

# HOLLOW GLEN

## Hollow Glen – Starting your model train layout

Welcome to the wonderful world of modelling. We have put together this article to help you create your own miniature realistic world by building a model railway. Bring it alive as your trains run around your layout, through towns and country side, over and under bridges, in and out of tunnels, or backwards and forwards in a shunting yard.

The excitement it brings young people and the pleasure it brings to people of all ages is what makes this hobby so unique.



Our Hollow Glen Layout started out as a single loop track around where the town and lake is now, using a Hornby model train set. It has grown into a six (6) modular layout that we take to model railway exhibitions where we allow children to drive and control Thomas the Tank engine around the town on the original track we started with. The layout sits on a justable

tables so it can be set up on a height that allows me to work on it, or set up at a lower display height that allows people of any age to view it, including people in wheel chairs.

## **Hollow Glen – Starting your model train layout.**

**Some pointers to help you get started.**

**Building a model train layout can seem to be a difficult task, especially if this is your first go. We have put together a bit of a guide to help you get started.**

**Once you do get underway you will find train modelling can be very rewarding and enjoyable hobby to get into.**

**There are so many aspects to this hobby, offering a wide range of interests, that at times will test you and at other times will give you great satisfaction. It's a matter of finding where your interests lie.**

- **That can be building a complete circuit and running trains around it or to building a shunting yard moving trains backward and forward changing rolling stock.**
- **Building a layout that replicates a piece of railway line in a town or country side, that may or may not still exist, that appeals to you.**
- **You may find you enjoy building bridges, stations and houses, other structures from scratch or assemble them from kit form.**
- **Making scenery using foam and plaster to make mountains, creating river beds, lakes, waterfall, adding trees and foliage etc.**
- **Electrical the side of layouts, setting up electrically controlled points, flashing lights and street lighting etc.**
- **Adding features like roads, cars, people, boats and creating scenes that add a story to you layout.**
- **Displaying your layout, or joining a club, or working/ helping other with their layouts.**

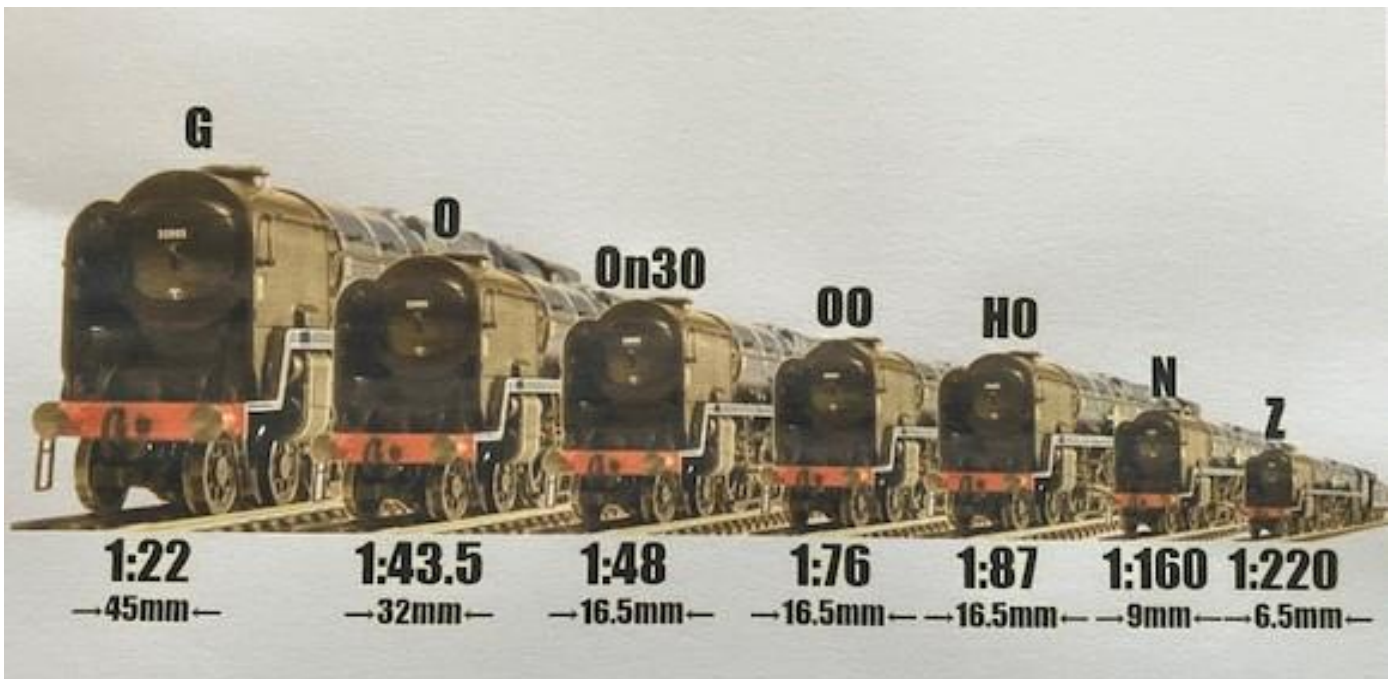
**And so the list goes on, once you get into this hobby you will be surprised where it will take you.**

**There are some pit falls to be aware of, so we have put together this article to help you navigate your way.**

# Choosing the size (GAUGE) and Origin of the model train you want to use.

## Gauges

- There are various sizes of SCALES for Model Trains.
- There are also various sizes of GAUGES for the tracks that the model trains run on.
- The OO Scale (1:76), trains are English and the HO Scale (1:87), trains are American, European and Australian, are the most common Scales used in layouts today. While HO Scale (1:87) and OO Scale (1:76) trains are slightly different sizes, they do however run on the same 16.5mm Gauge track.
- Other Scales you will come across are; -
  - The N Scale (1:160) trains run on a 9mm Gauge track and are the next most common.
  - The TT Scale (1:120) trains run on a 12mm Gauge track. Being between OO and N Scale its call TT as it is often referred to as a 'Table Top' model railway.
  - The Z Scale (1:220) trains run on a 6.5mm Gauge track and are one of the smallest commercially available model railway scales.
  - The S Scale (1:64) trains run on 22.5mm Gauge track.
  - The O Scale (1:43.5) trains run on 32mm Gauge track.
  - The On30 Scale (1:48) trains are much larger trains than the OO and HO trains but they also run on the 16.5mm Gauge track.
  - The G Scale (1: 22) trains run on a 45mm Gauge track, are often called garden railways.
  - The 009 Scale, trains are a HO scale locomotive that run on the 9mm Gauge track giving a model train narrow gauge appearance.



## Origin

Origin is a part of the world where the manufactures have based their Locomotives, carriages and rolling stock designs from.

- By Origin, a layout can be; - English, European, American, Japanese or Australian. (Thomas and friends is based on English origin).
  - When choosing a particular Origin you need to bear in mind that if you wish to make your layout as authentic as possible you will need to purchase Locos, carriages, buildings, cars and scenery that complement each other.
  - Alternately you can always make a fantasy layout and put whatever you like.
  - Ideally stick to one brand of manufacturer to start with. As more that one manufacturer, will make the same identical train, of the same origin, to the same scale. But some of the couplings from one make to another are not compatible or might appear to work but can release very easily. Check before you buy.
  - Cost does not always determine the quality of one item over another. The cost of 'tooling' for a smaller production run will often push up the price. Something to bear in mind when choosing your origin – the overall cost of the trains, cars, buildings Etc when you go away from main stream can add up over time.
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**Note;- Some of the old train sets, individual Locomotives & carriages along with accessories are collectable items and worth getting advice on before throwing them away.**

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## **Power to your layout**

Electricity is inherently dangerous and should always be treated with respect. But with model railways the voltage is so low and there is no risk of electrical shock at all from the controller onwards. You can touch the track and you will not feel anything (and will not hurt yourself).

However we recommend you plug your controller/s into a power safety box/board as a protection to you and your equipment, as a precaution, especially if you are setting up your layout in unfamiliar place. (For an example- a display at a model train show).

Other model railway accessories such as lighting, points etc, also are controlled with low voltage and are safe.

If you are just starting out in the world of model railway, you will have most likely come across the two different types of model train control systems. – DC and DCC.

## **CONTROL SYSTEMS**

There are two (2) systems for controlling model trains – Analogue and Digital.

Analogue controllers. – Direct Current (DC) is the simplest method of providing the power needed to run model trains. These are sometimes called analogue train sets. In DC, power is sent to the track and the trains are controlled by varying the level of voltage supplied. The voltage sent to the rails correlates to either an increase or decrease in speed – more voltage equals faster speed.

Varying the voltage will mean that all trains (on the track wired to the circuit) will increase or decrease in speed at the same time – there is no independence. In DC, the only way to have



independent control over multiple trains is to have different sections of track using their own separate supply of power.

DC has the advantage of being simpler for the operator and less expensive to set up than DCC. However, for some modellers it will prove limiting in terms of flexibility. DC could also lead to some very complicated wiring setups in complex track plans, where multiple DC circuits and power supply controllers are required.

Digital controllers. – Digital Command Control (DCC) is a more advanced system of operating a model railway. As the name implies, this is a digital system rather than an analogue one. In DCC, power is constantly supplied to the rails, and the movement of each train is controlled using a DCC decoder fitted to each locomotive. When the operator issues instructions using the command station, (controller) these instructions are transmitted through the track, to all the locomotives. However, these instructions are only acted upon by the locomotive for which they were intended. Each locomotive has its own call up address.

This means that each train can be controlled independently using a single supply of constant power. In DCC multiple trains can be operating at any one time – some could be stopped, others could be travelling forwards, one could be slowing down, and another could be reversing all on the same track. This gives a large degree of flexibility to the operator with regards to train movements.

There are also many extra features that are made possible with DCC. These include additional electronic effects such as locomotive sound, lights and replica smoke and steam.

The Main downside to DCC is often the cost. The initial up-front cost of a DCC system is significantly more than DC. DCC locomotives and accessories also tend to cost more when compared to their DC counterparts, due to the presence of complex digital components needed to run the additional electronics. Plus an extra level of care/concentration is needed when you have locomotives capable of running independently in different directions.

## **DCC Ready Locomotives**

A model railway locomotive that is DCC Ready is fitted with a DCC socket, but no DCC decoder. In order to run this locomotive on a DCC controlled layout, a Decoder will need to be fitted. DCC ready locos can still be safely used on DC layouts.

## **DCC Fitted Locomotives**

A DCC fitted locomotive has a DCC socket and a DCC decoder fitted, which means it is ready to run on a DCC layout straight away. Normally, DCC decoders will function correctly when running on DC power, so you can run a DCC locomotive on DC. (However, older decoders may be an exception.)

Some older analogue locomotives are not able to be converted DCC. You may have an old train set that you have not used in years and want to get it running again. It most likely will not be suitable to DCC. However the new DC controllers are much safer and easier to use than the old ones and well worth investing in. Or take your old controller to a model train shop and have it checked out. (Don't just plug it in and see what happens). You cannot go onto a commercial site with electrical devices unless they have been tagged with a current certified safety tag. But I have seen people plug a 50+ years old metal control box that has not been used for 40 odd years, into a 240 volt power point and turn it on while holding it in their bare hands!!

Both DC and DCC are both great systems, so it's a matter as to which one is more suitable to your needs.

## **MODEL RAILWAY STORES**

For anyone starting out with model trains, your local model train store is going to be very important to you as you enter this great hobby.

There are many great reasons to search for, and purchase from, a good model train shop near you. Being able to see products up close before you buy them are a great advantage and in some cases seeing a locomotive run on a demonstration track will give you peace of mind before you purchase.

A lot of these businesses are family owned and run, meaning they often have many years of experience with model trains and are able to offer specialist advice and guidance. This can be invaluable if you're undecided on which train set to purchase or you need advice on whether it'll be compatible with your existing model railway equipment.

These stores are often model rail specialists – meaning they only sell model train equipment (rather than larger store which sell a whole host of other products). This makes them far better placed to offer specialist expertise and advice on model railway locomotives, carriages/rolling stock, complete train sets, controllers and track etc. After sales support (including repairs) is also likely to be of a far higher standard too. Most offer a wide range of scenery, building kits, specialist tools and a wide range of goodies to enhance your layout.

By purchasing from a model rail store near you, you will also be helping to support the economy of your local area and small independent businesses – rather than large online multinational companies. This is becoming increasingly important as more and more small local shops are being forced to close down. If there's a good model railway shop near you, I would certainly recommend checking it out and supporting it where possible.

A good, relatively inexpensive way to get started is to buy a model railway set.

A set will have at least one locomotive and some rolling stock (carriages or wagons). There will be enough pieces of track to make a complete circuit including a point for connecting the power, a controller either DC or DCC and an easy to follow step by step manual.

## **MODEL RAILWAY CLUBS**

Joining a Model railway club can be beneficial for beginners, as you meet a group of people who are model train enthusiasts with experience all different fields of modelling. Most model railway clubs have in house layouts, where you can take your model trains and run them while you design and build your own layout. A club can be a great source knowledge for you and an opportunity to make friendships with people who have the same interests as you.



# Designing and building your layout.

Planning the starting size and shape of your layout. I use the term 'starting size and shape' as often model layouts have a habit of growing and often become more intricate as you start to enjoy the hobby. These are some of the questions you need to look at;-

- Importantly, apart from you, who are you building the layout for?
- Where is the layout going to be set up and how much room have you got?
- At what angle/direction will people be able to view the layout?
- Is the layout going to be fixed or movable?
- How is the layout going to be stored when you are not using it?

So often I see people build a beautiful a layout only to then have to cut it up to get it out of a room if they need to move. Building your layout on easy to move modules that fit through your doorway can be very handy. Using separate fold up, height adjustable 'off the shelf' tables should be considered.

Also you need to be able to reach all parts of your layout without damaging items like building and scenery etc.

We find that one of the most important issues is the height of a layout. So often layouts are built at a height that is easy for adults to work on, but are too high for children to view and enjoy your creation. This is where adjustable legs/tables are very handy.

Some layout designs cater for one or more people/controllers to stand in the middle of the layout as the trains loop around them in a complete circle/oval. (Often these are in Model train clubs or on display at model train shows). These can often be a problem with access, especially as you get older. They also require a lot of room.

Making your layout in modules is a relatively simple process. You can use loose pin door hinges to easily and accurately locate each module and loose flexible track that can be removed and slid back into place at ease.

Where storage is a problem you may consider using a pulley system in your garage to store your layout above a car. We have made a separate information section detailing this, if you require.

The size of your control panel and the area you allocate for it can vary from a small shelf upwards. The new DC and DCC controllers are quite small (some are hand held) and it will depend on what other types of activities you want to get into, like having control panels for multiple tracks and points.

## **THE BASEBOARD AND FRAME**

How you choose to support your layout is a matter for you to decide. Whether you put it on a table, folding tables or have fixed legs which may or not fold. Or you may also be fixing it permanently to a wall. There is golden rule on this matter.

With the baseboard it's self; the board should be a material that is relatively stable and be of a material that is easy to fix too. i.e. Plywood, chipboard or MDF. And of a thickness that gives you enough material to screw and nail too.

The base board should be sealed all-round. With temperature change and humidity the board can expand and contract, or distort, causing problems with tracks and/or scenery. Can also give you problems when you put products like wet plaster on the board.

By fixing the board onto a timber frame you give the board more stability and create an area to protect the wiring and any components you wish to hide under the layout. (Can be circuit boards or points motors etc.)

The timber frame can be made of pine, hardwood or similar, using 2x1 (42x19), 3x1 (65 x 19) 4 x1 (90 x19), on edge to give the base board added strength and stability. The frame should be fixed in line with the edge of the baseboard and have rails through the middle to give support evenly. Having the timber frame in line with the edge of the baseboard will enable you to fix scenery back boards, and fix panels around the edges to:- Stop train from coming off your layout, enable you to build up scenery like mountains etc. and give you stronger section where you want to join your modules.

## **JOINING SECTION OF LAYOUTS TOGETHER**

There are various ways of joining your layout modules/sections together. The aim is to end up with smooth running trains on tracks that have no steps and are perfectly lined up, especially if you are moving your layout on a regular basis. I have found, that using loose pin hinges (ideally stainless Steel) mounted vertically on both sides of the frame where your modules meet, gives you and accurate location in all three directions. By using flexible track over a reasonable distance and ideally on a curve, you will find the track will be easy to put together and remove. Fixing/holding the track in place with a few flat head screws painted black, screwed between the sleepers so the head of the screw gently clamps down on the track will give you smooth running trains. It is a little bit primitive but it works.

Putting a power feed to both modules/section using a simple two pin clip, (see page 14) will insure you have even voltage through the join.

Replacing your track connectors every so often or if they are loose is also a good move.

## TRACKS

- The power is supplied to your model train (locomotive) through the track rails, - that goes for both DC and DCC controlled systems.
- Make sure your joints in you tracks are tightly pressed together when laying the track.
- Bear in mind, that in cold weather the metal tracks will shrink and in hot weather the metal tracks will expand. If you lay your tracks on a really hot day you will find gaps in your tracks when they cool down. Ideally lay tracks in cooler conditions.
- If you are constantly pulling apart and setting up your tracks the small track connectors will become loose or bent and will need to be changed as this can result in a loss of power to the tracks. – Packs of these connectors are available.



- Cleaning the track on a regular basis is important as you can get a build up of oil, moisture, or even rust causing a fine film that will reduce the power supply to your locomotives. There are hand rubbers available especially for this purpose. Also you can buy track cleaning carriages that clean the track as your train runs around it.



- Laying your tracks on a 'Track Underlay' is important. The underlay will give you smoother and quieter running trains. You can use cork or a rubber moulded underlay. I have found the 'Trackrite' product easy to use and allows for expansion and movement in my tracks.

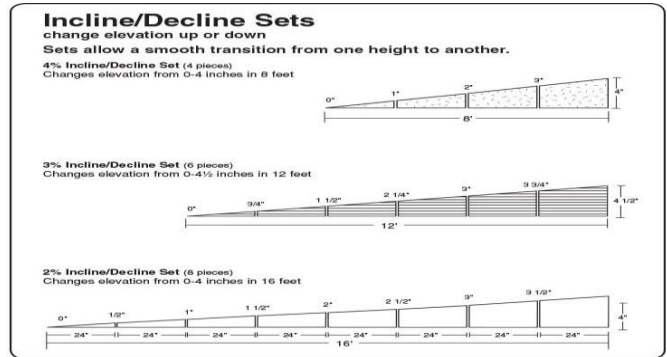
- You should look at using one (1) make /brand of track, points, Etc, on your layout where possible, especially when starting out. I have found both Hornby and Peco to be very good products.
- Bearing in mind that the Peco flexible track is compatible with other tracks.
- There are various sizes of track radius. IE. Hornby have 4 standard sizes in their range.

When choosing the configuration of your track layout especially the 'curvy bits' you need to take into consideration the following;-

- Some of the larger locos will not go properly around the smaller tighter radius.
- Also bear in mind that loco's with 'swinging' front wheels assemblies (especially 4 wheel ones) will have the front fixed body of the loco swing out wide as it goes around the bends the track and can catch on scenery such as tunnel entrances or bridges etc.
- Also long carriages will have the centre of the carriage cutting the corner especially on small, tight radius tracks that can cause the carriage to come in contact with scenery.
- Having your trains 'snake' or weave along the track imitating real trains following the contour of the land can look very impressive and realistic. But model trains changing direction quickly in a short distance can cause problems with swinging from side to side with de-railing or uncoupling. So choose your radius tracks carefully.
- NOTE: While different Scales (size) of trains can run on the same gauge of track they will not fit through tunnels and under bridges etc. if you make them to suit the smallest scale train.
- Similarly points or crossovers come in various lengths. With shorter the points the train has to travel slower through them so as not to de-rail or uncouple. You may look at using longer (express) points, if they fit into your layout as it allows the train to travel over them at a higher speed.

#### **TRACK INCLINE/DECLINE SETS**

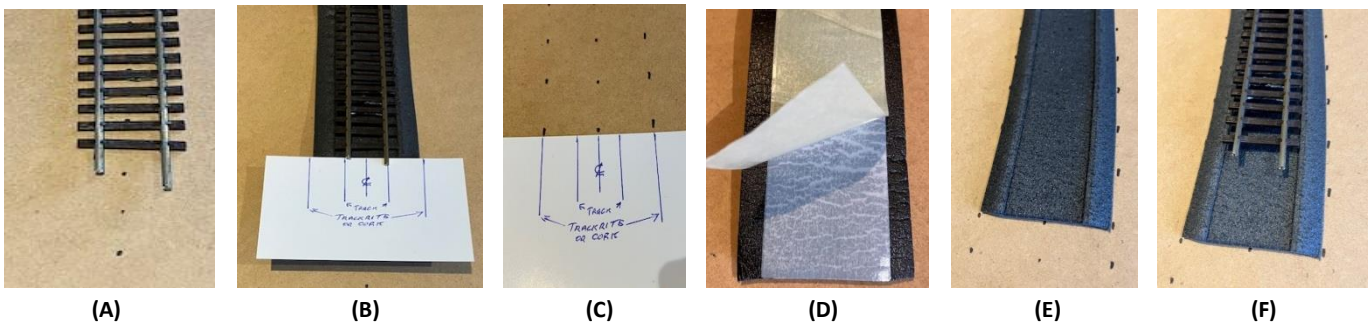
These are manufactured from foam and they give you the correct rate of incline when changing from one level to another. They are ideal for both rise and fall and are flexible for curved track. The 'Woodland Scenic's Risers' are very good products. They come in various degrees rise or fall allowing you to make less or more steeper slopes.



These come in 2%, 3% & 4% which mean a 3% incline will rise 3mm in 100mm of length (they are not degrees in angle). Be mindful the steeper the slope the harder it is for the train get up and the less number of carriages it can pull.

## LAYING THE TRACKS

- Lay your tracks on your baseboard in the configuration that you want. Mark the centre of the tracks with 'dots', 20mm apart on curved and 50mm apart on straight tracks (A).
- Once you have marked the centre of your tracks, remove them from the base board.
- Using a small piece of cardboard (the size of a business card). Mark a centre line on it. Then put two (2) mark on it one either side of the centre line slightly wider than the width of the underlay you are going to use (B). You now have a template to use to mark out the outline of your underlay on the baseboard by lining the cards centre line up with the dots on the board putting dots on the baseboard opposite the two lines outer lines on the card (C) .



- If you are using cork underlay you can either cut the cork so you have long straight lengths of cork to the width you require or in the case of curved sections place the cork sheet on the baseboard under the tracks and use the above system to mark our the shape. Then cut the cork to the curved shape. Once this is done place this curved cork on the baseboard and trace the shape on your baseboard giving you lines to work to when fixing down the cork.

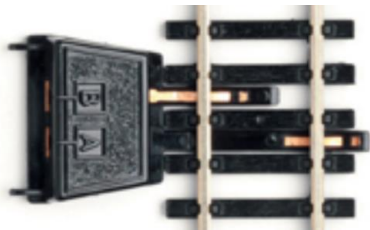
- With your strips of cork or foam underlay I recommend you stick them down with double sided tape (D). This way if you want to change your track layout at a later date it is easy to take up the underlay without damaging either the baseboard or the underlay.
- When laying foam underlay (Trackrite) around a bend put the double sided tape on the bottom of the foam underlay then cut down the centre of the underlay cutting in half. Stick one half of the underlay bending it to line up with the markings on your base board the stick down the other half up against the first. You can gently stretch and bend the foam to the shape required. On shallow bends you don't need to cut the Trackrite (E)
- Before you fix down your tracks down I recommend you chose the colour of the ballast (track gravel) you are going to use. (That is if you are going to use ballast). You can paint the underlay to match the colour of the ballast to give a better affect.
- I also do not recommend that you put ballast in the middle of the track between the track rails, as this makes the track easier to take up the tracks if you want to make changes. Also allows the track some room for movement with temperature changes. Most importantly you do not want to get glue and ballast stuck on top or inside the track rails or in your points.
- Note- You can buy Charcoal ballast to match the colour of the 'Trackrite'. Also the Trackrite has a rebated centre to help locate and hold the track in the right place along with sloped sides to give a realistic finish.
- Once the underlay is fixed in place the track can be fixed in place by either gluing down or being nailed down (F).
- Note: As you push the tracks together lay them on top of the underlay and run your finger over the joint to make sure the joint is flat (no step in the track joint) this ensure that both ends of the track rails are properly located in the track joiners before you fix the track down.
- I recommend you fix down the track using fine flathead black tack nail, nailing through the underlay and into the baseboard. Most tracks and points have small holes in the middle of some of their sleeper for this purpose. You can drill extra holes in other sleepers if needed.
- I recommend you hold the small nails with a pair of pointy nose pliers, gently tap into place to start then using a nail punch to tap the nail in fully so as to not damage the track. With underlay, especially foam underlay take care not to hammer the nail in too far as too compress the foam and distort the track.

- If you need to cut a length of track to a special size you can use a hacksaw and file but it is a lot easier and you get a better result using a track cutter. Track cutters are a pair of pliers specially designed for this purpose. Available from model train suppliers.
- Once you cut the track to length you should file any burrs or sharp edges off it. You may need to trim the sleepers back to allow for the track joiners to slide over the rail ends. Needle files are very handy for this. Also using masking tape placed on the track to help mark the track and stop the cutter from slipping can be very helpful.

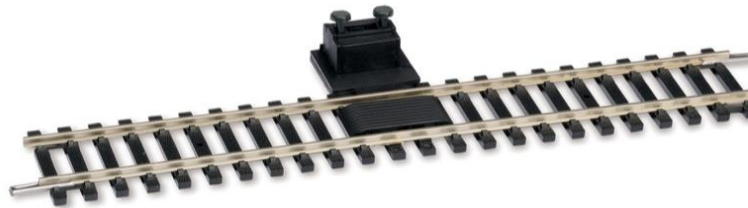
## WIRING UP YOUR LAYOUT

With both DC and DCC to supply power to your track there are only two (2) wires required from the controller to the track. It is a very simple system.

There are various types of systems for connecting wire to tracks, below is a sample of two (2) Hornby connectors.

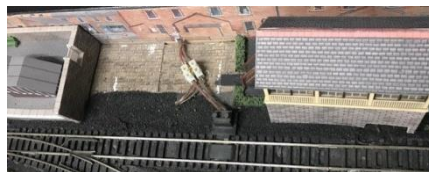


Hornby OO power connecting clip.



Hornby OO digital power bar. (More expensive but a better long term option.) P.13

I recommend, when you strip the ends of your wires, you should solder them to give better contact and less likely to come apart. (Pull out of connections)

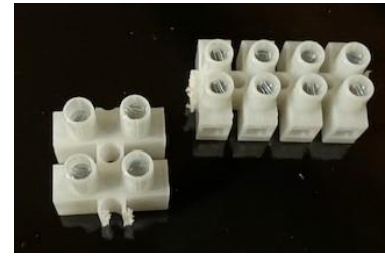


I use a double clear cable with a marking line on one side to connect power to the track and only use this cable to connect power around my layout. I can now identify the main power at any time. By using connecting bars I can take power from the main feed and feed it around the layout. There are a variety of clips on the market that are ideal for disconnecting/separating sections of your layout and disconnecting your controller.

When you want to put extra power around your layout you can either use a 'power bar track', as above or solder wires direct to the track rails. Make sure you solder the wires on the outside of the rails and do not get solder on the top or inside of the rails. Also make sure the wires, positive and negative, are connected to the same continuous track rail all the way around your layout. That is, you do not change sides.



Below are some of the electrical components and materials that will help you get started.



Connecting Bars

By using different coloured cables and tapes for different individual applications around your layout will help you to identify and trace problems quicker or know which cables clips together. It is also ideal to label each cable or joint. Paper clips make great little clamps for holding wires especially when soldering and you can buy coloured plastic sleeves to go over wire joints. These just shrink onto the wire when heated up. Connecting bars are very handy if you want to run power in more than one direction. Also these are ideal to protect delicate electronic items by connecting them into the bar then running a lead out the other side.



This setting is for DC



This setting is for DCC



A Digital Multimeter enable you to check the level of voltage to and around you your track.

There are so many helpful products available today designed to make modelling easy.

Some examples of these are;-

- Buildings, tunnel entrances & bridges There are many suppliers of readymade buildings to suite most gauges and Origins. They can come as a complete building or in kit form. The kits can be cardboard, plastic or lazar cut ply. The Cardboard kits that come from suppliers like -'Metcalfe' come pre-printed and fully detailed and only need assembly. Be aware some Kits may require cutting and/or painting to achieve the end result.

- Once again check before you buy. Either way assembling and making your building can be very rewarding. (You may find others in your family may enjoy this part of your hobby)

## TOOLS

Due to the nature of the intricate work at times and the fine scale you will be working to, you will need to look at purchasing some specialized tools other than your normal wood working tools. These are just a few handy items to have.



1 Magnifying glass

4 Cutting knife

7 Track cutters

10 Scaled ruler

13 Small flat screwdriver

16 Small brush

19 Wheel Spacer

22 Double side tapes

2 Good pair of scissors

5 Craft knife

8 Fine set of screw drivers

11 Wire trimmer

14 Small star screwdriver

17 Hobby foam brush

20 Wheel/ track gauge

23 Tape measure

3 Fine pair of scissors

6 Fine pointy pliers

9 Small clear ruler

12 Wire trimmer/ crimper

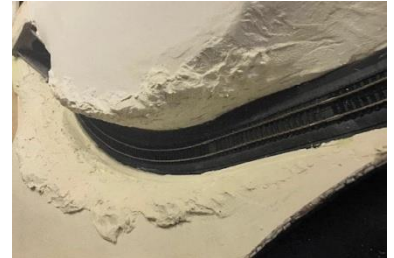
15 Tweezers

18 Set of small files

21 Small soldering iron

Small battery vacuum

- There are many highly detailed finished products all made to scale ready to be added to your layout. You can glue them in place or in some cases have them loose so you can move them around to change the appearance of your layout from time to time. Items like: Trees, foliage, cars, truck, buses, boats, fences, people and animals etc.
- We now have access some amazing electronics that can really bring a layout alive: featuring LED street lighting, camp fires, flashing welding in sheds, flashing lights for crossings, fire stations and others, points control etc.
- Rubber moulds for creating your rock features/walls using plaster or you can buy pieces finished rock walls etc.
- Rolls of printed sheets of scenery for making back walls.
- Fine modelling foam that can be shaped very easily and with use of plaster of Paris can be used to create mountains, hills, railway cuttings etc.



- With the use of craft glues, tapes and paints you can add beautifully realistic grasses, gravels, rocks, ballast, asphalt roadways and other feature. There are embossed papers that enable you to create realistic stone walls and even castles.



- Imitation water products for waterfalls, rivers, canals & lakes. (see pictures page 1)

I hope you find this article useful and you enjoy building your layout.

Trevor Holloway      [trev2ed@hotmail.com](mailto:trev2ed@hotmail.com)  
 0409 021 237