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Introduction

Purpose of this Instruction Manual

The present instruction manual (IM) is designed for studying technical parameters, structure and working order of the cross road stage diagram (CSD) design system on the basis of Controller UK-4.1.

Additional Documents

To fully and thoroughly study this document, first it is necessary to study the technical description of the Controller UK-4.1 (hereinafter - "controller").

Purpose

The CSD design system for a traffic lights field on the basis of Controller UK-4.1 (hereinafter – CSD design system) is developed to setup the controller in accordance with the given CSD. CSD is designed and provided by a corresponding Road Police department. Setting up the controller means to download CSD into the controller from a computer using a standard cable with the USB/COM interface converter. Thus, CSD design system binds the controller to a certain cross-road.

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Technical Details

Main Parameters and Characteristics

The present CSD design system provides a wide range of opportunities for designing flexible traffic schemes and allows to set up the controller for operation at both simple and complex Traffic Lights Fields.

CSD design system comprises the following settings:

- Number of power circuits – 32;
- Customized selection of color (red, yellow or green) for each channel;
- Directions – 32;
- Phases – 16;
- Programs – 16;
- Program maximum size – 16 ticks;
- Day Schedule or Automatic Timing Selector (ATS) enables to switch the controller to a program 1...16, YF, OFF, AR during the day of any week day;
- Operation mode of the controller upon the startup;
- "Red" conflict (channel numbers analyzed for circuit break);
- "Green" conflict (channel numbers analyzed for insulation break and short circuit);
- Network parameters to address the center;
- Installation of Pedestrian Buttons (PB) – up to 4 PB;
- Installation of traffic detectors – up to 4 detectors.

The latest program update details can be found in the file «readme.doc» on the setup CD-ROM in the folder «x:\SVP_WINDOWS»

Requirements

The following equipment is required for operating the program “Traffic Lights Field Equipment”:

- Standard personal computer or notebook with one of the operating systems (Windows XP/Vista/7/8/10) installed;
- One free USB port;
- Standard USB/COM interface converter;
- Printer (to print a cross-road passport).

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Set of CSD Design Engineer's AW

CSD design system includes the following hardware and software:

- computer;
- printer;
- program "Traffic Lights Field Equipment";
- USB-COM converter.

Only the program "Traffic Lights Field Equipment" is included into the delivery set (along with the controller). This program is recorded on the installation CD. The remaining parts of the CSD design system may be chosen and acquired by the user himself. Otherwise, the delivery of those parts along with the controller should be additionally discussed and ordered at the factory.

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CSD Design Technology

For the CSD design system, the documents on how the traffic is arranged at a traffic lights field constitute the primary (input) data; they are developed by a special Road Police department. The result (output data) is presented in the traffic scheme file, which is to be downloaded into the controller and determines the controller operation at a specific traffic lights field.

To reach such a result, it is required to fulfill the following order of designing a CSD:

- To prepare the primary documents;
- To design a CSD using the program "Traffic Lights Field Equipment";
- To check the operation of CSD – emulation;
- To print CSD (if necessary);
- To download CSD into the controller using USB-COM cable;
- To perform a full run of controller on the general checking stand; it means to check the operation of the controller using the given traffic scheme (it is strongly recommended not to rely only on program emulation);
- To install the controller at a required cross-road, and bind the traffic signal sections to it.

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How to Operate Controller UK-4.1 (Algorithm)

The controller can have one of the following states:

- OFF – all channels are switched off;
- YF – yellow channels are flashing;
- AR – all red channels are on;
- Phase – any fixed phase is on, all in all, there are 16 phases;
- Program 1...16 – one of 16 programs is running.

Each program represents a sequence of phases/ticks. A tick includes a phase number, phase length and length of intergreen period after tick. Programs do not depend on each other, and may contain different sequence of phases and phase length. Each program is fulfilled consistently, starting from the primary tick. The controller switches on power channels in each tick in accordance with the phase structure assigned to this tick, and keeps this state running during a period of time that equals the phase length. Upon the completion of this phase, intergreen tick starts. Intergreen structure of power channels is calculated automatically in accordance with the phase structures, between which such intergreen tick is performed. Upon the completion of the last program tick, the controller switches to the primary tick and keeps on fulfilling the operational cycle.

The sources of those states are the following devices (enumerated in increasing priority): ATS, service control pad, detector board, network board, PB, MC, conflict.

If several sources are sending commands to the controller, the source with a higher priority gets the control.

ATS controls the operation of the controller in accordance with a day schedule. Such day schedule indicates at what day time the controller should switch to one of its states – OFF, YF, AR, ATS 1...16 (Signal program). The day schedule is generated for each day of week.

Service control pad controls the operation of the controller switching it to one of its states: OFF, YF, AR. It also provides the opportunity to choose precise settings and perform the checking of LC.

Manual Control is installed at a cross-road and carried out by using a portable remote control of a serial or parallel type. It switches the controller to one of its states: OFF, YF, Phase 1...4 (RC – parallel type); OFF, YF, AR, Phase 1...16 (RC – serial type).

PB (all versions up to ROM 4.2.0) takes control over the controller upon pushing the pedestrian button by a pedestrian, which is installed right at a cross-road. Once the button is pushed, the signal **WAIT** lights on the pedestrian board. At this, the controller keeps on working in accordance with one of 1...16 programs, and only upon the completion of the last tick, it switches to the PB phase. Upon the completion of PB phase, such controller goes back to the primary tick of its currently activated program.

PB (all versions starting from ROM 4.2.0) takes control over the controller upon pushing the pedestrian button by a pedestrian, which is installed right at a cross-road. Once the button is pushed, the signal **WAIT** lights on the pedestrian board. At this, the controller keeps on working till ATS phase comes. The PB phase is inserted into this ATS phase, so the directions of PB phase are switched on within the ATS phase. Upon the completion of PB phase, such controller goes back to the ATS program; at this, the length of the program remains the same.

ATTENTION! Starting from the ROM version 4.2.1, a minimal phase time is set individually for each phase. It is necessary to correctly calculate the minimal time of ATS phase, which PB phase is inserted in. The minimal time of ATS phase must be less or equal ($\text{phase time}^{\text{ATS}} - \text{intergreen time}^{\text{ATS}} - \text{phase time}^{\text{ATS}}$).

Starting from the ROM version 4.2.2, 32 directions can be entered. Interface countdown is not supported for the additional 16 directions in LC. Binding to traffic detectors is not supported as well.

Network board controls the operation of controller through commands issued by ASRTC.

Detector board controls the state of controller in real time depending on the traffic intensity at a cross-road, and such intensity is determined by special devices – traffic detectors.

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If the controller is working under the control of any source (apart from the source CONFLICT), it constantly monitors the power circuits for detecting conflict situations: "red" and "green" conflicts.

"Red" conflict happens because: power cables have got broken, a lamp or a group of lamps has got burned out, and power locks of channels marked as "red" have got out of service.

"Green" conflict happens because of the short circuit of power cables or malfunction of power locks (thyristors break) of channels marked as "green".

Upon the detection of a conflict situation by the controller, it switches to OFF or YF mode depending on the malfunction type. It means, if a "red" conflict is detected, the controller works under YF program; if a "green" conflict is detected, the controller switches to OFF mode.

Working under control of the source CONFLICT, the controller performs a periodic check of power circuits every 2 minutes. If during such a check it is detected that a conflict has disappeared, such controller will switch to its regular operation under control of other sources. Otherwise, such controller keeps on working in one of its states – OFF or YF.

The source CONFLICT has the highest priority. Therefore, if the controller gets under control of such a source, the commands from other sources are being ignored.

Upon the startup, the controller can be operated in one of the following states: Program 1...16, YF, OFF, AR. The state and length of operation of the controller upon its startup is set using the program menu *Operation – Day Schedule and Controller Startup*. Upon the completion of the fixed period of time, the controller switches to the operation under control of ATS source, and runs the program in accordance with the current day time and its day schedule.

File System Structure

Upon the installation of the program "Traffic Lights Field Equipment", the disk gets the following file structure:

SVP_WIN\SVP4.CHM – it is data attributable to the "help" information system;

SVP_WIN\SVP4.EXE – it is the main "Traffic Lights Field Equipment" program module being run;

SVP_WIN\Instruction manual of CSD design engineer's AW.doc – it is the present document.

Upon the compilation of CSD file, one of the following files is generated in the subfolder SVP_WIN\HEX\:

*.HEX – programmer's ASCII file.

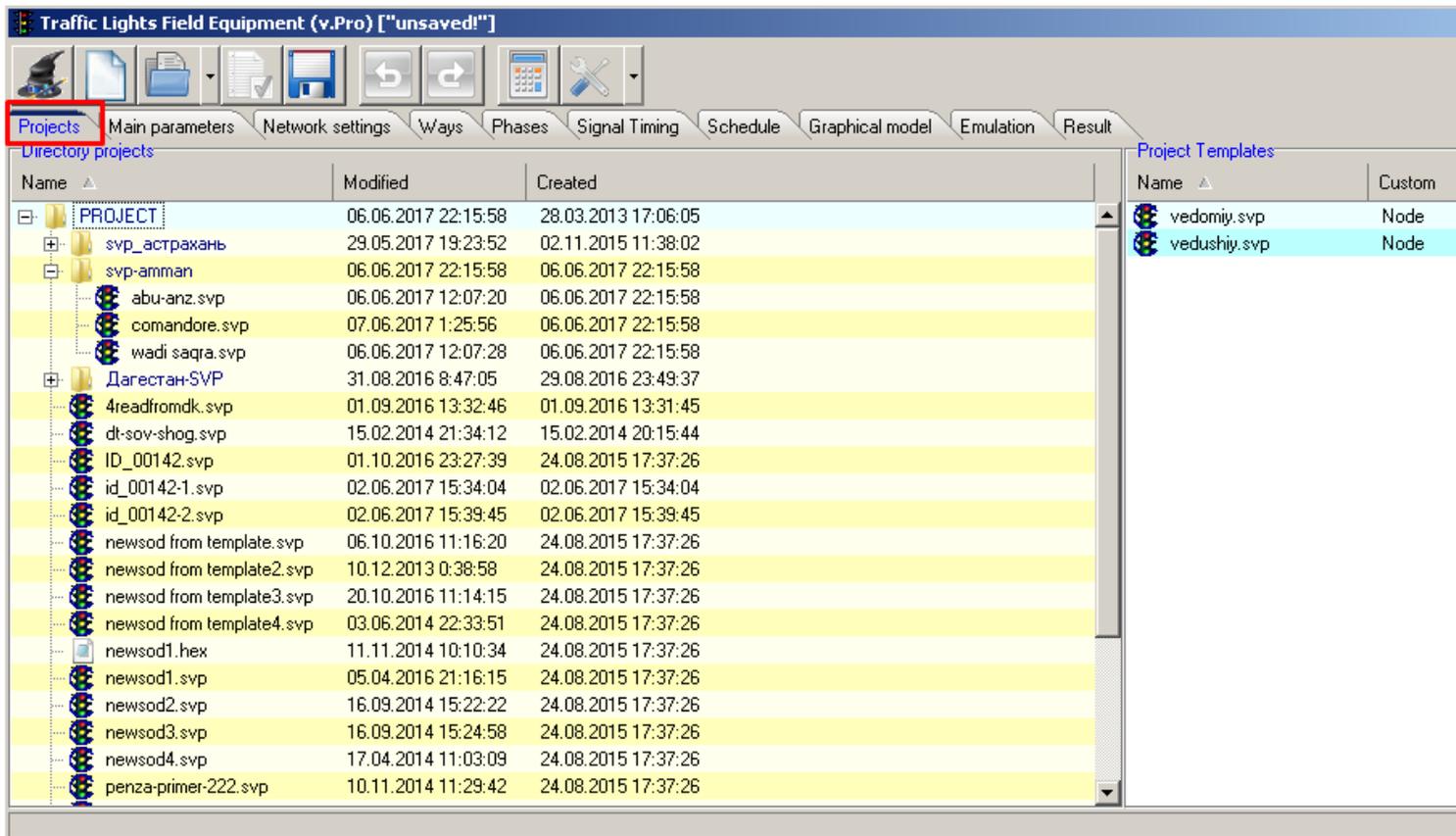
*.BIN – programmer's binary file.

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Window Interface

A user's interaction with the program "Traffic Lights Field Equipment" is performed by a standard window interface. Such interface means that:

- the main window becomes active after the program startup, and quick access buttons can be found in the upper part of this window;
- the window heading contains the names of program and open CSD file;
- after selecting any tabbed page, the working screen becomes active providing the opportunity to view, enter and edit information as well as to run other service functions.



Working screen consists of the following objects:

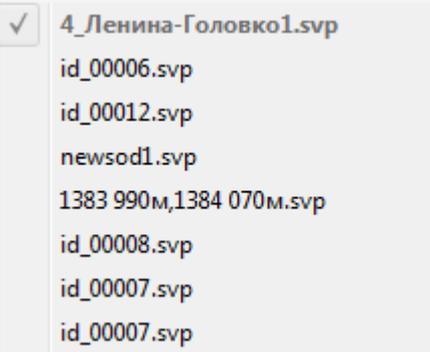
- input field – it provides the opportunity to enter various data such as tick number, length, etc.
- some fields are connected to an element, which is seen in the form of up and down arrows, so if such a field is activated (for entering), it is possible to change the value in this field using the corresponding arrow buttons on the keyboard and/or a mouse wheel (if available).
- layout of the buttons panel with a quick access to the main functions is also changed depending on the currently selected tabbed page.

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Control Panel Buttons



Create new (empty) CSD project



Select the last open and existing CSD project file



Save current amendments in the linked CSD project



Save the current CSD project under a new file name



Cancel the last action



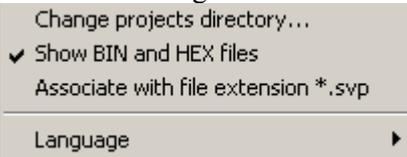
Repeat the last disregarded action



Fetch standard system «calculator»



Load/save settings for the current tabbed page



Automatic generation of thresholds for YF, AR, Green Conflict and Red Conflict



Erase all values set for YF, AR, Green Conflict and Red Conflict



Copy the current day schedule to next day or all days of week.

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- Copy to all days of the week
Copy to next day



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Installation

Installation of the Program “Traffic Lights Field Equipment”

Make a backup copy of the installation program using Windows explorer or by any other way.

Ensure 16Mb of free disk space. Program “Traffic Lights Field Equipment” may be installed on any disk, including removable disks.

It may be necessary to reboot your computer during the installation to make the program “Traffic Lights Field Equipment” ready for startup.

The installation program creates labels on your desktop and in the Startup menu – Programs. To open the program, click one of the labels or run the file “SVP4.EXE” (by default, it can be found in the directory “C:\Elsystar\SVP_WIN”).

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Pre-starting Procedures

Preparation of Primary Documents

Before you start working with the program "Traffic Lights Field Equipment", it is necessary to obtain the documents for a required Traffic Lights Field from a corresponding Road Police department. Such documents should contain:

- name of crossing streets or a square, where the given Traffic Lights Field Equipment is located (in future, this information is entered in the menu OPERATION – Notes to the file of program "Traffic Lights Field Equipment");
- number of activated channels;
- channel colors – red, yellow or green;
- number of channels fixed for the function WAIT, if this CSD contains PB;
- tick numbers, channel states in each tick and tick lengths of controller states under the program 1...16;
- day schedule of switches from one program to another;
- channel numbers checked for “red” conflicts (usually they are channels fixed for red lamps of a traffic signal object);
- channel numbers checked for “green” conflicts (usually they are channels fixed for green lamps of a traffic signal object);

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Working Order

Program Startup

Before you start working with the program "Traffic Lights Field Equipment", it is recommended to create a separate directory, which will contain only CSD files. For example: \SVP_WIN\PROJECT.

Selection of the CSD File

After starting the program, the tabbed page "CSD Projects" becomes active providing a corresponding list of existing projects. Choose a CSD file and double click on it to load it into the program.

If there is no required file in this list, you can always fetch a corresponding dialogue window to select a file for opening. In the file selection window only those files are seen, which names correspond to the filter chosen for this field (*.DBF, *.SVP) for opening and saving (saving is possible only in format *.SVP).

**Files in format *.SVP occupy considerably less disk space.*

Starting from the SVP version 3.0.0.3, it is possible to decompile files HEX and BIN in SVP project; as these files lack some information (for instance, channel colors, and what is more important – ROM version), the corresponding parameters of CSD are determined of thumb...

To open such files, first choose the ROM version correctly

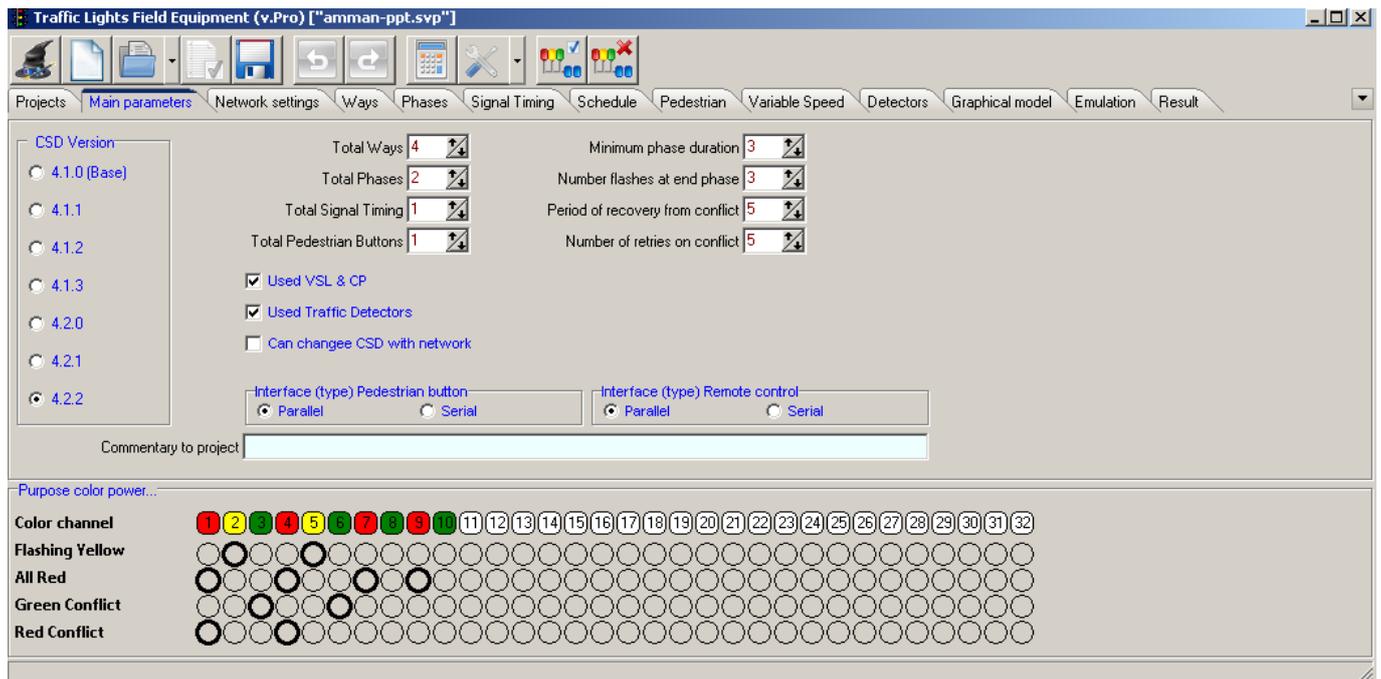
Note: decompilation is supported only for versions 4.1.3 and above

After selecting a CSD file, you are automatically switched to the tabbed page "**Main Parameters**"



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Main Parameters



It provides the selection of user's ROM version () v4.1.0 () v4.1.1 () v4.1.2 () v4.1.3 () v4.2.0 () v4.2.1 () v4.2.2, opportunity to set main parameters of cross road stage diagram (CSD) and make notes to the current file.

- Total channels** – number of channels (power locks), switching on lamps or groups of lamps of a traffic signal object. This value is constant and equals 32
- Total phases** – Number of CSD phases. Permitted values are 1...16
- Total directions** - Number of CSD directions. Permitted values are 1...16 (**up to 32 for ROM version 4.2.2**)
- Total programs** - Number of CSD programs. Permitted values are 1...16
- Total PBs** – Number of PBs. Permitted values are 1...4

Minimal phase length

It is the minimal time, within which the phase should be switched on. This parameter means the following: if any phase is switched on, the switching to a new phase will happen only upon the completion of minimal length of the current phase. This parameter is the same for all phases. It is measured in time discreteness units and equals 0.5 sec. Permitted values are 0...255
In case of version 4.2.1, it is possible to set minimal length for each phase.

Number of flashes in the end of phase

It is the number of green flashes flashing before switching to the next phase. This parameter is the same for all phases, if ROM version v4.1.0 is used. If ROM version v4.1.1 is used, the number of green flashes for each direction is set in the screen "Directions". Permitted values are 1...10

Period of cutting off the conflict

Upon the detection of "red" or "green" conflicts, the controller switches the traffic signal object to YF or OFF mode correspondingly. When the set period of time expires ("period of cutting off the conflict"), the controller performs a periodic check of power circuits, and if the conflict is eliminated, the controller switches a traffic signal object to its regular schedule. This parameter is measured in units (1 unit = 0.5sec). Permitted values are 10...255

Number of repeats for a conflict

It is the number of repeatedly occurred conflict situations at a traffic signal object, after which the controller switches to OFF or YF mode. This parameter sets sensitivity to conflict situations. Permitted values are 1...10

Variable Speed Limit and Countdown are in use – if this box is not checked, the controller will not send any corresponding data to these devices.

LC are in use – If this box is unchecked, the controller will not address any traffic detectors

Network Changing of CSD is allowed – if this box is unchecked, it will be forbidden to change CSD remotely (by ATMS)

RC Type (portable remote control)

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Parallel – it connects RC to the controller using parallel interface. Serial – it connects RC to the controller using serial interface.

PB type (pedestrian button)

Parallel – it connects PB to the controller using parallel interface. Serial – it connects PB to the controller using serial interface.

Colors and Thresholds

It provides the opportunity to assign colors to channels (power locks): red, yellow or green.

Assigning a color to a certain channel as well as generating thresholds is performed by clicking left mouse button over the corresponding icon. Color can also be changed by pressing corresponding digital buttons on the keyboard [1], [2], [3] and [4] for red, yellow, green and white correspondingly, at this, switching to next channel happens automatically. Channel that is currently active is outlined by a thick line.



[Auto values] – It is designed to automatically generate the thresholds for “yellow flashing”, “all red”, “green conflict”, and “red conflict”. If it is necessary, the generated values can be amended manually.

*If any channel is not used, white should be assigned to it



[Erasing] – It erases all channels from the settings

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Network Parameters (it determines the parameters of network operation of the controller)

No Network – Controller works locally

TCCS – Working in TCCS

START – Working in START system

Leading – Working in centerless system as a leader (coordinator)

Driven – Working without specifying a particular management system

Network Address – It determines a unique network identity

- For TCCS permitted values are 1...20.
- For START permitted values are 1, 2.
- For controller address in centerless system permitted values are 1...32.
- For ATCS/Driven permitted values are 1...32000.

IP Address or DNS – this field is designed for entering IP-address or DNS server names. This field has a predetermined obligatory format – IP or DNS are taken in double quotation marks, and then, separated by commas, TCP server port is indicated.

For example: **"www.gorod.mpl.ru",1088** or **"11.22.33.44",1088**

Maximum number of symbols in this line is 63.

Note: third party developers of network boards should mind this: other input format is permitted

APN – this field stores the access point granted by a GSM provider.

Login and Password – these fields are designed to store user name and password of GSM network user and activate the access point/APN.

Settings of Ethernet board – this group of parameters is designed to set up a network board connecting the controller UK-4.1M to ATCS through Ethernet technology:

IP Address and Destination Port – these are network parameters of the server, which is to be connected to.

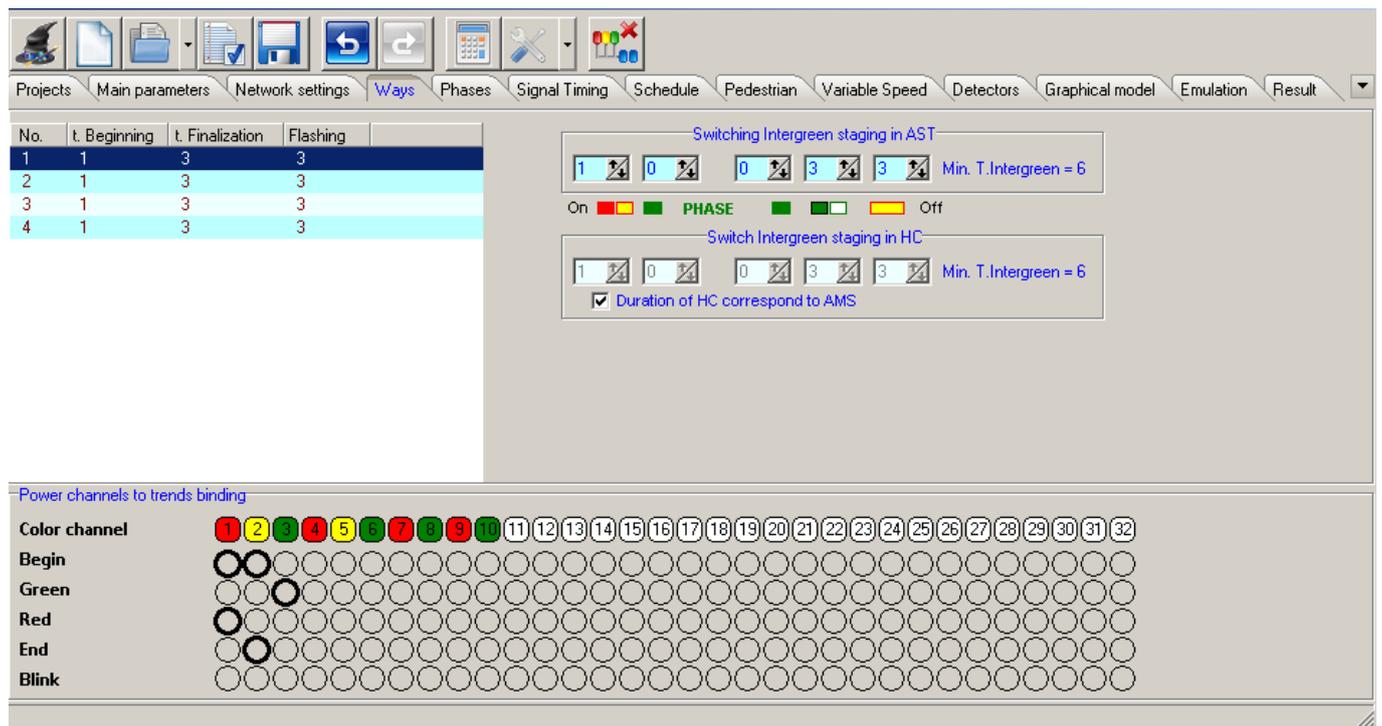
Its Own IP Address and Port – these are network parameters of the network board.

Netmask – IP-netmask of ATCS.

Gateway – IP address of subnet gateway (usually it equals its own IP Address).

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Directions



It is designed to set parameters of switching directions on and off, when phases/ticks of the traffic signal timing are changed.

Each direction has 5 parameters:

- beginning of phase (threshold "head");
- green (threshold "green");
- red (threshold "red");
- completion of phase (threshold "tail");
- flashing (threshold "flashing");
- length of "beginning of phase"; (threshold "head")
- length of "completion of phase"; (threshold "tail");
- additional green after green (only for version 4.1.1 and above);
- additional green after red (only for version 4.1.1 and above);
- number of green flashes (only for version 4.1.1 and above).

"beginning of phase" – it is the threshold, which precedes the switching of green channels of this direction, i.e. it is the threshold, when red and yellow channels of this direction are switched on.

"green" – it is the threshold, when green channels of this direction are switched on, i.e. it is the threshold permitting traffic in this direction.

"red" – it is the threshold, when red channels of this direction are switched on, i.e. it is the threshold forbidding traffic in this direction.

"completion of phase" – it is the threshold that switches on, when green channels of this direction get switched off, i.e. it is the threshold, when yellow channels of this direction are switched on.

"flashing" – This threshold contains channels, which will flash with the frequency of 2Hz during all time, while this direction is switched on.

Length of "beginning of phase" (red and yellow) – It is the period of time, while threshold "beginning" is switched on. This parameter is measured in time discreteness units, permitted values are 0...255

Length of "completion of phase" (green flashes) – It is the period of time, while threshold "completion" is switched on. This parameter is measured in time discreteness units, permitted values are 0...255

Additional green after green – It is the period of time, while green keeps on "burning" in intergreen phase, when green switches to red. This additional green will be switched on between phase and "completion".

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Additional green after red – It is the period of time, while green keeps on “burning” in intergreen phase, when red switches to green. This additional green will be switched on between “beginning” and phase.

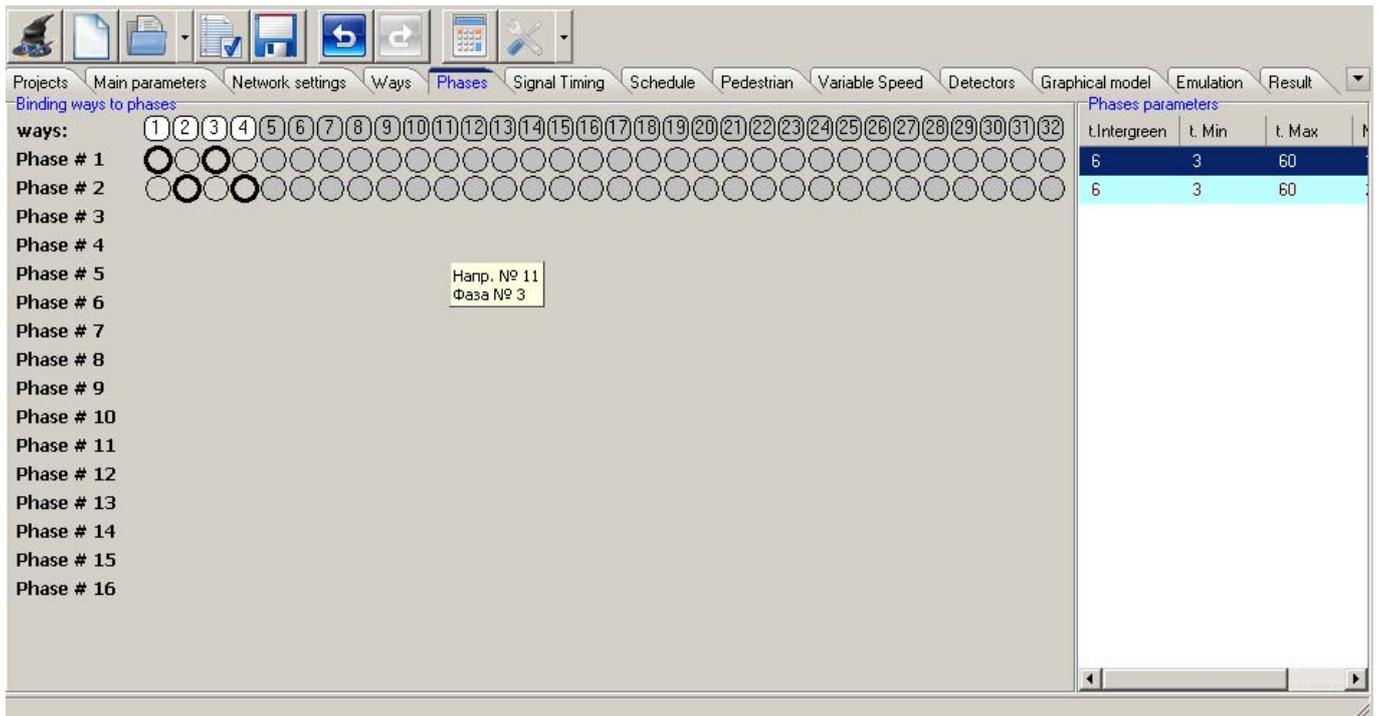
Number of green flashes – It is the number of green flashes flashing with the frequency of 2Hz in the end of the phase for the given direction.



[Erasing] – It erases all channels from the settings of the chosen directions

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Phases



Each phase is characterized by the following parameters:

- phase number;
- the length of intergreen after phase;
- set of directions included into phase (up to 32 directions for the ROM version 4.2.2).

A phase can comprise one or more directions.

If this direction is included into a phase set, it means that this phase has all green channels switched on for this direction (threshold “green”). If this direction is not included into a phase set, this phase has all red channels switched on for this direction (threshold “red”).

In case of the version 4.2.1 it is possible to set t.min and t.max separately for each phase.

t.min – minimal time during which a phase should be on.

t.max – maximum time during which a phase may be on.

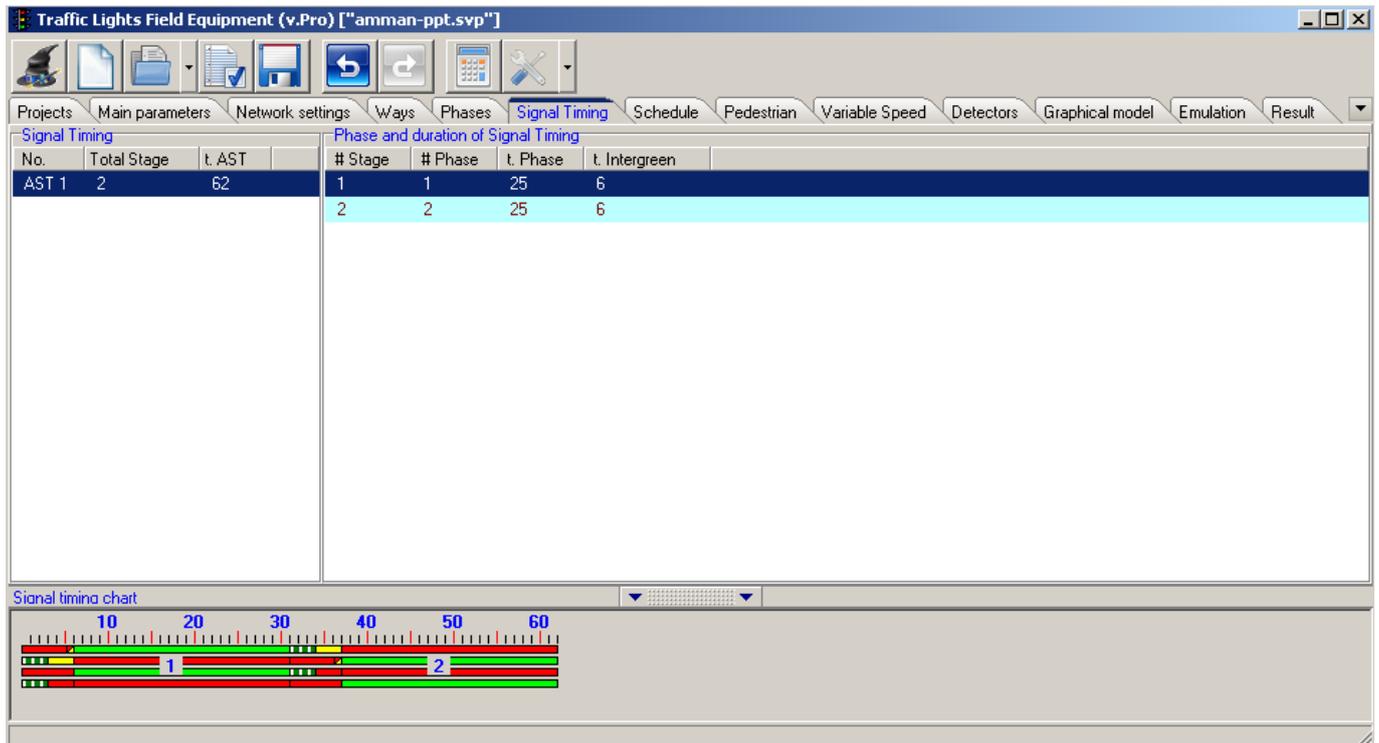
t.min – it is used mainly for modes MC and LAC, and t.max – only for LAC.

Green Streets

A certain phase should correspond to all of the green streets. The green street number may not be the same as the phase number. The number of green streets may not exceed the number of phases. It is impossible to edit the column “Gr. street N”.

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Signal Timing



It is designed to generate programs from existing phases.

Signal Timing – It is the list of existing Signal Timing.

Total Stage– It is the number of ticks in a program chosen from the list.

Stage – They are existing "Program Stages", which form the Signal Timing.

The present table consists of the following columns:

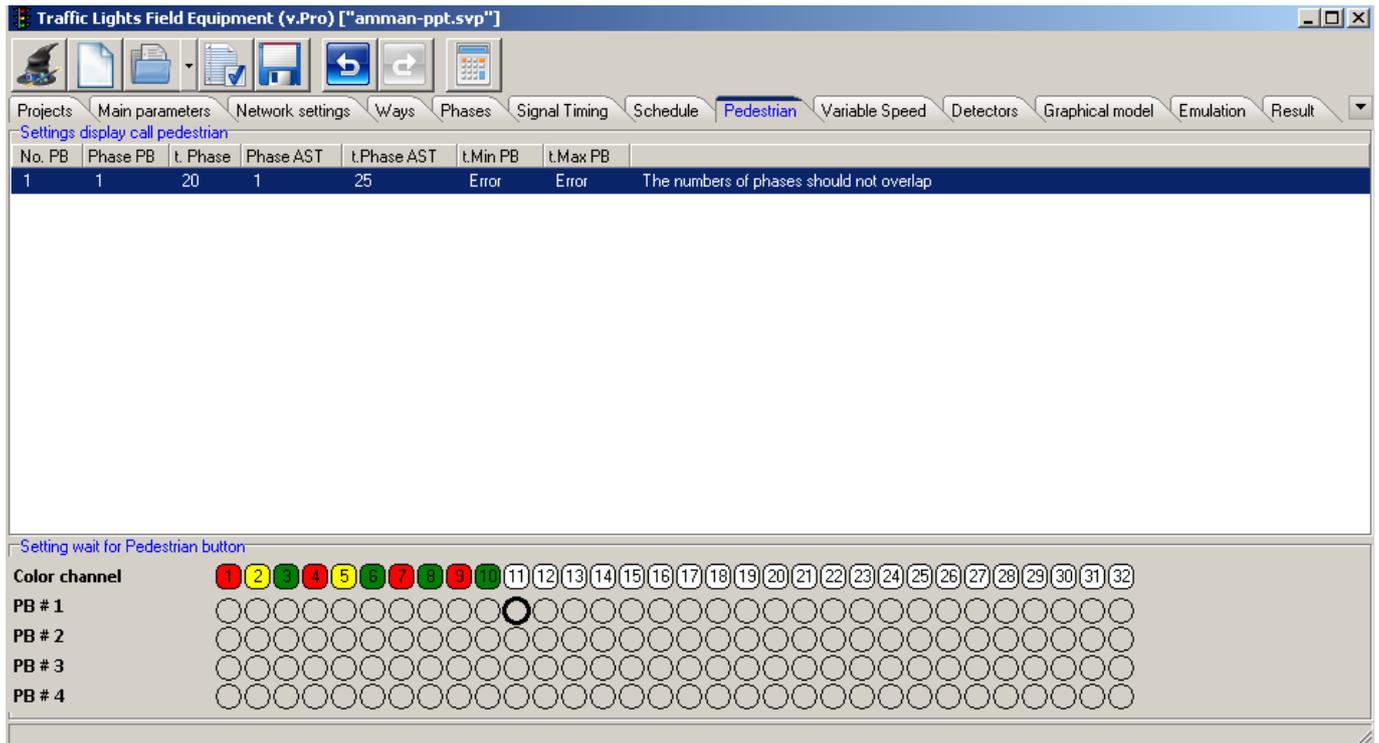
- "Stage N", it is not available for editing;
- "Phase N", Phase Number may not be the same as tick number;
- "Phase Length", may be 0...195 units;
- "Intergreen Length", may be 0...60 units.

Note: unit is a time discreteness unit that equals 0.5sec for ROM versions earlier than 4.2.0 (as, from now on, all temporary parameters (units) are indicated in seconds, the maximum values should be divided by 2 for all ROM versions earlier than 4.2.0), for ROM versions above 4.2.0 a time unit equals 1 second.

ATTENTION! Entering the value of phase length, make sure that it exceeds the minimal phase length.

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Pedestrian Button



It is designed to program the buttons on pedestrian boards (PB).

Each PB is characterized by 3 parameters:

- Phase number;
- Phase length;
- Threshold "wait".

(version 4.1.3.) PB mode works as follows: when a pedestrian pushes one of the buttons on the board, the lamp "Wait" gets switched on in the corresponding traffic signal section. Then, upon the completion of the current program cycle, the PB phase gets switched on and remains on during the period of time set for this button. When PB phase is completed, the control goes back to the current program.

(versions 4.2.0 and 4.2.1) when a pedestrian pushes PB, the lamp "WAIT" lights on the board. At this, the controller keeps on working till it reaches its ATS phase. As PB phase is inserted into ATS phase, the directions of PB phase are included into ATS phase. When PB phase is completed, the controller excludes the directions of PB phase, and goes to the next ATS phase. At this, the ATS cycle length remains the same.

ATTENTION! Starting from the ROM version 4.2.1, a minimal phase time is set individually for each phase. It is necessary to correctly calculate the minimal time of ATS phase, which PB phase is inserted in. The minimal time of ATS phase must be less or equal ($\text{phase time}^{\text{ATS}} - \text{intergreen time}^{\text{ATS}} - \text{phase time}^{\text{ATS}}$).

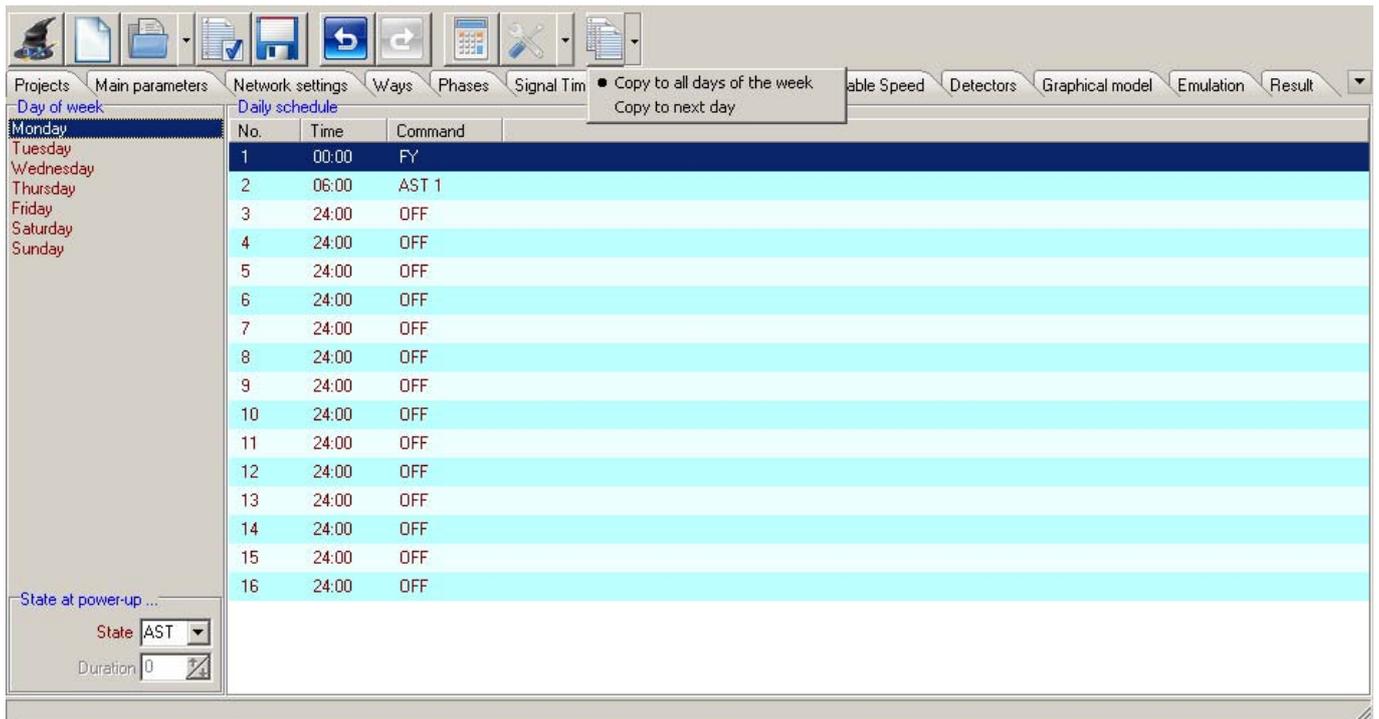
Phase Number – PB phase number for the indicated button

Phase Length – PB phase length. Permitted values are 0...255 units.

Threshold "wait" – This threshold is switched on upon the pressing PB by a pedestrian. It may result in a burning lamp (not obligatory).

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Day Schedule and Starting Up the Controller



It is designed to generate the day schedule on the basis of existing programs and states: switched off traffic signal object (OFF), yellow flashing (YF), all red (AR), and to fix the operating mode of the controller upon its startup.

Startup State – It sets one of the possible modes upon the startup of the controller: OFF, YF, AR, ATS.

Length – It is the lengths of startup state in seconds. When this time is finished, the controller switches to the ATS mode.

Day Schedule – It is designed to generate the day schedule on the basis of existing programs and modes: OFF, YF, AR.

Day schedule is generated separately for each day of week. All in all, it is possible to make 16 switches to the exact minute.

ATTENTION! The time in the first box of the day schedule table should be set as 00 hours 00 minutes, and should not be available for editing.



[Copy] – Copy the current day schedule to next day or all days of week depending on the previously selected mode in the context menu.

**It will be copied from the current day of week.*

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Coordinator

The screenshot shows the 'Network settings' tab of the Coordinator software. The interface includes a toolbar at the top with icons for file operations and navigation. Below the toolbar, there are several configuration sections:

- Network:** A dropdown menu set to 'MASTER' and a text field for 'Net Address (ID)' containing '0'.
- GPRS adapter Settings:** Fields for 'IP address or DNS & TCP port # 1', 'APN', 'IP address or DNS & TCP port # 2', 'APN', 'Login', and 'Password'.
- Ethernet adapter Settings:** Fields for 'Remote IP / Port' (192.168.1.2, 1088), 'Subnet mask' (255.255.255.0), 'Local IP / Port' (192.168.1.3, 1), and 'Gateway' (192.168.1.1).

On the right side, there is a table titled 'coordinating (master only)'. The table has columns for 'AST #', 't. Cycle', 'RC #', and 'Offset'. The 'Total slaves' is set to 4 (max = 32). The table contains the following data:

| AST # | t. Cycle | RC # | Offset |
|-------|----------|------|--------|
| 1 | 124 | 1 | 1 |
| | | 2 | 4 |
| | | 3 | 3 |
| | | 4 | 11 |

It is designed to generate the timing schedule of the leading controller.

Number of controllers in the schedule – It sets the number of controllers coordinated by the leading one. This value may be 1...32.

ATTENTION! The Number of controllers and the number of ATS programs are linked as follows: (controllers number) multiplied by (ATS programs number) \leq 96.

Timing Schedule

Table "Timing Schedule". This table consists of the following columns:

"LC N" – number/address of LC. This parameter cannot be edited;

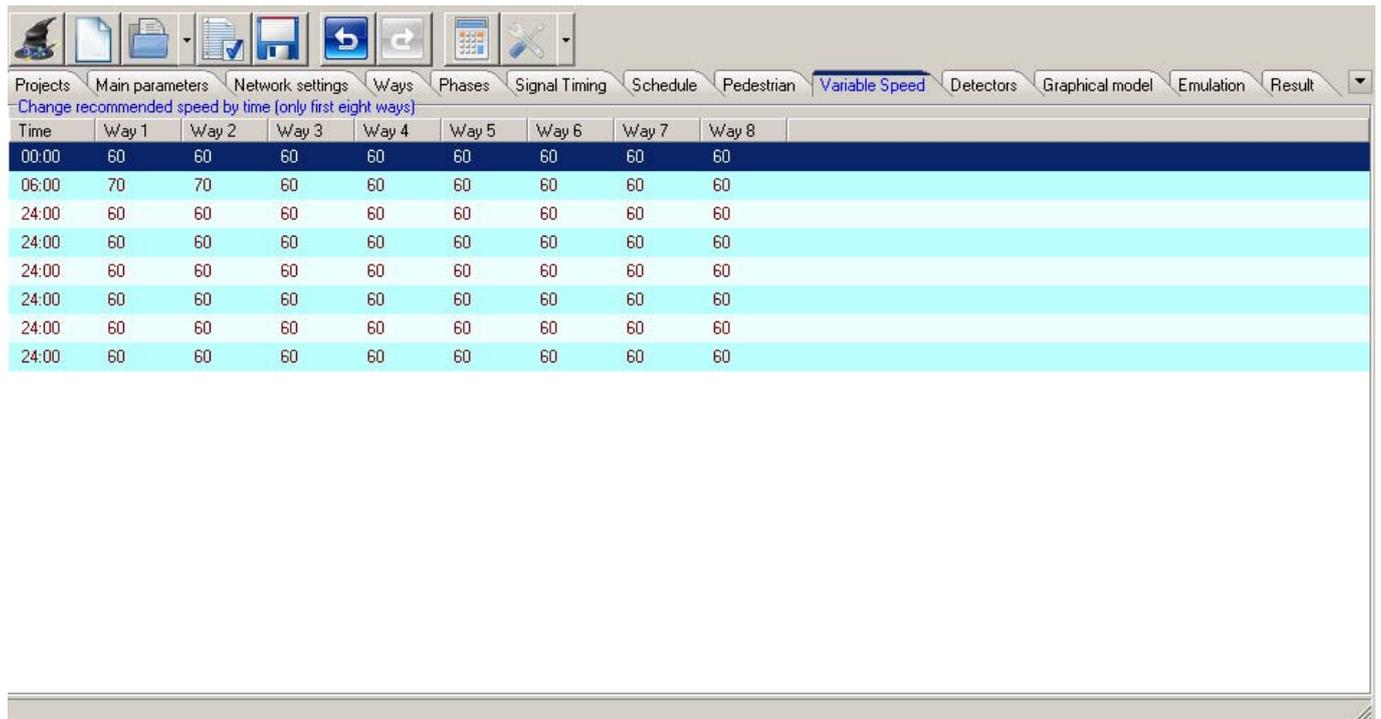
"Time Offset" – it is the delay in fulfillment of a command by a driven LC in seconds. It may be 0...255 sec.

Each ATS program should have its own timing schedule.

ATTENTION! If the time, during which the controller is switched on, exceeds the program cycle length, such controller will not be included in the timing schedule.

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Variable Speed Limit Parameters



| Time | Way 1 | Way 2 | Way 3 | Way 4 | Way 5 | Way 6 | Way 7 | Way 8 |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 00:00 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 |
| 06:00 | 70 | 70 | 60 | 60 | 60 | 60 | 60 | 60 |
| 24:00 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 |
| 24:00 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 |
| 24:00 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 |
| 24:00 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 |
| 24:00 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 |
| 24:00 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 |

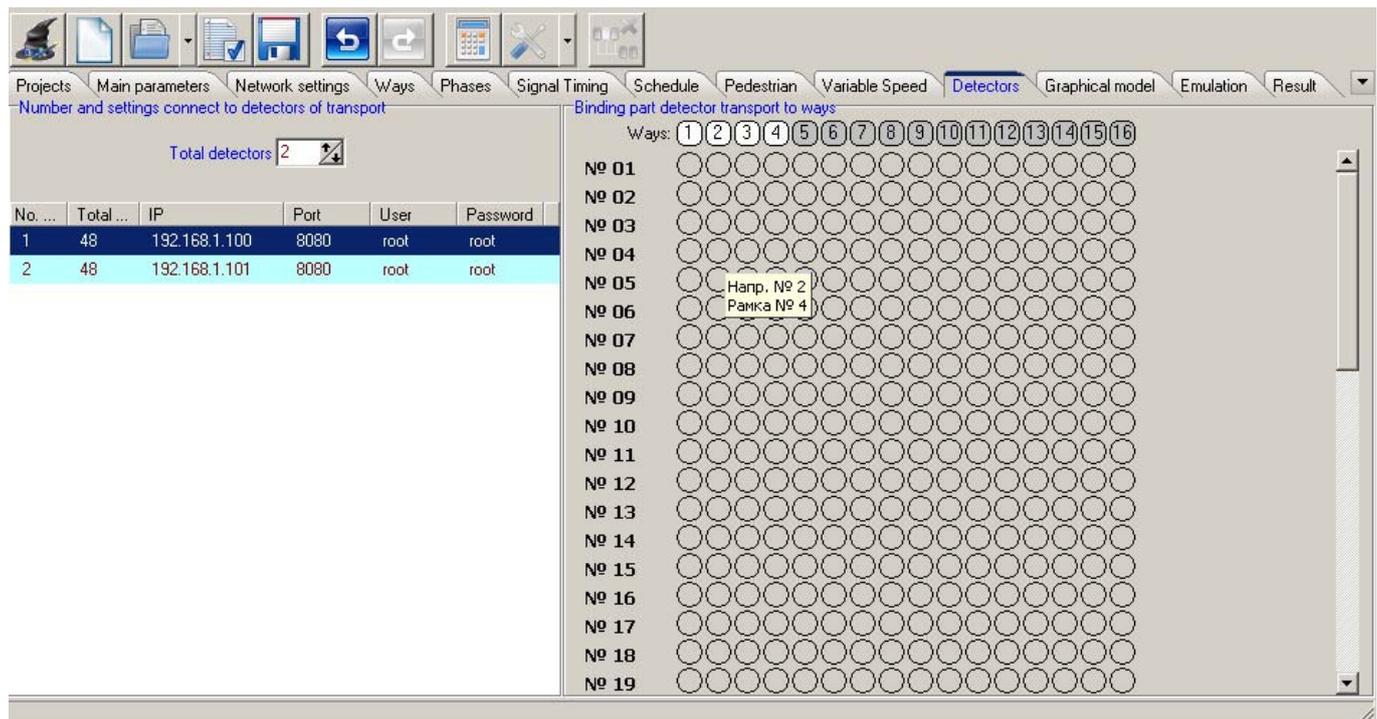
It is designed to set the maximum variable speed limit (VSL) during one day. The day schedule is generated once, for all days of week and 8 directions.

All in all, 8 switches are possible during the day, to exact minute for each of 8 directions. The speed can be set exactly to 1 km/h. The speed should not exceed 99 km/h, and should not be less than 5 km/h.

ATTENTION! The time in the first box of the day schedule table should be set as 00 hours 00 minutes, and should not be available for editing.

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Traffic Detectors



It is designed to enter the settings for traffic detectors (TD) in order to operate VSL in the mode of local adaptive control (LAC).

Total Detectors – It allows to indicate the number of detectors to be connected to the controller. Maximum: 4 detectors (usually one TD controls several lanes/directions).

It is possible to set the parameters of connection to traffic detectors below in the table. Such parameters include: number of sensor areas, IP Address, TCP Port, user name and password.

In the right part of the window you can find the table of sensor areas linked to directions in the CSD.

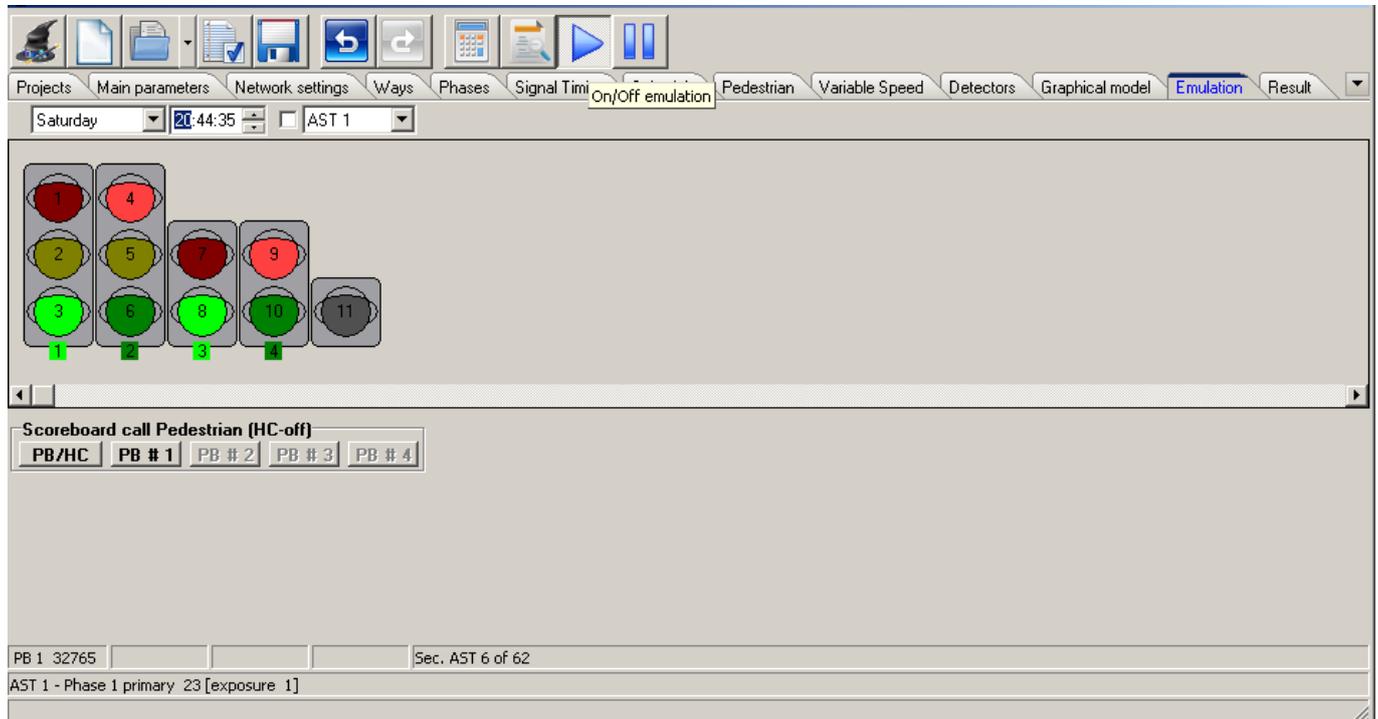
**one sensor area may influence on several directions and several phases!*

Detectors and/or separate traffic detector areas, which are physically present, but should not influence on the controller operation, should simply stay unchecked.

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Emulation

It is designed for viewing and emulation of the controller operation in accordance with the CSD project. It is supported only by the ROM version 4.1.3 and above. The operation algorithm of a real LC may insignificantly differ as it is constantly being elaborated.



When this tabbed page becomes active, channels are depicted as traffic signal sections, and automatically grouped in accordance with the directions into a frame containing the direction number. Lamps get their corresponding colors, and their channel numbers are indicated as well.

Starting Emulation

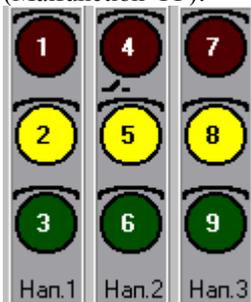


The imitation of controller work starts upon pressing the button located on the control panel or keyboard buttons combination [Ctrl] + [Alt] [I]

Emulation of burned out red lamps (circuit break) and short circuit of green channels

Clicking the left mouse button, when the cursor is over the channel ("lamp"), cyclically switches the channel state in the following order: **Circuit Break** > **Short Circuit** > **Regular State**.

The example of circuit break of red channel No.4, the traffic signal object is in the state of "yellow flashing" (Malfunction-YF)!



The example of circuit break of green channel No.6, the traffic signal object is off (Malfunction-OFF)!

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Emulation of Manual Control



This function is available only if the controller is switched on. The button “switch on/off” switches the operation mode of the controller from PB to MC and vice versa. The number of active buttons “phases” depends on the number of phases fixed by CSD.

When phases are being switched, it is possible that the following flashing sign will appear – **“Intergreen length error”**, it means that intergreen length is not enough for completing the switching process. It is also possible that the following sign will appear – **“Intergreen “green” error”**, it means that during the intergreen tick “green channels” of all directions, switched on and off, will be simultaneously burning for some time! You can study the details by performing CSD analysis.

If such a situation is not acceptable, to eliminate such errors, it is necessary either to increase the intergreen length or to decrease the length of “additional greens”.

Emulation of Pedestrian Button



This function is available only if the controller is switched on.

“PB” buttons are active only if the number of corresponding buttons in the CSD exceeds 0.

The implementation of PB for ROM versions 4.1.3 and 4.2.0 differs.

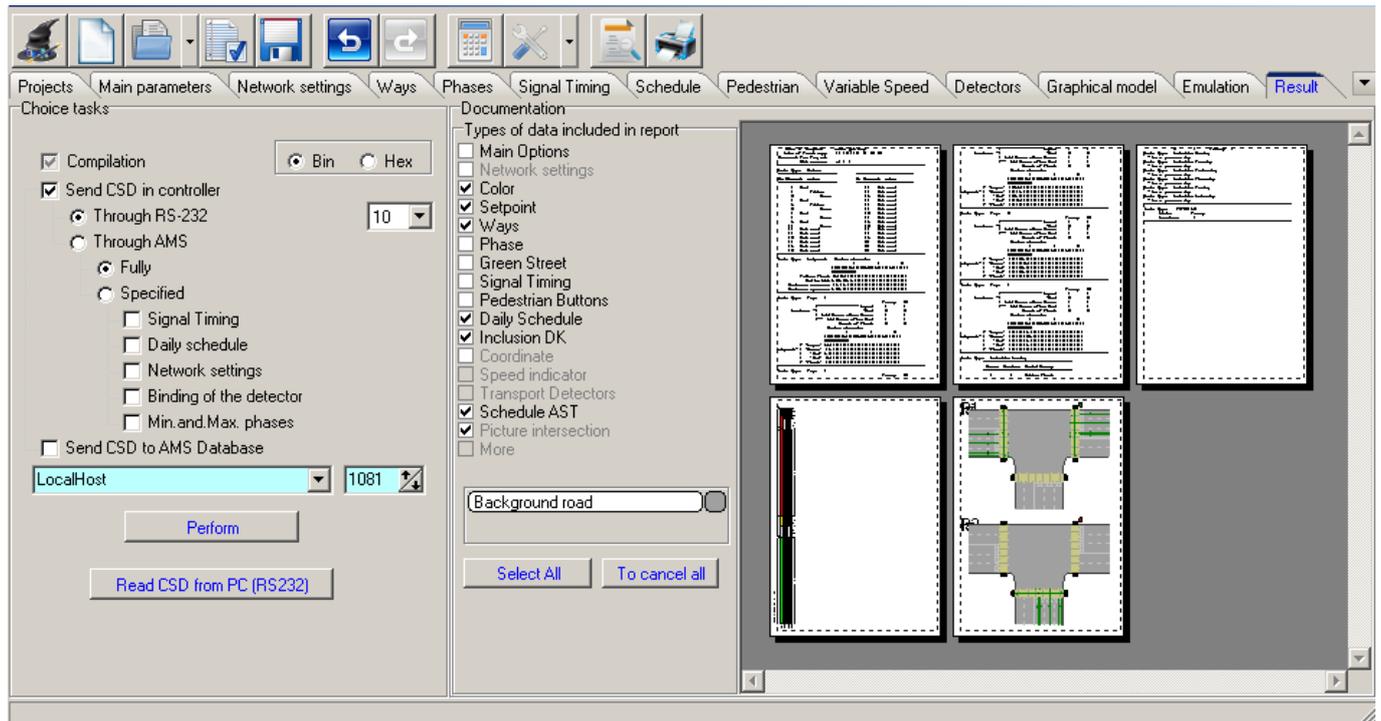
Emulation of Switching the Day Schedule



When the window appears, the time is set the same as in the computer, and “Monday” is set as the day of week by default. Then the time and days of week can be changed irrespectively of computer system time once in 0.5 sec. It is also possible to choose the day of week and time, and to select the ATS program from the list. If the box on the left of the list is checked, the imitation of switching of day schedule finishes before this box is unchecked (operating only the chosen program), and at this, the “time stops”.

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Result



Purpose – To select tasks for the current CSD project. To view and print the designed CSD in the form of report (for data backup, documenting a traffic lights field, etc.)

The following parameters are available:

Compilation – It is designed to turn the CSD file from the format *.SVP into binary file format (HEX or BIN, in future this file will be downloaded into the programmer for recording into the user ROM).

**If the box “Download CSD to LC” is unchecked, after the successful completion of compilation, a window should appear confirming such a successful completion and containing the path and file name for a programmer.*

Download CSD to LC – it allows to immediately perform the download of CSD to the LC from SVP using 2 ways to choose from – by way of RS232 or ATCS server.

Run – If this button is pressed, all checked tasks/items start running.

Documenting – it allows to choose parameters for generating a CSD report.

[Select All] – Include all CSD data into the report.

[Cancel All] – Exclude all CSD data from the report.



[Print] – This button generates and prints the report. The report will contain only those parameters that have been checked in the previous article. The preliminary review is available.

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“Traffic Lights Field Equipment” Program Errors and Their Removal

How to remove the errors

If any of the above mentioned errors arise, it is necessary to fulfill one of the actions described below.
If first action doesn't eliminate the error, fulfill the second one, and so on.

Action 1

Exit the program (activate the menu File-**Exit** in the working program window)
Start the program “Traffic Lights Field Equipment” again
Select the required CSD file

Action 2

Exit the program
Reboot the computer
Start the program “Traffic Lights Field Equipment” again
Select the required CSD file

Action 3

Exit the program
Reinstall the program “Traffic Lights Field Equipment” (see the section 6 “Installation”)
Start the program “Traffic Lights Field Equipment” again
Select the required CSD file

If all taken actions failed to eliminate the error, it means that:

- Some system error has happened, therefore it is necessary to call and consult the program “Traffic Lights Field Equipment” developers in order to remove such an error; or
- The structure of selected CSD file has been damaged, therefore it is necessary to restore this file from the backup or generate it all over again.

NOTE! It is necessary to backup all amended CSD files after completing the work.

**CSD file size (in the *.SVP format) is around 4Kb.*

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Annex 1. Notations and Terms

| | |
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| RC | Portable Remote Control |
| SRP | State Road Police |
| SRSD | State Road Safety Department |
| DOS and Windows | Disk Operational Systems |
| YF | Program "Yellow Flashing" |
| IM | Instruction Manual |
| ROM | Read-Only Memory |
| MC | Manual Control |
| CSD | Cross-Road Stage Diagram |
| TLF | Traffic Lights Field Equipment |
| PB | Pedestrian Button |
| TD | Technical Description |
| TCCS | Telemechanical Coordinated Control System |
| UK | Street Controller |
| UV | Ultraviolet Lamp |
| DBF | Foxpro 2 database file format |
| SVP | CSD file format |

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Annex 2. Button Functions

Tab

Move to objects

Shift + Tab

Move to objects in reverse order

Enter

If the cursor is set to input field, pressing Enter makes cursor move to the next object.

F1

Information

Ctrl + O

Open CSD project

Ctrl + S

Save CSD project

Ctrl + D

Clean CSD project. Set default settings.

Ctrl + X

Close program. Finish working with CSD project.

Ctrl + Z

Cancel the last editing action.

Ctrl + Y

Repeat the last canceled editing action.

Ctrl + F9

Fetch calculator.

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