THE NORTH STAR CHRONICLES – a newsletter primarily for the model railway fraternity

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Editorial

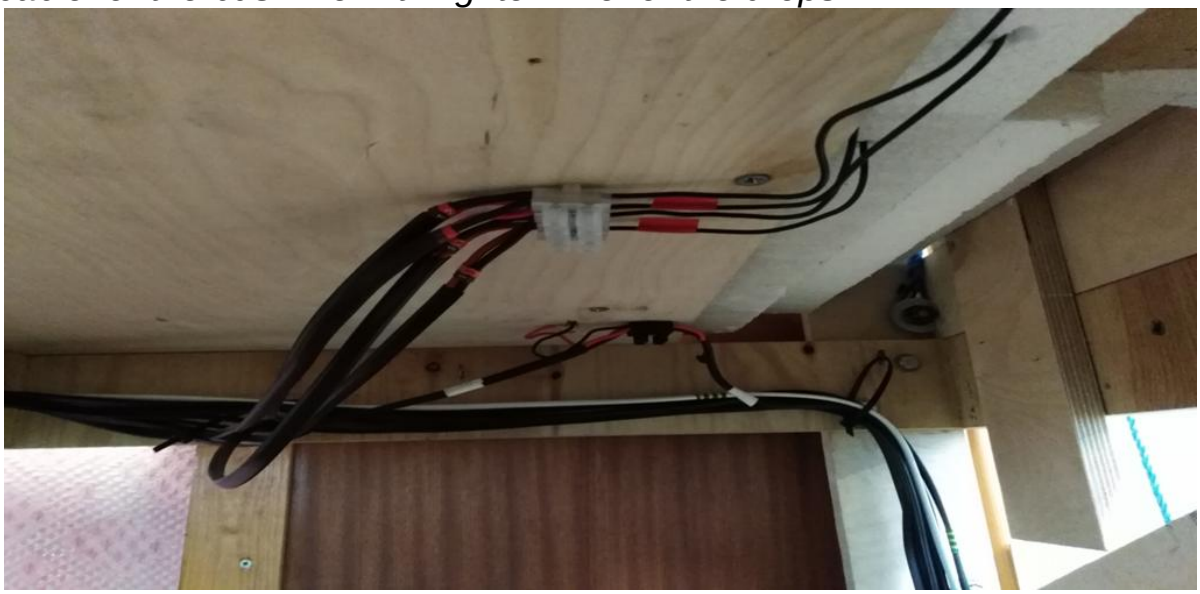
This month the feature article is part 2 of Cardigan Junction, Rob Shirley's Thirsk, UK HO North American themed layout. There is a wealth of practical information in the article so for anyone contemplating going the DCC route this should be of considerable assistance. Once again my thanks to Rob for writing the article.

Before moving on to the article, congratulations are due to Carel Janse van Rensburg for what has been achieved at the Centurion Society of Model Engineers. Carel conceived and largely built the Gauge 1/G gauge layout which had its highly successful commissioning over the weekend 21st and 22nd September. The layout will provide a semi-permanent (for security reasons while the structure is permanent the track is lifted after each operating session) to operate gauge 1 and G scale equipment. A 32mm track is to be added at a later stage. The Centurion event will be featured in the December NSC.

Cardigan Junction Part 2 DC to DCC by Rob Shirley

"I had set out to run the layout as a DC block section system similar to what we had in SA, so I laid the track for various sections with a separate bus feed wire for each section with all wires coming back to a central control panel. Each block section had suitably spaced drop wires from track to bus at every second rail joint, and this ensured no voltage

drop throughout the entire layout. I used 2 core automotive headlight cable for the bus wire with lighter wire for the drops.



View from below of the bus wire with droppers.

This worked very well to start off with, when all bus cables were connected together as one, several Trains could chase each other around to whole layout without any voltage drops or slowdowns. But what about a control panel for 16 different block sections????????????? As I had brought Megawatt Park and my original control panel with me from SA, I thought something similar could be made for the new layout. However as I had 16 block sections with 4 cabs available, the control panel soon became a major wiring nightmare with so many rotary switches and umpteen push button switches for the turnouts that my enthusiasm soon waned.

DCC came to the rescue!

Adrian, Richard and another friend Robin Coulthard, who had started helping me with scenery work, were already using DCC on their own layouts, and Robin and another pal of his Jim, called by one Tuesday morning session, and showed me what DCC could do.

I realised that this was the route I needed to take. They had chosen NCE as their system and this is what I subsequently chose. So in October 2014 the first step into the world of DCC was taken. This was to prove to be an interesting, challenging and somewhat expensive journey, but worthwhile in the end.

A model supply shop in Lincoln called Digitrains (www.digitrains.co.uk) was visited and my first purchase was a Power Cab and a SB5 smart booster. The smart booster was added to give extra power (5 amp) and to have provision for additional cabs and accessories. Also purchased were 4 Digitrax DH 126D Decoders. These decoders were fitted, by Adrian, to 2 Atlas GP 40's (RF&P) and 2 Atlas GP 38's (Conrail).

Atlas GP38 and Atlas GP40

The SB5 was connected to my Block section bus wiring, Power cab to the SB5 and we were up and running, no sound at this stage.

Shops area of Cardigan Junction

Those of you who are already using DCC, know about having a programming track, so I decided to incorporate one of the tracks in the Shops area of Cardigan Junction for this purpose.

In the above picture, the foreground RIP track has been doubled up as my programming track. The NCE Cab Bus Panel, which came with the Power Cab, has been modified with a Double Throw Double Pole Centre Off switch. With the switch down as in the picture, the RIP track is now a programming track. With the switch up, it's connected to the SB5 and is now part of the whole system.
This worked just fine while the rest of the scenery was completed, but when running sessions were contemplated it soon became apparent that there were not enough plug in points for 3 or more cabs. So 6 UTP panels were purchased along with various lengths of flat cable and I had a control panel bus loop running around the layout.

NCE UTP panel with two NCE Power Cabs

This arrangement served us well for the next six months, but things were about to change. It soon became apparent that sound was missing from my locos and it was at an exhibition, that I first became aware of TCS WOW Decoders. (www.tcsdcc.com). In the photo below, there are two different types of WOW decoders. The one on the left is a conversion kit (1774) which has a mother board, a chip and a speaker, and the one on the right is a hard wire chip and a KA3 keep alive (1533).
I've used the hard wire type on my old Atlas FP7's, and the conversion kit type on newer Atlas and Kato locos.

Two types of WOW decoders

In the above picture the two Kato locos Missabe and Wisconsin Central are fitted with conversion kits, the Conrail with hard wired, the U-boat has a Tsunami and the two heavily weathered FP7's are hard wired.

Operation and Button Mappings

In the TCS WOWSound decoders we have reinvented the way we think about model locomotive operation to reflect that of the prototype. Currently, most model trains operate without a brake seperate from the throttle speed. We call this kind of operation **"Traditional Mode"** because your locomotive will operate similarly to other decoders you may have. With our new default **"Prototype Mode"** operation users are expected to apply and release brakes seperately from adjusting the throttle just like the real thing, though the brakes will automatically release when the throttle is increased.

All of the sounds in this decoder can be remapped to any function except the toggle between light and sound mode and the Audio Assist™ mapping.

Function Button	Feature
1	Bell
2	Horn - Long Toot
3	Horn - Short Toot
4	Horn - Quill
5	Dynamic Brakes
6	Brake Release
7	Train Brake (20% Per Press)
8	1x Press: Mute/Unmute 2x Presses: Toggle between light and sound mode 4x Presses: Enter Audio Assist
9	Rotate Horn/Bell
10	Manual Notch Up
11	Manual Notch Down
12	Prime Mover On/Off
13	Coupling Sound
14	Uncoupling Sound
15	Mainline/Switching Momentum
16	Crew Alert On/Off
17	Windshield Wipers
18	Airspitter

NOTE: Functions 19-28 are supported but there are no features mapped to these functions by default.

Calibration Note: Please note that it is highly recommended to perform the motor calibration in Audio Assist™ prior to operating in Prototype mode.

Function buttons and their purpose

All TCS WOW decoders are supplied with sound and lighting buttons as per NMRA specifications as shown in the above photo, however F8 has 3 separate actions. Press once and it's mute, press twice in quick succession and it changes all functions from sound to lighting and vice-verse, press four times in quick succession and it goes into audio assist. Audio assist is an inbuilt female voice which gives instruction on changing the characteristics of the decoder from prime mover types, bells horns etc. changing momentum, button functions and much, much more.

I have re-assigned the sound function buttons on all my WOW decoders as follows.

F1. Bell	F8. Mute etc.
F2. Horn	F9. Exhaust Fan
F3. Spare	F10. Notch up
F4. Prime mover start/stop	F11. Notch down
F5. Coupling/uncoupling	F12. Windshield wipers
F6. Brake release	F13. Spare
F7. Train brake	F14 Spare

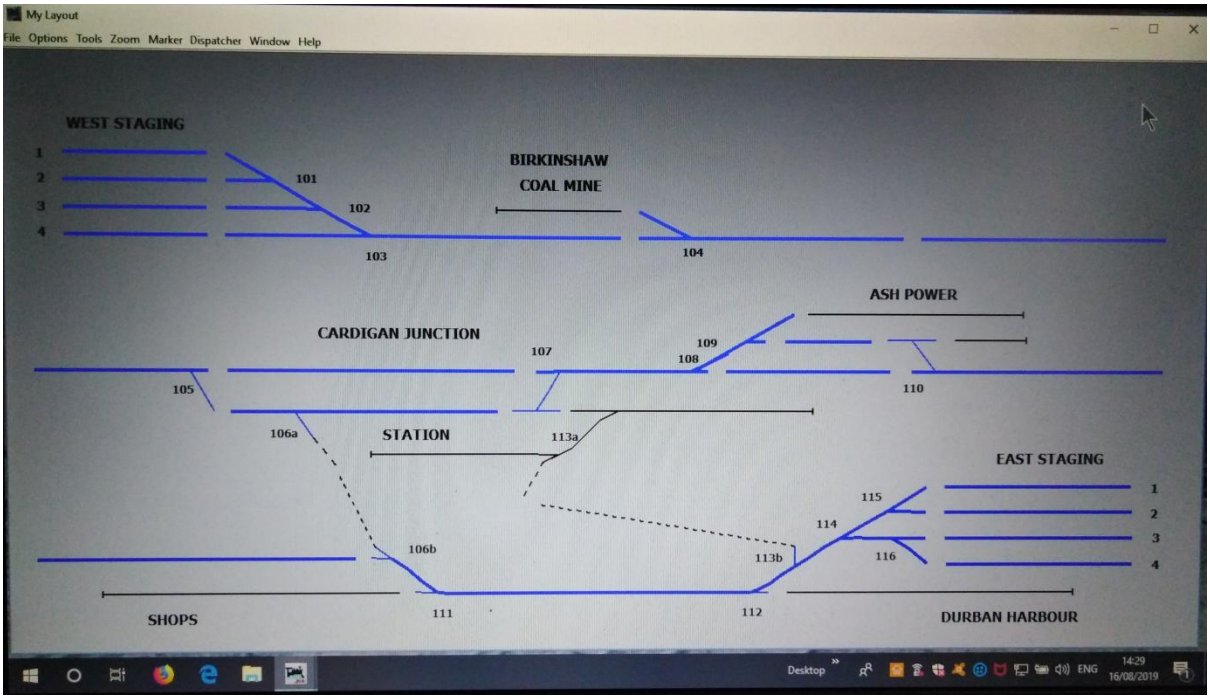
So the next step was DCC control of turnouts, and as I had a good supply of Peco point motors this was my first step. During track laying I had drilled a 13mm hole through the base board under each turnout. So I started to install these Peco point motors but they would require a suitable DCC discharge unit to operate them.

My first attempt was to use Train Tech (www.train-tech.com) DCC Quad Point Controllers, but this was not very successful and it was a right pain trying to get the Peco point motors lined up properly, and the capacitor discharge was not very strong. After fiddling around with this for several months and getting nowhere, my thoughts were turning towards a Tortoise slow motion turnout motor, but here in the UK they were quite expensive and not readily available. Adrian suggested using Cobalt Digital Point Motors made by DCC Concepts. (www.dccconcepts.com)

Cobalt iP point motor

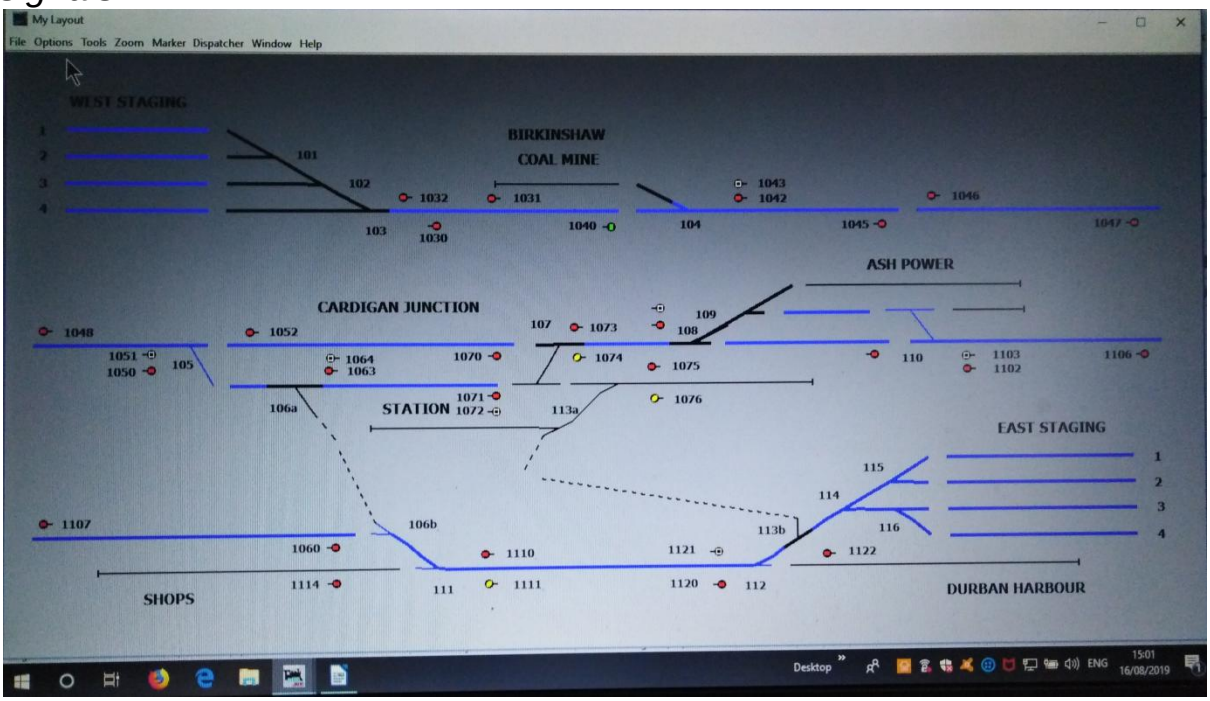
This Point motor is similar to the Tortoise but comes complete with built in Decoder and is very easy to install and program. I chose to use a 3 digit number for mainline turnouts, starting 101 through to 116.

DCC Concepts were originally located in Australia, but have now relocated to Settle in the UK. I bought 18, of these from Hattons on a very special deal, and have them on all my main line turnouts.
Once these were up and running, it was not long before signals were required. However this immediately presented me with a major decision, North American prototype signals, which are expensive and difficult to get in the UK, or British colour light signals which are easily available and reasonably priced.
BR won out, yes I know, I can hear the moans of the rivet counters from here. I have used 2, 3, and 4 aspect signals from Train-Tech. These signal have built in decoders which are very easy to program and easy to wire up. I decided to give them a 4 digit number, the first 3 numbers relate to the turnout near to their location, e.g. 1011, 1162 etc., odd numbers are eastbound, even numbers westbound.
Here in the UK we are very fortunate as there are model railway shows and exhibitions every weekend, sometimes two at the same time and in York which is only 22miles from Thirsk there is a four day show over the Easter weekend. Quite a few of these shows have North American layouts and at York I linked up with a group of North American modellers who have a bi monthly get together near Harrowgate which is about 30 miles from Thirsk.
It was here that I first became aware of JMRI, (Java Model Railroad Interface).(www.jmri.org)
For those who don't know JMRI, it's a computer software which allows communication between a computer and a model Railroad layout. I use both Panel Pro and Decoder Pro.
There are many YouTube videos on JMRI programming, so I won't go into detail here.
However NCE, my operating system, were included in the design of JMRI and so all the accessories required were readily available.
First a USB interface is required to connect computer to Railroad, and NCE have a suitable one and the software for it is a free download. With this all connected and working ok, it was time to start building a layout. profile with Panel Pro. I went onto YouTube for instructions and found a very good tutorial from a N. Cliffe. JMRI Signalling. He has 7 videos which go into great detail and very easy to follow. There is quite a bit of trial and error, but I soon got the hang of it.
Below is a copy of my first track plan as seen by the dispatcher on the laptop. At this point I have included the turnout numbers, staging track numbers and location names. In part 3 Operations, I'll explain the logic of my thinking in the plan as shown and the dotted lines.



Track plan no1

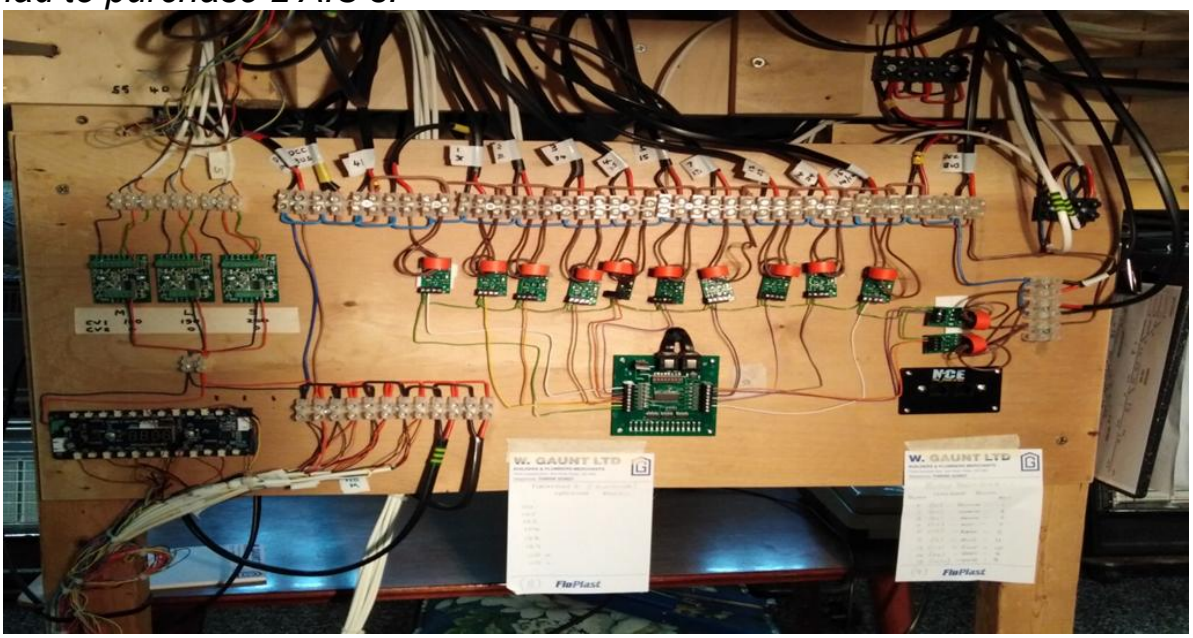
This first track plan took several weeks to prepare and tweak to get to the stage where the dispatcher (Adrian) could control the turnouts from his screen, and we ran with this for a few months, however as I already had signals on the layout it was time to put them on the dispatchers screen. Using N. Cliffe's tutorial I managed a slightly easier way to add signals.



Track plan no 2,

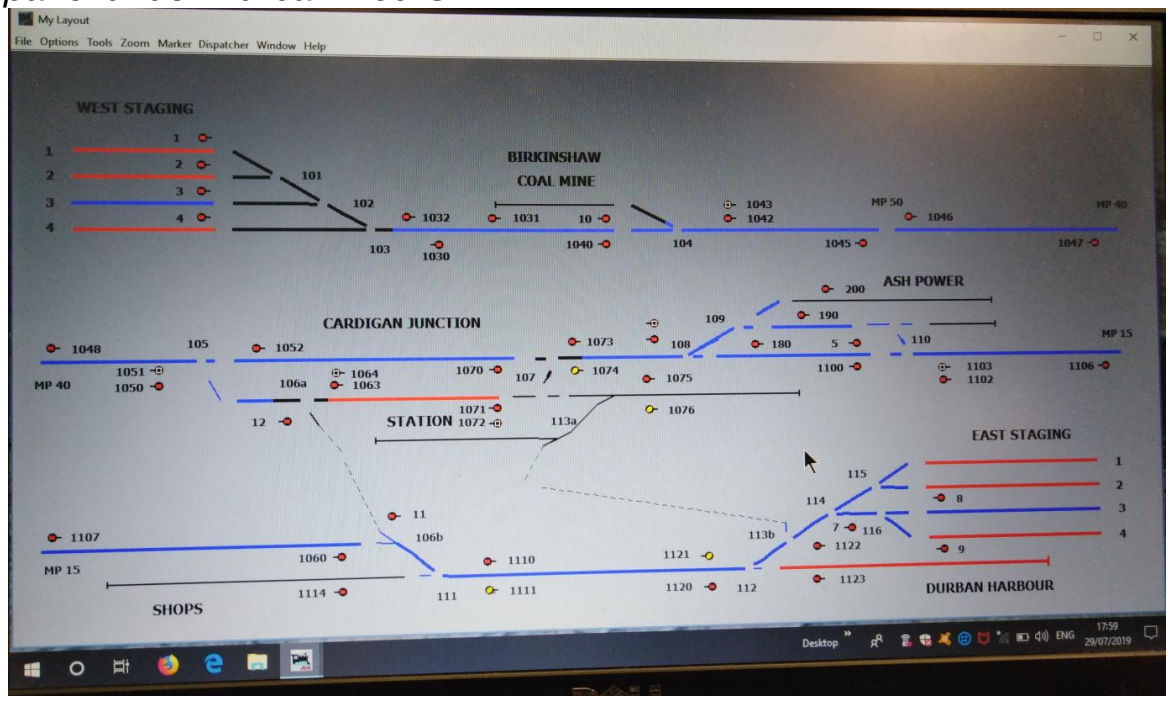
This now has some signals on it. You can now see how I have given the signals 4 digit numbers associated with the turnouts they are associated with.

This now gave the dispatcher (Adrian), more control as to where the trains should go and when they could proceed. At this point it was decided to locate the dispatchers office under the layout near the night storage heater. So now he had a comfortable place to hide and full control, (well almost full control). He could start a train off, but had no idea of exactly where it was on its journey and had to rely on the train engineers to advise him when passing signals etc, and with only two passing sidings on route this proved very exiting at times, cornfield meets a plenty.
What about block detection?
There should be a health (bank balance) warning when downloading JMRI!!!!!
As mentioned earlier NCE have all the items required, these are BD 20 block detectors and
AIU 01 Auxiliary Input Unit. As I initially had 16 block sections so 16 BD 20 detectors were purchased. As each AIU can handle only 14 BD 20's, I had to purchase 2 AIU's.



***New distribution board**.*
Up until now all 16 mainline block feeders came back to one large connector block, but with the introduction of the block detectors a new distribution board was required.
This picture shows one of two distribution panels which I made up to accommodate the block detectors, this one is under Durban Harbour, the other is under Cardigan Junction. The block detectors are the green and red units to the top and right of the panel with a single AHU under it.
Once this was all connected up and ready to go we hit the next major snag!!!, when the system was powered up all the blocks on the

dispatchers panel lit up showing them all as occupied, yet there were no loco's or rolling stock on the tracks.
Now what had gone wrong? After much thought and head scratching, Adrian and I finally worked out what was going on.
When we first put the Cobalt turnout motors and the Train-Teck signal in we took the power feed from the track adjacent to their position, this was ok then, but now they were consuming power and the BD 20 block detectors were sensing this. Time to think again, we decided that it would require a separate DCC bus cable around the whole layout to provide the required feed for the signals and turnouts. At the same time a separate 12v DC bus cable was also installed so that other accessories would have a power supply.
Once this was complete we were up and running with Adrian now having full information on the laptop display.
I have recently added some ground position signals on the approach to Westville staging as well as to East staging, these were a set of 12 from dcc concepts and the control unit for these can be seen on the left of the panel under Durban Docks.



Well what's next?
JMRI has a lot of other features including Logic and interlocking, but at this stage I'm not thinking of expanding in that direction.
However I have recently bought a small Mobius 4K camera which I have successfully made a cab view video which was passed on to David when he recently visited. This camera has been designed for Drone flying and I'm planning to get a compatible transmitter and receiver and having the train engineer drive using the picture from the camera."
The end