



NEWSLETTER

Vol. 33 – No. 6
Nov. – Dec. 2021

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Current Central Station 3 Version – 2.3.1 (8)
Current Central Station 2 Version – 4.2.13 (14)
Current Mobile Station 2 Version – 3.121

Here we are in the middle of another Holiday Season. As we did last year, we are hopeful of a brighter 2022 where we can get out and attend more shows and meet enthusiasts.

We have had several questions about “Function Mapping,” so we decided to describe the basics in our first article. Our second article is about C track lengths and geometry.

Function Mapping

Function mapping is a term that is used to describe the editing of a function button. In the CS3, the functions of a locomotive can be edited, removed or a new one added all together. While it is a little difficult to explain in writing, I will try.

As a basic example, I will use a 39639 Class 64 locomotive. This is much like creating a decoder project for a retrofit decoder except it is done on the CS3 rather than a computer. In fact, most settings of a retrofit decoder can be completed on the CS3 once the decoder is installed except for sound files (I will not get into the “ins and outs” of that in this newsletter). In my opinion, the only drawback to editing a locomotive on the CS3 is that I like to save the profile on my computer in case there is a problem later and while I can save a profile on the CS3, it is just simpler to keep it on my computer. This may be different for other users.



Fig. 1 - Lok Settings page – Select “Configuration” Tab

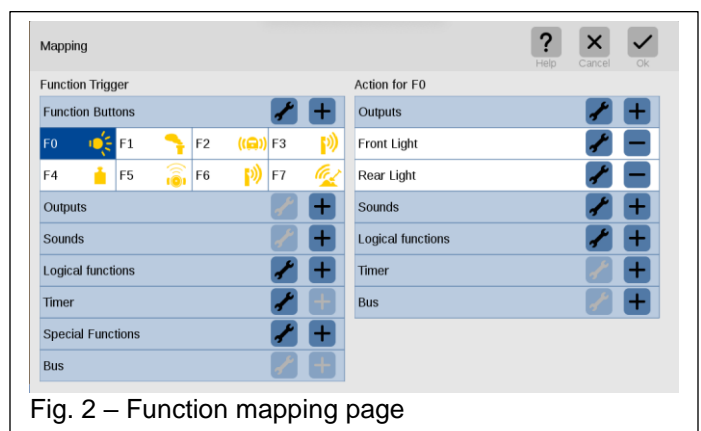


Fig. 2 – Function mapping page

The first thing I need to do is “Edit” the locomotive. Once I am on the “Lok Settings” page (Fig.1), the CS3 will show the “Info” tab of the locomotive. I select the “Configuration” tab and let the CS3 read the CVs. At this point there is just one more step, by touching any function icon on the left, the CS3 will load the “Function Mapping” page. This is where the mapping edits are made (Fig. 2).

Normally, I like to change the light functions in a new locomotive. I like them to fade in and out. From this “Mapping” page, I select the light function “F0”. Then, on the right-hand side is the “Actions for F0”. Usually, the front and rear lights have an action under “F0”. If I were to select the wrench icon for “Front Light” for example, a box opens showing the “Condition”, “Direction” and the “Motion” (Fig. 3).

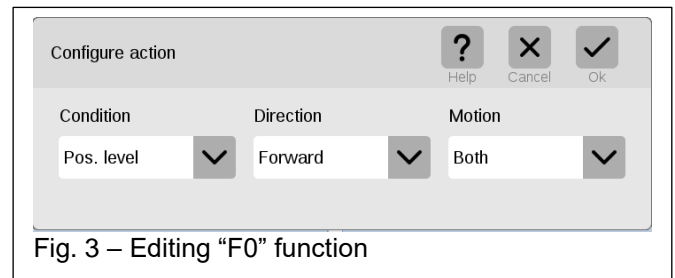


Fig. 3 – Editing “F0” function

Now I do have to admit that I have not discovered what the “Condition” actually does, but I have some theories that I have not tested so I just leave it at “Pos. level”. The “Direction” will allow me to set the output of the light to be on when the direction of the locomotive is forward, reverse, or both. Since its the front headlight, I will leave it on “Forward” because this is a new locomotive, and the configuration is correct from the factory. Basically, I would never really change the settings for “Configure Action” for F0 unless I needed to reverse the lights when I did an upgrade to a locomotive. Sometimes it’s more convenient to wire the front light to the rear socket and the rear light to the front socket during an upgrade, this is how to make the correct light come on in the direction of travel thus correcting the output to match the wiring. The “Motion” will allow me to set the output to work if the locomotive is running, stopped, or both.

To change the settings of each output, you need to select the wrench on the “Outputs” line. This will give you the option to change the configuration of each auxiliary output of the decoder. A window will open showing what the outputs are set to. As a default they are usually set to “Dimmer” (Fig 4). From here select the “Front Light” by clicking on the down arrow. There are many choices available, scroll down to “Fade in / Fade out Light(s)” and select it (Fig. 5).

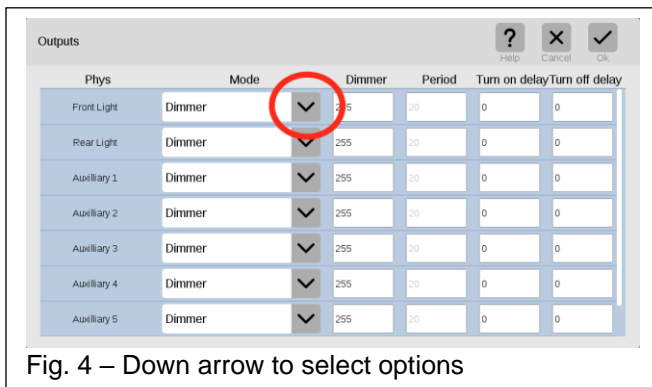


Fig. 4 – Down arrow to select options

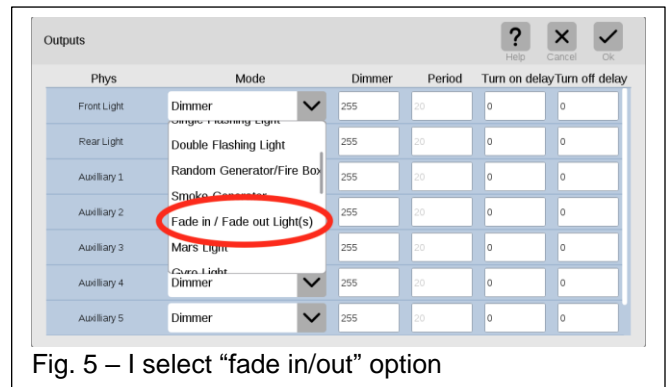


Fig. 5 – I select “fade in/out” option

Once this is done, you can dim the light if desired with the “Dimmer”. From the factory, it is set for the maximum of 255. A lower number will dim the light output. Since I want the light bright, I will leave it at 255. The setting that I want to change is the “Period”. This setting will set “how long” it takes to the light to fade in and out. I usually change it from 20 to 23 – 25

depending on the locomotive. At this time, you can do the same for the rear light or any other output of the decoder such as the cab light. You can also set a delay on and a delay off time for any of these auxiliary outputs in the “Delay” box.

This was a simple example of function mapping. For a more complex example, we can make the steam sounds come on when we turn on the smoke generator. To do this you just need to note what the button for “F2” does because F2 turns the sounds on and off. While still in the “Mapping” page, touch the “F2” box. This shows that it has a sound assigned to it called “Running Sounds” (Fig 6). If you want the running sounds with the smoke, select “F1”. In the “Action for F1” the “Outputs” shows “Auxiliary 1”. This means that the #1 output on the decoder is wired to the smoke generator. To add running sounds, we just need to assign a sound to “F1”. To do this, touch the “+” in the “Sounds” row (Fig 7). A box will open for you to select a sound file that you want to add to this function button. Select “Running Sounds” then touch the check mark (Fig 8). Figure 9 shows the smoke (Aux. 1) and the running sounds assigned to it. While you could select any sound you want to play while the smoke is going, you need to remember that the sound you select will not turn off until the smoke generator is turned off.

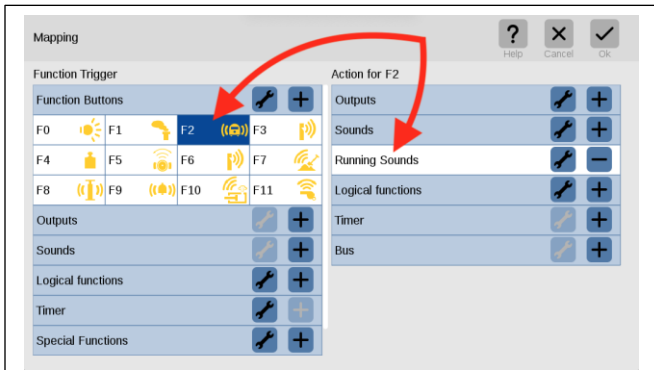


Fig. 6 – Running sounds assigned to F2



Fig. 7 - Select “+” to add a sound to F1

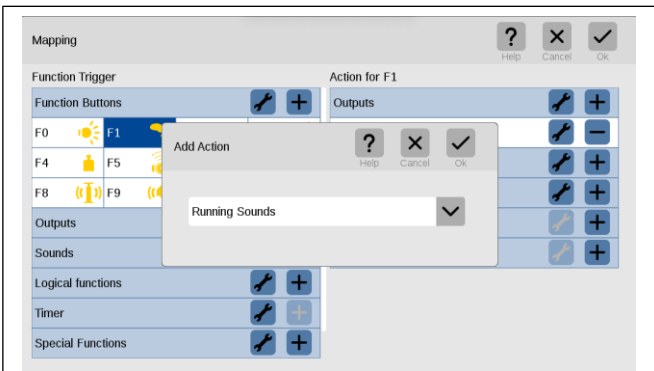


Fig. 8 - Select “Running Sounds”



Fig. 9 – Smoke and running sounds assigned

Changing the function Icons

With this example, it is possible to change any function button to control any function or functions. Once a function has been changed, the icon might need to be changed because an icon is assigned to a function button. By going back to the “Setup” tab you must touch an icon once again to get into the edit screen for the function buttons. You can select an icon on

the left then change it by selecting the desired category tab (Light, Sound 1, Sound 2, Mechanic, or Common). You can also configure the button with the settings on the right (Fig. 10).

Configuring the Function Button

Basically, the button configuration is how you want the button to react. A description is as follows:

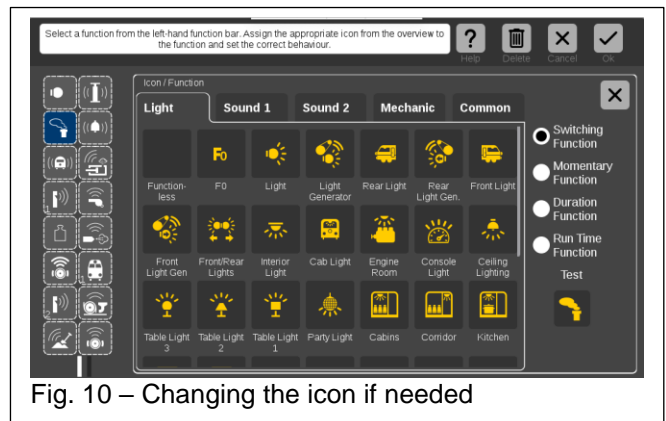


Fig. 10 – Changing the icon if needed

- Switching Function – Touch the icon and the function turns on, touch it again and the function turns off.
- Momentary Function – Touch the icon and the function turns on for as long as the icon is touched. Release the icon and the function turns off.
- Duration Function – Touch the icon and the function turns on for the set duration then turns off. A box will open to input a duration in seconds.
- Run Time Function – I have not played with this much, but it will activate a programmed event when the icon is touched.

Function mapping is a large topic with many facets to explain and I hope I cleared up a few questions. If there are more questions, feel free to contact us.

**Enjoy your hobbies,
Rick Sinclair**

Märklin's C-Track Geometry

Märklin's C-Track is an ideal choice of track for ease of use and reliability. Like most 'click' tracks, C-Track has a design geometry that is fixed. However, the available track parts still allow enough flexibility to stretch from the norms of a simple oval track. Part of doing so, means you will want to understand more about the C-Track Geometry.

Practically everything you will need to know about C-Track components can be found in the part number of the track. This doesn't mean you have to memorize every track part number; it just means you will know what you're dealing with when you have a track's part number. To begin with, we will start with the basic straight track inventory.

Straight Track

The key to straight track part numbers will be the last three digits. These numbers simply indicate the length of track in millimeters. These figures are rounded (up or down), once you get familiar with the track, you'll know what the fractional values are, albeit it is a minor detail. Fig. 1 shows the list of simple straight track part numbers and the coinciding length in mm.

Straight Track				
Part #	Length		Equivalents	
24360	360		24188 + 24172	360
24236	236.1		24172 + 24064	236
24229	229.3			
24188	188.3		24094 + 24094*	188.4
24172	171.7		24094 + 24077	171.7
24094	94.2			
24077	77.5			
24071	70.8			
24064	64.3			

Fig. 1: Straight Track and equivalent length combinations

Additionally, under the Equivalents heading, are track combinations that equate to the associated line item. Next to that column is the total length of the equivalent pieces. For example: a 24172 and a 24064 piece will equate to 236 mm, which is equivalent to the 24236 straight track with just a 0.1 mm difference.

Special Track (Straights)

In the 24188 equivalents column, the notation for 24094* is to point out that there are special track pieces which may be desired in your layout. You will want to know if you are taking out a 24188 piece of track and adding a 24094 special track, you will need to add an additional 24094 piece to accommodate the track shortage. Fig. 2 lists the special tracks available.

Specialized Tracks				
24994	94.2	Circuit		24094
24995	94.2	Contact		24188 or 24094*
24997	94.2	Uncoupler		24094
24951	180	C – M Track adapter		
24922	180	C – K Track adapter		

Fig. 2: Special use straight track

There are three 94mm length specialized straight pieces: Circuit, Contact and Uncoupler. Circuit tracks are commonly used as direction detectors that are triggered by the center ski of your engine. Uncoupler's are solenoid devices meant to release the couplers that hold your rolling stock together. Contact tracks can be used to trigger events and/or show track occupation. Contact tracks (24995) when used, are unique in the sense that they must be included in pairs. Also note that any piece of track can be converted into a contact track when used with track insulators. This method can eliminate the requirement of a contact track (24995) set. This method is outside the scope of this article and can be found in previous newsletters.

The other specialized track pieces are adapters that change over to different track styles C-Track to K-track for example.

Curved Tracks

Curved Track part numbers will not list the length of track like the straight pieces. Instead, the numbers will indicate the radius set and degree of arc. There are 6 radius sets from Marklin: R1 - R5 and R9. This is indicated by the 3rd digit in the part number. The track radius from center point to center rail are listed (in mm) in Fig. 3.

Curved Track	Radius	Degree of Turn	Equivalents	
24130	R1	360	30	24115 + 24115
24230	R2	437.5	30	24215 + 24215 or 24224 + 24206
24330	R3	515	30	24315 + 24315
24430	R4	579.3	30	
24530	R5	643.6	30	
24912	R9	1114.6	12.1*	
24115	R1		15	24107 + 24107
24107	R1		7.5	
24215	R2		15	24207 + 24207
24207	R2		7.5	
24206	R2		5.7*	
24224	R2		24.3*	
24315	R3		15	
24194	R1 Curved Circuit		15	
24294	R2 Curved Circuit		15	

Fig. 3: Curved track radius, degree of turn and geometric equivalents

The degree of curve is designated by the last two digits of the part number. You can see that a 24912 only has a 12.1-degree of turn to it. A 24215 has a 15 degree turn with an R2 arc.

Like the straight tracks, there are equivalents of combined tracks to the larger single pieces. The bulk of the equivalents are within the R1 & R2 radius tracks, except for the recently added R3 24315 half curves. The 24*30 curves can be swapped with two 24*15s, and likewise, a single 24*15 curve can be swapped with two 24*07 (7.5-degree) curves.

The 24*15 (half) pieces are designed as complements to the curved circuit tracks (24194 and 24294) which are combined to complete a 30-degree curve of track.

Unique curved sections of track are the 24206 (5.7-degree), 24224 (24.3 deg) and 24912 (12.1-degree). These are to complement turnouts which will be explained in the 'Turnouts/Crossings' section.

Parallel Track Spacing

An important thing to note, is that the radius curves are designed to maintain a specific track spacing for parallel tracks. Track spacing between lines using R1, R2 and R3 curves is 77.5 mm (from center rail to center rail). Track spacing between R3, R4 and R5 curves is a smaller 64.3 mm.

Turnouts/Crossings

There are two general turnout designs, those that turn off a straight track and those that turn off a curved track. There is a 3-Way turnout, and I will combine its geometry description with the 'straight' track turnout.

Straight Turnouts

Märklin has two styles of straight track turnouts, a standard angle (by Märklin's perspective) and a wide radius turnout. The standard turnout creates a 24.3-degree turn from the straight line. The curve radius of the turnout is the R2 radius. There are both left and right turnouts, listed respectively (24611 and 24612). The straight track length is the equivalent of a 24188 straight track (188.3 mm). The 3-way turnout is the same radius and straight length as the standard turnouts (Fig. 4).

Turnouts/Crossing	Length	Curve radius	Degree of Turn	Complimentary Pieces
24611	188.3	R2 Left	24.3	24206, 24224, 24172
24612	188.3	R2 Right	24.3	24206, 24224, 24172
24630	188.3	R2 3-way	24.3	

Fig. 4: Turnout (standard) length, radius, degree of turn and complimentary pieces

There are complimentary pieces that can be used with straight turnouts. You can extend the curve portion with either a 24206 (5.7 deg) curve or the 24224 (24.3 deg). With a 24206 curve, you can complete the curve section to a 30 deg curve if you wish to make a full turn.

Using a 24224 curve, these are intended in most cases to create a parallel track access. You can see examples of the complimentary pieces in Fig. 5. In addition, you can see that you may use similar turnouts connected to each other. (See right example).

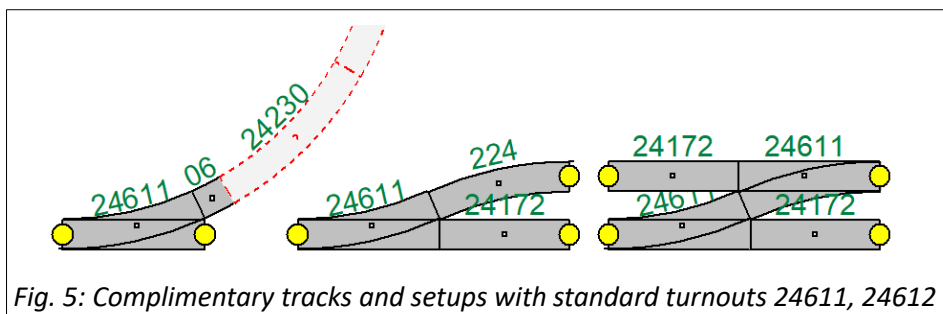


Fig. 5: Complimentary tracks and setups with standard turnouts 24611, 24612

The parallel track access using these components will create a track spacing of 77.5 mm mentioned in the section above (Parallel Track).

In the straight measurement, you may normally combine these turnouts with a 24172 straight. This creates an even connection point along parallel tracks. The combined straight measurement is also equivalent to the 24360 straight track length (noted in Fig. 1).

Wide Radius turnouts

The Wide Radius turnouts [24711 (L), 24712 (R)] are also track splits from a straight line. The straight and curve track equivalents are the 24236 Straight piece (236.1 mm) and the R9, 24912 curved track (12.1 deg turn). When using these, you must use the complimentary straights 24071. You'll need at least 2 for each isolated WR turnout. For parallel track access, you'll want to add 24912 and 24229 track pieces. (Fig. 6). If you wish to use two similar turnouts for a track exchange, you'll need three 071 pieces (right image).

24711	236.1	R9 Left	12.1	24912, 24229, 24071
24712	236.1	R9 Right	12.1	24912, 24229, 24071

Fig. 6: Wide Radius turnout and complimentary tracks

The track spacing between parallel tracks using the wide-angle turnouts is 64.3 mm. This matches the parallel separation for curved radii between R3, R4 and R5 tracks.

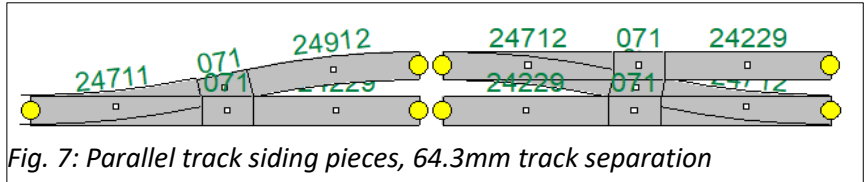


Fig. 7: Parallel track siding pieces, 64.3mm track separation

It is also possible to have 77.5 mm parallel track spacing using the wide radius turnouts. For instance, if the layout dimensions force you to only have R1 & R2 curves, or you've got a standard turnout on one end of a parallel line. You can add an additional 24071 track between the two WRTs. However, this does create an offset at the parallel connection by about 2mm. One line will be short or long depending on the combinations displayed in Fig. 8. I played with it a bit and could bring the offset down to about 1 mm, but it required additional lengths of track and 2mm is nothing when considering the variances from just laying down pieces of track. (If interested: $24229 + 24071 = 300.1$ mm, $24236 + 24064 = 300.4$ mm.)

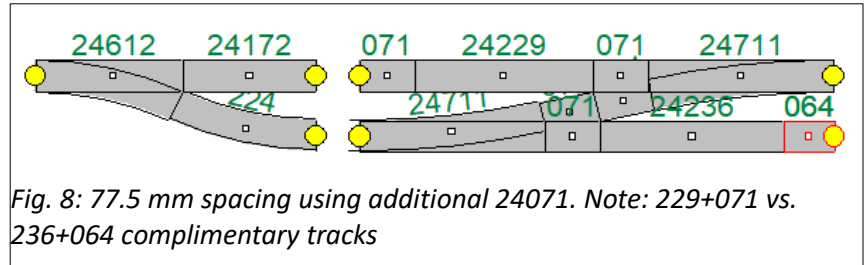


Fig. 8: 77.5 mm spacing using additional 24071. Note: 229+071 vs. 236+064 complimentary tracks

Curved Turnouts

Curved Turnouts are available in two configurations based on the smallest configurable radius: R1/R2 and R2/R3. The degree of turn for both items is 30-degrees. The R1/R2 is most easily used when configured with 4 additional curves of the same radius (any radius R1-R5, Fig. 9). This creates parallel track spacing at the 90-degree turn, then you can run parallel radius tracks to extend your turn requirements (see green 24230s parallel to 24130s). The R2/R3 turnout requires 4x 24315 pieces to facilitate a 90-degree turn.

If combining two curved turnouts, you'll probably need some complimentary pieces to compensate for unmatched alignments at the curved points. This is illustrated in Fig. 10, with the additional 24077 straight to compensate for the shortage at one end.

There are many combinations when it comes to curved radius turnouts which are too numerous to write about in this article. You can find curved track combinations in any supplied manuals with track sets or in a Märklin catalog. I will try and replicate the track options at the end of this article, but my software does contain the pieces for the R2/R3 turnouts.

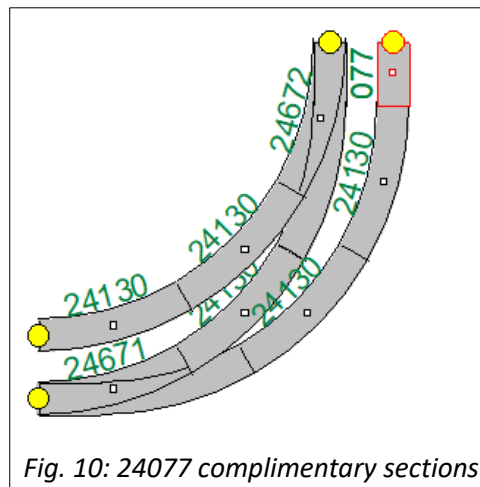


Fig. 10: 24077 complimentary sections

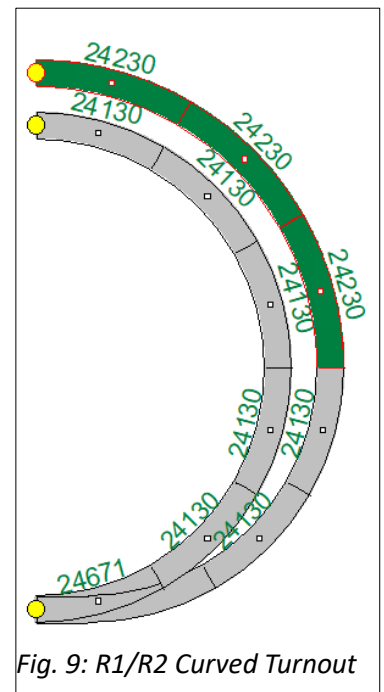


Fig. 9: R1/R2 Curved Turnout

Double Slips and Crossovers

The track geometry for Märklin's Double slip switch (24624), Crossovers (24640) and Wide-Angle Crossovers (24740) match that of the standard and wide-angle turnouts (24.3 and 12.1-degree offset, respectively). You can use the same complimentary pieces listed in Figs. 4-7. The curve radius for 24624 and 24640 are matched to the 24224 curve and can be used with 24206 pieces to create a double circle crossover (Fig. 10).

The exception to the family of crossovers is 24649. This piece has an angle of deflection of 48.6-degrees. It is useful in combinations where you might have two standard turnout pieces. The example in Fig. 11, lays out an example that I have used in an exchange track.

This has been an examination of some assembly observations on C-track geometry. There will be exceptions even after some careful planning of one's layout. Laying down track does not always lay out evenly according to geometry. You will even have some discrepancies when using inclines to your track plan. However, any added differences can be easily compensated with the variety of track available. It is also viable (but not recommended) to cut C-track pieces down to size. It's best to have at least one full 'click' end for these to be sure you have good power conductivity.

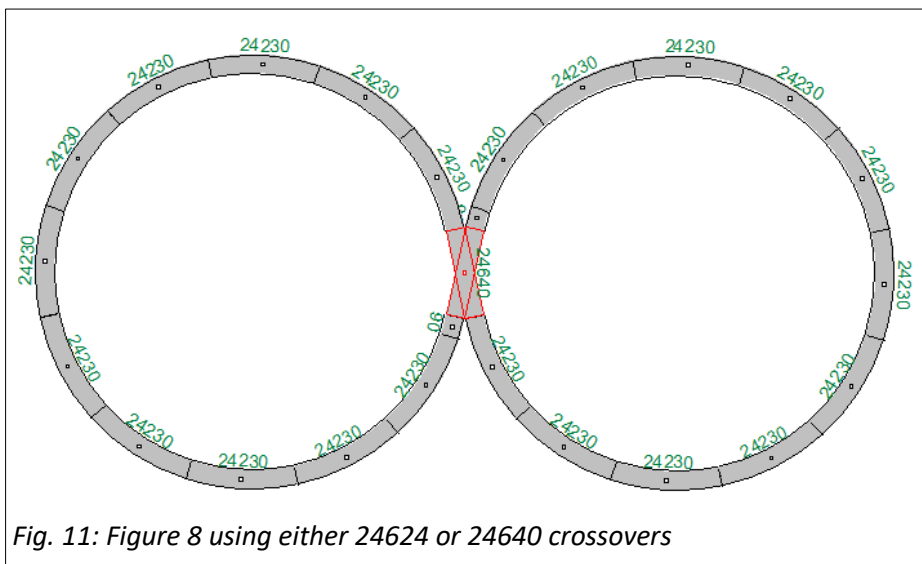


Fig. 11: Figure 8 using either 24624 or 24640 crossovers

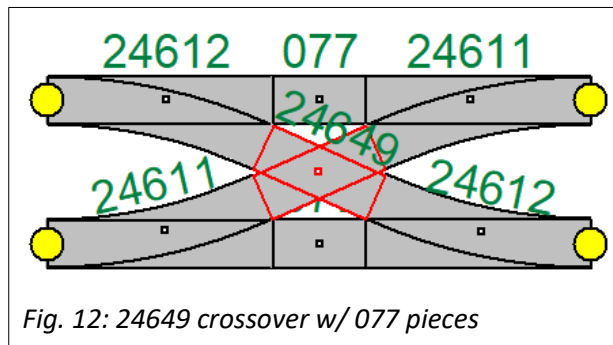


Fig. 12: 24649 crossover w/ 077 pieces

I will include some additional pages that you can print. They include spreadsheets of C-track geometries written in this article. I will also add the curved track connection possibilities.

Curtis Jeung

Upcoming appearances:

Märklin Digital Webinar #19

Dec. 15th

11:00 – 12:00 PST

Login details were emailed

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

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Straight Track		Equivalents		Degree of Turn		Equivalents		Parallel Track Spacing	
Part #	Length			Radius	Degree of Turn				
24360	360		24188 + 24172	R1	360		24115 + 24115		
24236	236.1		24172 + 24064	R2	437.5		24215 + 24215 or 24224 + 24206		77.5
24229	229.3			R3	515		24315 + 24315		77.5
24188	188.3		24094 + 24094*	R4	579.3				64.3
24172	171.7		24094 + 24077	R5	643.6				64.3
24094	94.2			R9	1114.6				
24077	77.5								
24071	70.8								
24064	64.3								
Specialized Tracks									
24994	94.2 Circuit		24094						
24995	94.2 Contact		24188 or 24094*						
24997	94.2 Uncoupler		24094						
24951	180 C – M Track adapter								
24922	180 C – K Track adapter								
Curved Track									
24130				R1	360				
24230				R2	437.5				
24330				R3	515				
24430				R4	579.3				
24530				R5	643.6				
24912				R9	1114.6				
24115				R1	15		24107 + 24107		
24107				R1	7.5				
24215				R2	15		24207 + 24207		
24207				R2	7.5				
24206				R2	5.7*				
24224				R2	24.3*				
24315				R3	15				
24194				R1 Curved Circuit	15				
24294				R2 Curved Circuit	15				

Turnouts/Crossing		Curve radius	Degree of Turn	Complimentary Pieces
Length				
24611	188.3	R2 Left	24.3	24206, 24224, 24172
24612	188.3	R2 Right	24.3	24206, 24224, 24172
24630	188.3	R2 3-way	24.3	
24671		R1/R2 Curved Left	30	
24672		R1/R2 Curved Right	30	
24711	236.1	R9 Left	12.1	24912, 24229, 24071
24712	236.1	R9 Right	12.1	24912, 24229, 24071
24771		R2/R3 Curved Left	30	
24772		R2/R3 Curved Right	30	
24624		Double Slip	24.3	
24640		Crossing	24.3	
24649		Crossing	48.6	
24740		Wide Angle Cross	12.1	

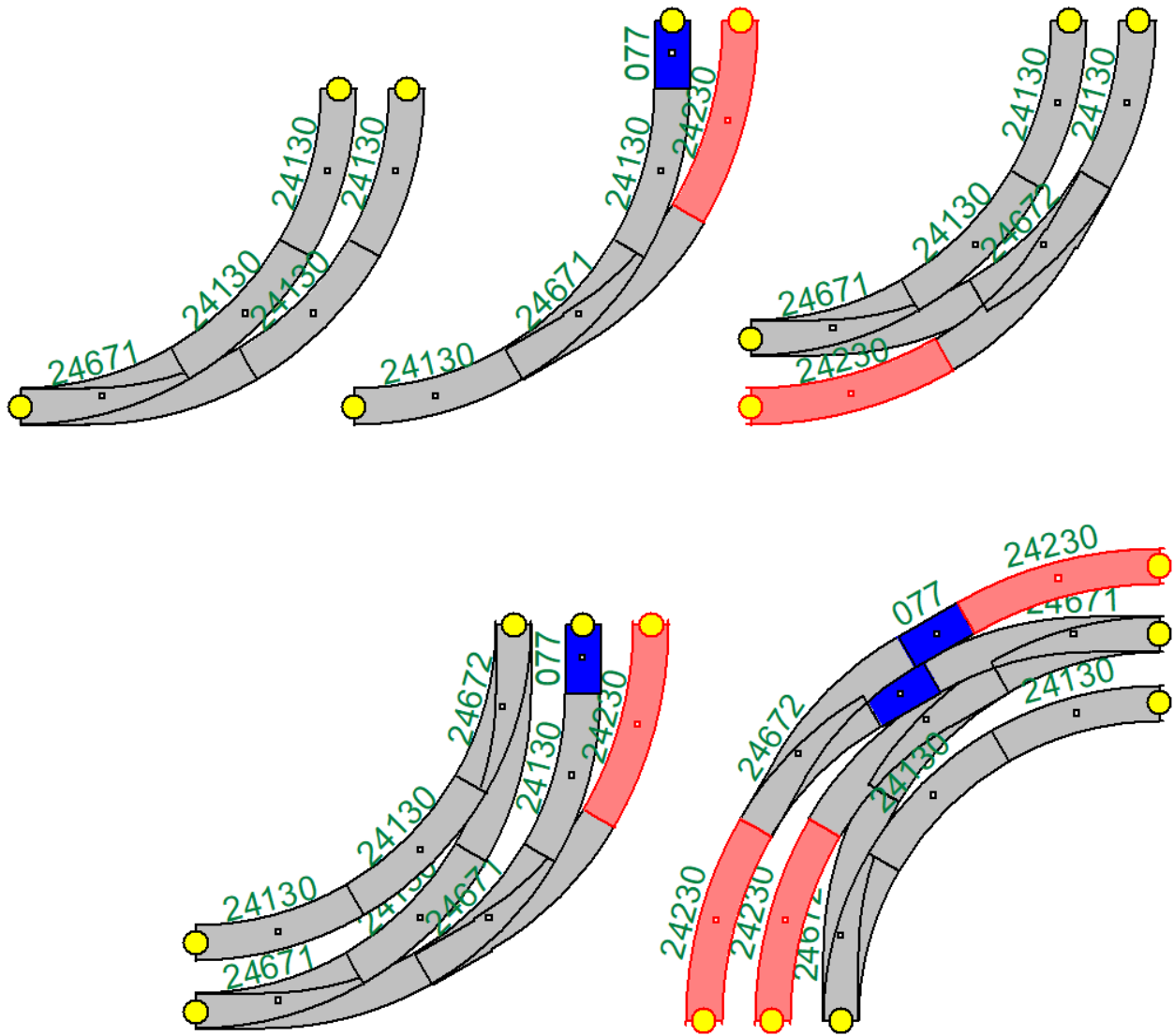


Fig. 13: R1/R2 Curved turnout assembly options