märklin DIGITAL CLUB

NEWSLETTER

Vol. 30 – No. 3
May – June 2018

Digital Consultants
Rick Sinclair
Curtis Jeung

Current Central Station 3 Version – 1.3.2 (1)
Current Central Station 2 Version – 4.2.1 (0)
Current Mobile Station 2 Version – 2.7

Earlier this month, we met a lot of great enthusiasts at the MEA Meet in Scranton, Pennsylvania. The summer ahead is full of events, so take a look at our upcoming appearances listed at the end of the newsletter to see if we will be in your area.

We mentioned in the last newsletter there was a rumor from the factory about a CS3 update. We assume it has been held up in beta testing, because we have not seen it yet. So like you, we patiently wait.

In our first article, we look into which “High Efficiency Motor Upgrade” set works for what analog motor. Our second article covers event setups for staging yards.

An Overview of Märklin H0 Motors

Motor Upgrade Questions

I wanted to write this article because we often get contacted by members of the Insider and Digital Clubs asking questions like, “What motor kit goes in my 3003 locomotive?” or “What is a LFCM and SFCM or DCM motor and which one do I need?” The answer is simple, “I don’t know.” There are too many locomotives for me to memorize which motor is in a particular locomotive or what motor upgrade fits.

These questions touch off a search for which analog motor is in the member’s locomotive. Since there is no master list of motor types for each locomotive, (as far as I know), I usually have to search out the answer. So instead of spending my time researching each locomotive, I decided to look at the problem from a different angle and look at the analog motor itself instead of researching each locomotive. I know there are three common motor types that have a corresponding upgrade kit. There’s also an “uncommon” motor that most people don’t know about, and there is a motor kit for it also.

An In-depth Look at Motors and Upgrade Kits

Märklin analog locomotives (with the exception of the 35xx series and “Can” motors) have a 3-pole motor. All Delta locomotives in the 34xx or 34xxx series have a 3-pole motor, with the same exception of “Can” motors. This means that the armature has 3 poles or “arms.”

Fig. 1 - 5 pole DCM armature

All Märklin motor conversion kits change the motor to a “Permanent Magnet” or “DC” motor with a 5-pole armature. These motors are considered “High Efficiency” because the armature has a small drum commutator near the axis of the armature. This gives the brushes a smaller contact area on the commutator for less friction, also the brushes are positioned close to the axis so it takes less force to turn the armature. This, combined with a 5-pole armature, gives the motor its smooth operation at slow speed (Fig. 1).

The “Drum Commutator Motor” (DCM)

The most common analog motor is the “Drum Commutator Motor” (DCM). It has the small drum commutator as in the high efficiency motor, but with a 3-pole armature (Fig. 2). This is easily identified because the motor brushes are the modern rectangle style and they insert facing the armature axle. It has a square brush-plate that is usually dark grey or black, but there are a few that are a whitish/clear color. This motor design started service in the late 70s (Fig. 3).

Fig. 2 – 3 pole DCM armature

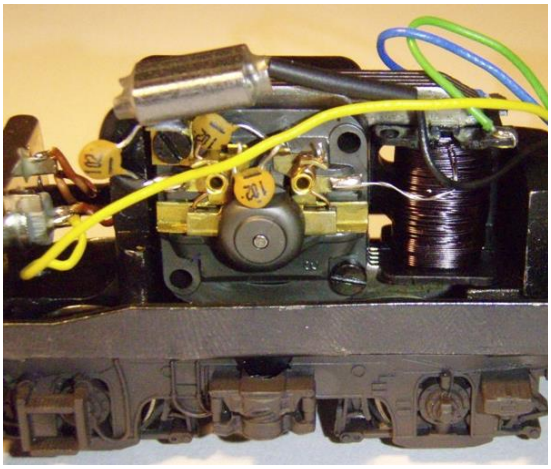

Fig. 3 - DCM analog motor

Fig. 4 - 60941 motor upgrade

The correct motor upgrade for this type of motor is the 60941 (Fig.4).

The “Small Flat Commutator Motor” (SFCM)

This motor has a small flat disc of copper (commutator) that the motor brushes contact (Fig. 5). This is recognizable by the round motor brushes. One brush is carbon and the other is a copper mesh coiled up.

These brushes insert from the side of the motor (Fig. 6) into a (usually) black or dark grey brush-plate.
This motor design started service in the 60s.

Fig. 5 - SFCM armature

Fig. 6 – SFCM analog motor

Fig. 7 - 60943 motor upgrade

The correct motor upgrade for this type of motor is the 60943 (Fig. 7).

The “Large Flat Commutator Motor” (LFCM)

Figure 8 shows the armature for a “Large Flat Commutator Motor” (LFCM). This motor type is easily recognized by the size of the motor. It‘s larger than the other two mentioned above. The motor brushes insert from the side into a black brush-plate that has a couple of different shapes (Fig. 9 and 10). This motor goes back to the 50s.

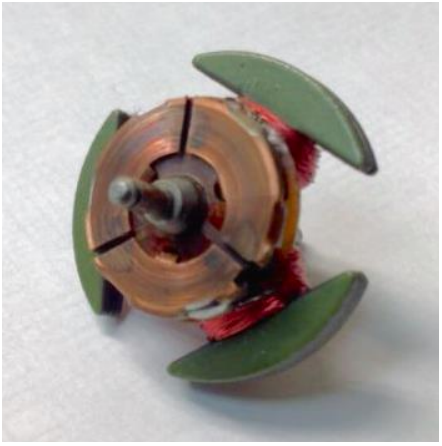

Fig. 8 – LFCM armature

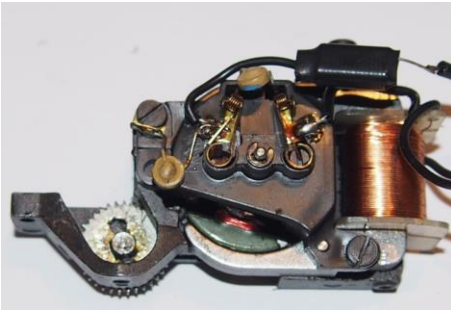

Fig. 9 – LFCM analog motor

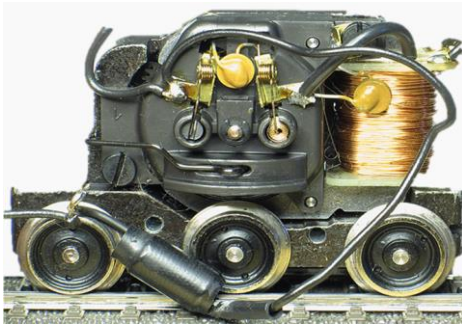

Fig. 10 LFCM analog motor

The correct motor upgrade for this type of motor is the 60944 (Fig. 11).

This motor kit has two different armatures. The difference in the two is one has 7 teeth on the gear and the other has 8 teeth. Just count the teeth on the armature that you remove and select the correct replacement.

Fig. 11 – 60944 motor upgrade

The motor kit comes with a massive field magnet and two styles of brush-plates. Again, choose the brush-plate that fits correctly.

Uncommon “Large Flat Commutator Motor” (LFCM)

The next Large Flat Commutator Motor (Fig. 12), is very uncommon but it is still out there, so I commend Märklin for making such a kit. It shows their commitment to backwards compatibility and detail.

This kit shares the field magnet and the 7-tooth armature of the 60944 kit, but this kit has a different brush-plate.

Fig. 12 – LFCM uncommon style

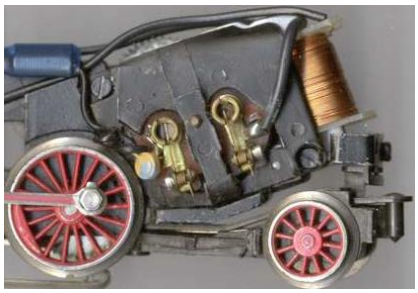

Fig. 13 - Zinc brush-plate

This analog motor has a couple of different looks in its original form, but both use the round brushes, where one is carbon and the other is a copper coil mesh. Since it is designed for older locos, the brush-plate could be black plastic or cast zinc like the frame of the locomotive (Fig. 13).

The correct upgrade kit is part #E188838 (Fig. 14). This will need to be ordered unless your dealer has it in stock, but it's so uncommon that it's usually has to be special ordered.

In addition to a field magnet, armature and brush-plate, all motor kits come with motor chokes and a set of brushes as well as a set of appropriate screws and one or two ground wire tabs depending on the motor kit (Fig. 15).

Fig. 14 – Part #E188838 motor upgrade kit

Fig. 15 – Motor kit hardware

Super "Large Flat Commutator Motor"

I do not know if "Super Large Flat Commutator Motor" is the official name of this, but it does describe it well. This motor is huge compared to the other ones. This motor type is not supported in an upgrade kit. These motors can be found in some of the models of the 50s like the 3015 Crocodile. There is no field magnet or brush-plate offered by Märklin to upgrade these motors (Fig. 16).

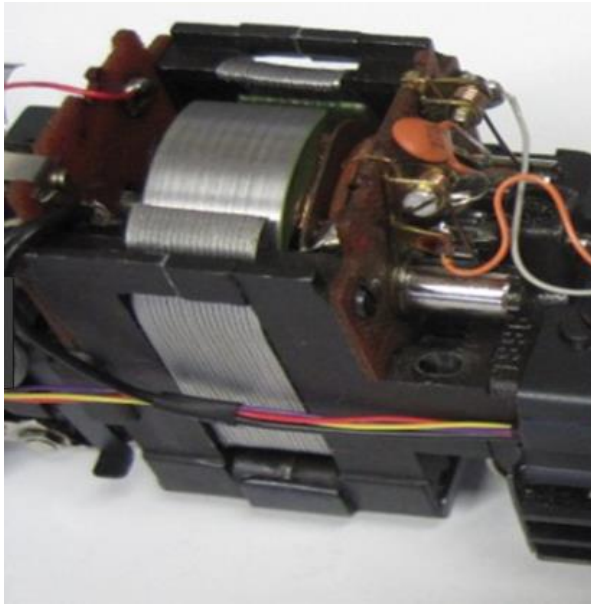

Fig. 16. - Super large flat commutator motor

While there are other motor designs from models in the 50s, only a few of them are supported with an upgrade kit. The others draw so much current, a special decoder is made to handle it when Märklin re-issues a digital version.

I hope this helps clear up some of the motor upgrade questions, but if it doesn't, you can still ask us, and we will get you an answer after we look into it.

Enjoy your hobbies!

Rick Sinclair

Factory Announcements – May 2018

The factory recently sent dealers these technical announcements and we want to share them with you.

NOTES ON THE NEW TELEX COUPLERS

A new generation of a TELEX coupling has been developed exclusively for the two Insider models 39567 / T22967. To operate this new TELEX coupling, it was also necessary to design a new generation decoder. Please note the following two points:

1. Operation of this coupler is specifically designed for use with this generation decoder. This means that no other decoder may be used with this model coupler. Attention: Use of other decoders with this coupling may result in damage to your decoder. THEREFORE, do not attempt any alterations with alternative product.

2. The new Telex coupling will not be offered as a spare part, because of the reason in #1. Should there be any damage to this model of Telex coupling, the customer, or their dealer, are welcome to contact our repair service. They will then, repair it for you.

COMBINATION OF TWO OR MORE OF THE CURRENT MODEL CENTRAL STATIONS

One of the special features of the current Central Station generation is the possibility of using one of the CS's as a main control panel. Using a CS3 (Item no. 60226), you can only use one of this model in a CS connected network (it would be the Master Controller). Using the CS3+ (Item no. 60216), multiple units of these can be used in a network. The current generation of CS units utilizes an extensive data exchange in this mode of operation. Therefore, a networked connection of a CS3 with a CS3+ (or a connection of two CS3+'s) cannot be done with only a 60123 connection cable. Data exchange between these two devices must be additionally enabled via a network connection.

For this purpose, a router is used with corresponding LAN ports. This router does not need to be connected to the Internet. The purpose of the router is to organize the communication network for the model railroad control. All CS3 or CS 3+'s integrated in this model railroad operating system has to be connected to the router via LAN cables (not USB!).

When the system will be started, please follow the following order:

1. Switch on the router
2. Switch on master (CS 3 or CS 3+)
3. Switch on the second device CS 3+

When the respective Central Station is switched on, the required network address is assigned by the router. Please do not intervene manually. If a CS 2 is used as a second device, the connection via the cable 60123 alone is sufficient for this connection.

Tip: Of course, this router is also very well suited to integrate devices such as a smartphone, a tablet, PC or a laptop in this network. If these devices are made for it, this connection can also be made via WLAN.

Staging Yards, a Revised Edition

It's easy to get locked into a specific way of thinking when you've grown accustomed to developing an event sequence using familiar procedures. 'Event Sequence' is the term used for Central Station 3 users, For CS2 users, they are called 'Memory Routes.' Recently, a friend of mine was requesting some assistance with a hidden staging yard, or as he puts it, "Schattenbahnhof." My typical staging yard is programmed with constant rotation of incoming and outgoing trains, but my friend wanted his to be less structured. He wanted the ability to release trains in an unordered manner, without the possibility of interrupting the operational cycle of the yard. In this article, I'll show you the original event and contact setup. Then, I'll show you how we adapted what I (or we) changed as an alternative event setup for a hidden staging yard.

In Fig. 1, I display the complete setup of Track Lines, Contact Tracks and Stop Sections (K84 outputs in a hidden yard). Each of the contact tracks utilize Arrival and Departure trigger events. If you are unfamiliar with what these are, then I suggest you refer to Digital Newsletter Vol. 28 Number 2. Please note Arrival and Departure Triggers were previously

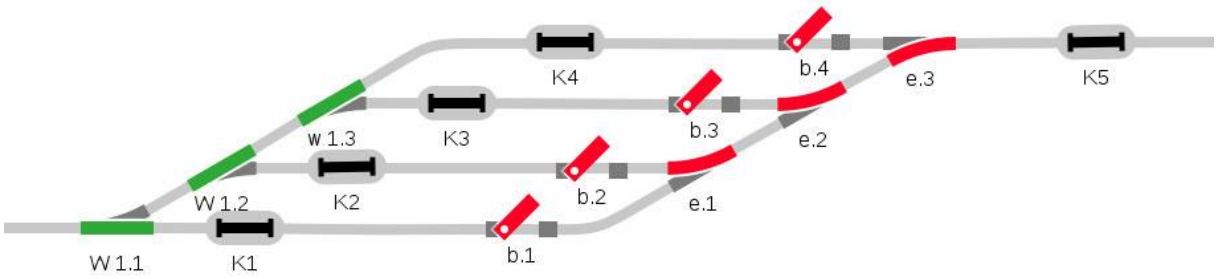

Fig. 1 - Default contact track locations and Staging yard

called Entry and Exit triggers (used in the prior article). The names have changed due to Central Station software updates, as well as the change from CS2 to CS3.

To summarize, when an incoming train makes contact with 'K1' it releases the train waiting in front of 'b.2'. 'K1' contact changes from gray to yellow. Note how 'b.2' now shows green (Fig. 2). Bear in mind, this script is to clear the track and train controlled by b.2.

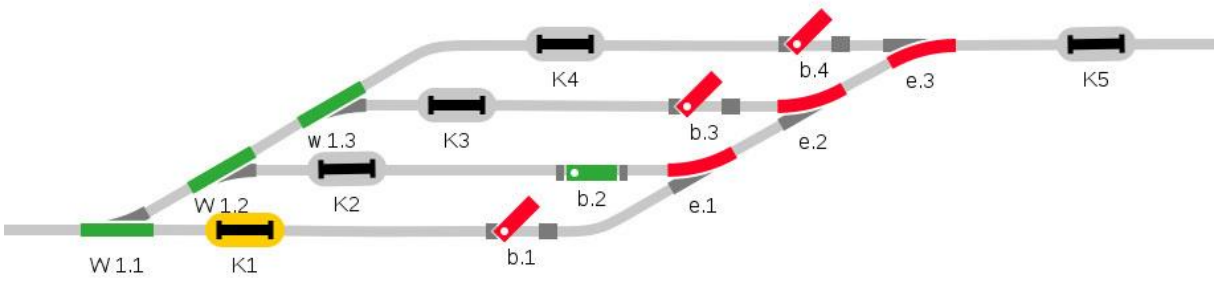

Fig. 2 - Incoming train trigger 'K1' releases train on 'K2' line

At this point, two additional events will occur. The first one to trigger will depend on a train's speed and length. The trigger sequence of which event occurs first will not matter, because they have independent functions apart from each other. In this example, events at either 'K1' or 'K5' will occur next.

Let's first look at contact 'K5'. Contact 'K1' released the train at 'b.2', which means that 'K2' should soon become unoccupied. As the train leaving this line will be reaching 'K5',

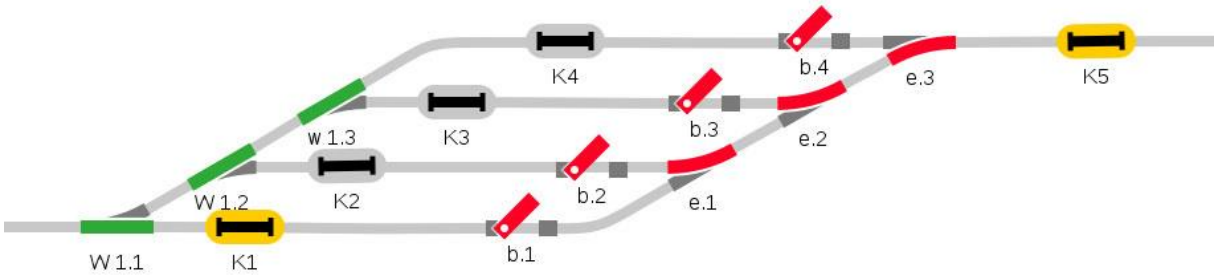

Fig. 3 - Departing train from line 'K2', activates 'K5' resetting all tracks to 'stop'

it will be re-setting all stop blocks back to 'stop' or red (compare Fig. 2 to Fig. 3). In Fig. 3 and Fig. 4, they show the layout screen and the Event script for 'K5'. This insures that all trains coming into the staging yard will not overrun the yard.

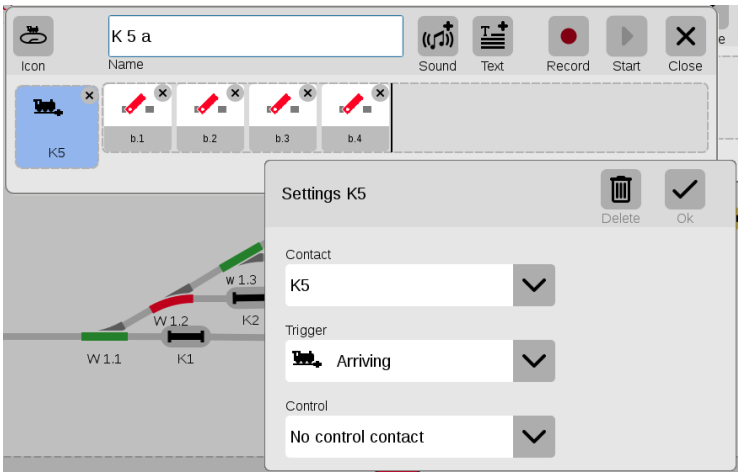

Fig. 4 - 'K5' Settings, arrival trigger

As you recall, there was an arriving train (in Fig. 1) to trigger the Arrival Script for 'K1'. By looking at Fig. 3, you can see that the yard is still set to route the next incoming train into 'K1' (Switch 'W1.1'). 'K1' is also showing track occupation, this may indicate that the train on 'K1' has not yet cleared the turnout 'W1.1.' When the train clears this contact track ('K1'), I initiate a 'Departure' Script that sets the turnouts (W.1.1 and W1.2) to route the next incoming train back into the line controlled by 'b.2'. You can see in Fig. 5, contact 'K1' indicates no train occupation, which also means the incoming train has

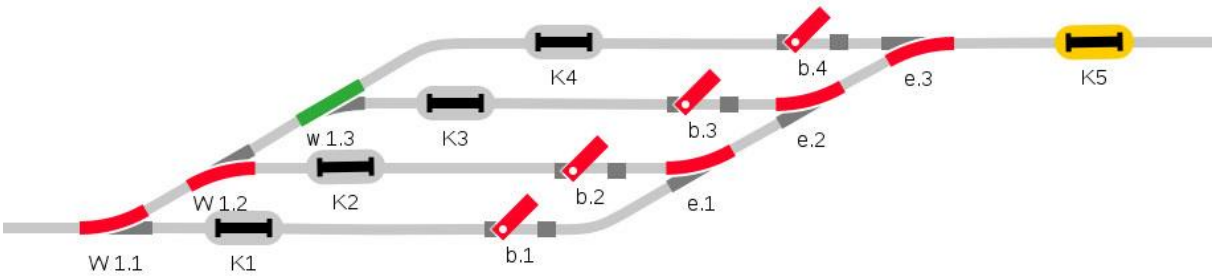

Fig. 5 - 'K1' departing script, when incoming train on 'K1' clears contact track.

cleared the turnout ‘W1.1’. The departure script has now re-routed the next incoming train to go to the second line (‘W1.1’ and ‘W1.2’).

By thinking it through, you should be able to see that each train entry releases the next train to depart the staging yard. On the last line of the yard, the entering train is set to release the train on the first line. Then the entire routing cycle starts all over again.

A New Staging Method

As I mentioned before, my friend had asked for a way to select which train may depart his hidden yard, while not conflicting with the set rotation established in our initial staging yard. In order to release a train ‘out of cycle,’ one just needs to release any of the line stops (b.1, b.2, etc.).

A potential cycle conflict is caused by a couple of factors: One, the contact sensors at the entry point of each staging line are short. This is because it needs to use Departure triggers to safely re-route trains. Two, there are no occupational sensors by each of the stop blocks. When a train leaves a stage line, it doesn’t enable re-routing to allow a train to take its place (re-routing has already occurred, based on the events of issue one). If this isn’t clear, what may end up happening is that one incoming train can potentially run through the yard without stopping, because an incoming train will release the stop on an empty line, but there would be no train to reset the stop. An additional problem is the train that enters into the ‘non-stop’ line, is still going to release the next programmed train. A collision will occur.

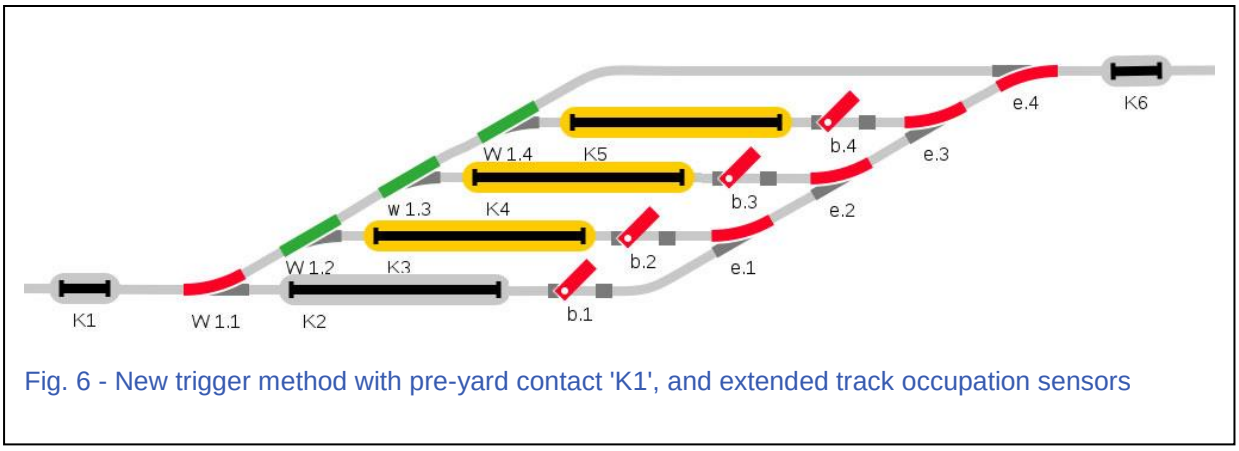

Fig. 6 - New trigger method with pre-yard contact 'K1', and extended track occupation sensors

Fig. 6 shows the layout setup for our version 2 of a staging yard. A few things I should mention:

1. There is now a pre-yard contact ‘K1’.

2. A bypass line has been added in case all lines are full (more on this later). A bypass line is something that could not be created without the pre-yard contact or in the set rotation.

3. I have extended the staging line contact tracks to also be used as full line Occupational sensors. This is because we will no longer require Departing triggers, when using the pre-

yard contact. The illustrated sample has been visually altered to represent this and occupational tracks cannot be visually represented this way in the Central Station. Please keep this in mind, as the remaining illustrations will revert back to CS accurate representation.

Pre-Yard Contact

In the ‘traditional’ staging setup, departure triggers were used to enable proper routing around the yard. In this staging setup all the routing will now be handled by the pre-stage

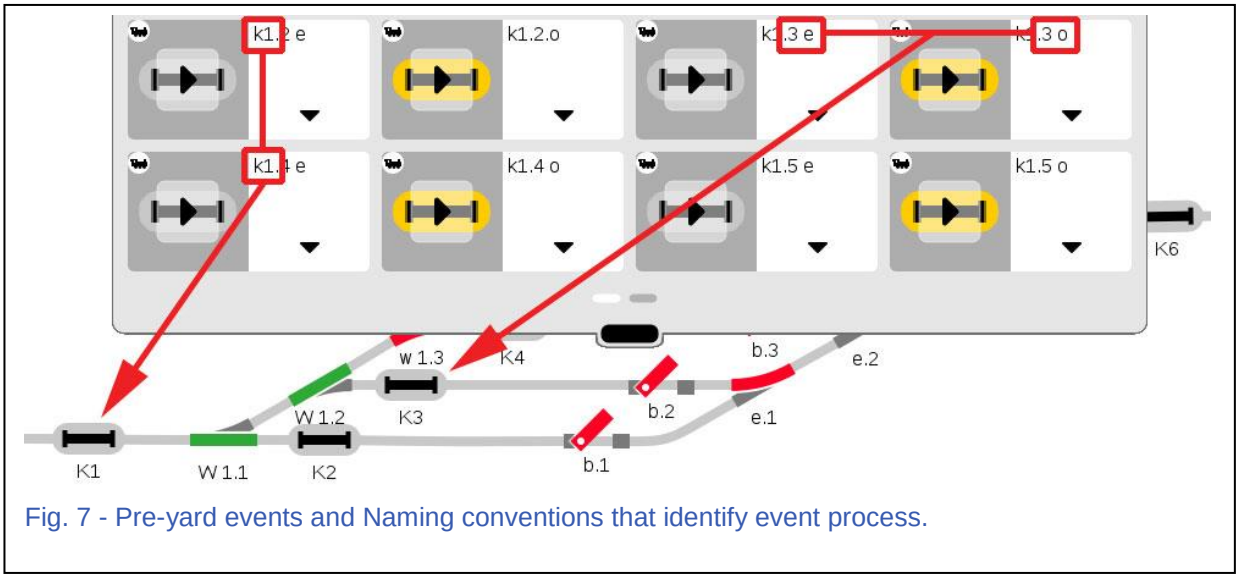

Fig. 7 - Pre-yard events and Naming conventions that identify event process.

contact at ‘K1’. ‘K1’ will now have multiple script events that will all be triggered and evaluated when ‘K1’ is activated with an Arrival trigger. You can see all the script events I have programmed to operate with this contact in Fig. 7. Note in the image how I labelled the contacts to indicate the contact trigger is assigned to ‘K1’. These are the red outlined boxes toward the left of the label / image.

The right side label outlines indicate I have a condition in the script, indicating which contact is used as the condition (labelled ‘3 e’ and ‘3 o’). This labelling gives me a quick reference to locate the proper script should I have a programming error, especially when compared to the other scripts being displayed.

The events in Fig. 7 represent 4 pairs of event scripts, 1 pair for each contact in my staging yard. The pairs consist of detection of occupancy (‘o’) or detection of the track being cleared (‘e’ = empty). The ‘e’ or ‘o’ state can be identified as the condition of the track. Fig. 8 represents the two scripts for each pair. To verbally state what each script does, using ‘K1.4 o’ as an example: “When K1 is activated (triggered) AND if K4 is occupied (‘4 o’) then switch the turnout w1.3 to

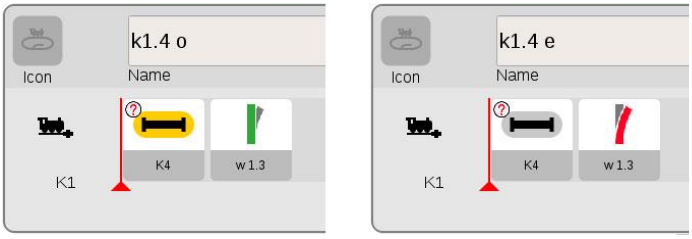

Fig. 8 - Conditional contact track script pair for yard line. Occupied - 'o', Empty - 'e'

straight.” If K4 is not occupied, then the script will simply not activate. This is why there are a pair of scripts, because in ‘K1.4 e’ if K4 is empty, the turnout will switch to curved instead.

With the 4 pairs of scripts (one for each line in the yard), I can divert an incoming train to any empty line in my yard, or it will be diverted to the bypass track if all lines are full.

A Retrospective Comparison

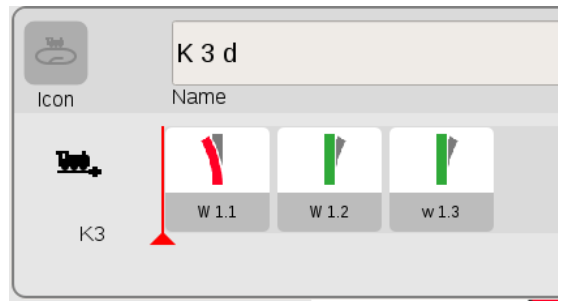

Fig. 9 - Comparative complexity on traditional staging departure script.

The only change we have made between the ‘traditional’ staging scripts and the new version is towards the events that re-route trains to appropriate lines. In the traditional sense, we used departure triggers that assure a turnout is cleared before re-routing the track. In the new version, we use a pre-yard contact to evaluate all lines and re-routes the train before entry. While the new method requires more script events, the events themselves are actually more elementary and easy to duplicate. Fig 9. Shows the event script for the ‘traditional’ routing script. They will need to be evaluated and adjusted for each line. As a reminder, the new method scripts are displayed in Fig. 8.

All other arrival scripts for each yard line are identical. Train entry into a yard line will release an adjacent train to enter the mainline. The post yard contact will reset all stop blocks to ‘stop’.

Revisiting the Conditions in Scripts

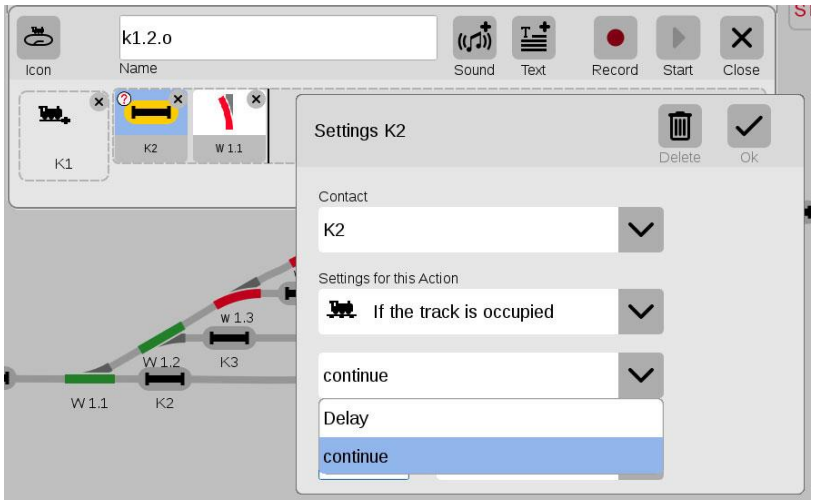

Fig. 10 - Script setup with condition settings.

For veteran script users of the CS2 who use conditions… yes, you are alone… just kidding, enabling script conditions is drastically different when compared to the CS3. As a matter of fact, I was initially stumped on how this was done because there was no additional dialog box (‘ext.’ button) to be found on the CS3. To enable a condition within the CS3, you may have noticed that the process is enabled by simply dragging the conditional contact track into the event script steps. In Fig. 10, I show an event script that uses a conditional (contact ‘K2’) and the edit box for that conditional step.

There are two fields which you may wish to adjust. The ‘Settings for this Action’ field, to detect occupied or empty. The second field is to decide if you want to continue if the setting matches your condition, or if you only wish for a timing delay if the condition is met. (The timing fields are covered in the example.) I haven’t yet thought up the condition where I would use the delay script, but if you find one let me know.

A Note about Incorrect Event Programming

Fig. 11 - Faulty script event programming with conflicting conditions - see both K2 contacts

Conditions are very handy evaluators for executing event script and you may think it would be possible to combine the pair of scripts noted above in the pre-yard contact. An example is shown in Fig 9. You can see the script has two conditions, to evaluate for both conditions: K2 – occupied (yellow), and K2 – empty (grey). The reason why this won’t work is because IF ‘K2’ is occupied, the script will still evaluate the first ‘K2 empty’ condition (grey icon, in which the track should be empty). If the track is occupied, the script will end and never reach the Condition for ‘K2’ occupied (yellow) and never set the turnout ‘W1.1’.

A Note on Trial and Error

As I had mentioned before, this revision into the staging yard was initiated via a request from a friend. The method logged here had proved viable, but in the process despite the logical accuracy of events, the user had some erratic behavior. In this case, the staging yard was implemented on K Track, and we had some stability issues that were never suitably addressed. A solution we used to stabilize the process, was to separate the Contact/Occupation sensor into two separate contacts. One for the arrival trigger, and another just for track occupation. While I believe the single contact/occupation track will operate properly, it may be better suited with more stable track contact such as C Track. I would suggest trying this first, before wiring up an additional set of yard contacts.

Deciding which method you may want to program your staging yard with is obviously up to you. The new method detailed here, shows another method of re-directing track flow. The traditional method provides insurance a turnout is clear before switching a turnout. The new method allows for pre-directing traffic where different line selections are available. The new method is also less predictable (or programmatic), because it will search for the first available empty track line.

In the future, I may test this method for use with a short station, and use a pre-yard evaluation to allow a long train to bypass the station. I’ll let you know when this happens. In the meantime, have fun!

Curtis Jeung

Upcoming appearances:

National Garden Railway Convention
Cobb Galleria Convention Center
2 Galleria Pkwy SE
Atlanta, GA 30339
June 6-9, 2018

EuroWest
Hiller Aviation Museum
601 Skyway Rd
San Carlos, CA
July 21-22, 2018

NMRA National Train Show
Kansas City Convention Center
301 West 13th St
Kansas City, MO
August 10-12, 2018

LGB 50th Anniversary Event
Orange Empire Railway Museum
Perris, CA
September 2, 2018, 4:00 pm – 8:00 pm
For more information and to RSVP by August 6, 2018: 573-365-9522 or stacy.cousins@marklin.com
Come out and celebrate LGB! Meet LGB representatives, including a special guest from the factory, explore the museum and enjoy free food. Plus, many other activities, including a Märklin Digital LGB Demonstration. Sponsored by Märklin, Inc.

Just Trains Open House
5650 Imhoff Dr, Ste H
Concord, CA
October 7, 2018

Rocky Mountain Hobby-Expo
Denver Mart
451 E 58th Ave
Denver, Colorado
October 27-28, 2018

Trainfest
Wisconsin State Fair Park Expo Center
8200 W Greenfield Ave
West Allis (Milwaukee), Wisconsin
November 10-11, 2018

To contact Rick and Curtis for help with your Digital, technical and product related questions:

Phone: 650-569-1318 Hours: 6:00am – 9:00pm PST. Monday through Friday.

E-mail: digital@marklin.com