INSTRUCTIONS
HO Scale Turnout

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14-712 Code 83 #5b LH 14-713 Code 83 #5b RH 14-718 Code 83 #5e LH 14-719 Code 83 #5e RH
14-812 Code 70 #5b LH 14-813 Code 70 #5b RH 14-818 Code 70 #5e LH 14-819 Code 70 #5e RH

For information on using these **Ladder Track System** turnouts to build a railroad yard, see the Micro Engineering pdf information docs and turnout templates available for download at **microengineering.com**.

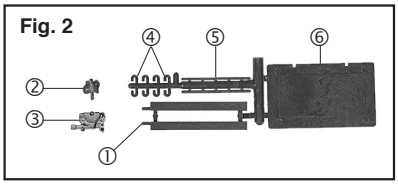
Caution: Micro Engineering turnouts are scale models. As with most models, they are somewhat fragile and must be handled carefully. The turnouts should be held by the ties not by the rails. To avoid dislocating the rail from its spikes, never exert pressure on the side of the rail and never push downward on unsupported ties.

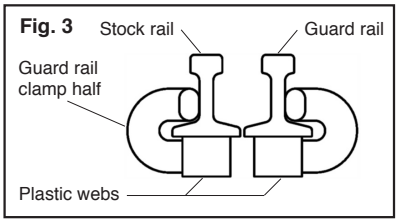
1. FEATURES

These turnouts are a "DCC friendly" design meaning they are compatible with **Digital Command Control** (**DCC)** power systems but can also be used with conventional **DC Block Control** power systems. Some of the features incorporated in this turnout include; an all metal frog for good electrical performance and appearance; metal guard rails for a more realistic appearance; prototypical spacing and placement of scale size turnout ties; snap action, sprung switch rails; a non-operating switch stand; optional positioning of headblock ties and switch stand on either side of the turnout; blind nail mounting holes; a detail kit for super detailing the turnout; and a special wheel set gauge for checking wheel sets should derailments occur. In addition, these turnouts have a large amount of molded-in detail including; scale size tie plates and spikes; tie wood grain detail; rail braces and slide plates in the switch rail area; hook twin tie plates in the frog and closure rail areas; and full length gauge plates on the two ties at the point end of the switch rails.

2. DESIGN & OPERATION

Attention to factors effecting good operation and prototype appearance were the guiding principles in the development of these turnouts. Design effort was especially focused on the dimensions in the frog area in order to accommodate as wide a range of HO wheel sets as possible while still maintaining smooth operation. The result is turnouts that have superior operating characteristics with trouble free operation of most equipment, forward or backward, at virtually any speed. When derailments do occur, it is often the result of an out of spec wheel set on the rolling stock. Included with your turnout is a **wheel set gauge** ⑥ for checking wheel pairs. If the wheel flanges of a wheel pair do not fit in the grooves of the wheel set gauge, the wheel set is out of spec and should be repaired or replaced.

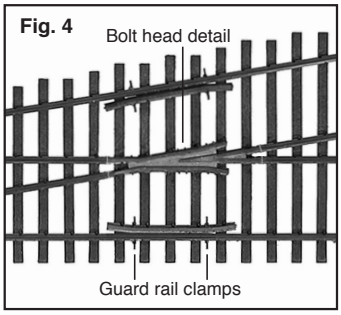




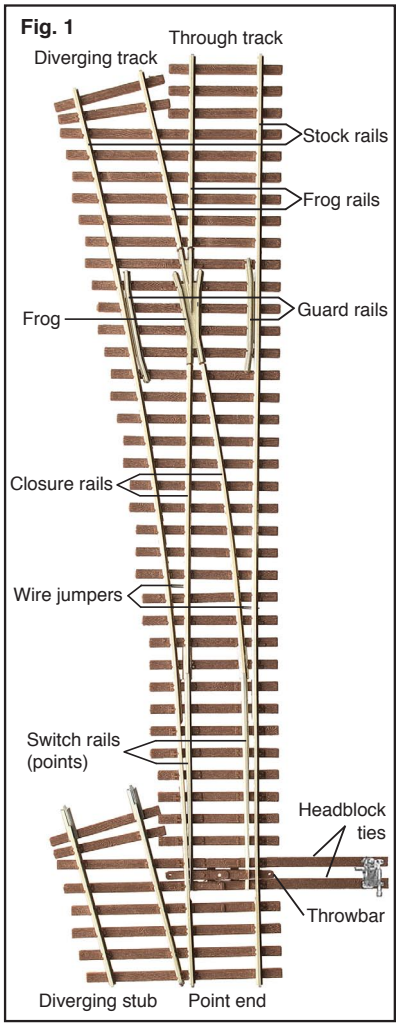
3. PARTS

The turnout is ready to install on your layout right out of the package or it can be super detailed using the extra detail parts included with the turnout. (See fig. 1-4.) These parts are made of an acetal plastic or white metal and should be glued with a cyanoacrylate (CA) cement. Listed below and shown in fig. 2 are the parts and the number included with each HO scale turnout.

①	**headblock tie extension set**	**1**
②	**switch stand target**	**1**
③	**switch stand body**	**1**
④	**guard rail clamps (halves)**	**8**
⑤	**frog bolt head plates**	**2**
⑥	**wheel set gauge**	**1**



14-718 HO Code 83 #5e LH Shown



4. DETAILING

a. Headblock ties: (See fig. 1.) The turnout is designed so the headblock ties and switch stand can be located on either side of the turnout. The two ties of the **headblock tie extension set** ① have a plastic connector between them near each end. With a razor knife cut out the connector at the end with the pins (the end that will be against the turnout). Do not remove the connector at the opposite end as it will be hidden by the switch stand (if used). Place the turnout on a flat surface and insert the pins on the end of the extension set into the slots in the ends of the headblock ties on the desired side of the turnout and cement in place.

b. Switch stand: Cement the **switch stand target** ② into the **switch stand body** ③. Paint the switch stand assembly and cement it near the ends and on top of the headblock tie extensions. (See fig. 1.)

c. Guard rail clamps: On modern prototype railroads **guard rail clamps** ④ are used to help hold the guard rails in their proper position. They are located in the spaces between ties, perpendicular to the stock rail and guard rail, with a clamp near each end of the straight section of the guard rail. (See fig. 4.) Cut each clamp half off the parts sprue and cement in place with one end against the rail web and the other end against the plastic web under the rail. Trim or file the long end as necessary to fit. (See fig. 3.)

d. Frog bolt head detail: Cement a **frog bolt head plate** ⑤ to each side of the frog so the end with the separate pair of bolt heads is at the closure end of the frog. (See fig. 4.)

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PAGE SIZE INFO #5b & #5e only:

1. Cut 1-1/2" off bottom of printed sheet (maintain 1/4" top margin). **Finished page size** after cutting**:** 8-1/2" w. x 9.5" h.
2. Fold in half, side to side (with front showing), fold in half again (with logo showing). **Finished size** after folding**:** 2-1/8" w. x 9-1/2" h.

Finished document must be flat.

5. MODIFICATIONS

a. Weathering: Most of the metal parts of the turnout can be weathered to match our Weathered Flex-Trak™ by using Micro Engineering Rail Weathering Solution, #49-103 or #49-104. All of the rail parts must be cleaned before weathering to remove all of the lubricant residue left from their manufacture. Remove the weathering from the tops of the rails with a Bright Boy, Micro Engineering #49-113, or a fine sanding block.

6. ELECTRICAL

a. DCC Compatible: Micro Engineering turnouts are compatible with Digital Command Control (DCC) power systems. The turnouts are manufactured so the stock rails and their adjacent closure rails and switch rails have the same polarity. This assures that if a metal wheel contacts the stock rail and its adjacent switch rail at the same time, it will not short and shut down the DCC control system. Another feature of DCC compatible turnouts is an electrically isolated frog which is necessary to avoid shorts where rails with opposite polarity join the frog. Built in **plastic insulators** between the frog base and the base of each of the four rails joining it, prevent the rails from sliding against the frog and creating a short. The turnouts can also be used with conventional DC Block Control power systems without alteration.

b. Power Feeds: The wiring hookup to the turnout is identical for DCC or conventional DC Block Control power systems.

1. Stock rails: Power of opposite polarity needs to be supplied to each stock rail through metal rail joiners from connecting tracks or through a power wire soldered to each stock rail. (See 7c. Wire Attachments, below.)
2. Frog rails: Power also needs to be supplied to the two frog rails in the same manner as the stock rails. Frog rails must be of opposite polarity from their adjacent stock rail.
3. Frog (optional): The metal frog can be powered or left un-powered. (See 6c. Frog Power Routing, below.)
4. Closure rails: Power is already supplied to the two closure rails via built-in wire jumpers from their adjacent stock rails.
5. Switch rails (points): Power is already supplied to the two switch rails via the built in hinge rail joiners.

c. Frog Power Routing: Because the frog is not powered, it is possible some short wheel based locomotives such as 0-4-0's could stutter or stop when crossing the frog at slow speeds. To avoid this, the metal frog in Micro Engineering turnouts offers the option of powering the frog through Power Routing (which cannot be done with plastic frog turnouts). Power Routing provides power to the frog and changes its polarity each time the turnout is thrown. To do this, a wire is soldered to the frog (see 7c. Wire Attachments, below) and power is supplied to the frog through the electrical contacts of a switch machine or a separate toggle switch.

7. INSTALLATION

a. Throw Mechanism: The snap action, sprung switch rails allows the switch rails to be thrown with your finger. Optionally, a manual throw switch stand or electric switch machine can be used. Since the spring installed in the turnout is fairly strong, it may be necessary to remove the plastic retainer and spring from the underside of the turnout for use with some throw mechanisms. The plastic throwbar has .035" diameter holes at either end and in the center where a 1/32" wire throw linkage can be inserted from below or above.

b. Rail Joiners: The three end ties of the turnout are without spike detail and are slightly thinner to allow easier installation of metal rail joiners. Gently push down the end tie so the joiner can slide over the tie. Be careful not to apply too much pressure on the tie which can pop the spikes off the rail on following ties. We recommend making a few swipes with a file on the corners of the rail base which makes it even easier to get the rail joiners on the rails.

c. Wire Attachments: If power wires are needed (see 6. Electrical, above) it may be easier to solder them to the appropriate rails and/or frog before mounting the turnout. On the underside of the turnout, a small, round metal pad that is part of the frog extends through the plastic for soldering a wire to the frog. (This pad may be covered with a thin layer of plastic flash which is easily scraped off.) **Caution:** when soldering wires to the turnout, use a small, hot soldering iron and apply the heat quickly to avoid melting the plastic spikes and ties.

d. Mounting: You may need to tweak the turnout to straighten the straight stock rail which may have a slight bow, caused by shrink of the molded-on plastic ties. To do this draw a straight line on the roadbed where the tie ends of the turnout's through track will be located. Place the turnout on the line and drive four temporary small nails into the roadbed, against the tie ends at each "corner" of the turnout. Start with two nails at the point end, straighten the turnout and hold it in place with two more nails against the ends of a long turnout tie at the other end. Sight down the through track to make sure it is straight when installing the nails. These temporary nails will hold the turnout straight while it is glued or nailed in place.

The turnout can be mounted to the roadbed by gluing or nailing. Many modelers prefer gluing their track and turnouts in place for a more realistic appearance (no nail heads showing). The turnout ties, like our Flex-Trak, are made of an acetal plastic (for superior strength) and require a rubber based cement such as Pliobond®, Micro Engineering #49-101 or #49-102 or a cyanoacrylate (CA) cement or silicone caulk. To glue the turnout in place, paint a thin layer of Pliobond cement on the roadbed, or apply CA cement to the undersides of the ties, or spread a thin layer of caulk on the roadbed with a putty knife, place the turnout in position, and place weights on the turnout until the cement sets. Additional holding power will be gained when the ballast is cemented around the ties.

For nailing, blind nail holes are provided on the underside of some of the ties. Use a 3/64" (#56) drill to drill through the remainder of the blind holes. Avoid applying too much pressure when drilling which can break the ties. Fasten the turnout to the track board with small nails, brads, or spikes. Avoid driving the nails in too far which can warp or break the tie.

e. Final Installation: Attach the connecting tracks to the turnout and ballast the turnout and track. Be sure to ballast over the wire jumpers or paint them black to hide them. **Caution -** Keep glue and ballast clear of the moving switch rails and throwbar. Do not ballast between the headblock ties where the throwbar operates. Check the throw action of the switch points making sure they snap against the stock rail when thrown to either side. Use a Bright Boy, Micro Engineering #49-113, or a sanding block to clean the top of the rails for good electrical pickup and a better appearance.