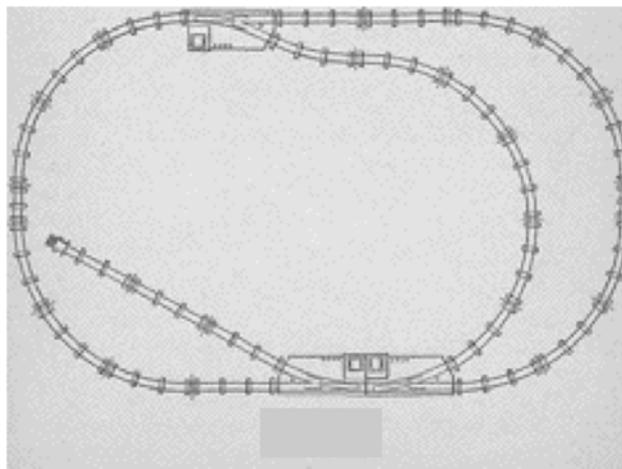


Figure 12

The distorted and broadened ovals may be combined with the circle to give great variety in a 4' by 6' layout, as shown in Fig. 13:

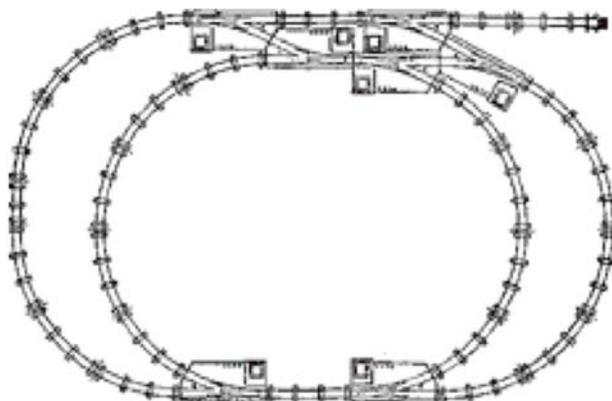


Figure 13

You don't need to use every feature of it -- just choose what you wish and what you have track for.

Another interesting layout (Fig. 14) that looks as if it could not fit on a 4' x 6' board (but can, even though there is very little room left over) involves a complete circle which need not involve the large oval enclosing it.

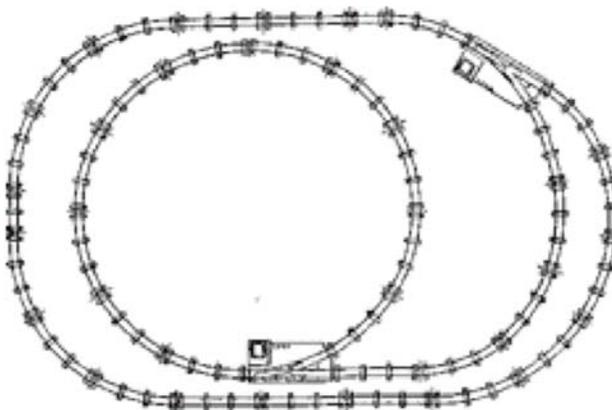


Figure 14

A long curved connecting line, however, lets you send a train from the inner circle to the outer oval. You can keep two trains rolling around both of these at once without interference.

When you operate your trains on this layout, you will wish that you could get from the outer oval back to the inner circle without backing up -- or rather, in addition to backing up, for reversing actions are always interesting in themselves.

The layout that will accomplish this is easy to construct, but it will not fit on a 4' x 6' board. A 4' x 8' panel, however, will hold it nicely, as shown in Fig. 15:

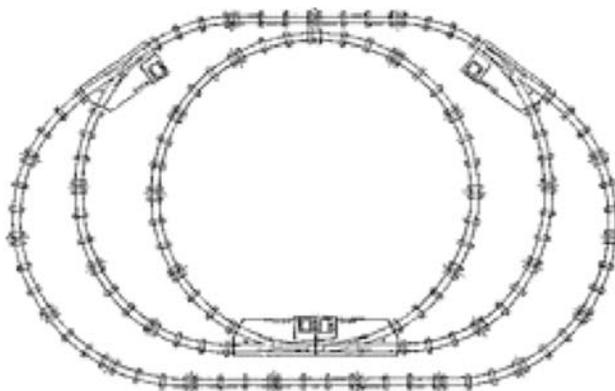


Figure 15

Going Beyond A 4' x 6' Layout

On a 4' x 8' table you can handle every layout possible on a 4' by 6' table, with plenty of other variations. There are also many interesting layouts that can't possibly be managed on a 4' x 6'.

Of these, one of the most popular is the Figure Eight, to which you can add a siding or two if you want.

Another good 4' x 8' layout consists of two connected circles.

There is a lot of variety here, but even more is possible when your table can be a little wider. Five by nine feet is a popular size. This is the size of a regulation ping-pong table.

Most lumber yards don't carry plywood panels of these dimensions. They can usually special order panels made specifically for ping-pong tables, 5' x 9', but they come in only 3/4" thickness, which is heavier than you need.

They're also fairly expensive compared with other plywood panels. None of the wallboards are supplied in this size.

You can build your table of tongue-and-groove fir or pine, and make it any size you want. Or you can add on either side of a regular four-foot-wide plywood panel a strip six inches wide, attached with shelf brackets, to bring the width of

your board up to five feet. You might consider this possibility when examining layouts that will fit a 5' x 9' table.

Layouts with grades of enough height to allow one track to pass under another are exciting, but inclines must be fairly steep, even a 5' x 9' table, although it can easily be done with the power and traction found in the latest locomotives.

Some train manufacturers also put out trestle sets, each trestle a little higher than the next one, so that you can make one track elevated above another easily.

While these may not be as realistic as graded landscaping, they enable you to have more variety of operation and layout before you reach the stage of building scenery and sculpting your own bit of earth.

Regardless, there's plenty to keep the new builder of a model railroad busy and happy, even when he works on a small table. In addition to the laying of track in a chosen pattern and the running of trains over it, there are accessories, buildings, signals and lots more.

And in each of these categories there are so many possibilities that you may have a hard time deciding which to get or make first. This decision will be easier after you have done some thinking about the nature and special character of your private railroad empire.

Where Do You Go From Here?

There are many sources of layouts and ideas for your model railroad. You'll find many books which go into detail about how to build your railroad, as well as many more example layouts.

There are also plenty of websites that have great information about the model railroading hobby.

Be sure to check out www.themodelrailroader.com for lots more helpful advice as well as news and updates from the model railroading world.