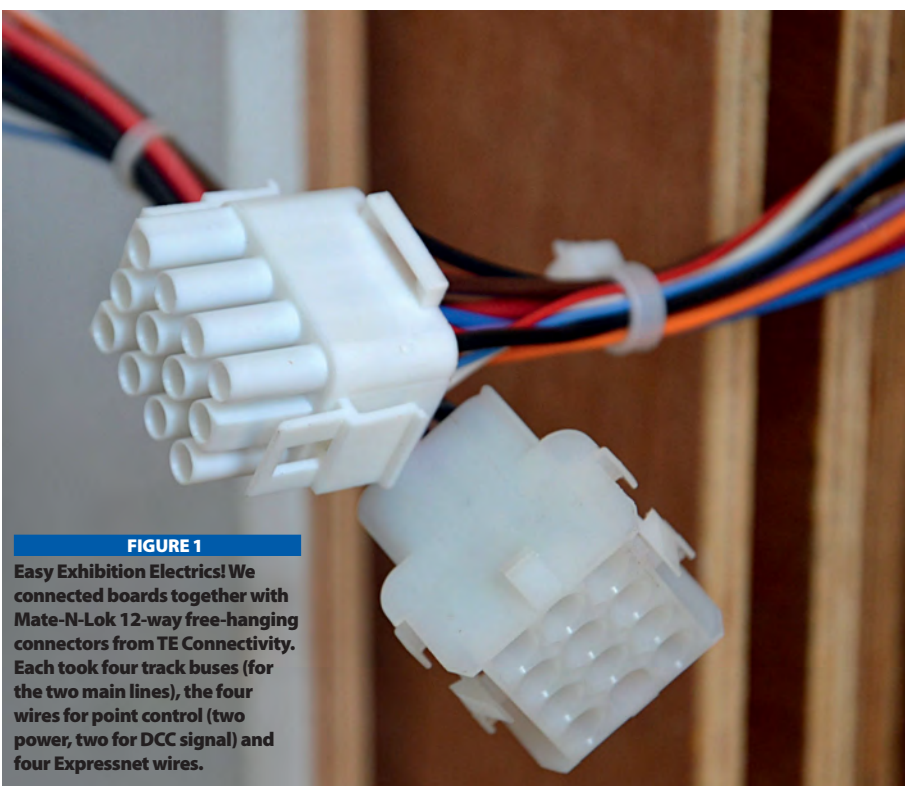# Big Bear & Team Viewer

STEVE HALES explains how Barrowmore Model Railway Group created multiple virtual panels to show all the operators of their 'HO' scale layout what was happening all the time.

The team behind Mauch Chunk, an American outline 'HO' scale layout by Barrowmore Model Railway Group, paired *Big Bear* computer control software with *TeamViewer* to make this large exhibition layout work.

FIGURE 1
Easy Exhibition Electrics! We connected boards together with Mate-N-Lok 12-way free-hanging connectors from TE Connectivity. Each took four track buses (for the two main lines), the four wires for point control (two power, two for DCC signal) and four Expressnet wires.

WE HAD A PROBLEM – we have a large Digital Command Control (DCC) layout that had been built for exhibiting. We wanted a system to control the points that was flexible and reliable and that could be operated by several operators at different points on the layout. We also wanted this to be as simple as possible and not involve building multiple bespoke physical mimic panels. Ideally, we wanted all the operators to see the same panel so that they could see points changing when other operators initiated this.

These requirements set us along a fairly clear initial road: pointwork must be DCC controlled and the mimic panel should be virtual, running on some sort of computer. This left a lot of options and it took some time to work out the best. Having done this and shown that the solution is reliable under exhibition conditions, we are happy to share our findings so that others may use the same or similar system with, we hope, similar enjoyment.

DCC POINT CONTROL
We use Peco motors on Peco points in our storage yard and Tortoise motors in the scenic area on hand-built points. There are a fair number of commercial options available with DCC accessory decoder boards that control usually two, four or more points – these are usually placed underneath the baseboards near to the physical points.

It is likely that any of the options would work with our solution, but we were fortunate that one of our team is a Model Electronic Railway Group (MERG) member who supplied us with enough MERG boards (of two types) to control our Peco and Tortoise point motors. The boards in question were kit 52 - DCC Accessory Decoder (pulsed outputs) for Peco or any other solenoid motor and kit 53 - DCC Accessory Decoder (steady output) for constant drive turnouts, such as Tortoises. These can each control up to four points, giving them each a unique number based on the number coded into the MERG board.

Rather than using the track power/DCC buses, a separate AC power bus and a DCC signal bus are best used to power and provide control to the MERG boards. This ensures that any shorts on the track do not affect the ability to change points. For connecting the layout to a PC a computer interface module was required – and most if not all DCC control manufacturers supply these.

MIMIC SOFTWARE
This is where the greatest difficulty was felt. Our requirements were simple: all we wanted to do was draw a mimic panel and control the points – both individually and with route setting. We weren't looking for any feedback or locomotive

Without the need for physical mimic panels, all the control modules are fitted to a sheet of plywood which fits snugly in a 'Really Useful Box'. For transit, a sheet of bubble wrap is placed over the components and all the wiring is folded on top. During operation, the lid is left off to avoid overheating.
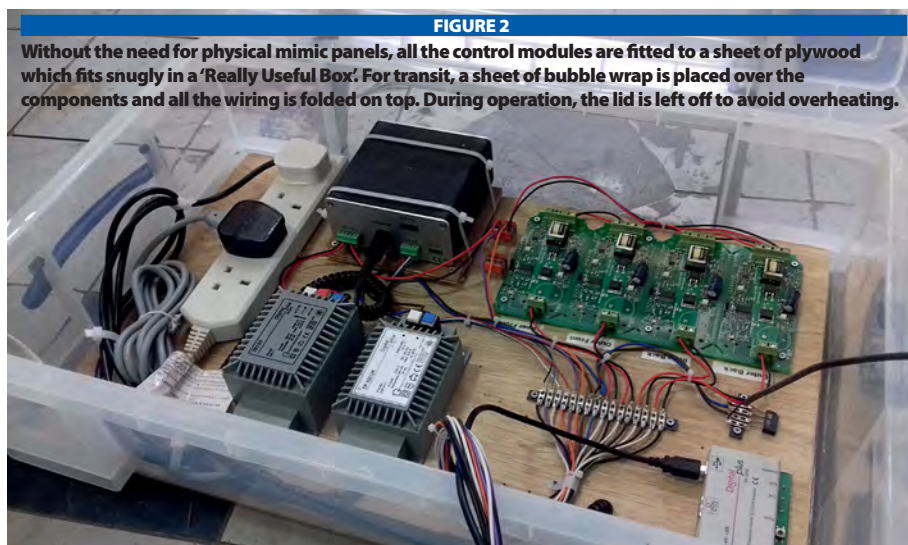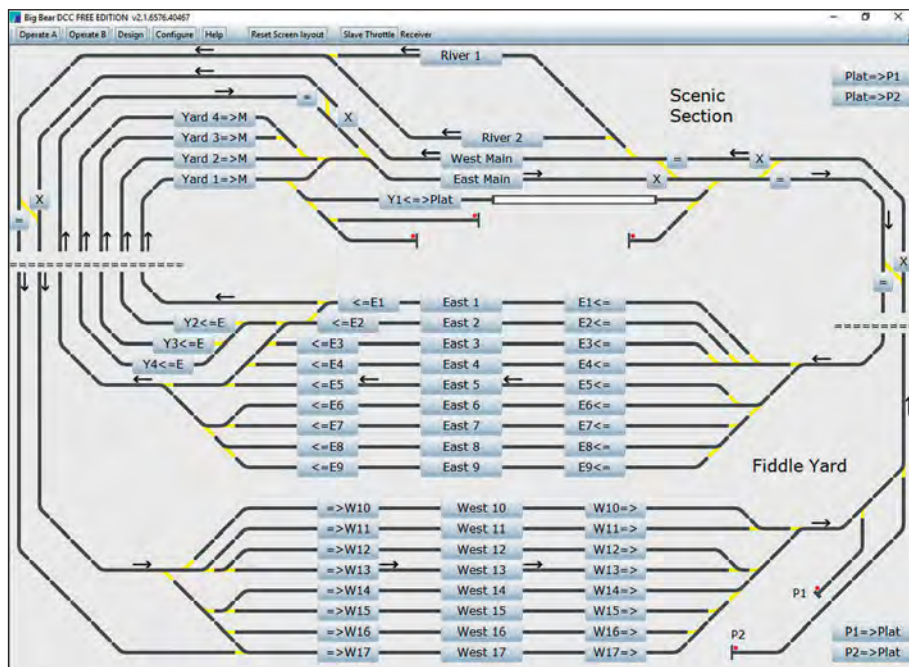
control but were interested in possibly controlling signals at a later stage. We also wanted something that was easy to use and cheap. There is a list of mainly non-proprietary software in Table 1 (see p93) – which will doubtless grow in the future.

Most of the available software is designed for full automation of train and route control and this inflates the price as well as making use and manuals rather complicated for modellers. There are also software/ hardware solutions such as train brain by CTI Electronics which are out of our scope.

After trying 'demonstration' versions of several of these – especially JMRI - we looked at and eventually adopted the *Big Bear* software which runs under Windows. It met all our criteria: it is intuitive, easy to draw the track plan, link the on-screen turnouts to the real ones and to set up routes. It is also very cheap at £19.95 for the basic system (which can also control up ⟩⟩

While the rolling stock is very different to British layouts, the principles of operation are identical. Mauch Chunk uses Lenz handsets to drive the locomotives and *Big Bear* to operate points and provide route setting.

seven locomotives) and the support has been excellent. We haven't used the locomotive control (except to show it worked) but for mimic panels we have now used it for several years with an NCE system and more recently with a Lenz system which has been completely reliable.

SETTING UP BIG BEAR

First download Big Bear from the *www. bigbearrail.com* website. Try it out for free and then pay for the version you want – the basic version is enough for all mimic panels. It is well worth paying for it for the excellent support.

Big Bear has eight tabs/buttons along the top (see Figure 3) – **Operate A** and **Operate B** give two options for the operating screen layout (we will only use one), **Design** and **Configure** are the ones we will discuss.

Draw the track plan: the **Design** tab lets you draw your track plan for the mimic panel. Before starting and depending on both the size of your layout and your screen resolution, you will need to select the screen size. The bottom left-hand side of the screen prompts you to **Stretch screen to required size** and the options are *Normal, Compact* and *Super Compact*. We have used both the latter as we have a large layout. If you start drawing your layout in the top left of the screen, then you can opt for a 'larger' screen – i.e. compact or super compact - if you find you do not have enough space.

The panels at the right hand of the screen contain the drawing elements. Select active track elements like points and slips from the **DCC Track** panel or passive track elements from the **Straights & Curves** panel. Clicking on an icon pops up an explanation box for each drawing element.

Click on the required element and drag it to the required location (a drawing square) and drop it. Double clicking on another square will repeat paste the element making it easier to draw, for example, straight track.

Once the track plan has been drawn, right-clicking on an active track element in the plan

will bring up a **Turnout** box at the bottom where you enter the **DCC address** for the point (or signal, or whatever). See Figure 7. Click **OK** to fix this. Later, when the system is connected to your layout, check that the display correctly shows the direction of point throw and, if it doesn't, return here and select *reverse*.

Setting a route: the **Configure** tab lets us set up routes. Select the **Routes and Sequences** tab. Make up a name for your route and enter it in the **Name** field. Then type in the route as follows (for example): 03/1-#-43/2-#-05/1. Finally click on the **+ Add or Update a Route** button. This piece of gobbledegook would change point 3 to position 1, pause (-#-), change point 43 to position 2, pause again and finally change point 5 to position 1. See Figure 8. The pause is to prevent the PC sending the command

sequence too fast – not all PC/DCC interfaces can handle rapid sequences of commands – and to ensure that any capacitors involved in throwing the points get a brief chance to recharge.

Add a button and assign a route to it: return to the **Design** tab and this time select a button from the **Miscellaneous** panel – it is the grey
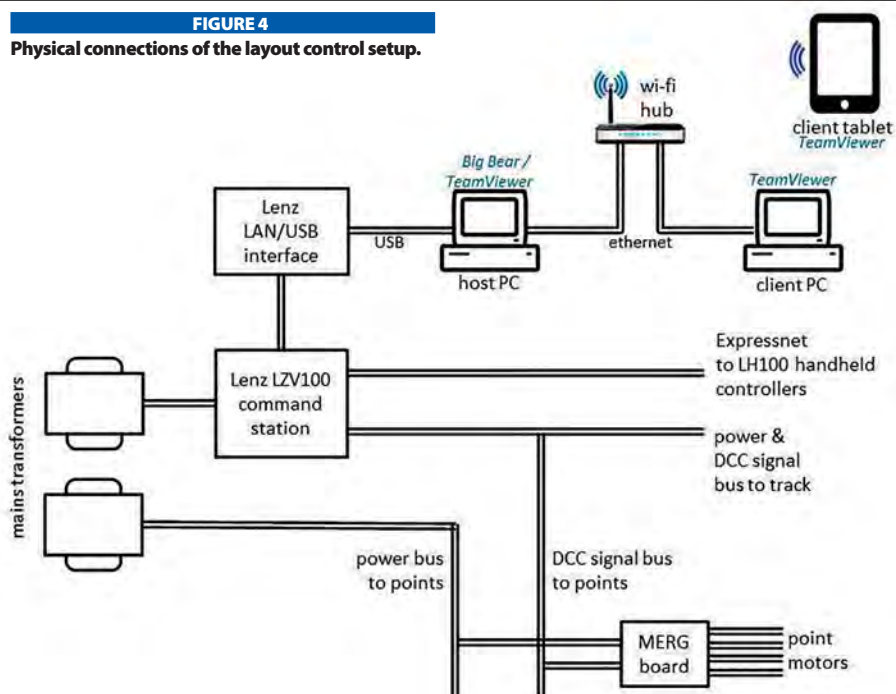
FIGURE 4
Physical connections of the layout control setup.

square with the word **key** written in it. Drag it over the track (into a gap you have left) or anywhere else you want to put it. Right click on it and a **Diagram Fast Key** box appears at the bottom – here you can enter the name of your route in the **Command** field and the name for the button in the **Label** field and

A MERG board controlling four Tortoise point motors connected to the point power and point DCC buses with Waygo three-way connectors.
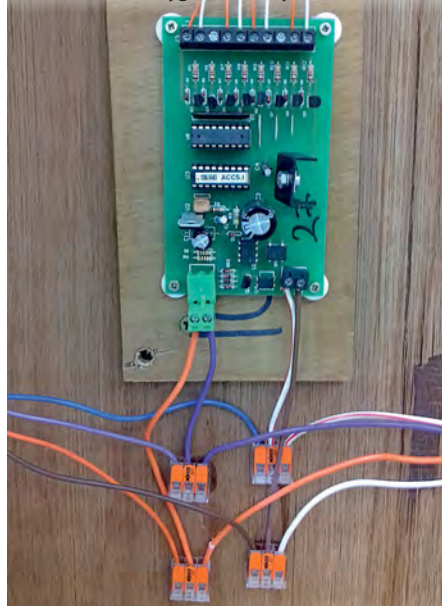
click **OK**. Alternatively to typing the route name into the **Command** field, you can type a short (or even a long) route sequence in directly – for example, on our layout 46/2-#-47/2 changes two facing points with the label 'X'.

Whenever you exit *Big Bear*, your panel is saved in two files, train.xml and trackdiagram.xml in the *Big Bear* directory. You may want to find this as, if you want to draw different panels, you will need to rename these files. *Big Bear* only works with one track diagram at a time.

CONNECTING BIG BEAR TO YOUR LAYOUT

Firstly you will need the appropriate USB module for your DCC system to connect to your layout. The price of these varies enormously, but you can expect to pay around £50-100. The Lenz 23151 module is shown in Figure 6. To connect your PC to this, you need a standard USB cable. You also need driver software so that the PC recognises the module – in many cases this comes with the

The Lenz 23151 LAN USB interface module.

module on a CD, or instructions are given for downloading it from a website. In the Lenz case, this seemed problematic, until we found that just plugging the module in (when electrically live) to the computer (when connected to the internet) prompted Windows to download generic driver software that has worked perfectly.

With the module connected, right click on the 'Windows' icon at the bottom left-hand side of »

TABLE 1 – DCC SOFTWARE			
SORTWARE	**ORIGIN**	**FUNCTIONALITY**	**BASIC SYSTEM PRICE**
Railcontroller	UK (Bachmann)	Turnouts, signals, trains	Free (trial software)
RailMaster	UK (Hornby)	Full automation	Free (trial software)
JMRI	US, International	Full automation	Free
Rocrail	Germany	Full automation	Free
Big Bear	UK	Turnouts, signals, trains	£20
i-Train	Germany	Full automation	€99
Railroad & Co	Germany	Full automation	€111
Windigibet	Germany	Full automation	€119

your screen – this will pull up a menu. Select **Device Manager** and scroll down the 'devices' to **COM ports** (note: this entry will not be visible if no module is connected and live) and expand the entry to see the COM ports connected. See which COM port is shown as being connected to the module (e.g. COM4) and make a note.

Open *Big Bear*, select the **Configure** tab, and under **Connection Settings**, select the appropriate DCC system in **Controller Select**, then select the appropriate COM port in **Select Serial Port**. Leaving the speed of connection (**Baud**) as suggested usually works, but there is no harm in experimenting if not. If everything is connected and switched on, it should all work.

MULTIPLE PANELS

For this we looked at several options initially – including plugging several screens and mice into one computer. Some of this worked but we felt it was inflexible. An alternative option presented itself which was to use remote control and desktop sharing software. There are several systems available but the one almost universally used is *TeamViewer* – which is free for non-business use and available for Windows, Android, Apple MacOS and iOS, Chrome OS and Linux.

It quickly became apparent that this works very well displaying the screen with the mimic panel on remote PCs – not only Windows based laptops but also several tablets. Of course, in the case of tablets, this gives a touchscreen mimic panel which can be zoomed (see Figure 12). Second-hand tablets can be picked up cheaply or a new 10-inch Android tablet from a reputable manufacturer can be found for a little over £100 (or much less from other manufacturers). Using a mouse or touch on several screens at once could have been problematic, but we found that in practice, with three screens in use, this did not cause any difficulties.

SETTING UP TEAMVIEWER

TeamViewer can be downloaded from the *TeamViewer* site onto your PC, Macintosh, tablet or phone. We found that if one of the components of your computer setup is running an old version of the software, connections do not always work, so make sure you check for updates and/or accept them when offered.

Open *TeamViewer* on the 'host' computer (the one connected to the layout). To make sure that you can use it without the internet being connected, select the **Extras** menu and then **Options.** This opens the **Options** screen (see Figure 11). Under **Network Settings**, select *accept* for **Incoming**
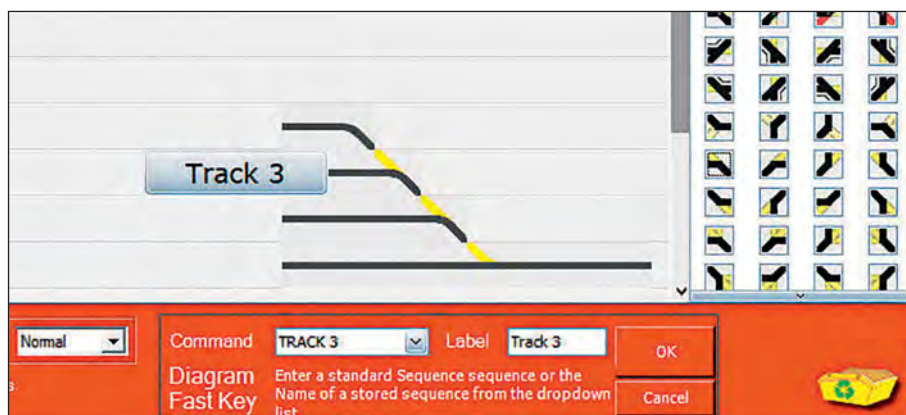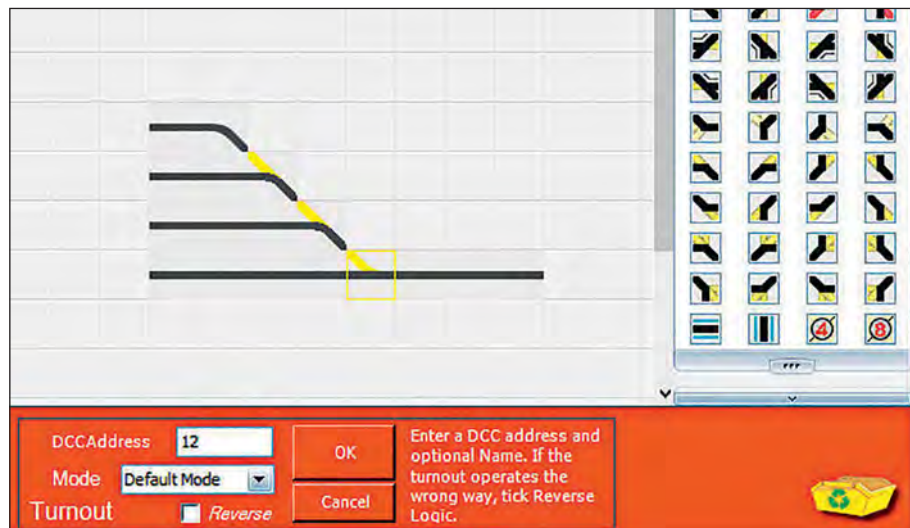
Once a track plan has been drawn, right clicking on a point allows it to be allocated to a DCC address.
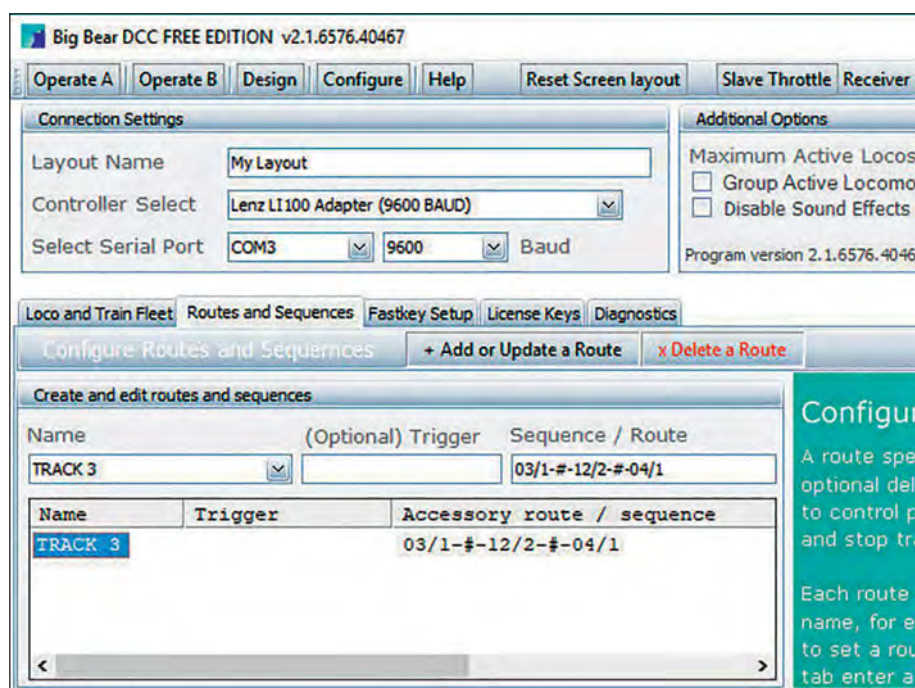

FIGURE 8

The points and their orientation are entered into a named route.

LAN Connections and then click **OK**.

Back on the main screen, **Your ID** should read something like 192.168.0.3 and a **password** something like 4924. Write these down.

Now open *TeamViewer* on each client computer or tablet in turn – make sure it too is set to work on LAN as above (see Figure 10). On a PC under **Control Remote Computer** enter the code - 192.168.0.3 in this example - into the **Partner ID** field and then enter the **Password** when requested. On a tablet you will be asked directly for the **Partner ID**, then click on the **Remote Control** button and the connection will be made, you will be asked for the **Password** and enter this too. In both cases, all things being well, the host screen will appear on the remote computer or tablet and can be used as if it were the original.

With tablets, you can zoom in on the screen, which is useful if you want to work on a small part of the layout only – for example to do some shunting while you walk around. To enable this in Android, go to **Settings**, select **Accessibility** on the **Systems** panel and turn **Magnification gestures** on. Note that when a tablet turns the screen off after inactivity, to save battery, the connection can be lost. It is worth turning this feature off if use is likely to be intermittent.

FIGURE 9

Right clicking on a route button allows it to be labelled and allocated to a pre-set route.

NETWORKING

TeamViewer requires the various control computers/tablets to be networked. Although it expects an internet-connected network, it also works happily with a closed local area network (LAN). This is easily provided by any old router/hub as provided by broadband suppliers. However, many exhibition environments have multiple Wi-Fi networks, and, in this case, we found that a strong signal was required from a router if a reliable Wi-Fi network is to be set up. To overcome this issue, a wired connection may be set up between PCs (normally laptops) and the router with ethernet cable and this is completely reliable, closed and not affected by other networks nearby. We have used both Wi-Fi and wired connections from our laptops to the router and a Wi-Fi connection to a tablet.

We successfully used *Big Bear* and *TeamViewer* running on an old host laptop with another client laptop and a client tablet both running *TeamViewer*, to provide us with multiple mimic panels for Barrowmore Model Railway Group's Mauch Chunk 'HO' scale American outline exhibition layout at Chatham in 2017 and Chiltern MRA in 2018. In the latter case, using the Lenz 23150 interface module, a Lenz DCC system, MERG boards with Tortoise motors in the scenic section and Peco motors in the storage yard, operation was flawless. Clicking a route with Peco point motors generates a satisfying sequence of clicks as the points change.
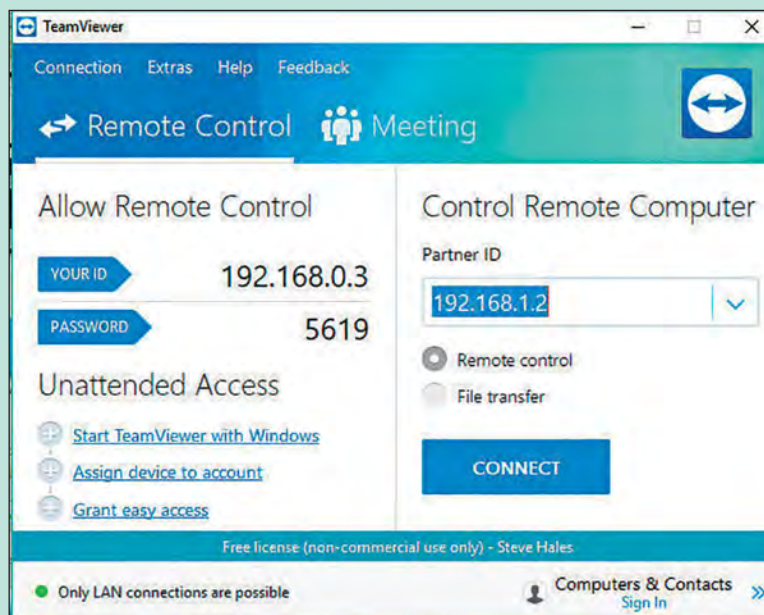
Footnote: Peter Thurston and Dominic Moore originally developed *Big Bear* for the Moore Street TMD. The layout for which this exhibition solution was developed is Mauch Chunk, an American prototype layout by the Barrowmore MRG. Peter helped us troubleshoot and enhanced the *Big Bear* software for us to make sure it worked smoothly with the Lenz system. **Hm**

■ **Mauch Chunk will be at Model Rail Scotland in Glasgow on February 22-24 2019 *(www.modelrail-scotland.co.uk)* and the Warley National Model Railway Exhibition on November 23-24 2019 *(www.thewarleyshow.co.uk)*.**
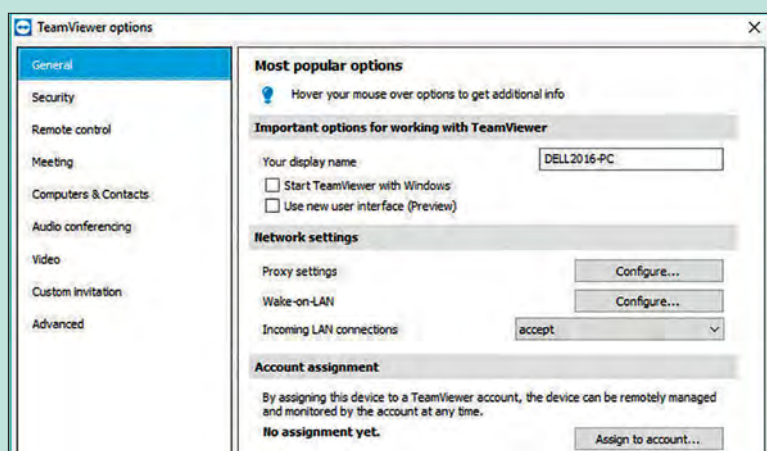
Big Bear layout control software was originally developed by Peter Thurston and Dominic Moore for Moore Street TMD – a British outline diesel depot scene.