Scripts and icons for the Italian (RFI) signals – version 4.6 of 15/6/2015

This zip file contains all the icons and scripts needed to simulate Italian (RFI – *Rete Ferroviaria Italiana*) signals in Traindir 3[1]; they work since version 3.8w of the program, but using the latest version is always recommended.

WARNING! If you still have version 3.1 or 3.0 of the package, please delete the old files before installing this package; if you copied other files (your own icons and scripts) in the package folder, remember to keep them. If you have any 4.x version of the package, all the files will be automatically updated.

Version 4.x scripts are easier to use, as they should now take into account every possible combination of signals that come next to each other. Now you just need to choose the correct type and number of heads (and auxiliary indicators); for more details see the comments in each script or read on.

New features since the previous version

Departure signals with the triangle are now automatically considered always unclear; the three scripts that force diverging routes, unclear signals and short blocks can now be freely combined. Added the script templates for signals that are common to more tracks (please see the specific chapter), even featuring the direction indicator. Fixed some bugs (thanks to Francesco Avellini for reporting them).

Summary of the available signals

- Simple distant and home signals, with round heads, square heads or square heads with an arrow above. As square heads command to the left and round heads command to the right, the arrow (which is lit only when the signal is clear) helps distinguish which signal is the left one when two signals are placed on the same mast between two tracks, one commanding to the left and one commanding to the right.
- Home signals with round heads, square heads or square heads with an arrow above (as above) and a rappel (speed indication, see glossary) below. These signals are also used as exit signals for station tracks where a no stop route is allowed or the exit route is straight (see glossary).
- Exit signals with round heads, square heads or square heads with an arrow above (as above) and a triangle below. This means that any exit route from this station track has at least one diverging switch, so when the signal is not at red the driver must read the aspect as if another head was present on top, showing red. These signals cannot be used if a no stop route is allowed on the track they command.
- Permissive block signals with round heads, square heads or square heads with an arrow above (as above) and a white P below. These are usually automatic signals (to be placed along the line using the two-head icon of the editor).
- Other signals: dwarfs and high shunting signals, level crossing signals (also for the cars) and gates, train announcement, block occupancy, block direction and occupancy, shunting limit, dead ends, direction indicators, facing point lock status, signals for high speed lines.
- Templates for signals common to more tracks, with round heads and eventually the triangle or the rappel (speed indicator): unlike the other scripts of the package, these must be adapted to the scenario and distributed with it, so please read the specific chapter to learn how to use them.

All main signals (i.e. all that can stop trains) now support the “Shunt” aspect for shunting: if the signal is cleared with Ctrl-click (white track), or if a speed limit lower than 30 km/h is detected before the next signal, the signal remains red, but the track turns white or green (respectively) and shunting trains can pass the signal (shunting signals, move in, move on, route continuation indicators show the correct aspect accordingly). Three head signals show the correct RYY aspect (“proceed by sight, as another train is on your track before the next signal”) to allow joining.

To fully understand these instructions, please read the glossary later on, as I’m not sure about the terms used in other administrations, and some features of the Italian signals could be quite unique, thus needing specific explanations for foreign players and scenario designers.

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[1] A software by Giampiero Caprino, who designed an eccellent and very versatile simulator. I must thank him for all the adjustments he did to allow the implementation of this package.

Installation

If you already have a version 4.x of the package, this version updates all the files automatically. If you still have version 3.1 or 3.0, delete all the files – except your own scripts and icons, if any – from the folder where you installed the previuos version (typically `C:\Program Files\Traindir3\Signals`). If the suggested folder doesn't exist, create it and set it as the "Path to signal scripts" in the "Environment" tab of the Edit | Preferences command.

Open the .zip file, select all the files and extract them in that folder; the package is compatible with the other packages of mine, so the same folder can be used (typically `C:\Program Files\Traindir3\Signals`) and mixed scenarios can be designed.

However, more and more packages will hopefully be available in the future, so it could be a good option to use a separate folder for each package (for example `C:\Program Files\Traindir3\Signals_RFI`) and modify the folder the program points to whenever the signal system changes. Now the program knows where to look for the signals' scripts and icons and you won't need to include them in every scenario you create.

Description of the scripts

The script name for normal signals follows this scheme: "rfi" (the network manager company), underscore, signal type, undescore, number of heads, head shape, `.tds` extension. The script names for special signals follow their own scheme (see the following table). All the scripts have comments explaining how they work and how to use them; the package includes a `Demo.trk` scenario showing most cases. In the editor almost all the scripts are to be assigned to signals that were placed in the scenario using the single head icon. Exceptions like permissive block signals will be noted specifically.

Normal signals

`rfi_avv_**.tds`	Pure distant signals (see glossary) with 1 or 2 heads: round (N), square (Q) or square with an arrow above (F). They cannot stop trains and thus cannot show the "Stop" (red) aspect (all aspects have 'none' as action). They must be followed by a main signal (normal or special); following distants are ignored, as according to the Italian rules only one pure distant can exist between two main signals.
`rfi_prot_**.tds` `rfi_prot_*R*.tds`	Home signal (used also as exit signal when a no stop route is allowed or at least one exit route is straight) with 1, 2 or 3 heads: round (N), square (Q) or square with an arrow above (F); also with a rappel (R between the number and the shape of the heads – see the glossary). They can stop trains and can be followed by whatever signal (normal or special).
`rfi_part_**.tds`	Exit signals (used when a no stop route is not allowed and every exit route has at least one diverging switch), with 1 or 2 heads: round (N), square (Q) or square with an arrow above (F) and a triangle below. They can stop trains and can be followed by whatever signal (normal or special). Previous signals consider these signals always unclear[2], as no stop routes are not allowed with these signals.
`rfi_perm_**.tds`	Permissive signals (white P under the heads), with 1 or 2 heads: round (N), square (Q) or square with an arrow on top (F). They can stop trains and can be followed by whatever signal (normal or special). Usually these signals turn automatically back to the most clear aspect as soon as possible, so they should be placed in the scenario using the 2 head icon of the editor. All the automatic signals must be "activated" at the beginning of the simulation with the "Set sig. to green" menu command.
`rfi_com_**.tds`	Templates for signals common to more tracks, with 1, 2 or 3 round heads (N), eventually with a triangle (T) or a rappel (R between the number and the shape of the heads – see the glossary). Please read the specific chapter later on how to use them.

[2] In Italy an exit signal with the triangle can be cleared only if a train is occupying the track circuit before it. This enforces the fact that exit and home cannot be clear simultaneously (as a no stop route is not allowed when the triangle exit signals are used). This cannot be enforced in Traindir, but at least the home signal will show the correct aspect even if the exit signal is already open.

Segnals for high speed lines

`rfi_prot_AVs.tds` `rfi_prot_Avd.tds`	Main signals for high speed lines with radio block system (ETCS level 2) placed to the left or to the right of the commanded track. They are actually signs, so they don't change aspect, but can be used as normal signals.
`rfi_perm_AVs.tds` `rfi_perm_Avd.tds`	Block signals for high speed lines with radio block system (ETCS level 2) placed to the left or to the right of the commanded track. They are actually signs, so they don't change aspect, but can be used as normal permissive signals. Being usually automatic signals, they should be placed in the scenario using the 2 head icon of the editor. All the automatic signals must be "activated" at the beginning of the simulation with the "Set sig. to green" menu command.

Normally these signs are to be ignored by drivers. Only in case of problems to the radio block system (lack of the proceed permission) they become meaningful and trains cannot pass them without specific permission.

Departure repeater

`rfi_ind_part.tds`	Departure indicator, to be used as a distant of the exit signal when the latter is far from the platform (warning: there cannot be any switch between this signal and the linked exit signal). The indicator is lit when the exit signal is not red (i.e. neither at "Stop" nor at "Shunt").

Special signals to be placed before and adjacent to a main signal.

`rfi_avanz.tds` `rfi_avvio.tds`	"Move in" and "Move on" indicators, mounted under the heads of a home or exit signal (respectively) to indicate that the train can respectively enter or leave the station even if the signal cannot be set to a clear aspect. In Traindir they are distants, working as shunting indicators: they light up (in white and light blue respectively) when the main signal is clear for shunting (i.e. red but passable). If the main signal features also the direction indicator (`rfi_ind_dir.tds`), the latter should be placed in the middle.
`rfi_ind_dir.tds`	Direction indicator, actually a distant to be placed adjacent to a main signal. To activate the indicator, put a fake station in each branch after the main signal, named after the number[3] you want to appear when the main signal is clear towards that branch ('zero' for 0, 'one' for 1, and so on). If no such stations are found in the route after the main signal, the indicator will stay off. The indicator can show also the letters A, D, P, ^ (these are lit also when the signal is red) to be combined with the home and the exit signal of the straight route track of a station when the station is disabled and unmanned (insert a fake station named A, D, P, V respectively). See the glossary for details.

Shunting signals (dwarfs or high)

`rfi_marm_i.tds`	Commanding dwarf: it's actually a main signal, as it stops trains when not clear, and the previous signal considers its aspect correctly. It's normally used in yards to control shunting movements. If you put a fake station named X after this signal, you can get the flashing clear aspect, used to indicate that the common exit signal that follows is clear for this track.
`rfi_marm_a.tds`	Irrelevant repeater dwarf, a distant that's just a repeater of the main signal that follows. The dwarf is clear whenever the main doesn't show "Stop" (so also when it shows "Shunt"). If you put a fake station named X after this signal, you can get the flashing clear aspect, used to indicate that the common exit signal that follows is clear for this track.
`rfi_marm_m.tds`	Irrelevant shunting dwarf, a distant that is clear only when the main signal that follows shows "Shunt".
`rfi_marm_*d.tds`	Same as above, but to be placed to the right of the track they command.
`rfi_sam_*.tds`	High shunting signal, working like the corresponding i, a, m version of the above dwarfs, but never featuring the flashing aspect.

[3] Counting the branches from left to right; 0 is used for "dead" or special branches like yards, depots, etc.

Shunting limit

rfi_LM.tds rfi_LM_s.tds rfi_LM_d.tds	This signal looks like and simulate the post or the sign (to the left or to the right of the track) – to be used respectively inside or outside the home signals – that shunting trains cannot pass when moving towards the plain line. This is actually a main signal that stops trains. As it cannot be limited to shunting trains, it can be cleared as any other signal (but its aspect doesn't change), so normal trains can pass it. For the previous signal it's a red, so if you want to mask it (i.e. see a clear instead of a "Prepare to stop" aspect) you must place a hidden level crossing distant (rfi_avv_PL.tds) before it.

Special signals, to be used as hidden distants

These distants can be freely combined, but they must appear in the order they are listed here.

rfi_avv_dev.tds	Force diverging aspects: put this signal after a main signal if you want it to show diverging aspects even if all the switches along the route are straight. This distant is to be placed before the first switch after the main signal. It is used in bigger stations, to slow down also the straight route track without needing to slow down the line speed.
rfi_avv_part.tds	Block no stop routes: place this signal before a main signal and previous signals will always consider it unclear and show "Prepare to stop", even when it's clear. It's used when the exit signal is normal but no stop routes aren't allowed. Exit signals with the triangle don't need this distant anymore to be considered unclear.
rfi_avv_tronc.tds	Very short block: place this distant after a main signal to force it at YY or RYY ("Prepare to stop at next signal, which is nearer than 600 m") even when the distance to the next signal (or track end) is more than 600 m. Other aspects still consider the actual distance. It's tipically used in head stations, to indicate that the train will be received in a set of shorter tracks, even if they are actually longer than 600 m.

Dead end

rfi_tronc.tds	This always red signal (mark the specific option in the properties) looks like a dead end. It should be linked to the last track element of an exit point to block the trains, that would otherwise exit the scenario. Previous signals will show the correct aspect ("Prepare to stop").

Block occupancy (indicates that a train is still occupying the block just after a visible exit point)

rfi_OB_auto.tds	Special automatic signal (use the two head icon of the editor to place it) to be linked at the beginning of an auxiliay hidden track that follows the visible exit point. The indicator lights up when the train passes the signal, and goes off when the train actually leaves the scenario from the hidden track. When the indicator is lit the previous block signal will show "Prepare to stop", otherwise it will show "Clear". This indicator works only for unidirectional tracks where trains leave the scenario, so it's suitable only for two track lines, where all trains enter from one track and exit from the other.
rfi_OB_bi.tds	Special distant to be placed before an auxiliary hidden signal, the latter being at the end of an auxiliay hidden track that follows the visible exit point. The indicator lights up when the auxiliary is clear (to clear it, use a pedal placed just before the visible exit point), and goes off when the train passes the auxiliary signal. When the indicator is lit the previous block signal will show "Prepare to stop", otherwise it will show "Clear". This signal is compatible with the Train Announcement indicator for bidirectional tracks (rfi_AT_i.tds), so it's the only one suitable for single track lines, where trains enter and exit the scenario from the same track.
rfi_OB_a_small.tds rfi_OB_b_small.tds	Small version of the previous indicators.

Block direction and occupancy

`rfi_DB_avv.tds`	Block direction and occupancy indicator, for bidirectional tracks. It should be linked as distant of an auxiliary signal followed by a switch, on a hidden track placed before/after the visible entry/exit point. The block is oriented in the same direction as the signal having this script if the switch after the auxiliary signal is diverging; the block is oriented in the other direction if the switch is straight. The block is occupied (in the current direction) when the auxiliary signal is cleared. At the beginning of the simulation the block is free and oriented in the direction opposite to the signal having the script. The `Demo_blocco.trk` demo scenario shows a particular auxiliary track which allows the entry and exit of trains with the correct indications (including the "Prepare to stop" aspect on the last visible signal when the block is occupied in the exit direction). This particular track is available as a macro (to be placed with the "Macro" and "Place" buttons of the editor) for each of the 4 possible exit directions: `Blocco_dx.trk` (east), `Blocco_sx.trk` (west), `Blocco_giu.trk` (south), `Blocco_su.trk` (north).
`rfi_DB_s.tds`	Simple block direction indicator (doesn't show the occupancy), to be linked to an isolated hidden track element. This signal must be "cleared" and "uncleared" through pedals, so mark the "No penalty for un-necessary clicks" option.
`tln_DB_s.tds`	Direction and Occupancy indicators for blocks that are normally not oriented (used by another Italian company, "LeNord"). Place a signal for each direction, both linked to an isolated hidden track. The script that follows lights up the correct indicator: just customize the coordinates in the script and associate it to the track element in the center of the block. In the example this center element is at 5,5, while 4,5 is the element to the left; 4,3 and 6,3 are the two indicators for the left and right direction respectively. To switch off the indicators, use a pedal placed at the end of the block, so mark the "No penalty for un-necessary clicks" option.

```
OnSetBusy:                              # When this track element turns to green…
 if Track(4,5).color = black            # …if the element to the left is still black…
  if Signal(4,3).aspect = red
   do click 4,3                         # …the block is to be oriented to the left…
  end
 else                                   # …otherwise to the right.
  if Signal(6,3).aspect = red
   do click 6,3
  end                           # NOTE: Use Notepad to customize the script and
 end                            # remove all comments before assigning it to the track
end
```

Ringbell

`rfi_leopolder.tds`	This is a distant to be hidden before a home signal or before the train announcement `rfi_AT_i.tds`. When the signal that follows is cleared, a sound is played. The sound file (`leopolder.wav`) must be distributed with every scenario that uses this script, as the program doesn't look for it in the signals' folder. In the real world this bell rings as long as the home signal is clear, warning all the people in the station that the home signal is open for a train to arrive, so no shunting can occur and no manual switches can be thrown. When the ring stops the train has passed the home signal, so it's very near: all people are warned to stop crossing any track until the train has stopped or passed by. Nowadays this bell is obsolete and is being dismantled, as most switches are remotely operated and voice announcements keep warning all passengers that crossing the tracks is always prohibited.

Level crossing (with gates) signals

rfi_avv_PL.tds rfi_prot_PL_i.tds	These signals (distant and home respectively) are specific for protecting level crossings, when the nearest normal signal would be too far, (tipically in single track lines, where the section between the exit signal of a station and the home signal of the next is a single block section with no other signals). In this case the gates position is not simulated and the level crossing home – which is actually a main signal that stops trains – has to be cleared in advance using a pedal or an itinerary. See the glossary for details. The previuos normal signal ignores these specific signals and always clears at green, but if these signals are nearer than usual you can have the previous signal show a flashing yellow by using rfi_avv_PL_i.tds. instead of rfi_avv_PL.tds
rfi_avv_PL.tds rfi_prot_PL_a.tds rfi_PL_i.tds	These signals (distant, home and gates) are specific for protecting level crossings, in the case when also the gates position is simulated. In this case the gates are the main signal that stops the trains, while the other two are distants. When using these three signals in both directions the gates cannot be closed together, which is unrealistic. If you want to see both gates closed, and the signals at clear for both directions (as it happens in the real world) a trick must be used: place two sequences of these signals (using rfi_PL_i.tds in the first and rfi_PL_a.tds in the second) linked to an isolated hidden track having a U shape. Place one sequence on each "arm" of the U, in such a way that all signals are distants of the first gate (rfi_PL_i.tds): clicking on this gate should clear all of them. This gate signal will be cleared and uncleared by pedals (remember to mark the "No penalty for un-necessary clicks" option), as the train passes elsewhere. Two macro blocks containing the auxiliary tracks and the signals are included in the package (PL_oriz.trk and PL_vert.tds, with horizontal and vertical tracks respectively). Place the suitable one somewhere in the scenario using the "Macro" and "Place" buttons and then move the signals near the real tracks. This is the most realistic simulation of level crossings, but the home signal will not stop trains when the gates are closed[4]. If you want also this to happen, add a hidden sequence of distant and home (as in the case when the gates are not simulated) and clear also this home with the pedals. As in the real world, the previuos normal signal ignores these specific signals and always clears at green.
rfi_avv_PL_big.tds rfi_prot_PL_big_a.tds rfi_prot_PL_big_i.tds	Bigger version of the previously described signals.
rfi_PL_a.tds	Special distant repeating the gates position indicator (rfi_PL_i.tds) in a level crossing. See the three signals sequence above.
rfi_avv_PL_i.tds	This version of the level crossing distant forces the previuos normal signal to take into account the distance between level crossing distant and home (if this distance is less then usual the normal signal will show a flashing yellow instead of a green).

Level crossing (no gates) signals

rfi_prot_PL_s.tds	Special signal to protect level crossings with no gates for the cars (just 2 flashing red lights). When lit it indicates that the lights for the cars are also lit. In Traindir it's a main signal that stops trains when "off", so it must be "cleared" in advance using a pedal. For the previous signal it's a red, so if you want to mask it (i.e. see a "Clear" instead of a "Prepare to stop" aspect) you must place a hidden level crossing distant (rfi_avv_PL.tds) before it.
rfi_prot_PL_b.tds	Special signal simulating the red lights for the cars in a level crossing with no gates, to be placed as a distant of the signal for the trains (rfi_prot_PL_s.tds) and then moved near the road.

[4] As in the real world: see the glossary for the driver's expected behaviour.

Train announcement (indicating that a train will soon appear in the visible part of the scenario)

`rfi_AT_a.tds`	Special automatic signal (use the two head icon of the editor to place it) to be linked at the beginning of an auxiliay hidden track that precedes the visible entry point. The length of the hidden track determines how long the player will see the indicator lit before the train becomes visible. The indicator lights up as soon as the train passes the signal and remains lit until the train passes the first signal after the visible entry point. If the first signal is very far from the entry point, consider placing a hidden automatic signal just after the visible entry point, to turn off the announcment as soon as the train becomes visible. This indicator works only for unidirectional tracks where trains enter the scenario, so it's suitable only for two track lines, where all trains enter from one track and exit from the other.
`rfi_AT_i.tds`	Special main signal to be placed immediately after the visible entry point and to be "cleared" by a pedal placed at the beginning of an auxiliay hidden track that precedes the visible entry point. The indicator goes off when the train passes it. The length of the hidden track determines how long the player will see the indicator lit before the train becomes visible. This signal is compatible with the block occupancy indicator for bidirectional tracks (`rfi_OB_bi.tds`), so it's the only one suitable for single track lines, where trains enter and exit the scenario from the same track.
`rfi_AT_small_i.tds` `rfi_AT_small_a.tds`	Small version of the previous indicators.

Facing point lock status

`rfi_TD.tds`	Special signal to be linked to an isolated hidden track element, to be "cleared" and "uncleared" through pedals, so mark the "No penalty for un-necessary clicks" option. This signal has no effect on trains (actually they don't see it: it's only on the CTC panel) and shows the facing point lock (FPL) status. When FPL is active, the points are locked in such a strong way that a trailing point movement would force the train to derail (otherwise it would just break the switch mechanism and throw the points in the needed position). FPL is required active for every facing point movement, except when elastic switches are used. In these swithches simple springs keep the points in the straight position (the only one allowing facing point movement, at very low speed) but allow trailing point movements also from the diverging track.

All the signals (not only permissive ones) can be made automatic, so they will turn automatically back to the most clear aspect as soon as possible: just place them in the scenario using the two head icon of the editor and then associate the chosen script. At the beginning of the simulation the "Set sig. to green" menu command activates this feature and clears all of them.

This feature can be temporarily disabled by right-clicking such a signal when clear (so it will remain red after the next train passes it), or by explicitly unclearing it. This feature can later be activated again by clearing and then right-clicking the signal.

Unfortunately, there is no way to know if a scripted signal is automatic and if the feature is active at the moment, except when issuing the "Set sig. to green" menu command at the beginning of the simulation.

Signals common to more tracks

In Traindir a signal can command only one track, so the simulation of a signal commanding more tracks (being clear for only one of them at a time) requires some tricks, explained in the two solutions that follow. The first solution doesn't require to modify the scripts, but it works only in one case – the most common, but not the only one – while the second solution works in all cases but requires to adapt the scripts to the specific scenario and to distribute the modified scripts with it.

In the real world the signals common to more tracks have always round heads, and if a no stop route is allowed on one track of the commanded set – typically the straight one – the signal is placed near it, as if it were dedicated to that track.

Standard signals without modification.

This solution is shown in the right part of the example scenario `Esempio_comune.trk` that's included in the package; it works only if all the paths from the commanded tracks have diverging switches, all at the same speed, and at least one of that switches is after the common signal. In this case the common signal, placed immediately after the confluence of the commanded tracks, can be the same exit signal with triangle that would be used for each track. On each track the dedicated exit signal will be just a commanding dwarf (`rfi_marm_i.tds`), followed by an 'X' fake station to activate the flashing aspect that indeed indicates the track for which the common signal that follows is clear.
As the common signal should clear only together with one of the dwarfs, please consider the use of concatenated itineraries and/or setting the "Intermediate" property of the common signal.

Specific signals adapted to the scenario

This solution is shown in the left part of the example scenario `Esempio_comune.trk` that's included in the package; in this solution the dedicated signals for each track are still present – but hidden – and the common signal is actually a distant repeating the only hidden signal that is clear. Each hidden signal should be preceeded by an ininfluent dwarf (`rfi_marm_a.tds`), followed by an 'X' fake station to activate the flashing aspect that indeed indicates the track for which the common signal that follows is clear.
As the aspect of the common signal depends on the aspects of signals that are before it, the script must 'know' the coordinates or names of the signals to be controlled, i.e. it cannot be used as is: it must be modified as follows and thus distributed with the scenario.
First choose the type of the common signal[5], that must be able to show all the possible aspects of the hidden signals it replicates. Make a copy of the chosen script in the scenario folder[6], open that copy with a text editor and insert the coordinates or names of the signals to be controlled: you can just do a global search & replace of `Sig_1` with the actual coordinates of the first hidden signal (for example `20,21`), of `Sig_2` with those of the second hidden signal, and so on for all hidden signals.
The script templates are suitable for up to 4 tracks (hidden signals); when they are less than 4 just leave the unused placeholders untouched (`Sig_4` or `Sig_3`).
Finally, save the dedicated copy of the script and assign it to the common signal, which should be placed immediately after the confluence of the commanded tracks, but must be linked to an isolated and hidden track element[7].
If the common signal features the direction indicator, it too needs to be adapted: make a copy of the normal script `rfi_ind_dir.tds` in the scenario folder and modify it with a text editor as explained in the script itself, than assign it to the distant representing the indicator. There are two points where you need to move # at the beginning of the next line and to replace `x,y` with the actual coordinates of the common signal to which the indicator is adjacent. The indicator must be linked to a track element, immediately after the confluence of the common tracks, from where it can "see" all the branches it should indicate (see the example scenario `Esempio_comune.trk`).

Icon naming

This is the naming convention for icons: two uppercase letters telling the icon type, underscore, lowercase letters describing the aspect (colour sequence, position, size, etc.), undescore, one uppercase letter indicating the direction, `.xpm` extension.

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[5] Templates with 1, 2 or 3 heads are available, eventually with the rappel (2 or 3 heads – see the glossary) or the triangle (1 or 2 heads).

[6] If the scenario features more sets of tracks with a common signal, each signal requires a copy of its chosen template, so use filenames that are easy to recognise for each set of tracks..

[7] Be very careful about this point: as the aspect of the common signal depends on signals that are before it, and they look ahead to decide their aspect, if they 'see' it along the tracks a loop is generated that would hang the program.

Types

AT:	Train Announcement
OB:	Block Occupancy
DB	Block Direction (and occupancy)
ID:	Direction Indicator (from 0 to 9) or the letters P, A, D, ^ for unmanned stations
TD:	Facing Point Lock indicator
PL:	Level Crossing gates position, sign or lights for LCs without gates
LQ, LT:	Special signals for protecting level crossings, with square or triangular head
LM:	Post or sign indicating the shunting limit or the beginning of the plain line
MA, MF:	Shunting dwarf (ground level signal), commanding to the right or to the left
SM:	High shunting signal
TR:	Dead End, special fake signal to prevent trains from exiting the scenario
PN, PQ, PF:	Permissive signals (white P under the heads) with round heads, square heads or square heads with an arrow above
NN, NQ, NF:	Normal signals, with round heads, square heads or square heads with an arrow above
RN, RQ, RF:	Signals with a rappel (speed indication) under the heads, with round heads, square heads or square heads with an arrow above
TN, TQ, TF:	Exit signals (white a triangle below the heads) with round heads, square heads or square heads with an arrow above
AV	"Move in" or "Move on" signal (see glossary) or signal for high speed lines

Aspects

b,r,y,g:	Colours: black (off), red, yellow, green – one letter per head starting from the top.
–, =, +:	After the colours, indicates the rappel (one or two lines), or the arrow, or just the P.
on, off, b,a, r,w,c:	On, off or colours for auxiliary signals: black (off), orange, red, white, cyan
I, –, _, !, =:	Gate position (open, closed) or shunting signal aspects: vertical line, horizontal line, off.
big, sml:	Size (for level crossing, train announcement and block occupancy signals).
off, 0,1,..., 9, P,A,D,V	Off, numbers, letters, for the direction indicator.

Orientation

N,S,W,E,X:	Icon is oriented for trains going up, down, to the left, to the right, or in any direction.

Conversion of old scenarios using 3.1 or 3.0 scripts

The following table lists the scripts that need to be replaced; other scripts have been updated keeping the same name, so no action is needed. Version 3.x signals are so old that no scenario should still use them.

Suggested method[8]: open the scenario in Traindir, and at the same time open its `.trk` file with Notepad. In Traindir hover the mouse on every signal that shows the standard icon instead of the desired one, take note of which script it's using, switch to Notepad and do a global search & replace of that script with the new one (taken from the table below). Save the `.trk` without closing it and reload the scenario in Traindir: all the signals using the replaced script should now be OK; repeat the procedure until all signals are OK. One head signals can be ambiguous when unclear (the red icon is the same), so clearing is needed to verify them, as the clear aspects icons of the scripts are always different from the standard green one.

Replace this	with this	Replace this	with this	Replace this	with this
rfi_avv1F_i.tds	rfi_avv_1F.tds	rfi_prot2F_ii.tds	rfi_prot_2F.tds	rfi_prot2RF_ii.tds	rfi_prot_2RF.tds
rfi_avv1N_i.tds	rfi_avv_1N.tds	rfi_prot2F_in.tds		rfi_prot2RF_in.tds	
rfi_avv1Q_i.tds	rfi_avv_1Q.tds	rfi_prot2F_ip.tds		rfi_prot2RF_ip.tds	
rfi_avv2F_i.tds rfi_avv2F_r.tds	rfi_avv_2F.tds	rfi_prot2F_ir.tds rfi_prot2F_ni.tds		rfi_prot2RF_ir.tds rfi_prot2RF_ni.tds	
rfi_avv2N_i.tds rfi_avv2N_r.tds	rfi_avv_2N.tds	rfi_prot2F_nn.tds rfi_prot2F_np.tds		rfi_prot2RF_nn.tds rfi_prot2RF_np.tds	
rfi_avv2Q_i.tds rfi_avv2Q_r.tds	rfi_avv_2Q.tds	rfi_prot2F_nr.tds rfi_prot2F_pi.tds		rfi_prot2RF_nr.tds rfi_prot2RF_pi.tds	
rfi_part1F_i.tds	rfi_part_1F.tds	rfi_prot2F_pn.tds		rfi_prot2RF_pn.tds	
rfi_part1F_in.tds		rfi_prot2F_pp.tds		rfi_prot2RF_pp.tds	
rfi_part1F_ip.tds		rfi_prot2F_pr.tds		rfi_prot2RF_pr.tds	
rfi_part1F_n.tds		rfi_prot2F_ri.tds		rfi_prot2RF_ri.tds	
rfi_part1F_ni.tds		rfi_prot2F_rn.tds		rfi_prot2RF_rn.tds	
rfi_part1F_p.tds		rfi_prot2F_rp.tds		rfi_prot2RF_rp.tds	
rfi_part1F_pi.tds		rfi_prot2F_rr.tds		rfi_prot2RF_rr.tds	
rfi_part1N_i.tds	rfi_part_1N.tds	rfi_prot2N_ii.tds	rfi_prot_2N.tds	rfi_prot2RN_ii.tds	rfi_prot_2RN.tds
rfi_part1N_in.tds		rfi_prot2N_in.tds		rfi_prot2RN_in.tds	
rfi_part1N_ip.tds		rfi_prot2N_ip.tds		rfi_prot2RN_ip.tds	
rfi_part1N_n.tds		rfi_prot2N_ir.tds		rfi_prot2RN_ir.tds	
rfi_part1N_ni.tds		rfi_prot2N_ni.tds		rfi_prot2RN_ni.tds	
rfi_part1N_p.tds		rfi_prot2N_nn.tds		rfi_prot2RN_nn.tds	
rfi_part1N_pi.tds		rfi_prot2N_np.tds		rfi_prot2RN_np.tds	
rfi_part1Q_i.tds	rfi_part_1Q.tds	rfi_prot2N_nr.tds		rfi_prot2RN_nr.tds	
rfi_part1Q_in.tds		rfi_prot2N_pi.tds		rfi_prot2RN_pi.tds	
rfi_part1Q_ip.tds		rfi_prot2N_pn.tds		rfi_prot2RN_pn.tds	
rfi_part1Q_n.tds		rfi_prot2N_pp.tds		rfi_prot2RN_pp.tds	
rfi_part1Q_ni.tds		rfi_prot2N_pr.tds		rfi_prot2RN_pr.tds	
rfi_part1Q_p.tds		rfi_prot2N_ri.tds		rfi_prot2RN_ri.tds	
rfi_part1Q_pi.tds		rfi_prot2N_rn.tds		rfi_prot2RN_rn.tds	
rfi_part2F_i.tds	rfi_part_2F.tds	rfi_prot2N_rp.tds		rfi_prot2RN_rp.tds	
rfi_part2N_i.tds	rfi_part_2N.tds	rfi_prot2N_rr.tds		rfi_prot2RN_rr.tds	
rfi_part2Q_i.tds	rfi_part_2Q.tds	rfi_PL.tds	rfi_PL_i.tds	rfi_OB_avv.tds	rfi_OB_auto.tds[9]

[8] If your system features an advanced editor like Notepad++, supporting regular expressions (regexp), you can just globally replace the string `([1-3]R*[NFQ])_.+\.tds` with the string `_\1.tds`

[9] You need also to replace the signal at the beginning of the hidden track with an automatic one (use the two head icon of the editor), then assign the new script to the new signal (in Traindir).

Replace this	with this	Replace this	with this	Replace this	with this
rfi_perm1F_i.tds	rfi_perm_1F.tds	rfi_prot2Q_ii.tds	rfi_prot_2Q.tds	rfi_prot2RQ_ii.tds	rfi_prot_2RQ.tds
rfi_perm1F_n.tds		rfi_prot2Q_in.tds		rfi_prot2RQ_in.tds	
rfi_perm1F_p.tds		rfi_prot2Q_ip.tds		rfi_prot2RQ_ip.tds	
rfi_perm1F_r.tds		rfi_prot2Q_ir.tds		rfi_prot2RQ_ir.tds	
rfi_perm1N_i.tds	rfi_perm_1N.tds	rfi_prot2Q_ni.tds		rfi_prot2RQ_ni.tds	
rfi_perm1N_n.tds		rfi_prot2Q_nn.tds		rfi_prot2RQ_nn.tds	
rfi_perm1N_p.tds		rfi_prot2Q_np.tds		rfi_prot2RQ_np.tds	
rfi_perm1N_r.tds		rfi_prot2Q_nr.tds		rfi_prot2RQ_nr.tds	
rfi_perm1Q_i.tds	rfi_perm_1Q.tds	rfi_prot2Q_pi.tds		rfi_prot2RQ_pi.tds	
rfi_perm1Q_n.tds		rfi_prot2Q_pn.tds		rfi_prot2RQ_pn.tds	
rfi_perm1Q_p.tds		rfi_prot2Q_pp.tds		rfi_prot2RQ_pp.tds	
rfi_perm1Q_r.tds		rfi_prot2Q_pr.tds		rfi_prot2RQ_pr.tds	
rfi_perm2F_i.tds	rfi_perm_2F.tds	rfi_prot2Q_ri.tds		rfi_prot2RQ_ri.tds	
rfi_perm2N_i.tds	rfi_perm_2N.tds	rfi_prot2Q_rn.tds		rfi_prot2RQ_rn.tds	
rfi_perm2Q_i.tds	rfi_perm_2Q.tds	rfi_prot2Q_rp.tds		rfi_prot2RQ_rp.tds	
		rfi_prot2Q_rr.tds		rfi_prot2RQ_rr.tds	
rfi_prot1F_i.tds	rfi_prot_1F.tds	rfi_prot3F_i.tds	rfi_prot_3F.tds	rfi_prot3RF_i.tds	rfi_prot_3RF.tds
rfi_prot1F_n.tds		rfi_prot3F_n.tds		rfi_prot3RF_n.tds	
rfi_prot1F_p.tds		rfi_prot3F_p.tds		rfi_prot3RF_p.tds	
rfi_prot1F_r.tds		rfi_prot3F_r.tds		rfi_prot3RF_r.tds	
rfi_prot1N_i.tds	rfi_prot_1N.tds	rfi_prot3N_i.tds	rfi_prot_3N.tds	rfi_prot3RN_i.tds	rfi_prot_3RN.tds
rfi_prot1N_n.tds		rfi_prot3N_n.tds		rfi_prot3RN_n.tds	
rfi_prot1N_p.tds		rfi_prot3N_p.tds		rfi_prot3RN_p.tds	
rfi_prot1N_r.tds		rfi_prot3N_r.tds		rfi_prot3RN_r.tds	
rfi_prot1Q_i.tds	rfi_prot_1Q.tds	rfi_prot3Q_i.tds	rfi_prot_3Q.tds	rfi_prot3RQ_i.tds	rfi_prot_3RQ.tds
rfi_prot1Q_n.tds		rfi_prot3Q_n.tds		rfi_prot3RQ_n.tds	
rfi_prot1Q_p.tds		rfi_prot3Q_p.tds		rfi_prot3RQ_p.tds	
rfi_prot1Q_r.tds		rfi_prot3Q_r.tds		rfi_prot3RQ_r.tds	

GLOSSARY – The Italian equivalent is in *italic*

Main signal (*segnale imperativo*)

A signal that can show the "Stop"[10] aspect, and thus can stop trains. In Traindir it can have the "red" aspect, the only one that can have *stop* as action. Most of the signals are of this type.

Pure / Combined main signal (*segnale imperativo puro / segnale con avviso accoppiato*)

Pure main signals don't tell anything about the next signal aspect (they can show only "Stop", "Clear" or "Diverging clear"- R, G or RG). Nowadays the main lines feature concatenated block signalling, so most of the signals are "combined", i.e. they act also as distant of the next, showing many more aspects. The only pure main signals remaining are exit signals protecting single track lines or home signals protecting single track junctions. Pure main signals must be followed by pure distants, which have a different mast colouring, so main signals are qualified as pure or combined only when necessary, as this property is always evident from the line layout.

Permissive signal (*segnale permissivo*)

A particular main signal that in the real world can be passed even when at "Stop" (usually after stopping and waiting for some time, but without being told by someone else). Signals that are always permissive feature a white sign with a black P on the mast, while a white P may light up under the heads of other signals when they are permissive only at times.

Distant signal (*segnale di avviso*)

A signal that can tell something about the next signal aspect. All main signals that can show restrictive aspects (requiring a stop or a speed reduction) must be preceded by a distant warning about those aspects in advance. Nowadays most of these distants are combined with the preceding main signal (see also Pure / Combined main signal), but pure distants still exist, usually on single track lines.

Pure distant (*segnale di avviso puro*)

This signal cannot stop trains, so it cannot show the "Stop" aspect, but always gives some information about the next signal aspect. In Traindir this signal has no effect on trains and blocks, as all of its aspects have *none* as action, so many special and "fake" signals are of this type. In the real world the mast of these signals and the signs announcing them are coloured in a unique way, so the drivers know that even if unlit (faulty) they don't require an emergency stop.

Normal signals (*segnali normali*)

Signals that represent and simulate real world signals.

Special signals (*segnali speciali*)

Signals used only in Traindir to simulate other objects (Level crossings, Dead ends, etc.) or particular situations.

Auxiliary signals (*segnali ausiliari*)

Signals that represent and simulate indicators, signs, etc. that in the real world are combined in a single signal but in Traindir need a separate "signal" object.

Home signal (*segnale di protezione*)

The signal that protects a station, a junction or a level crossing. Bigger stations can have more than one such signal along the entering route (each one acting also as distant of the next).

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[10] Real aspects names have a capital letter, Traindir aspects names are all lowercase, both are quoted.

Exit signal (*segnale di partenza*)

The signal that protects the line and allows a train to leave a station. Bigger stations can have more then one such signal along the exiting route (each one acting also as distant of the next).

Block signal (*segnale di blocco*)

Intermediate signal that protects just a line section. It's usually permissive (P under the heads), completely automatic and concatenated with the next, i.e. each such signal acts also as distant of the next.

Straight route (*corretto tracciato*)

The route in a station/junction that is usually the continuation of the plain/main line and so has no switches in the diverging position. In disabled unmanned stations (e.g. by night) this route is permanently locked in the switches, so the home and exit signals can become permissive (a P is lit under their heads) and clear themselves automatically as soon as possible. Normal signal aspects tell the driver that his train will travel this route. Actually, any route that doesn't require a speed lower than the line speed is "straight".

Diverging route (*tracciato deviato*)

Any route that has at least one switch in the diverging position, thus requiring a speed reduction (to 30, 60 or 100 km/h, depending on the diverging track radius and on the line speed) and specific signal aspects[11].

Normal (signal) aspects (*aspetti normali*)

All clear aspects when the topmost head is not red and no triangle is present under the heads. No speed reduction is specifically enforced (preparing to stop or to reduce speed by the next signal is left to the driver), as the train will follow the straight route (see above).

Diverging (signal) aspects (*aspetti in deviata*)

All clear aspects when the topmost head is red or when a triangle is present under the heads (the rest of the aspect is and means the same as a normal aspect). They indicate that the train will follow a diverging route requiring a speed reduction (to which speed is told by the distant, and eventually "reminded" by the rappel that is mounted under the heads). If no rappel is present and the distant didn't give any speed indication – the next signal being not clear yet – a reduction to 30 km/h is implied. In exit signals from which only diverging routes are possible, a white triangle under the heads tells the enforced speed (30 km/h if empty, 60 km/h if "60" is written in it) and the topmost head at red must be imagined by the driver when the signal is clear, thus saving the installation of a head that would always be red.

Direction indicators (*indicatori di direzione*)

These indicators consist of a set of light dots mounted on a black rectanguar plate under the signal heads. When lit they show a number, telling the driver which route he will travel. It's up to the driver to check that the route is correct for his train and eventually stop the train immediately if the route is wrong (even if the signal is clear). Possible routes are counted from left (1) to right and 0 (simulated) or numbers above 9 (not simulated) are sometimes used for special routes (towards yards, depots, dead ends, etc.).

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[11] In curved or Y switches, both branches can be "straight" or "diverging", depending on the possibility of travelling at line speed or not. For the signal aspects, "diverging" means actually "requiring to slow down to a speed lower than line speed": if the line speed is already lower than or equal to the speed required by the switch geometry for the diverging route, normal aspects are used also for that route, and only the direction indicator will tell the driver the route he'll travel.

Rappel (*rappel*)

A speed reminding indicator placed under the lower head of a main signal that can show diverging aspects, to be considered only when such an aspect is shown: two horizontal white lines mean reduction to 100 km/h, one horizontal white line means reduction to 60 km/h, rappel off means reduction to 30 km/h, no rappel present means reduction to 30 km/h unless the distant indicated another speed.

Other indicators (*altri indicatori*)

These letters or symbols may appear under the signal heads, in the same way as the rappel or direction indicators:

P The signal is now permissive: if red, wait for 3 minutes and then proceed at shunting speed (max 30 km/h) until the next signal is seen. In traindir the red aspect means always "Stop", so it's up to the player shunting the train and opening the signal with ctrl-click to have it passed at red.

A "Advance" (may appear under block and exit signals only): line is clear. If the signal is red a control signal is missing, preventing the signal to clear normally, but the driver can leave the station by sight even if the signal is red. If the "A" is flashing (not simulated) the driver has to check the switch positions and eventually stop and throw them before proceeding. When the signal is red the "A" means the same as the "Move on" indicator, otherwise it's redundant[12]. In traindir the red aspect means always "Stop", so it's up to the player shunting the train and opening the signal with ctrl-click to have it passed at red.

D "Disabled" (may appear under home signals only): the station is disabled and the straight route through the station is locked in the switches and the line is free. If the signal is red a control signal is missing, preventing the signal to clear normally, but the driver can enter the station by sight even if the signal is red. If the "D" is flashing (not simulated) the driver has to check the switch positions and eventually stop and throw them before proceeding. When the signal is red the "D" means the same as the "Move in" indicator, otherwise it's redundant[12]. In traindir the red aspect means always "Stop", so it's up to the player shunting the train and opening the signal with ctrl-click to have it passed at red.

C "Closed" (not simulated). The line or station is closed to normal traffic (which is prohibited) for maintenance, so maintenance vehicles or cars can circulate freely (by sight) and their operators are free to throw switches as needed.

T "Telephone" (not sumulated). The home signal is red because the CTC operator has something to tell the driver, so he should get down the loco and pick up the phone that is always installed nearby the signal. Nowadays all the drivers are given a mobile phone (restricted to the railway mobile network), so the CTC operator can almost always call them as needed in advance, without forcing them to stop at a signal. Exceptions are secondary mountain lines or long tunnels, where no field of the mobile network is present. This "old" procedure is one of the most feared by the drivers, as the almost never used telephone boxes are perfect places for bees and wasps to build their nest.

^ "Route continuation". When a station features more than one exit signal along the exit route, all of them are interlocked to clear together (all or none), but in practice it may be helpful to allow an entering or ready-to-leave train to proceed beyond the first exit signal (up to the next).
If that movement is safe, the CTC operator can manually light up this indicator, and the driver can proceed at shunting speed beyond the first exit signal and stop the train in front of the next.
In Traindir this indicator lights up when the first exit is open at "Shunt" (using ctrl-click) and a fake 'V' station is present along the route to the next signal.

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[12] "A" and "D" are automatic indicators, used to minimize human checking and intervention at night and/or in disabled and unmanned stations, so they are allowed only when the straight through route is locked in the switches; "Move in" and "Move on" indicators are manually lit by an operator, and can be used on any route.

"Move in" / "Move on" indicators (*segnale di avanzamento / segnale di avvio*)

These indicators (two horizontal lights) are placed under the heads of a home signal (white lights) or an exit signal (cyan lights) respectively. These lights are manually lit by the CTC operator when the signal cannot be cleared (for example due to a faulty switch position detector), but the operator has checked that the line is clear, so the signal can be passed at shunting speed even if red. If the lights flash (together), the driver must proceed very slowly, as he/she has to check the switch positions for the expected route[13]. In traindir only the fixed lit aspect is simulated, and it appears when the signal is open with ctrl-click for shunting.

Signal apects (*aspetti dei segnali*) for main and distant signals

R, Y, G = Red, Yellow, Green; the subscript $_x$ means flashing.

Normal	Diverging[14]	Meaning
R	R	"Stop". Call the CTC operator to ask what to do; if it's not possible and the signal is not permissive, just wait until the aspect changes or someone arrives to tell what to do. If permissive, wait for 3 minutes and then proceed by sight (max 30 km/h) until the next signal is seen.
Y	RY	"Prepare to stop". Line is clear at full or diverging speed, but next signal is at "Stop" or at "Prepare to stop within short distance" or at "Prepare to stop by sight".
YY	Not allowed	"Prepare to stop within short distance". Line is clear at low speed (the previous Y or RY made the driver prepare to stop) but next signal is at "Stop" or at "Prepare to stop by sight" and is nearer than 600 m.
RYY[15]	RYY	"Prepare to stop by sight". The line is not clear, as the route goes towards a short or already occupied track (this aspect is used to join trains or to occupy the same station track with two short trains).
YG	RYG	"Prepare to slow". Line is clear at full or diverging speed, but next signal shows a diverging aspect requiring a speed reduction to: - 30 km/h if the Y and G lights are fixed (YG) - 60 km/h if the Y and G lights flash together (Y_xG_x) - 100 km/h if the Y and G lights flash alternately (Y_x/G_x) Please note that the announced speed may be higher than the one enforced by this signal (if diverging), but it's always lower than line speed.
Y_x	RY_x	"Warning". Line is clear at full or diverging speed, but the next signal shows "Prepare to stop" or "Prepare to slow" and it's nearer than 1200 m (standard braking distance) from the next signal.
G	RG	"Clear": line is clear at full or diverging speed. No info is given about the next signal aspect, as the driver can safely wait to see it before taking any action.

[13] If the CTC operator is unsure of a switch position on the panel, but he can be sure by sight that it's correct, he will bypass the control and light up this indicator in the fixed aspect (no bypass ever allows to clear the normal signal). If he is uncertain of the position of a switch he cannot see, he can bypass the control, light up this indicator in the flashing position and have the train driver check the switch position (if wrong, the driver will stop the train and throw the switch points manually).

[14] Diverging (a red on the topmost head, and something on the other heads) means restricted speed from this signal on, as told by the distant and eventually reminded by the rappel; the rest of the aspect is normal. Exit signals with the triangle show the normal aspects, and it's the triangle that indicates the speed reduction, at 30 km/h if empty, at 60 km/h if "60" is written in it ("imagine a red head on top"). The diverging speed must be kept until the last car has passed the last switch, or until the next signal is reached, or until the "beginning of plain line" sign is reached, whichever occurs first.

[15] This is the only "diverging" aspect used also on the straight route, due to rule modifications. In the past the YY and RYY aspects were "regular" and meant "Prepare to stop by sight" (track may end or be occupied, or the next red signal is nearer than 600 m), for the straight or the diverging route respectively, and YG preceded RYY, like any other diverging aspect. Now both YY and RYY are always preceded by a Y or RY (and RYY may be preceded by YY or RYY if it's at less then 600 m from the previous signal, as if it were R).

Dwarf / Shunting signal (*marmotta* or *segnale basso di manovra / segnale alto di manovra*)

Dwarfs are placed at ground level, high shunting signals can be standalone or coupled just below the lower head of a main signal; all of them are meaningful (usually) only for shunting trains. They usually command only short movements (over a couple of switches or so), and don't tell anything about the next signal, as the latter should be already visible. The first of them is usually mounted together with a normal signal (the home or the exit), forming a single signal that can show "Shunt" (red with dwarf or shunting head showing "Clear"). If the normal signal is clear, all shunting signals are to be ignored until the next normal signal, so they can show either "Clear" (typically in bigger stations, to help the driver "see" the route he will travel) or remain at "Stop" and just be ignored. Dwarfs can show a flashing aspect that isn't actually a shunting aspect: this aspect is used to indicate the track a clear exit signal is commanding when that exit signal is common to more than one track.

Shunting aspects (*aspetti dei segnali di manovra*)

– or | resemble the orientation of the 2 over 3 white lights that are lit on the signal;
the subscript $_x$ means flashing.

Aspect	Meaning
–	"Stop". Shunting trains cannot pass the signal until it changes its aspect or someone else tells the driver to do so. A train is shunting if its movement was commanded by a shunting signal or by a shuntman. If the movment was commanded by a normal signal showing a clear aspect, dwarfs and shunting signals must be ignored up to the next normal signal, so they can be passed even when showing "Stop"[16].
|	"Shunting clear" / "Clear": shunting trains (see the definition above) can proceed by sight at max 30 km/h up to the next unclear signal (normal or shunting); other trains may proceed obeying the clear aspect of the previous normal signal.
$\|_x$	"Clear": this is not a shunting aspect and indicates that the clear normal signal that follows is common to more tracks and is now commanding this one. Proceed obeying the clear aspect of that signal.

Shunting limits / Beginning of plain line (*limite delle manovre / inizio della piena linea*)

Normally shunting movements in stations must always be protected by the home signals, so shunting trains moving towards the line should never get nearer than a braking distance (for a train coming from the line) from the home signal. This point is usually marked by a concrete post coloured with white and black horizontal stripes.
When the line features concatenated block signalling, the last automatic signal before the home signal can detect any train that passes the latter towards the line, and protect it by turning immediately red. So if no other trains have already passed this last signal, shunting movements can proceed towards the line until all the shunting train is just beyond the home signal (the last block signal is always further than braking distance for an arriving train). This simplifies shunting, as the next movement (typically back towards the station) can be controlled through the home signal itself, with normal aspects, so just one dwarf per track in the exit direction is the minimum installation required to control all shuntings. In this case the maximum length allowed beyond the home signal towards the line is marked by a special sign (magenta triangle in a white square) that means "beginning of the plain line" (*inizio della piena linea*). Both markers are simulated in Traindir.

Level crossings (*passaggi a livello*)

Level crossings are protected by normal signals when these are near enough: the interlocking just prevents the signal from clearing if the gates aren't closed, and the request to clear the signal triggers the gates closure (the signal then clears when the closed position is detected). Should the closed position detection go off, the signal would turn back to "Stop" immediately and automatically.

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[16] Nowadays normal and shunting signals are independent only in smaller and older stations, while in modern or refitted ones the shunting signals open together with the normal signals to show the driver the path that its train will follow, and there is no need to ignore them anymore.

In some larger crossings a button near the gates can be pushed to obtain this, in case a car is stuck on the tracks when the gates close.
If normal signals are too far, on one or both sides, they will ignore the gates position, and specific signals will be installed to protect the level crossing: a home with a square head and a distant with a triangular head. Both feature a specific light geometry: three horizontal lights for “Caution: gates open” (yellow for the distant, red for the home), and two vertical green lights for “Clear: gates closed”.
When the driver sees a level crossing distant at yellow he must slow down enough to pass the level crossing home (if still at red) at a speed that allows him to stop the train by sight immediatley before each level crossing (their number is on a sign on the signal mast). He can so be seen and heard (using the horn is mandatory) by the cars and only then he can cross the road at human speed (4 km/h). When the loco is beyond the road, the driver can accelerate again.

Rules for script designers to consider in normal signals when placed before special signals

Signal	**Type**	**Aspects**	**Rules for preceding normal signals**
rfi_AT_a	automatic	red, off	Irrelevant, as it’s always the first signal
rfi_AT_i	main	red, on	Irrelevant, as it’s always the first signal
rfi_ind_dir	*distant*	*off, 0-9, a, p, d, v*	*To be ignored: consider the next one*
rfi_LM*	main	red, green	Always seen as a “red”, so it needs to be masked
rfi_marm_a	*distant*	*red, shunt*	*To be ignored: consider the next one*
rfi_marm_m	*distant*	*red, shunt*	*To be ignored: consider the next one*
rfi_marm_i	main	red, shunt, flashing	Already considered (same aspect as a normal)
rfi_sam_a	*distant*	*red, shunt*	*To be ignored: consider the next one*
rfi_sam_m	*distant*	*red, shunt*	*To be ignored: consider the next one*
rfi_sam_i	main	red, shunt	Already considered (same aspect as a normal)
rfi_OB_auto	automatic	red, green	Already considered (same aspect as a normal)
rfi_OB_a_small	automatic	red, green	Already considered (same aspect as a normal)
rfi_OB_bi	*distant*	*red, green*	*To be intercepted as special case: a red distant*
rfi_OB_b_small	*distant*	*red, green*	*To be intercepted as special case: a red distant*
rfi_DB_avv	*distant*	*red, white, anti_red, anti_white*	*To be intercepted as special case: a red distant*
rfi_DB_s	main	red, white	Irrelevant, as it’s linked to an isolated track
tln_DB_s	main	red, on	Irrelevant, as it’s linked to an isolated track
rfi_PL_i	main	red, closed	Should be always preceded by specific distants
rfi_PL_a	*distant*	*clear, closed*	*Should be always preceded by specific distants*
rfi_prot_PL_s	main	red, closed	Always seen as a “red”, so it needs to be masked
rfi_prot_PL_b	*distant*	*clear, closed*	*To be ignored: consider the next one*
rfi_prot_PL_i	main	red, closed	Should be always preceded by specific distants
rfi_prot_PL_a	*distant*	*clear, closed*	*Should be always preceded by specific distants*
rfi_avv_PL	*distant*	*yellow_flashing, green*	*To be intercepted as a normal distant*
rfi_avv_PL_i	*distant*	*yellow_yellow, yellow, green*	*To be intercepted as a normal distant*
rfi_tronc	main	red	Already considered (same aspect as a normal)
rfi_TD	main	red, on	Irrelevant, as it’s linked to an isolated track
rfi_avv_part	*distant*	*red*	*To be intercepted as a special case: a red distant*
rfi_avv_tronc	*distant*	*short*	*To be intercepted as a special case.*
rfi_avv_dev	*distant*	*thrown, yellow_thrown, flashing_thrown, green_thrown, short_thrown*	*To be intercepted as a special case.*
rfi_ind_part	*distant*	*red, on*	*To be ignored: consider the next one*
rfi_leopolder	*distant*	*red, sound*	*To be ignored: consider the next one*