NEWSLETTER
Vol. 30 – No. 2
March – April 2018

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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

We attended the Amherst Railway Society/EuroEast train show at the end of January. It was a great show and we thank all of you who braved the cold and rain to attend. The show was very busy and as always we had fun demonstrating Märklin Digital products and answering questions from model railroading fans.

We want like to thank the Keystone Chapter of the ETE (European Train Enthusiasts) for their hospitality and camaraderie throughout the show.

From Märklin Service: A new update for the Central Station 3 is being tested and should be available in early April. We don't have any additional details at this time.

In our first article, we show the maintenance of a well-used locomotive and get it running like new again. The second article provides an in-depth look at the M84.

Locomotive Maintenance

I was thinking that since I have shown how to install motors and decoders, it's time to show how to properly clean and oil them as part of a maintenance routine. Now, if you are like me, you don't keep track of the total hours of operation for your locomotives or rolling stock, and you don't oil your locomotives until there is a problem. So I guess the word "routine" does not apply.

Usually, the first sign of a problem is the sound of the locomotive. I can hear if it needs oil. Sometimes it is an obvious squeal of the motor, other times it is a growl (and anything in-between).

Lately, I haven't had the chance to run any of my own trains long enough to need maintenance, but I had an opportunity to use my skills at our latest train club meeting,

when a member came to me with a problem. He was running his locomotive on the club module and it would stop at a red signal, but it would not start once the signal turned green. I asked him if he had to “push” it and turn the motor to get it to run. He replied, “yes,” so I knew I had a good candidate for some deep maintenance and I also had a good idea what the problem was.

Fig. 1 - Swiss Re 4/4

He handed over a 3623 locomotive. The locomotive is a Swiss Re 4/4 electric (Fig. 1). I was a little worried because this is a 3600 series locomotive (early generation digital). I didn’t know what to expect inside the locomotive. It could be an old three-pole motor with a c80 decoder. Or maybe it was upgraded? I would soon find out.

Now, since this is not my locomotive, I thought I should test it and give it a once-over visually to see what damage I could repair. This locomotive seemed to be well-used, so I knew that the owner liked it very much.


Fig. 2 - Bent coupler

Right off the bat, I could see that I would need to straighten out the couplers and the pantographs, along with a few cosmetic repairs to handrails and other detail parts (Fig. 2). I thought I would do the cosmetic repairs last, in case I do something stupid and damage something else while doing the motor maintenance.

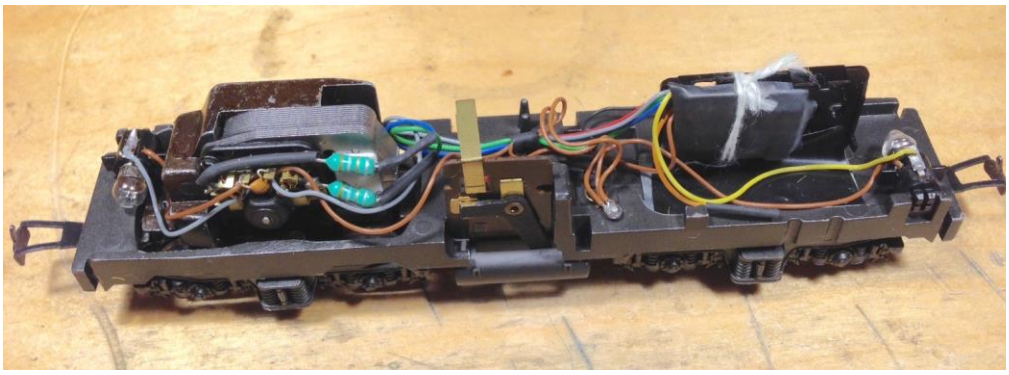
Fig. 3 - Inside the locomotive

I registered the locomotive and ran it for about 10 minutes to warm up the motor. I wanted to see if I could replicate the same problem where it wouldn’t start once stopped. The locomotive sounded “ok” and ran nice and slow. It also started just fine for me, but that didn’t mean there wasn’t a problem. So, I decided to start the maintenance and get it to run the best I could.

I removed the body (Fig. 3). What a surprise! The motor and decoder had been upgraded with what looks like a 60760 decoder and motor but with a somewhat less than professional technique. The decoder is actually tied-in with a piece of string. This isn’t something I would do, but it works fine so I will leave it.

The red wire from the slider had been pinched between the frame and the screw hole at some point (Fig. 4).

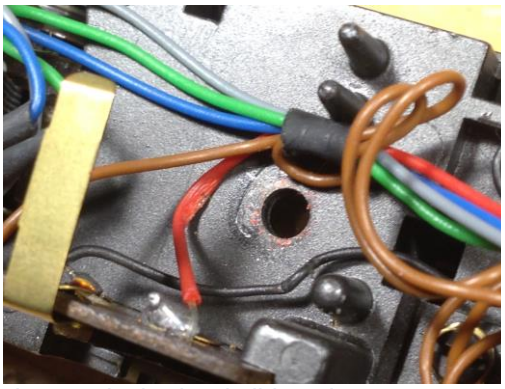
Fig. 4 - Pinched red slider wire

In the past, I have done this myself and blown the decoder. This one was still working, so I figured the wire should be fine. The bundle of wires should be between the two pillars to avoid this pinching. I will make sure the wires are correctly routed before I put the body on.

The next thing I noticed was the orange wire was not being used as a ground return for the lights. It was just shrink-wrapped and sitting there. Using a chassis ground instead of the orange return, causes the lights to flicker when digital code is sent through the tracks. I will also fix this to make myself feel better knowing there won't be any light flicker.

The power truck did not have a chassis ground either. This is very important because all four wheels on the power truck have rubber tires. So there was very little ground coming from the track to ground the motor. It was getting a ground from the chassis, which is also unreliable. Obviously, it ran "ok" for the club member, but this could be one reason why the locomotive would not start.

I needed to remove the power truck from the frame, so I started the disassembly.

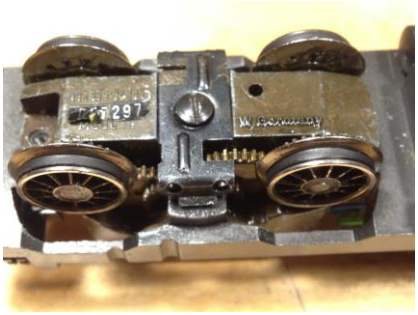
Fig. 5 - "Girdle" not tightened

The screw holding the "girdle" (as I call it), was not tightened down all the way. This could cause the whole power truck to "wobble" too much and de-rail easily. Again, the club member had no idea, so it wasn't a problem yet (Fig 5).

Next, the motor truck showed signs of over-oiling. This is a problem that many locomotives have. More oil does not make it better – it traps more debris.

With the motor truck out, I can remove the brushes and then the brush-plate. As I said, this locomotive was well-used. This is what I suspected from the beginning when I first talked to the owner. The inside of the motor is covered in debris (Fig. 6).

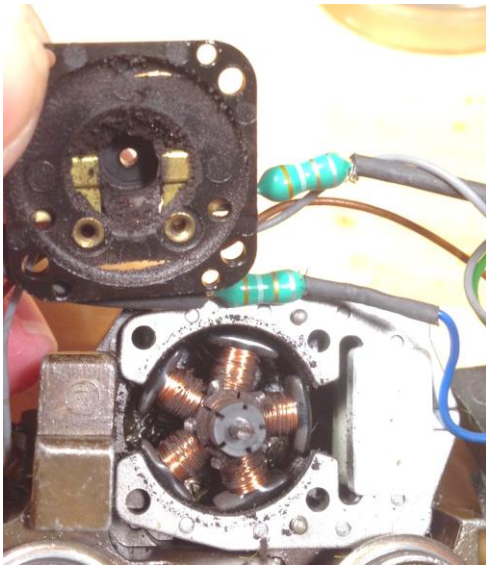
Fig. 6 - A lot of debris in the motor

Now, we get to one possible cause of the motor not starting. There are armature segments that the

brushes press against (commutator), these have collected brush dust in between them (Fig. 7).

This dust conducts electricity and as a result, the motor does not start once there is an electrical contact from one segment to another. Basically, the +/- (push/pull) of the armature in the magnetic field is cancelled out when the gap in-between the segments gets too much debris in them.

Fig. 7 - Debris in armature

Fig. 8 - Debris cleaned out

It is a simple matter of cleaning out the groove that is in-between the segments, then cleaning the brush-plate with a cotton swab and alcohol (Fig 8).

With the armature cleaned, I can now clean the motor frame.

I can see there has been too much oil applied to the motor (Fig. 9). Since there is so much oil, I use an aerosol PLASTIC SAFE electrical contact cleaner to clean out all of the old oil that is all over the frame and the gears (Fig.10).

The motor not starting, probably caused a downward spiral resulting in over-oiling of the locomotive. The motor would not start, so the owner added oil. It may have helped a little, but if it happens over and over and the owner continues to oil it, well you get the picture.

Fig. 9 - Yuck!

Once the frame is clean and free of all oil, I need to oil the gears. I put a very small drop of oil on all of the gear axles and the armature bearing. Then, I can re-install the field magnet and the armature (Fig 11).

Fig. 10 - Motor parts cleaned

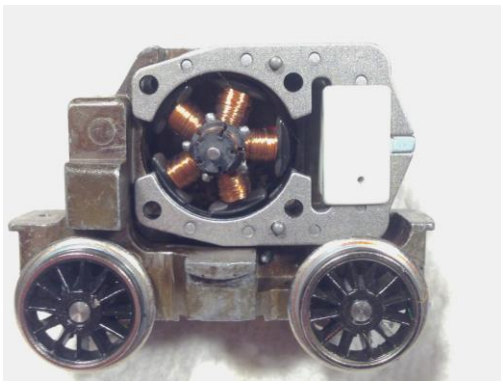

Fig. 11 - Magnet and armature installed

I installed the brush-plate and screws, not forgetting the new ground tab (Fig. 12) for the motor, and a small drop of oil on the armature shaft at the brush-plate.

Since the brushes looked pretty bad, I installed new brushes (yes, I remembered them this time, Fig. 13).

I rewired the ground return wires for the lights and used the orange wire from the decoder. Now the lights don't flicker and the motor is smooth and quiet (Fig. 14).

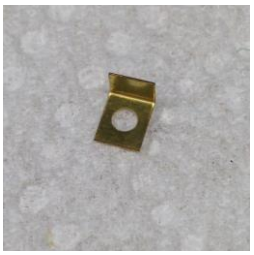

Fig. 12 - Ground tab

Fig. 13 - New brushes

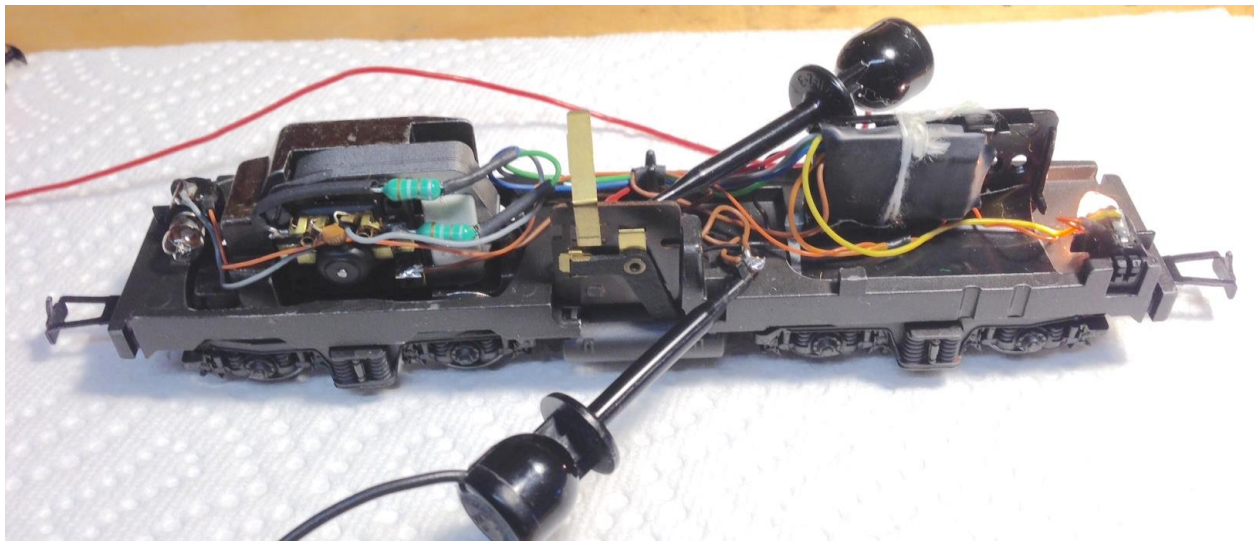

Fig. 14 - Final operation test

Now that the motor is properly serviced, I can turn my attention to the cosmetic problems.

I looked at the non-powered truck. This truck has also been oiled too much. It has collected much of the scenery on the club layout and his home layout (Fig. 15). In my opinion, this truck does not really need any oil on the axles unless they squeak. I believe that debris collected by oil will cause a lack of conductivity, which will result in grounding problems.

Fig. 15 - More debris!

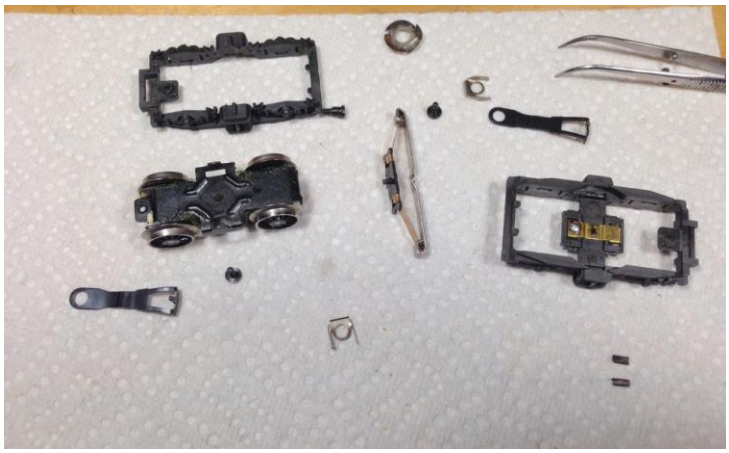

Fig. 16 - Additional parts that need cleaning

I disassembled the truck, and once again I turned to my PLASTIC SAFE electrical contact cleaner. With a few shots and a little scrubbing, all of the parts are clean (Fig. 16). Also, while I had the couplers removed, I could straighten them out as best I could.

With everything clean, I re-assembled the non-powered truck and adjusted the couplers to the correct ride height with the 7001 coupler gauge (Fig. 17).

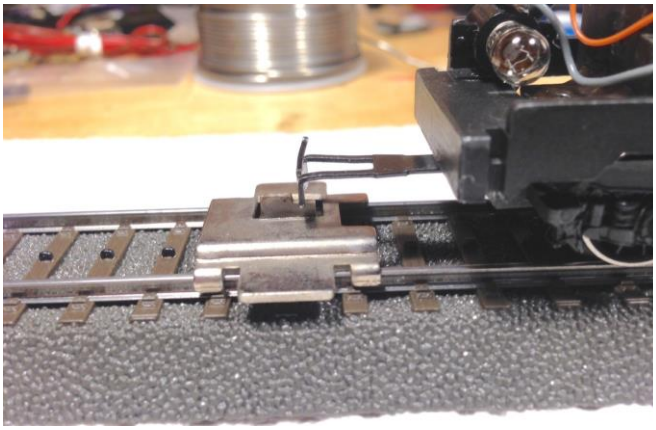

Fig. 17 - Couplers adjusted with gauge

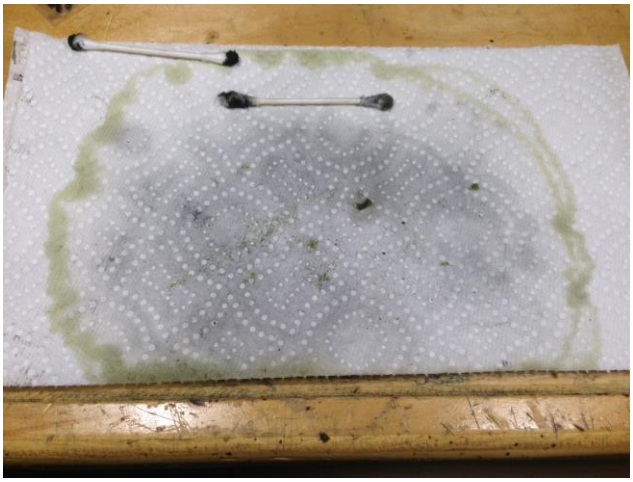

Fig. 18 - Debris that was removed

Figure 18, is a picture of the aftermath. I saw the dried “green” oil when I disassembled the motor. In this picture you can see the green ring from the dissolved oil. This is very old oil that

Märklin used in the 1980s, so I know this motor frame has never been thoroughly cleaned.

I straightened the bent wires, pantographs and handrails. The finished locomotive looks good now, not quite as sad, and runs great (Fig.19).

Fig. 19 - Finished locomotive – looks and runs great

It is important to note, I did not have to use my soldering iron to service the motor. I did use it to service the non-powered truck and re-wire the light return though. So this means, almost anybody with a screwdriver and tweezers can do this type of maintenance.

Enjoy your hobbies!

Rick Sinclair

M84 (60841, 60842) – An In-Depth Look

In the Digital Newsletters, Volume 29 (2017) - No 4 and No 5, I wrote in-depth about the M83 (60831 & 60832). In this issue, I will write about the M84 (60841 & 60842). The M84, by my recollection, is one of the least mentioned auxiliary boxes in our correspondence with users. After reading this, you may find it is probably one of the most versatile devices following in the trail behind a Central Station and a Mobile Station. This includes the ability to use its functions in an analog system! Its basic function is the ability to switch devices on or off.

Setting up the M84

Setting up the M84 for use with a CS or MS controller is similar to setup used with the M83. Because of the lengthy in-depth look of setting up the M83, I ask that you read through Vol 29 No 4, so we can get right to the details of the M84. There is one exception that I will explain here. This information can also amend the information on the M83. Both M83s and M84s are now built with mfx decoders.

A word about mfx Decoders

Mfx decoded M84s will not automatically register themselves into your CS when attached to the layout or power is supplied to the track. The registration is based on the initial dip switch address that you assign to the module. Mfx addresses are indexed internally within your controller. The index is what allows for multiple mfx items to have the same address. For example, you can have three decoders all with an address of 25, but the CS will index and recognize them independently as 25.0, 25.1, 25.2. Please bear in mind, the actual code wording may be different from my example, but you get the gist. There are at least 1024 index slots per address, so memory limits should not occur. However, I tend to want to spread my addresses around just to prevent reaching an unlikely maximum limit. You may want to change your physical dip switch addresses as you would any other device.

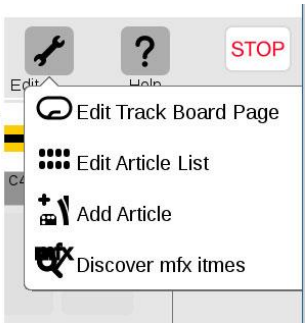

Fig. 1 - mfx load menu selection

Adding an mfx enabled M83 or M84 to your CS3/3+ is quite different from the examples given in the M83 article. The method used in the prior article still applies to the newer units, but the mfx adds another load option which I will describe. I will also discuss the differences between the two after I describe the mfx method of loading the M84 into your CS3.

Under the 'Edit' button is the 'Discover mfx items' [currently there is a misspelling ('itmes'), shown in Fig. 1]. Clicking on that will display the first dialog box shown in Fig. 2.
I have set the dip switches to address the M84 to 9. The options in Fig. 2 will dictate if the CS should re-index the address to an empty available address or force the address to the dip switch address that is set on the M84.

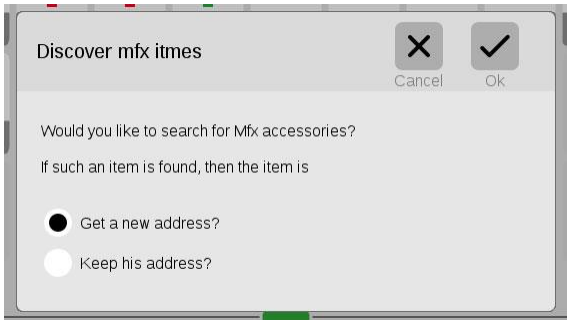

Fig. 2 - Option to force dip switch address or allow CS to index to available address in memory

After that there are few dialog boxes for load progress. When the loading is complete, the CS will now display the 4 reserved slots for the M84 in both the Layout page as well as the articles list (Fig. 3). These are recognized by the red ‘M’ in the icon display.

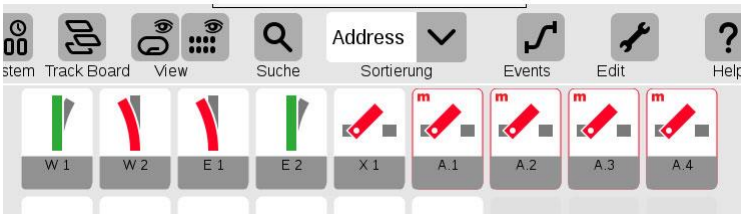

Fig. 3 - Result of adding an M84 with mfx decoder (identified with an ‘M’)

The differences between the earlier article M83/M84 entry and the mfx M84 entry into the CS are primarily: mfx method will load all four output slots into the article list, but they will need to be edited to suit your use (from a generic switch to a light for example). The non-mfx method will only display the assigned output (like the light), and you would add the articles into the M-device rather than directly into the article list. Also, the non-mfx method doesn’t display the ‘M’ icon.

I managed to load a double entry in my CS using the option in Fig. 2 to keep the device address. An address that is duplicated will be shown in red numbering (Fig 4). You can see that while I chose to keep my assigned M84 address (#9), it displays the duplicated address of a device already entered.

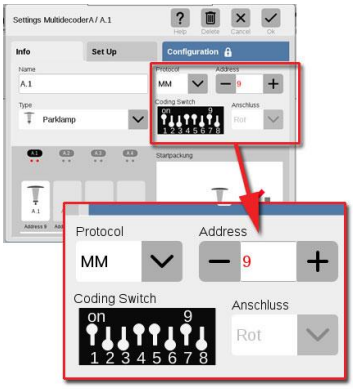

Fig. 4 - Identifying a duplicated address

A Point to Make

An area of confusion for many users, is how power is relayed to the outputs. The answer to this question can be as complex to explain as it is to answer. The answer is, the M84 does and it doesn’t relay power to the outputs. This is also part of the reason why the M84 is such a useful tool in a layout. As I said, confusing. However, each example I show you here will clarify the issue.

Common Use and Setup of an M84

The two primary uses of the M84 are: Switching of constant power source items like depot lights. The other would be in a hidden staging yard or stop area for a train.

In Fig. 5. (left side), I show the inputs into the red/brown connections supply track power where the digital code is embedded. The brain of the device interprets the digital code and then activates the appropriate output on the M84. In this case, output #1.

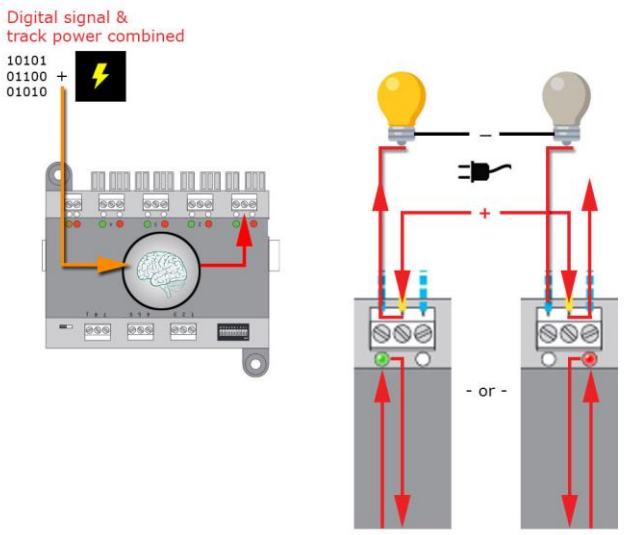

Fig. 5 - Diagram of hookup. Note how switch power is not transferred to output.

Switched Light Hookup

The expanded detail on the right in Fig. 5 illustrates the power flow within the M84 and the required hookup of a switched light. The power within the M84 does NOT supply power to devices connected to the screw terminal outputs. Notice how the indication arrows (wires) loop back to their respective source and do not cross over. The light source is a loop back to the plug (or battery), and the M84 switch power loops back to the M84. Using the screw terminal hookups, it is important to recognize the power from the M84 and the output screw terminals are electrically uncoupled.

Switched Track Hookup

In Fig. 6, I display the signal flow and wiring used to control stop blocks of track. Each example of track (2-rail as well as 3-rail) has a pair of track insulators that isolates a section of track. This is indicated by a pair of red markers on a single rail. A live (powered rail) is connected to the center terminal of the M84. It will be used to supply power to the matched rail when the M84 output is switched to ‘green’ (left most track example).

When the M84 output is switched to Red (right side track example), the internal relay now connects the center connection to the ‘red’ post. Because there is no connection to the red post, the power throughput to the insulated track section has been shut off. No power is diverted to the insulated section, but instead, away from the track.

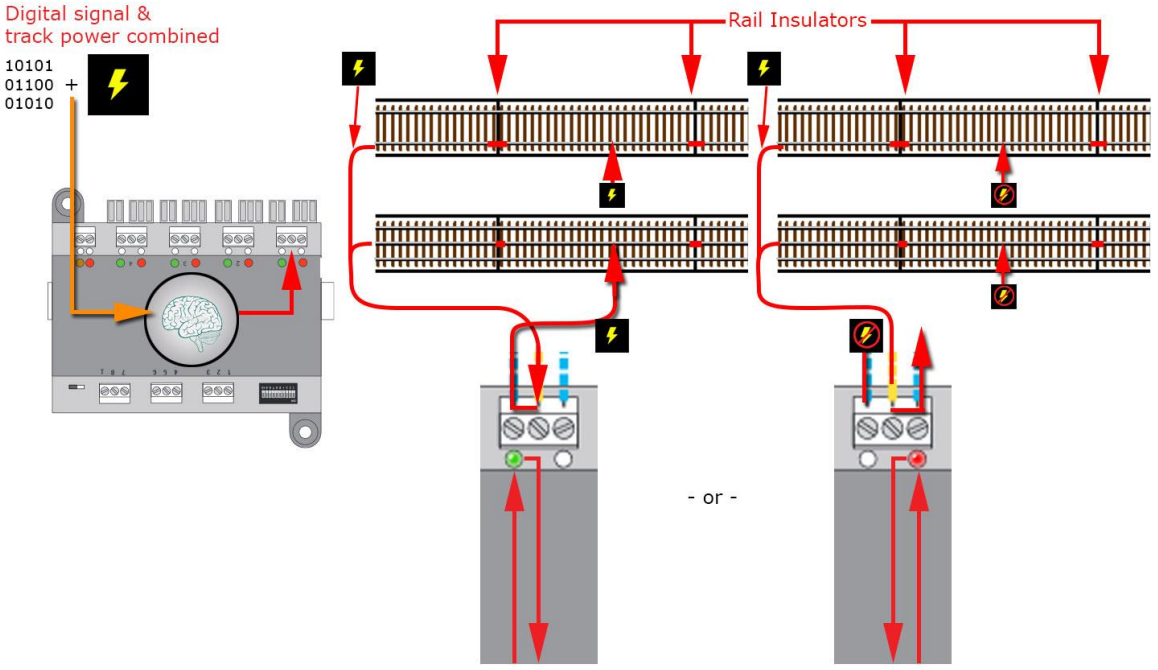

Fig. 6 - Illustration of track power flow and wiring. Note the right example does not show complete wiring to clarify that power does not flow to track.

Powered output terminals

The previous two examples give a basic wiring setup for the two most used purposes. It also makes a point to show that the output connections are not internally linked to the control

power feeds. However, the M84 does have a socket for a switched mode power pack (66367). Unlike the screw terminal outputs, the M84 has circuit board tabs that lie underneath the screw terminals. These tabbed connections are specifically designed for Märklin's Start Up line of accessories. You can see the tabs in all the M84 illustrations above the screw terminals. The Marklin Start Up signals are listed as:

74391 - Color Light Block Signal
74380 - Color Light Distant Signal
74371 - Color Light Track Block/Yard Signal

Each output on the M84 has a pair of tabs, one wide with 3 contact points, and one narrow tab with two contact points. The signals listed above have a plug that slides over the tabs. The wide tab is for the main signals, whereas the narrow tab is designed for the distant signal. When you activate the output of the M84, both the distant signal and block signal will switch according to their pairing and use.

Unlike the screw terminals described in the previous section, the tab connection receives power from the power supply socket on the side of the M84. Therefore, the power to light an attached signal will need to come from a switched mode power pack for the M84 (66367).

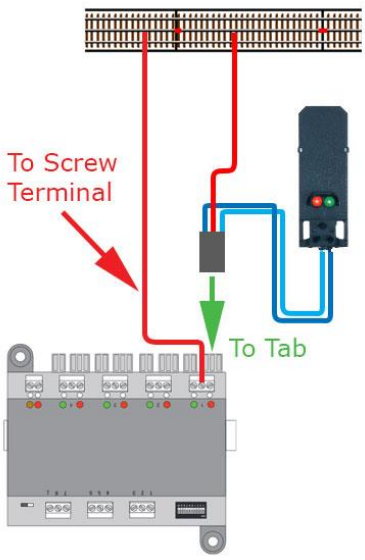

Fig. 7 - Tab connection and wiring for Start Up signals

When using a Märklin Start Up type signal, you may notice there is the red wire that is used to cut power to the track. Even though M84 power is supplied to the signal light it won't supply power to the track wire. This red wire will still need digital track power to operate trains on the connected section of track. Therefore, as the diagram indicates in Fig. 7, you will need to connect a feed wire from the live track to the center screw terminal of this output.

There is an 'On/Off' switch located at the lower left of my diagram (upper right on the actual device). This switch only needs to be on if you are using the signal tab connections, otherwise just leave it off.

What Makes the M84 Special

You may recall that I touted the M84 as being one of the more versatile devices following behind the Central Station or Mobile Station. Users who only have a Mobile Station as their main controller, don't have the benefits of automation that the Central Station users do. One critical benefit is the ability to operate your layout with signal/track blocks. This is a method of operating many trains on a single loop without fear of collision, or the typical constant monitoring of speeds for several of locomotives. While the MS controller will allow you to control more than a single engine on track, it won't manage block occupation.

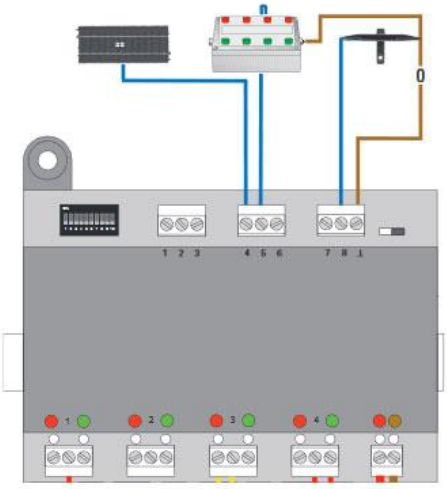
Fig. 8 - M84 input connections with sensors or switches

Along the top of the M84 there are 8 screw terminal inputs along with a reference ground input (Fig. 8).

The reference ground would be the brown wire (in accordance with Märklin's track wiring color scheme). This is the terminal with the inverted 'T' (I suppose one could say that it is a profile of a track rail). The 8 terminals can be wired to a switch box for manual control of the M84's outputs, OR even more exciting, connect these inputs to track sensors (Circuit Track, or Magnetic Reed) for automatic track blocking. Using both the signal light and track wiring on a single output method described above, Märklin has enabled users with a basic method to easily connect a track block system. One additional benefit that crossed my mind is an M84 that is wired this way, can also be used with analog layouts.

Hook up of a Basic Track Block

Each pair of input numbers (1-8) control a single output on the M84. Odd number inputs (1, 3, 5, 7) will activate the red output, whereas the even inputs (2, 4, 6, 8) will switch the output to the green channel. To wire up a track block, you will need one contact (wired to #1, for example) to set a signal to red. Then further down the track line, you will install a second contact (wired to #2) to set the red signal to green. Fig. 10 illustrates the wiring of two straight circuit tracks #24994 to the inputs 1 & 2. They both control the light signal via the M84. Remember, these are the Märklin Start Up series of signal lights. You can also wire up a track block. Also not illustrated is the ground reference wire (to the inverted 'T', be sure to hook that up).

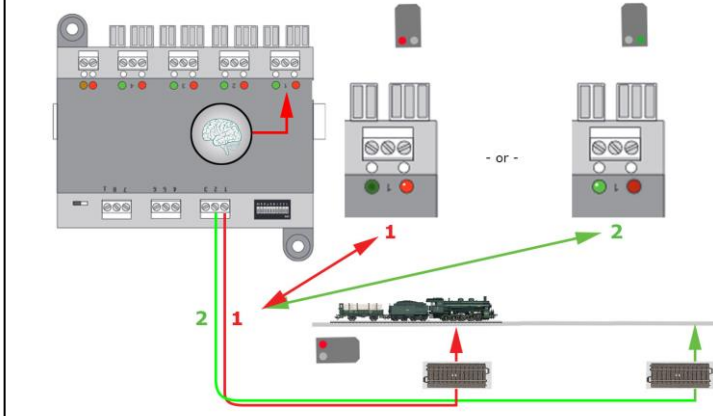

Fig. 9 - Operational wiring of an M84 track block

Special CV Settings

The M84 has special CV settings you can use to expand the uses of this module. The default setup of an M84's operation is to toggle back and forth between two circuits per each output. In other words, toggle between the green and red outputs. While one is on, the other is off.

Using CV 79, control on the M84 can be configured to have 8 independent outputs, each toggling between on and off. Simply put, a green output will have an on/off state, and the red output will have the same. The first 3 values set the use of the output switching: 0 is the default setup, 1 is for 8 switch/4 address, 2 sets the M84 for 8 switch/8 address.

Setting of 1 or 2 means you should decide if you wish to configure the M84 for 8 outputs using only 4 addresses (4 outputs with a red/green pair of lights each), or 8 outputs using 8 addresses. Remember, when you set the address for an M84, you are only setting the first address. The Central Station or Mobile Station will then reserve the subsequent addresses accordingly.

There are two additional modes for CV 79. Setting a value of 3 sets the M84 with 8 addresses and the output function for each of the 8 is a random blink circuit for each output. Typical use is for warning lights or flashing signs. If you set CV 79 at a value of 4, it is similar to setting 3 with 8 addresses, but the output is non-blinking and it still enables a random on/off function. This is a setting for building lights. To simplify the description, each output has an icon that will switch the function on or off. While the function is on, the output will randomly turn the output on or off, only at different timing intervals (a flashing light versus an on/off interval of a few seconds or minutes. *Note- I didn't see any timing information in the manual to determine the switch cycle).

The M84 may not be the most commonly seen module on many layouts, but as this article shows, I think there are some pretty amazing capabilities for a variety of uses. For many new users of Märklin products, or the veteran users getting into digital with the Mobile Station, this product is ideal. Its use in operating track blocks and signal lights with common track triggers expands your layout control with automation methods only available with a Central Station. For Central Station users, the added functionality via CVs makes this product even more flexible as a solenoid controller (especially lights) that was never available with the K84. Its flexibility of connections allows you to use your imagination to digitally control any device that requires an on/off switch. I hope you give it a look and come up with something creative.

Curtis Jeung

Upcoming appearances:

Märklin Enthusiasts of America (MEA) Spring Meet
Steamtown, Electric Trolley Museum
Scranton, Pennsylvania
May 6, 2018

National Garden Railway Convention
Cobb Galleria Convention Center
2 Galleria Pkwy SE
Atlanta, GA 30339
June 4-9, 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

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