

Building a Modern Yard

Designed for Operations

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Some Words about My Layout

- N scale
- Very modern era
- Strong usage of Digitrax DCC and JMRI
- Kato track and turnouts for reliability

Key Features

- Optimized for modern operations
- Will use an off-line dispatcher, with radio connectivity.
- Will have a yardmaster and crew for switching at the main yard and at least one of the two industrial yards.
- It has a huge staging yard accessed by 6 layer helix operating at a 2% grade. Can hold 18 unit trains with bi-directional entry and exit.

My Critical Decision Points

- The Division, under the guidance of Pete Birdsong, sponsored a visit in February, 2012 to Bob Weinheimer's layout in West Virginia.
- I began the visit scared to death that I was going to screw something up but Bob encouraged me to try everything.
- I came home convinced that I had to build my layout with operations as a goal.

Major Decisions

- Dedicated a significant amount of real estate on my layout to yards.
- Electrical operation of all turnouts.
- One big yard and several smaller sub yards
- Two industrial yards
- Huge staging yard

Research

- Huge amount of information on Internet
- Several good books, but very little on modern operations
- Spent several weeks in Wyoming and Montana with the big Class 1s
- Invested in a good 2D CAD program - McDraft - and a very good Rail Modeller design program. Learned how to be very good in using them.
- Thought about it a LOT

Rules of good yard design

- “The Ten Commandments of Model Railroad Yard Design”, Craig Bisgeir ---The classic”
- “The Model Railroader’s Guide to Freight Yards”, Andy Sperandeo
- “Realistic Model Railroad Operation”, Tony Koester
- Get off your ass and go see how the big yards operate. It’s called rail fanning.

Important Elements

- Modern yards have evolved from the older yards
- The only really new yards are the huge intermodals that just need a lot of new real estate.
- My observations were focused on how the big western Class 1s had evolved their yards.
- Then I began the design.

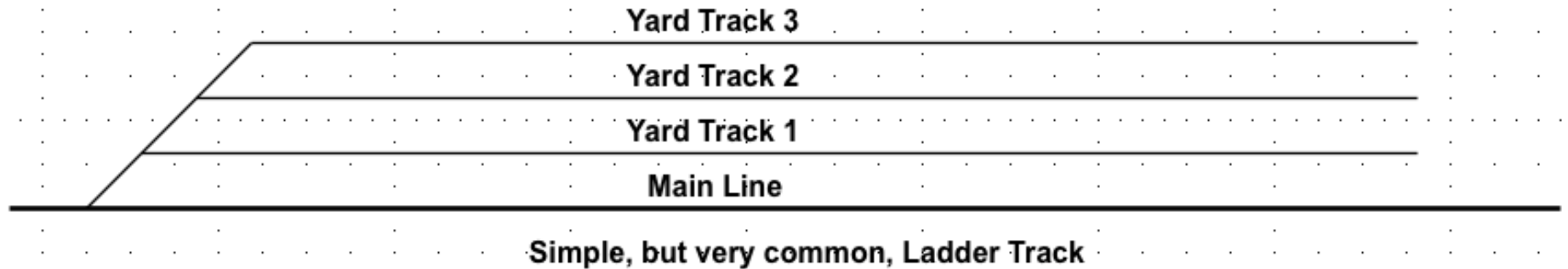
What do you find in every yard?

- The stuff that makes all of our yards the same
- Doesn't matter what era is being modeled.
- Good yard design lasts forever.
- Some yards operate well and some don't.
- You gotta decide what YOU want.

Fiddle Yard

- Most model yards all begin with the fiddle yard
- Small Yard, (rarely equipped with scenery)
- Often used for industrial sites
- Usually uses some form of a compound ladder of turnouts

Simple Ladder Yard



- **EVERYTHING** in good yard design builds from this concept.

My Yard Rules

- Dedicated lead tracks
- Don't foul the main
- Carefully define your yard limits and don't allow the operators to violate them
- Establish how you use your yard geometry
- More to follow as I begin operations

Dedicated Lead Track(s)

- The most important track in the yard is the lead.
- The yard switcher should always be able to get to any yard track in one forward move and to be able to escape one one move.
- The turnouts off of the lead should be facing-point turnouts.



Don't Foul the Main

- Every effort should be made to not allow the yard usage to block the main and if required the blockage should be very short lived.
- There should only be two turnouts leading into the yard from the main line.
- They should **ONLY** be used when trains are entering or departing the yard.
- Does not apply for small stub ended terminal yards.

Yard Limits

- Your yard should have definitions on where the yard begins and ends. Use a sign to aid the operating crew.
- Yard limits signs are a way of warning inbound crews that they are about to go from the jurisdiction of a dispatcher to the the control of a yardmaster.
- If the main line is contained within the “yard limits” passage on the mail line should be at “restricted speed”
- The dispatcher must authorize all movements on the main track.
- On my layout, the Kuhn yard “limits” do not incorporate the main line and there is very clear control between the dispatcher and the yardmaster. The dispatcher will have the only control of the turnouts into and out of the Kuhn yard.

Yard Geometry

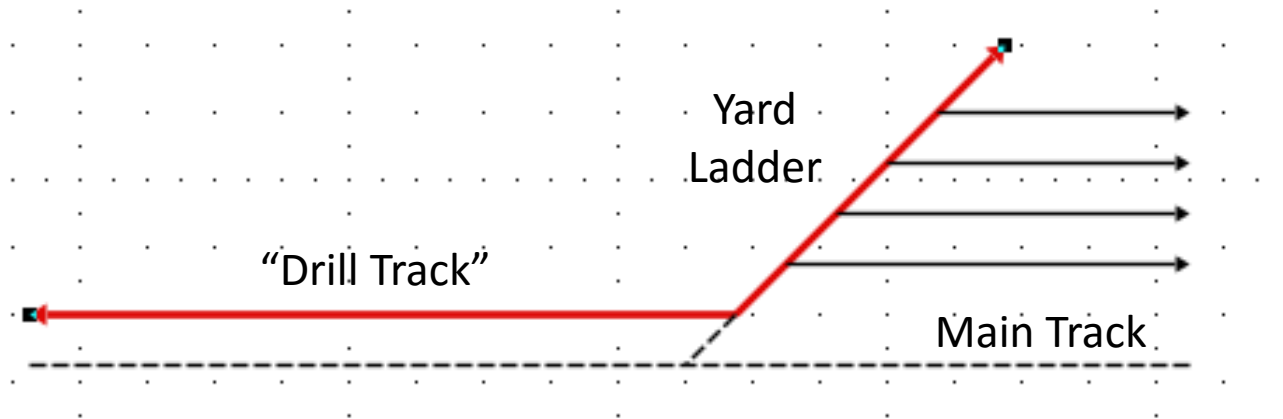
- Yard design involves turnout angles, track spacing, car and train lengths, and the length of the lead and ladder track.
- My sharpest turnout is a #4 turnout but it must be perfectly tuned.
- #6 turnouts work better but require the sacrifice of yard capacity.
- Reading car reporting marks becomes a limiting factor.
- No one can give design rules to the modeler, as the yard has to fit into the modeler's space.

Classification Yard

- Where cars are sorted into groups that are bound for the same destinations.
- Most common yard found on model railroads.
- Very hard to make like the prototype because of space constraints on most layouts.
- Has to deal with arrival and departure.
- This is the yard with the most operating pressure.

The Lead Track

The most important track



The switcher now has a track of his own

Because the switcher will use the lead to “drill”, or move railcars in and out of the body tracks, the lead should be longer than the longest yard track. Not always possible, but try to make it as long as space allows.

Arrival/Departure Tracks

- Next most important tracks.
- A/D tracks are “sidings” off of the yard lead for temporary storage while they are broken down or built up.
- A/D tracks should be located close to the main track and should not be used as an extra classification track.

Classification Tracks

These are the working tracks

- Sidings off of the lead track.
- Tracks used to sort cars for future departure.
- Yards require several CTs, four at a minimum.
- Should be double ended tracks as well as spur tracks.
- Should be located further away from the main track.

Uncoupling

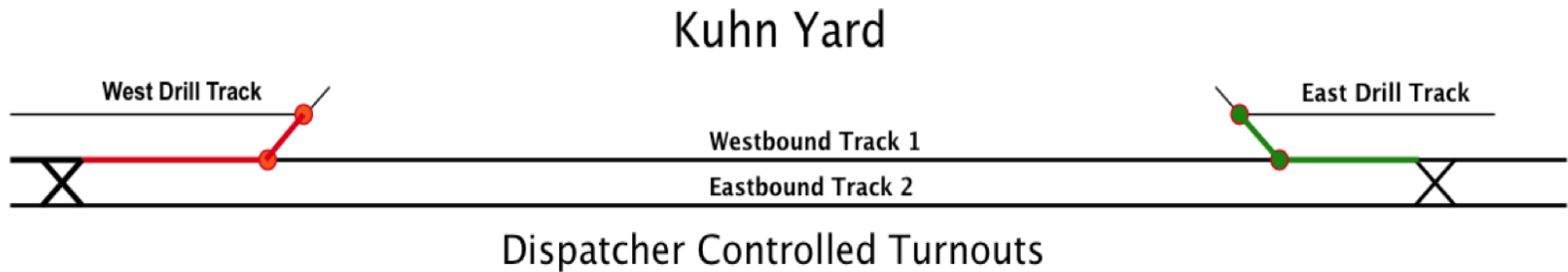
- Picks or sticks are the least costly, but in my opinion, the most damaging form of uncoupling.
- Electromagnetic uncouplers are the best for a double ended yard track and permanent magnets (cheaper) can be used for stub yard tracks.
- So far this has been my biggest worry as I build my yard. How will all this work when I begin operations?

Elements of the Modern Yard

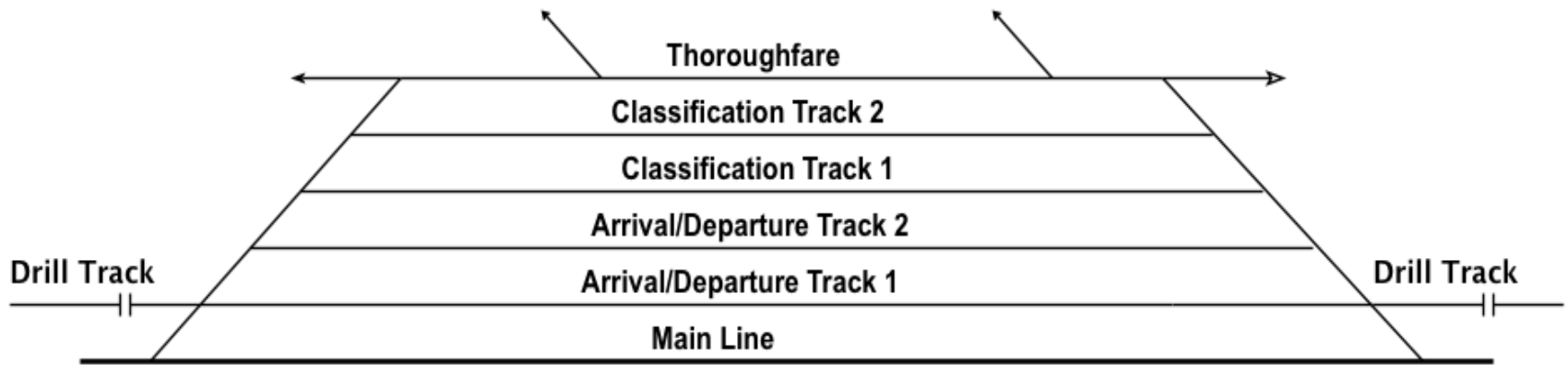
- Classification Yard
- Fueling Facility
- Engine Maintenance
- Railcar Maintenance
- Intermodal

Lets go though my yard evolution

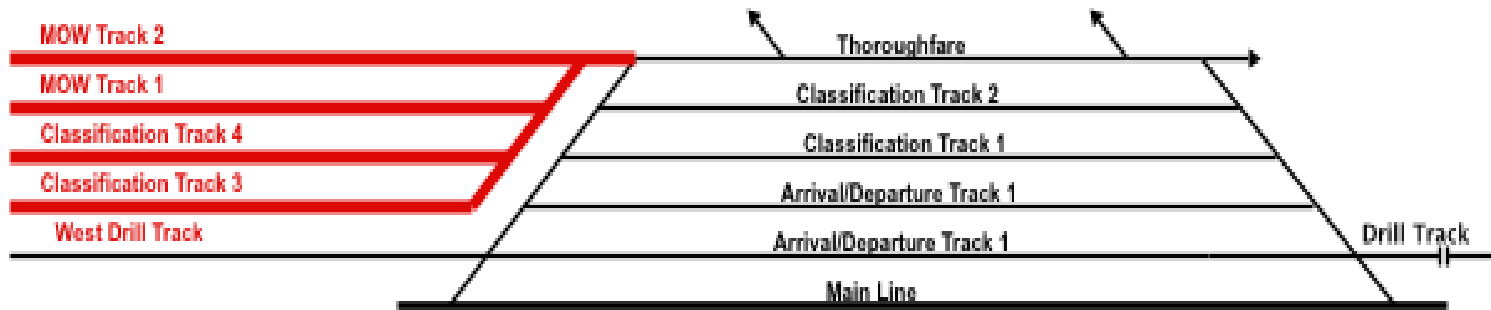
- In the following series of charts I will take you through the development of my main yard, the Kuhn Yard
- The Kuhn yard is really a composition of five separate yards, each with its own set of needs
- Following are a sequence of slides showing how I used my real estate to build the Kuhn Yard.
- Stop me to ask questions as we go along.



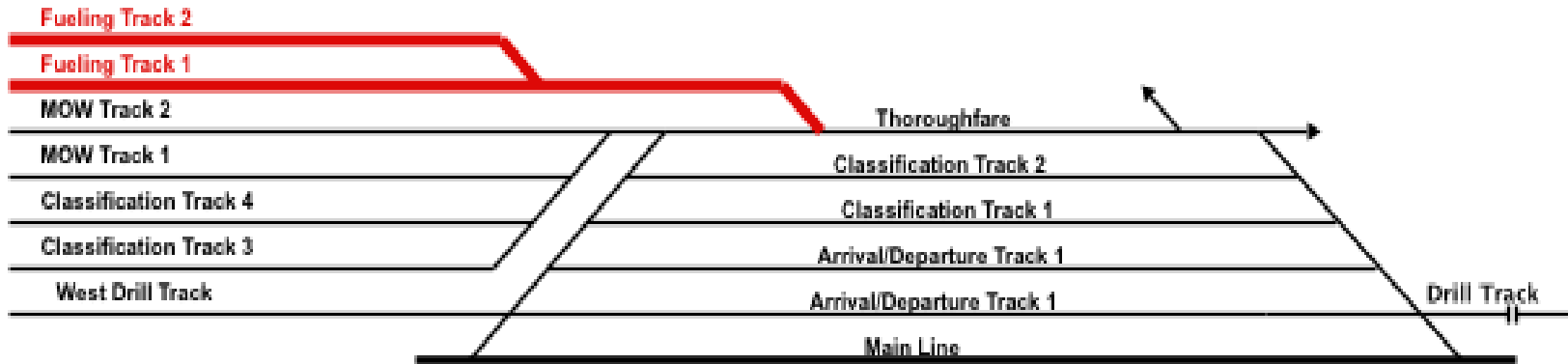
- Double Crossovers on the double main are at both ends of the yard.
- Provides full flexibility for both mains.
- Dispatcher controlled turnouts on the main
- No unauthorized fouling of the main.



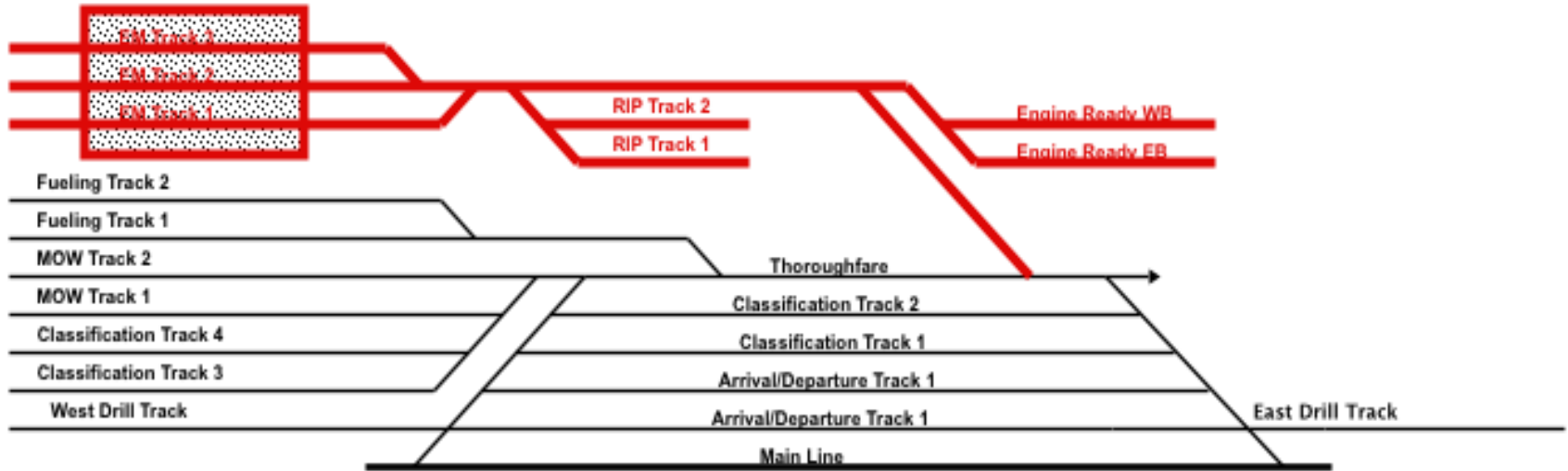
- My primary yard design incorporates:
 - the A/D tracks
 - as many classification tracks as space allows
 - drill tracks on either side
 - A cross yard thoroughfare track for access across the entire Kuhn yard off-main



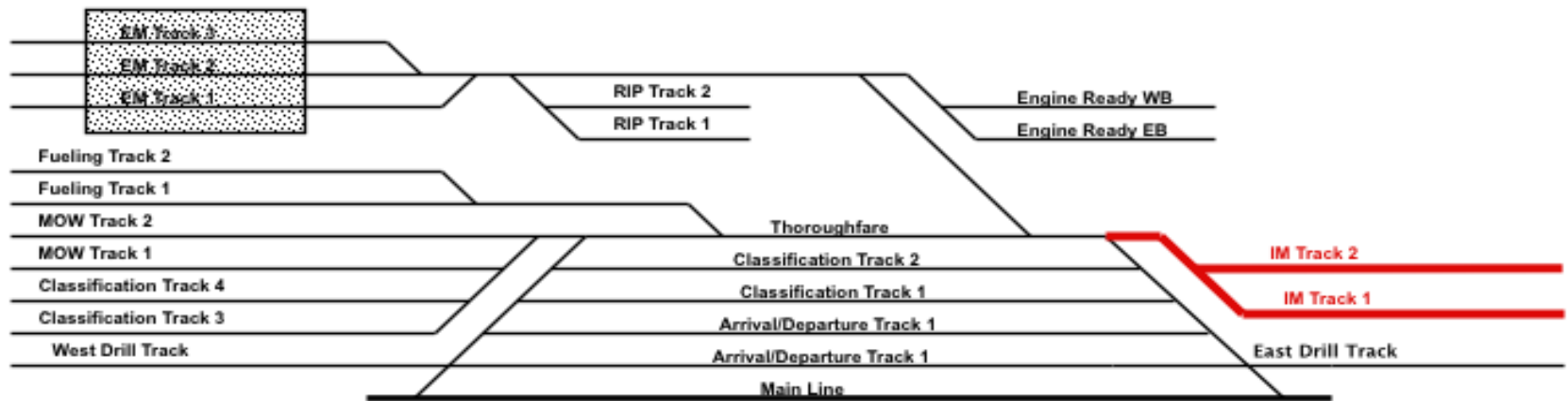
- A simple ladder yard provides:
 - Additional classification tracks
 - MOW train cars and equipment storage



- Another simple ladder yard provides:
 - two fueling tracks
 - sand tower
 - underground fuel storage



- A more complex yard provides for:
 - Access to EM building
 - Eastbound and westbound:
 - Engine RIP tracks
 - Engine ready tracks



- A small ladder yard provides for:
 - A small regional intermodal yard

Yard Design Issues

- Still concerned about finding a good, reliable EM un-coupler for n-scale and whether I will have enough geography beneath my layout to facilitate it.
- Had to use Kato #4 turnouts. Hope I can keep them well tuned.
- Spent many hours on the design and a couple hundred hours on the wiring.

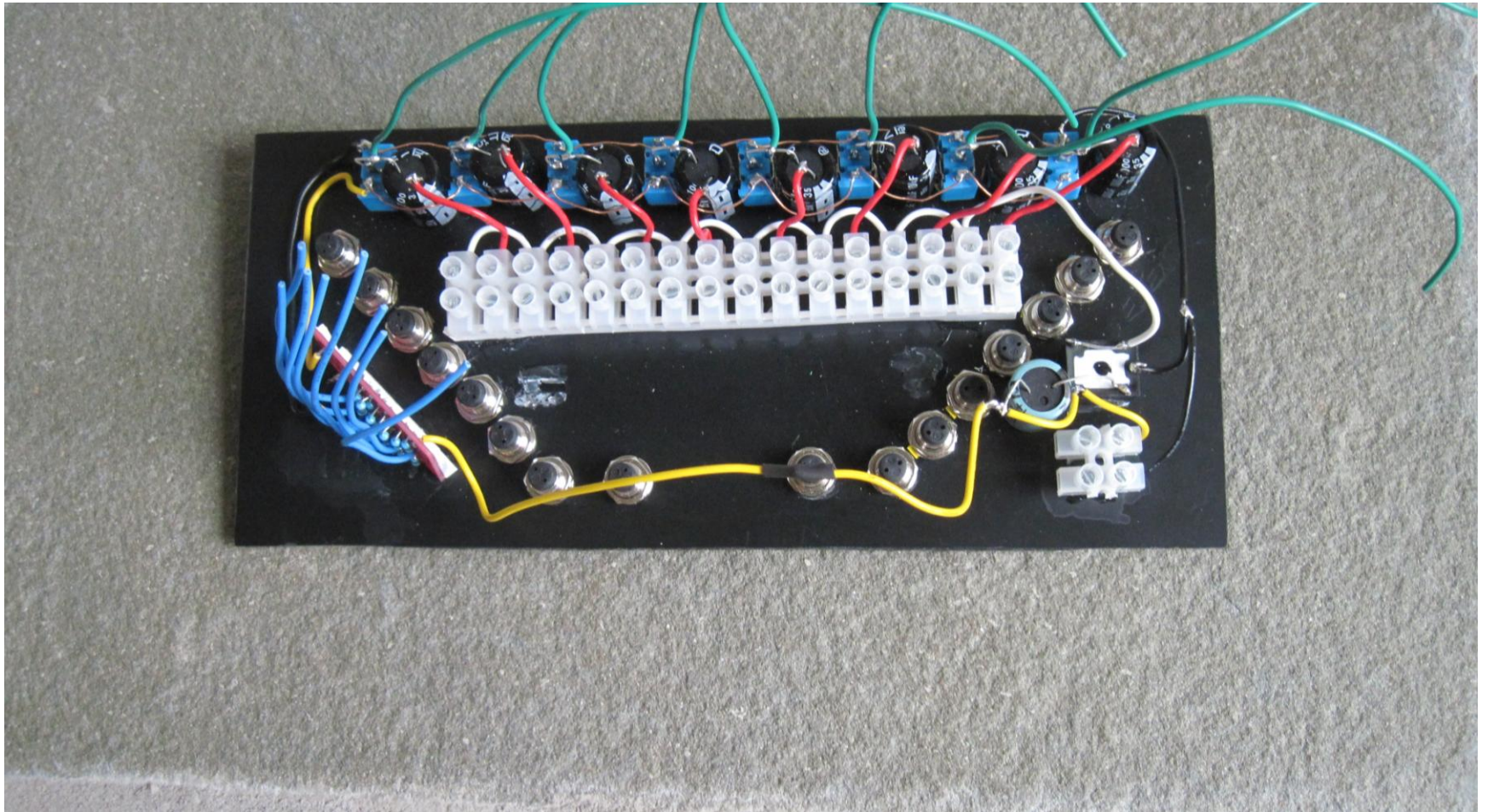
Electrical Operation of the Turnouts

- The double main line Kato turnouts (11) and the staging yard (18) will be controlled by Digitrax DS64s and some self-designed electronics.
- The status of the double main turnouts will be shown on lit signal heads and the staging yard will show its status on a control panel.
- The 38 yard turnouts use a bi-polar, capacitive discharge circuit designed to properly pulse the Kato turnouts to thrown and closed states and provides a bi-color LED indicating each turnout status
- Each of the six yards on the layout has its own switch panel.

Front Switch Panel Drilling, Taping, Toggle and LED Holders



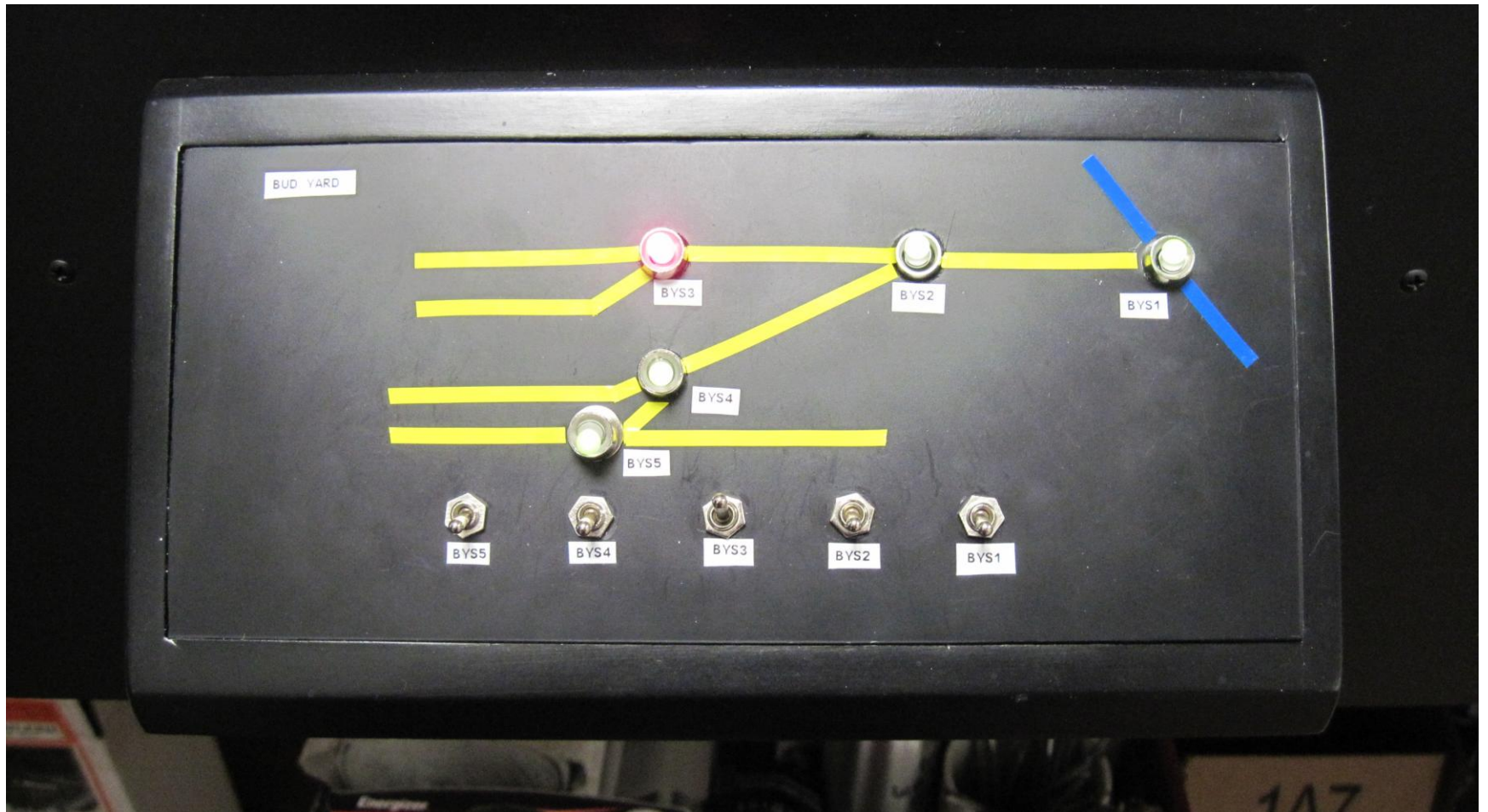
Rear Wiring of Switch Panel



Finished Wiring and Panel Housing



Finished Switch Panel



Summary

- I've shared with you the thoughts and plans of the yards on my new layout.
- I'll share the staging yard plans at another clinic on the staging yard very soon.
- Thanks for listening