SCRIPTS AND ICONS FOR THE GERMAN (DB) SIGNALS – VERSION 2.0

1 Foreword

1.1 Updates from the previous version

The DB 1.1 signal pack has been updated:

- with added the Ks system signals
- with the creation of new signals of the Hp system
  - DB_Zs13.tds, short or busy track warning
  - DB_Sh2.tds, bumper warning
- with the modification of the form signals DB_F_esig.tds and DB_F_esig_V.tds for the Hp system

1.2 Signaling systems in Germany

At present in Germany 5 different signaling systems are used.

- **Hp**: it is used in the ex federal Germany: it can use light signals or, on local lines and old freight yard, semaphores. Light signals and semaphores don't give any information about speed but only the entry turnout speed (typically 40 km/h).
- **Hl**: it is used in the ex democratic Germany and it gives information about speed.
- **Ks**: it's a new system used after the reunification and it mixes Hp and Hl systems. It is used in the new plants.
- **Sk**: for the first time on the line Ausburg – Donauwörth and there still used.
- **Sv**: since 1928 it is used in the Berlin and Hamburg urban rails

This zip file contains icons and scripts needed to simulate German (DB – *Deustche Bahn*) signals in Traindir 3[1], but **only those related with Hp** and **Ks system** which are the most important one. Some signals, of smaller relevance, are omitted.
There are both light signals and semaphores.
They work since version 3.9q of the program, but using the latest version is always recommended.

There are also two scenarios illustrating the use of the two systems, Hp and Ks:

- kleinstadt-Hp.tds: it uses the signals of the Hp system
- kleinstadt-Ks.tds: it illustrates the Hp and Ks systems together to show the connections between the two systems.

This second scenario contains itinerary buttons with scripts that allow the creation and the release of the itineraries, if not committed.

1.3 Note on the Ks system

The Ks system (Kombinationssignal, combination signal) was designed to ultimately replace the West German Hp system and the east German Hl System with a single new one, in connection with the installations of new electronic interlockings.
The Ks signals like the Hl signals combine the function of distant and main signals in one single head, that is they indicate the speed after this signal, as well as the speed the next signal will induce.
On top there may be a speed indicator (Zs 3) showing the maximum speed after this signal (in the points zone). Below there may be a speed announcing indicator (Zs 3v) for the maximum speed the next signal will impose.
Generally speaking, the green light is flashing whenever the speed announcing indicator Zs 3v (the lower sign with the amber number) is lit. Also note that the speed is the displayed number multiplied by 10 km/h.

1.4 Sources

These are the most important sources I have referred to.
http://www.bahnstatistik.de/Signale/SB-DBAG.pdf
http://www.sh1.org/eisenbahn/index.htm
http://mysite.du.edu/~jcalvert/railway/germaust.htm

[1] *A software by Giampiero Caprino.*

http://www.tf-ausbildung.de/home.htm
http://stellwerke.de/signal/deutsch/index.html
http://www.hurrug.de/bahn/bahnindex.html
http://www.joernpachl.de/glossar.htm

1.5 Acknowledgments

I want to express my appreciation to Giampiero Caprino whose skills and perseverance allow the implementation of TD package; to Paolo Rosati for his Rfi, Sncf and Ffs signal packages, unlimited source of ideas. And eventually to Paengel_Anton for his help in testing the package into his DB scenarios.

2 Installation

Create a new folder, i.e. C:\Program Files\Traindir3\Signals\BB. Open the .zip file, select all the files and extract them in that folder and set it as the "Path to signal scripts" in the "Environment" tab of the Edit | Preferences command.

3 Summary of the available color light signals

- Distant (Vorsignale) and main entry signals (Einfahrttsignale) in stations or interlocking areas, with or without shunting indications
- Main exit signals (Ausfahrttsignale) for stations or interlocking areas, with shunting and opposite track indications
- Intermediate block signals (Zentralblocksignale) with or not distant signal
- Permissive block signals (Selbblocksignale) with or not distant signal
- Other signals: dwarfs and high shunting signals, shunting limits, dead ends, opposite track and speed indications

3.1 Aspects

3.1.1 Main signals (Hauptsignale, Hp)

Hp1	green	clear
Hp2	Green yellow	Clear with 40km/h if not indicated otherwise
Hp0	Red or double red	stop

3.1.2 Distant signals (Vorsignale, Vr)

Hp1	Green	Clear
Hp2	Green yellow	Clear with 40km/h if not indicated otherwise
Hp0	Red or double red	stop
Vr1	Double green	Expect clear
Vr2	Green yellow	Expect clear with 40 km/h
Vr0	Yellow yellow	Expect stop
Vrb	off	Distant signal is off if its main one, on the same mast, is red

3.1.3 Dwarf main signals (Niedrigessignal)

Hp0	Red or double red	stop
Sh	Red + 2 white lights (down left, up right)	Shunt
Zs1	Red + 3 white lights at the vertexes of an A	May pass this signal and continue with previous indications
Zs1	off	Clear shunting signal and continue with previous indications
Zs8	Double red + 3 white flashing lights at the vertexes of an A	Exit or continuation signal for opposite track

3.2 Description of the scripts

DB_Hp_esig.tds	Entry main signal (Einfahrtsignal) for stations or interlocking areas where shunting operations are not permitted. It is always combined with distant signal. Speed on diverted route is 40km/h if not indicated otherwise. Aspects: HpxVry with x and y from 0 to 2. Mast: white-red-white.
DB_Hp_esig_S.tds	Entry main signal (Einfahrtsignal) for stations or interlocking areas where shunting operations are permitted. It is always combined with distant signal. Speed on diverted route is 40km/h if not indicated otherwise. Aspects: HpxVry with x and y from 0 to 2. Hp0Sh1Vrb, clear for shunting with Hp red, Sh1 [shunting] switched on, Vr off. Mast: white-red-white.
DB_Hp_asig.tds	Exit main signal (Ausfahrtsignale) from stations with shunting. Normally it isn't combined with a distant signal. Aspects: HpxVry with x and y from 0 to 2 Hp0Sh1, shunting permitted Mast: white-red-white.
DB_Hp_asig_Zs8.tds	Exit main signal (Ausfahrtsignale) from stations with shunting and substitution signal Zs8 for opposite track. aspects: HpxZs8d with x from 0 to 2 and Zs8 switched off Hp0Zs1 red and Zs8 switched on Hp0Zs8Sh1 shunting Mast: white-red-white. You must put a fake station named "gg" at the beginning of the opposite track.
DB_Hp_Zsig.tds	Intermediate interlocking signal (Zwischensignal) placed between an entry and an exit signals. It has shape and aspects like an entry signal, but if after there isn't an exit signal (a branch line) and if the distance from the next block signal is more than 2000 m, it operates like an exit signal. Aspects: HpxVry with x and y from 0 to 2 Hp0Sh1, shunting permitted Mast: white-red-white.
DB_Hp_Bz_HpVr.tds	Main intermediate signal (Zentralblocksignal) with distance signal. Its aspect is always red and it must be placed with "intermediate" option in the editor. Aspects: HpxVry with x = 0, 1 and y = 0, 1, 2, b Mast: white-red-white.
DB_Hp_Bz.tds	Main intermediate signal (Zentralblocksignal) without distance signal. Its aspect is always red and it must be placed with "intermediate" option in the editor. A distant signal must precede it. Aspects: Hpx with x = 0, 1, 2. Mast: white-red-white.
DB_Hp_Bs.tds	Permissive signal (Selbblocksignal) without distance signal. Usually these signals turn automatically back to the clearest 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. A distant signal must precede it. Aspects: Hpx with x = 0, 1, 2. Mast: white-yellow-white-yellow-white.
DB_vor.tds	Pure distant signal (Vorsignal). If the distance to the next main signal is less than 1000 m, there is a white light (reduced distance). Aspects: Vrx with x= 0 , 1, Aspects with K as suffix are for a reduced distance signal (white light). On the mast there is a white iron plate with a black S. Andrew cross
DB_vorw.tds	Distant repeater signal (Wiederholenvorsignal). It repeats the aspects of pure distant signal if the distance between pure distant and main signals is less than 1000 m. On the mast there is no plate.

3.2.1 Dwarfs and shunting signals.

These signals are the same in Hp, Kl, and Ks systems. So the file mane hasn't Hp indication.

DB_N_esig.tds	Dwarf (Niedrigessignal) entry main signal (Einfahrtsignal) with a subsidiary signal (Zusatzsignal) Zs1 (Ersatzsignal). Usually it is used in the interlocking areas. If Zs1 is turned on (Red + 3 white lights at the vertexes of an A), the engineer must overlook this signal and proceed according to the previous indications. The previous signal has aspects according to the next main signal. Aspects: Hp0Zs1x con x = d (Zs1 turned off, red), l (Zs1 turned on, clear)
DB_N_asig.tds	Dwarf (Niedrigessignal) exit signal (Ausfahrtsignal) with a subsidiary signal (Zusatzsignal) Zs1 (Ersatzsignal), Zs8 (Gegengleisfahrtt) counter line signal, Sh1 shunting permitted. Usually it is used in the interlocking areas. Aspects: Hp00 red, unclear Zs1 exit to normal track (overlook this signal) Zs8 exit to counter track To turn on Zs8, must be placed a fake station named "gg" at the beginning of the opposite track.
DB_N_gg_esig.tds	Dwarf (Niedrigessignal) main or block signal (Ausfahrtsignal) with a subsidiary signal (Zusatzsignal) Zs1 (Ersatzsignal), Zs8 (Gegengleisfahrt) counter line signal (it isn't necessary to place a fake station "gg") Aspects: Hp0Zs1d red Hp0Zs1l back to normal track Hp0Zs8l proceed along counter track
DB_gsp.tds	Dwarf (Niedrigessignal) shunting signal (Gleissperrsignal) Aspects: Gps0 – red Sh1 shunting permitted Sh1d clear
DB_sh.tds	Just like DB_GSP.tds, but with different shape Aspects: Sh0 via red Sh1 shunting permitted

3.2.2 Other signals

DB_rht.tds	This simulates the limit of shunting movements (Rangierhalttafel). It can be automatically cleared by trains (if not in shunting maneuvers) using intermediate option.
DB_Zp9.tds	Departure signal. It's a distant signal placed before an exit signal. Aspects: Zp90 red Zp91 clear
DB_Zp9_z-y.tds	Main departure signal. It can be cleared only if the next exit signal is cleared. If the next exit signal becomes unclear, the present signal becomes automatically unclear. The present script takes into consideration the existence, between the stop point and the exit signal, of any dwarf signal; because of this, the script must be customized by inserting the coordinates of present signal. The modified script must be distributed with the scenario. Aspects: Zp90 red Zp91 clear Shunt
DB_Zs6.tds	Distant signal for counter track. A fake station "gg" must be placed at the beginning of the opposite track. Aspects: dnk turned off Gle turned on
DB_Zs13.tds	Short or busy track warning
DB_gaz.tds	Speed indicator. It is mounted to a main signal. It is a distant signal. It must be placed before the main signal. Aspects: gaz4 speed 40 km/h gaz6 speed 60km/h dnk turned off

DB_gas.tds	Dead end. It should be linked to the last track element of an exit point to block the trains, which would otherwise exit the scenario. It is always red and previous signals will show the correct aspect.
DB_Sh1.tds	Usually used at dead-end tracks if this track is a direct entry line or entered by regular train movements (e.g. at a terminal station) to block the trains, that would otherwise exit the scenario. It should be linked to the last track element of an exit point. It is always red and previous signals will show the correct aspect.
DB_Sh2.tds	Usually used at dead-end tracks if this track is a direct entry line or entered by regular train movements (e.g. at a terminal station) to block the trains, that would otherwise exit the scenario. It should be linked to the last track element of an exit point. It is always red and previous signals will show the correct aspect.

4 Summary of the available Ks system signals

- Main and distant signals for stations or interlocking areas showing shunting, short or busy tracks.
- Exit main signal (Ausfahrtsignale) from stations or interlocking areas.
- Main intermediate signal (Zentralblocksignal) without distance signal.
- Permissive signal (Selbblocksignal) without distance aspects
- Speed prescription warning signals

4.1 Description of the scripts

4.1.1 Main and permissive signal

DB_ks_Ms.tds	Entry main signal (Mehrabschnittsignal - combination signal) to protect stations and interlocking areas. If it is an entry signal, it is always preceded by a distant signal or a block signal Kz_sBs. Aspects: normal ones (red, Hp1, Hp2, Hp1b, shunt), short track (red_Zs7), reduced distance between signals (Hp2vk, Hp1bvh) Mast: white-red-white.
DB_ks_Hp.tds	Exit main signal from stations or interlocking areas, shunting allowed. It has no warning signal: the next signal must be preceded by a warning signal. It can be automatic and intermediate. It must be preceded by a distant signal or a ks_Ms signal. Aspects: red, Hp1, shunt, red_Zs7 (short or busy track)
DB_ks_Bs.tds	Simple automatic block signal with only two aspects, red and clear. It may be automatic or intermediate. It must be preceded and followed by a signal showing warning aspect (yellow) Aspects: red, clear (Hp1)
Db_ks_sBs.tds	Simple automatic block signal with three aspects, red, clear and warning aspect (yellow). It can be automatic and intermediate. Aspects: red, Hp1, Hp2, Hp2v (stop warning with reduced distance between signals), H1b (clear with speed reduction warning at the next signal)

4.1.2 Distant signals

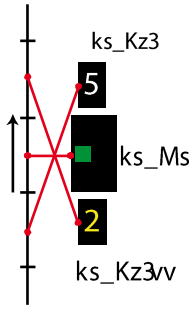
DB_ks_vor.tds	Pure distant signal (Vorsignal). If the distance to the next main signal is less than 1000 m, there is a white light (reduced distance). Aspects: : Vr1, Vr2, Vr2vk (reduced distance). Aspects with vk as suffix are for a reduced distance signal (white light).
DB_ks_vorkz.tds	Warning signal with aspects that warn a speed reduction to the next signal To be used together with DB_ks_Kz3v.tds Aspects: Vr1, Vr2, Vr2vk (reduced distance), Vr1b (clear with speed reduction warning to the next signal), Vr1bvk (clear with speed reduction warning to the next signal placed at a reduced distance)

DB_ks_vorw.tds	Distant repeater signal (Wiederholenvorsignal). It repeats the aspects of pure distant signal. To be used together with DB_ks_Kz3vv.tds Aspects: Vr1, Vr2, Vr1b (clear with speed reduction warning to the next signal).

4.1.3 Speed indicator and announcing ones

DB_ks_Kz3.tds	Prescription indicator of maximum speed after this signal from 20 to 130 km/h; the speed is the displayed number multiplied by 10 km/h. To be use with signals DB_ks_Ms.tds, DB_ks_Bs.tds, DB_ks_sBs.tds, DB_ks_Hp.tds. It must be linked before the signal and placed after it. Aspects: Kz3b (red), Kz3_02÷Kz3_13 (white numbers)
DB_ks_Kz3v.tds	Prescription announcement of maximum speed starting from the next signal; the speed is the displayed number multiplied by 10 km/h. To be used with signal DB_Ks_vorkz.tds It must be linked after the signal and placed before it. Aspects: Kz3vb (red), Kz3v_02÷Kz3v_13 (amber numbers)
DB_ks_Kz3vv.tds	Prescription announcement of maximum speed starting from the next signal; the speed is the displayed number multiplied by 10 km/h. To be used with signal DB_Ks_Ms.tds, DB_Ks_Bs.tds, DB_Ks_sBs.tds It must be linked after the signal and placed before it. Aspects: Kz3vb (red), Kz3v_02÷Kz3v_13 (amber numbers)

The positioning of the maximum speed and speed reduction warning indicators must be accurate according, in general, to the following scheme:



- the visual indicator (Kz3) with the white numbers that indicates the maximum speed after the signal to which it is connected, must be linked before the signal but placed after, that is in reality, above the signal.
- the visual indicator (Kz3v or Kz3vv) with the amber numbers which announces a reduction in speed to the signal following the one to which it is connected, must be linked after the signal but placed before, that is in reality, under the signal.

The figure illustrates the scheme for the group ks_Ms. After this signal the maximum speed is 50 km/h and a maximum speed of 20 km/h is announced at the next signal.

5 Summary of the available semaphores signals

5.1 Description of the scripts

DB_F_esig.tds	Entry main signal (Einfahrtsignal) with two arms (Formsignal). The upper arm is a main signal, the lower signal is a braking signal. Speed on diverted route is 40km/h. Aspects: Hp0 red Hp1 clear and expect clear Hp2 clear and expect braking Mast: white-red-white.
DB_F_esig_V.tds	Entry main signal (Einfahrtsignal) with two arms (Formsignal). The upper arm is a main signal, the lower signal is a braking signal. Speed on diverted route is 40km/h. Aspects: Hp0 red Hp1Vr0 clear, expect red Hp1Vr1 clear, expect clear Hp1Vr2 clear, expect braking Hp2Vr0 braking, expect red Hp2Vr1 braking, expect clear Hp2Vr2 braking, expect braking Mast: white-red-white.

DB_F_asig.tds	Exit main signal (Ausfahrtsignale) from stations with tow arms and shunting. Normally it isn't combined with a distant signal. Aspects: HpxVry with x and y from 0 to 2 Hp0Sh1, shunting permitted Mast: white-red-white.
DB_F1_Hp.tds	Exit or block signal. Only one arm. A distant signal must precede it at a distance greater than 1000 m. It can be an *intermediate* signal. Aspects: red Hp1 clear Mast: white-red-white.
DB_F_vor.tds	Pure distant signal which usually precedes DB_F_esig.tds Aspects: red expect red Vr1 expect clear and advanced warning for clear Vr2 expect braking
DB_F1_vor.tds	Pure distant signal which usually precedes DB_F1_Hp.tds. Aspects: Vr0 expect red Vr1 expect clear.