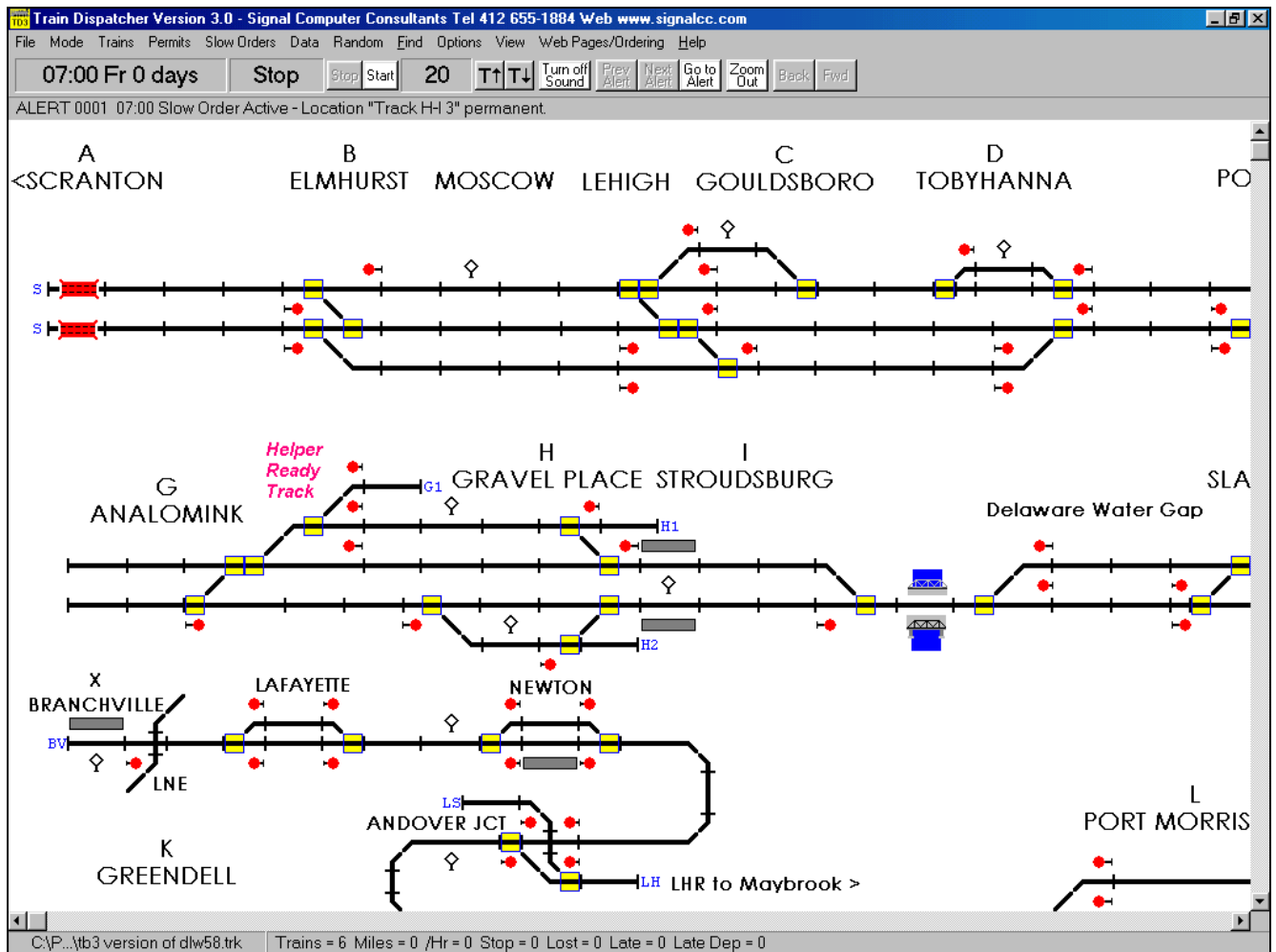


TRAIN DISPATCHER 3.5

User Manual

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Train Dispatcher 3 and Track Builder 3 are dedicated to Frank Bryan and Fred Frailey who tested both programs over a four month period and provided many suggestions on improvements.

It is doubtful that these programs could have been successfully completed without their help and support.

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1. INSTALLATION

1.1. Loading the Program

Train Dispatcher 3 is a 32-bit Windows program that will run on systems running Windows 95, 98, 2000, NT 3.51 or NT 4.0 or later. It will not run under Windows 3.1.

Train Dispatcher comes on a CD-ROM. To install the program, insert the CD-ROM into the CD-ROM drive and click the Start and then the Run buttons. In the Open box, type d:autorun.exe if your CD-ROM is the D drive on your computer. If it is not the D drive, type the appropriate drive letter followed by a colon and then autorun.exe (ex. e:autorun.exe, f:autorun.exe, etc.). Follow the instructions in the installation program to complete the installation. The Setup program will ask you for a serial number. The serial number for Train Dispatcher 3 is the same serial number you received for Train Dispatcher and/or Train Dispatcher 2.

When Train Dispatcher 3 is installed, the Setup program will load the program into the Train2 folder (default) and create a desktop icon.

1.2. Starting the Program

There are four ways to start the program. To start the program:

- ◆ Click the Start button, point to Program, then to the Train2 folder, and click on the Train Dispatcher 3 program.
- ◆ Double click on the Train Dispatcher 3 icon on the desktop.
- ◆ Open the Windows Explorer, find the Train Dispatcher 3.exe file in the Train2 folder and double click on the file.
- ◆ Open the Window Explorer, find a track file (track files have a .trk file name extension) in the Train2 folder, and double click on the file. This will cause the Train Dispatcher 3 program to start and load the track file on which you clicked.

After starting the program, the Track Display appears (see Figure 1).

2. WHAT'S NEW

Train Dispatcher 3 has been designed to meet the requirements of a major Class I railroad and also include many of the suggestions from our Train Dispatcher 2 customers. Territories developed using Track Builder 2 can be loaded into Train Dispatcher 3; however, some of the new features require data they can only be generated by the Track Builder 3 program.

The following is a brief list of some of the new features of Train Dispatcher 3:

- ◆ Simulations can run for multiple days up to 90. (TB3 territory files only).
- ◆ Routes can be cleared by designating an entrance and an exit signal (Union routing).
- ◆ Routes can be stacked. Users can specify up to 5 stacked routes per signal that will automatically be cleared for the next train, after the previous route has been completed or cancelled
- ◆ Trains can be given permission to proceed past a red signal.
- ◆ Trains can be merged or split into two trains.
- ◆ The user can request a train to stop anywhere on the territory.
- ◆ Trains can be reversed at any location in a block and in blocks that are used to enter or exit the territory.

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- ◆ Helpers may be required in order for some train types to move through some blocks. (TB3 territory files only).
- ◆ Trains scheduled to arrive on the territory can be easily displayed by clicking on an entrance/exit location.
- ◆ Trains scheduled to stop at a platform can be easily displayed by clicking on a block that contains the platform.
- ◆ The user may be required to give permission before trains can enter the territory at designated locations. (TB3 territory files only).
- ◆ Crews can expire because their time on duty has exceeded the 12-hour limit.
- ◆ The user can call crews and specify where the crew exchange will occur for a given train.
- ◆ Block permits and slow orders can be scheduled for different days of the week.
- ◆ The user must grant permission before a block permit can go into effect.
- ◆ Some entrance/exit locations can be designated as yard entry locations, and the user can specify how often trains can enter the yard (leave the territory). (TB3 territory files only).
- ◆ Slow orders can be made permanent.
- ◆ Diamonds (at grade crossings) are supported. (TB3 territory files only).
- ◆ Diamonds used as part of a junction with a foreign railroad can specify how often a train on the foreign railroad will be cleared over the diamond. (TB3 territory files only).
- ◆ Diamonds can be set up for automatic signaling which allows conflicting routes to be cleared over the diamond at the same time. The first train that hits the approach block to the diamond gets the route. (TB3 territory files only).
- ◆ Trains can be scheduled to perform local work in designated blocks. (TB3 territory files only).
- ◆ Signals can fail and require a maintainer to fix.
- ◆ When switches fail, the user can specify that a train crew can manually throw the switch.
- ◆ Train OSs are recorded and a train graph can be displayed. (TB3 territory files only).
- ◆ A simulation can be recorded and later played back.
- ◆ Train schedules, block permits, and slow orders can be changed in Train Dispatcher 3.
- ◆ Trains can develop problems (such as a broken hose).
- ◆ Locomotives can develop problems that degrade the performance of the train.

Train Dispatcher 3 is an extremely realistic simulation of a dispatcher 's job. Because of the many enhancements, a novice user can find the simulation overwhelming. To alleviate this problem Train Dispatcher 3 allows the user to turn off many of the optional functions. The following is a list of function that can be turned off:

- ◆ Slow Orders
- ◆ Block Permits
- ◆ Crew Calling
- ◆ Helper Requirements
- ◆ Requiring the user to grant permission before allowing a train to enter the territory.
- ◆ Limiting how often a train can enter a yard.

3. GETTING FAMILIAR WITH TRAIN DISPATCHER

3.1. Screen Components

Figure 1 shows the main Train Dispatcher screen.

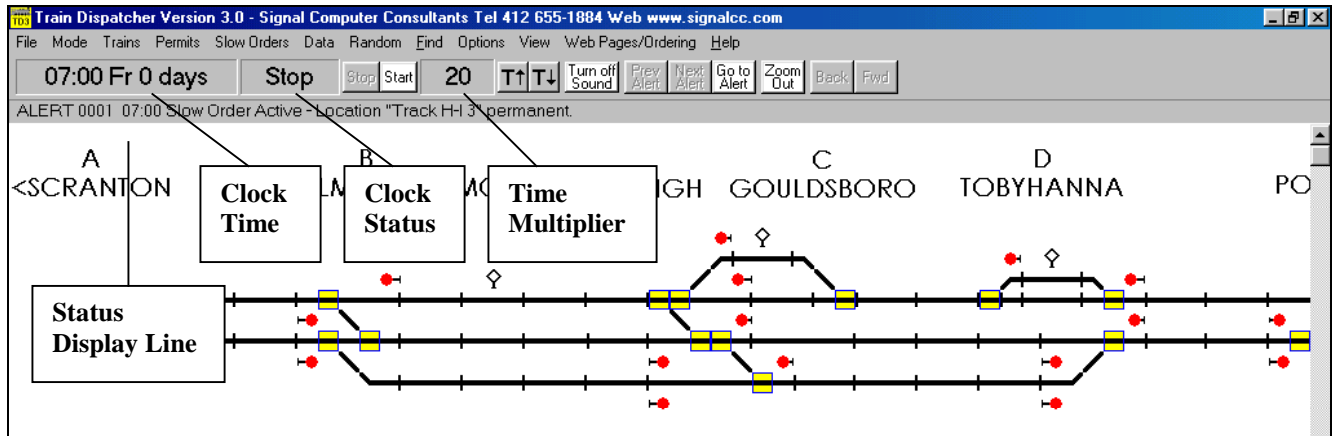


Figure 1 - Train Dispatcher Screen

Under the menu bar there is a tool button bar containing a number of items. The following describes these items in order from left to right:

- ◆ **Clock time** - displays the game's simulation time in 24-hour military time, the day of the week, and the number of days since the start of the simulation.
- ◆ **Clock status** - displays the status of the simulation's clock. "Run" indicates time is running, and "Stop" means the clock is stopped.
- ◆ **"Stop" button** - when clicked causes the simulation's clock to stop.
- ◆ **"Start" button** - when clicked causes the simulation's clock to start.
- ◆ **Time multiplier** - displays how many times faster than real time the simulation's clock is running. If, for example, the time multiplier is 30, the clock will run 30 times faster than normal and will, therefore, be incremented one minute for every 2 seconds of real time.
- ◆ **"T up arrow" button** - when clicked causes the time multiplier to be increased.
- ◆ **"T down arrow" button** - when clicked causes the time multiplier to be decreased.
- ◆ **"Turn Sound Off (Turn Sound On)"** - when clicked causes the sounds generated for various alerts to be turned off (or on if the sound is already off).
- ◆ **"Prev Alert" button** - when clicked causes the previous alert message to be displayed in the status line located below the button.
- ◆ **"Next Alert" button** - when clicked causes the next alert message to be displayed in the status line located below the button.
- ◆ **"Go to Alert" button** - when clicked causes the screen to automatically scroll to, and the mouse pointer to be placed on, the train or block that generated the alert,
- ◆ **"Zoom In/Out" button** - when clicked zooms the track diagram either in or out depending on its current zoom status.

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- ◆ **“Back” button** - when clicked scrolls and zooms the screen back to its previous location and zoom status.
- ◆ **“Fwd” button** - when clicked returns the screen to the location and zoom status that was displayed before the “Back” button was clicked.

Under the tool button bar there is a **Status Display Line** that displays, depending on the location of the mouse pointer, information about trains, blocks, switches, diamonds, signals, entrance/exit locations, or alert messages. If the mouse pointer is on a block that is occupied by a train, train status will be displayed. If the mouse pointer is on a switch, diamond, signal, or unoccupied block, information about that device will be displayed. If the mouse pointer is not on a block, switch, diamond or signal, an alert message will be displayed.

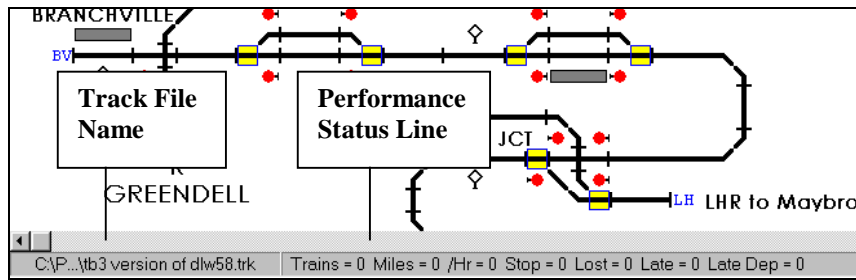


Figure 2 - Train Dispatcher Screen Bottom

At the bottom of the screen there is a message line (see Figure 2). This message line contains the file name of the track territory currently being displayed and the **Performance Status Line**.

The **Performance Status Line** contains the following items in left to right order:

- ◆ The number of trains currently on the territory.
- ◆ The total number of miles trains have traveled since the beginning of the simulation.
- ◆ The total number of miles all trains have traveled divided by the number of hours the simulation has been running.
- ◆ The total amount of time trains have been stopped waiting for signals to clear and the total amount of time trains have been stopped due to crew expirations.
- ◆ The total amount of time lost since the beginning of the simulation because trains were not moving at their maximum speed.
- ◆ The total amount of time since the beginning of the simulation that trains were late in departing station platforms.
- ◆ The number of times since the beginning of the simulation that trains were late departing station platforms.

3.2. Track Diagram Symbols

The track diagram has a number of symbols to represent tracks, switches, diamonds, signals, trains, etc. Many of these symbols are shown in Figure 3.

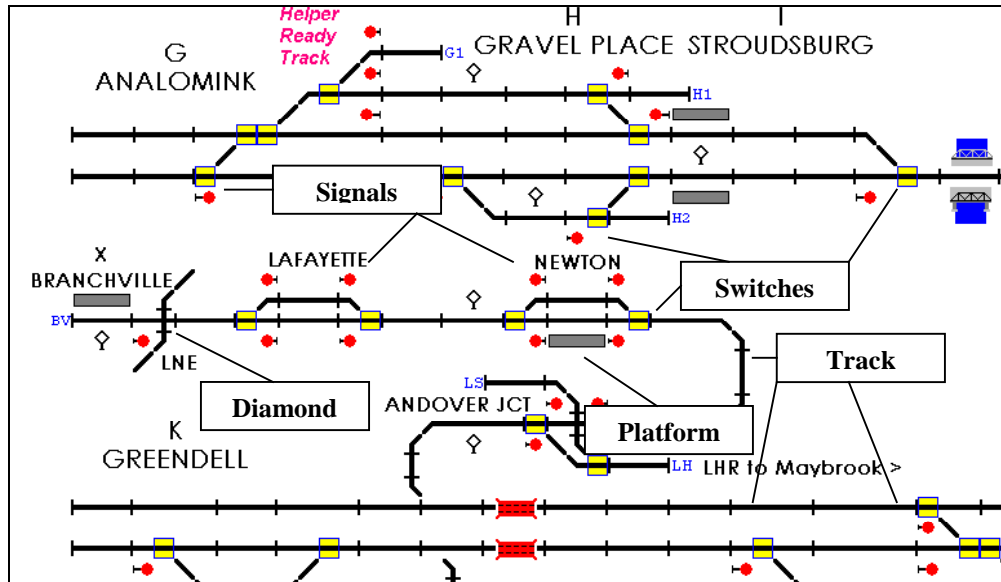


Figure 3 - Track Symbols

The following lists the different symbols and the meaning of the colors used to indicate their status:

- ◆ Straight lines drawn on the track diagram represent railroad track. The vertical or horizontal bars drawn perpendicular to the track line indicate the beginning or termination of a track block. The track is broken down into a number of blocks. Block lengths may vary, and several trains can occupy a block at a given time.

The following describes the meaning of the different track block colors:

- **Red** - indicates a train occupies the track block. A train identifier will appear above the block that contains the train. If the screen is in "Graphic" display mode an icon representing a locomotive is displayed on the track. If the train is moving in reverse an icon representing a caboose is displayed.

If more than one train occupy a block, the train identifiers of the other trains in the block will be displayed below the track. The lead train will be above the track and the following trains will be displayed below the track in the order in which they are moving through the block.

If any of the train identifiers are displayed in red those trains are at stop. If in blue, those trains are moving.

A train may occupy more than one block at a time since a train can be longer than a block. If the program is in "Graphic" display mode a locomotive will partially overlay the block into which a train is moving and a caboose will partially overlay the block the train is leaving.

Arrows will be displayed to indicate the direction in which trains are moving. Locomotive and caboose icons may, in some cases, be displayed on top of these arrows.

- **Green** - indicates the track block is part of a cleared route. Arrows indicate the direction of the route.
- **Yellow** - indicates the track is part of a route that is stacked (scheduled to be automatically cleared).
- **Light Blue** - indicates a block permit will become active in the next 30 minutes. The time at which the block permit will become active is displayed above the track block.
- **Dark Blue** - indicates a block permit is active. The time the block permit will expire is displayed above the track block.

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- If track blocks are blinking, they are part of a route that is running time (see Paragraph 6.2.3) and, therefore, cannot be cleared until a specified time period has elapsed.

- ◆ If the screen is in the “Graphic” display mode, a yellow box signifies a switch location. Switches have two positions, which are called normal and reverse. The normal position causes the train to proceed through the switch along the straight track as it would if there were no switch present (see Paragraph 6.1). The reverse position causes the train to change course and move off at an angle to the straight track.

The yellow box around the switch will turn light blue if the switch fails.

A blinking switch indicates the user tried to clear a route that could not be cleared. Switches will also blink if they are part of a route that is running time (see Paragraph 6.2.3).

- ◆ A diamond (at grade crossing) is represented by two lines that cross each other. Diamonds will be displayed in the same color combinations as track blocks.
- ◆ Any one of four different symbols can represent a signal. These symbols consist of a mast and a signal ball. If the signal ball is to the right of the mast, the signal controls train movement to the right and, conversely, signals with the ball to the left of the mast control movements to the left. Signals that have long signal masts can be fletted (see Paragraph 6.2.2), and signals with short masts cannot be fletted.

A red signal ball indicates the signal is at stop, a green ball indicates the signal is cleared for traffic to proceed, and a blue ball indicates the signal has failed. If a gray signal ball also appears, the signal is fletted.

Signals that are blinking are running time.

A signal that is the entrance signal to one or more a stacked routes will have the number of stack routes displayed near the base of the signal (see Paragraph 6.2.5).

- ◆ A station platform is represented by a gray rectangle located near the track block that contains the platform. Usually a passenger station name appears near the platform symbol.
- ◆ Entrance/exit location names are assigned to any track block that is not connected to another block or switch. These names are two characters long and are displayed in blue (white in the “Classic” view) at the end of the block that does not have a connecting switch or block. Entrance/exit locations are places where trains enter and exit the territory.

3.3. Moving Around the Screen

Most territories will not completely fit on the screen when the territory is zoomed-in (old Closeup View). However, if you are using a screen with a resolution of 800 by 600 pixels, most territories designed should entirely fit on the screen when the territory is zoomed-out (old Overview). The Northeast Corridor territory from Washington, DC to Philadelphia, because of its size, will not entirely fit on a screen with a resolution of 800 by 600 but will fit on a screen with a resolution of 1024 by 768.

There are a number of ways to move around the territory. The following lists these:

- ◆ Scroll using the horizontal and vertical scroll bars located at the bottom and right side of the screen.
- ◆ Press the “Home”, “End”, “Pg Up”, “Pg Dn” or arrow keys to scroll the screen.
- ◆ Press a key that represents a station call up character. Each station name on the screen has a station call up character assigned. These call up characters are displayed above the station names. In Figure 3 the “Analomink” station is assigned a call up character of “G”. If, for example, you press the “G” key the screen will scroll to position the “Analomink” station as close to the center of the screen as possible.
- ◆ Position the mouse pointer close to the edge of the screen. If the pointer is not located on a block, switch or signal, it will turn to a solid arrow pointing in the direction the screen will scroll if you click the left mouse button.

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- ◆ Position the mouse pointer on any grid square that does not contain a train, switch, signal, diamond or track block. If you click the right mouse button, the screen will zoom in or out depending on its current zoom mode, and the mouse pointer will be positioned at its location on the screen prior to the operation.
- ◆ Position the mouse pointer on a track at the far left or far right of the screen. If you click the left mouse button the screen will scroll to, and the mouse pointer will be placed on, the track that is linked to the first track.

3.4. Display Views

3.4.1. Classic and Graphic Views

There are two display views. We have named these views “Graphic” and “Classic”. The “Graphic” view has a white background and displays locomotive and caboose icons. There are yellow boxes around each of the switches, and graphics representing objects such as bridges, rivers, buildings, etc. are displayed.

Most real Centralized Traffic Control systems do not use icons to display trains. They mainly use train identifiers and different colored track lines displayed on a black or dark background. Train Dispatcher 3 can simulate this type of classic or traditional display (see Figure 4). To display the territory in the “Classic” view click the “Classic View” item under the “View” menu.

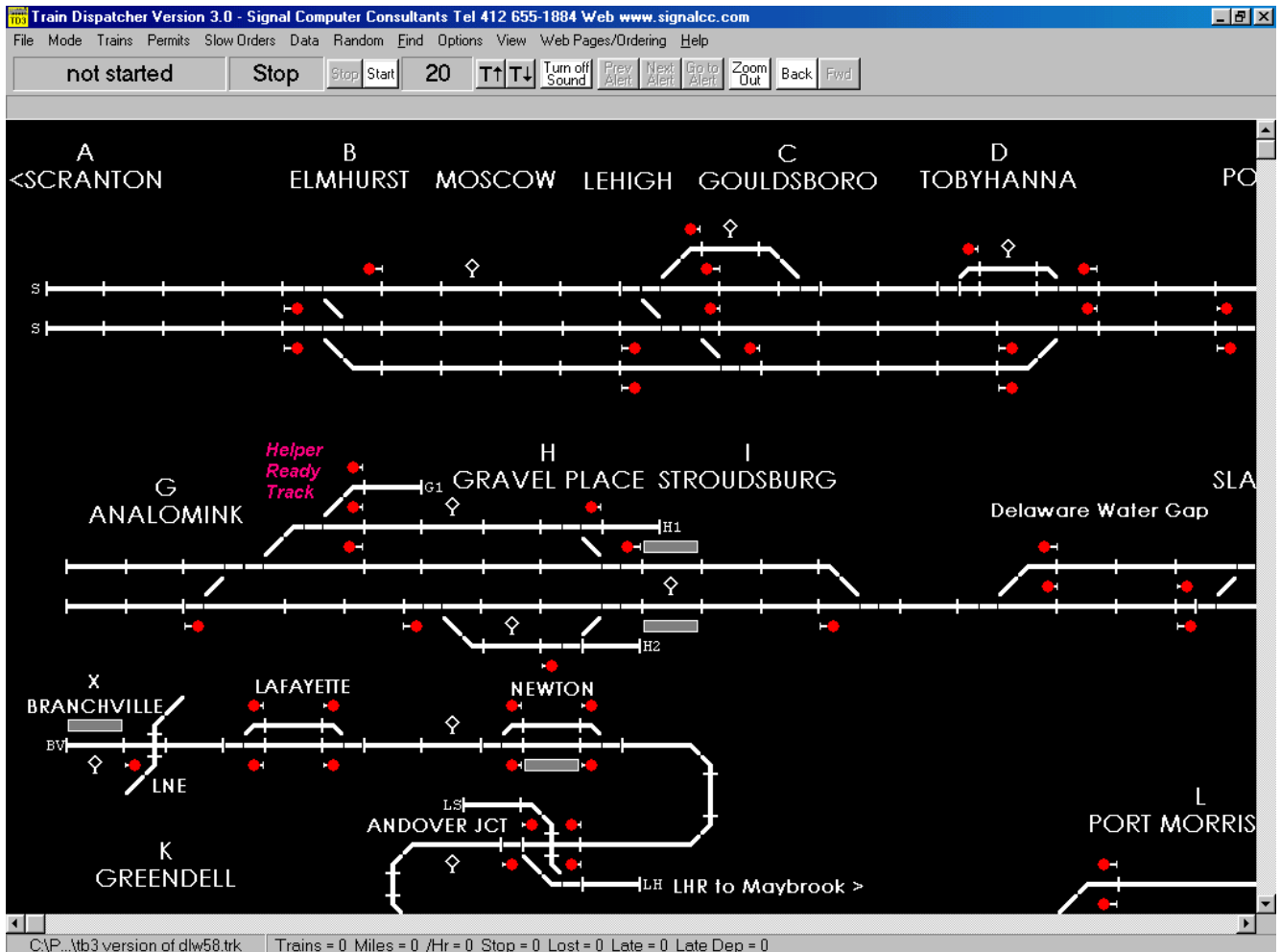


Figure 4 - Classic View

3.4.2. Displaying Block Information

Blocks lengths, speeds, signal directions and names can be displayed on the track diagram when in zoom-in mode. Only one of these items can be displayed at a given time. For blocks that are occupied by a train, have a cleared route, or have an active block permit, no block information will be displayed. Figure 5 shows the block speeds displayed on the track diagram. The speeds above the track line are for trains moving to the left and below the track for train moving to the right. The speeds displayed apply when two or more signals are cleared ahead of the block. The first number is the highest train type speed and the second the lowest train type speed for that block.

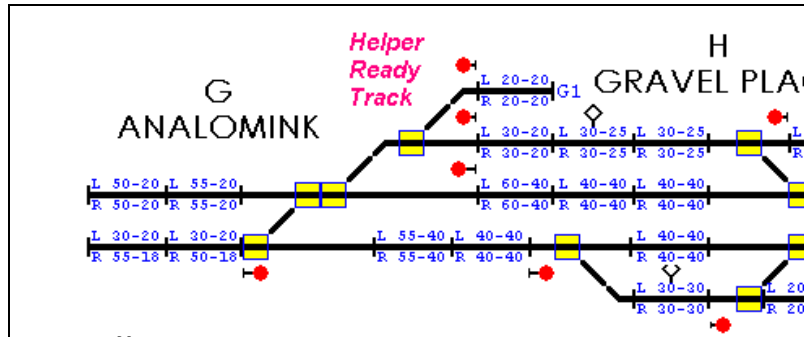


Figure 5 - Block Speeds

Figure 6 shows the block lengths in feet and miles displayed on the track diagram. Lengths are displayed in feet or meters above the track and in miles or kilometers below the track.

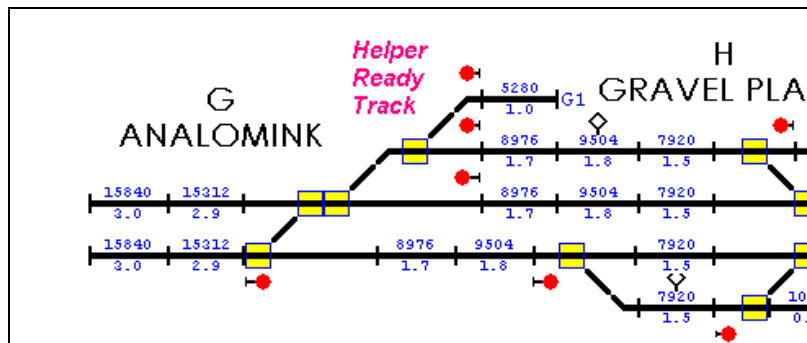


Figure 6 - Block Lengths

The track diagram can be printed out at any time by selecting the "Print Track Layout Diagram" menu item under the "File" menu. The block information displayed on the screen when the track diagram is printed will also appear on the printed copy, which can be used for reference. Block speeds, lengths, signal directions or names will not appear on either the track diagram or a printout of the track diagram when the screen is zoomed out.

3.5. Displaying Detailed Track and Train Information

3.5.1. Track Block Information

When the user places the mouse pointer on a grid square that contains a track symbol and is not occupied by a train, the status display line located under the tool button bar at the top of the screen will display some information about the track block (see Figure 7).



Figure 7 - Track Block Status Line

The information fields in the status line from left to right are the following:

- ◆ The track block number
- ◆ The track name or an indication that the selected block is a connecting line. Connecting lines are not real blocks and, therefore have no length. Connecting lines link switches and diamonds to real blocks.
- ◆ The train speeds in the block. The first two speeds are for trains moving to the left, and the second two for trains moving to the right. These speeds apply when two or more signals are cleared ahead of the block. The first number is the highest train type speed, and the second is the lowest train type speed for that block.

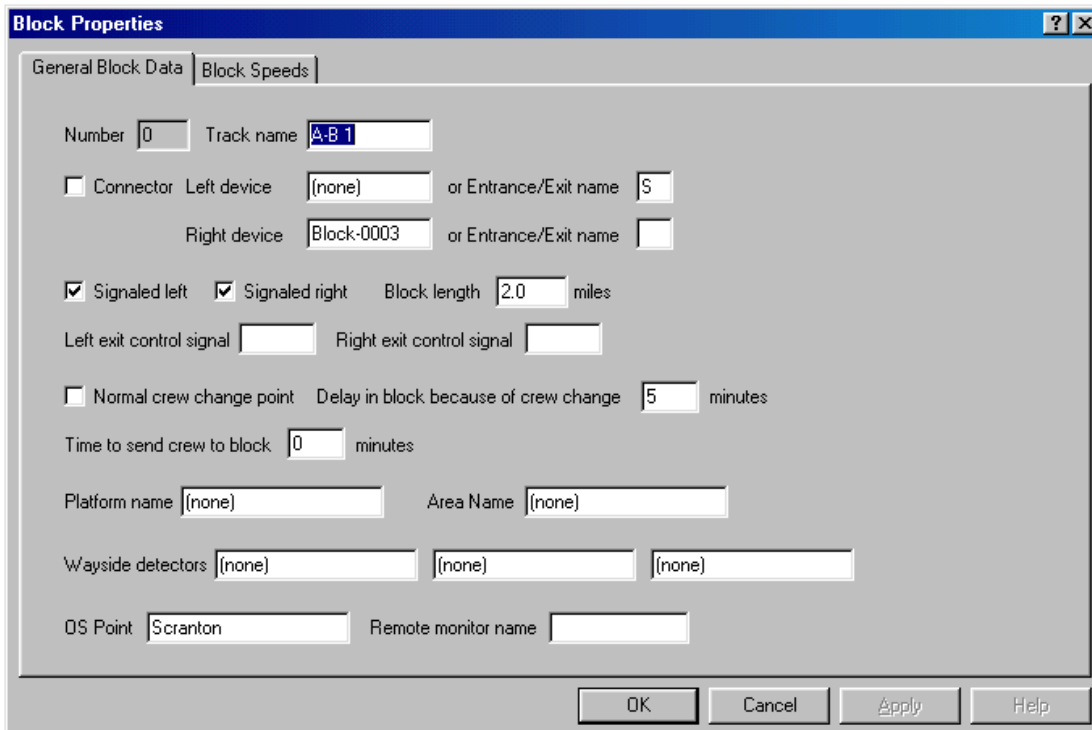
If a slow order is active, the highest and lowest slow order speeds will be displayed instead of the normal train speeds for the block.

The length of the block in feet (meters).

The direction(s) in which the block is signaled (Left, Right or Both directions).

- ◆ The name of the passenger platform located in the block. If no platform is located in the block, nothing will be displayed.
- ◆ The name of the OS point assigned to the block. If no OS point is assigned, nothing will be displayed.
- ◆ The name of the area (work area) associated with the block. If no area is associated, nothing will be displayed.
- ◆ The types of the wayside detectors located in the block. Up to three detectors can be located in a block. If there are no detectors in the block, nothing will be displayed.

To display more information about the track block, place the mouse pointer on the block and click the right mouse button. If a train occupies the block, a pop-up menu will appear. Select the "Block XXX Properties" menu item and Figure 8 will appear. If a train does not occupy the block, Figure 8 will appear immediately.



Block Properties

General Block Data | Block Speeds

Number Track name

Connector Left device or Entrance/Exit name

Right device or Entrance/Exit name

Signaled left Signaled right Block length miles

Left exit control signal Right exit control signal

Normal crew change point Delay in block because of crew change minutes

Time to send crew to block minutes

Platform name Area Name

Wayside detectors

OS Point Remote monitor name

OK Cancel Apply Help

Figure 8 - Block Properties - General

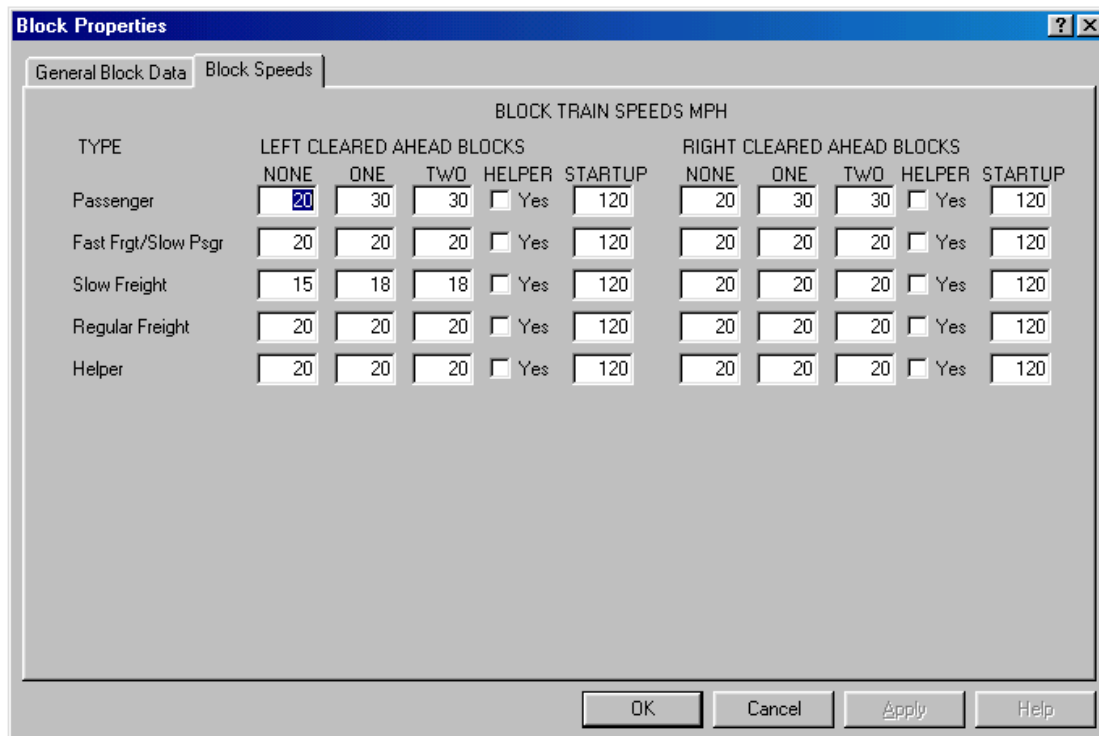
Data in this dialog was created via Track Builder and cannot be modified by the Train Dispatcher 3 user. The following describes each of the fields in this dialog:

- ◆ **Number** - the unique number assigned to the block.
- Track name** - the name of the track block
- ◆ **Connector** - a check box to indicate whether or not the block is a connecting line that does not have length or hold trains
- ◆ **Left device** - the block, switch or diamond to the left
- ◆ **Entrance/Exit name (Left)** - the entrance/exit name to the left of the block.
- ◆ **Right device** - the block, switch, or diamond to the right
- ◆ **Entrance/Exit name (Right)** - the entrance/exit name to the right of the block
- ◆ **Signal Direction** - indicates if the block is signaled in the left and/or right direction. Usually blocks are signaled in both directions. If not, trains can only move in the direction in which the block is signaled.
- ◆ **Block Length** - the length of the block in feet, miles, meters or kilometers
- ◆ **Left exit control signal** - the signal number of the controlled signal that allows a train moving to the left to exit the block. If no signal number is displayed the program assumes the exit signal is automatic.
- ◆ **Right exit control signal** - the signal number of the controlled signal that allows a train moving to the right to exit the block. If no signal number is displayed the program assumes the exit signal is automatic.
- ◆ **Normal crew change point** - a check box to indicate if crews are normally changed in the block
- ◆ **Delay in block because of crew change** - the amount of time (in minutes) for the crews to change once the new crew has arrived

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- ◆ **Time to send crew to block** - the amount of time (in minutes) it will take the new crew to get to the block after being is called
- ◆ **Platform name** - contains the passenger platform name assigned to the block. Passenger trains that are scheduled to stop at a particular platform will stop in blocks that are assigned to the platform name. Several blocks can be assigned to the same platform name.
If a platform is not assigned to the block, "none" will be displayed in this field.
- ◆ **Area name** - contains the name of the area to which the block is assigned. Blocks can be grouped in areas. Areas are used to define locations where trains will perform local work or where trains will either become new trains or be split into multiple trains.
If the block is not assigned to an area, "none" will be displayed in this field.
- ◆ **Wayside detectors** - up to three wayside detectors can be located in a block. Wayside detectors check the train for problems such as hot boxes and dragging equipment
If a wayside detector is not located in the block, "none" will be displayed in these fields.
- ◆ **OS point** - contains the OS point assigned to the block. OS points are used to create a train graph. OS points can be assigned to multiple blocks or switches.
If an OS point is not assigned to the block, "none" will be displayed in this field.
- ◆ **Remote monitor name** - An advanced version of Train Dispatcher 3 is capable of monitoring and controlling external devices such as real railroad ground equipment or a model railroad display. The remote monitor name is used to associate external devices to the devices in the Train Dispatcher 3 display.

Speeds must be assigned to the block for each different type of train for each of the three signal aspects. To display the Block Speed dialog click the Block Speeds tab at the top of the Block Properties dialog (see Figure 8), and Figure 9 will appear.



TYPE	LEFT CLEARED AHEAD BLOCKS					RIGHT CLEARED AHEAD BLOCKS				
	NONE	ONE	TWO	HELPER	STARTUP	NONE	ONE	TWO	HELPER	STARTUP
Passenger	20	30	30	<input type="checkbox"/> Yes	120	20	30	30	<input type="checkbox"/> Yes	120
Fast Frgt/Slow Psgr	20	20	20	<input type="checkbox"/> Yes	120	20	20	20	<input type="checkbox"/> Yes	120
Slow Freight	15	18	18	<input type="checkbox"/> Yes	120	20	20	20	<input type="checkbox"/> Yes	120
Regular Freight	20	20	20	<input type="checkbox"/> Yes	120	20	20	20	<input type="checkbox"/> Yes	120
Helper	20	20	20	<input type="checkbox"/> Yes	120	20	20	20	<input type="checkbox"/> Yes	120

Figure 9 - Block Properties - Speed

- ◆ **BLOCK TRAIN SPEEDS** - specifies the speeds of trains based on train type and the number of blocks than are cleared ahead. The system is designed to handle up to four speed aspects. If the next block is not clear, the train will stop when it reaches the end of the current block. If the block beyond the next is not cleared, the train must travel at a lower speed than its maximum in anticipation of stopping at the end of the next block.

Other fields pertaining to train speeds are:

- **TYPE** - lists the train type descriptions.
- **NONE (Left/Right Cleared Ahead Blocks)** - contains the train speed in the current block if the next block is not cleared for the train (train will stop at the end of the current block).
- **ONE (Left/Right Cleared Ahead Blocks)** - contains the train speed in the current block if one block beyond the current block is cleared for the train.
- **TWO (Left/Right Cleared Ahead Blocks)** - contains the train speed in the current block if two blocks beyond the current block are cleared for the train.
- **HELPER** - if checked indicates that the train type requires a helper for it to travel through the block. The user will have to merge a helper with the train before the train will pass into any block for which a helper is required, even if the signal allowing the train to enter the block has been cleared.
- **STARTUP** - is the time in seconds before the train will start moving into the block if the train is at stop waiting for the signal to be cleared.

3.5.2. Switch Information

When the user places the mouse pointer on a grid square that contains a switch, the status display line at the top of the screen will display some information about the switch (see Figure 10).



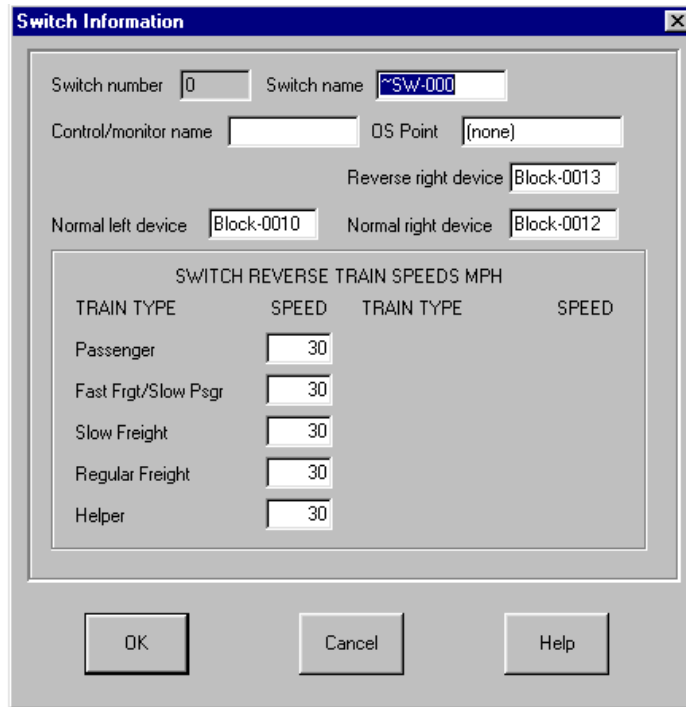
Figure 10 - Switch Status Line

The information fields in the status line from left to right are the following:

- ◆ The switch number
- ◆ The switch name
- ◆ The train speeds when a train goes over a switch that is in the reverse position. The highest and lowest train speeds of all types of trains are shown.

Switch failure information including the time a maintainer will arrive to fix a switch.

To display more information about the switch, place the mouse pointer on the switch and click the right mouse button, and the dialog in Figure 11 will appear.



SWITCH REVERSE TRAIN SPEEDS MPH			
TRAIN TYPE	SPEED	TRAIN TYPE	SPEED
Passenger	30		
Fast Frgt/Slow Psgr	30		
Slow Freight	30		
Regular Freight	30		
Helper	30		

Figure 11 - Switch Information

Data in this dialog cannot be modified by the Train Dispatcher 3 user. The following describes each of the fields in this dialog:

- ◆ **Switch number** - the unique switch number assigned to this switch.
- ◆ **Switch name** - the name of the switch.
- ◆ **Control/monitor name** – An advanced version of Train Dispatcher 3 is capable of monitoring and controlling external devices such as real railroad ground equipment or a model railroad display. The remote monitor name is used to associate external devices to the devices in the Train Dispatcher 3 display.
- ◆ **OS point** - contains the OS point assigned to the switch. OS points are used by Train Dispatcher 3 to create a train graph. OS points can be assigned to multiple blocks or switches.
If an OS point is not assigned to the switch, “none” will be displayed in this field.
- ◆ **Reverse Left Block** - the block, switch or diamond to the left of the switch when the switch is in the reverse position. The switch can either have a value in the “Reverse Left Block” or “Reverse Right Block” field, but not both. If the switch does not have a reverse left position, this field will not appear.
- ◆ **Reverse Right Block** - the block, switch or diamond to the right of the switch when the switch is in the reverse position. The switch can either have a value in the “Reverse Left Block” or “Reverse Right Block” field, but not both. If the switch does not have a reverse right position, this field will not appear.
- ◆ **Normal Left Block** - the block, switch or diamond to the left of the switch when the switch is in the normal position.
- ◆ **Normal Right Block** - the block, switch or diamond to the right of the switch when the switch is in the normal position.
- ◆ **SWITCH REVERSE TRAIN SPEEDS** - the speeds to which trains will be limited when moving over a switch that is in the reverse position. Each type of train will travel at the indicated speed for the length of time it takes the entire train to move over the switch.

If there is no speed in this field for a type of train, the train's speed over a switch in the reverse position will not vary from its normal speed in the block.

3.5.3. Diamond Information

When the user places the mouse pointer on a grid square that contains a diamond, the status display line at the top of the screen will display some information about the diamond (see Figure 12).



Figure 12 - Diamond Status Line

The information fields in the status line from left to right are the following:

- ◆ The diamond number
- ◆ The diamond name
- ◆ If the diamond is automatically signaled (see Paragraph 6.2.6)
- ◆ The number of trains per day that automatically move left to right and right to left (top to bottom and bottom to top) across the diamond (see Paragraph 6.5)

4. STARTING A SIMULATION

When Train Dispatcher 3 is executed the last territory used will automatically be loaded. To load another territory select the "Change Territory Track File" menu item under the "File" menu.

To start the simulation click the "Start" button in the tool bar near the top of the screen. The first time this button is clicked after the program is executed or a new territory is loaded the Start Time and Day Selection dialog will appear (see Figure 13).

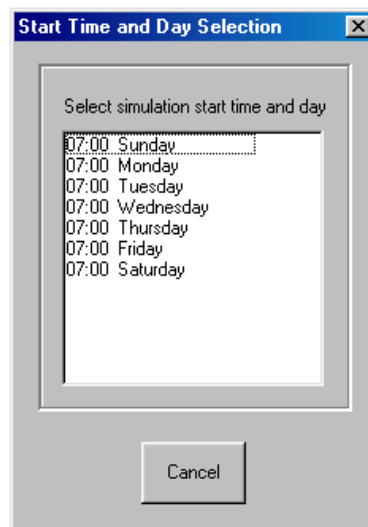


Figure 13 - Start Time and Day Selection

Most territories will have multiple start time selections. Select the start time and day to pre-load the trains that are already on the territory at that start time. To see the list of trains already on the territory for each start time select the "Start Time" menu item under the "Data" menu.

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To start the simulation clock, click the “Start” button again. The clock will start and trains will begin to move.

If, after you click the “Start” button, a dialog appears asking for a password, you are trying to simulate a track territory from the “For Sale” library which you have not previously used. See Paragraph 4.2 for more information.

4.1. Restarting a Simulation

To restart a simulation, click the “File” menu in the menu bar at the top of the screen to display a pop-up menu and then click the “Restart Simulation” menu item.

4.2. Territory Libraries

Signal Computer Consultants maintains two distinct libraries of territory track files, which we have named the “Customer Contributed” and “For Sale” libraries. As of December 2000 there were over 300 track files available. Most of the files were created by our Track Builder customers. All track files developed with Track Builder 2 and Track Builder 3 can be simulated in Train Dispatcher 3.

The track files (over 150) in the Customer Contributed Library are completely free and can be simulated in Train Dispatcher 3. The track files (over 150) in the For Sale Library can be viewed via Train Dispatcher 3 prior to purchase but are password protected for operational purposes. When a territory from the For Sale Library is purchased from Signal Computer Consultants a password is assigned that “unlocks” that territory for use. The first time the user clicks the “Start” button with a “For Sale” territory loaded that has not been previously used, the system will ask for the password for that territory. Once a valid password is entered for the particular territory the program will not ask for it again.

Track files in both the “Customer Contributed” and “For Sale” libraries can be downloaded from our web page at www.signalcc.com (select the “Territory Libraries” menu item under the “Web Menu” to go the territory library web page) and are included on the Train Dispatcher 3 CD-Rom. To load these territories from the CD, insert the CD into the drive, and a program should automatically load. If this program does not automatically load, click the “Start” button, select the “Run” menu item and then type “D:autorun.exe” where “D” is the drive identifier for your CD. If “D” is not your CD drive, substitute the appropriate letter that identifies your CD drive. Finally click the “Ok” button to start the installation program.

When the installation program starts, it will display buttons for loading the track territory libraries. Click on the button for either the For Sale or Customer Contributed Library, which will open a WinZip Self Extracting program. If you click the “Unzip” button all the tracks in the library chosen will be loaded into the designated folder. If you have WinZip installed on your computer, you can click the “Run WinZip” button to load just the territories you want. If you do not have WinZip on your computer you can download a free evaluation copy from their web page at www.winzip.com.

4.3. Changing the Territory

There are over 300 territories that can be simulated with Train Dispatcher 3. To change the territory to be simulated, click the “Change Territory Track File” menu item under the “File” menu. The program will display a list of territory files that can be opened. Each of these files has a file extension of “.trk”. Select the file to be simulated and click the “OK” button.

4.4. Saving a Simulation

Train Dispatcher 3 allows you to save the current simulation and restart it at a later time at the point where you left off. To save the current simulation, click the “Save Simulation As” menu item under the “File” menu. The program will ask the user to assign a file name. The file name must have an extension of “.ssm” to indicate it is a saved simulation.

4.5. Opening a Previously Saved Simulation

To run a previously saved simulation click the “Open Previously Saved Simulation” menu item under the “File” menu. A selection box will appear. Select the file to be simulated and click the “OK” button. After you have entered the appropriate day of the week, the simulation will resume where you left off and display the track diagram.

4.6. Loading Previous Simulation

A list of the 10 most recently used track (.trk) or previous simulation (.ssm) files will appear as menu items under the “File” menu. Simply click on one of these menu items to load the appropriate track or previous simulation file.

4.7. Saving the Startup Switch Positions and Signal Conditions

After you have simulated a given territory several times you will notice that the initial switch positions and signal conditions you set will not vary from time to time. You will most likely always begin the simulation in the same way. It is convenient, therefore, to save these initial switch positions and signal conditions. To save these parameters, before clicking the “Start” button the second time to start the simulation’s clock, set the switch positions and signal conditions, and use the “Save Simulation As” menu item under the “File” menu as described above. This action will preserve these initial settings to be returned to on future simulations of the territory. On future uses of the territory choose the “Open Previously Saved Simulation” menu item under the “File” menu instead of “Change Territory Track File.”

5. MODES OF OPERATION

Train Dispatcher 3 has five modes of operation. These are:

- ◆ Simulation with no playback
- ◆ Simulation with playback
- ◆ Playback
- ◆ CTC Control
- ◆ External I/O

The mode of operation can be selected by clicking the “Mode” menu item in the menu bar. This will cause a pop-up menu to appear with the five modes of operation listed as separate menu items. Select the appropriate menu item to go into that mode of operation. The following describes these modes of operation:

5.1. Simulation (no playback) Mode

This is the normal simulation mode. Train Dispatcher 3 will simulate the territory, but will not create a playback file.

5.2. Simulation (with playback) Mode

This mode allows the user to run the simulation and create a playback file. When this mode is selected, the system will first check to see if a simulation is running. If there is a simulation running the system will ask the user if he wants to restart the simulation. The user must select “Yes” to enter into this mode.

After the user clicks the “Start” button and selects a start time, the system will then ask the user for the name of the playback file. The file name must have an extension of “.ply” to indicate it is a playback simulation. Please note that the system will generate about 200 to 400 K of data for each hour of the simulation. For 24 simulated hours as much as 12 MB of data will be stored in this file.

The playback file allows the user to review previous simulations. Signal Computer Consultants also plans to develop a screen saver program from a user generated playback file.

5.3. Playback Mode

In playback mode the system will ask the user for the name of the playback file. After entering a playback name the system will display the Simulation Playback Time dialog in Figure 14.

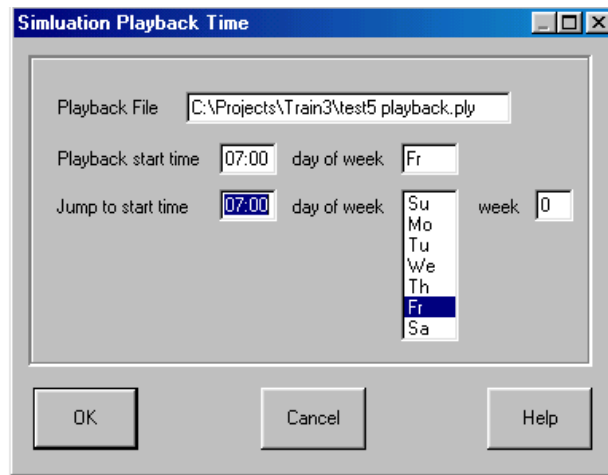


Figure 14 - Simulation Playback Time Dialog

The playback of a simulation can be fast forwarded to a particular time in the simulation by entering a time and day in the “Jump to start time” and “day of week” fields different from the simulation’s original start time and day. Once the system reaches the time and day specified in the “Jump to start time” and “day of week” fields, it will continue the playback of the simulation at the speed specified in the “Time Multiplier” field in the tool bar on the main screen.

During playback the user can stop and start the time clock, change the time multiplier, zoom-in or out, scroll around the display and display various status windows. The user cannot throw switches or clear signals during playback. He can, however, at any time in the playback, stop the operation and place the system into the simulation without playback mode. This allows the user to continue on with a new simulation at any point in the playback of a previous simulation.

5.4. CTC Control Mode

The CTC Control Mode allows a user to control and monitor a model railroad. For more information on the mode see Paragraph 11.

5.5. External I/O Mode

The External I/O Mode allows Train Dispatcher 3 to be driven by an external CTC machine. Instead of using the mouse to clear signals and throw switches, Train Dispatcher 3, in this mode, will get these commands from an external machine. It will also provide signal, switch, and track circuit conditions back to the external machine as if these conditions were generated by the wayside equipment.

For more information on the External I/O Mode see Paragraph 12.

6. DISPATCHING OPERATIONS

The primary job of a dispatcher is to move trains over the territory from their origin to their destination as quickly as possible. Because the amount of track is limited, a number of trains traveling in the same and opposite directions must often share tracks. Part of the dispatcher’s job is determining routes that cause the most time efficient sharing of the limited trackage. This can be a very complex task. The primary tools dispatchers have in routing trains are switches and signals.

6.1. Switch Control

Switches allow the dispatcher to change the routes of trains. Switches have two positions, which are called normal and reverse. The normal position is for a straight move through the switch (see Figure 15). The reverse position is for movement at an angle to the original course.

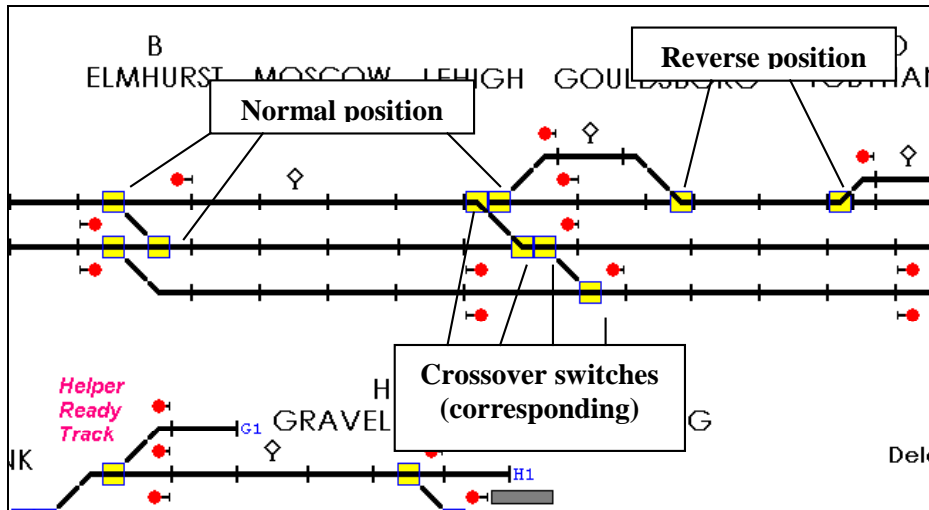


Figure 15 - Switch Normal and Reverse

To throw a switch (change its position) place the mouse pointer on the switch, which will cause a box to appear around the switch, and click the left mouse button. If the switch's position was normal prior to the operation, it will change to reverse, and vice versa.

There are cases where switches will not throw. If the "Help Messages" menu item is checked (located in a pop-up menu which will appear when the "Help" menu in the menu bar at the top of the screen is clicked), a message will appear to explain why the switch did not throw.

The following is a list of reasons why a switch might not throw:

- ◆ The switch has a train on it (occupied).
- ◆ The switch has a cleared route over it.
- ◆ The corresponding switch cannot throw. Two switches can be tied together when they are configured as a crossover (see Figure 15). If you throw one switch, the corresponding switch will automatically throw to the same position. If the corresponding switch cannot throw because it is occupied by a train or has a cleared route over it, the switch that was requested to throw also will not throw.
- ◆ The switch failed. Train Dispatcher 3 simulates random failures of switches, which often occur on real territories. You can determine how often random failures will occur by setting parameters in the Random Switch and Signal Failure Parameters dialog (see Paragraph 8.1.3).

6.2. Signal Control

Signals operate like highway traffic lights. Trains will not advance beyond a signal unless it is cleared (green). All signals on the track diagram have two states called stop (red) and cleared to proceed (green).

Railroad signaling systems are designed to maintain safe train operations. Because it can take over a mile to stop a 100-car train moving at 60 miles per hour, the locomotive engineers must rely on the signaling system. The system is designed to allow only one train to occupy a given track block at a given time. Each block has wayside signals that allow trains to enter the block. Some blocks have automatic signals, which allow a train to enter the block as long as the block is not occupied or does not have a route cleared in the opposite direction. Other blocks have controlled signals, which are controlled by the dispatcher and appear on the track diagram.

Controlled signals can be located anywhere on the track diagram, but are usually used to control moves over switches at interlockings.

When a signal is cleared, it clears a route to the next controlled signal that is in the same direction. The route may be cleared over a number of blocks and switches. The switches and blocks in a cleared route are displayed in green, with arrows showing the direction of the route.

6.2.1. Signal Commands

To change a signal's state, place the mouse pointer on the signal, which will cause a box to appear around it, and click the left mouse button, which will cause the signal to go to the opposite state unless an existing condition prevents the change.

There are many safety reasons why a signal might not clear. If the "Help Messages" menu item (located in a pop-up menu which will appear when the "Help" menu in the menu bar at the top of the screen is clicked) is checked, a message will appear explaining why the signal did not clear and blink the switch or block that caused the problem.

The following is a list of reasons why a signal might not clear:

- ◆ A route cannot be established to the next signal because a switch is open.
- ◆ A block in the route is cleared in the opposite direction.
- ◆ A block in the route is not signaled in the same direction as the requested route (see Paragraph 3.5.1).
- ◆ A train occupies the first block in the route.
- ◆ A block in the route has an active block permit (Track and Time) (see Paragraph 7.7).

6.2.2. Signal Fleeting

Each time a train advances beyond a signal, the signal will go to stop. If another train is following, the dispatcher has to re-clear the signal. A signal fleeting function is provided to help the dispatcher. This function automatically re-clears the signal as soon as the train that initially passed the signal no longer occupies the first block beyond the signal.

Only signals with long masts can be fledted (see Figure 16). To fleet a signal, place the mouse pointer on the signal and click the right mouse button. A pop-up menu will appear which will have a "Fleet" menu item. Select the "Fleet" menu item, and a gray signal ball will appear next to the green signal ball to indicate the signal is now fledted.

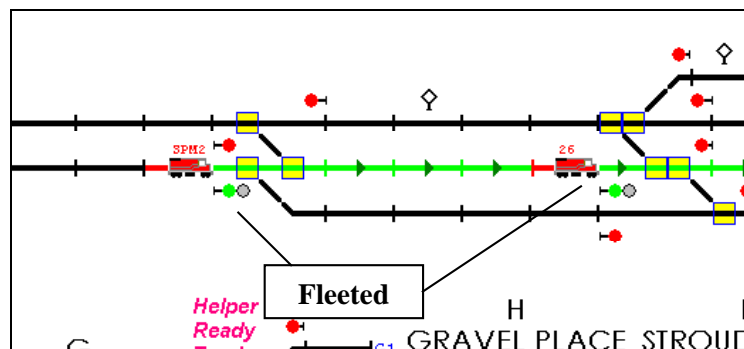


Figure 16 - Signal Fleeting

Signals do not have to be cleared prior to being fledted. If the signal is at stop, Train Dispatcher 3 will automatically try to clear it.

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To cancel signal fleeting, place the mouse pointer on the fleeted signal and click the right mouse button. A pop-up menu will appear which will have a "Remove Fleet" menu item. Select the "Remove Fleet" menu item, and the gray signal ball will disappear.

6.2.3. Running Time on a Signal

Train dispatchers controlling a territory operating under Centralized Traffic Control are prevented from causing dangerous conditions because of safety procedures built into the system. The most dangerous thing a dispatcher can do is drop a signal (turn it red) in front of train when, from information provided by previous signals, the locomotive engineer is not expecting to have to stop.

The signaling system is designed to tell the locomotive engineer how many blocks are cleared ahead. If a locomotive engineer suddenly sees a stop signal, when he is expecting to see a cleared one, he will probably place his train into emergency braking to attempt to stop the train from entering the next block. Emergency braking is very dangerous and can cause the train to de-rail.

The safety system assumes the train may not come to a complete stop until it has entered the block beyond the signal at stop. The system will, therefore, not allow the dispatcher to change the switch positions in the route that was cleared until five minutes after the signal was dropped. The signal and route will blink on the track diagram when time is running on a signal.

The program will only run time on a signal if the block in front of the signal is occupied by a train.

6.2.4. Entrance-Exit Signal Commands

To help the dispatcher set a route faster, some dispatching offices use a system where a dispatcher specifies a route's entrance and exit signals, and the system automatically aligns the route (positions all the switches) and clears the signals. This eliminates the need for the dispatcher to manually position each switch before clearing the signals.

Train Dispatcher 3 also has this capability. To specify an entrance-exit route place the mouse pointer on the signal which is the first signal in the route and click the right mouse button. A popup menu will appear that has an "Entrance" menu item. Select the "Entrance" menu item, and the signal will begin blinking. Next find the signal where you want the route to end, place the mouse pointer on the signal, and click the left or right mouse button. If Train Dispatcher 3 can find a path from the entrance to the exit signal it will try to clear a route. If it cannot clear the route, an appropriate message will appear.

In Figure 17, for the indicated entrance signal you can select any signal on the second or third track from the top of the figure as the exit signal. Even signals that are for the opposite direction can be selected. When an opposite direction signal is selected as an exit, the route will be cleared to the next signal that is in the same direction as the route.

To cancel an entrance-exit request, after selecting the entrance signal, place the mouse pointer on any place on the screen that is not a signal and click the left mouse button.

Entrance-exit requests will set up routes that go beyond just the next signal in the same direction. The system will search for the exit signal up to 50 devices from the entrance signal. A device is considered to be any track block, switch, diamond or connecting line. In Figure 17 the number of devices from the entrance signal to the first signal to the right of the entrance signal on the second track from the top of the figure is 9.

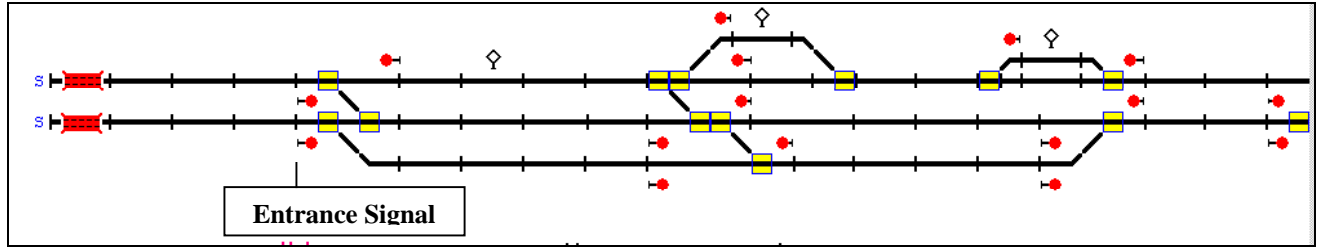


Figure 17 - Entrance-Exit Signal Commands

6.2.5. Stack Route Commands

There are many occasions when a dispatcher wants to clear a route as soon as a conflicting situation is resolved. For example, a dispatcher wants to clear a train out of siding as soon as a train moving in the opposite position clears the mainline block in front of the siding. Without stacking, the dispatcher has to constantly monitor the situation until there is no longer a conflict and then clear the new route.

Stacking allows the dispatcher to enter the next route to be cleared into the system. As soon as the system sees that there is no longer a conflict, it will automatically clear the route by positioning the switches and clearing the signal.

To set up a stacked route, place the mouse pointer on the signal you want to clear next and click the right mouse button. A pop-up menu will appear. Select the "Add Stack Command" and the signal will begin to blink in the same fashion as the entrance-exit command. Next find the signal where you want the stacked route to end, place the mouse pointer on the signal, and then click the left or right mouse button. If Train Dispatcher 3 can find a path from the beginning to the ending signal it will give you a message that the stack command was added. The stacked route will also be displayed in yellow. Only those portions of the route that are currently unoccupied will be shown in yellow. A number will also appear at the base of signal indicating the number of routes that have been stacked for that signal.

Unlike entrance-exit commands, stack commands can only go to the next signal. In Figure 17, if the signal shown as the entrance signal is specified as the beginning of a stacked route, there are only two signals that could be designated as the ending signal. These are the first signals to the right of the entrance signal on the second and third tracks from the top of the figure.

You can designate up to five stacked routes per signal. The first stacked route you enter will be the next route cleared when the current conflict is resolved. To see a list of stacked routes place the mouse pointer on the signal and click the right mouse button. A pop-up menu will appear which will have a "Delete Stack Command XXX (entrance signal name) – (exit signal name)" menu item for each stacked route. To close the pop-up menu, place the mouse pointer at any location outside the pop-up menu and click the left mouse button.

To delete a stack command, select the appropriate "Delete Stack Command" menu item.

6.2.6. Automatic Signaling of Diamonds

Diamonds can be automatically signaled. This means that routes can be cleared across a diamond in both directions at the same time. If conflicting routes are cleared across a diamond the first train that hits the approach track to the diamond will be cleared to proceed across the diamond. The signals governing the diamond for the other routes will automatically go to stop until the diamond is no longer occupied by the first train, at which time the next train to arrive at the approach track to the diamond will be cleared to proceed.

If the diamond is not set to be automatically signaled, only one route across the diamond can be cleared at any given time.

To determine if a diamond is automatically signaled, place the mouse pointer on the diamond and look at the diamond's parameters in the Status Display line.

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6.3. Train Speeds

The safety system determines the speeds trains shall travel. Because locomotive engineers usually can not see far enough ahead to know if they must soon stop, they must rely on the signaling system to tell them how fast they should be going. The wayside signals will tell the engineer how many blocks ahead are cleared for his train. Most systems have three aspects, which indicate the condition of the next two blocks. The three aspects are stop, clear to proceed through the next block preparing to stop at its end, and clear to proceed through the next two blocks. Train Dispatcher 3 is designed to handle up to four aspects, which gives the engineer information about the next three blocks.

The speed a train travels through a block depends on the type of train and the number of blocks that are cleared ahead of the train. To display the train speeds for a particular block, follow the instructions in Paragraph 3.5.1.

6.4. Train Commands

Train Dispatcher 3 allows the user to issue commands directly to a train crew. The following is the list of commands:

- ◆ Stop the train now
- ◆ Stop the train in block XXX
- ◆ Start the train
- ◆ Clear stop train request
- ◆ Pass next red signal
- ◆ Reverse the train
- ◆ Change the crew in block XXX
- ◆ Split train
- ◆ Merge train with train XXX

To issue commands to a particular train, place the mouse pointer on the block that contains the train and click the right mouse button. A pop-up menu will appear with a list of menu item representing the commands that currently can be issued to the train. If there is more than one train in the block, the commands available for each train in the block will be listed. Only currently valid commands for each train will be listed. For example, if the user has not manually stopped a train, the "Train XXX Start Movement" menu item will not appear. If the train has been manually stopped, the "Train XXX Stop Now" will not appear.

The following is a description of the train commands:

6.4.1. Train XXX Stop Now Command

The "Train XXX Stop Now" menu item command causes the designated train to stop as soon as possible. This menu item will always appear in the pop-up menu unless this command or the "Train XXX Stop in Block" command has already stopped the train.

Once the train is manually stopped the only way to start the train is to issue the "Train XXX Start Movement" menu item command.

6.4.2. Train XXX Stop in Block Command

The "Train XXX Stop in Block" menu item command causes the designated train to stop in the designated block. The train will always stop at the far end of the block. When this menu item is selected a dialog will appear with a list of blocks in which you can command the train to stop.

Once the train is manually stopped the only way to start the train is to issue the "Train XXX Start Movement" menu item command.

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6.4.3. Train XXX Start Movement Command

The “Train XXX Start Movement Now” menu item command causes the designated train to start moving as soon as possible. This menu item will only appear in the pop-up menu if the train is stopped because the “Train XXX Stop Now” or the “Train XXX Stop in Block” commands have previously been issued for the train.

6.4.4. Train XXX Clear Stop in Block XXX

The “Train XXX Clear Stop in Block XXX” menu item command causes a previous instruction to stop the train in a designated block to be cancelled. This menu item will only appear in the pop-up menu when a train has been issued a “Train XXX Stop in Block” command.

6.4.5. Train XXX Pass Red Signal Command

The “Train XXX Pass Red Signal” menu item command causes the designated train to move past the next red signal. There are several reasons why a dispatcher may want to instruct the crew to “go through” a red signal. The two most common are to allow the train to pass a signal “stuck” on red due to signal failure and to allow a train to proceed into a block already occupied by another train traveling in the same direction. This second reason is important if two trains are going into a merge. For example, if a train requires a helper to move up a hill, the helper would have to move past a red signal in order to get into the block that is occupied by the train needing the helper. Once in the block and stopped behind the other train, the helper can be connected to it by use of the “Train XXX Merge” menu item command.

This menu item will only appear in the pop-up menu when a train is stopped waiting for a signal.

6.4.6. Train XXX Reverse Train Command

The “Train XXX Reverse Train” menu item command causes the designated train to stop and start movement in the reverse direction as soon as possible. This menu item will always appear in the pop-up menu unless the train has been manually stopped or there is another pending reverse request.

Trains cannot be reversed if there is opposing traffic in the reverse direction between the train and the next control signal or the track behind the train is not signaled in the reverse direction.

6.4.7. Train XXX Change Crew Command

The “Train XXX Change Crew” menu item command instructs the train to stop in a designated block and wait for the new crew to arrive. It also calls the new crew.

When this menu item is selected it causes the Call Crew dialog in Figure 18 to appear.

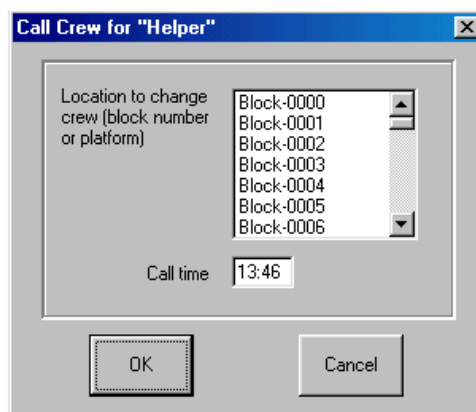


Figure 18 - Crew Call

The block in which the crew exchange is to occur must be selected. The time the new crew will arrive will be determined by the crew’s call time entered in this dialog and the time it takes the new crew to travel to the block.

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The time it takes for a crew to get to a block can be found in the Block Properties – General dialog (see Paragraph 3.5.1).

When information in the Call Crew dialog is successfully entered, the time the new crew will arrive in the block will be displayed. See Paragraph 6.8 for more information about the crew calling and crew time expirations.

6.4.8. Train XXX Merge with Train XXX Command

The “Train XXX Merge with Train XXX” menu item command causes the designated train to merge with another train. This menu item will appear in the popup menu when the designated train is behind another train in the same block and both trains are stopped.

Once two or more trains are merged together, they can be split apart by the “Train XXX Split” command.

6.4.9. Train XXX Split Command

The “Train XXX Split” menu item command causes the designated train to be split into two trains. This menu item will appear in the popup menu when the designated train has been previously merged with another train.

When this menu item is selected a dialog will appear which asks which train is to be split from the designated train.

6.4.10. Use of Helper Trains

Two trains are sometimes connected together or merged for various reasons. The most common reason to merge two trains is to facilitate the use of a “Helper” train to power a second train over a steep grade. Because of the safety controls that are a part of CTC, the merging of two trains requires several steps. The CTC circuitry normally will prevent two trains from occupying the same block at the same time.

When a heavy train encounters a grade it cannot traverse it will stop, and its status will indicate the train is stopped waiting for a helper. The trains in a particular territory that are available as helpers can be seen in the Active Train List Window. A train designated as a helper must be maneuvered to the block immediately behind the block containing the train needing more power. The helper will automatically stop when it encounters the red signal at the entrance to the block containing the other train. The dispatcher can instruct the helper to go through the red signal and into the block by right clicking on the train and selecting the “Train XXX Pass Red Signal” menu item. The train will then proceed into the block and stop behind the other train. Once the helper is stopped behind the other train, the dispatcher can instruct the two trains to merge by right clicking on the helper and selecting the “Train XXX Merge with Train XXX” menu item. The two trains will henceforth move as one train and assume the train identifier of the original forward train.

After the grade has been traversed the merged train can be split into the two original trains by right clicking on the train and selecting the “Train XXX Split” menu item. The original helper train will reassume its original train identifier, and the two trains will once again move as two distinct trains obeying all of the CTC circuitry.

6.5. Trains at Junctions

Diamonds are often used at junctions with a foreign railroad. Trains moving across the junction are often controlled by another railroad and can have a serious impact on dispatching operations.

Train Dispatcher 3 simulates the impact of these trains by specifying how often a train controlled by another dispatcher will cross the junction. Diamonds that are partially controlled by another dispatcher do not have any signals in the route across the diamond that the other dispatcher controls. In Figure 19, another dispatcher controls the route that crosses the diamond at Branchville from top to bottom.

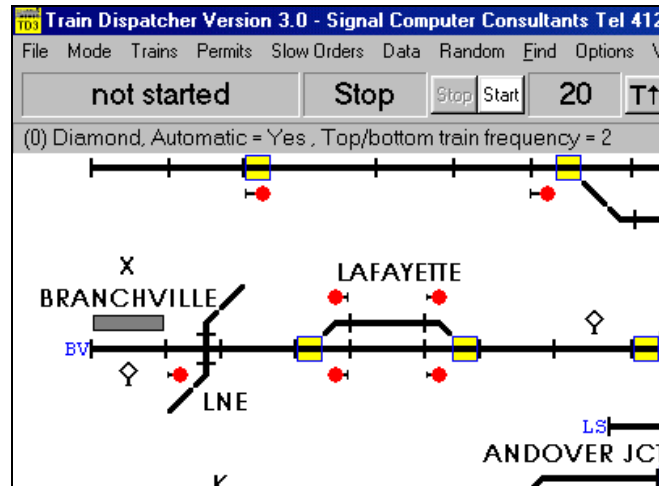


Figure 19 - Diamond Train Frequency Example

To display the frequency of foreign trains across the diamond, place the mouse pointer on the diamond. The train frequency over the diamond will appear in the status display line. In this case Train Dispatcher 3 would automatically clear and move 2 trains a day across this junction. Each train's route would be cleared 5 to 15 minutes before the train arrived and be occupied for 2 to 5 minutes.

6.6. Permission to Enter Territory

A number of entrance/exit locations require the dispatcher to give the train permission before it can enter the territory. To determine if an entrance/exit location requires trains to obtain permission before entering the territory, place the mouse pointer on the entrance/exit location name. The status display line will display information about the entrance/exit location including whether trains must obtain permission to enter the territory at that location.

When a train requests permission to enter the territory the dialog in Figure 20 will appear.

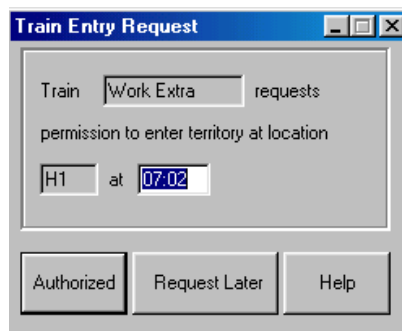


Figure 20 - Train Entry Request Dialog

The request can either be granted for a specified time or can be delayed until later. If delayed, the train will make another request in 30 minutes.

The train entry request function can be de-activated. See Paragraph 8.3 about turning off this function.

6.7. Block Permit Request

Tracks often require maintenance. Before maintenance can be performed, the track must be taken out of service. To take a track out of service, the dispatcher issues a block permit (track & time). The block permit authorizes a maintenance gang to work on the track for a specified amount of time.

When a foreman wants to obtain a block permit he will issue a request to the dispatcher. When a request is made in Train Dispatcher 3, the dialog in Figure 21 will appear.

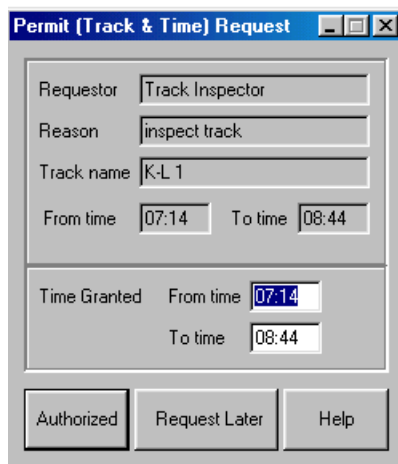


Figure 21 - Block Permit Request Dialog

The dispatcher can either ask the foreman to request the permit again or authorize it for a specific time period. If the foreman is not granted time, he will make another request in 30 minutes.

If time is granted, but not for the total amount requested, the foreman will make another request after the first permit that was granted has expired.

6.8. Crew Calling

Train crews are only allowed to be on duty for 12 hours. If a train crew's on-duty time exceeds 12 hours (crew's time expires), the train will stop and will not move again until a new crew arrives and replaces the current train crew.

It is the job of the dispatcher to call replacement crews and to prevent train crews from expiring on the mainline.

The time a train's crew will expire can be found in the Active Train List window (see Paragraph 7.2) or in the train's status line display at the top of the screen, which is seen when the mouse pointer is positioned on the block containing the train.

A new crew for a train can be called at anytime and be scheduled to replace a train's crew at a platform or in a specified block. The time it takes for a crew to arrive at a platform or block is determined by the time the crew was called plus the travel time to the block. There is a field in each block's Block Properties – General dialog that contains the amount of time it takes to get a new crew to the block.

A crew's on-duty time starts when the dispatcher calls the crew.

7. SIMULATION STATUS INFORMATION

Train Dispatcher 3 provides a considerable amount of information about the status of a simulation. Most of this information is centered around the status of trains, but also addresses block permits and slow orders. The following describes various functions that provide status information.

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7.1. Train Status Line

To quickly find information about a train, place the mouse pointer on the train. The train's status will appear in the status display line near the top of the screen (see Figure 22)



Figure 22 - Train Status Line

The train status line contains the following information:

- ◆ The train identifier
- ◆ The average speed of the train in the block
- ◆ The length of the train
- ◆ The next entrance/exit location where the train is to leave the territory or the train identifier of the train this train will become
- ◆ The status of the train (i.e. “moving forward”);
- ◆ The train’s next scheduled event
 - if the train is moving, the time it will arrive at the end the block
 - if the train is at stop waiting for a signal, the time it stopped
 - for all other train stops (platform, work area, etc.), the estimated time of departure.
- ◆ The time when the crew will expire because they have worked 12 hours.
- ◆ If a new crew has been called, the place and time the crew change will occur

7.2. Active Train List

Trains that are on the territory and are due to arrive on the territory in 8 hours appear in the Active Train List window. To call up the Active Train List window, select “Trains” in the menu bar, and the display in Figure 23 will appear.

Train ID	Status	Length	Type	Location	Direction	Speed	ETA	Crew Ex...	Entrance	Exit	Next Station Stop/Time	Part of Train
1009	stopped waiting signal	700	Passenger	P-P Sdg	Left	0	07:10	15:00	D		Newton/07:36	
1011	scheduled to arrive	500	Passenger				11:20	21:20	D		Lake Hopatcong/11:34	
1014	stopped waiting signal	500	Passenger	L-M 2a	Right	0	07:10	15:00	L4	D		
1016	moving forward	500	Passenger	O-P Md	Right	20	07:13	15:00	N1	D	Lake Hopatcong/07:14	
1022	became another train	500	Passenger									
1024	stopped at Netcong's...	500	Passenger	P-P M	Right	0	07:19	17:03		D	Netcong/07:19	
2	scheduled to arrive	1000	Passenger				11:19	22:19	S	D	Pocono Summit/12:10	
2/HB9	scheduled to arrive	5000	Slow Freight				14:30	00:30	L3	S		
26	scheduled to arrive	1000	Passenger				07:15	18:15	S	D	Pocono Summit/08:00	
3	scheduled to arrive	1000	Passenger				11:33	21:33	D	S	Blairstown/12:04	
47	scheduled to arrive	1000	Fast Frgt/St...				08:48	18:48	D	S	Blairstown/09:28	
B&P	scheduled to arrive	1000	Regular Frei...				08:33	18:33	BP	PO		
BH8	scheduled to arrive	5000	Slow Freight				13:40	00:25	S	D		
Boonton	scheduled to arrive	2000	Regular Frei...				11:30	21:30	L1	D		
Cementer	stopped waiting signal	4000	Regular Frei...	LK 2	Right	0	07:10	15:00	L2	L2		

Figure 23 - Active Train List Window

This window is dynamically updated. As trains move and their status change, the window will be modified to reflect these changes. To stop this window from updating click the “Stop” button to stop the simulation clock.

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The list can be sorted by train identifier, train status or by estimated time of arrival/departure (ETA). To sort by train identifier, status, or ETA click the "Sort ID", "Sort Status" or "Sort ETA" buttons, respectively.

To display only the trains that are scheduled to arrive on the territory, are stopped, are moving, or are off the territory and will not return, check the "Arriving", "Stopped", "Moving" or "Completed" boxes, respectively.

The user can re-size any of the columns in this window by placing the mouse on a vertical separator in the columns header and, while holding down the left mouse button, drag the mouse to the left or right. Once the columns are re-sized, the user can save the column widths for the next time the window is displayed by clicking the "Save Column Widths" button.

The following describes each of the columns in this window:

- ◆ **Train ID** - contains the train identifier.
- ◆ **Status** - contains a text description of the train's current status.
- ◆ **Length** - contains the train length in feet/meters.
- ◆ **Type** - indicates the type of train.
- ◆ **Location** - contains the name of the track where the train is currently located.
- ◆ **Direction** - indicates the train's current direction.
- ◆ **Speed** - the average speed in which the train is moving in the current block.
- ◆ **ETA** - the following describes the contents of this field
 - if the train is moving, the time it will arrive at the end the block
 - if the train is scheduled to arrive, the time it will arrive on the territory
 - if the train is at stop waiting for a signal, the time it stopped
 - for all other train stops (platform, work area, etc.), the estimated time of departure.
- ◆ **Crew Expiration** - the time the crew will expire because it was on duty for 12 hours.
- ◆ **Entrance** - contains the entrance/exit location where the train came onto the territory the last time.
- ◆ **Exit** - contains the entrance/exit location where the train should exit the territory.
- ◆ **Next Station Stop/Time** - contains the name of the next station platform and the time the train is scheduled to stop at the platform.
- ◆ **Part of Train** – if the train is merged with another train, the train identifier of the merged train.

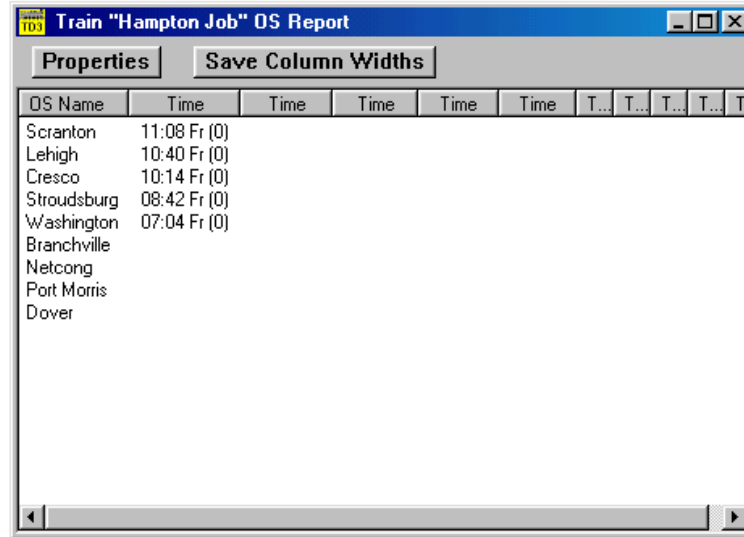
To locate a train on the territory, place the mouse pointer on any of the data contained in a train's row, click the left or right mouse button to select the train, and then click the "Find" button. Train Dispatcher 3 will then scroll on the territory screen to the location of the train and place the mouse pointer on the train.

The train's data dialog can be called up by placing the mouse pointer on any data contained in a train's row, clicking the left or right mouse button to select the train, and then clicking the "Properties" button.

Train Dispatcher 3 keeps a record of train movements by recording the time a train passes an OS point (OS is sometimes referred to as on-station or out of station).

OS point names are usually assigned to the switches at each end of a siding or to blocks in the middle of a siding. The number and location of the OS points are determined by the railroad. A list of the OS points can be called up by selecting the "OS Points" item under the "Data" menu.

The train's OS window can be called up by placing the mouse pointer on any data contained in a train's row, clicking the left or right mouse button to select the train, and then clicking the "OS" button. Figure 24 shows the Train OS window.

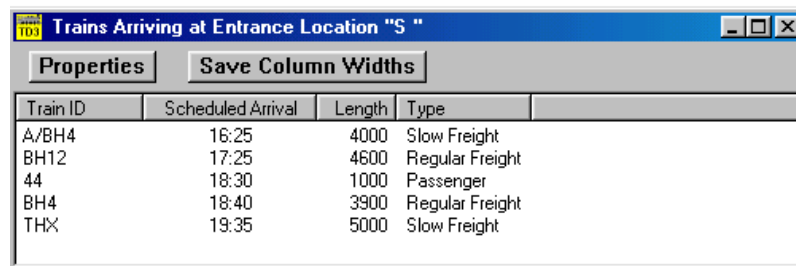


OS Name	Time	Time	Time	Time	Time	T...	T...	T...	T...	T
Scranton	11:08	Fr	(0)							
Lehigh	10:40	Fr	(0)							
Cresco	10:14	Fr	(0)							
Stroudsburg	08:42	Fr	(0)							
Washington	07:04	Fr	(0)							
Branchville										
Netcong										
Port Morris										
Dover										

Figure 24 - Train OS Window

7.3. Train Territory Arrival Schedule

A list of trains that are to arrive on a territory at a given entrance/exit location can be called up placing the mouse pointer on the entrance/exit location name and clicking the right mouse button. Figure 25 will then appear.



Train ID	Scheduled Arrival	Length	Type
A/BH4	16:25	4000	Slow Freight
BH12	17:25	4600	Regular Freight
44	18:30	1000	Passenger
BH4	18:40	3900	Regular Freight
THX	19:35	5000	Slow Freight

Figure 25 - Train Territory Arrival Window

This window shows the trains that will arrive on the territory in the next eight hours. The trains are sorted by their arrival time.

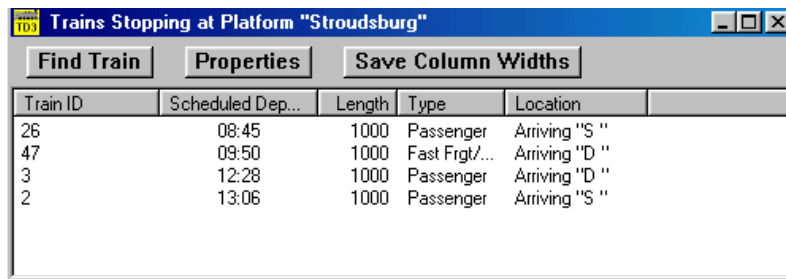
The user can re-size any of the columns in this window by placing the mouse on a vertical separator in the columns header and, while holding down the left mouse button, drag the mouse to the left or right. Once the columns are re-sized, the user can save the column widths for the next time the window is displayed by clicking the "Save Column Widths" button.

The train's data dialog can be called up by placing the mouse pointer on any data contained in a train's row, clicking the left or right mouse button to select the train, and then clicking the "Properties" button.

Multiple Train Territory Arrival windows for different entrance/exit locations can be opened at the same time. These windows will automatically update as the status of trains change.

7.4. Train Platform Schedule

A list of trains scheduled to stop at a platform can be called up placing the mouse pointer on a block containing the platform and clicking the right mouse button. Click on the "Train Stop at Platform" item in the pop-up menu that will appear, and the window shown in Figure 26 will be displayed.



Train ID	Scheduled Dep...	Length	Type	Location
26	08:45	1000	Passenger	Arriving "S "
47	09:50	1000	Fast Figt/...	Arriving "D "
3	12:28	1000	Passenger	Arriving "D "
2	13:06	1000	Passenger	Arriving "S "

Figure 26 - Train Platform Schedule Window

This window shows the trains that will be stopping at the platform in the next eight hours. The trains are sorted by their scheduled platform departure time.

The user can re-size any column in this window by placing the mouse on a vertical separator in the columns header and, while holding down the left mouse button, drag the mouse to the left or right. Once the columns are re-sized, the user can save the column widths for the next time the window is displayed by clicking the "Save Column Widths" button.

To locate a train on the territory, place the mouse pointer on any of the data contained in a train's row, click the left or right mouse button to select the train, and click the "Find" button. Train Dispatcher 3 will then scroll on the territory screen to the location of the train and place the mouse pointer on the train.

The train's data dialog can be called up by placing the mouse pointer on any data contained in a train's row, clicking the left or right mouse button to select the train, and then clicking the "Properties" button.

7.5. Train Graph

A historical record of train movements can be displayed in the form of a train graph. The train graph is a graphical representation of train movements obtained by plotting the time each train hits an OS point. To display the train graph select the "Display Train Graph" item under the "View" menu (see Figure 27).

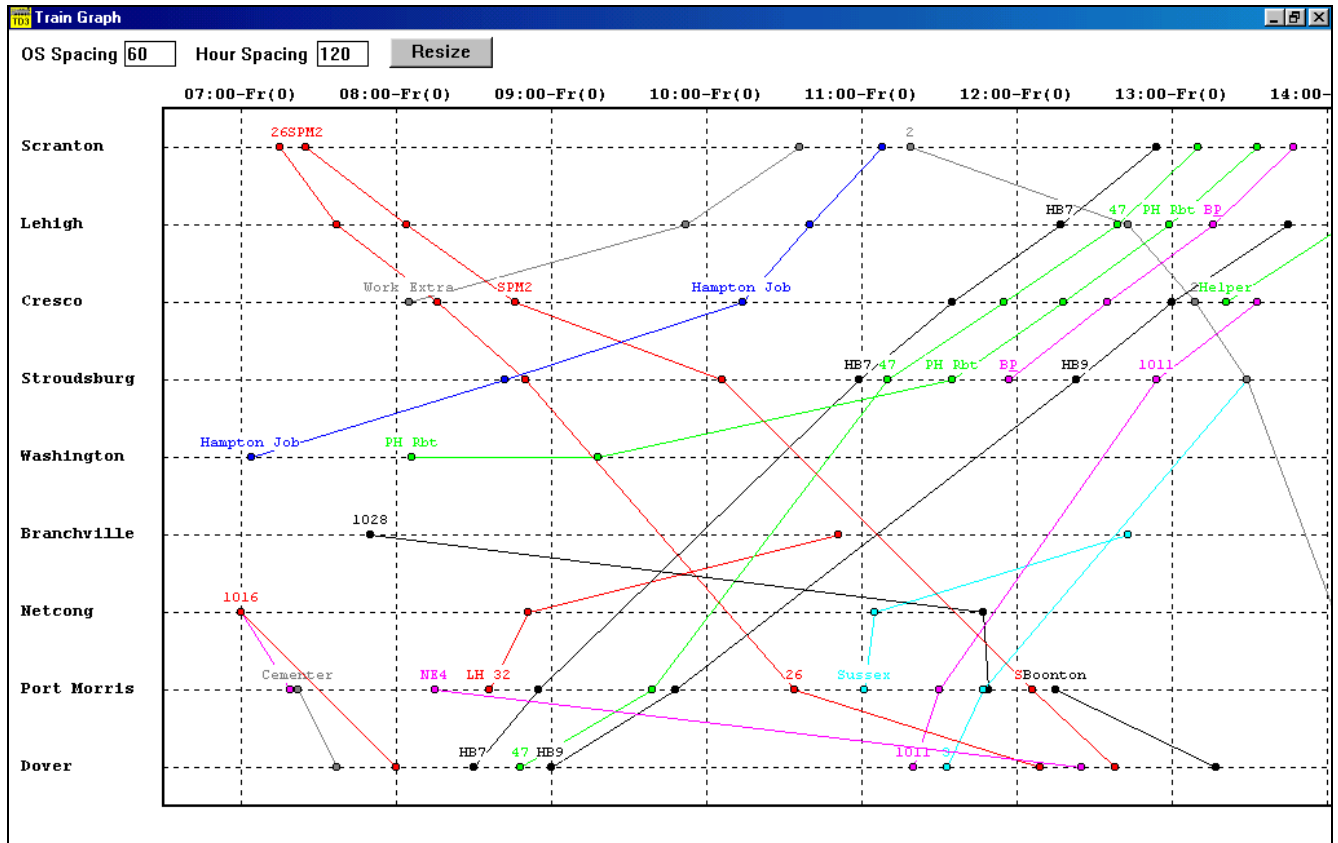


Figure 27 - Train Graph

The train graph plots each train. The OS points are indicated on the left side of the display and time across the top. Dots indicate when an actual OS time was recorded for the train. Each train is assigned a color, and the train's identifier is displayed above alternating OS hits.

To change the size of the train graph, modify the pixel widths in the "OS Spacing" (height) and "Hour Spacing" (width) fields at the top of the screen, and then click the "Resize" button.

7.6. Performance Data

The performance of individual trains can be monitored. To view train performance, select the "Display Performance" item under the "View" menu, and the window shown in Figure 28 will appear.

Train ID	Miles	Stop Time	Lost Time	Late Departure Time	Late Departures	Missed Exits
TOTAL	1219	1505	369	656	14	8
1009	20	1	9	0	0	0
1011	78	24	37	0	0	0
1014	5	10	1	0	0	0
1015	0	0	0	0	0	0
1016	11	31	5	5	1	0
1017	0	0	0	0	0	0
1021	0	0	0	0	0	0
1022	0	0	0	0	0	0
1023	0	0	0	0	0	0
1024	1	0	0	0	0	1
1028	22	89	1	82	1	1
1031	0	0	0	0	0	0

Figure 28 - Performance Window

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This window displays the total performance of the system (first row) and the individual performance of each train. The train performance is sorted by the train identifier. The following describes the columns in this window:

- ◆ **Train ID** - the train identifier.
- ◆ **Miles** - the total number of miles the train has traveled.
- ◆ **Stop Time** - the amount of time the train has been stopped either waiting for a signal to clear or due to crew expiration.
- ◆ **Lost Time** - the amount of time that was lost because the train was not moving at its maximum speed.
- ◆ **Late Departure Time** - the amount of time the train was late in departing station platforms.
- ◆ **Late Departure** - the number of times the train was late departing station platforms.
- ◆ **Missed Exits** – the number of times the train departed the territory at the wrong entrance/exit location.

7.7. Active Block Permits

Block permits that are active, authorized by the dispatcher and not active, or to be requested within 8 hours (pending) can be viewed in the Active Block Permit List window. To call up the Active Block Permit List window select the "Permit" item in the menu bar, and the window in Figure 29 will appear.

Nu...	Status	Track Name	From Time	To Time	Time Still Needed	Requestor	Reason
9	Active	K-L 1	07:33	09:03	0	Track Inspector	inspect track
12	Pending	F-G 2a	09:30	11:00	90	Track Inspector	inspect track
5	Pending	O-P Ma	09:30	11:30	120	Section Foreman	surface track
4	Pending	L-M 2a	10:00	12:00	120	Surfacing Gang	replace ties
3	Pending	L-M 1a	12:00	15:00	180	Surfacing Gang	replace ties
8	Pending	F-G 1a	13:45	16:15	150	Section Foreman	replace ties
2	Pending	K-L 2	14:00	15:00	60	Roadmaster	inspect track

Figure 29 - Active Block Permit List Window

This window is dynamically updated. As the status of block permits change, the window will continually be modified to reflect these changes.

The list can be sorted by track name or the permit's requested or actual start time. To sort by the track name or the permit's requested or actual start time click the "Sort Track" or "Sort Time" buttons, respectively.

To display just the block permits that are pending, authorized or active, check the "Pending", "Authorized" or "Active" boxes, respectively.

The user can re-size any column in this window by placing the mouse on the vertical separator in the columns header and, while holding down the left mouse button, drag the mouse to the left or right. Once the columns are re-sized, the user can save the column widths for the next time the window is displayed by clicking the "Save Column Widths" button.

The following describes each of the columns in this window:

- ◆ **Number** - contains the internal system number of the permit.
- ◆ **Status** - contains the status of the permit.
- ◆ **Track Name** - contains the name of the track that will be protected by the permit.

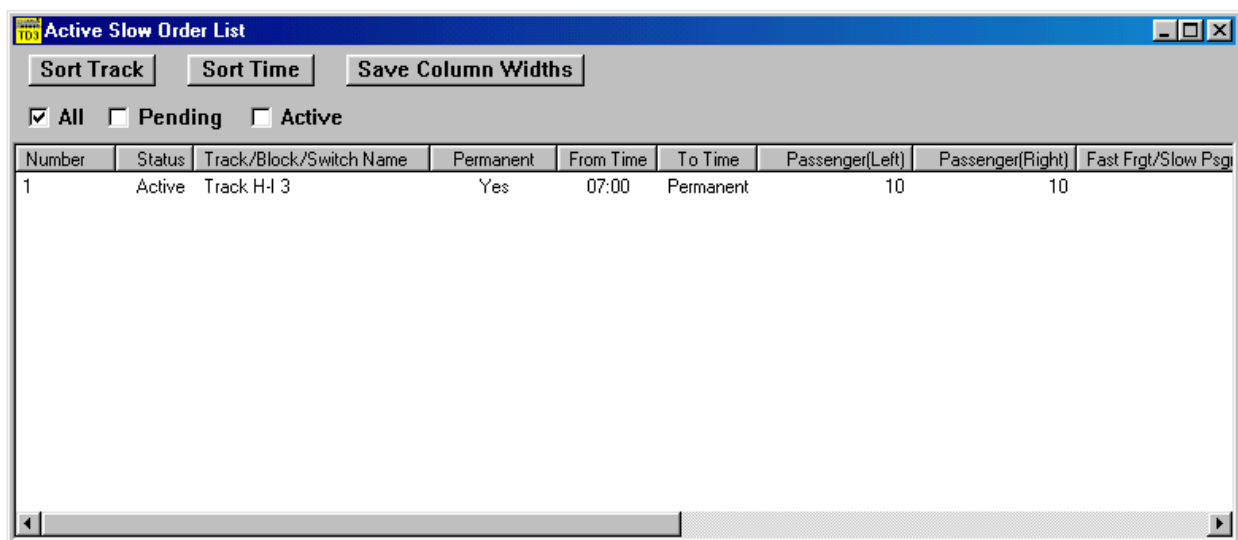
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- ◆ **From Time** - contains the requested or actual time the permit will start.
- ◆ **To Time** - contains the requested or actual time the permit will end.
- ◆ **Time Still needed** - the amount of time the requestor still needs after the currently authorized or active permit ends.
- ◆ **Requestor** - the name of the person requesting the block permit.
- ◆ **Reason** - the reason for the request.

To authorize a pending block permit request, place the mouse pointer on any of the data contained in a block permit's row, click the left or right mouse button to select the block permit, and click the "Authorize" button. The Block Permit Request dialog in Figure 21 will then appear.

7.8. Active Slow Orders

Slow orders that are active or will occur within 8 hours (pending) can be viewed in the Active Slow Order Permit List window. To call up the Active Slow Order List window select the "Slow Order" menu item in the menu bar, and the window in Figure 29 will appear.



Number	Status	Track/Block/Switch Name	Permanent	From Time	To Time	Passenger(Left)	Passenger(Right)	Fast Frgt/Slow Psg
1	Active	Track H-1 3	Yes	07:00	Permanent	10	10	

Figure 30 - Active Slow Order List Window

This window is dynamically updated. As the status of slow orders change, the window will be continually modified to reflect the changes.

The list can be sorted by track name or the slow order's requested or actual start time. To sort by the track name or the slow order's requested or actual start time, click the "Sort Track" or "Sort Time" buttons, respectively.

To display only the slow orders that are pending or those that are active, check the "Pending" or "Active" boxes, respectively.

The user can re-size any of the columns in the window by placing the mouse on a vertical separator in the columns header and, while holding down the left mouse button, drag the mouse to the left or right. Once the columns are re-sized, the user can save the new column widths for the next time the window is displayed by clicking the "Save Column Widths" button.

The following describes each of the columns in this window:

- ◆ **Number** - contains the internal system number of the slow order.
- ◆ **Status** - contains the status of the slow order.

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- ◆ **Track/Block/Switch Name** - the name of the track, block or switch that is affected by the slow order.
- ◆ **Permanent** – indicated if the slow order is permanent or has a limited time period.
- ◆ **From Time** - the time when the slow order goes into effect.
- ◆ **To Time** – the time the slow order expires.
- ◆ **Slow Order Speeds** – is a group of fields for each type of train in each direction, which contains the maximum speeds the trains can travel over the track, block or switch when the slow order is in effect. If the speed for a train type is blank, the slow order does not affect the speeds for that type of train.

7.9. Alert System

Centralized Traffic Control systems generally allow dispatchers to view their entire territories at one time by using several monitors or a wall board. Because most computers only have one monitor, Train Dispatcher 3 cannot, in some cases, display the entire territory on a single screen even if the track diagram is zoomed out and the monitor is set at its highest resolution.

To help the user, Train Dispatcher 3 has a message alert system, which informs the user of situations that may require his or her attention. The system can generate an alert message for any of the following situations:

- When a train arrives on the territory
- When a train is stopped waiting at a signal
- ◆ When a train is stopped because of a wayside defect detector alarm
- When a block permit will become active in 30 minutes
- ◆ When a block permit becomes active
- ◆ When a slow order becomes active
- ◆ When a train is late arriving at a passenger station
- ◆ When a train has locomotive problems which affect the train's performance
- ◆ When a train is having problems that require it to stop
- ◆ When a train's crew will expire in two hours
- ◆ When a train's crew expires

The user can decide which alert messages will be generated and whether they will have an associated audio alarm (see Paragraph 8.2).

Alert messages will appear in the status line near the top of the screen (see Figure 31) if the mouse pointer is not placed on a train, track block, switch, diamond, or signal. If the mouse pointer is on any one of these items, instead of the alert message, information on that item will be displayed in the status line.

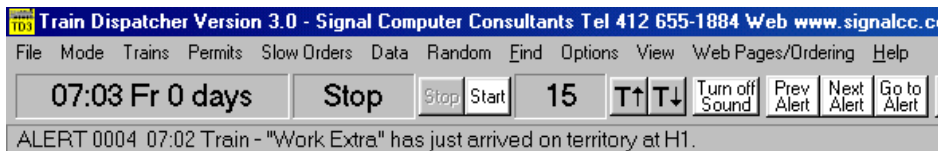


Figure 31 - Alert Messages

The alert displayed in the status line is either the last alert that occurred or the last alert the user looked at. To set this option to be the last alert that occurred, select the "Display Last Alert" menu item under the "View" menu.

There are three buttons located above the status line that are associated with the alert system. These are the "Prev Alert", "Next Alert" and "Go to Alert". The program saves a list of the 50 most recent alert messages.

Each alert message is assigned a sequential number. If there is an alert message after the one that is currently being displayed in the status line, the "Next Alert" button will be active (not gray). To display the next alert message, click the "Next Alert" button. If there is an alert message previous to the one being displayed, the "Prev Alert" button will also be active.

Clicking on the "Go to Alert" button will cause the mouse pointer to be positioned on the territory screen at the location (train or track block) that caused the alert condition displayed in the status line.

The alert system can also display a window that shows all 50 of the alert messages currently saved in the system. To display the Alert Message window (see Figure 32), click on the "Display Alert Window" item in the "View" menu. The alert that is displayed in the status line will be highlighted in the window that appears. To go from this window to the device that caused the alert message double click (using the left mouse button) on the message.

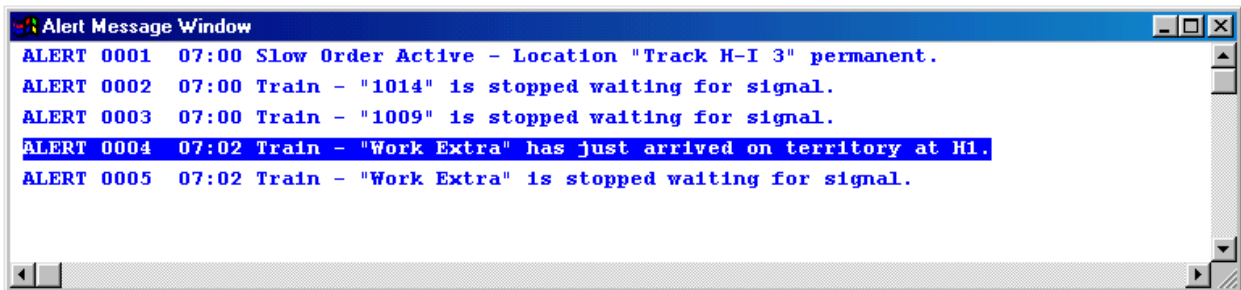


Figure 32 - Alert Message Window

8. OPTIONS

Train Dispatcher 3 has a number of options that can be selected to vary a simulation. These options are broken down into three categories. These categories specify the randomness of a simulation, the alert parameters, and which functions are to be active.

8.1. Random Performance

To make each simulation different and more realistic, a random performance generator is included in Train Dispatcher 3. The user controls the effect of the random performance generator by entering various parameters. There are three types of random performance parameters: train; wayside defect detector; and switch and signal.

8.1.1. Random Train Parameters

To enter the train parameters for the random performance generator, select the "Random Train Parameters" menu item under the "Random" menu. Figure 33 will appear.

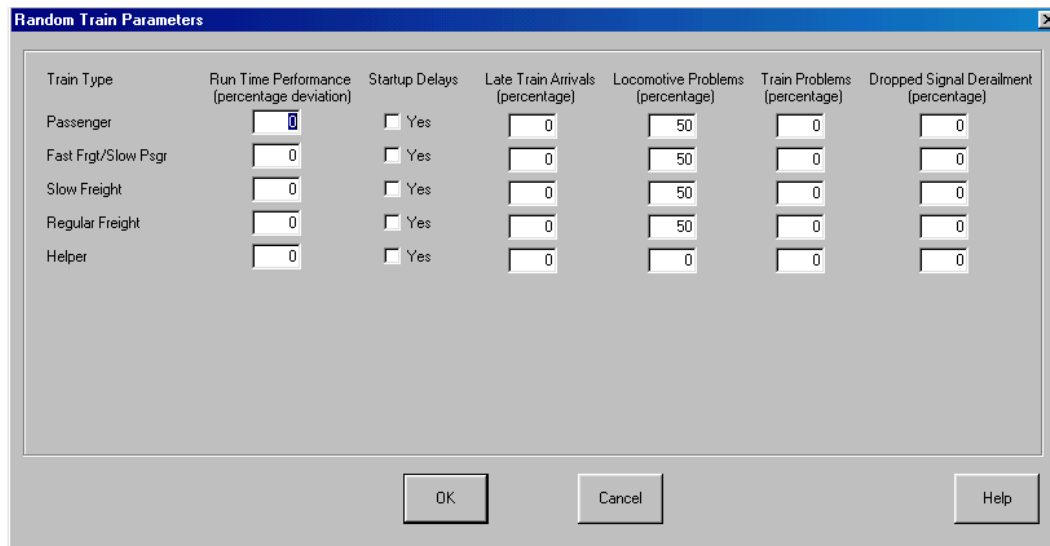


Figure 33 - Random Train Parameters Dialog

For each train type the user can define a range of randomness for performance, delays, and failures. The following describes each of the fields in the Random Train Parameters dialog:

- ◆ **Run Time Performance** - Even though the signaling system and operating rules dictate how fast a train should travel, locomotive engineers operate differently. This parameter sets by how much train speed will deviate from expected speed. If this field is set to 10, for example, the trains' speeds will deviate +-10% from the expected speed. A train, therefore, with an expected speed of 60 miles per hour will be assigned a random speed between 54 and 66 miles per hour. If this parameter is set to zero, the trains will always travel at the expected speeds.

The random speed deviation for a particular train type applies from the time it enters the territory until it exists the territory. Therefore, a train will travel through all blocks at the same percentage deviation from the expected speed.

- ◆ **Startup Delays** - Stopped trains do not always immediately start to move when a signal is cleared. The train startup time can be affected by the weight of the train, the slope of the track, and the locomotive engineer's response time. When this parameter is checked, a random startup time for the train will be generated based on the normal start up time for that train type.
- ◆ **Late train arrival** - Trains will not always arrive on the territory at the scheduled time. This parameter sets the percentage of trains that will be late arriving on the territory. If this parameter is set to zero, all trains will arrive on the territory on time.

The amount of time a train can be late deviates from 1 minute to 9 hours and 59 minutes. The algorithm used to calculate the lateness of a train causes lower time delays to be assigned more often than higher ones. For example, 50% of all time delays will be less than one hour, 75% less than 2 hours, 87.5% less than 3 hours, etc.

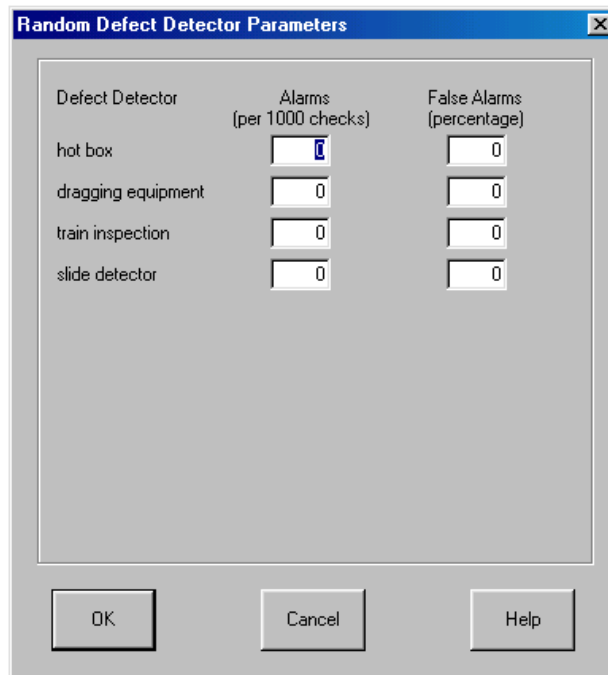
- ◆ **Locomotive Problems** - Trains can have problems with one or more of their locomotives that will affect the performance of the train. The number entered into this parameter indicates the percentage of trains on the territory that will have locomotive problems. For example, if this parameter set to 0, none will; if it is set to 50, then 50 percent of the trains will develop locomotive problems.
- ◆ **Train Problems** - Trains can have problems such as broken air hoses. When a problem of this type occurs the train must stop and the crew will have to fix the problem before it can move again. As above, the number entered into this field indicates the percentage of trains on the territory that will have this type of problem.

- ◆ **Dropped Signal Derailment** - One of the most dangerous things a train dispatcher can do is drop a signal (abruptly change the signal from cleared to stop) in front of a moving train. This parameter determines the percentage of trains moving at speeds greater than 35 miles per hour that will be derailed if the dispatcher drops a signal in front of them. For trains traveling less than 35 miles per hour, the percentage that will de-rail will be half of this parameter. Trains already stopped when a signal is dropped will obviously not be de-railed.

Derailed trains will be stopped for a period of between 2 and 10 hours.

8.1.2. Random Defect Detector Parameters

To enter the defect detector parameters for the random performance generator, select the "Random Defect Detect Parameters" item under the "Random" menu. Figure 34 will appear.



Defect Detector	Alarms (per 1000 checks)	False Alarms (percentage)
hot box	1	0
dragging equipment	0	0
train inspection	0	0
slide detector	0	0

Figure 34 - Random Defect Detector Parameters Dialog

For each type of wayside defect detector the user can define a range of randomness for alarms and false alarms. The following describes each of the fields in the Random Defect Detector Parameters dialog:

- ◆ **Alarms** - A number of track blocks may contain wayside defect detectors. Trains passing through these blocks will be scanned for problems and an alarm will be generated if a problem is detected. This parameter determines the number of times a problem be detected for every 1000 trains scanned. If an alarm is generated the crew will stop the train, walk to the car that is the subject of the alarm, and determine if the alarm was real or false. This process will cause the train to be stopped for a period of time based on the distance from the front of the train to the car that caused the alarm.
- ◆ **False Alarms** - Not all alarms are real. A number of them are false. This parameter sets the percentage of alarms that are false. If the alarm is false, the train will restart immediately after the car is checked. If the alarm is real, the train will be stopped for an additional period of time while the crew corrects the problem.

8.1.3. Random Switch and Signal Failure Parameters

To enter the switch and signal failure parameters for the random performance generator, select the “Random Switch and Signal Failure Parameters” item under the “Random” menu. Figure 35 will appear.

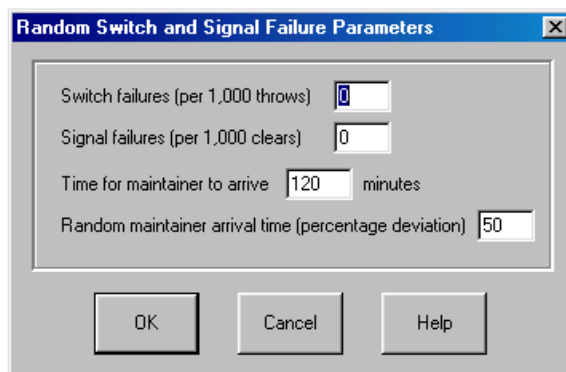


Figure 35 - Random Switch and Signal Failure Parameters Dialog

The user can define a range of randomness for switch and signal failures. The following describes each of the fields in the Random Switch and Signal Failure Parameters dialog:

- ◆ **Switch failures** - Switches sometimes fail to throw because of mechanical problems or debris located near the switch points. This parameter determines the number of switch failures that will occur for every 1,000 switch throws. If a switch fails to throw, the dispatcher will make several attempts to throw it again and hope the movement of the points will dislodge any debris. Train Dispatcher 3 is designed to recover from a switch failure 50% of the time on the first attempted throw after the switch failure, 25% on the second attempted throw, 12.5% on the third throw, etc. The user will be asked if a maintainer should be called to correct the problem.

The user can also tell the crew of a train stopped near the switch to manually throw the switch. To request a crew to manually throw a switch, place the mouse pointer on the failed switch and click the right mouse button. This will cause a pop-up menu to appear with a “Crew to throw Switch XXX Manually” menu item. Select this menu item to throw the switch in the opposite direction.

Please note that this menu item will not appear if there is no train stopped near the switch.

- ◆ **Signal failures** – Signals will sometimes fail to clear. This parameter determines the number of signal failures that will occur for every 1,000 attempts to clear the signal. If a signal fails to clear, the dispatcher will make several attempts to clear it again. Train Dispatcher 3 is designed to recover from a signal failure 50% of the time on the first attempt to clear after the signal failure, 25% on the second attempted throw, 12.5% on the third throw, etc. The user will be asked if a maintainer should be called to correct the problem.

While waiting for a maintainer to fix a signal stuck on red, the user can allow trains to pass the failed signal. For more about this see Paragraph 6.4.5.

- ◆ **Time for maintainer to arrive** – It takes a certain amount of time for a maintainer to arrive and fix the problem. In this field the user specifies, in minutes, this amount of time.
- ◆ **Random maintainer arrival time** – The amount of time it takes for a maintainer to arrive and fix a problem is not always constant. This field allows the user to specify limits on the randomness of the arrival time. If 50% is entered into this field and the maintainer’s arrival time is 2 hours, then the random arrival time will be between 1 and 3 hours.

8.2. Alert Options

There are a number of alert messages that can be activated or de-activated by the user. The user can select which alert messages are active and if they will produce an audio alarm. The audio alarm can either use the computer's internal bell or a sound card. To select the alert options, click the "Alert Parameters" item under the "Options" menu. Figure 36 will appear.

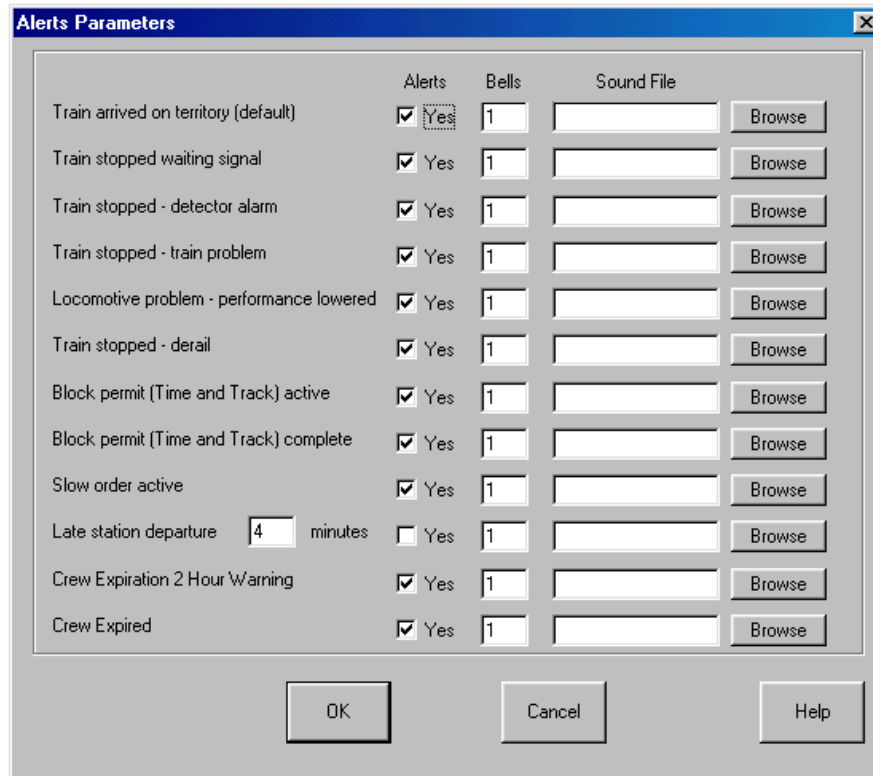


Figure 36 - Alert Parameters Dialog

The following describes the fields in this dialog:

- ◆ **Alerts** - Each type of alert message can be turned on or off by clicking the appropriate "Yes" check box. If the "Yes" box is checked for a particular alert message, an alert message will be issued any time the condition exists. For any alert message conditions that do not have the "Yes" box checked, alert messages will not be issued.
- ◆ **Bells** - Sounds can also be generated when an alert message is issued. If the computer's internal bell is used, a number greater than zero should be entered in the appropriate "Bell" field indicating how many times a bell will chime as an alert to the dispatcher of the alert condition.

Please note that sometimes the internal bell is turned off if the computer has a sound card installed. Please refer to your computer's setup function (not the Window's Setup function) if the internal bell fails to sound.

Please also make sure that the sound in Train Dispatcher 3 is turned on by clicking the "Turn on Sound" button in the toolbar near the top of the screen.

- ◆ **Sound File** - If a sound card is installed in the computer, unique sounds for each alert condition can be generated by entering a wave file name (files with an extension of ".wav") in the "Sound File" field.

If the computer has a sound card, a number of wave files are usually provided by one of the vendors and are located in the windows or windows/media folder. To find these files, use the "Browse" button next to the "Sound File" field.

If you cannot find any .wav files, click the Window's "Start" button, select the "Find" menu item, select the "Files or Folders" menu item, enter "*.wav" in the "Named" field and click the "Find Now" button. A list of .wav files should appear and indicate in which folders they reside on the disk.

With a sound card, users can also generate their own sound files that contain verbal messages (check the documentation which accompanied the sound card for more information).

- ◆ **Late station departure** – the user can also specify, in this dialog, how many minutes beyond a scheduled departure time a train can fail to depart a platform before an alert is generated.

8.3. Function Activation

Train Dispatcher 3 tries to accurately simulate a dispatcher's operation. This can sometimes be overwhelming to a novice. To make it simpler to simulate a territory, Train Dispatcher 3 allows the user to turn off various functions.

To activate or de-activate these optional functions, click the "Function Activation" menu item under the "Options" menu. Figure 37 will appear.

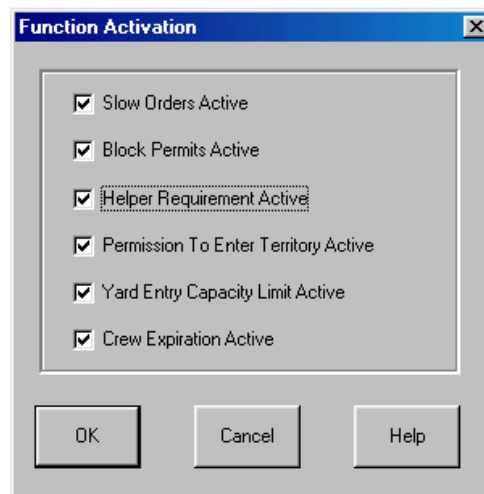


Figure 37 - Function Activation Dialog

9. TERRITORY DATA

The user can view data in a loaded track territory file by selecting one of the menu items under the "Data" menu. A Train Dispatcher 3 user can also modify some data in the track file. The Train Dispatcher 3 user can modify train, block permit, and slow order data. Data about the track structure or speed restrictions cannot be changed.

If the user changes track file data, a new track file can be created that contains the user changes. To save a modified track file, select the "Save Territory Track File" menu item under the "File" menu. This action will not overwrite the original track file.

The following describes the various track file data areas:

9.1. Territory Data

Data about the territory that can be viewed by the users is included in Train Dispatcher 3. To view this information, select the "About Territory" item under the "Data" menu in the menu bar. Figure 38 shows the dialog this menu selection produces.

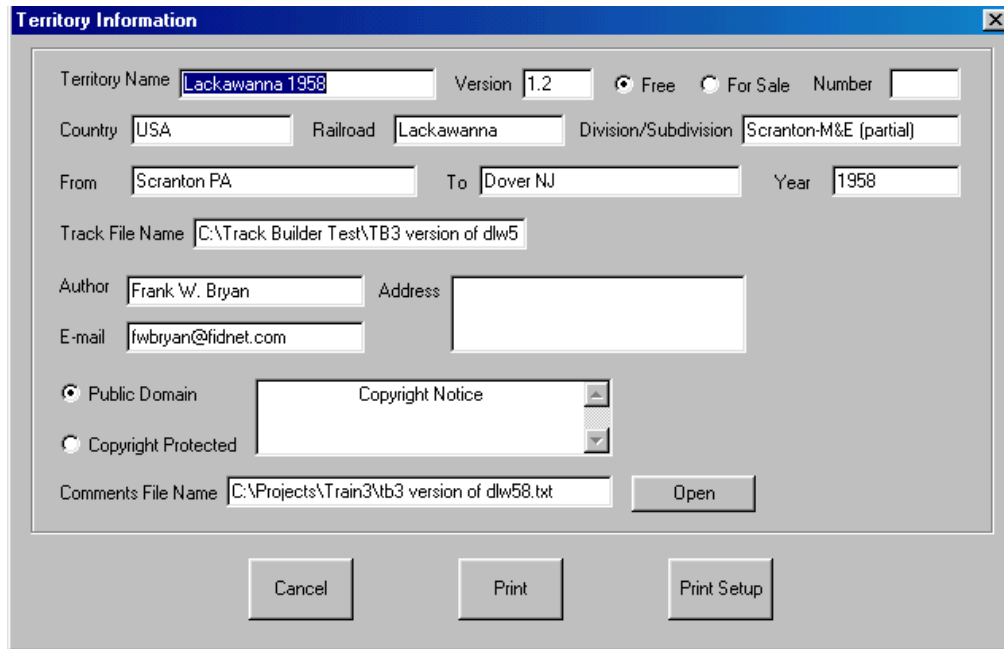


Figure 38 -Territory Data Dialog

Train Dispatcher 3 does not have the “Comments” field that was in Train Dispatcher 2. To provide greater flexibility Track Builder 3 users can attach a comments file to the track file. When Train Dispatcher 3 loads a track file it generates the comments file. This file is a text file (.txt file extension) and can be generated by any word processing application or Window’s NotePad or WordPad programs.

To open the comments file, click the “Open” button, and the NotePad program will start and display the comments file. A sample of what this display might look like is shown in Figure 39,

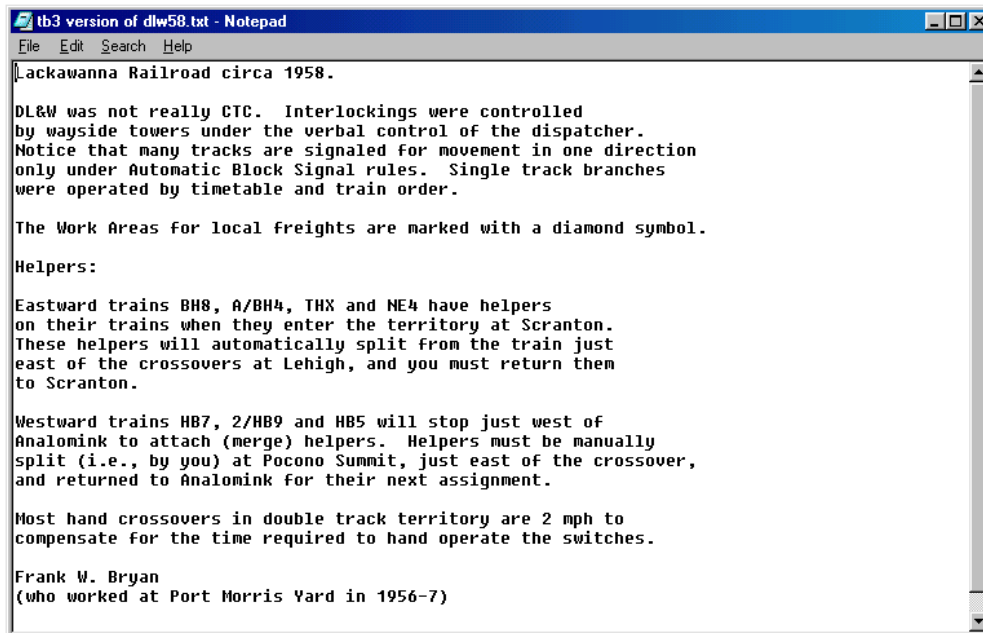
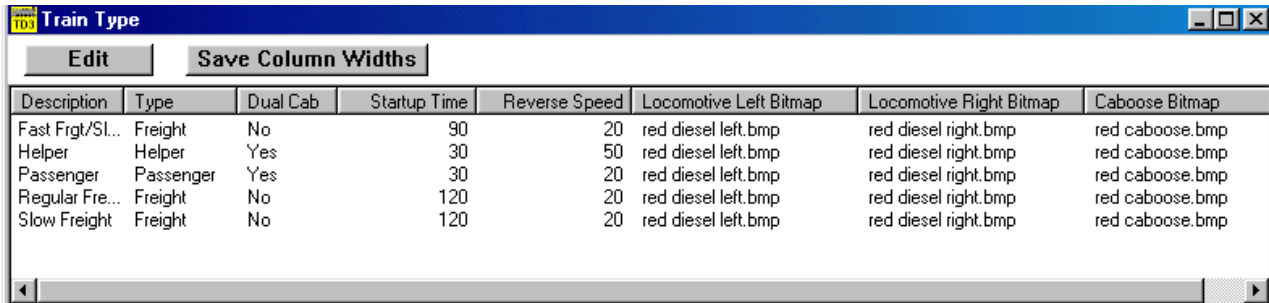


Figure 39 - Territory Comments File

9.2. Train Type Descriptions

Trains can be designated as one of ten types. To view the train types select the “Train Type Description” item under the “Data” menu in the menu bar at the top of the screen. The Train Type Data Window in Figure 40 will appear.



Description	Type	Dual Cab	Startup Time	Reverse Speed	Locomotive Left Bitmap	Locomotive Right Bitmap	Caboose Bitmap
Fast Frgt/SL...	Freight	No	90	20	red diesel left.bmp	red diesel right.bmp	red caboose.bmp
Helper	Helper	Yes	30	50	red diesel left.bmp	red diesel right.bmp	red caboose.bmp
Passenger	Passenger	Yes	30	20	red diesel left.bmp	red diesel right.bmp	red caboose.bmp
Regular Fre...	Freight	No	120	20	red diesel left.bmp	red diesel right.bmp	red caboose.bmp
Slow Freight	Freight	No	120	20	red diesel left.bmp	red diesel right.bmp	red caboose.bmp

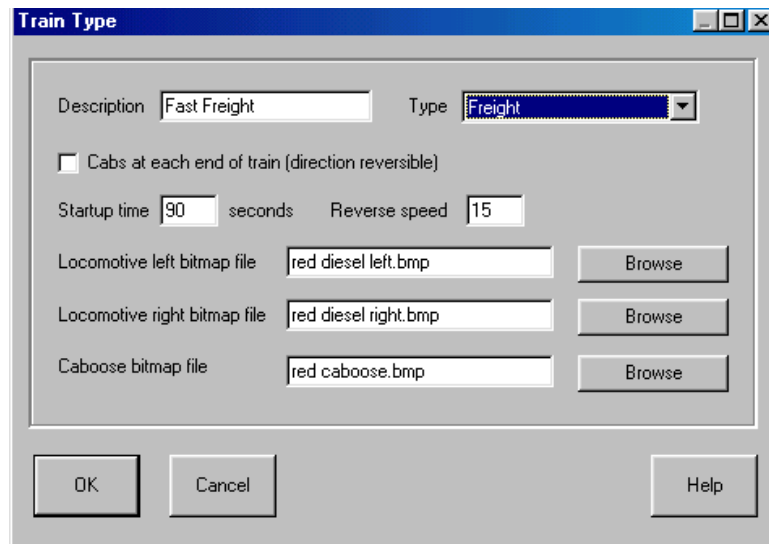
Figure 40 - Train Type Data Window

This window displays information about all of the train types. The user can re-size any column in this window by placing the mouse on a vertical separator in the columns header and, while holding down the left mouse button, drag the mouse to the left or right. Once the columns are re-sized, the user can save the column widths for the next time the window is displayed by clicking the “Save Column Widths” button.

To edit a train type, first place the mouse pointer on the train type row and click the left button to select (highlight) the train type. Then click the “Edit” buttons. The “Edit” button will cause the Train Type dialog to appear (see Figure 41).

You can also place the mouse on the train type row and click the right mouse button, which will also cause the Train Type dialog to appear.

The only fields that can be changed in this dialog are the “Locomotive left bitmap file”, the “Locomotive right bitmap file” and the “Caboose bitmap file” fields.



The dialog box contains the following fields and controls:

- Description:
- Type:
- Cabs at each end of train (direction reversible)
- Startup time: seconds
- Reverse speed:
- Locomotive left bitmap file:
- Locomotive right bitmap file:
- Caboose bitmap file:
- Buttons:

Figure 41 - Train Type Dialog

The following describes each of the fields in the dialog:

- ◆ **Description** – a description of the train type.
- ◆ **Type** – a system description of the train type.

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- ◆ **Cabs at each end of train** – is a check box that indicates the train has cabs on both ends and, therefore, has equal performance in both directions. In Train Dispatcher 3 these trains are never considered to be moving in a reverse direction. Trains that have dual cabs are usually transit vehicles or passenger trains.
- ◆ **Startup time** – is the time it takes to get a train started if it was stopped waiting for a signal. This field is used to assign for the train type the default startup time that appears in the Block Properties - Speeds dialog (see Figure 9).
- ◆ **Reverse speed** – is the maximum speed of the train when it is moving in reverse.
- ◆ **Locomotive left bitmap file** – custom icons can be added to the track execute file in Train Dispatcher 3. These icons are created from bitmap files that have a bitmap representing a left facing locomotive, a right facing locomotive, or a caboose. These bitmaps must be 32 bits wide by 14 bits high and have no more than 16 colors. A number of locomotive and bitmaps files are included with Train Dispatcher 3. The user should feel free to modify these.

The data entered into this field is the name and location of the bitmap file. To easily locate and enter this data click the “Browse” button.

- ◆ **Locomotive right bitmap file** – see “Locomotive left bitmap file”.
- ◆ **Caboose bitmap file** – see “Locomotive left bitmap file”.

If the user changes the bitmap files for the locomotive or caboose icons, these new bitmaps will be displayed only after the track file is saved using the “Save Track Territory File” menu item under the “File” menu and then re-loaded using the “Change Territory Track File” menu item.

9.3. Train Information

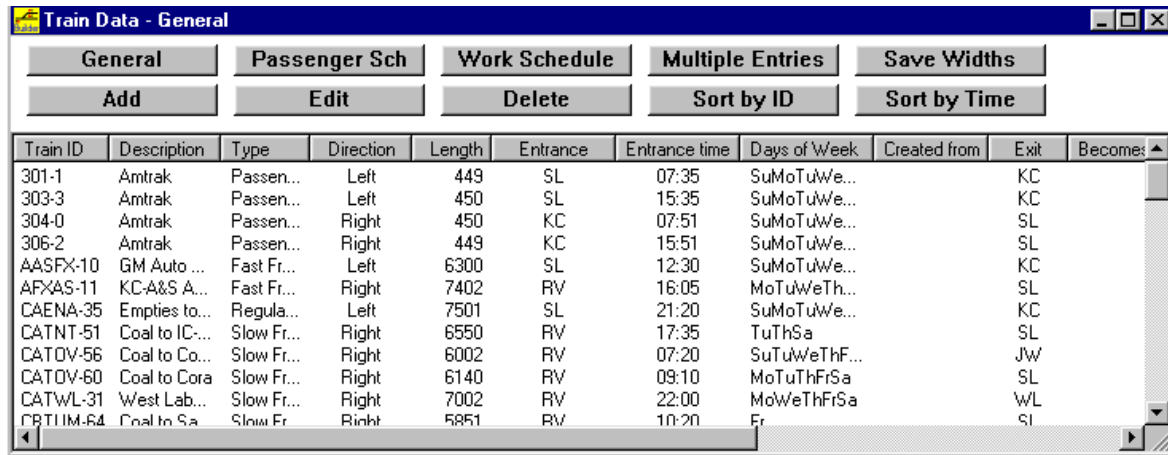
Each territory has a considerable amount of data on each train. Train Dispatcher 3 users can not only view this information but also change it and save the modified territory.

Please note that changes made to the train information should be made prior to starting a simulation. If changes are made after the simulation has started they will not affect any train that already appeared in the Active Train List window (see Paragraph 7.2). The Active Train List window shows all of the trains that are on the territory and all of the trains that are scheduled to arrive on the territory in the next 8 hours.

Train Dispatcher 3 breaks this data out into four data areas. The following describes these areas:

- ◆ **General Information** – contains general identification information about a particular train such as its type, length, the time and location of entry onto the territory, if it was created from another train, if it is to become another train, the days of the week it is scheduled to run, and where it is to exit the territory
- ◆ **Multiple Entries** – contains specific information about a train that is to leave the territory and later return.
- ◆ **Work Schedule** – contains specific information about a train that performs local work in a track area.
- ◆ **Passenger Schedule** – contains specific information about when a train is scheduled to depart station platforms.

Train Dispatcher 3 has separate windows for each of these categories and separate dialog displays for entering data. To enter train data, select the “Train Schedule” menu item under the “Data” menu in the menu bar at the top of the screen. The Train Data - General window shown in Figure 42 will appear.



Train ID	Description	Type	Direction	Length	Entrance	Entrance time	Days of Week	Created from	Exit	Become:
301-1	Amtrak	Passen...	Left	449	SL	07:35	SuMoTuWe...		KC	
303-3	Amtrak	Passen...	Left	450	SL	15:35	SuMoTuWe...		KC	
304-0	Amtrak	Passen...	Right	450	KC	07:51	SuMoTuWe...		SL	
306-2	Amtrak	Passen...	Right	449	KC	15:51	SuMoTuWe...		SL	
AASF-10	GM Auto ...	Fast Fr...	Left	6300	SL	12:30	SuMoTuWe...		KC	
AFXAS-11	KC-A&S A...	Fast Fr...	Right	7402	RV	16:05	MoTuWeTh...		SL	
CAENA-35	Empties to...	Regula...	Left	7501	SL	21:20	SuMoTuWe...		KC	
CATNT-51	Coal to IC...	Slow Fr...	Right	6550	RV	17:35	TuThSa		SL	
CATDV-56	Coal to Co...	Slow Fr...	Right	6002	RV	07:20	SuTuWeThF...		JW	
CATDV-60	Coal to Cora	Slow Fr...	Right	6140	RV	09:10	MoTuThFrSa		SL	
CATWL-31	West Lab...	Slow Fr...	Right	7002	RV	22:00	MoWeThFrSa		WL	
CBT11M-64	Coal to Sa	Slow Fr...	Right	5851	RV	10:20	Fr		SL	

Figure 42 - Train Data Window

There is a different Train Data window for each of the four train data areas. Figure 42 shows the data for the General data area. To display data from another data area, click the “Passenger Sch”, the “Work Schedule” or the “Multiple Entries” button. The first column of all displays contains the Train ID. When the “Train Data – General” window is first called up, data is sorted by Train ID. To sort the list by direction and the time the train is scheduled to enter the territory, click the “Sort by Time” button. This and the “Sort by ID” button will operate on windows for all four train data areas.

The user can re-size columns in each of these windows by placing the mouse on the vertical separators in the columns header and, while holding down the left mouse button, drag the mouse to the left or right. Once the columns are re-sized, the user can save the column widths for the next time the window is displayed by clicking the “Save Column Widths” button.

To add a new train, click the “New” button. To delete or edit a train, first place the mouse pointer on any data in the train’s row in the window and single click the left button to select (highlight) the train. Then click the “Delete” or “Edit” button. The “Edit” button will cause the Train Data dialog to appear (see Figure 43).

You can also place the mouse on data in a train’s row and click the right mouse button, which will cause a pop-up menu to appear that has “New”, “Edit” and “Delete” menu items. Double clicking the left mouse button on a train type row will automatically cause the Train Data dialog to appear in the edit mode.

The train identifiers displayed in all four Train Data windows consist of the train identifier entered in the Train Data dialog in Figure 43 plus a dash (-) and then a unique train internal number. Because several trains can have the same user entered identifier, it was necessary to add a unique number to the identifier to discriminate trains that have the same ID. Train Dispatcher 3 will not display the unique train internal numbers in the Active Train List or on the Track Display.

Information about the data displayed in each of the Train Data windows can be found in the following descriptions of each data area’s input dialog.

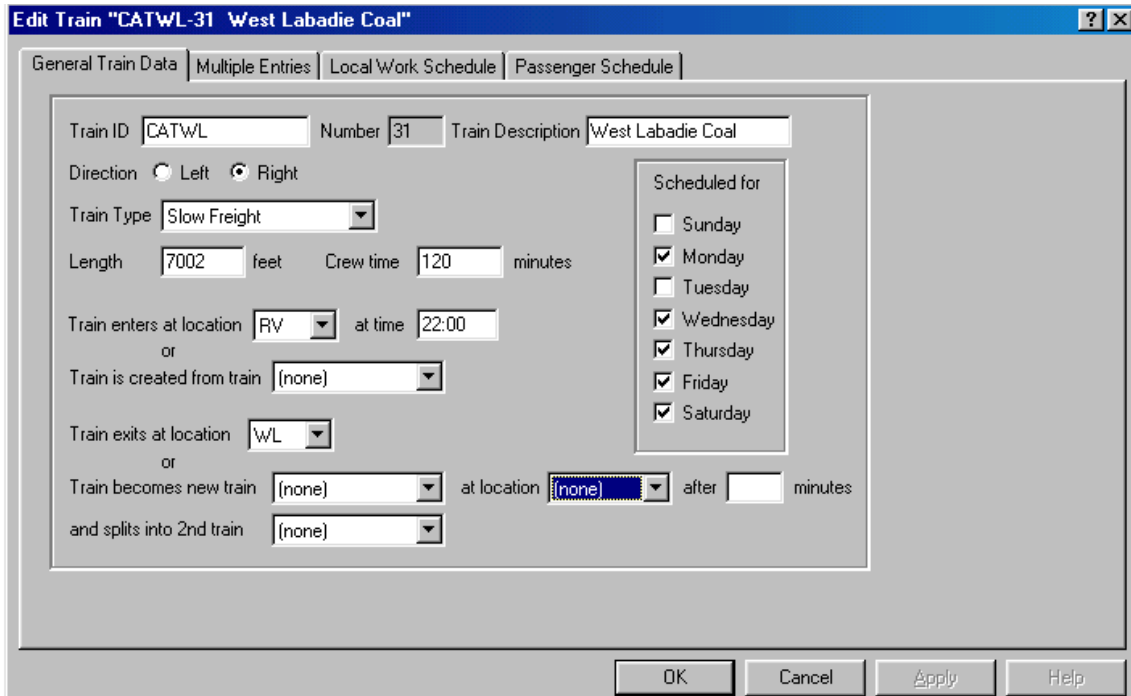


Figure 43 - Train Data - General Dialog

9.3.1. Train Data - General Dialog

The following describes each of the fields in the dialog:

- ◆ **Train ID** - contains the train identifier. The user can enter up to fifteen alpha/numeric characters into this field. Several trains can have the same identifier.
- ◆ **Number** - contains the unique train internal number. The user cannot change this field.
- ◆ **Train Description** - contains a description of the train. The user can enter up to twenty alpha/numeric characters into this field. Multiple trains can have the same description.
- ◆ **Train Direction** - indicates the train's initial direction of movement on the screen.
- ◆ **Train Length** - contains the train length in feet/meters. The length must be greater than or equal to 50 feet or 16 meters.
- ◆ **Train Type** - indicates the type of train. See Paragraph 9.2 for more information on train types.
- ◆ **Crew Time** - the amount of time the crew has been on duty when it arrived on the territory.
- ◆ **Train enters at location** - contains the entrance/exit location where the train will come onto the territory. This field should be blank if the train was created from another train.
- ◆ **At time** - contains the time the train will enter the territory. This field should be blank if the train is already on the territory at the start of the simulation. The time is entered in 24-hour military time. To enter 1 AM type "100" or "0100". To enter 1 PM type "1300".
- ◆ **Scheduled for** - check boxes that indicate the days of the week the train will be scheduled to arrive on the territory.
- ◆ **Train is created from train** - trains can be created from other trains. To select a train identifier for this field click the down arrow to see a list of trains that could create this train. Please note that you must have previously entered these trains into the system.

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- ◆ **Train exits at location** -- contains the entrance/exit location where the train should exit the territory. This field should be blank if this train becomes (creates) a new train.
- ◆ **Train becomes a new train** – trains can become new trains at a specified location. This procedure is used often on a passenger system where the same physical equipment is assigned a new train identifier and runs on the schedule assigned to that identifier. To select a train identifier for this field click the down arrow to see a list of trains this train could become. Please note that you must have previously entered these trains into the system.
- ◆ **at location** – the platform or area location (“P-“ for platform, “A-“ for area) where this train will become a new train and/or split into another train.
- ◆ **after XX minutes** – the amount of time this train must be at the location before it becomes and/or splits into another train.
- ◆ **and splits into 2nd train** – the train this train will split into. To select a train identifier for this field click the down arrow to see a list of trains this train could split into. Please note that you must have previously entered these trains into the system. The split train will be located behind the original train in the block. The length of the original train will be reduced by the length of the split train.

9.3.2. Train Data - Multiple Entries Dialog

A train will often leave the territory and later return. The best example of this is when a train leaves the territory to load coal at a mine and then returns to the territory to deliver that coal to its destination. Train Dispatcher 3 allows trains to reenter the territory up to ten times.

To enter information on multiple entries, the user clicks the “Multiple Entries” tab in one of the Train Data dialogs (see Figure 43), which causes Figure 44 to appear.

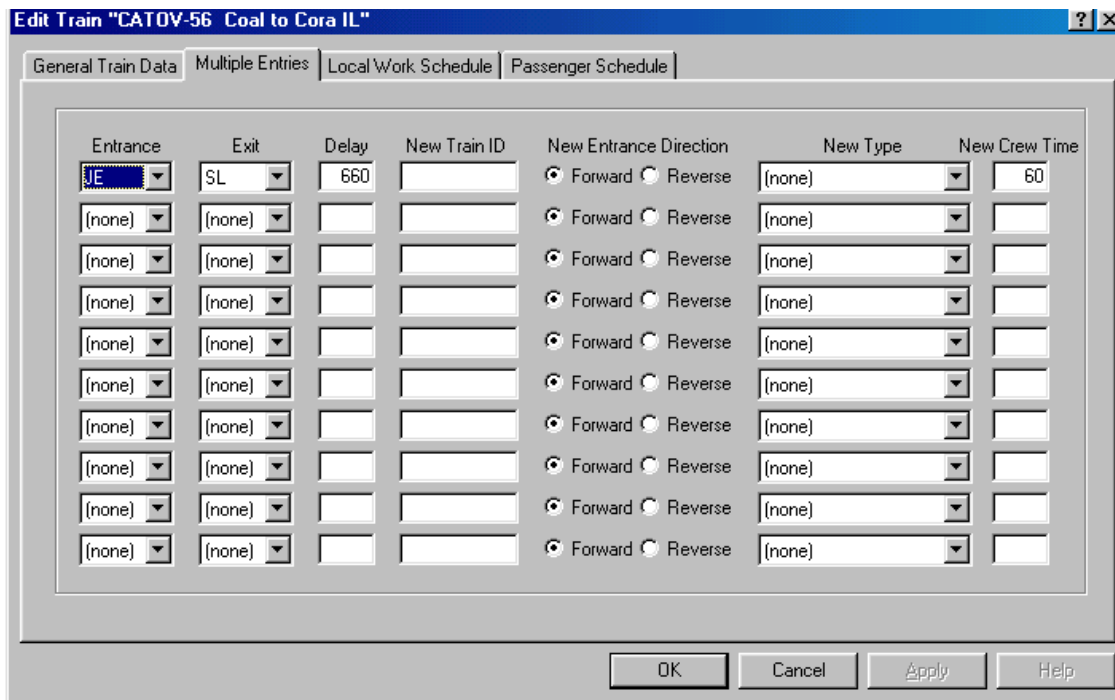


Figure 44 - Train Data - Multiple Entries Dialog

The following describes the fields in the Train Data - Multiple Entries dialog.

- ◆ **Entrance** -- contains the location where the train will return to the territory.

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- ◆ **Exit** -- contains the location where the train should leave the territory after it re-entered the territory at the location specified in the "Entrance" field.
- ◆ **Delay** -- contains the time in minutes from the time the train leaves the territory until it returns to the territory at the location specified in the "Entrance" field.
- ◆ **New ID** -- contains the new train identifier for the train when it re-enters the territory at the location specified in the "Entrance" field. If this field is blank, the last train identifier will be used.
- ◆ **New Entrance Direction** – indicates whether the train re-enters the territory moving forward or in reverse.
- ◆ **New Type** -- contains the new train type, if applicable. For example, if a train left the territory empty and returned full the user may want the train to become a different type to reflect its change in weight. If this field is blank, the last train type is used.
- ◆ **New Crew Time** -- the train may have had a crew change when it was off the territory. If there is an entry in this field, there was a crew change, and the time in minutes the new crew had been on duty when it arrived on the territory is entered into this field. If this field is blank, there was not a crew change and the time the crew has been on duty is accumulated from the train's last crew change.

9.3.3. Train Data - Work Schedule Dialog

A train will sometimes perform local work on the territory. This local work often consists of local trains picking up and delivering cars to industrial customers along the mainline. Train Dispatcher 3 allows a train to be scheduled for local work in up to ten locations on the territory.

To enter information about local work, the user clicks the "Local Work Schedule" tab in one of the Train Data dialogs, which causes Figure 45 to appear.

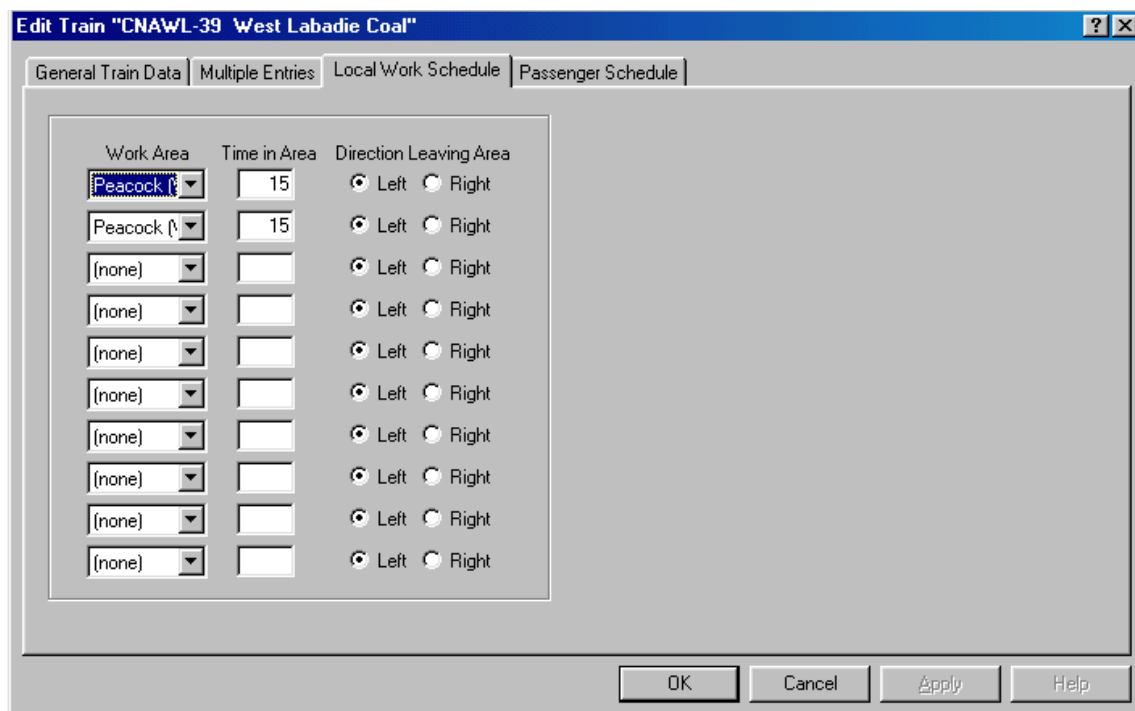


Figure 45 - Train Data - Work Schedule Dialog

The following describes the fields in the Train Data – Work Schedule dialog.

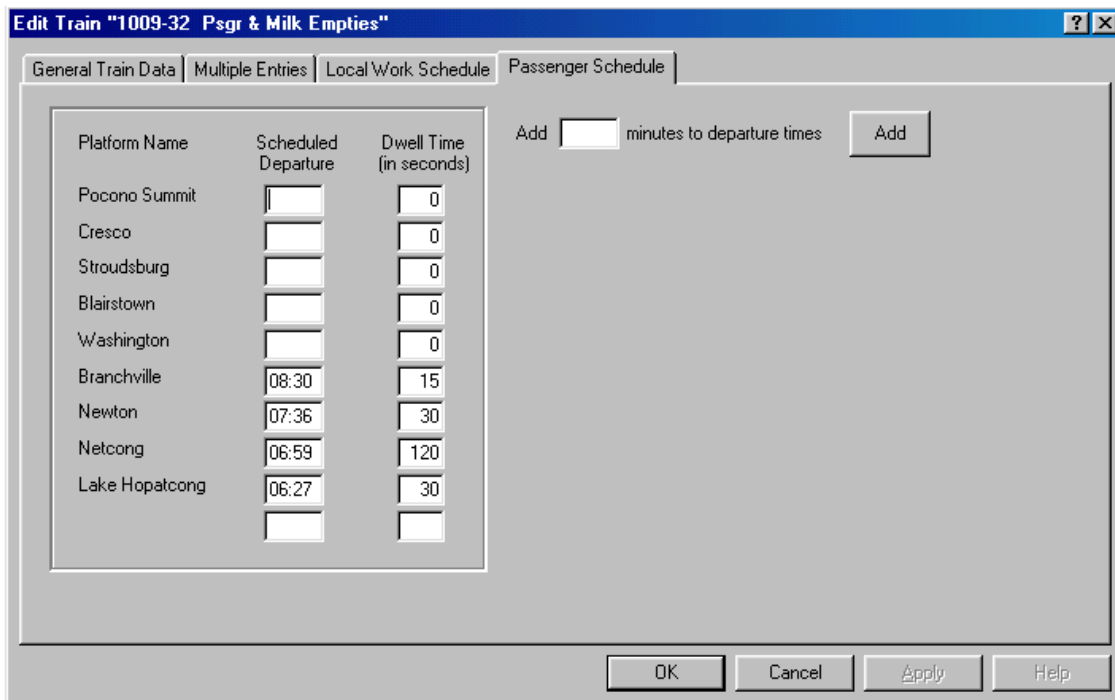
- ◆ **Work Area** -- contains the name of the track area where the local work will be performed.

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- ◆ **Time in Area** – is the time in minutes that the train will be stopped in the work area.
- ◆ **Direction Leaving Area** – after the work is completed a train can leave the area and travel in either direction. If it leaves the area in a direction that is opposite the direction from which it entered the area, the system assumes the train turned around in the area and will move forward (not reverse) in the new direction.

9.3.4. Train Data - Passenger Schedule Dialog

This function allows a user to define a train's departure time for each platform defined in the territory. To enter this information the user clicks the "Passenger Schedule" tab in one of the "Train Data" dialogs, and the Train Data – Passenger Schedule dialog will appear (see Figure 46).



Platform Name	Scheduled Departure	Dwell Time (in seconds)
Pocono Summit		0
Cresco		0
Stroudsburg		0
Blirstown		0
Washington		0
Branchville	08:30	15
Newton	07:36	30
Netcong	06:59	120
Lake Hopatcong	06:27	30

Figure 46 - Train Data - Passenger Schedule Dialog

Each Train Data – Passenger Schedule dialog can display up to 10 station platform names. If the territory has more than 10 platforms, there will be multiple Train Data – Passenger Schedule dialogs. Each will have a tab such as "Passenger Schedule 1", "Passenger Schedule 2", etc.

The following describes the fields in the Train Data -- Passenger Schedule dialog.

- ◆ **Platform name** -- names of the platforms defined for the territory. The user cannot add or delete platform names in this dialog. To perform this function, select the "Station Platform Data" menu item under the "Data" menu in the menu bar.
- ◆ **Scheduled Departure** -- contains the time the train is scheduled to depart the passenger station or platform. The time is entered in 24-hour military time. To enter 1 AM, type "100" or "0100". To enter 1 PM, type "1300".
- ◆ **Dwell Time** -- contains the amount of time in seconds the train will stay at the station to load and unload passengers. The first train in Figure 46 will depart, for example, 60 seconds after it arrived if it is behind schedule. If it is running ahead of schedule, it will depart at the scheduled departure time.
- ◆ **Add XXX minutes to departures** -- since adding passenger schedules is a long and tedious process, we added this feature to simplify the schedule entry for subsequent or earlier trains that run on schedules similar to trains already entered. To add or subtract time from a train schedule enter the time

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in minutes (negative minutes to subtract time) and click the “Add” button. All departure times in the Train Data – Passenger Schedule dialog will be immediately updated.

9.4. Simulation Start Times

When a simulation is started the user can specify a number of start times. The user can view information about start times.

To view the start time data select the “Start Time” menu item under the “Data” menu in the menu bar at the top of the screen. The Start Times window in Figure 47 will appear.

Start Time	Start Day	End	End Time	After (days)	Train/Block/Direction	Train/Block/Director
07:00	TuWeThFr	Yes	06:59	1	1009-32/0252/Left	Hampton Job-43/01..
07:00	Mo	Yes	06:59	1	1009-32/0252/Left	Hampton Job-43/01..
07:00	Sa	Yes	06:59	1	Hampton Job-43/01...	1053-60/0158/Right
07:00	Su	Yes	06:59	1	Cementer-79/0368/...	

Figure 47 - Start Times Window

This window displays information about all of the start times. To re-size any column in this window place the mouse on a vertical separator in the columns header and, while holding down the left mouse button, drag the mouse to the left or right. Once the columns are re-sized, the user can save the column widths for the next time the window is displayed by clicking the “Save Column Widths” button.

To view data on a start time, first place the mouse pointer on the data in the start time’s row and single click the left mouse to select (highlight) the start time. Then click the “View” button. The “View” button will cause the Start Time Data dialog to appear (see Figure 48).

Double clicking the left mouse button on data in a start time’s row will automatically cause the Start Time Data dialog to appear.

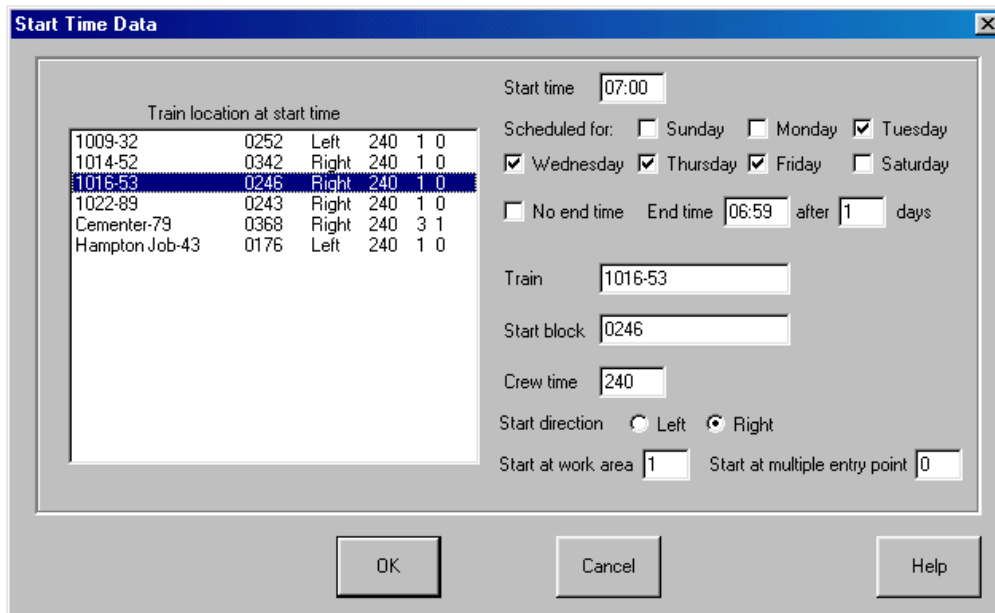


Figure 48 - Start Time Data Dialog

The following describes each of the fields in the dialog:

- ◆ **Train location at start time** – this is a list of trains that are on the territory at the start time. Included in this list, from left to right, is the following data about each train;
 - Train Identifier
 - Block in which the train is located at the start of the simulation
 - Direction the train is moving at the start of the simulation
 - Time (in minutes) the crew has been on duty at the start of the simulation
 - The first work area the train will see after the start of the simulation
 - The number of multiple entries the train has made at the start of the simulation

Trains in this list are sorted by their Train Identifier.

- ◆ **Start time** - is the time of the day the simulation will start.
- ◆ **Scheduled for** - is a group of check boxes that indicate for which days of the week the start time is valid. A single start time entry can be used for every day of the week.
- ◆ **No end time** - Train Dispatcher 3 can run the simulation for multiple days up to 90. If this box is checked, Train Dispatcher 3 will not end the simulation until 90 days after the start.
- ◆ **End time** - the time the simulation will end.
- ◆ **after xx days** - is the number of days (or 24 hour periods) the simulation will run. If this number is 0, the start time is 00:01, and the end time is 23:59, the simulation will start at 00:01 on the first day and end at 23:59 on the first day. If the number of days is 1, the simulation will start at 00:01 on the first day and end at 23:59 on the second day.
- ◆ **Train** – is the train identifier of the selected train in the “Train location at start time” list
- ◆ **Start block** – is the block where the selected train will be located when the simulation starts
- ◆ **Crew time** – is the time the crew has been on duty for the selected train at the start of the simulation.

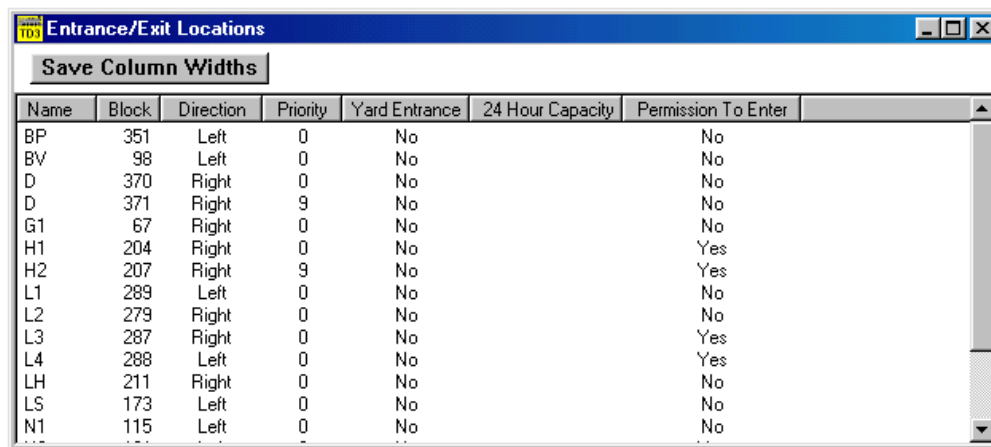
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- ◆ **Start direction** – is the direction in which the selected train is traveling at the start of the simulation.
- ◆ **Start at work area** – is the number of the next work area in which the selected train is scheduled to perform work. If the train has not performed work at any of the scheduled areas at the start of the simulation, this number will be 1. If it has already completed work at the first work area, this number will be 2.
- ◆ **Start at multiple entry** – is the number of multiple entries the train has completed prior to the start of the simulation. If the train has never left the territory this number will be 0. If the train has left the territory once and returned, this number will be 1.

9.5. Entrance/Exit Locations

Each entrance/exit location has information regarding its entrance priority, whether or not it is a yard entrance, whether or not the yard has a capacity limitation, and whether or not the train has to ask the dispatcher for permission to enter the territory at the location.

The user can view information about each entrance/exit location by selecting the “Entrance/Exit Location” menu item under the “Data” menu in the menu bar at the top of the screen. The Entrance/Exit Location Window in Figure 49 will appear.



Name	Block	Direction	Priority	Yard Entrance	24 Hour Capacity	Permission To Enter
BP	351	Left	0	No		No
BV	98	Left	0	No		No
D	370	Right	0	No		No
D	371	Right	9	No		No
G1	67	Right	0	No		No
H1	204	Right	0	No		Yes
H2	207	Right	9	No		Yes
L1	289	Left	0	No		No
L2	279	Right	0	No		No
L3	287	Right	0	No		Yes
L4	288	Left	0	No		Yes
LH	211	Right	0	No		No
LS	173	Left	0	No		No
N1	115	Left	0	No		No

Figure 49 - Entrance/Exit Location Window

This window displays information about all entrance/exit locations. To re-size any of the columns in this window, place the mouse on a vertical separator in the columns header, and, while holding down the left mouse button, drag the mouse to the left or right. Once the columns are re-sized, the user can save the column widths for the next time the window is displayed by clicking the “Save Column Widths” button.

The following describes each of the columns in this window:

- ◆ **Name** - name of the entrance/exit location
- ◆ **Block** - the block number that is associated with this entrance/exit location.
- ◆ **Direction** - the side of the block the entrance/exit location is on
- ◆ **Priority (0-9) 0 is highest, 9 is lowest** - the same entrance/exit name can be assigned to several block locations. Train Dispatcher 3 will check each of the blocks to see if the train can enter at that block. If the block is occupied or cleared in the opposite direction, Train Dispatcher 3 will check the other blocks assigned as entrance/exit locations.

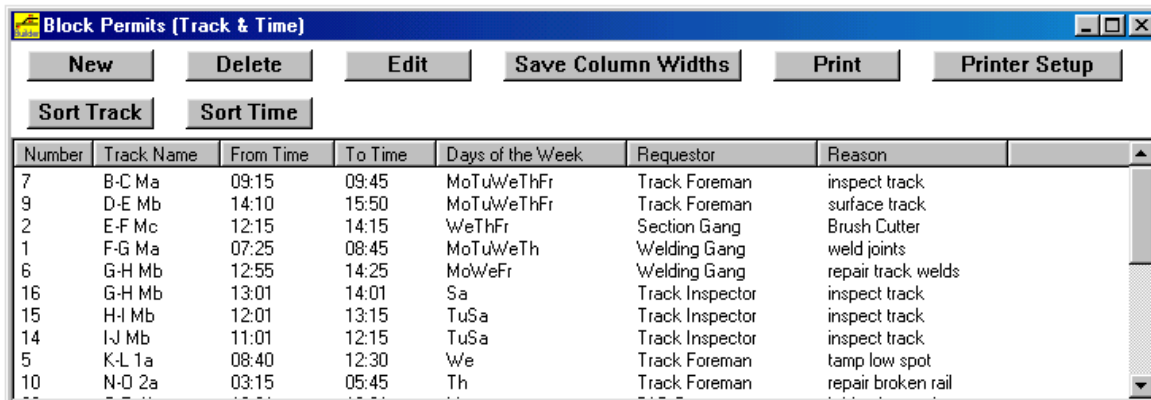
Priorities are assigned from 0 to 9. 0 is the highest priority, and 9 indicates the train will never try to enter the territory at that location.
- ◆ **Yard Entrance** – indicates if this entrance/exit location is associated with a yard.

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- ◆ **24 Hour Capacity** – if it is a yard entrance, this field indicates the number of trains per day the yard can handle. If Train Dispatcher 3 sees this capacity being exceeded, it will prevent trains from exiting into the yard until the number of trains handled over a given period of time is reduced below the yard's capacity.
- ◆ **Permission To Enter** – indicates if trains entering the territory at this entrance/exit location are required to ask permission before entering the territory.

9.6. Block Permits

The user can create and modify block permits (Track and Time) and specify when they become active. The user can enter information about block permits by selecting the "Block Permits" item under the "Data" menu in the menu bar at the top of the screen. The Block Permits window in Figure 50 will appear.



Number	Track Name	From Time	To Time	Days of the Week	Requestor	Reason
7	B-C Ma	09:15	09:45	MoTuWeThFr	Track Foreman	inspect track
9	D-E Mb	14:10	15:50	MoTuWeThFr	Track Foreman	surface track
2	E-F Mc	12:15	14:15	WeThFr	Section Gang	Brush Cutter
1	F-G Ma	07:25	08:45	MoTuWeTh	Welding Gang	weld joints
6	G-H Mb	12:55	14:25	MoWeFr	Welding Gang	repair track welds
16	G-H Mb	13:01	14:01	Sa	Track Inspector	inspect track
15	H-I Mb	12:01	13:15	TuSa	Track Inspector	inspect track
14	I-J Mb	11:01	12:15	TuSa	Track Inspector	inspect track
5	K-L 1a	08:40	12:30	We	Track Foreman	tamp low spot
10	N-O 2a	03:15	05:45	Th	Track Foreman	repair broken rail

Figure 50 - Block Permits Window

This window displays information about all block permits. To re-size any of the columns in this window, place the mouse on a vertical separator in the columns header, and, while holding down the left mouse button, drag the mouse to the left or right. Once the columns are re-sized, the user can save the column widths for the next time the window is displayed by clicking the "Save Column Widths" button.

This window can be sorted by the block permits' track names or the requested times for the block permits to start by clicking the "Sort Track" or "Sort Time" buttons.

To add a new block permit click the "New" button. To delete or edit a block permit, first place the mouse pointer on its data and single click the left mouse button to select (highlight) the block permit. Then click the "Delete" or "Edit" button. The "Edit" button will cause the Block Permit dialog to appear (see Figure 51).

You can also place the mouse on data in a block permit's row and click the right mouse button, which will cause a pop-up menu having "New", "Edit" and "Delete" menu items to appear. Double clicking the left mouse button on data in a block permit's row will automatically cause the Block Permit dialog to appear in the edit mode.

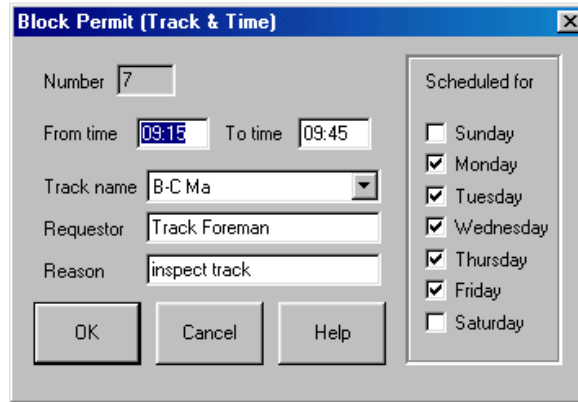


Figure 51 - Block Permit Dialog

The following describes each of the fields in the dialog:

- ◆ **Number** – is the internal number, which cannot be changed by the user, that the system has assigned to the block permit.
- ◆ **From time** -- contains the requested start time of the block permit. The time is entered in 24-hour military time. For example, 1 AM would be entered as “0100” and 1 PM as “1300”.
- ◆ **To time** -- contains the requested end time of the block permit. The time is entered in 24-hour military time. For example, 1 AM would be entered as “0100” and 1 PM as “1300”.
- ◆ **Scheduled for** – is a group of check boxes that indicate the days of the week the block permit will be active.
- ◆ **Track name** – is the name of the track (a group of blocks) protected by the block permit. To display a list of allowable track names, click the down arrow at the right side of the selection box.
- ◆ **Requestor name** – is a text entry field that holds the name of the person requesting the block permit.
- ◆ **Reason** – is a text entry field that holds the reason for the block permit request.

9.7. Slow Orders

The user can create or modify temporary or permanent slow orders, designate when they become active, and specify their speed restrictions for the different train types. The user can enter information about slow orders by selecting the “Slow Order” item under the “Data” menu in the menu bar at the top of the screen. The Slow Order window shown in Figure 52 will appear.

Number	Track/Block/Switch Name	Permanent	From Time	To Time	Days of the Week	Passenger(...)	Passenger(...)	Fast Freight(...)	Fast Freight(...)
2	Block 0072	No	01:53	04:30	Th	10	10	10	10
3	Block 0194	Yes			SuMoTuWeThFrSa	40	40	40	40
0	Track D-D SDG	Yes			SuMoTuWeThFrSa	10	10	10	10
5	Track K-L 1b	No	00:01	23:59	SuMoTu	30	30	30	30
1	Track K-L 1b	No	00:02	12:30	We	30	30	30	30
4	Track Q-R 1b	No	08:30	15:30	MoTuWeTh	40	40	40	40

Figure 52 - Slow Orders Window

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This window displays information about all of the slow orders. To re-size any of the columns in this window, place the mouse on a vertical separator in the columns header, and, while holding down the left mouse button, drag the mouse to the left or right. Once the columns are re-sized, the user can save the column widths for the next time the window is displayed by clicking the “Save Column Widths” button.

This window can be sorted by the slow orders’ track/block/switch names or the slow order start times by clicking the “Sort Track” or “Sort Time” buttons.

To add a new slow order, click the “New” button. To delete or edit a slow order, first place the mouse pointer on its data and single click the left mouse button to select (highlight) the slow order. Then click the “Delete” or “Edit” button. The “Edit” button will cause the Slow Order Data dialog to appear (see Figure 53).

You can also place the mouse on data in a slow order’s row and click the right mouse button, which will cause a pop-up menu having “New”, “Edit” and “Delete” menu items to appear. Double clicking the left mouse button on data in a slow order’s row will automatically cause the Slow Order Data dialog to appear in the edit mode.

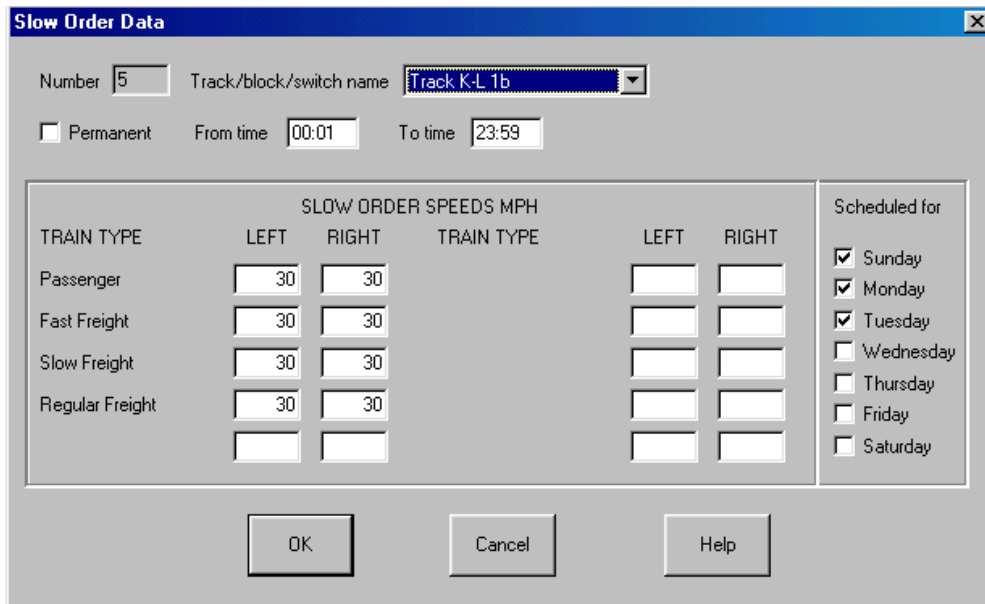


Figure 53 - Slow Order Data Dialog

The following describes each of the fields in the dialog:

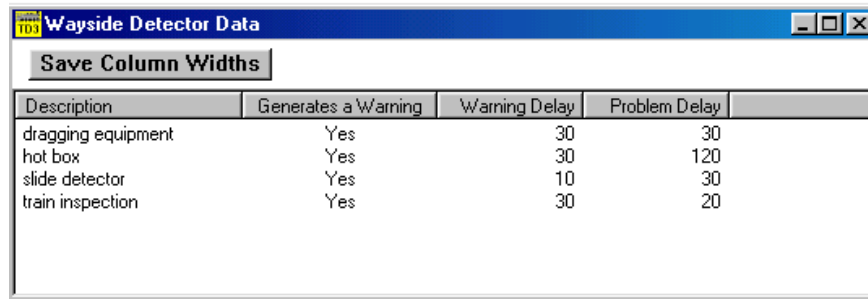
- ◆ **Number** – is an internal number, which cannot be changed by the user, given to the slow order by the system,
- ◆ **Track/block/switch name** – is the name of the track (a group of blocks), block or switch that is affected by the slow order. To display a list of allowable track, block and switch names, click the down arrow at the right side of the selection box.
- ◆ **Permanent** – is a check box that, if checked, indicates that the slow order is always in affect.
- ◆ **From time** -- contains the start time of the slow order. The time is entered in 24-hour military time. For example, 1 AM would be entered as “0100” and 1 PM as “1300”.
- ◆ **To time** -- contains the end time of the slow order. The time is entered in 24-hour military time. For example, 1 AM would be entered as “0100” and 1 PM as “1300”.
- ◆ **Scheduled for** – is a group of check boxes that indicate the days of the week the slow order is in affect.
- ◆ **SLOW ORDER SPEEDS** -- the maximum speed a train will be allowed to move over the track section, block or switch during the slow order. Maximum speeds are set for each train type in each direction.

If there is no speed in this field for a type of train in a specified direction, the speed of the train over the track section, block or switch during the slow order will not vary from its normal speed over the track section, block or switch.

9.8. Wayside Detectors

Up to ten types of wayside detectors can be specified for a territory. Wayside detectors are used to monitor passing trains for various types of problems. Two of the most common types of wayside detectors are hot box (journal) and dragging equipment.

To view information about wayside detectors, select the “Wayside Detectors” item under the “Data” menu in the menu bar at the top of the screen. The Wayside Detector Data window shown in Figure 54 will appear.



Description	Generates a Warning	Warning Delay	Problem Delay
dragging equipment	Yes	30	30
hot box	Yes	30	120
slide detector	Yes	10	30
train inspection	Yes	30	20

Figure 54 - Wayside Detector Data Window

This window displays information about all wayside detectors. To re-size any of the columns in this window, place the mouse on a vertical separator in the columns header, and, while holding down the left mouse button, drag the mouse to the left or right. Once the columns are re-sized, the user can save the column widths for the next time the window is displayed by clicking the “Save Column Widths” button.

The following describes each of the columns in this window:

- ◆ **Description** – is the name or description of the wayside detector.
- ◆ **Generate a Warning** – indicates if the alarm will create a warning that will stop the train. Hot boxes, for example, create false alarms. If this field contains a “Yes”, the train will stop for the crew to check the train (Warning Delay). If the crew finds a problem, there will be an additional delay (“Problem Delay” field) for the time it will take the crew to correct the problem. In the case of a real hot box the crew would remove the car from the train.
- ◆ **Warning Delay** – is the time in minutes for the crew to check the train for a problem.
- ◆ **Problem Delay** – is the time in minutes for the crew to correct the problem.

9.9. OS Names

Train Dispatcher 3 can create a train graph showing the movement of trains during a simulation. The train graph shows when a train arrives at each of the OS points (OS is sometimes referred to as on-station or out of station).

To view information about OS point select the “OS Points” item under the “Data” menu in the menu bar at the top of the screen. Figure 55 will then appear.

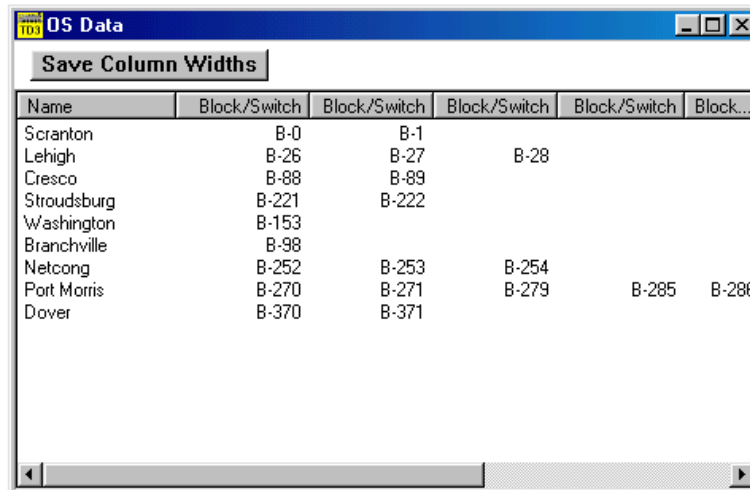


Figure 55 - OS Data Window

This window displays information about all OS points. The user can re-size any of the columns in this window by placing the mouse on a vertical separator in the columns header, and, while holding down the left mouse button, drag the mouse to the left or right. Once the columns are re-sized, the user can save the column widths for the next time the window is displayed by clicking the "Save Column Widths" button.

The window lists the blocks and switches that are assigned to each OS point. An unlimited number of blocks or switches can be assigned to each OS point, but only 10 will be displayed.

10. FINDING A TRAIN, TRACK, BLOCK, SWITCH, DIAMOND OR SIGNAL

Train Dispatcher 3 has a tool to help users find a particular train, track, block, switch, diamond or signal. To find one of these items, select the appropriate menu item under the "Find" menu. If the "Find a Train" menu item is selected, the dialog illustrated by Figure 56 will appear.

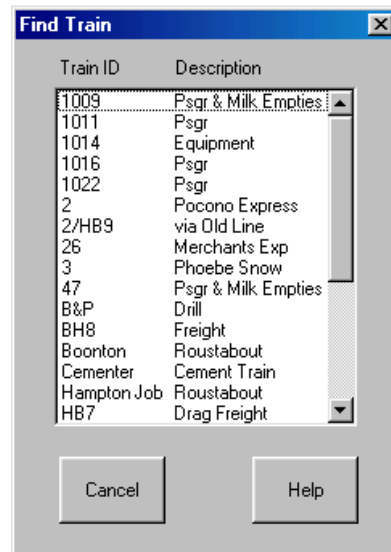


Figure 56 - Find a Train Dialog

To locate a particular train, place the mouse pointer on its ID, and click to left mouse button. This will cause this dialog to disappear and the mouse pointer to be placed on the selected item in the Track Display.

Other track elements can be found in the same way by choosing the appropriate item under the "Find" menu.

11. CTC CONTROL MODE

Train Dispatcher 3 can operate as a CTC office for a model railroad signaling system. It has the capability to send switch and signal commands and to receive signal indications, switch positions, and block occupancy status.

Train Dispatcher 3 does not communicate directly with external hardware. Since there are many types of hardware interfaces, Train Dispatcher 3 relies on programs commonly called handlers that are specifically written to communicate with a particular piece of external hardware. These allow Train Dispatcher 3 to have one common interface for many types of external equipment. It also allows users to develop their own handlers for new types of equipment.

Even though Train Dispatcher 3 is capable of operating as a CTC office for a commercial railroad, Train Dispatcher 3 customers are not licensed to use Train Dispatcher 3 in any commercial application. Use of Train Dispatcher 3 in commercial applications is strictly prohibited. If you are interested in using Train Dispatcher 3 in a commercial application, please contact Signal Computer Consultants at 888 872-4612 or 412 655-1884.

CTC Control Mode is a free upgrade to Train Dispatcher 3 customers. Because it is a free upgrade we do not provide free support for the CTC Control Mode function. A support contract is available. For more information about a support contract for the CTC Control Mode function, contact Signal Computer Consultants at 888 872-4612 or 412 655-1884.

11.1. Handler Communication

Train Dispatcher 3 communicates with equipment handlers by writing to and reading messages from two comma delimited text files. Although this is not a very elegant means of communication between two programs, it is very simple and extremely easy to troubleshoot. Normally these two files reside in the same folder as the Train Dispatcher 3 program (Train3.exe), but can be assigned to another folder or disk (RAM disk) by clicking on the Options/Assign CTC File Folder menu item.

Any word processing program such as Notepad, WordPad or Word can view these text files.

The text file that is used to send commands from Train Dispatcher 3 to the handler is called td3ctccommands.txt. The text file into which Train Dispatcher 3 receives status indications from the handler is called td3ctcindications.txt.

Each of the files is a comma delimited text file with each record (message) in the file terminated with a line feed character (Hex 0A). Records have variable lengths.

Train Dispatcher 3 will only write records to the td3ctccommands.txt file when Train Dispatcher 3 is placed in CTC mode (select the CTC Mode menu item under the Mode menu).

11.2. CTC Control Mode Functions

When Train Dispatcher 3 is placed in CTC Control mode, the simulation clock will show the time of day. Most of the Train Dispatcher 3 simulation functions will be disabled. Signal and switch commands will also act differently.

When switches are thrown, instead of the switch automatically moving to the new position, Train Dispatcher 3 will blink the switch and send a command to the handler to throw the switch. Train Dispatcher 3 accomplishes this by adding a switch command record to the td3ctccommands file. The switch will continue to blink until a switch status message is received from the handler that indicates that the switch has been moved to the requested position. Any time before the switch status message is received, the user can cancel the switch request by placing the mouse on the switch and clicking the left mouse button.

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Train Dispatcher 3 will constantly try to read the td3ctcindications.txt file. When it sees that this file exists, it will rename the file and begin processing the status records in the file. Once Train Dispatcher 3 renames the file, the td3indications.txt file will no longer exist in the system. When the handler wants to add a new status record, it will create a new td3ctcindications.txt file if it does not exist or append the new record to the end of an existing td3ctcindications.txt file.

Signals will also no longer automatically clear a route when they are clicked. Train Dispatcher 3 will blink the signal and the route until it receives a status message from the handler that the route has been cleared. As with switches, a request to clear a signal can be cancelled prior to receiving a command from the field that the signal has been cleared.

11.3. CTC Control Log File

To help troubleshoot, a log file called td3ctclog.txt can be maintained. This file contains all records that were sent to and received from the handler and can be viewed by any word processing program.

The log file function is turned on/off from a check box located in the Assign CTC File Folder dialog that is displayed by clicking on the Options/Assign CTC File Folder menu item.

Train Dispatcher 3 will monitor the size of this file. When it reaches 1,000,000 bytes Train Dispatcher 3 will reduce its size to 800,000 bytes by deleting the oldest records.

To view the CTC Log file, select the View/Show CTC Control Log File menu item.

11.4. Train Tracking

When Train Dispatcher 3 receives a block status message indicating that a block previously unoccupied is now occupied, it will search the adjacent blocks for the train cleared into the blocks. If it finds the train, it will display the train identifier on the new occupancy block and move the train icon to it (if in graphic display mode). Please note that the train found in the adjacent block must have a clear signal into the newly occupied block.

If a train is not found, it will create a new train and assign it an identifier. The format for the identifier will be Tdxxxx where d is the day of the week (0 for Sunday, 1 for Monday, etc.) and xxxx is the train number. The train number starts at 0000 at the beginning of the simulation and increments by one each time a new train is created. The direction a new train will face is left unless traffic direction information was included in the block status message sent by the handler.

When Train Dispatcher 3 receives a block status message that a block previously occupied is now unoccupied, it will remove the train identifier from the block. If the train is not occupying another block, Train Dispatcher 3 will assume the train has left the territory.

Please note that the train tracking algorithms are not extremely sophisticated. If, for example, a train spans several track blocks, and one of the blocks in the center of the train becomes unoccupied, Train Dispatcher 3 will split the train in two and assign a new train identifier to the back half of the original train.

11.5. Train Parameters and Commands

The user can modify the parameters of a tracked train and issue commands to the train. To access these functions place the mouse pointer on the train and click the right mouse button. A pop-up menu will appear.

Clicking on the Train "XXXX" Reverse Direction menu item will cause the train to point in the opposite direction.

Clicking on the Train "XXXX" Properties menu item will cause the Train Information dialog to appear. You can change all of the train's parameters in this dialog (see Figure 57).

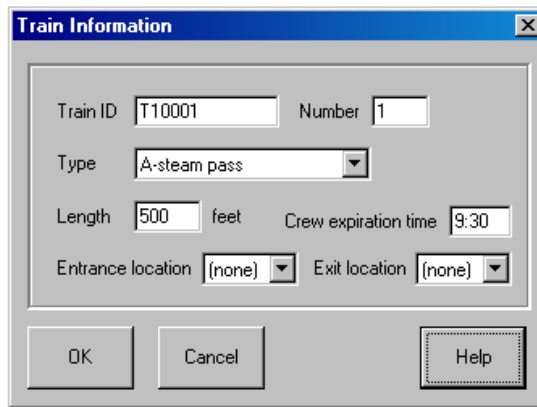


Figure 57 - Train Information

Clicking on the Train "XXXX" Status menu item will cause the CTC Active Train List window to appear with the selected train highlighted. By clicking the Properties button in this window, the Train Information dialog will appear for the train (see Figure 58).

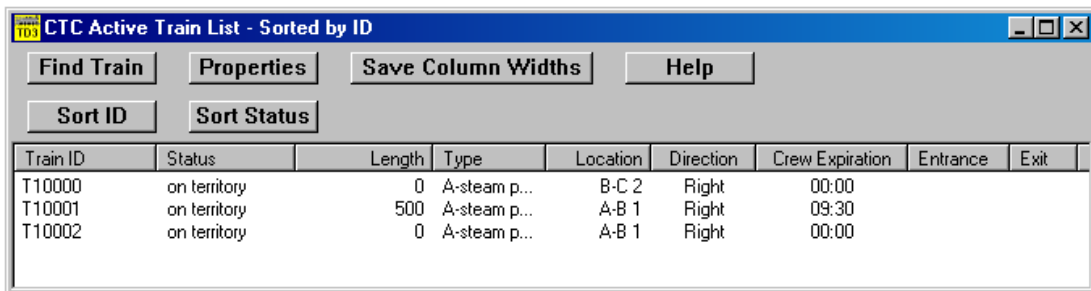


Figure 58 - CTC Active Train List

The CTC Active Train List window can also be accessed by clicking the Trains menu item near the top of the screen. Select the appropriate train (place the mouse on the train and click the left mouse button), and then click the Properties button to display the Train Information dialog for the train.

If another train is located in an adjacent block, clicking the Train "XXXX" Merge Ahead with Train "XXXX" menu item or Train "XXXX" Merge Behind with Train "XXXX" will cause the two trains to merge into one.

There may be times when a train needs to have the block ahead cleared, but there is no controlled signal at the block entrance. The Train "XXXX" Clear Blocks Ahead menu item is available in CTC Control Mode and will clear all of the blocks ahead of the train to the next controlled signal.

Train Dispatcher 3 maintains OS information. The OS time is the current time on the clock.

Train OS data can be displayed by placing the mouse pointer on the train and clicking the right mouse button. A pop-up menu will appear. Select the Train "XXXX" OS menu item to bring up the Train OS Report window.

The train graph function is also active in CTC mode and will show OS data for all trains. To display the train graph, select the View/Display Train Graph menu item.

11.6. Speed Control

For model railroad operation it is helpful to provide speed information to the external hardware. With this information, a model railroad can control train separation between following trains and slow a train up when it must stop at the next signal.

When a signal is cleared, Train Dispatcher 3 will send to the handler a message for each block that is in the cleared path. This message will show the block status (cleared), the cleared direction (traffic direction) and the number of blocks beyond this block that have a cleared signal. If the next block is occupied, the number will be zero.

The number of blocks cleared ahead will never be reported as a number higher than two. If four blocks are actually cleared ahead, this message will only indicate two.

This message will be sent again any time the status of the block changes or the number of blocks cleared ahead changes.

Train Dispatcher 3 does not expect the handler to respond to these messages. If speed information is of no interest to the handler, these messages can be ignored.

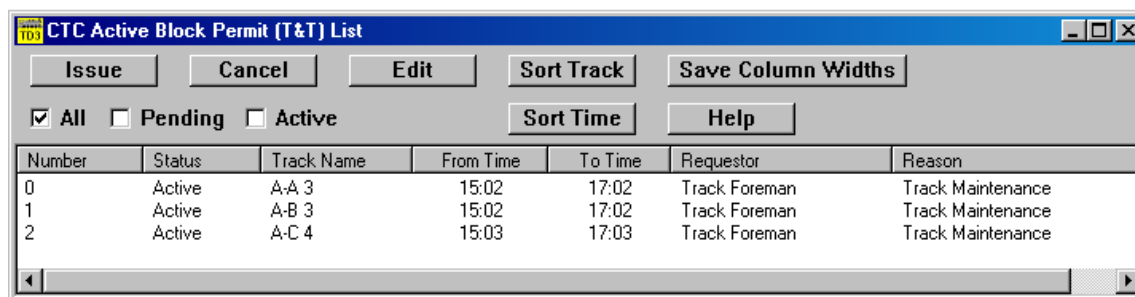
11.7. Train ID Reporting

Any time Train Dispatcher 3 sees that a block status has changed from unoccupied to occupied or that a train's identifier or type has changed, it will send a message to the handler for each affected block, which contains the train identifier of the train occupying the block and its type.

Train Dispatcher 3 does not expect the handler to respond to these messages. If the train identifier or type information is not of interest, these messages can be ignored.

11.8. Block Permits (T & T)

Block permits can be issued in CTC Control Mode. There are two methods for issuing block permits. The first is to click on the Permits menu near the top of the screen. This will cause the CTC Active Block Permit List window to appear (see Figure 59). Click on the Issue button to create a new block permit (see Figure 60).



Number	Status	Track Name	From Time	To Time	Requestor	Reason
0	Active	A-A 3	15:02	17:02	Track Foreman	Track Maintenance
1	Active	A-B 3	15:02	17:02	Track Foreman	Track Maintenance
2	Active	A-C 4	15:03	17:03	Track Foreman	Track Maintenance

Figure 59 - CTC Active Block Permit (T&T) List

The second method is to place the mouse pointer on the track for which you want to issue the block permit and click the right mouse button. This will cause a pop-up menu to appear. Select the Issue Block Permit menu item to create a new permit.

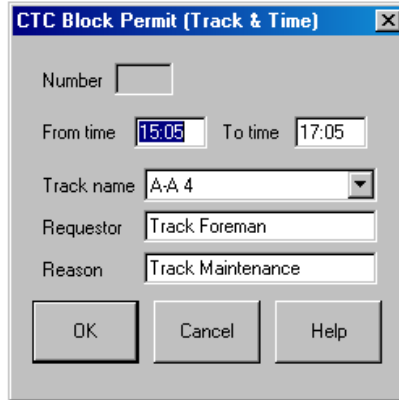


Figure 60 - CTC Block Permit Dialog

11.9. Test Handler

Included with Train Dispatcher 3 is a Test Handler program called testhandler.exe. This program, when running, will automatically respond to signal and switch commands sent by Train Dispatcher 3. It will also send user-generated messages to Train Dispatcher 3 in the proper format.

When the program is first executed, a Test File Folder Setup dialog will appear. The first parameter in this dialog specifies the folder name where the td3ctccommands.txt file can be found. This is the folder in which the Test Handler program will create the td3ctcindications.txt file. This folder should be the same as specified in the Train Dispatcher 3 Assign CTC File Folder dialog.

The second parameter in the Test File Folder Setup dialog specifies, in seconds, how often the Test Handler program will execute. If the Test Handler program sees a message in the td3ctccommands.txt file, it will not respond to that message until it runs a second time.

The Test File Folder Setup dialog can be displayed at any time by clicking on the Setup menu at the top of the screen.

Manually generated messages can also be sent to Train Dispatcher 3 at any time. Manually generated messages are entered into a text file with the following format:

Field Number	Data Name	Data Format	Description
1	Device Type	SIGNAL SWITCH BLOCK	The type of record.
2	Device Name	Alpha/Numeric	Each signal, switch and block when created by Track Builder 3, can be assigned a unique remote monitor name that identifies the signal to the external program. If a remote monitor name was not assigned, Train Dispatcher 3 will recognize a name that uses its internal number. The format is SIGNALXXXX, SWITCHXXXX, or BLOCKXXXX where XXXX is the number.
3	Status	STOP CLEAR NORMAL REVERSE	The status of the device.

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		UNOCCUPIED OCCUPIED OCCUPIEDLEFT OCCUPIEDRIGHT	
--	--	---	--

Examples:

**BLOCK,BLOCK0004,OCCUPIED
SWITCH, SWITCH0102,NORMAL**

The Test Handler program reads the records in this file and creates a corresponding status message that it sends to Train Dispatcher 3 in the td3ctctindications file.

To send a manually generated message, click on the Send File menu at the top the screen. This will cause the Send File dialog to appear. Enter the file path and name and click the Ok button to send.

11.10. Command Records

Train Dispatcher 3 generates command records when it wants the external hardware to perform a specific action like throwing a switch or clearing a signal. Block commands are also sent. Block commands provide speed control information to the handler if the block is cleared or train identifier information if the block is occupied.

There is also a command that requests the handler to send all the block occupancy status and switch position messages. This command is used when Train Dispatcher 3 is first started so that it can synchronize with the hardware.

Command records contain a series of fields separated by commas. The first field in the record always defines the type of record and the second always contains the sequence number.

The sequence number is a 4-digit number. Each time Train Dispatcher 3 generates a new record it increments the sequence number by one. When the sequence number reaches 10000, it is reset to zero.

Command records are not case dependent. "CONTROL" is the same as "control".

Leading zeroes are not necessary. "09:01:01" is interpreted the same as "9:1:1" by Train Dispatcher 3.

There are six types of command records. The following table lists these types:

Type	Field Code	Description
Control	CONTROL	Requests the handler to perform a specific control command not related to switch, signal or block commands.
Time	TIME	Contains the Train Dispatcher 3's time when requested by a command issued by the handler
Signal	SIGNAL	Requests a specific signal command
Switch	SWITCH	Requests a specific switch to change its position
Block	BLOCK	Provides speed control or train identifier information
Error	ERR	Contains error information about a bad message received by Train Dispatcher 3 in the td3ctctindications.txt

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The following six tables describe the fields in each type of command record. An example follows each table.

Field Number	Data Name	Data Format	Description
1	Type	CONTROL	The type of record.
2	Sequence Number	0 thru 9999	The record sequence number.
3	Command Type	ALLDATA	Requests the handler to send all switch positions and block occupancy status records.
4	Time	HH:MM:SS	The time Train Dispatcher 3 issued this command. The first two characters are the hours, the next two the minutes, and the final two the seconds.

Example:
CONTROL,0034,ALLDATA,14:33:19

Field Number	Data Name	Data Format	Description
1	Type	TIME	The type of record.
2	Sequence Number	0 thru 9999	The record sequence number.
3	Time	HH:MM:SS	The current time. The first two characters indicate the hour followed by the minutes and seconds on the Train Dispatcher 3 clock.

Example:
TIME,0034,15:11:12

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Field Number	Data Name	Data Format	Description
1	Type	SIGNAL	The type of record.
2	Sequence Number	0 thru 9999	The record sequence number.
3	Signal Name	Alpha/Numeric	Each signal, when created by Track Builder 3, can be assigned a unique remote monitor name that identifies the signal to the external program. If a remote monitor name was not assigned, Train Dispatcher 3 will recognize a name that uses its internal signal number. The format is SIGNALXXXX, where XXXX is the signal number.
4	Time	HH:MM:SS	The time the Train Dispatcher 3 issued this command. The first two characters are the hours followed by the minutes and seconds.
5	Signal Command	CANCEL CLEAR	The signal command being issued. Commands can be issued for canceling a signal or clearing a signal.
6	Free Blocks	Numeric 0 to 2	This field will only exist if the status of the signal is CLEAR. This field contains the number of blocks ahead of this signal that are also cleared in the same direction. If the number is greater than 2, 2 will be contained in this field.

Example:

SIGNAL,0112,SIGNAL0122,11:15:10,CLEAR,1

Field Number	Data Name	Data Format	Description
1	Type	SWITCH	The type of record.
2	Sequence Number	0 thru 9999	The record sequence number.
3	Switch Name	Alpha/Numeric	Each switch, created by Track Builder 3, can be assigned a unique remote monitor name that identifies the switch to the external program. If a remote monitor name was not assigned, Train Dispatcher 3 will recognize a name that uses its internal switch number. The format is SWITCHXXXX, where XXXX is the switch number.
4	Time	HH:MM:SS	The time Train Dispatcher 3 issued this command. The first two characters are the hours followed by the minutes and seconds.
5	Switch Command	NORMAL REVERSE	The switch position command being issued. Commands can be issued for throwing the switch into the normal or reverse position.

Example:

SWITCH,0187,SWITCH0005,08:32:19,NORMAL

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Field Number	Data Name	Data Format	Description
1	Type	BLOCK	The type of record.
2	Sequence Number	0 thru 9999	The record sequence number.
3	Block Name	Alpha/Numeric	Each block, when created by Track Builder 3, can be assigned a unique remote monitor name that identifies the block to the external program. If a remote monitor name was not assigned, Train Dispatcher 3 generates one. The generated name will be BLOCKXXXX, where XXXX is the block number.
4	Status	CLEAREDLEFT CLEAREDRIGHT OCCUPIEDLEFT OCCUPIEDRIGHT UNOCCUPIED	The status code of the block. The status code is composed of the cleared, occupied or unoccupied status of the block followed by the traffic direction when the block is cleared or occupied.
5	Time	HH:MM:SS	The time Train Dispatcher 3 issued this command. The first two characters are the hours followed by the minutes and seconds.
6	Train ID	Alpha/Numeric	This field will only exist if the status of the block is OCCUPIEDLEFT or OCCUPIEDRIGHT. This field contains the train identifier of the first train traveling in the direction of the traffic.
6	Free Blocks	Numeric 0 to 2	This field will only exist if the status of the block is CLEAREDLEFT or CLEAREDRIGHT. This field contains the number of blocks ahead of this block that are also cleared in the same direction. If the number is greater than 2, 2 will be contained in this field.
7	Train Type	Alpha/Numeric	This field will only exist if the status of the block is OCCUPIEDLEFT or OCCUPIEDRIGHT. This field contains the train type of the first train traveling in the direction of the traffic.

Example:

BLOCK,0005,BLOCK0020,OCCUPIEDRIGHT,13:12:59,Train2,Passenger

Field Number	Data Name	Data Format	Description
1	Type	ERR	The type of record.
2	Sequence Number	0 thru 9999	The record sequence number.
3	Error message	Alpha/Numeric	A text error message, in quotes, that explains the problem with the command record.
4	Command Record	Alpha/Numeric	The command record, in quotes, with which this error message is associated.

Example:

ERR,0008,"The signal named in the third field of the message could not be found on the track layout", "SIGNAL,0011,SIGNAL0412,12:23:17, CLEAR"

11.11. Status Indication Records

The handler generates status records when the status of a block, signal or switch changes or when Train Dispatcher 3 requests that all status information be sent.

Status records contain a series of fields separated by commas. The first field in the record always defines the type of record and the second always contains the sequence number.

The sequence number is a 4-digit number. Each time the handler generates a new record it increments the sequence number by one. When the sequence number reaches 10000, it is reset to zero.

There are four types of status indication records. The following table lists these types:

Type	Field Code	Description
Control	CONTROL	Requests Train Dispatcher 3 to perform a specific control command.
Signal	SIGNAL	Contains the current signal status
Switch	SWITCH	Contains the current switch status
Block	BLOCK	Contains the current block status

Each of the following tables describes the fields in each status indication record type and is followed by an example:

Field Number	Data Name	Data Format	Description
1	Type	CONTROL	The type of record.
2	Sequence Number	0 thru 9999	The record sequence number.
3	Command Type	TIME	Requests Train Dispatcher 3 to send its current time (TIME command record).
4	Time	HH:MM:SS	The time the handler generated this message. The first two characters are the hours followed by the minutes and seconds

Example:

CONTROL,0023,TIME,15:46:09

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Field Number	Data Name	Data Format	Description
1	Type	SIGNAL	The type of record.
2	Sequence Number	0 thru 9999	The record sequence number.
3	Signal Name	Alpha/Numeric	Each signal, when created by Track Builder 3, can be assigned a unique remote monitor name that identifies the signal to the external program. If a remote monitor name was not assigned, Train Dispatcher 3 generates one. The generated name will be SIGNALXXXX, where XXXX is the internal signal number.
4	Status	CLEAR STOP	The status code of the signal.
5	Time	HH:MM:SS	The time the handler generated this message. The first two characters are the hours followed by the minutes and seconds.

Example:

SIGNAL,0006,SIGNAL0019,CLEAR,09:23:17

Field Number	Data Name	Data Format	Description
1	Type	SWITCH	The type of record.
2	Sequence Number	0 thru 9999	The record sequence number.
3	Switch Name	Alpha/Numeric	Each switch, when created by Track Builder 3, can be assigned a unique remote monitor name that identifies the switch to the external program. If a remote monitor name was not assigned, Train Dispatcher 3 generates one. The generated name will be SWITCHXXXX, where XXXX is the internal switch number.
4	Position	NORMAL REVERSE	The position code of the switch. The position code indicates whether the switch is in the normal or reverse position.
5	Time	HH:MM:SS	The time the handler generated this message. The first two characters are the hours followed by the minutes and seconds
6	Status	OCCUPIED OCCUPIEDRIGHT OCCUPIEDLEFT UNOCCUPIED	The status code of the switch. The status code is composed of the switch occupied or unoccupied status followed by the traffic direction (if the direction is available). This is an optional field and does not have to be included in the message.

Example:

SWITCH,0056,SWITCH0199,NORMAL,17:12:54,OCCUPIEDLEFT

Field Number	Data Name	Data Format	Description
1	Type	BLOCK	The type of record.
2	Sequence Number	0 thru 9999	The record sequence number.
3	Block Name	Alpha/Numeric	Each block, when created by Track Builder 3, can be assigned a unique remote monitor name that identifies the block to the external program. If a remote monitor name was not assigned, Train Dispatcher 3 generates one. The generated name will be BLOCKXXXX, where XXXX is the internal block number.
4	Status	OCCUPIED OCCUPIEDLEFT OCCUPIEDRIGHT UNOCCUPIED	The status code of the block. The status code is composed of the block occupied or unoccupied status followed by the traffic direction (if available) when the block is occupied.
5	Time	HH:MM:SS	The time the handler generated this message. The first two characters are the hours followed by the minutes and seconds

Example:

BLOCK,0005,BLOCK0020,OCCUPIEDRIGHT,13:12:59

12. EXTERNAL I/O INTERFACE

Train Dispatcher 3 allows an external program to control and monitor train dispatcher functions. Commands and status indications are transferred from and to an external program via text files that by default reside in the same folder as the Train Dispatcher 3 program (Train3.exe). However, clicking on the Options/Assign External I/O File Folder menu item can change the folder in which these files reside.

Any word processing program such as Notepad, WordPad or Word can view these text files.

The text file that is used to send commands to Train Dispatcher 3 from an external program is called td3commands.txt. The text file that Train Dispatcher 3 uses to transfer status indications to an external program is called td3indications.txt.

Each of the files is a comma delimited text file with each record in the file terminated with a line feed character (Hex 0A). Records have variable lengths.

Train Dispatcher 3 will only write records to the td3indications.txt file when Train Dispatcher 3 is placed in External I/O mode (select the External I/O menu item under the Mode menu) and after a Start Time and Day have been selected (click the Start button after the territory is loaded).

When a switch, signal or block status changes, Train Dispatcher 3 will append a new record to the end of the td3indications.txt file. If the file does not exist, Train Dispatcher 3 will create a new td3indications.txt file.

When in External I/O mode, Train Dispatcher 3 will monitor the td3commands.txt file. When it sees that this file exists, it will rename the file and begin processing the command records in the file. Once Train Dispatcher 3 renames the file, the td3commands.txt file will no longer exist in the system. When the external program wants to add a new command record, it will have to create a new td3commands.txt file.

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12.1. External I/O Log File

To help troubleshoot, a log file called td3eiolog.txt can be maintained. This file contains all records that were sent to and received from the external program and can be viewed by any word processing program.

The log file function is turned on/off from a check box located in the Assign External I/O File Folder Name dialog that is displayed by clicking on the Options/Assign External I/O File Folder menu item.

Train Dispatcher 3 will monitor the size of this file. When it reaches 1,000,000 bytes Train Dispatcher 3 will reduce it to 800,000 bytes by deleting the oldest records.

To view the External I/O Log File select the View/Show External I/O Control Log File menu item.

12.2. Command Records

The external program generates command records when the program wants Train Dispatcher 3 to perform a specific action like throw a switch or clear a signal. There are also commands to load a new simulation, start or stop (pause) the simulation, request the current simulation time, and request the current status of all blocks, signals, and switches.

Command records contain a series of fields separated by commas. The first field in the record always defines the type of record and the second always contains the sequence number.

The sequence number is a 4-digit number. Each time the external program generates a new record, the sequence number is incremented by one. When the sequence number reaches 10000, it is reset to zero.

Command records are not case dependent. "CONTROL" is the same as "control".

Leading zeroes are not necessary. "09:01:01" is interpreted the same as "9:1:1" by Train Dispatcher 3.

There are three types of command records. The following table lists these types:

Type	Field Code	Description
Control	CONTROL	Requests Train Dispatcher 3 to perform a specific control command not related to switch and signal commands. These control commands are for things such as loading a new simulation and starting or stopping the simulation clock.
Signal	SIGNAL	Requests a specific signal command
Switch	SWITCH	Requests a specific switch to change its position

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Each of the following tables describes the fields in various command records and is followed by an example:

Field Number	Data Name	Data Format	Description
1	Type	CONTROL	The type of record.
2	Sequence Number	0 thru 9999	The record sequence number.
3	Command Type	LOAD	Request Train Dispatcher 3 to load a track territory.
4	Time	HH:MM:SS	The time the external program issued this command. The first two characters are the hours followed by the minutes and seconds.
5	File Name	Alpha/Numeric	The track file name, in quotes, of the track territory to be loaded.
6	Start Day	Su, Mo, Tu, We, Th, Fr, Sa	The day of the week on which the simulation will start. (Please note that the track territory must have a start day and time that is the same as the entry in the Start Day and Start Time fields. If not a CMDERR message will be generated.)
7	Start Time	HH:MM	The time of the day the simulation will start. The format is the hours followed by a colon and then the minutes.

Example:

CONTROL,0001,LOAD,10:12:11,"C:\Train3\USA BNSF Bakersfield CA - Oakley CA 2000.trk",tu,0:00

Field Number	Data Name	Data Format	Description
1	Type	CONTROL	The type of record.
2	Sequence Number	0 thru 9999	The record sequence number.
3	Command Type	SIMLOAD	Request Train Dispatcher 3 to load a previously saved simulation.
4	Time	HH:MM:SS	The time the external program issued this command. The first two characters are the hours followed by the minutes and seconds.
5	File Name	Alpha/Numeric	The simulation file name, in quotes, of the simulation to be loaded.

Example:

CONTROL,0001,SIMLOAD,10:12:11,"C:\Train3\USA BNSF Bakersfield CA - Oakley CA 2000.ssm"

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Field Number	Data Name	Data Format	Description
1	Type	CONTROL	The type of record.
2	Sequence Number	0 thru 9999	The record sequence number.
3	Command Type	START	Requests Train Dispatcher 3 to start the simulation.
4	Time	HH:MM:SS	The time the external program issued this command. The first two characters are the hours followed by the minutes and seconds.

Example:
CONTROL,0013,START,23:12:11

Field Number	Data Name	Data Format	Description
1	Type	CONTROL	The type of record.
2	Sequence Number	0 thru 9999	The record sequence number.
3	Command Type	STOP	Requests Train Dispatcher 3 to stop (pause) the simulation.
4	Time	HH:MM:SS	The time the external program issued this command. The first two characters are the hours followed by the minutes and seconds.

Example:
CONTROL,0015,STOP,12:12:11

Field Number	Data Name	Data Format	Description
1	Type	CONTROL	The type of record.
2	Sequence Number	0 thru 9999	The record sequence number.
3	Command Type	TIME	Requests Train Dispatcher 3 to send the current simulation time (TIME indication record).
4	Time	HH:MM:SS	The time the external program issued this command. The first two characters are the hours followed by the minutes and seconds.

Example:
CONTROL,0023,TIME,15:46:09

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Field Number	Data Name	Data Format	Description
1	Type	CONTROL	The type of record.
2	Sequence Number	0 thru 9999	The record sequence number.
3	Command Type	ALLDATA	Requests Train Dispatcher 3 to send all switch, signal and block indication records.
4	Time	HH:MM:SS	The time the external program issued this command. The first two characters are the hours followed by the minutes and seconds.

Example:

CONTROL,0034,ALLDATA,14:33:19

Field Number	Data Name	Data Format	Description
1	Type	SIGNAL	The type of record.
2	Sequence Number	0 thru 9999	The record sequence number.
3	Signal Name	Alpha/Numeric	Each signal, when created by Track Builder 3, can be assigned a unique remote monitor name that identifies the signal to the external program. If a remote monitor name was not assigned, Train Dispatcher 3 will recognize a name that uses its internal signal number. The format is SIGNALXXXX, where XXXX is the signal number.
4	Time	HH:MM:SS	The time the external program issued this command. The first two characters are the hours followed by the minutes and seconds.
5	Signal Command	CANCEL CLEAR FLEET FLEETCANCEL	The signal command being issued. Commands can be issued for canceling a signal, clearing a signal, fleeting a cleared signal or canceling a fledted signal.

Example:

SIGNAL,0112,SIGNAL0122,11:15:10,CLEAR

Field Number	Data Name	Data Format	Description
1	Type	SWITCH	The type of record.
2	Sequence Number	0 thru 9999	The record sequence number.
3	Switch Name	Alpha/Numeric	Each switch, created by Track Builder 3, can be assigned a unique remote monitor name that identifies the switch to the external program. If a remote monitor name was not assigned, Train Dispatcher 3 will recognize a name that uses its internal switch number. The format is SWITCHXXXX, where XXXX is the switch number.
4	Time	HH:MM:SS	The time the external program issued this command. The first two characters are the hours followed by the minutes and seconds.
5	Switch Command	NORMAL REVERSE	The switch position command being issued. Commands can be issued for throwing the switch into the normal or reverse position.

Example:
SWITCH,0187,SWITCH0005,08:32:19,NORMAL

12.3. Status Indication Records

Status records are generated when the status of a block, signal or switch changes, when Train Dispatcher 3 receives a command record that requests information, or when there is an error in a command record.

Status records contain a series of fields separated by commas. The first field in the record always defines the type of record and the second always contains the sequence number.

The sequence number is a 4-digit number. Each time Train Dispatcher 3 generates a new record it increments the sequence number by one. When the sequence number reaches 10000, it is reset to zero.

There are five types of status indication records. The following table lists these types:

Type	Field Code	Description
Block	BLOCK	Contains the current block status
Signal	SIGNAL	Contains the current signal status
Switch	SWITCH	Contains the current switch status
Command Error	CMDERR	Contains error information about a bad command received by Train Dispatcher 3 in the td3commands.txt
Time	TIME	Contains the simulation time when the simulation time is requested by a command issued by the external program

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Each of the following tables describes the fields in each status indication record type and is followed by an example:

Field Number	Data Name	Data Format	Description
1	Type	BLOCK	The type of record.
2	Sequence Number	0 thru 9999	The record sequence number.
3	Block Name	Alpha/Numeric	Each block, when created by Track Builder 3, can be assigned a unique remote monitor name that identifies the block to the external program. If a remote monitor name was not assigned, Train Dispatcher 3 generates one. The generated name will be BLOCKXXXX, where XXXX is the block number.
4	Status	CLEAREDRIGHT CLEAREDLEFT OCCUPIEDLEFT OCCUPIEDRIGHT UNOCCUPIED	The status code of the block. The status code is composed of the block cleared, occupied or unoccupied status followed by the traffic direction if the status is cleared or occupied.
5	Time	DD-HH:MM:SS	The simulation day and time of the status. The first two characters indicate the number of days the simulator has been running. This is followed by a hyphen and then the hours, minutes and seconds on the simulator's clock.
6	Train ID	Alpha/Numeric	This field will only exist if the status of the block is OCCUPIEDLEFT or OCCUPIEDRIGHT. This field contains the train identifier of the first train traveling in the direction of the traffic.
6	Free Blocks	Numeric 0 to 2	This field will only exist if the status of the block is CLEAREDLEFT or CLEAREDRIGHT). This field contains the number of blocks ahead of this block that are also cleared in the same direction. If the number is greater than 2, 2 will be contained in this field.

Example:

BLOCK,0005,BLOCK0020,OCCUPIEDRIGHT,01-13:12:59,Train2

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Field Number	Data Name	Data Format	Description
1	Type	SIGNAL	The type of record.
2	Sequence Number	0 thru 9999	The record sequence number.
3	Signal Name	Alpha/Numeric	Each signal, when created by Track Builder 3, can be assigned a unique remote monitor name that identifies the signal to the external program. If a remote monitor name was not assigned, Train Dispatcher 3 generates one. The generated name will be SIGNALXXXX, where XXXX is the signal number.
4	Status	CLEAREDRIGHT CLEAREDLEFT CLEARRIGHTFLEET CLEARLEFTFLEET STOP STOPFAILED STOPERROR	The status code of the signal. For cleared signals, the status code will have CLEARED followed by the traffic direction and the fleet indication. For stopped signals, the status code will have STOP which maybe followed by FAILED or ERROR. If FAILED, the signal has a problem that may require a maintainer to fix. If ERROR, the signal could not be cleared (as requested by the last command) because of a traffic conflict.
5	Time	DD-HH:MM:SS	The simulation day and time of the status. The first two characters indicate the number of days the simulator has been running. This is followed a hyphen and then the hours, minutes and seconds on the simulator's clock.

Example:

SIGNAL,0006,SIGNAL0019,CLEAREDRIGHT,02-09:23:17

Train Dispatcher 3.5



Field Number	Data Name	Data Format	Description
1	Type	SWITCH	The type of record.
2	Sequence Number	0 thru 9999	The record sequence number.
3	Switch Name	Alpha/Numeric	Each switch, when created by Track Builder 3, can be assigned a unique remote monitor name that identifies the switch to the external program. If a remote monitor name was not assigned, Train Dispatcher 3 generates one. The generated name will be SWITCHXXXX, where XXXX is the switch number.
4	Position	NORMAL REVERSE NORMALFAILED REVERSEFAILED NORMALERROR REVERSEERROR	The position code of the switch. The position code indicates whether the switch is in the normal or reverse position. This may be followed by FAILED or ERROR. If FAILED, the switch has a problem that may require a maintainer to fix. If ERROR, the switch position could not be changed (as requested by the last command) because of a traffic conflict.
5	Time	DD-HH:MM:SS	The simulation day and time of the status. The first two characters indicate the number of days the simulator has been running. This is followed by a hyphen and then the hours, minutes and seconds on the simulator's clock.
6	Status	CLEAREDRIGHT CLEAREDLEFT OCCUPIEDRIGHT OCCUPIEDLEFT UNOCCUPIED	The status code of the switch. The status code is composed of the switch cleared, occupied or unoccupied status followed by the traffic direction if the status is cleared or occupied.

Example:

SWITCH,0056,SWITCH0199,NORMALERROR,01-17:12:54,OCCUPIEDLEFT

Field Number	Data Name	Data Format	Description
1	Type	CMDERR	The type of record.
2	Sequence Number	0 thru 9999	The record sequence number.
3	Error message	Alpha/Numeric	A text error message, in quotes, that explains the problem with the command record.
4	Command Record	Alpha/Numeric	The command record, in quotes, with which this error message is associated.

Example:

CMDERR,0008,"The signal named in the third field of the message could not be found on the track layout", "SIGNAL,0011,SIGNAL0412,12:23:17, CLEAR"

Field Number	Data Name	Data Format	Description
1	Type	TIME	The type of record.
2	Sequence Number	0 thru 9999	The record sequence number.
3	Time	DD-HH:MM:SS	The current simulation day and time. The first two characters indicate the number of days the simulator has been running. This is followed by a hyphen and then the hours, minutes and seconds on the simulator's clock.

Example:
TIME,0034,"01-15:11:12

13. TECHNICAL SUPPORT

Signal Computer Consultants provides free technical support for up to one year after purchase to registered Train Dispatcher 3 customers for all Train Dispatcher 3 functions with the exception of the CTC Control Mode and External I/O Mode functions. A separate support contract is available for CTC Control and External I/O Mode functions. Please contact Signal Computer Consultants for more information.

To obtain technical support contact Signal Computer Consultants via the following means:

- Telephone 412 655-1884
- Facsimile 412 655-1893
- E-mail signal@signalcc.com

14. WARRANTY

If Train Dispatcher 3 does not operate correctly on the computer on which you initially installed Train Dispatcher 3, and, after you contact us about the problem, we are not able to solve it within a 2-week period, our policy is to give you a 100% refund on the purchase price of the program. To obtain this refund we must have the original CD Rom returned to us.

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