



# North Raleigh Model Railroad Club

## Standards and Recommended Practices

### Show Operating Procedures — NTRAK Layout

#### Standard

Issue 8

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Questions, comments, corrections and suggestions should be addressed to the NRMRC Standards Committee at [dsd@pinehurst.net](mailto:dsd@pinehurst.net)

#### Table of Contents

Introduction.....	Page 1
Logistics .....	2
Job Descriptions.....	2
Superintendent.....	2
Digital Master .....	2
Engineer.....	2
Dispatcher.....	2
Yardmaster .....	2
Setup.....	3
Setup Time.....	3
Members' Tasks During Setup.....	3
Show "Set-Up" Procedure.....	3
Protection of Modules .....	4
Operations.....	4
General Operations.....	4
Operating Rules for Engineers.....	5
Uni-Directional Running.....	5
Bi-Directional Running.....	5
Locomotives with Sound.....	5
Raleigh & FitzGerald Yards.....	5
Turnouts .....	5
Engineer's Attention .....	5
Lift Bridge Modules (Geezer Gate).....	5
Yard Operations.....	5
Class of Trains.....	6
Superior Direction .....	6
Tear Down.....	6
Motive Power & Rolling Stock.....	6
Electrical Control & Operation.....	7
Digital Control .....	7

Turnout Control.....	7
Miscellaneous .....	7
Show Operations Training Session .....	7
Children .....	7
Dress Code.....	8
Food and Drink.....	8
Disputes.....	8
Security .....	8
Supplies for Emergency Use .....	8
Show Superintendent's Report .....	8
References.....	8
NRMRC Publications.....	8
Other Publications .....	8
Appendix A — Job Function Descriptions.....	9
Appendix B — Form 19 Train Order .....	11
Appendix C — Using the NRMRC Digital Track Gauge.....	12
Appendix D — Raleigh Yard Operating Instructions .....	13
Appendix E — FitzGerald Yard Operating Instructions.....	18
Appendix E — Geezer Gate Operating Instructions .....	19

#### Introduction

This publication was authorized by the Standards Committee on June 11, 1991, and proposed to the general membership. It was ratified by the Club on August 7, 1991. Major revisions have been made to reflect the change from wired to wireless throttle control of trains, the universal use of Digital Command Control (DCC), the use of electrically controlled turnouts and routes, and the use of timesaving devices.

Shows have been a basic part of Club activities since its inception, for a number of reasons. Important goals are to reach

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the general public, to educate them about railroading and to help them become more aware of the hobby of model railroading. Our shows have attracted a lot of public attention wherever they have been held. Also, no Club activity has proven more successful at recruiting new members than the train show.

Shows afford Club members opportunities to display our work to the public and to collaborate on a group project. They offer a compelling deadline for finishing new modules and improving existing ones. Shows bring Club members together in a spirit of fellowship and instill a sense of pride and accomplishment.

Shows provide major benefits for the Club, but they also entail a considerable amount of work and planning. The public is entitled to see trains run in an orderly, professional manner. They see the operators (Club personnel) as experts; thus the smooth and continual operation of the layout is necessary and required. The following operating procedures therefore are set with the public in mind and will be used for the Club's NTRAK layout at each show. A companion document provides Show Operating Procedures for our T-TRAK layouts.

Any corrections or suggestions for changes or improvements should be directed to the Chairman, Standards Committee, North Raleigh Model Railroad Club.

## Logistics

Logistics essentially means the ability of the Club to transport modules and equipment, set up and tear down, and operate the layout committed to the organizers of the Train Show.

Based on our experience at train shows over many years, the Club has determined that it takes on average approximately one man-hour per module to set up the layout; a 4ft or 6ft module is a single module, but an 8' module made up of two 4ft modules is considered as two modules.

The various parameters must be matched — sufficient manpower, transport capability and operating capability — for a successful show. The final layout size will result from this match.

## Job Descriptions

A number of specific job functions must be carried out in order to manage and operate the layout successfully during a show. Several functions are defined. Specific requirements depend on several factors including layout size and complexity, number of members and guests participating in the show, and the operating scheme planned. While the layout could be operated with as few as two people (Engineers), operation would at best be nothing more than the same trains running around the main lines endlessly. See also detailed job descriptions in Appendix A.

**Superintendent:** In charge of all layout planning, logistics, setup and operation, train movements on mainlines and overall look of the layout to the public eye.

As warranted and at the discretion of the Club, an Assistant Superintendent may be appointed, who will assist the Superintendent, and assume the duties of the Superintendent during any absence or inability to fulfill his/her duties.

Should an Assistant Superintendent not be appointed, or not be present, the Chairman of the Standards Committee, then the Club President, then the Dispatcher, in that order, will assume the duties of the Superintendent during any absence or inability of the Superintendent to fulfill his/her duties.

A Show Superintendent's Checklist is available as a separate document to assist the Superintendent to fulfill these functions.

**Digital Master:** In charge of all aspects of the digital design, setup and operation of the layout. The Digital Master is appointed by the Standards Committee. In performance of these duties the Digital Master will follow the rules in the Club publication "Digital Command Control for NTRAK Layouts — Design & Operational Considerations."

As required due to layout size and/or complexity, the Digital Master may appoint one or more Assistant Digital Masters.

**Engineer:** Responsible for operating a train safely on the assigned track(s) at prototypical speeds, or as defined in any Form 19 orders, according to the operating rules specified herein.

One or two additional positions may be required when the Club's NTRAK layout has a formal prototypical operating session:

- **Dispatcher:** Directly in charge of all trains on the layout — the "Train Controller." Chooses track assignments. Keeps track of length of operating time per train and train location. Responsible for preparing and updating the Control Board during an Operating Session. This function is normally staffed only during a formal Prototype Operations session.
- **Yardmaster:** Directly in charge of trains in and out of either Raleigh Yard or FitzGerald Yard, ensuring that departing trains keep clear of trains entering the yard, which have priority. Chooses car and locomotive assignments, and supervises the makeup of trains in the yard by their owners. This function is normally staffed only when there is a lot of traffic on the main lines and guidance must be given to trains entering and leaving Raleigh Yard so they do not disrupt or compromise the safety of mainline trains.

The Superintendent can reassign functional responsibilities to meet the needs of current operating conditions.

## Setup

Setup of the layout is key to a successful Show. Everyone must arrive on time and fully participate in the process, especially if setup time is short.

Transportation of modules, etc., is the responsibility of the owners. If the owner cannot provide transportation contact the Superintendent as soon as possible. Transportation of club-owned modules and other necessary equipment is to be arranged by the Superintendent.

Every module owner or designated person is to arrive on time for setup and bring the tools necessary to assemble the modules. Each module or unit is positioned in accordance with the map provided by the Superintendent. Everyone is expected to help unload and set up, and remain until the layout is completely assembled, or work is officially stopped. If a person must leave early, make the Superintendent aware of it (upon arrival).

Modules must be in place no later than one hour before the doors are opened to the public, or insertion may be refused.

Space in the layout for a module or module unit is made by the Superintendent according to the following guidelines. Only fully scenicked and certified modules are chosen in this order:

- 1) Guest-owned modules
- 2) Member-owned modules
- 3) Club-owned modules

Note: club-owned modules necessary for successful configuration of the layout (for example, Raleigh Yard, FitzGerald Yard and corners) will always be included.

The Superintendent has the final decision as to which modules are accepted or rejected.

On occasion, an unscenicked, partially scenicked or non-certified module may be allowed in the layout. The minimum criteria for such acceptance are full electrical operation of the tracks.

### Setup Time

The Superintendent will advise all members of the date and time to collect modules and other material from storage, and the date, time and place for start of setup at the show location, as well as any other necessary information regarding events on setup day.

### Members' Tasks During Setup

Members' first task on arrival at a Train Show is to find the Show Superintendent and check-in. Even if you don't have a module, check in. There are always club corners, the yard and other modules needing a "foster parent" for show set-up.

When you check in you should find out where your module(s) will go, and the location of the anchor point — the first module

put in place from which the layout is built in two directions. With this information, move your module to the correct spot, set up the legs and erect the module.

Owners of "module sets" clamp them, make the electrical connections, and place connector tracks within their set.

Any removable details on modules can be added as time allows.

### Show "Set-Up" Procedure

The following procedure will be followed to ensure set-up is accomplished in a timely and successful manner. This procedure requires all modules be on site at the start of set up, and that all Club members, even those without modules, be available to assist. The Superintendent may vary this procedure at his discretion; his Superintendent's Checklist will have additional details.

- Pre-plan the layout and configuration of modules based on the allotted space.
- Using masking tape, mark the floor at all corners of the layout, per the floor plan.
- Set one end of the layout in place (usually the end with the yard T-module) to anchor the layout.
- Set up modules and place in position sequentially per the diagram, starting from the anchor end. Each module owner is responsible for his/her own module(s), aided by other members, especially those without modules of their own (see previous section).
- Moving "teams" successively assemble and complete the layout. If sufficient people are present, two sets of teams can be used, each working outwards from the anchor end.
  - Level the modules at the correct height using the Height Bars and a level, and clamp to the adjoining module.
  - Use the Digital Track Gauge (instructions in Appendix C) to determine the correct length of the joiner tracks, and lay the track section in the gap where it will be installed. Install the connector (joiner) tracks between modules. Be sure to install insulated rail joiners at electrical district boundaries, as indicated on the layout plan and by markers on the layout.
  - Clean the track on each module, using acceptable methods such as a Bright Boy, a sock wetted with isopropyl alcohol and/or suitable wet and/or dry track cleaning cars.
  - Install curtains and "Module ID" tags around the layout.

When attaching the skirt (curtains), start at any bridge module in the layout. Start the skirt on the inside layout side of a bridge module or Geezer Gate, place around

the end of the joining module, and then continue on around the layout. Whenever a bridge module is encountered, run the curtain to the inside of the layout and fasten. At the other end of the bridge module start a new curtain section and continue around the layout. When starting a new section of curtain be sure to overlap the old section by at least one foot (so the ends of the curtain don't slide apart providing a view into the messy underside of the layout).

- Set stanchions in place and run protective rope around the layout.
- Once installed power up the control system(s) and check for correct operation throughout the layout. Correct any faults.
- Operate test locomotives over all tracks and correct any faults.
- Place buildings and other scenery or local operation items on the modules.
- At the same time, the Digital Master and staff install the DCC Command Station, Boosters, Radio Tower(s), Universal Panels and interconnect LocoNet and Track Bus wiring. They then fully test the system.
- Once the layout is complete and operational, construction of Raleigh Yard commences. The first set of trains to be run should be set up on the layout proper, in order to be ready to run when the public arrives.

### Protection of Modules

Modules must be handled with care during transportation and setup to ensure they are not damaged, especially items installed on the surface of the module such as track, buildings and other scenic accents, or electrical components, turnout machines and linkages, etc., on the bottom of the module.

- Carefully unpack module end plates and secure the fasteners, being sure that modules do not get damaged when loose.
- Stand the module(s) up and secure the legs

**Once modules are setup, no material of any kind is to be transported or handed across the top of the module. This includes boxes of equipment, toolboxes, food, drink, etc., since they may slip and fall onto the module. No boxes of any kind (including the track box), food, drink, etc. may be placed on a module at any time.**

### Operations

Depending on the circumstances of the train show, or for a specific event such as an Operating Session members may be

asked to sign up for functions and/or time slots when they will attend the layout during the show. The sign-up process will either be a sign-up sheet available at the Club meeting prior to the show or as requested using the Club's email list. **Ensure you are present at the time(s) you signed up for.** For positions or time slots not filled, or in the case of no-shows, the Superintendent will assign duties.

Note: except for special circumstances, no Member will hold the same job function during consecutive time slots.

Every operator shall remain at the assigned position unless relieved by the Superintendent, i.e. the Yardmaster does not leave the yard to see what is happening elsewhere on the layout, etc.

When local conditions at a Train Show dictate a modification to these procedures, a Form 19 Train Order (see Appendix B), detailing all modifications, will be issued to all Members and guests present.

### General Operations

The intent of operating trains at a Show is to make it appear that a railroad is in operation. This requires variety, which means not letting the same trains be operated for a prolonged period. The following procedures are based on this premise:

- Change trains frequently, but not too frequently. Move a train out of the yard and onto the main line, run it around several loops or for a specific amount of time, at prototypical speeds, then send it back to the yard and replace it with another one. The Dispatcher, when present, will decide the length of time each train will spend on the layout before being returned to the yard. The Dispatcher will prepare and update a Control Board containing the status of all trains on the main lines and branch line, and in the yard.
- To ensure all Members have the opportunity to run their equipment on the layout, the Dispatcher and the Yardmaster may not run their own equipment during the time slot they are acting in those functions.
- Conduct as many local operations as possible on modules so equipped. Make use of industrial spurs, passing sidings, branch lines, freight yards, passenger stations and engine terminals. This not only adds to the action, but can compensate for a slowdown on the main lines due to derailments and moving long trains to and from the yard.
- Card Order or other forms of operation may be used for local way freights under the direction of the Dispatcher, as agreed by the Superintendent.
- The NTRAK main lines (Red and Yellow tracks) are to be operated as main lines. The preferred direction for the main lines is right hand running (outer main (red) goes counter-

clockwise, inner main (yellow) goes clockwise). Wrong main running is permissible only for detours, moving a train from one track to another, moving trains to and from the yard, and when bi-directional running is in effect unless otherwise authorized by the Superintendent. The NTRAK branch line, alternate branch line and mountain division line will be bi-directional, with the Superintendent selecting the direction of travel.

Note: With DCC power multiple trains can be run on each track. Trains should be similar types with similar speeds. A fast passenger train should not be run on the same track as a coal drag.

- From time to time passenger trains are to be stopped for 30 to 60 seconds at passenger stations. If the station has a passing siding, trains can be swapped. Thus, a train can pull out almost as soon as the incoming train arrives.
- Train length and makeup should be reasonably realistic. Mainline freights should have freight or dual-purpose power, and be limited to about 75 cars (preferably 50 to 60 cars). Passenger trains should be pulled by passenger or dual-purpose power, and be limited to 20 cars (preferably 12 to 15 cars, although some trains should be limited to the length of station tracks). Extra-long trains have a habit of derailing. Any trains in excess of 75 freight cars or 20 passenger cars require authorization of the Superintendent. The caboose, if used, should be the same road name as the engine; exceptions are permitted when consistent with prototypical practice.

**Note:** A proper end car *must* accompany all trains. No end car indicates a break-away. End cars include the following: caboose, observation car, freight car equipped with a FRED, brake van, etc. When an unusual end car is placed on the end of a train, the Engineer shall provide details of the end car to other Engineers via voice or radio before departing Raleigh or FitzGerald Yard.

- Owners assemble their trains in the yard under supervision of the Yardmaster, if one is appointed and on duty.

### Operating Rules for Engineers

The following operating rules apply to engineers operating on the North Raleigh Railroad and other layouts in which the NRMRC participates. When a Dispatcher is in charge of operations these rules are suspended and engineers must obtain clearance from the Dispatcher for all operations.

**Uni-Directional Running** The engineer of the following train is responsible for avoiding rear end collisions with the train in front (just like driving a car). Since sometimes an engineer cannot see the rear of his/her train (e.g. around a corner of the layout) this

places the responsibility for avoiding a rear end collision on the next following engineer in case of a stop or a breakaway in the preceding train.

**Bi-Directional Running** When bi-directional operation is permitted an engineer must ensure the track to the next siding is clear before leaving the previous siding. When two trains are ready to proceed onto the same section of track then priority is based on Class of train or superior direction. The responsibility to avoid a rear end collision also applies.

**Locomotives with Sound** Engineers running trains with sound-equipped locomotives should sound the whistle/horn and bell according to prototype practices at level crossings, when starting, stopping, etc.

**Raleigh and FitzGerald Yards** An engineer desiring to enter into or depart from Raleigh Yard must ensure the way is clear and inform other engineers of his/her planned movement. When two trains are involved priority goes to Class of train or superior direction of travel. See Section "Class of Trains."

If a Yardmaster is present then all entry into or departure from the yard is under the Yardmaster's control.

Detailed instructions for operating Raleigh Yard are provided in Appendix D.

**Turnouts** Engineers of trains are responsible for ensuring turnouts in front of their train are aligned correctly for the desired route and turnouts behind their train are re-aligned to the normal position. This applies to both manual and electrical (pushbutton or DCC throttle) operated turnouts.

**Engineer's Attention** If an engineer's attention is diverted from operating the train (such as talking to the public) he/she is to immediately notify other engineers of his/her intent to stop his/her train and then stop the train until the diversion ends. Alternately the engineer hands his/her throttle to another engineer to take control of the train.

**Lift Bridge Modules (Geezer Gate)** All members must watch for approaching trains before opening the lift bridge on any modules so equipped, such as Geezer Gate, to ensure that locomotives and rolling stock do not fall to the floor. Do not assume that an electrical interlock has been set up and will work. Detailed operating instructions for Geezer Gate are in Appendix F.

When fast intercity passenger trains are being run a sign will be hung on Geezer Gate so members will take extra care to make sure the fast train is not approaching around a corner.

### Yard Operations

The following rules apply to the operation of **Raleigh Yard**, including setup and tear down of trains, arrivals and departures, and operation of the electrical power routing switches on the yard control panels.

**Yardmaster** If a Yardmaster is present, all yard operations are under the Yardmaster's control. This includes track assignments for train setup, train tear down and arrivals, control over arrivals and departures from the yard, and operation of the electrical power routing switches on the yard control panels.

**No Yardmaster** Engineers may set up their train on any track except tracks 1 and 20 (turnaround loop tracks). However, at least four (4) tracks must remain clear to allow arriving trains to enter the yard.

When an engineer wishes to depart Raleigh Yard he/she must inform other engineers by voice or radio of his/her intentions, then proceed when it is safe to do so and the way is clear. Only when ready to depart and the way is clear should the engineer line the electrical power routing switches for his/her train.

When an engineer wishes to enter Raleigh Yard he/she must advise other engineers by voice or radio of his/her intentions, then proceed when it is safe to do so and the way is clear. If two trains are ready to enter the Yard priority is based on the Class of the Trains or the train traveling in the superior direction. Only when ready to enter the yard and the way is clear should the engineer line the electrical power routing switches for his/her train. Appendix D provides Raleigh Yard operating instructions.

Electrical power routing switches can be lined to a specific track for a short period for DCC locomotive consisting, providing such action does not affect trains arriving or departing the yard.

The following rules apply to the operation of **FitzGerald Yard**, including setup and tear down of trains, and arrivals/departures.

If a Yardmaster is present, all yard operations are under the Yardmaster's control. This includes track assignments for train setup, train tear down and arrivals, and control over arrivals and departures from the yard.

If there is no Yardmaster Engineers may set up their train on any track except the main tracks. However, some tracks must remain clear to allow arriving trains to enter the yard.

When an engineer wishes to depart FitzGerald Yard he/she must inform other engineers by voice or radio of his/her intentions, then proceed when it is safe to do so and the way is clear. Only when ready to depart and the way is clear should the engineer line the turnouts for his/her train.

When an engineer wishes to enter FitzGerald Yard he/she must advise other engineers by voice or radio of his/her intentions, then proceed when it is safe to do so and the way is clear. If two trains are ready to enter the Yard priority is based on the Class of the Trains or the train traveling in the superior direction. Only when ready to enter the yard and the way is clear should the engineer line the turnouts for his/her train.

## Class of Trains

The following is the Class of Train superiority that is used on the North Raleigh Railroad, listed in descending order.

- Passenger Trains
- Local Passenger Trains
- Intermodal Freight Trains
- Unit Freight Trains
- General Merchandise Trains
- Local Freight Trains

## Superior Direction

Unless otherwise specified by the Superintendent, clockwise is the superior direction on the North Raleigh Railroad. This rule applies even when a train changes from the superior to the inferior direction. For example, a train traveling in the superior direction crosses onto a track where it is running in the inferior direction. This train becomes inferior to a train of the same class running in the superior direction.

## Tear Down

The Superintendent will advise the time for start of tear down of the layout. No person can pull his module out ahead of time and leave without serious disruption to the layout operation. Advance warning and planning is required. The layout must not be torn down while other exhibits are still open.

Because of the size and complexity of the modules making up Raleigh Yard, tear down of the yard is permitted to start thirty minutes before the close of the Show. Before tear down of the yard commences, the Superintendent must ensure sufficient trains are operating on the layout for normal viewing by the public until the Show closes.

Everyone is expected to stay until all modules are disassembled. Corners and club-owned equipment are the responsibility of everyone. When we are all loaded and ready to go, we all leave together. If you must leave early tell the Superintendent upon arrival that day.

The space occupied by the layout should be left clean, and any garbage placed in appropriate receptacles.

## Motive Power and Rolling Stock

Since showmanship is the key to success at a show, if a specific train or piece of rolling stock or motive power gives problems with derailments, breakaways, etc., it will be removed from the track or layout.

The Superintendent, Assistant Superintendent and Dispatcher have the authority to remove trains or individual cars or locomotives that don't operate reliably when running on the layout. In general the rule of "twos" will apply:

Two derailments  
Two uncouplings

Rolling stock, locomotives or trains so removed will not be returned until the malfunction has been remedied and tested. Major cosmetic flaws in rolling stock or locomotives are also cause for removal from the layout.

Only those locomotives meeting the requirements specified in the Club publication "**Equipment Standards and Procedures**," or otherwise approved by the Superintendent, may be used during the time the show is open to the public.

**Note:** High quality rolling stock and locomotives are common in N Scale. Much of this equipment was expensive to purchase, is somewhat fragile and is very valuable. Most are no longer available, except possibly through auction at extremely inflated prices. ***Extreme care must be taken in the handling of Members' equipment following derailments, collisions and break-aways, and in the yard during handling of equipment.*** Refer to the guidelines for "**Train Show Etiquette**" and "**Railroad Courtesy**" for further suggestions.

The use of expensive locomotives and rolling stock should be avoided on layouts where stanchions/ropes are not present around the layout perimeter.

All maintenance and testing must be done on a test track or yard track, not in public view on the main lines or branch line.

All locomotives and rolling stock must be identified with a color code painted on the underframe of each, or by a personal decal bearing the name of the owner. The code, consisting of one to three dots or stripes, is used to identify ownership of the rolling stock when it has been intermixed on the layout. The color codes are registered with the Club Secretary and are defined on the Membership Roster.

All set-up and teardown of trains must be done in the yard area, not in public view on the main or branch lines, if at all possible, unless otherwise specified by the Superintendent.

Packing/unpacking of rolling stock and trains is to be done on tables, not the yard; equipment must be transported to/from the yard on trays. All boxes used for the transportation of trains by Members must be kept under the modules or on tables, not in walking space.

No Club member may have more than 2 trains on the layout (main lines and yard) at one time unless approved by the Superintendent.

At the start of operations on the first day of a Show, the Superintendent will designate certain members to provide the initial trains for testing and operation on the layout.

## Electrical Control and Operation

The North Raleigh Model Railroad Club utilizes 100% Digital Command Control. Analog locomotives may not be operated on club layouts. It is the intent that the electrical control of Show layouts be reliable and continuous.

### Digital Control

Digital Command Control (DCC) systems will be used for operations on Club Layouts at all Train Shows. Digital design for NRMRC layouts shall follow the guidelines specified in the publication "Digital Command Control for NTRAK Layouts — Design & Operational Considerations." The Club standard for DCC is the Digitrax Digital Command Control System.

### Turnout Control

More and more turnouts on modules are being equipped with electric turnout machines controlled by pushbuttons and/or DCC throttles and/or software. Modules owners must advise the Superintendent and operators of the type of turnout control on their module(s) and provide operating instructions. If the module(s) requires a DCC signal for train operation or turnout/route control, this signal can be obtained from the layout DCC system or from a Command Station/Booster provided by the module owner, as directed by the Show Superintendent.

## Miscellaneous

### Show Operations Training Session

All members must participate in and pass an operations training session and be familiar with these Show Operating Procedures before operating trains on a club layout at a train show. This is required once upon joining the Club.

### Children

The Club encourages Members to involve their children in the hobby of model railroading. In order to avoid conflict with the objectives of a Train Show, however, the following rules apply:

Parents are directly responsible for their children's behavior at all times, both within and outside the Show layout. When inside the layout, young children of Club Members not running trains must be provided with gainful activities to keep them occupied at all times, and they must be kept away from areas used by Members who are operating the layout.

***Children under 12 are not permitted to operate trains at any time on the Show layout or any individual module in the Show layout, unless and until they have passed a Youth Basic Operations Training session. They may not sign up for any of the operating functions on the Show roster.***

Children 12 to 18 must be under direct adult supervision (parent or other adult Member) when performing layout related

functions. The Show Superintendent may modify the age limitations as appropriate based on the demonstrated maturity of the individual child.

When outside the layout, children who are not operating a train must remain outside any protective ropes around the layout; other children do not know these are member's children and think that they too should be allowed inside the ropes. Children of members should avoid chasing trains.

### Dress Code

While there is no formal dress code for Club members at Shows, it is recommended that official Club shirts and caps be worn by Members during show times. Otherwise, Members should dress as the public sees a railroader — blue jeans, vest, railroad hat, rail scarf, etc. Remember to always wear your Club name badge or a shirt with your name embroidered on it. A Club name badge can be obtained from the Club Secretary.

### Food and Drink

Permitted inside the layout only on the tables. Keep food and drink away from the trains and off the modules. Food and drink waste should be placed in appropriate receptacles or garbage bags, as soon as consumption is complete. ***No food or drink is to be placed on any module or on tables containing electronic control equipment.***

### Disputes

Any disputes between members must be settled quietly with the public eye in mind. No arguments! Both parties walk away and resolve all issues later or at the next Club meeting. For disputes involving operations or operational issues the Superintendent is the final authority.

### Security

For protection of the layout and equipment from the public, whenever possible stanchions with a rope will be used to circle the layout at a distance of at least two feet from the layout. Equipment and rolling stock should not be left on the layout overnight or whenever the layout is unattended.

For layouts where stanchions and ropes cannot be used due to restricted space members present at the layout should be continuously vigilant to ensure trains are not stolen or damaged and modules are not damaged by members of the public.

During setup and tear down all boxes, modules and other club and member equipment should be secured, especially if the public has access to the layout space. At least one member should be present unless uniformed security forces are present.

### Supplies for Emergency Use

From time to time, modules and/or track and/or wiring will receive damage which must be repaired before the layout can

be used in a Show. The following constitutes a minimum list of the supplies to be kept on hand to deal with any damage:

- 6 sections flex-track (Atlas 2500)
- 1 package rail joiners, metal (Atlas 2535)
- 1 package rail joiners, insulated (Atlas 2538)
- 10 ft, 16 Ga. Insulated lamp cord and 50 ft, 12 Ga. zip wire
- Powerpole Connectors — 2 red (Anderson 1327), 2 black (1327G6) and 4 contacts (1331)
- Flashlight/Magnifying Glass/First Aid Kit
- Normal model railroading tools, such as pliers, wire cutter, wire stripper, soldering iron and solder, screwdrivers, Bright Boy track cleaner, glue, etc.

## Show Superintendent's Report

The Superintendent will provide a ***written*** report on the show, either electronically on the Club's email list or at the next Club meeting. It should cover highlights of the show, operational issues, specific recommendations and any other comments that can be used to enhance the success of future shows.

## References

### North Raleigh Model Railroad Club Publications

- Digital Master's Checklist
- Equipment Standards and Procedures
- Locomotives for Use at Shows
- Module Certification and Grading
- Module Standards and Recommended Practices
- Preparing to Participate in a Train Show
- Railroad Courtesy
- Recommended Practice for 120VAC NTRAK Layout Wiring
- Recommended Practice for NTRAK Module Wiring
- Rules for DCC Design and Operation of NTRAK Layouts
- Show Superintendent's Checklist
- Train Show Etiquette

### Other Publications

- Niagara Orleans Model Engineers (NOME) Club Standards, NTRAK Data Sheet #3.1.
- "Mall Show Guidelines," NTRAK Magazine, Sept/Oct 1985, Page 28.
- "NTRAK Train Operations," NTRAK Magazine, Nov/Dec 1985, Page 30.
- "Public Show Operations on a Modular Layout," NMRA Bulletin, May 1984, Page 33.
- "The Modular Way," by Jim FitzGerald, N-Scale Magazine, May/June 1997.

## Appendix A — Job Function Descriptions

### Show Superintendent (The “Boss”)

Following are the functions of the **Show Superintendent**.

#### General

- In charge of all layout planning, set up and operation, train movements on main lines and overall look of the layout to the public eye.

#### Planning the Show

- Advise Members of date and times for start of set up, the Show, and start of tear down.
- Arrange transportation of Club-owned modules.
- Coordinate visiting modules.
- Prepare configuration (map) of the Show layout.
- Prepare operator assignment sign up sheet when needed.

#### Show Set Up

- Final decision as to which modules are included/excluded in the layout, using the following guidelines:
- Only fully scened and certified modules are chosen in this order:
  - Guest-owned modules
  - Member-owned modules
  - Club-owned modules (except those necessary for operation of the layout)
- Change configuration (map) of Show layout in real time in response to changing conditions.

#### Show Operations

- Ensure Members and guests do not hold the same operator functions during consecutive time slots.
- Final authority for resolving any disputes.
- Assign job functions when insufficient Members and/or guests have signed assignment sheet or any have not showed up for their assignment.
- Decide on cars/locomotives/trains to be removed from the layout for non-reliable operation — rule of "twos."

#### Tear Down

- If present, authorize tear down of Raleigh Yard 30 minutes prior to end of Show.
- Arrange transportation/storage of Club-owned modules.
- Look after any material (modules, parts, trains, etc.) left behind by Members, and attempt to return to owner.

#### Report

- Prepare a written report on the Show, including highlights, operational issues, recommendations for future Shows, and any other comments, for transmission electronically on the Club’s email list or at the next Club meeting.

### Digital Master

Following are the functions of the **Digital Master**.

- Fully responsible for and final authority for all aspects of digital design, setup and operation of the layout.
- Ensures sufficient DCC equipment on hand to control and power the layout, including a spare Command Station.
- Ensures Command Station reset to default parameters then to standard settings at the start of the show and each day prior to start of operations.
- Inspects visiting modules for compliance with digital wiring specifications.
- Ensures Coin Test successfully carried out on all tracks in all power districts.
- Coordinates LocoNet ID/Duplex Group Name setting with other layouts so there is no inter-layout interference.

### Engineer

Following are the functions of the **Engineer**.

- Operates according to Operating Rules for Engineers
- Operates a train on the assigned track at speeds defined as prototypical elsewhere in this publication, or as defined in any Form 19 Train Orders.
- Ensures the rule of "right-hand running" is followed on the Red and Yellow tracks, except as directed by the Superintendent, Dispatcher and/or any Form 19 Orders.

Red track:	Counter-clockwise
Yellow track:	Clockwise
Blue/Alternate Blue track:	Either direction
Green track:	Either direction

- Follows the progress of multiple trains on the assigned track to ensure safe operation and spacing.

**Safe spacing of multiple trains on the same track and prevention of rear-end collisions are the responsibility of the engineer.**

- Stops passenger trains at stations from time to time.
- Ensures all trains are started and stopped smoothly, and any speed changes made smoothly, so as to not cause derailments or breakaways.
- When operating sound-equipped locomotives blows the whistle/horn and rings the bell in a prototypical manner for starting/stopping, grade crossings, etc.

- Watches all passing trains for problems or potential problems. Advises train Engineer and/or Dispatcher as appropriate.

### Dispatcher

Following are the functions of the **Dispatcher**.

- Does not run own equipment/train(s) while dispatching, except as approved by the Superintendent.
- Prepares and updates Control Board containing status of all trains on the layout and in the yard.
- Keeps track of length of operating time per train. Changes trains at reasonable frequency, based on availability of equipment and good or bad operation of existing trains.
- Decides on cars/locomotives/trains to be removed from the layout for non-reliable operation — rule of "twos."

***Must not leave assigned location during shift.***

### Yardmaster

Following are the functions of the **Yardmaster**.

- Located at the throat of Raleigh Yard.
- Chooses track assignments.
- Supervises owner make up of trains in yard.
- Ensures train lengths kept within limits, either per this publication or as set in any Form 19 Train Orders.

- Selects trains from those available in the yard, roughly in the order they are presented by their owner, taking into account the operational requirements of the layout.
- **Does not make the decision whether a train will be run or not; it will be run if it meets the Club standards for locomotives and rolling stock.** If the Yardmaster determines any difficulty with the train or its equipment in the yard, he is to resolve the issue with the owner. Should the Yardmaster and the owner not reach agreement, the issue must be brought to the Superintendent for resolution.
- Plans movement of trains into/out of Raleigh Yard to minimize disruption to main line train operation.
- Identifies train and its end car for each train to Engineer(s) and Dispatcher when train leaves the yard.
- Ensures operation of the NTRAK main lines (red, yellow) in right-hand running mode, except when bi-directional operation of these tracks has been authorized by the Superintendent or by Form 19 orders.
- Ensures owners remove trains from yard following completion of run.
- Ensures all yard tracks are powered down except when actual train movement is taking place on a specific track. This ensures that locomotives are not inadvertently wearing down their wheel tires or burning out their motor at the track bumper at the far end of the yard.
- Does not run own equipment or trains while Yardmaster.

***Must not leave assigned location during shift.***

## Appendix B — Form 19 Train Order

	<b>North Raleigh Model Railroad Club</b>	<b>Form 19</b>
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Train Order No. \_\_\_\_\_ Date: \_\_\_\_\_

<b>To:</b> NRMRC Operating Crews	<b>Subject:</b> XXXXTrain Show Raleigh, NC Month, Days, Year Operational Instructions
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The following changes to the normal Show Operating Procedures are being made to improve operations at this Show. The aim is to keep trains running continuously and reliably.

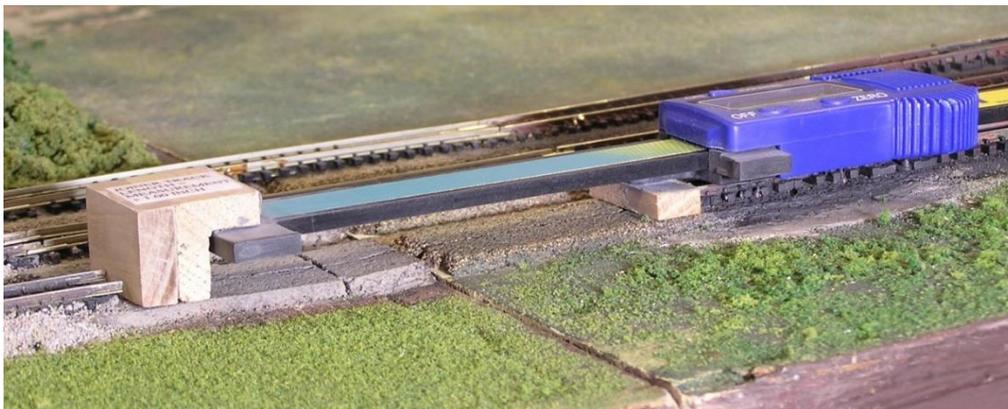
<p><b><u>General Instructions for Use of Form 19</u></b></p> <p><b>Form 19</b> is to be used by the Show Superintendent to communication to Members and others operating the layout at a Train Show any changes to the <b>Show Operating Procedures</b> necessary due to local conditions at the Show, to indicate special events such as Card Order Operation or DCC operation, or for any other reason where additional information and/or instructions must be provided.</p> <p>Members and others operating the layout at a Train Show should check from time-to-time to see if a Form 19 Order has been issued, read it and follow the instructions in the Order.</p>	<p>The normal arrangement of a Form 19 Order is for each employee (Member) needing the information to have his/her own copy. This can normally only be done if all the contents are known before the Show starts (access to printers, copiers, etc.) A hand-written Form 19 is acceptable for use at the Show as necessary. The single copy should be posted in a conspicuous place where all Members and others operating the layout can read it. A suggested spot is the tower supporting the Club's electric signs; alternately the Dispatcher's position is suggested.</p> <p>Only the Show Superintendent or Assistant Superintendent is authorized to issue a Form 19.</p>
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**EACH EMPLOYEE MUST HAVE A COPY OF THIS ORDER.**

Made: \_\_\_\_\_ Time: \_\_\_\_\_ Authorized: \_\_\_\_\_

**Superintendent**

## Appendix C — Using the NRMRC Digital Track Gauge



**Caution!!** This gauge is electronic and can be damaged by rough handling.

**DO NOT use this gauge when DCC power is applied to the track (Track Power ON).**

### Gauge Setup:

- Close jaws until they touch
- Push ON button and make sure the display reads "inch". If it reads "mm", push ON again until it reads "inch"
- Push ZERO button to zero out the display

### Using the Gauge:

- Set up the gauge as described above.
- Lay the gauge in the gap between track ends.
- Open the jaws until the wood block faces contact the rail ends.

**\*\*CAUTION\*\*** Make sure the faces of the wood blocks are hitting just the rail ends, not rail joiners left in from the last layout, or errant ballast, or anything else.

- Read the measurement from the digital readout and add exactly 1 inch. This is the exact length of the required joiner track piece needed to give a tiny gap at each end.

The gage will show 2 decimal places (hundredths of an inch) while we have the joiner tracks measured to 3 decimal places (thousandths of an inch). This can create a bit of confusion, so use the following general guidelines to pick a suitable length of joiner track.

### Picking the Right Piece of Joiner Track

The object is to find a piece of joiner track that will give a SMALL gap at each end of the joiner track when put in place. For ease of finding that particular joiner track, we will look for one within a SMALL range of lengths.

The range we want to look for in a joiner track length is one that just matches the 2 decimal places on the gauge readout, to one that is .020" (twenty thousandths) less.

For example: The gauge readout says 3.14, add one inch to get 4.140. The lower range would be .020 less, or 4.120. Therefore, we want to find a joiner track that measure between 4.120 and 4.140.

### For Joiner Tracks that Need Insulated Joiners

Insulated joiners take up another .020", so we need to subtract this to lower the range of acceptable joiner tracks.

For example: The gauge readout says 3.14, but the note on the layout says "insulated joiners". We add one inch to get 4.140 and then subtract .020 for the insulated joiner to give us the top end of the range at 4.120. Now we subtract the .020" to get the lower end of the range which gives us 4.100. Therefore the joiner track needs to be between 4.100 and 4.120 in length.

If you can't find a joiner track in these lengths, you can lower the number further, but REMEMBER! **THE LOWER YOU GO, THE LARGER THE GAPS WILL BE !!!!!**

So, if you are the one measuring, **TAKE YOUR TIME TO GET IT RIGHT and MAKE SURE YOUR RANGE IS NOT TOO LARGE**

**Large range = Big gaps = Poor running**

## Appendix D — Raleigh Yard Operating Instructions

### Introduction

Raleigh Yard is a classic NTRAK inside yard. The three main lines — Red, Yellow and Blue — pass across the yard tee and optionally, any of those lines connect to the throat of the yard by way of a Crossover Module. Additionally the Blue mainline may be switched into a Bypass Track so that a train can traverse Raleigh Yard by entering on one side, taking the Runaround track route and leaving on the opposite side without interfering with other yard operations. The Red mainline is equipped with a double-ended siding. The Green mainline is carried directly across the yard tee and is equipped with a double-ended siding, but cannot be switched into the yard.

The Crossover module increases the flexibility and utility of the yard by allowing either side of the yard to handle incoming and outgoing trains in either mainline direction. The crossover connects to the yard turnout ladder that allows access to twenty yard tracks. Tracks 1 and 20 are connected by a loop of track forming the runaround track.

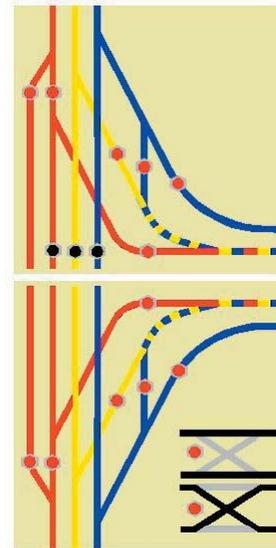


Raleigh Yard at NRV Show 2013, Photo by Brian Sadler

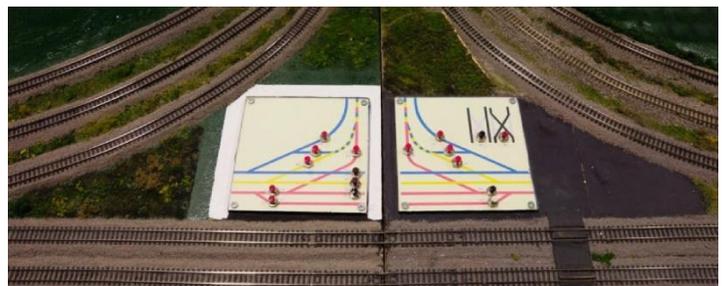
Turnout operation on the yard tee and crossover modules is automated while all turnouts in the yard ladder are manually operated. The turnout controls for the Tee and Crossover are located on the module surface along the front edge of the yard tee modules near the center. A route from any of the Red, Yellow or Blue mainlines to the yard (or to the Bypass Track from the Blue mainline) is selected by pressing the button associated with the desired route. This will cause all turnouts on the desired route to be positioned appropriately. Crossover turnout controls are on the same panel and duplicate controls are also located on the crossover module.

Each end of the red siding is controlled individually so that opposing trains may meet. After using the Red siding, the

turnouts on each end of the siding must be aligned for main line operation. The three black pushbuttons in the middle of the route selector panel are used to restore the mainline route after trains enter and leave the yard. Care must be taken to avoid resetting the mainline pushbutton to align for straight through route if there is a train on the opposite side of the yard Tee leaving or entering the yard (as this would cause a derailment by realigning their route also). It is the responsibility of the train crew to realign the yard Tee back for mainline routes after their train has completed its move.



The photo below, by Brian Sadler, is a view of the two control panels in place on Raleigh Yard. The location of these panels allows easy access from the front or from either side of the yard.

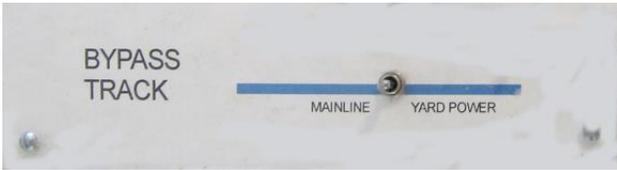


### Power Selection Switches

Two control panels are located on the Tee module near the interface with the crossover module, as shown below. Each panel has the capability to select the source of power applied to the bypass track for the respective side of the yard.



Left Power Selection Panel



Right Power Selection Panel

Electrically Raleigh Yard is split into right and left halves so that the left half includes the left tee module, the left half of the crossover module, the left half of the yard ladder and tracks 1 – 10 of the yard while the right half includes the right tee module, the right half of the crossover module, the right half of the yard ladder and tracks 11 – 20 of the yard. When the crossover is set

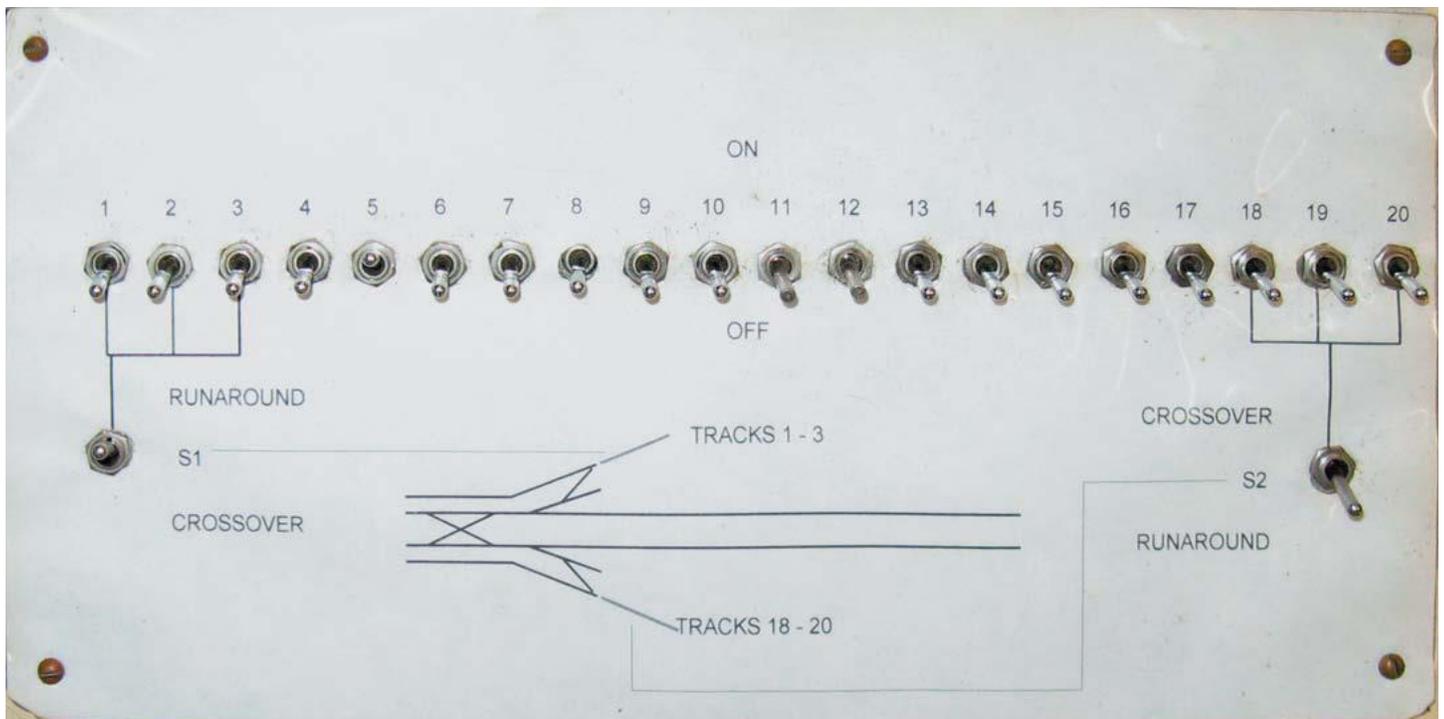
to the crossover position though, control of the yard ladder halves and the outlet of the crossover halves is reversed. This follows the same pattern as the track. As an example, when in the crossover position the right tee is connected to the left yard ladder and therefore, so is the power.

The Bypass Track power selector is a toggle switch that controls the bypass track from the turnout where the runaround track leaves the blue line through the crossover module. There is a Bypass Track power selector for each half of the yard. When the toggle switch is in the mainline position the power to the runaround track is the same as is applied to the Blue mainline. Note that the Bypass utilizes yard Tracks 1 and 20 to travel to and from the Tee module to the return loop.

An auto reversing DCC booster is in place to provide the source of DCC power to each half of the yard.



Yard Throat and Two Yard Modules. Control Panel on Throat Module Shown in Detail on Next Page



There are 20 toggle switches on the yard ladder module that extend the selected power to yard tracks when the respective toggle switch is in the ON position. Best practice is to keep these switches Off unless that track needs to be powered. Two additional toggle switches (S1 and S2) select the power source for tracks 1 - 3 and tracks 18 - 20, respectively. When S1 or S2 is in the crossover position, the power applied to their respective tracks is derived from the main power selection switches on the yard tee, depending on the state of the crossover. Thus in crossover position tracks 1 - 3 are powered from the same source as tracks 4 - 10 and tracks 18 - 20 are powered from the same source as tracks 11 - 17. When in the runaround position, tracks 1 - 3 and 18 - 20 are powered from the bypass track power selection switches.

The manually operated yard turnouts have been equipped with slide switches that both move the turnout points and assure solid power, in the correct phase, to the turnout frogs. **All manual turnouts are to be operated by using the slide switch and not by moving the turnout directly.**

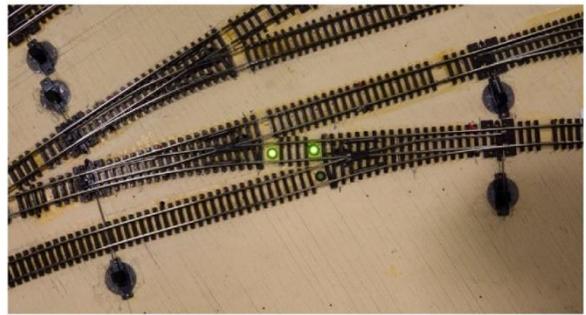


Turnaround Loop

The runaround loop module, shown above, has a single loop of track, insulated in the center. Each half of the runaround track loop is connected to track 1 and 20 respectively.

A further improvement to the manually operated turnouts is the addition of green LED indicators that are wired so that the yard operator can determine if the turnouts in a route have all been positioned correctly. These LEDs are mounted between the ties of the track on the frog end of turnouts where indicators are required. In most cases there is simply one green LED that will be illuminated for the yard tracks that have a valid route to the Crossover. Because yard track 1, 2, or 3 could be routed to either the Crossover or to the Bypass track, Three LEDs are provided to identify the valid route. Note that, as the yard tracks are symmetrical, reference to tracks 1, 2 or 3 applies equally to tracks 20, 19 or 18.

The following photos, courtesy of Brian Sadler, show the three LEDs lighted or dark for various routes.



Valid Route to Crossover! The two illuminated LEDs shown here indicate that the route from Crossover to track 1, 2, or 3 is valid.



Valid Route to Bypass! There is clearly only one route selected in this view; the Bypass to track 1, 2, or 3 route.



Care must be exercised here because there are two lighted LEDs; one for the Bypass to Track 1, 2 or 3 route and one showing the turnout for the Crossover to track 1, 2 or 3 route although this route is not valid.



Don't be fooled by this condition. Although the LED is illuminated showing the Crossover route is selected rather than the Bypass, the second LED is dark meaning the route from track 4, 5, or 6 to the Crossover is selected.

## Tips

To help make operation of Raleigh Yard a more pleasant experience we offer the following tips.

- 1) Make sure your train's wheels are CLEAN.
- 2) **Make sure the power to your yard track is turned OFF before putting a locomotive on it. This will both prevent damage or runaway situations as well as preventing any short circuits from affecting other parts of the yard.**
- 3) Before aligning the turnouts and setting the yard power switches, make sure someone else hasn't already set them for taking a train out or bringing one in. Simply communicate with others and call out your intentions.
- 4) If after aligning the turnouts and power switches correctly, ensure that the green lights are lighted in each turnout that you plan to traverse.
- 5) Be patient. Long trains can take a while to get into or out of the yard. Communicate with others if you block mainlines when leaving or entering the Yard. If radios are not in use simply call out your intentions.
- 6) Be considerate. You typically are not the only one waiting to get your train out of the yard.

## Special Tips for Blue Line Users

Raleigh Yard is considered to be feature rich in terms both of flexible power sources and routing. One feature that enhances the routing flexibility of Raleigh Yard is the Bypass Track arrangement. Like many enhancements though, the inclusion of the Bypass Tracks complicated the route between the yard tracks and the Blue Line by adding an extra turnout to traverse between the crossover and the Blue Line with attendant tight turns. To make running on the Blue Line easier when using equipment that does not favor these tight turns, consider the following.

Set up trains on tracks 1 – 3 or 18 – 20. These tracks have access to the Blue Line both through the Crossover and by way of the Bypass Tracks. If the Bypass route is taken from yard to the Blue Line the tight turns are avoided.

## Operation Example

Let's set up a short train on yard track 18 to head out to the red line. We remember that typical running on the red line follows the right hand rule. This means we will be running our train counterclockwise around the layout. In order to do this, we will be exiting the right hand side of the Yard Tee (as if we are standing IN FRONT of the layout).

First we make sure that the toggle switch on the yard throat that corresponds to our track number (18 in this example) is in

the OFF position. We then build our train (that has CLEAN WHEELS).

Next, we make sure that no one else is sending out or bringing in a train by observing and asking our fellow engineers. Once we have concluded that the yard electrical switches and turnouts can be changed, it's time to set our route out of the yard.

Carefully align the manual turnouts on the Yard Throat as required to route your train from yard track 18 through the yard crossover module, making sure you go STRAIGHT through, and not crossing over to the left Yard Tee. This would send you out in the opposite direction to right hand running.

Next we ensure that the toggle switch on the Yard Throat labeled S2 is set to the CROSSOVER position (because we have selected a route through the manual turnouts leading to the Crossover). Finally go to the toggle switch on the yard throat for track 18 and flip it to the ON position. Power is now extended from the Red mainline, through the yard, to track 18.

Acquire your locomotive on your throttle. Turn on the headlight or have it move a little to insure that you have acquired it correctly.

Send your train through the route set in the Yard Throat and stop it when it reaches the front of the Yard Crossover (right before you enter the Yard Tee).

After ensuring there is no oncoming traffic on the Red line, set the route to the Red line through the right hand Yard Tee using the Right Module Turnout Control Panel. Look in both directions, and announce your intention to come out of the yard to other engineers. When clear, slowly bring your train out onto the Red Line.

Once totally through the Yard Tee turnouts, reset the Red Line for main line running. Announce that you are clear of the yard so that train crews on other tracks can proceed.

Run your train and have some FUN!

## Summary

To take a train out:

- 1) Set yard track toggle switch on Yard Ladder Module to OFF
- 2) Build Train on yard track corresponding to toggle switch in step 1
- 3) Make sure no other engineer has preset switches or turnouts. ASK!
- 4) Set yard throat control panel toggle switches to route power to your track
- 5) Acquire locomotive and bring to front of Yard Crossover
- 6) Set route through appropriate Yard Tee and yard crossover via Module Turnout Control Panel

- 7) Announce leaving yard, make sure both ways are clear, bring train through Yard Tee
- 8) Once train is clear of Yard Tee turnouts, reset the Red Main Line for straight through running
- 9) Announce when you are clear of the yard

To bring your train back in:

- 1) Announce intention to enter the yard
- 2) Make sure route chosen is not used by someone else coming into or going out of yard
- 3) Set route into yard through appropriate Yard Tee and yard crossover via Module Turnout Control Panel

- 4) Set appropriate yard track toggle switch(s) on Yard Ladder Module to ON
- 5) Make sure both ways, all tracks are clear and start train into yard through Yard Tee
- 6) Once train has cleared turnouts on Yard Tee, reset Main Line for straight through running
- 7) Once train is stopped on appropriate yard track, turn yard track toggle switch on yard throat to OFF

### References

Authors: David Derway, Joel McCurry & David Thompson

Photos: David Thompson, except where noted.

## **Appendix E — FitzGerald Yard Operating Instructions**



## Appendix F — Operating Instructions for Geezer Gate

### Description

Geezer Gate provides an easier means of ingress/egress to the inner portion of NTRAK layouts by means of a lift bridge, which raises the NTRAK main and mountain tracks to allow a person to pass through the module. The features are the following:

- Counterweighted to hold bridges in open position.
- Both bridges lift & lower simultaneously by a single handle.
- Adjustable bridge length to accommodate humidity and temperature changes with alignment pins for precise vertical bridge alignment, and interior adjustable feet for strength and height adjustment.
- Electromagnet lockdowns for secure holding and horizontal alignment.
- Bridge track rail ends soldered to PC board for alignment and maintaining track gauge. Also staggered and tapered so track gaps are not aligned.
- Guardrails placed to trap wheels along rail, keeping other rail from jumping opposite gap.
- Big push buttons for ease of operation when releasing electromagnets.
- Electrical relay circuit shuts down power to entire module when either button is pushed and/or bridge is in up position. Buttons are momentary only.
- Adjacent modules can be added to the stopped blocks with the addition of track bus extension cables.

### Operating Instructions

The following operating rules are intended to permit safe operation of the bridge without disrupting train operations:

**Basic Operation:** Push the button to release the bridges. Lift the handle straight up till the bridges are vertical (or leaning slightly backwards from the closing side), walk through. The pushbutton may be released as soon as the bridges are about 1" above their closed position. Immediately turn around, and use the handle (top or bottom rung) to gently lower the bridges straight down to their closed position.

### IMPORTANT ITEMS TO REMEMBER AT ALL TIMES!!!!!!!!!!!!!!

- **YOU are responsible for making sure a train is not on or entering the module when you push the button and lift that handle!**
- **ALWAYS USE THE HANDLE. DO NOT lift or lower the bridges by the bridges themselves. Lift straight up and**
- **Lower straight down.**

- **Make sure the bridges are vertical (or leaning slightly backwards from the closing side) and are held by the counterweight before turning the bridge handle loose. DO NOT let the bridges slam down.**
- **Once through the geezer gate, make sure you CLOSE the bridges (by the handle) immediately. DO NOT let the bridges slam down.**
- **NEVER force the handle open or slam it shut. If the magnets haven't released when you push the button, or the alignment pins have locked the gate closed or they won't allow the bridges to close, use another means to get inside or outside of the layout and contact David Derway, the owner of the geezer gate immediately.**

**Additional detailed information:** This module is a lift-bridge design, with electrical interlocking to remove power from switched rails when the bridges are open. The electrical interlocking is accomplished through a relay and electromagnet circuit. The circuit operates as follows:

- During normal operation, power is provided to the switched tracks through the relays. The relays get this power directly from splices off the 12AWG Main Through Power Bus.
- The power to close the relay circuit is provided by a 800MA 12VDC wallwart, routed through a pair of momentary hand operated push button switches, and through bridge location switches for each bridge. This power circuit also provides power to the bridge hold down electromagnets.
- To operate the bridge, push one of the large momentary switches. This opens the relay/electromagnet circuit, cutting power to the electromagnet (which releases the bridges), and causes the relay to switch to the normally closed position, cutting power to the switched tracks.
- The bridges are raised via the handle, which open the bridge location switches, and the push button switches may be released. The open bridge location switches maintain the open circuit, which keeps power to the electromagnets and relays off.
- Once ingress/egress has been completed, the bridges are lowered via the handle to their closed positions. The lockdown circuit will be activated once the bridges have centered on their respective centering pins and have traveled far enough to close the bridge location switches. This will pull the mating plate firmly against the electromagnet and also restores power to the switched track.