



SWARCO TRAFFIC HUNGARIA KFT.

PASTROS

USER MANUAL (201708)

SWARCO | First in Traffic Solutions.

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The Pastros software

Congratulations on your recent purchase of SJT sign SJT-02, or SJT-02V (Further mentioned as SJT sign). As you may already know, our SJT signs are innovatively designed with a unique configuration of LEDs (light emitting diodes) that allows for maximum brightness at low energy consumption.

Below, please find a guide to programming, monitoring and using your SJT sign with the PASTROS user software to slow down traffic on your streets.

This parameterisation and statistic reporting software (PASTROS) is designed to manage your signboard in the most convenient way. It allows you to set up and parameterise your SJT sign and save, visualize and export collected traffic data.

Not all functions are supported by all firmware versions.

1 Connecting to an SJT sign

To use the above mentioned functions, connect a laptop or a PC to your SJT sign via Bluetooth.

1.1 Setting up a Bluetooth device

A Bluetooth device has to be connected to your PC or just switched on in case of a built-in device. The computer and the SJT sign have to be paired. The default name of the SJT sign is **WT-12** or **WT-11** and the default password is **12345678**. The name and the password can be changed any time with PASTROS. (See later)

1.2 Starting PASTROS

After establishing the Bluetooth serial port connection, start PASTROS. During the start-up process, the software will attempt to locate the SJT sign. This could take several seconds. After the connection is successfully established, an **OK** message is shown in the status bar.

If the connection cannot be established, go to the **Signboard** menu and choose **Search signboard...** PASTROS will attempt to locate the sign again. If this attempt is also unsuccessful, check your Bluetooth connection.

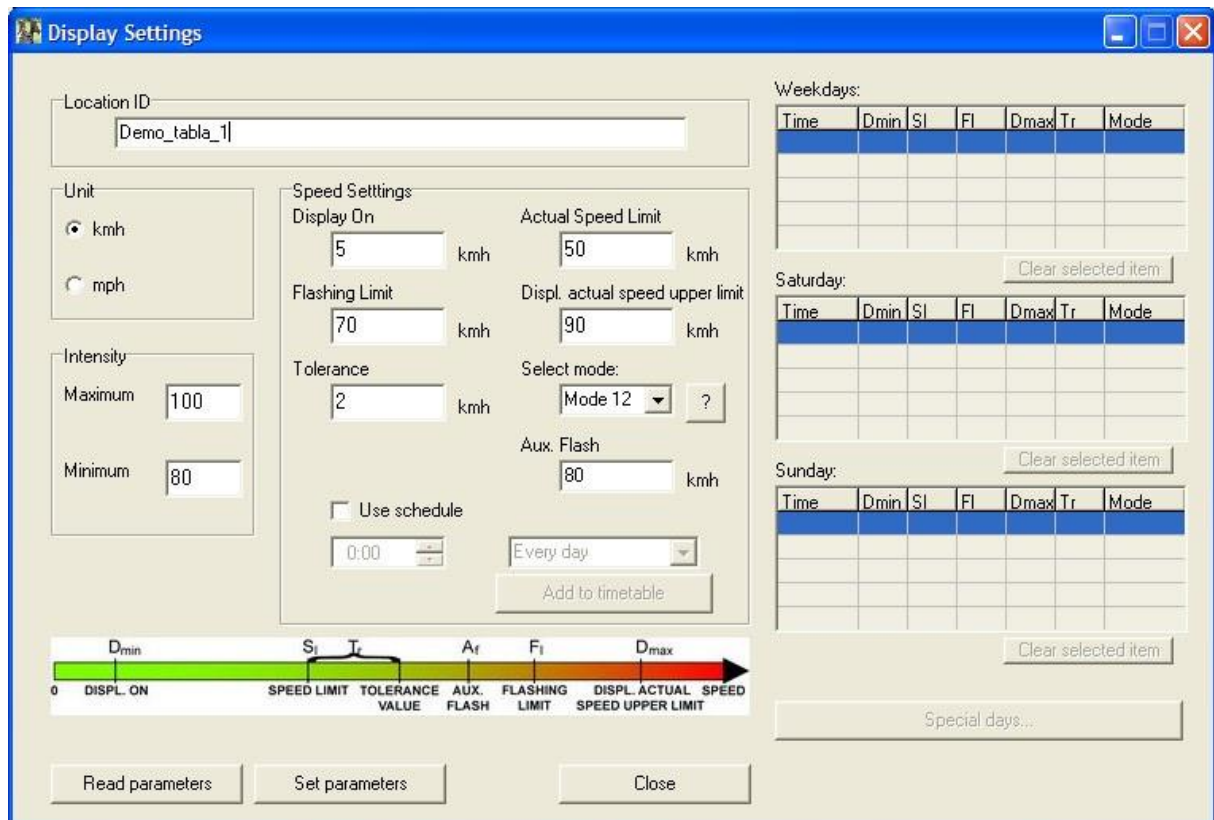
If you know the COM port the Bluetooth connection is using (see Windows Bluetooth devices menu) you can set the serial port in PASTROS manually. Use the **Select serial port...** option of the **Signboard** menu.

2 Sign Settings

The following parameters can be adjusted here: display parameters and operation modes, measuring and data recording parameters, Bluetooth name and password, and the device clock.

2.1 Display settings

Set how your SJT sign should react to an approaching vehicle.



Display Settings

Location ID:

Unit: ☒ kmh ☐ mph

Intensity: Maximum Minimum

Speed Settings:

Display On: kmh Actual Speed Limit: kmh

Flashing Limit: kmh Displ. actual speed upper limit: kmh

Tolerance: kmh Select mode: ?

Aux. Flash: kmh

☐ Use schedule Every day

Weekdays:

Time	Dmin	Sl	Fl	Dmax	Tr	Mode

Clear selected item

Saturday:

Time	Dmin	Sl	Fl	Dmax	Tr	Mode

Clear selected item

Sunday:

Time	Dmin	Sl	Fl	Dmax	Tr	Mode

Clear selected item

Special days...

Read parameters Set parameters Close

Legend: 0 DISPL. ON Dmin Sl Tr Ar Fl Dmax DISPL. ACTUAL SPEED SPEED UPPER LIMIT

Display settings Parameters

Location ID

The name of the sign.

Maximum 30 characters. For example, the location and ID of the device can be used here.

Note: Do not use special characters not allowed in filenames. (\:*?<>, etc.)

Starting this field with a space character enables **demo mode**. In demo mode, random speed values are generated as if they would be measured by the radar. This mode is useful for device testing. Actual data from the radar is not displayed or recorded. To turn demo mode off, set a Location ID that does not start with a space character.

Unit

The unit of speed limit parameters (mph or km/h).

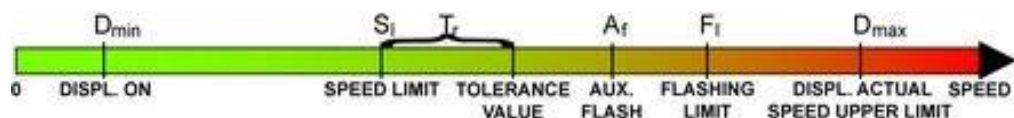
Intensity

The maximum and minimum intensity values of the LEDs in percent.

The maximum value is 100, the minimum value is 0. Automatic dimming works within these limits.

Speed settings

The following speed values must be set:



Remark: There is a minimum speed, below which the radar does not sense vehicles.

Display On (D_{min}) The sign does display a vehicle's speed below this value.

Speed Limit (S_l) The actual speed limit at the sign's location.

Tolerance value (T_r) Increases the speed limit with this value. Set it to a 'still acceptable speeding' value.

Flashing Limit (F_l) Above this speed value the displayed text flashes.

Display actual speed upper limit (D_{max}) To prevent racing, the sign does not display a vehicle's speed over this limit.

Aux. Flash Above this speed value, the auxiliary flashers are activated (aux. flashers are optional accessories, e.g. amber lights or beacons).

Select mode Click on the ? button, and you get a list with a wide variety of predefined operating modes. This chart refers to the above mentioned limit values, showing what is displayed by the device in the different modes based on the user defined limit values and on the speed of the approaching vehicle. The first line of the description text is the displayed **text** (SJT-02V models only), the second line is the displayed **speed value**.

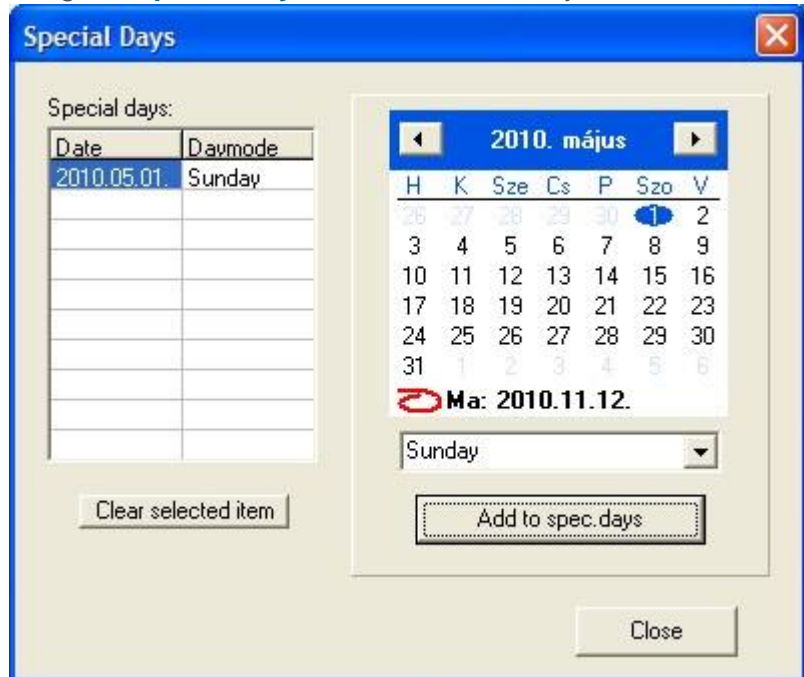
Select display mode					
	Display without flashing			Flashing display	
	0 to Dmin	Dmin to (S _l +T _r)	(S _l +T _r) to F _l	F _l to Dmax	over Dmax
Mode 0	Blank Blank	Blank Blank	Blank Blank	Blank Blank	Blank Blank
Mode 1	Blank Blank	Speed Limit [Speed Limit]	Your Speed [Vehicle Speed]	Blank Blank	Blank Blank
Mode 2	Speed Limit [Speed Limit]	Speed Limit [Speed Limit]	Your Speed [Vehicle Speed]	Slow Down [Speed Limit]	Slow Down [Speed Limit]
Mode 3	Blank Blank	Speed Limit [Speed Limit]	Slow Down [Vehicle Speed]	Slow Down [Speed Limit]	Slow Down [Speed Limit]
Mode 4	Blank Blank	Blank Blank	Slow Down [Vehicle Speed]	Slow Down [Speed Limit]	Slow Down [Speed Limit]
Mode 5	Blank Blank	Blank Blank	Your Speed [Vehicle Speed]	Slow Down [Speed Limit]	Slow Down [Speed Limit]
Mode 6	Blank Blank	Blank Blank	Speed Limit [Speed Limit]	Slow Down [Speed Limit]	Slow Down [Speed Limit]
Mode 7	Blank Blank	Blank Blank	Slow Down [Vehicle Speed]	Slow Down [Vehicle Speed]	Slow Down [Speed Limit]
Mode 8	Blank Blank	Blank Blank	Your Speed [Vehicle Speed]	Your Speed [Vehicle Speed]	Your Speed [Speed Limit]
Mode 9	Blank Blank	Blank Blank	Your Speed [Vehicle Speed]	Slow Down Blank	Slow Down Blank
Mode 10	Blank Blank	Blank Blank	Speed Limit [Speed Limit]	Slow Down Blank	Slow Down Blank
Mode 11	Blank Blank	Blank Blank	Speed Limit [Speed Limit]	Your Speed [Vehicle Speed]	Slow Down Blank
Mode 12	Blank Blank	Your Speed [Vehicle Speed]	Slow Down [Vehicle Speed]	Slow Down [Vehicle Speed]	Speed Limit [Speed Limit]
Mode 13	Blank Blank	Your Speed [Vehicle Speed]	Slow Down [Vehicle Speed]	Slow Down [Speed Limit]	Blank Blank
Mode 14	Blank Blank	Your Speed [Vehicle Speed]	Slow Down [Vehicle Speed]	Slow Down [Speed Limit]	Slow Down [Speed Limit]
Mode 15	Blank Blank	Your Speed [Vehicle Speed]	Slow Down [Vehicle Speed]	Slow Down [Vehicle Speed]	Slow Down Blank

Mode selection

Use Schedule

Use time schedule. Set different speed limits for different parts of the day or week. Five different speed limits can be set for each day type (workdays, Saturdays and Sundays). Using a schedule, your SJT sign can be adapted to alternating speed limit requirements as well (school time regulated zones, night time speed reductions, etc.).

Using the **Special days** button, local holidays can be set.



Special Days

Special days:

Date	Daymode
2010.05.01.	Sunday

Clear selected item

2010. május

H	K	Sze	Cs	P	Szo	V
26	27	28	29	30	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31	1	2	3	4	5	6

Ma: 2010.11.12.

Sunday

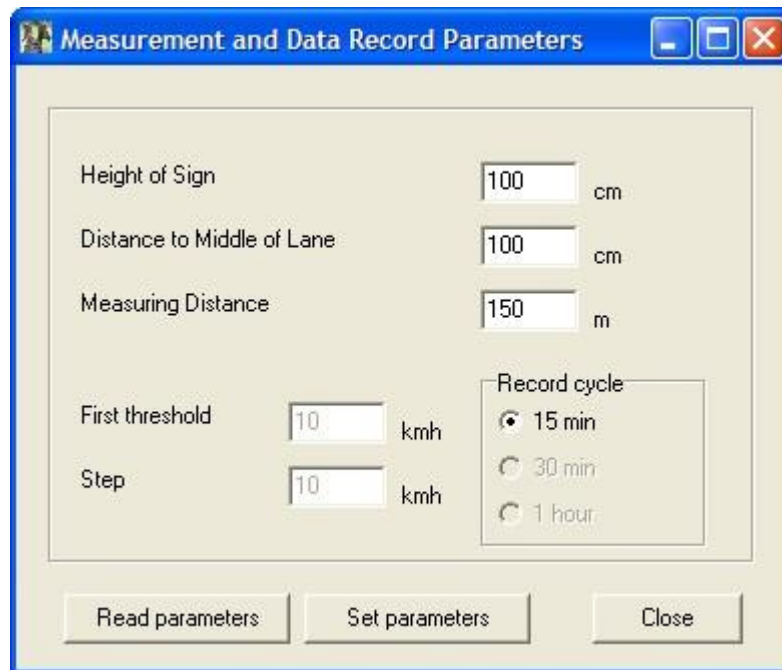
Add to spec.days

Close

Remark: Automatic daylight savings time adjustment is firmware dependent. See the **Read device ID** menu for more information.

2.2 Measurement and data record parameters

These settings are important for the accuracy of speed measurement.



Measurement and data record parameters

The first three lines define the exact physical location of the radar unit. Since the radar makes use of the Doppler Effect, to keep the measured speed values accurate, the speed values need continuous correction depending on the position of the radar. (The radar unit is placed behind the hole near the bottom of the numeric letter at the road side of the display)

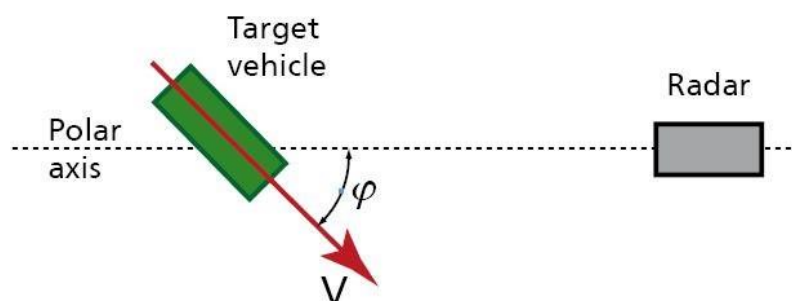
The Doppler shift frequency is the difference between the fundamental transmitted frequency and the received frequency. This is denoted by 'F' and is calculated by:

$$F = \frac{2 * V * F_0}{c} * \cos(\phi)$$

Doppler formula

V = Velocity of the target (m/s)

F0 = Fundamental Frequency (Hz) c = Speed of Light (3*10⁸ m/s) ϕ = Angle subtended between the radar polar axis and the direction of travel of the target.



Comment

There is no Doppler frequency shift signal received by the radar from the target when the target is stationary or if $\phi = 90^\circ$.

The following values must be set:

Height of the sign

The vertical distance of the radar from the surface of the road.

Distance to the middle of the lane

The horizontal distance of the radar from the middle of the observed lane(s).

Measuring distance

The horizontal distance of the radar from the position of the approaching vehicle in the moment of first detection. The SJT sign collects data records for the user. Data records contain the number of passed vehicles classified into 20 speed bins. Furthermore it contains the min, max, average, 85th percentile speeds and the actual speed limit of the time interval.

Record cycle

The time interval of the data records is 15 minutes. If your traffic demand does not exceed 65 535 vehicles per interval (which is almost impossible on one lane), you can expect a recording capacity of 15 days. After 15 days, the oldest data is overwritten.

First threshold

Speed value of the first speed bin. 10 km/h or 5 mph depending on the unit set.

Step

Speed step between the next 19 bins. 10 km/h or 5 mph depending on the unit set.

To transfer the settings to the sign, use the **Set parameters** button.

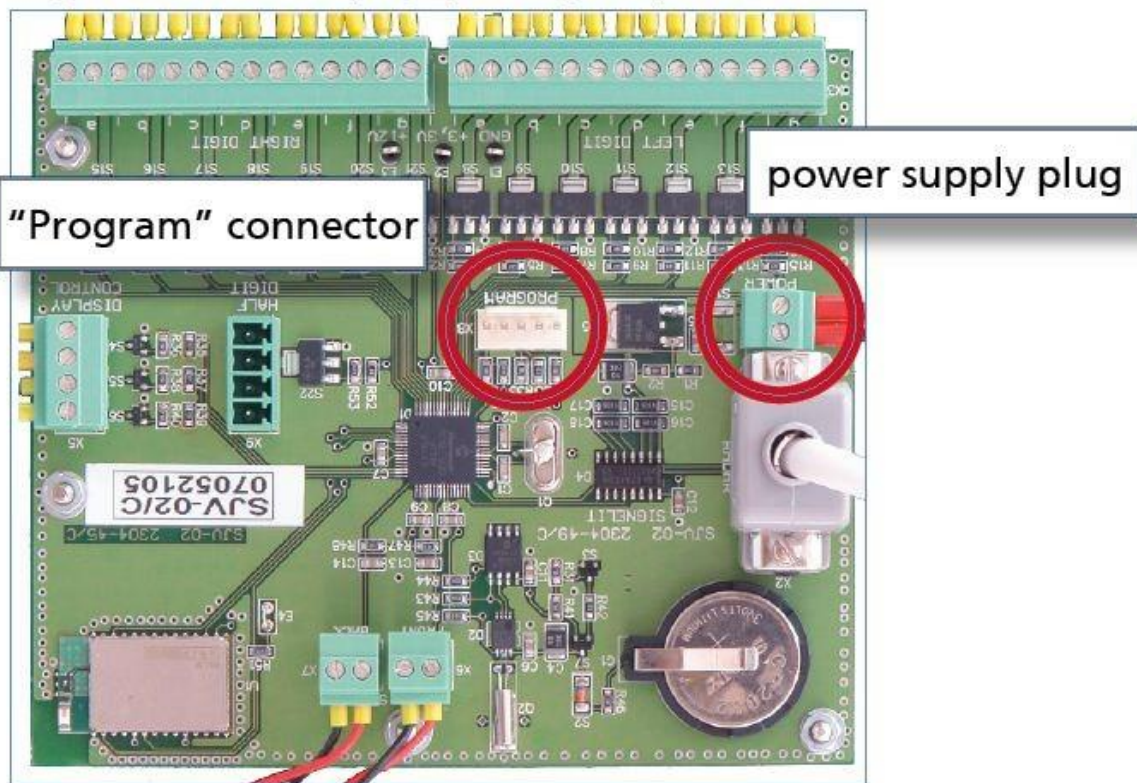
2.3 Bluetooth Settings

Bluetooth settings

In this submenu, Bluetooth parameters such as the SJT sign's Bluetooth name and the pairing password can be changed. These are required to set up a Bluetooth connection in Windows.

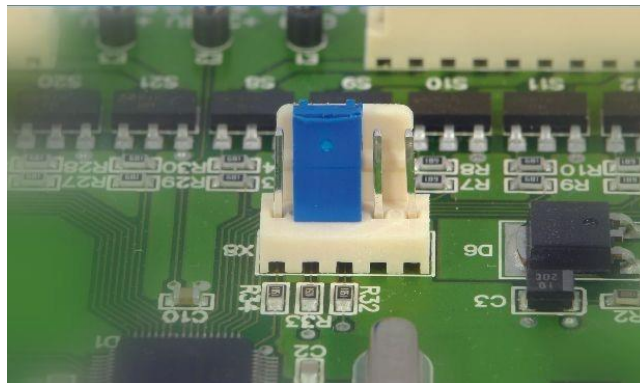
For safety reasons, you should change these parameters according to the security policy of your organization.

If you had forgotten the Bluetooth password, you can reset the factory settings. Open the sign and disconnect the power supply plug on the controller board, then find the Program connector (X8). (See below)



The SJV electronic board

Short the 2nd and 3rd pins of the Program connector (X8) with a jumper. (See below)



Jumper on the Program connector

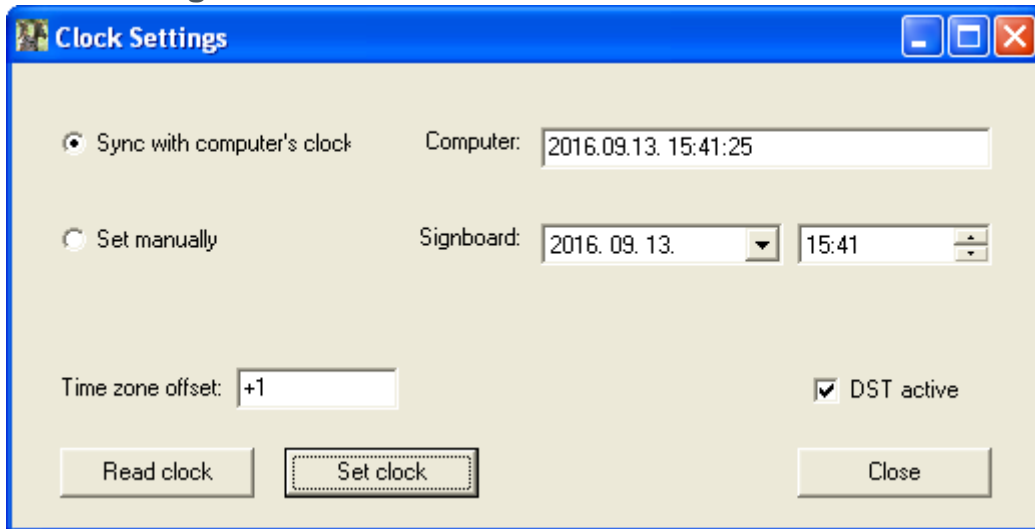
Reconnect the power supply plug and wait several seconds. Remove the power supply plug again, take off the jumper. Reconnect the power supply plug and close the sign door.

The Bluetooth name and password is now reset to factory settings.

Name: BT-12 or BT-11

Password: 12345678

2.4 Clock settings



The date and time can be adjusted in this submenu.

The first line shows the PC's clock, the second line is the actual time read out from the device. You can sync the clock of the device to the PC's, or set the time manually.

The third line are the speed sign's time zone settings. These settings complement the **Automatic DST Change** setting of the SJV firmware (third parameter character of the firmware file name).

Time zone offset

The difference (offset) in hours to UTC. Currently, only integer values are accepted (-12..12).

DST active

If DST (Daylight Saving Time) is in effect for the specified date, set it to active, if not, leave unchecked. If this setting is not correct, timestamps can be off by one hour.

2.5 Auto time sync

PASTROS automatically syncs the device's clock to the PC's when it successfully connects to a display device.

2.6 Auto port search

PASTROS can automatically search for a speed sign on all available Bluetooth serial ports. When disabled, PASTROS uses the last port on which it has found a speed sign. If you usually use a fixed port, disable this option after PASTROS finds your sign, so next time you start PASTROS, the same Bluetooth port is used.

If no sign is found on the last used port, PASTROS will search for a speed sign on all available ports.

2.7 Modem settings

If your sign is equipped with a GPRS modem card, it can be connected to a remote administration or data collection system. The modem and connection parameters are set here.

APN

APN for an internet connection (ask your mobile provider for the correct setting)

Username

Username for an internet connection (optional, ask your mobile provider for the correct setting)

Password

Password for an internet connection (optional, ask your mobile provider for the correct setting)

IP address or host

Address of the DFS Remote server (default: dfsremote.com)

Port number

Port number of the DFS Remote server (default: 7856)

PIN

If the SIM is set to ask for a PIN, enter it here. Please note, that if you enter an incorrect PIN, the modem only validates it once to avoid blocking the SIM. To revalidate, enter a different PIN.

Status

GPRS modem card status. If the modem card indicates an error, check the connection parameters.

Modem firmware

GPRS modem card firmware version.

Network Time Sync

Enable or disable network time synchronization. Important to keep the internal clock of the speed sign accurate.

Uses `time.nist.gov` on TCP port 13 (daytime protocol) for time synchronisation.

3 Download Data

With a click of a mouse, the collected traffic data from your SJT sign is downloaded to your computer.

If you want to download the collected data only from a certain date and time, change the date in the **Start date** control to an appropriate value.

To start the download process, click the **Data Download** button.

If the **Erase after download** checkbox is marked, all collected traffic data is erased after a successful data download process.

PASTROS v1.589

File Settings Signboard Charts About

Storage parameters: Record cycle: 15 min First threshold: 10 km/h Step: 10 km/h Start date: 2010. 01. 01. 0:00 Erase after download: ☐ Data Download

Location ID: Demo_tabla_1

Date	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90-99	100-109	110-119	120-129	130-139	140-149	150-159	160-169	170-179	180-189	>190	Sum	Avg	85th pe	Max spd	Min spd
2010.10.29. 21:15	44	118	29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	191	14	19	24	8
2010.10.29. 21:30	31	139	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	195	14	19	23	8
2010.10.29. 21:45	37	148	22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	207	14	19	23	8
2010.10.29. 22:00	35	132	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	192	14	19	24	8
2010.10.29. 22:15	34	145	26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	205	14	19	24	8
2010.10.29. 22:30	31	139	21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	191	14	19	24	8
2010.10.29. 22:45	45	120	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	195	14	20	25	8
2010.10.29. 23:00	36	151	29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	216	14	19	25	8
2010.10.29. 23:15	43	140	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	207	14	19	24	8
2010.10.29. 23:30	46	130	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	201	14	19	24	8
2010.10.29. 23:45	51	131	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	212	14	19	24	8
2010.10.30. 0:00	35	137	35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	207	14	20	24	8
2010.10.30. 0:15	42	138	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	204	14	18	23	8
2010.10.30. 0:30	44	119	26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	189	14	19	23	8
2010.10.30. 0:45	27	154	22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	203	14	19	23	8
2010.10.30. 1:00	44	132	19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	195	14	18	23	8
2010.10.30. 1:15	42	138	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	205	14	19	23	8
2010.10.30. 1:30	38	131	29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	198	14	19	23	8
2010.10.30. 1:45	36	129	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	195	14	20	24	8
2010.10.30. 2:00	39	150	29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	218	14	19	23	8
2010.10.30. 2:15	41	146	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	217	14	19	23	8
2010.10.30. 2:30	36	136	28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	200	14	19	29	8
2010.10.30. 2:45	38	157	22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	217	14	19	24	8
2010.10.30. 3:00	40	130	26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	196	14	19	26	8
2010.10.30. 3:15	41	134	26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	201	14	19	24	8
2010.10.30. 3:30	51	113	25	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	190	14	19	32	8

In progress...

Data download

The downloaded data shows the vehicle counters by speed class in 15 minute steps along with the average, minimum, maximum and 85th percentile speed values. The actual speed limit is also shown. The downloaded data also contains the time of a device restart (For example after a voltage break).

4 Other Menus

4.1 File

In this menu you can manage your downloaded or earlier saved traffic data.

4.1.1 Save data

Saves the downloaded traffic data in DFS format.

4.1.2 Export data to Excel

Exports the downloaded traffic data to a Microsoft Excel spreadsheet. The header data is displayed in the first four rows with each coming row displaying one data record.

4.1.3 Save data as text

After the data is downloaded successfully, you can save it as a CSV text file. To do this, select **Save data as text...** from the **File** menu.

The file is saved in the following format: In the header, the location and storage parameters are displayed. After the header each row contains the data of a measured period. The values are separated by comma.

If you want to add data to an existing file, choose an existing filename and the new records will be appended to the end of the existing file. The headers must be identical for the merge to be accurate. The software will not check the header of the original document before merging the new data.

4.1.4 Exit

Exit PASTROS.

4.2 Signboard

In this menu you can erase the SJT sign's memory, read out the factory serial number, and update the firmware.

4.2.1 Erase device memory

All collected traffic data from the speed sign can be erased using the **Erase device memory** submenu.

The following message box opens to confirm this command.



Confirmation of device memory erase

4.2.2 Read device ID

The **Read device ID** submenu displays the Factory ID (Controller Name), firmware version, radar type, radar input unit and time zone setting of your sign. This is for information purposes only and cannot be changed.

4.2.3 Search signboard

Search for a sign again, or re-establish the connection with a sign after a firmware update.

4.2.4 Select serial port

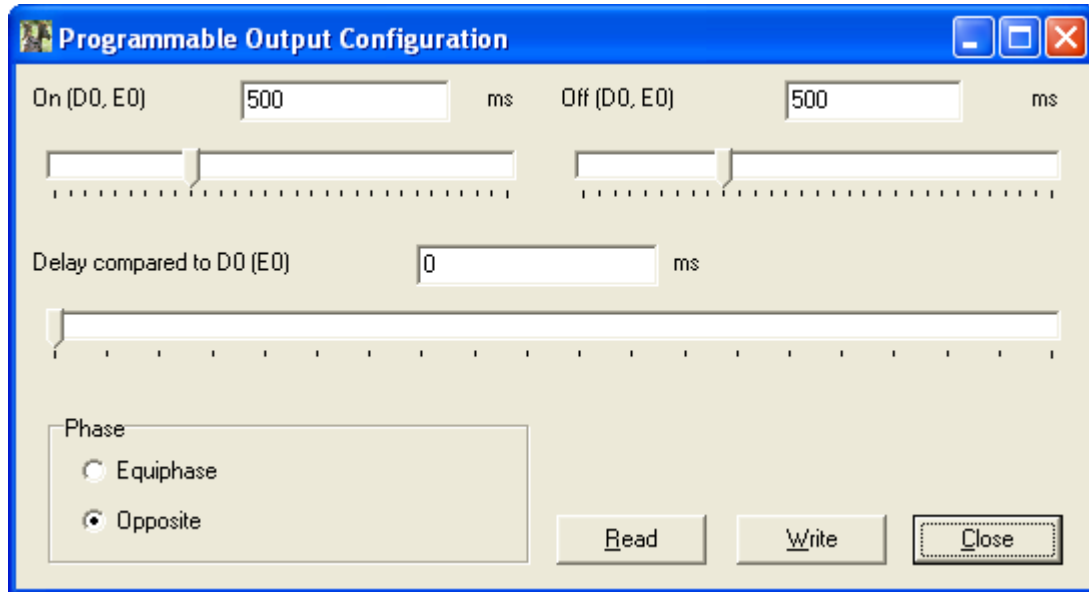
Select the serial port of the Bluetooth connection manually.

The **automatic serial port search timeout** is also set here. The value is in milliseconds. On slow computers or for some Bluetooth devices, the default value of 4000 ms might need to be increased.

4.2.5 Bluetooth reset

In some cases you have to reset the Bluetooth device of the sign's controller card. Click on this menu to reset the sign's Bluetooth device.

4.2.6 Outputs



Configure half-digit outputs (D0, E0).

2 digit signs: The **On** value is the time in ms when the outputs are on, and **Off** is the time in ms when the outputs are off. The E0 output is delayed by the **Delay** value relative to D0.

Equiphase: D0 and E0 is On at the same time, and Off at the same time.

Opposite phase: E0 is On when D0 is Off, E0 is Off when D0 is On.

For example: On: 100 ms, Off: 150 ms, Delay: 50 ms, Equiphase

Result: D0 on for 100 ms, off for 150 ms

E0 on for 150 ms, but 50 ms later than D0, off for 150 ms.

2.5 digit signs: D0 and E0 are used for the half-digit, and should not be set here.

4.2.7 Memory map

Specific firmware versions support reading and saving the memory content of the controller card. This menu option is reserved for support purposes.

4.2.8 Firmware update

With this function you can update the firmware running in your SJT sign. Before starting the update process, please make sure you have both the current and the new firmware version on your computer.

The collected traffic data and the settings are not affected by the update. If the update is for some reason unsuccessful, select **Search sign...** or **Select serial port...** from the menu. The sign will ask for a firmware after establishing the Bluetooth connection.

Please note that not all PASTROS versions are compatible with all SJT sign firmware versions. In any case of doubt, please contact your SJT sign supplier.

WARNING!

BL1 type (without marking) cards work only with BL1 type firmware versions!

BL2 type cards work only with BL2 type firmware versions! The naming of the firmware .bin files are the following:

5125_ShKWR.bin

5125: Firmware version or name (e.g. 5125 or S7C) **S:**

Firmware type (S = SJV, H = StatPack)

a: Radar communication protocol (a = AGD, h, d = SI3)

K: Radar unit (K = kmh, M = mph)

U: Automatic DST change (W = Western European Time (GMT), E = EU/Central European Time (GMT+1), A = Eastern European Time (GMT+2), U = North America, N = none)

R: Firmware subversion (R = release, other = non-release version)

(optional) additional characters: special versions

P: parameter value – this setting has no preset value, can be set with PASTROS ([Factory Settings -> Firmware parameters...](#)).

4.3 Charts

Basic visualization of downloaded traffic data. Please note that your PASTROS window should not be in full screen mode while you use this features.

4.3.1 Lines

With this feature you can visualize the counters of the speed classes of a time interval. You can zoom in by selecting a part of the chart.

4.3.2 Characteristic speed values

Choosing this option the maximum, minimum, average and 85th percentile speeds of the collected traffic data are shown. The checkboxes switch speed value types on and off.

5 About



About