

# SLControlBox 101



Interaction With  
External Devices  
via GPI

*Revision as of  
November 28, 2013*

Quick Start



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## Introduction

The SLControlBox 101 device is an external combined device used to:

- organize interaction with other external devices via GPI (for both transmitting and receiving commands) dealing with hardware-software complex basing on:
  - FD300 boards;
  - FDExt type of boards (FD322/FD422/FD842 boards);
- monitor hardware and software sets used in reserve broadcasting schemes (WatchDog function) based on boards of the FDExt type (FD322/FD422/FD842 boards).



**Note:** GPI protocole (General Purpose Interface) is a protocol used to control different devices. GPI is used for transmitting control signals only. It is impossible to transmit audio/video/other data via this protocol.

SLControlBox allows using up to 8 input GPI signals (GPI-In) and up to 4 output GPI signals (GPI-Out) simultaneously.



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## General Information

### Software Set

The SLControlBox 101 delivery set includes:

- SLControlBox 101 device;
- mini USB cable for plugging to PC;
- connector (DHR-26M) for plugging to external devices.



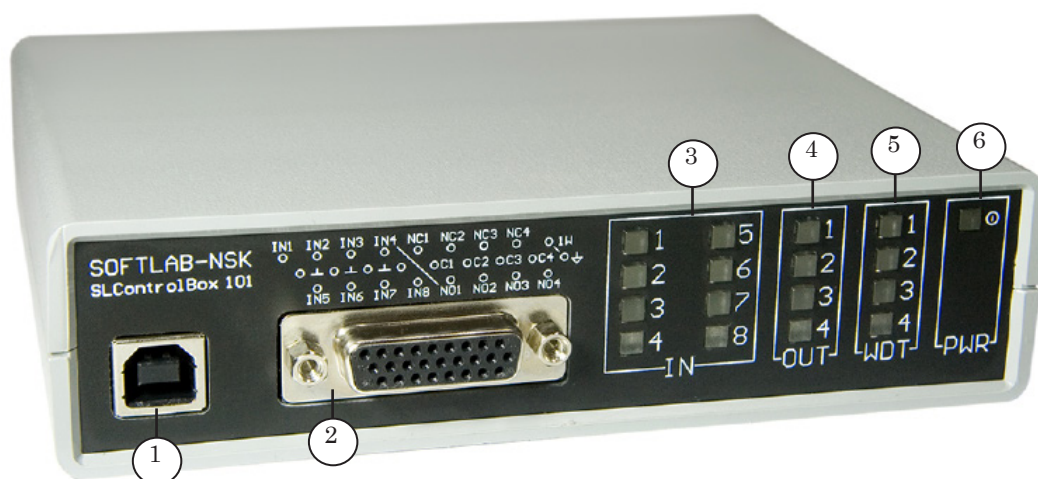
## Device Description

SLControlBox is an external device of the HID type that is plugged to PC via USB.

There is a serial number on the device front panel.

The front panel has:

- slot for plugging to PC via USB (1);
- DHR-26F connector (2) for plugging to external devices;
- blocks of indicators that display current state of lines used for transmitting signals (for more information see corresponding sections of this document):
  - GPI-In (3);
  - GPI-Out (4);
  - WatchDog functions (5);
- power supply indicator (6).





## Plugging the Device

The SLControlBox 101 device is the USB HID type of device.

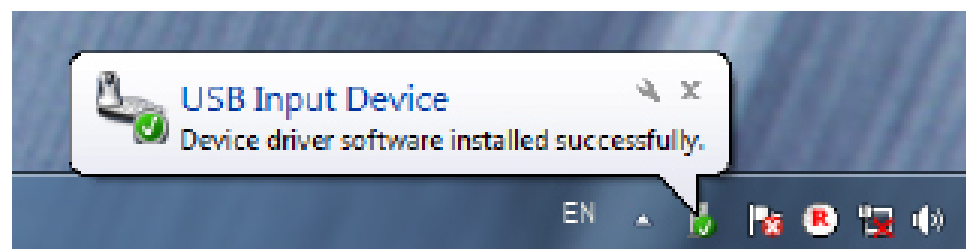
- ✓ **Important:** OS identifies type of device and installs drivers when plugging the device automatically.

Complete the following to connect the device to PC:

1. Plug SLControlBox to PC via USB. The cable is included into delivery set. Power supply indicator is lightened on the front panel of the device (1). It is lightened all time of device working.



2. Wait until installation of all necessary components is complete. Service message in the low right window corner appears.



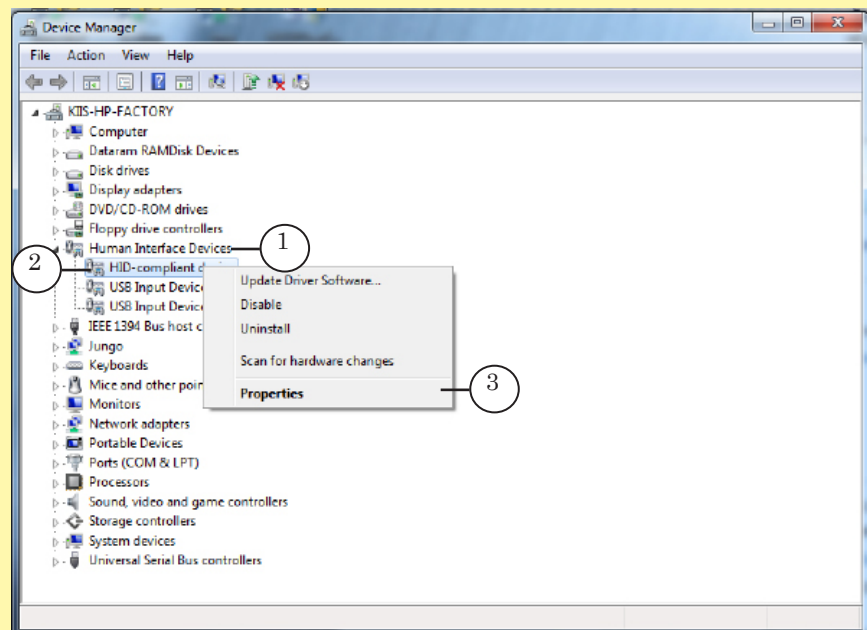
3. Installation is complete.



**Tip:** The device appears in the HID Devices group of the Device Manager window.

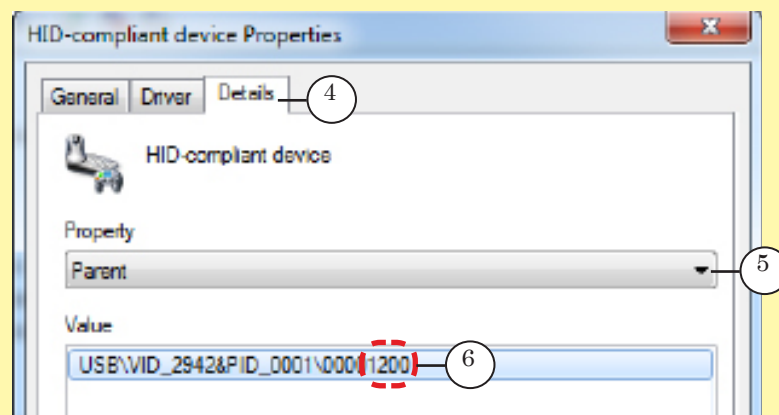
Complete the following to check it:

1. Click Control Panel in the Start menu.
2. Select Device Manager in the appeared window.
3. Find the HID Devices (Human Interface Devices) group of elements (1) in the list of system devices. SLControlBox is marked as HID-compliant device (2).
4. Select Properties (3) in the context menu.



The Details: HID-compliant device window is opened.

5. Pass to the Details tab (4).
6. Select the Parent item in the Property drop-down list (5). SLControlBox device serial number (6) is displayed in the Value field (at the end, last 4 digits).

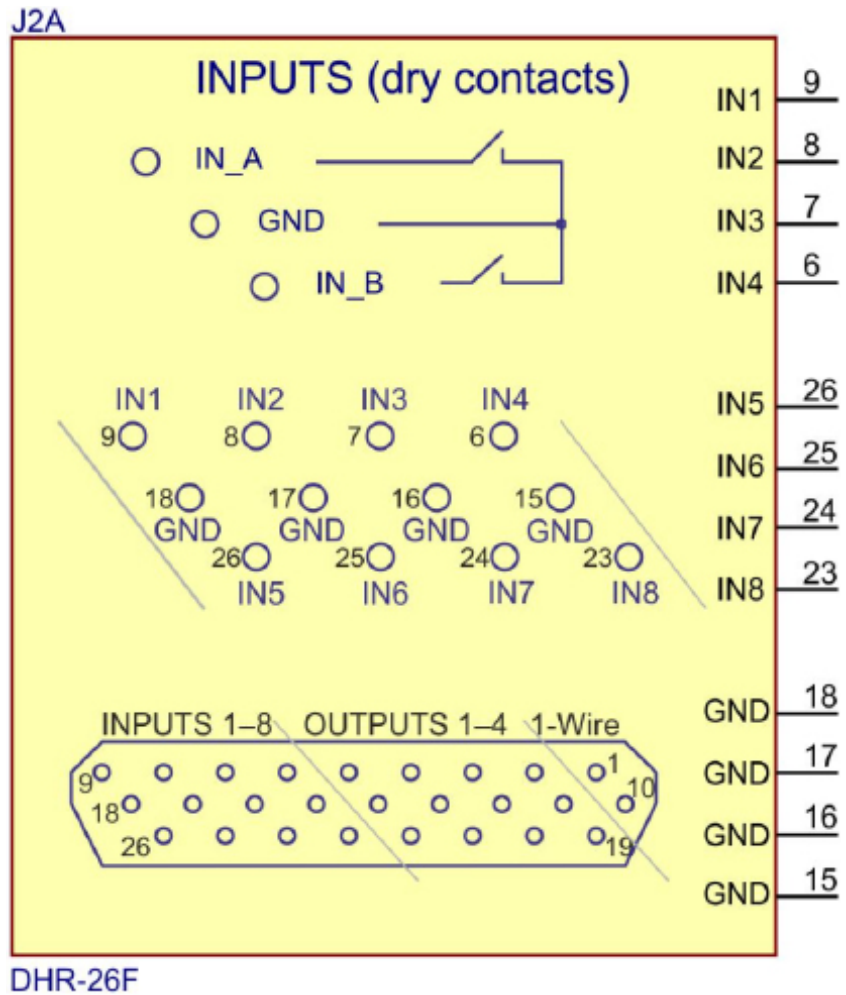






# DHR-26F Connector Wiring Scheme

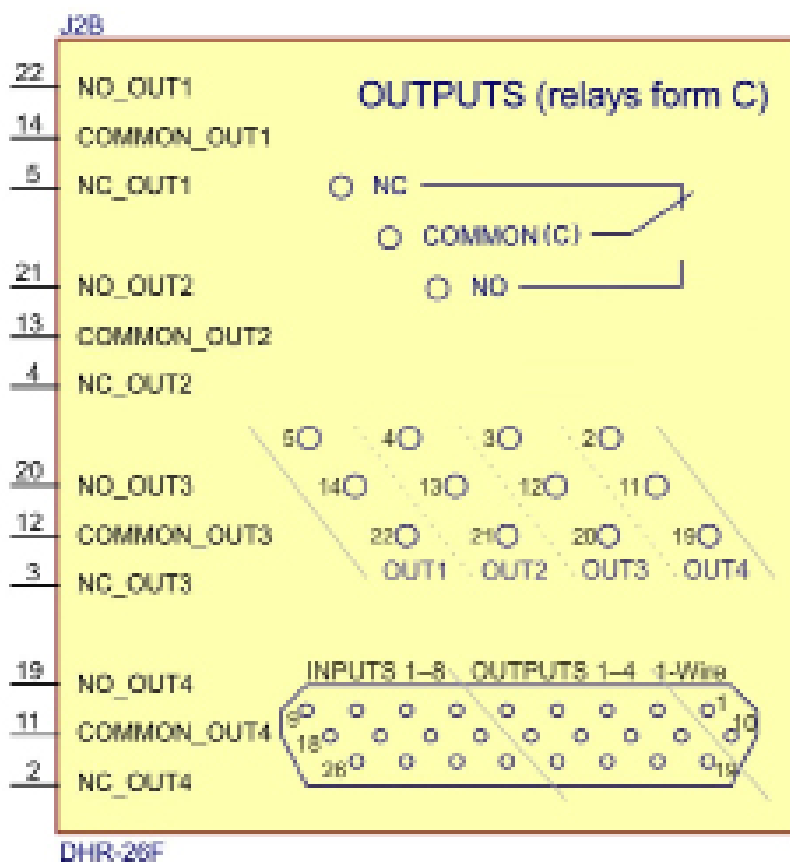
## 1. Input Group



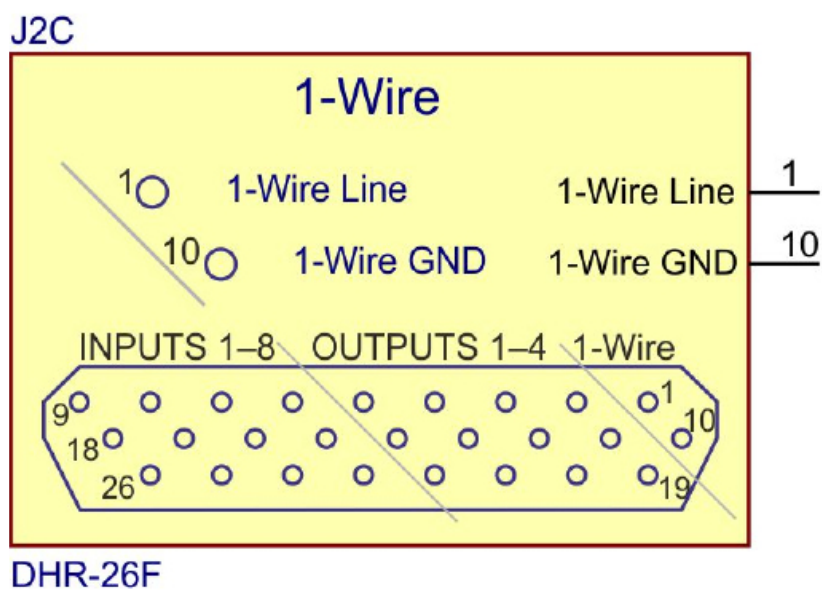
General Information



## 2. Output Group



## 3. 1-Wire Group

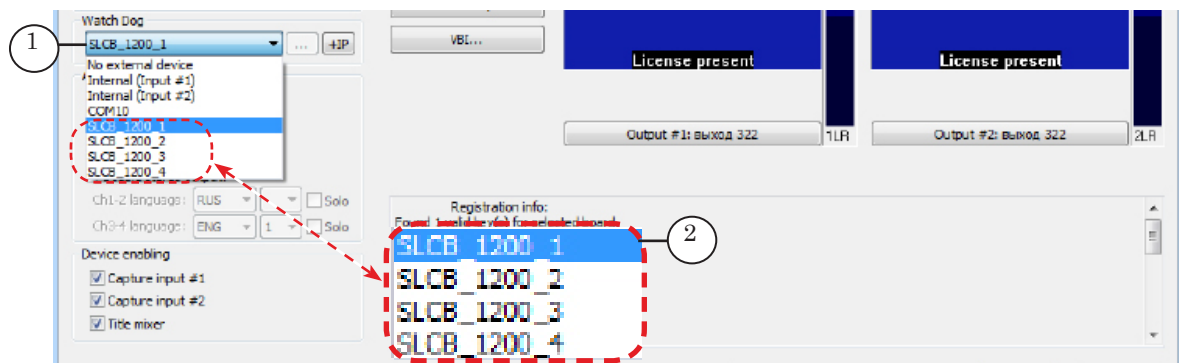


Contacts of this group are not used at the present moment.



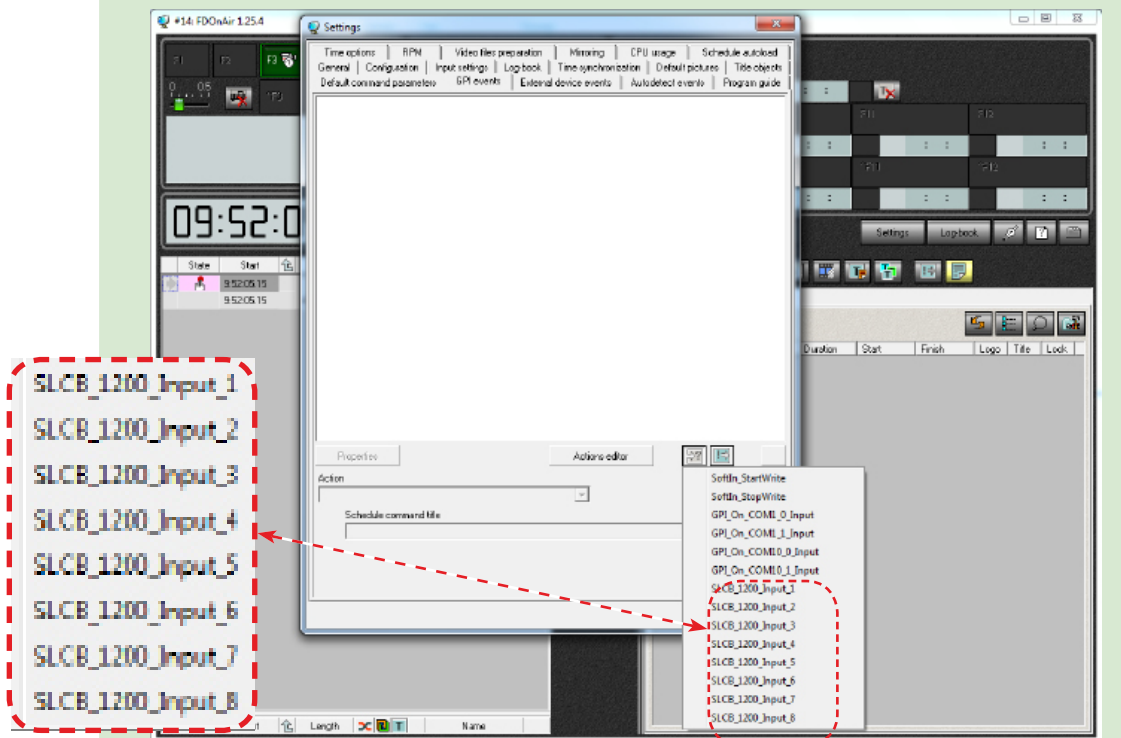
## System Identifiers of Lines and GPI Signals

1. Identifiers of SLControlBox lines at customizing WatchDog function in the FDConfig2 program look like (1):  
SLCB\_XXXX\_N, where XXXX is a serial number of used SLControlBox device, N is a serial number of line (from 1 up to 4), for example, SLCB\_1200\_1 (2).



2. Identifiers of GPI-In input signals in the FDO nAir program look like:  
SLCB\_XXXX\_N\_Input, where XXXX is a serial number of used SLControlBox device, N is a serial number of line (from 1 up to 8);

➡ **Example:** The picture below presents a list of input signals identifiers for device with serial number 1200.

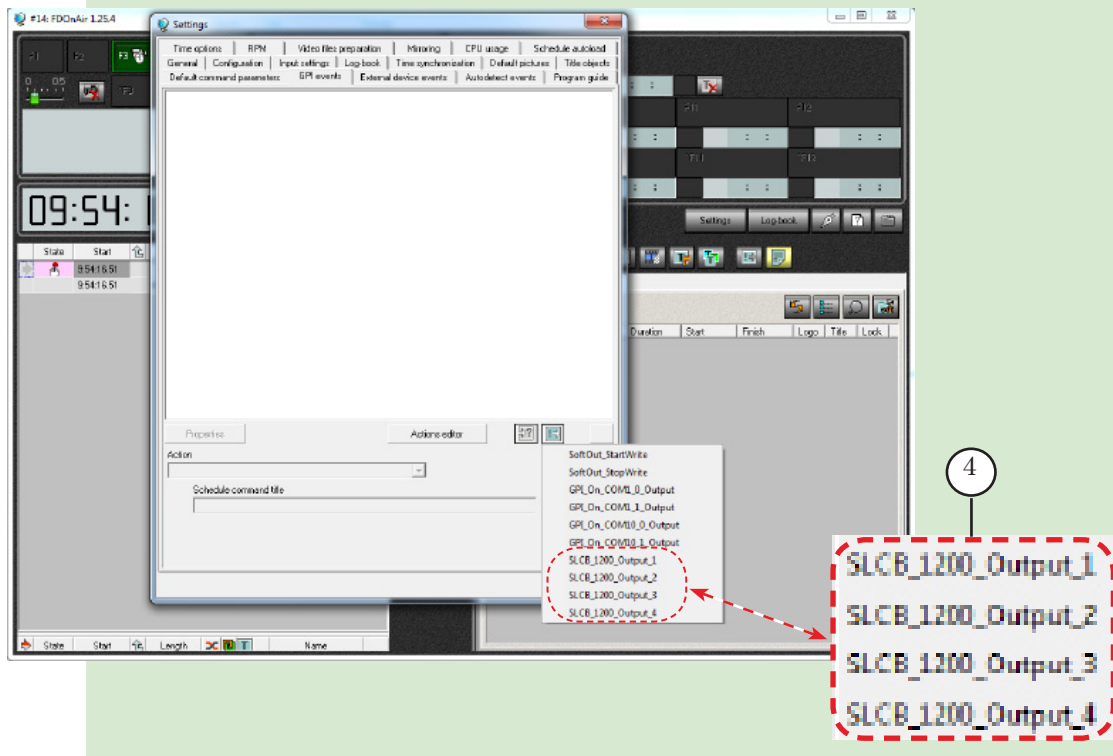




3. Identifiers of GPI-Out output signals in the FDO nAir program look like:

SLCB\_XXXX\_N\_Output, where XXXX is a serial number of used SLControlBox device, N is a serial number of line (from 1 up to 4).

**Example:** The picture below presents a list of identifiers of output signals for device with serial number 1200 (4).





## Main Features of Device Output Lines

Each of the four GPI-Out lines can be used for:

- monitoring hardware-software complexes – the WatchDog function;
- transmitting control signals to external devices in FDO nAir according to schedule.

✓ **Important** One line can be used only for one function: either for transmitting control signals or for the WatchDog function. The WatchDog function has a priority. If a line is selected for both functions then WatchDog is active in this case only. Be attentive at specifying line when configuring GPI-Out control signals in FDO nAir. Select only the lines that are not used for the WatchDog function.



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# WatchDog Function

## General Information

The SLControlBox device can be used for monitoring hardware-software complexes based on FDExt boards (FD322/FD422/FD842 boards). It assists in solving a backup redundancy problems occurred in automated broadcasting systems based on one of the ForwardTA/TP products.

In case of broadcasting server failure the complex switches from input to a passthrough signal or to a redundant server via external commutator automatically. The commutator is purchased separately. Redundant server and principle server work consecutively.

The device responds failures in a work of:

- OS;
- FDExt boards (FD322/FD422/FD842);
- FDO nAir program.

In case of a principle air server failure the device transmits a signal to commutator to switch to redundant broadcasting.

When principle server starts functioning again then the device sends signal to commutator to return from redundant broadcasting to the usual one.



## Schemes of Redundancy

### 1. General Information

There are 3 schemes of redundancy:

- bypass;
- mirroring;
- mirroring with bypass.

- ✓ **Important:** Mirroring requires presence of the second video server identical to the principle one. For example, if Forward TA product is used on the principle server then you must purchase the same product for the second server (the same is with Forward TP product).

At mirroring all actions are implemented via integrated FDO nAir mechanism (the main broadcasting program from the Forward TA/TP set) for transmitting messages to other program instances. All operator actions (loading schedule, launching titles or video material, etc.) implemented on the first machine are duplicated on the second one automatically.

Schedule on the second server is completely the same as on the first server. Note that all used material (video clips, titles, etc.) must be placed in the same folders on both PCs. For this you can store all necessary material on the same disk, for example, «D:» and in folders with the same names. You can also store material on external file server. In this case you must identify network disk for both servers identically, for example, with «V:» symbol.

A process of copying files to mirror servers is not automatical. To do this we recommend using the CopyDR utility (copying files with specified maximal data rate) included into the Forward T software set.

- ✓ **Important:** Configure network connection between used machines for mirroring in FDO nAir. For more information on this issue see the «FDO nAir: Mirroring, Remote control» document.

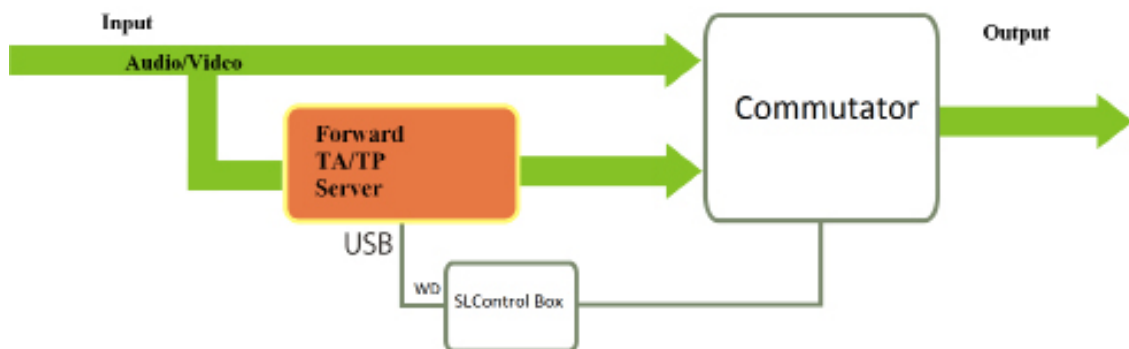


The following elements are present on schemes below:

- Server is a broadcast automation server (Forward TA/TP);
- Commutator is a commutator of video/audio signals (is purchased separately);
- WD – WatchDog signal.

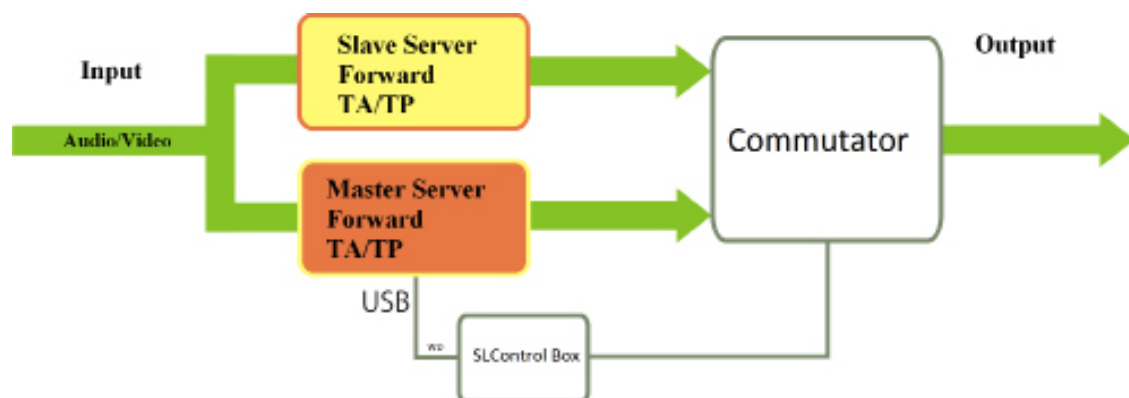
## 2. Bypass

Bypass enables automatic switching to passthrough signal in case of a server failure.



## 3. Mirroring

Mirroring enables automatic switching to redundant server in case of the main broadcasting server failure.

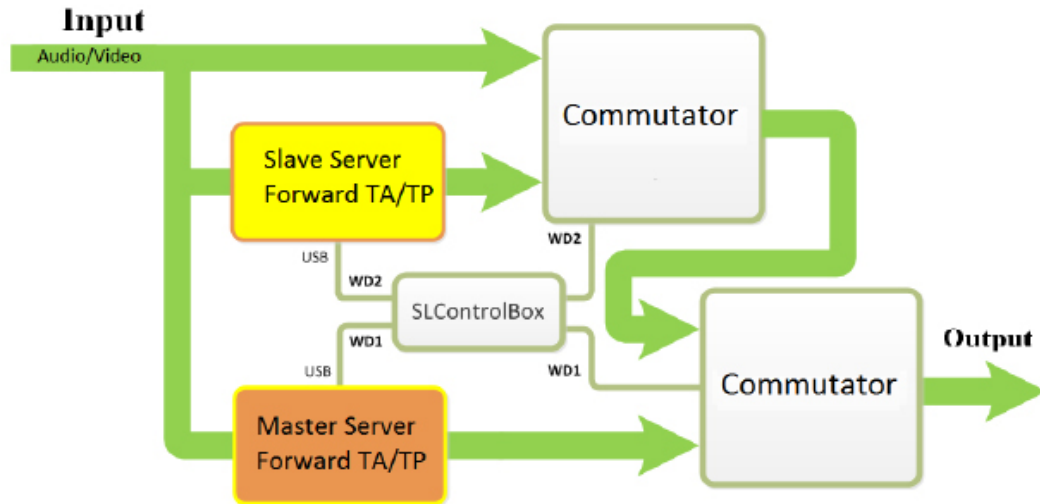






#### 4. Mirroring With Bypass

In case of failure of the main server it switches to redundant server automatically. If redundant server is failed switching to passthrough signal occurs.





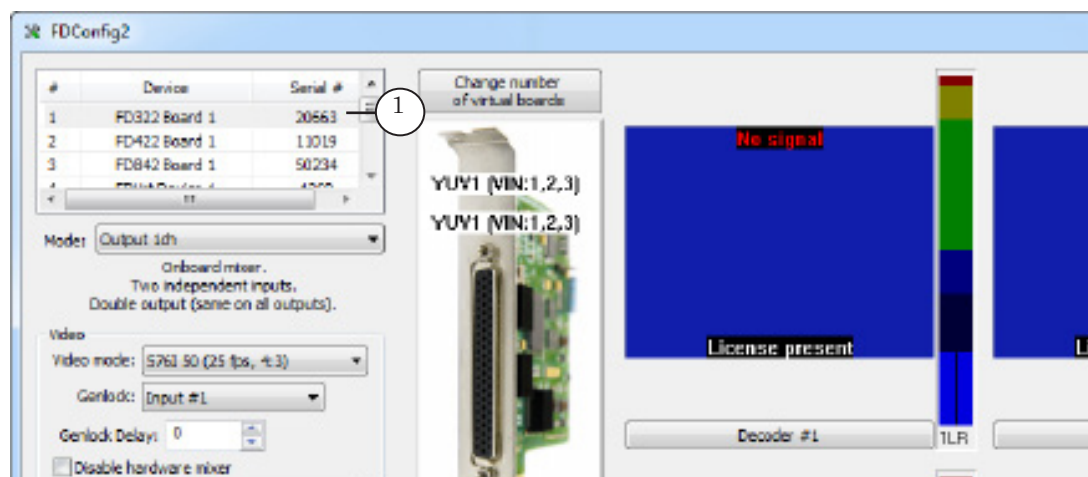
## Preliminary Steps

### 1. General Workflow

1. Prepare cable for plugging SLControlBox device and commutator according to description of plugged commutator. Also, take into account the Output wire group of the SLControlBox device (see the "DHR-26F Wiring Scheme" section).
2. Plug SLControlBox device to PC used as a principle broadcasting server. Be sure that PC system detects the device and necessary drivers are installed.
3. Customize the WatchDog function in the FDConfig2 program.
4. Prepare necessary redundant scheme (see the "Schemes of Redundancy" section above).
5. Test WatchDog function work (see the "3. Checking and Indication of WatchDog Working Modes" subsection of this section).

### 2. WatchDog Customizing

1. Launch the FDConfig2 program in one of the following ways:
  - via desktop shortcut;
  - via the Start menu:  
Programs > ForwardT Software > Board Setup > FDConfig2.
2. If several FDExt boards are installed then select the board for which redundancy scheme is customized in the Boards List group (1).

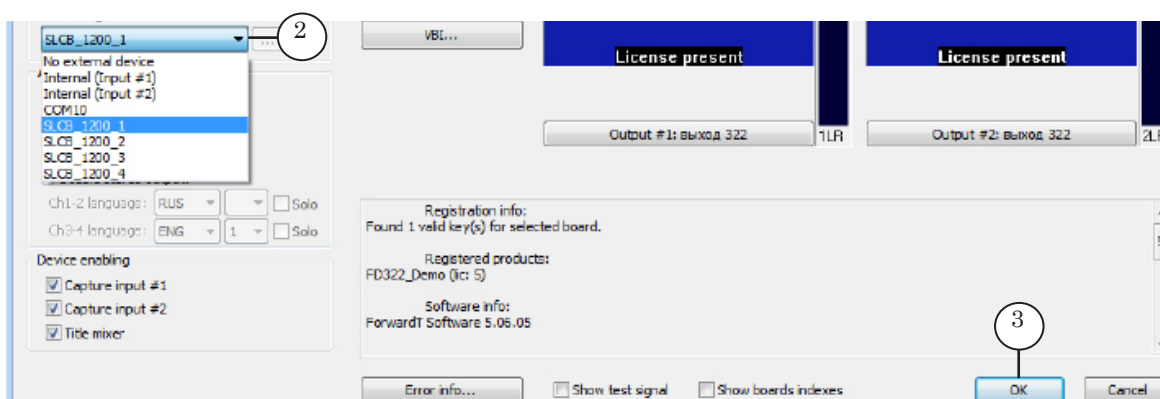




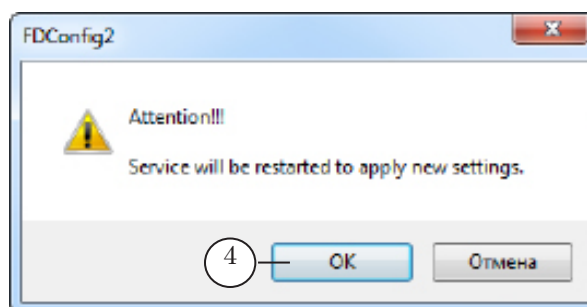
3. Select identifier of necessary line (SLCB\_XXXX\_N, where XXXX is a serial index of SLControlBox, N is index of line from 1 up to 4) in the WatchDog drop-down list (2).

✓ **Important:** At specifying line index be sure that the line is not used for WatchDog function by another board or for GPI-Out signal in FDOAir.

4. Click OK (3) to apply changes.



5. Service message appears. Click OK (4).



The FDConfig2 program is closed.

✓ **Important:** After FDConfig2 program closing the WatchDog function is customized but is not activated yet. The function is activated when air signal is transmitted to board output via one of the FDOAir commands (more information you can find in the "3. Checking and Indication of WatchDog Working Modes" section). Indicators located on the front panel of the SLControlBox device display current state of the WatchDog function: active/not active.



### 3. Checking and Indication of WatchDog Working Modes

WatchDog function can be tested via the FDO nAir program.

Current state of WatchDog is displayed on the front panel of the SLControlBox device via indicators of the OUT and WDT groups (1). The indicators have the same indices.

**Note:** The OUT indicator shows that current line is already in use. It is impossible to use it for the Send signal command.



Complete the following to test WatchDog that deals, for example, with line 1 (SLCB\_XXXX\_1 identifier):

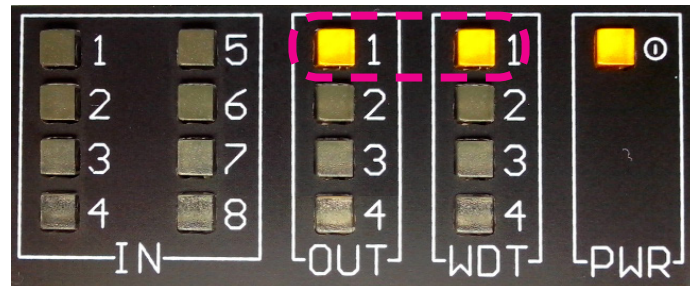
1. Select line with SLCB\_XXXX\_1 identifier in FDConfig2 (for more information see "2. Customizing WatchDog in FDConfig2 Program" subsection).

Check indicators' state. The indicators are not lightened because WatchDog function is not activated yet, the state is INITIAL.

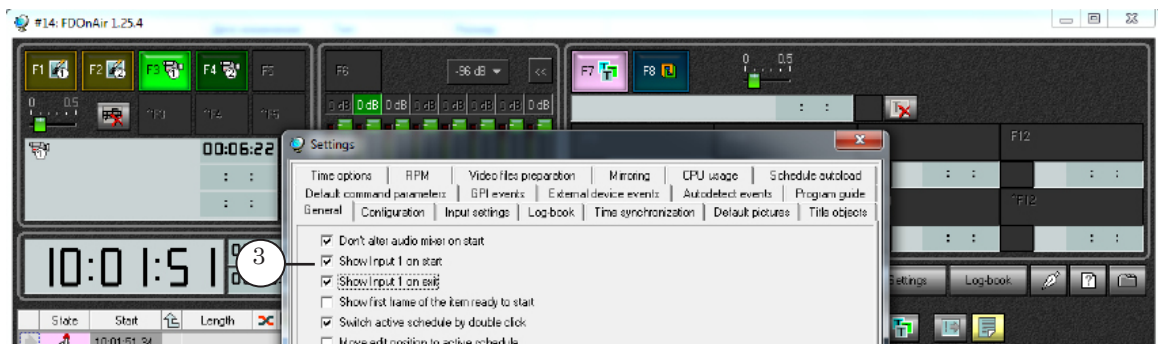
2. Launch the FDO nAir program and click the VideoInput 1 button (2) to transmit air video and audio signal to work board output (or execute some other playback command).



Check indicators' state now. The indicators must be lightened: indicator 1 in the OUT group and indicator 1 in the WDT group: WatchDog function is activated, the state is NORMAL.



**Note:** If the Show Input 1 on start mark (3) is put in the FDO nAir program on the General tab of the Settings window then indicators are switched on at opening FDO nAir main program window.



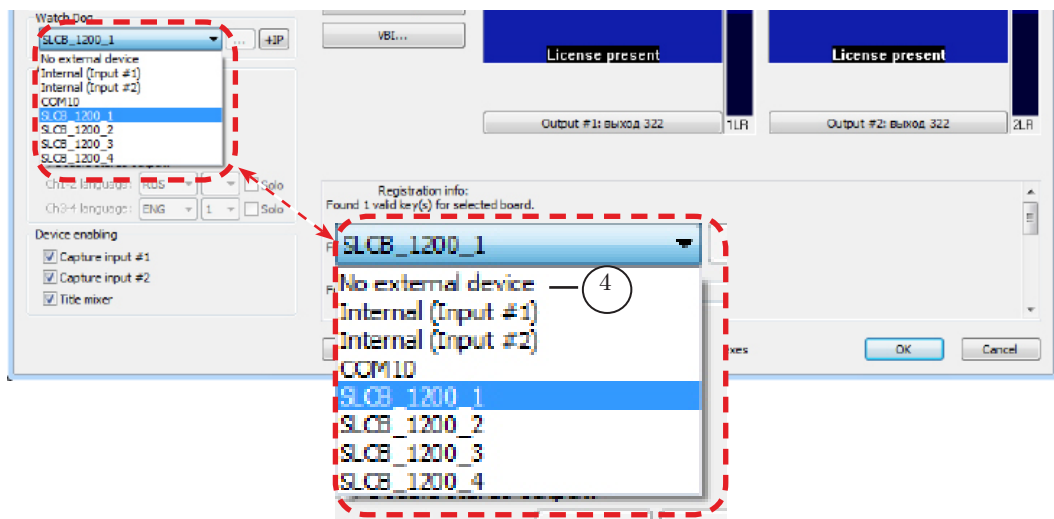
3. Close the FDO nAir program. There is the ALARM state in this case.  
Check indicators' state:
  - indicator 1 in the OUT group is not lightened;
  - indicator 1 in the WDT is blinking.
4. Repeat actions of item 2. WatchDog state is changed from ALARM to NORMAL.
5. Unplug the SLControlBox device by taking USB cable away or switching video server off. Then plug the cable again.  
Check indicators' state. The indicators must not be lightened. The WatchDog state is changed to INITIAL state.



### Indication of WatchDog function state.

OUT and WDT indicators	State
Indicators are not lightened	INITIAL state. WatchDog monitoring system is not functioning because one of the reasons: – broadcasting in FDO nAir is not started yet after WatchDog plugging; – hardware-software complex is switched on after unplugging power though broadcasting is not started yet; – the SLControlBox device is switched off, it is plugged to power but broadcasting is not started yet.
Both indicators are lightened	NORMAL state. Hardware-software complex functions usually: video and audio signal is transmitted to board output.
OUT is not lightened.  WDT is blinking	ALARM state. Hardware-software complex stopped functioning.

**Note:** If the FDConfig2 program is opened and No external device option (4) is selected then after program closing the WDT indicator continues blinking.  
Unplug device from power (first unplug, then plug USB cable again) to display current INITIAL state of the function by indicators correctly.  
Implement these actions when reassigning WatchDog function to another output line.

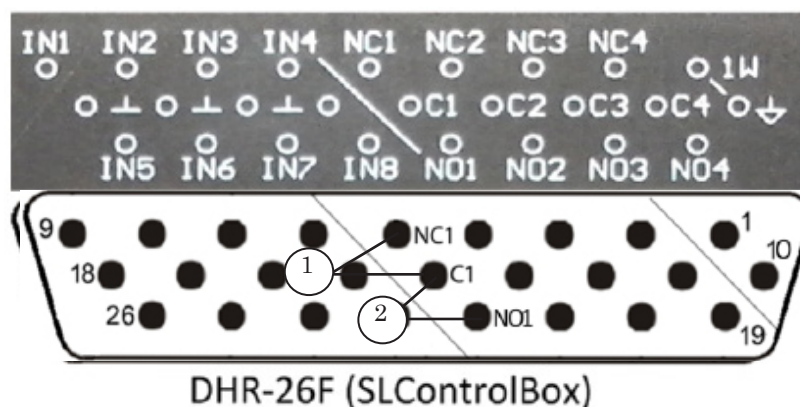






## Examples of Plugging SLControlBox to External Commutators

Prepare cable to plug SLControlBox device to external commutator. Order of commutating contacts depends on construction of a concrete commutator. If switching to reserve is implemented at closing corresponding contacts then deal with NC-C sockets contacts (1), if at opening – deal with NO-C contacts (2). Index of pair corresponds to index of used output line for WatchDog.



✓ **Important:** We insistently recommend working according to instructions supplied with the concrete device. Take into account schemes of wiring presented in this document. Strictly follow the instructions supplied with commutator.

Let us consider the order of SLControlBox plugging to external switchers on the example of 2 devices:

- redundant switcher SW-212VAS2 – manufactured by «LES-TV» ([www.les.ru](http://www.les.ru));
- bypass relay module PRB-097 – manufactured by «PROFIT» ([http://www.profit.ru/index\\_e.html](http://www.profit.ru/index_e.html)).

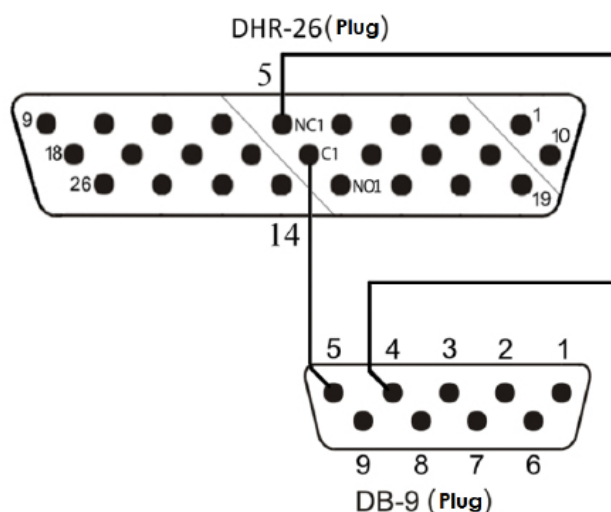


## 1. Redundant Switcher SW-212VAS2

DB-9 (EXT) socket is used in SW-212VAS2 redundant switcher for a remote control. Switching to reserve is implemented at closing contact 4 to contact 5 («ground»). This information is taken from the «LES-TV» web-site.

Prepare connection cable to plug SLControlBox to switcher. On the one end of the cable there is DHR-26 plug plugged to SLControlBox device, on the other end there is DB-9 plug for plugging SW-212VAS2 device.

A scheme of connecting DHR-26 and DB-9 plugs is given below.



(Viewing connectors "plugs" from the site of contacts for wiring).

In case when NC1–C1 pair is used you can deal with output line with SLCB\_XXXX\_1 identifier for WatchDog function (XXXX denotes a serial number of device).

- ✓ **Important:** Information in this section is taken from web-page of manufacturer company. This is not directly a user's guide on plugging SW-212VAS2. That's why we insistently recommend working according to instructions supplied to the concrete device because manufacturer can vary construction of switcher.



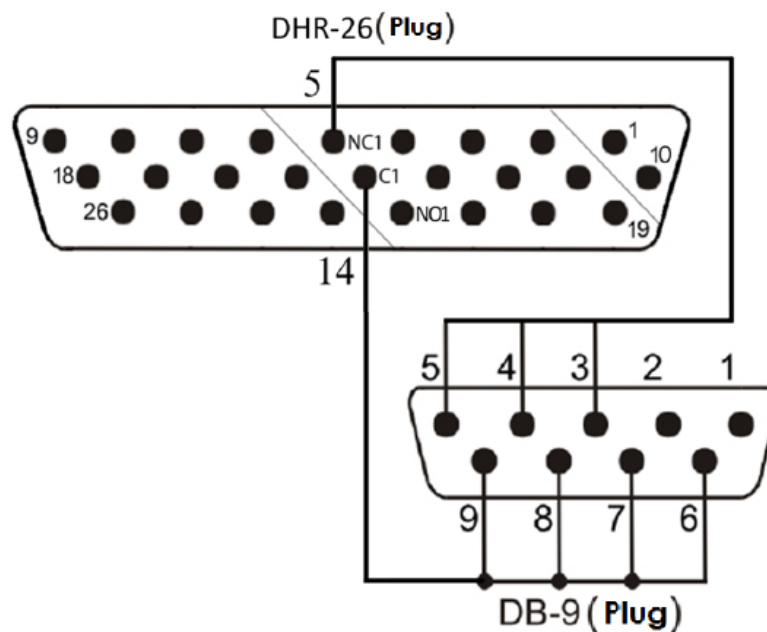


## 2. Bypass Relay Module PRB-097

DB-9 type socket is used in PRB-09 bypass relay module for a remote control. Switching to reserve is made at shorting a corresponding contact (signal) with the «ground» one (GND).

Prepare connection cable to plug SLControlBox to the module. On the one end of the cable there is DHR-26 plug, on the other end there is DB-9 plug for plugging to PRB-097 relay module.

A scheme of connecting DHR-26 and DB-9 plugs is given below. In this case when failure appears all channels are simultaneously switched to reserve.



(Viewing connectors "plugs" from the site of contacts for wiring).

In case when NC1–C1 pair is used you can deal with output line with SLCB\_XXXX\_1 identifier for WatchDog function (XXXX denotes a serial number of device).

- ✓ **Important:** Information in this section is not directly a user's guide on use of PRB-097. That's why we insistently recommend working according to instructions supplied to the concrete device because manufacturer can vary construction of switcher.



# Use of GPI Signals in FDO nAir Program

## General Information

There is a possibility to receive and send GPI signals in the FDO nAir program using SLControlBox input and output lines.

Such possibility also manages realizing simple ways of own (regional) ads insertion into air of the main broadcasting station:

- GPI-In signals allow to control FDO nAir work and schedule execution via external devices.  
For example, to insert ads "by clicking button" (see screenshots and Examples);
- GPI-Out signals allow transmitting control signals to external devices.  
For example, to insert regional ads into transitional air signal via commutator (without use of a video server).

## 1. Preparatory Workflow

1. Prepare connection cable for device that is plugged to SLControlBox. Take into account all aspects described in this document concerning pinouts and instructions supplied with external device.
2. Define what state is active one (when contacts are closed or opened) for external device that is plugged to SLControlBox (more information see in the "The Wait Signal Command", "The Send Signal Command" sections).
3. Plug SLControlBox to PC.  
At first plugging wait till the system installs necessary drivers automatically.
4. Plug external device to SLControlBox via DHR-26.
5. Launch the FDO nAir program.
6. Complete the following in FDO nAir:
  1. Configure necessary commands for interacting with external devices via GPI:



- the Wait Signal command is used for receiving control signals from external devices;
  - the Send Signal command is used for transmitting control signals to external devices.
2. Load schedule. Add necessary commands (Wait Signal or Send Signal command) for interaction with external devices with assigned Resume Schedule/Autodetect action (Wait Signal commands with any other assigned actions are not added to schedule).
  3. Test activation of configured commands.
7. The device is ready for use.

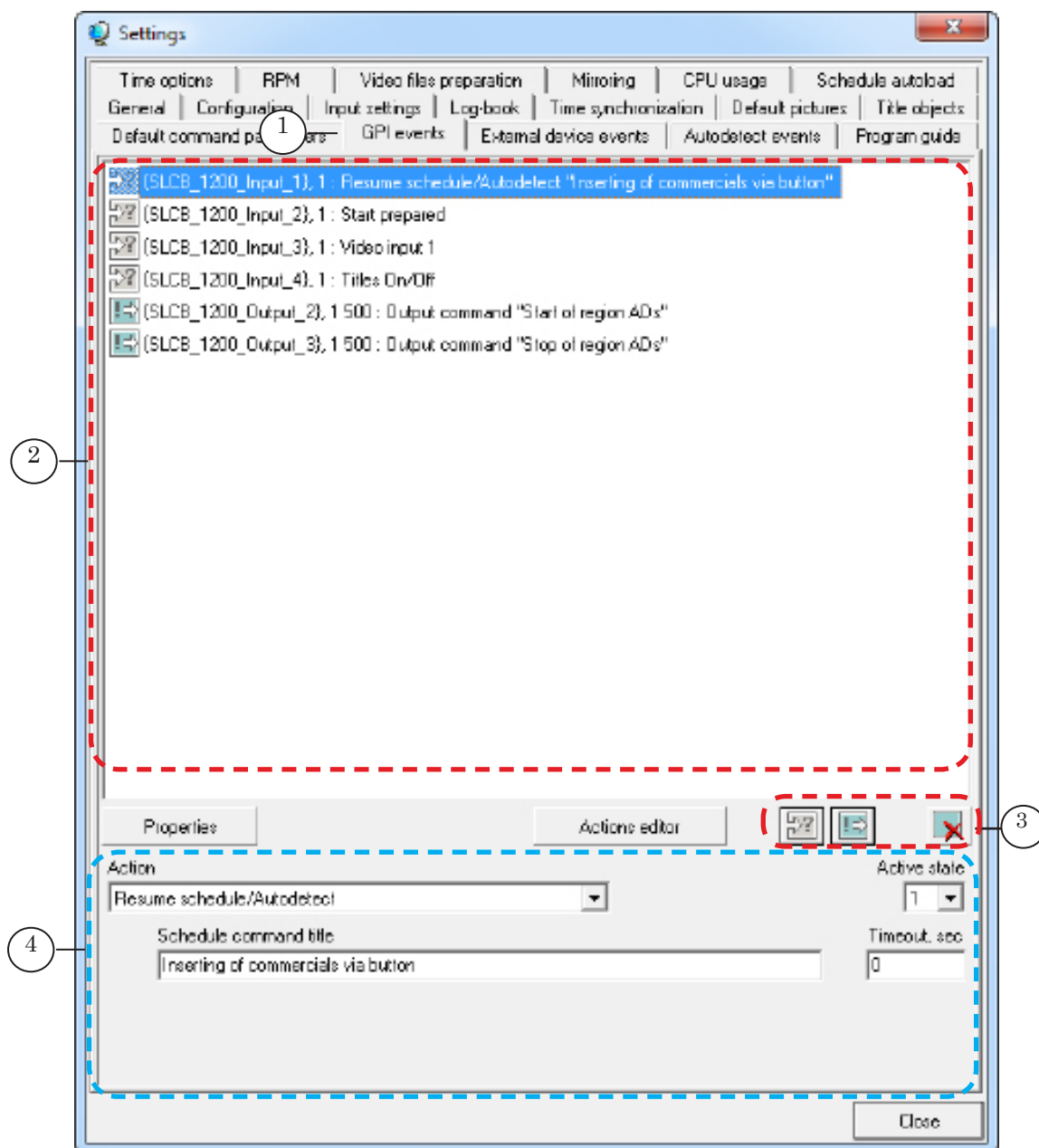
## 2. FDO nAir Commands for Working With GPI Signals

You must adjust special command for each GPI signal in FDO nAir:

- for input signals – the Wait Signal command;
- for output signals – the Send Signal command.



Commands for dealing with GPI signals are configured in the Settings window, on the GPI Events tab (1).



Control elements:

1 – tab title; 2 – window with a list of adjusted commands; 3 – buttons for editing commands list; 4 – elements for editing the Wait Signal command (for the Send Signal command adjusting elements are different).



## The Wait Signal Command

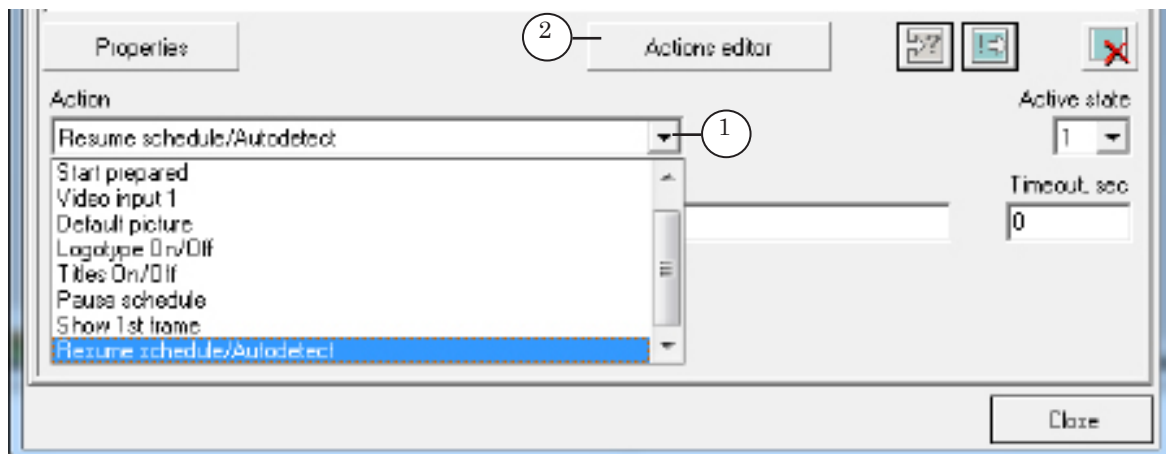
### 1. Types of The Wait Signal Commands

The Wait Signal command is used to correspond input GPI signal and action implemented by FDO nAir. There are 2 types of the Wait Signal commands:

- command with assigned Resume Schedule/Autodetect action;
  - other commands.
1. The Wait Signal command with assigned Resume Schedule/Autodetect action is used as a schedule command to control schedule execution.
  2. You can assign actions that correspond to FDO nAir control commands for other Wait Signal commands. Such commands are executed by the program at receiving GPI signal with assigned command.

### 2. Actions Executed via the Wait Signal Command

Pass to the GPI events tab and click the Actions Editor button (2) from the Action drop-down list (1) to view a list of actions possible to be executed when GPI signal is received.



Each action (except the Resume Schedule/Autodetect action) corresponds to a specific FDO nAir command in the Actions Editor window.



Action for selected string (3) is displayed in the (4) field and corresponding command in the (5) field. Table with possible standard actions and corresponding commands is given below.

You can also create new action via the (6) button in the Actions Editor window, give name in the (4) field and assign command to it in the (5) field. Unnecessary actions (except the standard ones) can be selected and deleted via the (7) button.

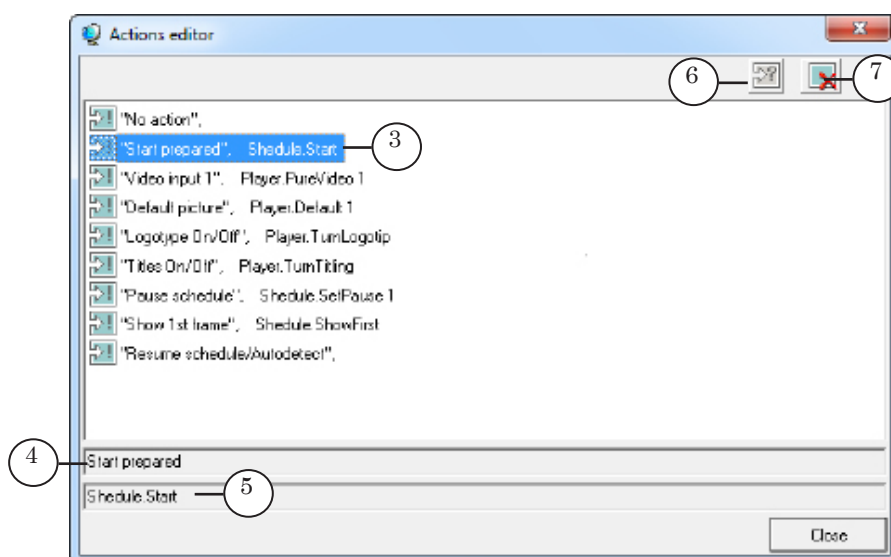


Table of correspondence among standard actions (specified as the Wait Signal command) and FDO nAir commands and result are described below.

Action	FDO nAir command	Result
Start Prepared	Shedule.Start	Start of schedule execution from the next command (corresponds to clicking the Start button).
Video Input 1	Player.PureVideo1	Video from Video Input 1 is transmitted to board output.
Default Picture	Player.Default1	Default picture is displayed on board output (the Default Picture 1 command).
Logotype On/Off	Player.TurnLogotip	Logotype on/off.
Titles On/Off	Player.TurnTitling	Titles on/off.
Pause Schedule	Shedule.SetPause1	Schedule execution is paused when a current command is finished to be performed (corresponds clicking the Pause button).
Show First Frame	Shedule.ShowFirst	First frame of displayed material is displayed on board output.
Resume detect	Schedule/Auto-detect	–
		Start of execution of the next schedule task.



### 3. Use of Command

There are different rules of the Wait Signal command use depending on assigned action to control signal. Complete the following items for correct command activation:

1. Customize the command on the GPI Events tab.
2. If you deal with command with Resume schedule/Autodetect assigned action then after its customizing on the GPI Events tab you must insert it to FDO nAir schedule.

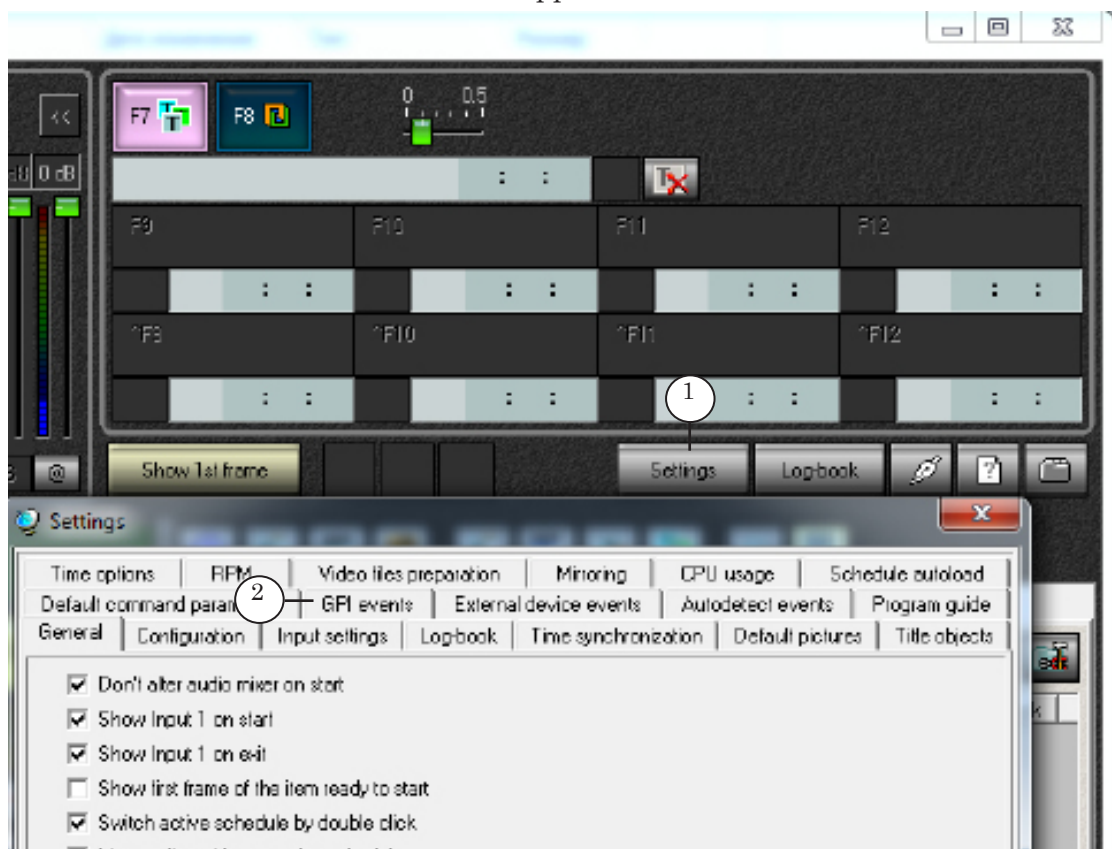
### 4. Customizing the Wait Signal Command

The Wait Signal command with any assigned action except the Resume schedule/Autodetect action is configured in the Settings window on the GPI Events tab. Then the command is executed in FDO nAir each time when GPI signal is received.

The command is customized in two stages: firstly add input signal (is customized automatically), secondly edit it by assigning necessary command with action to it.

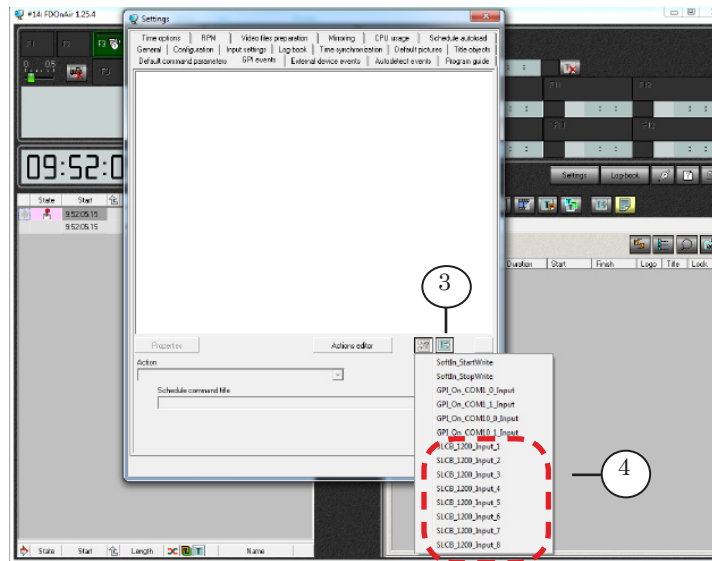
Complete the following to add input signal:

1. Click the Settings button (1) and pass to the GPI Events tab (2) in the FDO nAir application main window.

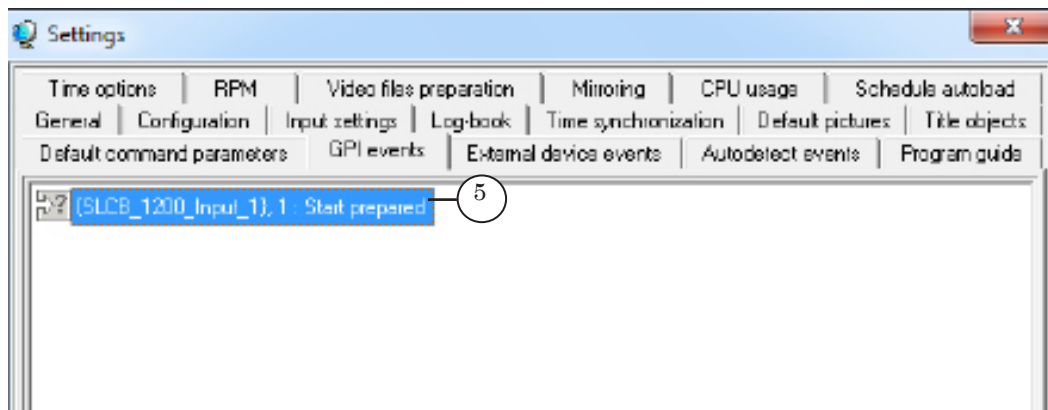




2. Click Add Input Signal button (3) on the GPI Events tab.



3. Select GPI-In signal identifier (4) by clicking it in the appeared list.
4. New configured automatically Wait Signal command (5) is added in the GPI Events window.









New configured command has the following format:

 {SLCB\_XXXX\_N\_Input}, AC : Action "Command Name"

where:

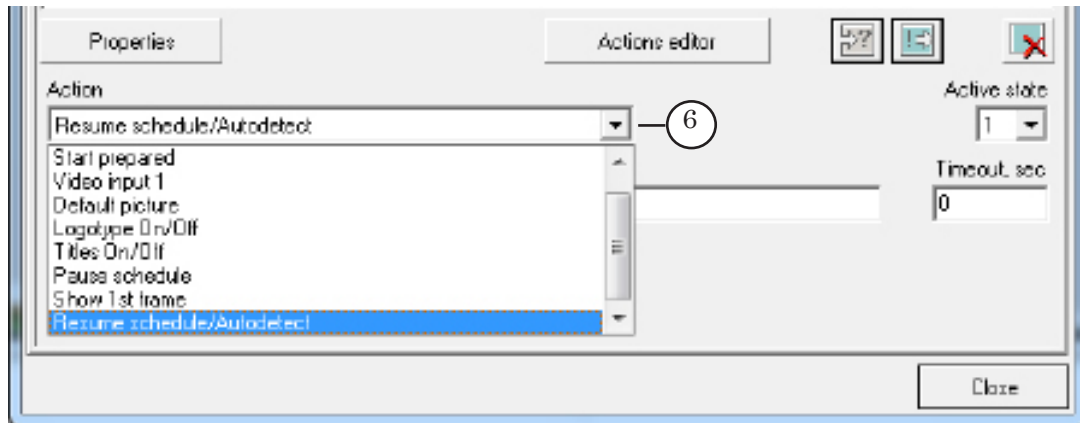
-  is a picture that denotes the Wait Signal commands ready for activation. The command is customized incorrectly and will not be executed if it is marked by ;
- **SLCB\_XXXX\_N\_Input** is identifier of expected GPI signal on input where:
  - **SLCB\_** is identifier of device that generates GPI signal (SLCB denotes SLControlBox);
  - **XXXX** is a serial number of device;
  - **N** is an index of used GPI signal, from 1 up to 8;
- **AC** is value of the Active state parameter that denotes active state of plugged device:
  - 0 – contacts are open;
  - 1 – contacts are closed;
- **Action** denotes name of executed command when GPI signal is received, for example, Titles On/Off;
- **Command name** denotes name of a command (arbitrary text that comments use of the command). When adding the command to schedule its name is displayed in the Name column of table with schedule. This parameter is displayed only for the **Resume schedule/Autodetect** commands.

**Note:** Active state is a state of external device when the Wait Signal command is activated.  
For example, if external device sends GPI signal at closed contacts then "closed contacts" state is active. In this case you must specify value "1" on the GPI Events tab (see information below).



Complete the following to edit added command:

1. Select line with added command. Its current configuration is displayed in lower part of the GPI Events tab.
2. Select action implemented when GPI signal is received in the Action drop-down list (6).

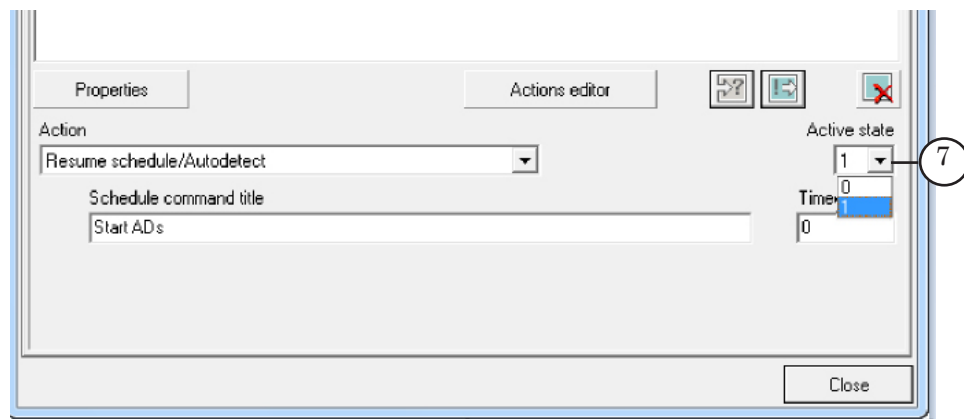


If there is no desired action add it in the Actions Editor window, then select it in the Action list.

3. Specify state of GPI signal source (external device) via the Active State list (7).

The command is activated at:

- 1 – closing contacts;
- 0 – opening contacts.



If the Action parameter is Resume schedule/Autodetect pass to the next step. If another action is specified configuration is complete.

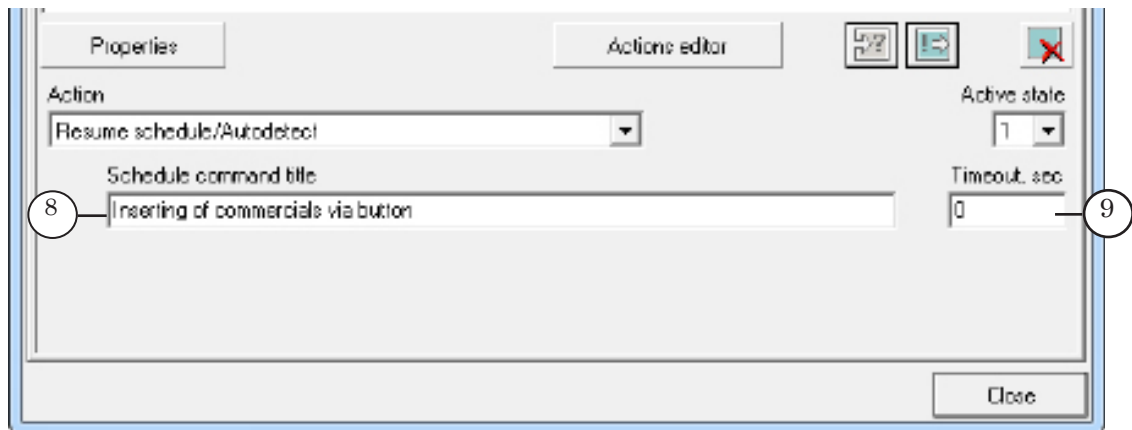
Such command is not inserted into the schedule but is executed at receiving GPI signal.

For example, receiving GPI signal with Start Schedule action is the same as clicking the Start button in the FDO nAir main program window: execution of schedule starts (if it was prepared for being executed in advance).

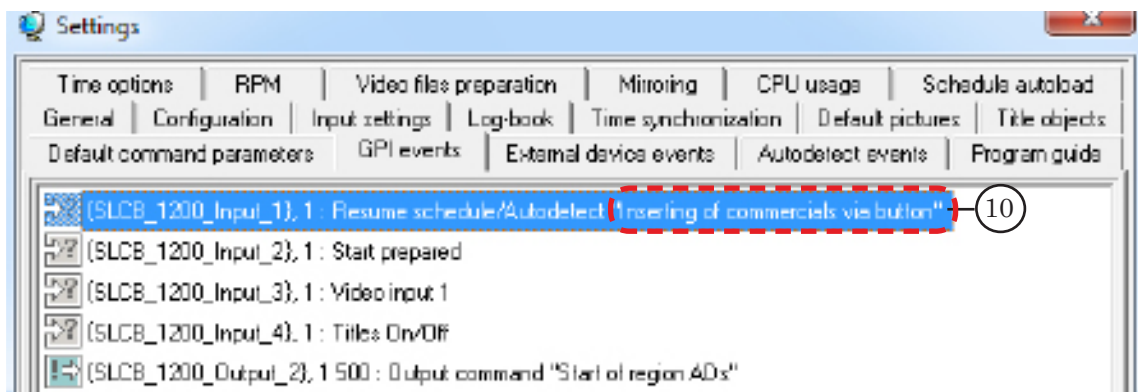


Customize features for the Resume Schedule/Autodetect command (the options are available only for this command) by completing the following:

4. Type name of command in the Schedule Command Title field (8). The name is displayed in the Name field when adding the command into schedule.
5. Specify timeout in seconds in the Timeout field (9). Timeout is a maximal duration of command execution in schedule (is displayed in the Duration bar of the FDO nAir program schedule):
  - if Timeout is not zero then the command in schedule is executed during specified time period; if GPI signal for this command is not received then the next command starts to be executed;
  - if Timeout is zero then the command is executed unlimited time until GPI signal is received.



Note: Compare typed text for configured commands in the GPI Events window. Command name is an additional parameter specified in the full name of the Resume Schedule/Autodetect command (10). The Timeout parameter is not displayed here.





## 5. Adding Command to Schedule

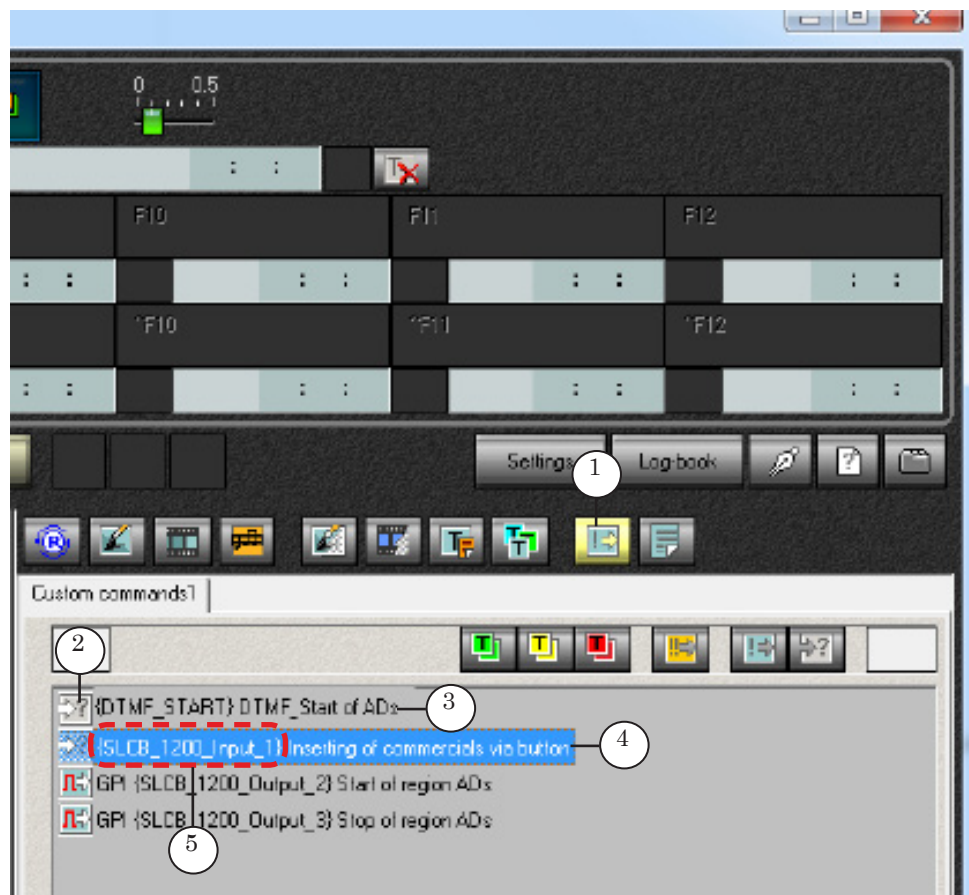
You can add the Wait Signal command with assigned Resume Schedule/Autodetect action to schedule only. The subsections 5 and 6 describe such type of commands only.

Complete the following to add the Wait Signal to FDO nAir schedule:

1. Click the Custom Commands button (1) in the main FDO nAir program window.

The Custom Commands page presents a list of commands that can be added to schedule.

The Wait Signal commands are marked by .



**Note:** The Wait Signal commands with assigned Resume Schedule/Autodetect action configured for AutoDetect events (3) are on this file page. Configured command (4) includes identifier of GPI signal of the SLControlBox device (5).

2. Set position identifier in necessary place of schedule (6) and double-click line with necessary command (7) to add it to schedule (8).



The screenshot displays a radio control software interface with the following components:

- Top Left:** Function keys (F1-F5) and a digital display showing "00:30:15".
- Top Center:** A multi-band equalizer with frequency sliders.
- Top Right:** A frequency display showing "0.05" and a grid of frequency slots.
- Middle Left:** A large digital display showing "16:49:28" and "00:00:00".
- Center:** A playlist table with columns for State, Start, Length, and Name. It lists various commercial files and "ADs" (Advertisements).
- Center Right:** A vertical toolbar with buttons for "Start", "Pause", and other playback controls.
- Bottom Right:** A "Custom commands" window containing a list of commands such as "IDTMF\_START|DTMF\_Start of AD's" and "ISLCB\_1200\_Input\_1|Inserting of commercials via button".

Annotations in the image:

- 8:** Points to the "Inserting of commercials via button" command in the playlist.
- 6:** Points to the "Inserting of commercials via button" button in the vertical toolbar.
- 7:** Points to the "ISLCB\_1200\_Input\_1|Inserting of commercials via button" command in the custom commands list.

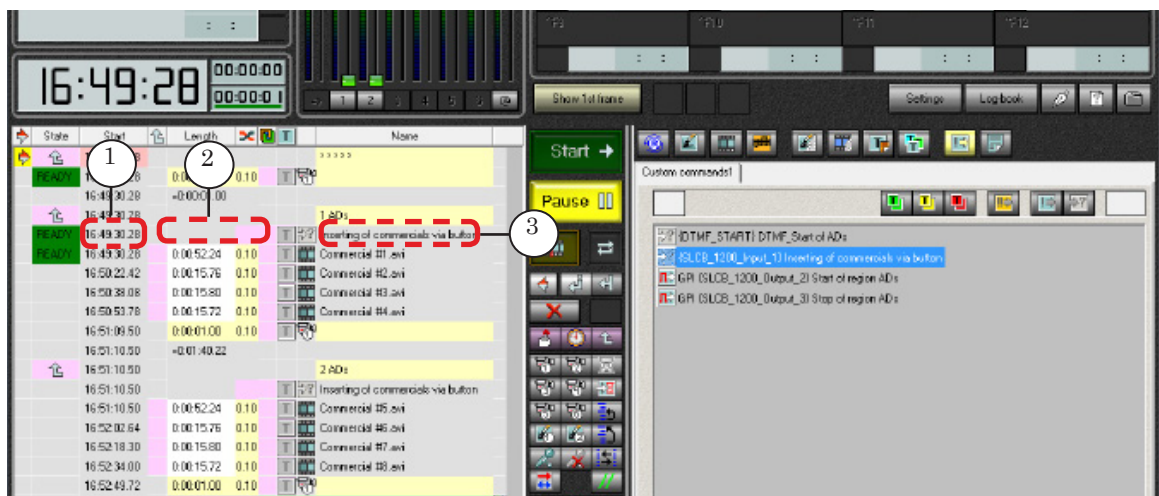
State	Start	Length	Name
READY	16:49:29.28	0:00:01.00	*****
READY	16:49:30.28	+0:00:01.00	*****
READY	16:49:30.28		1 ADs
READY	16:49:30.28		Inserting of commercials via button
READY	16:49:30.28	0:00:52.24	Commercial #1.avi
	16:50:22.42	0:00:15.76	Commercial #2.avi
	16:50:38.08	0:00:15.80	Commercial #3.avi
	16:50:53.78	0:00:15.72	Commercial #4.avi
	16:51:09.50	0:00:01.00	*****
	16:51:10.50	+0:01:40.22	*****
	16:51:10.50		2 ADs
	16:51:10.50		Inserting of commercials via button
	16:51:10.50	0:00:52.24	Commercial #5.avi
	16:52:02.64	0:00:15.76	Commercial #6.avi
	16:52:18.30	0:00:15.80	Commercial #7.avi
	16:52:34.00	0:00:15.72	Commercial #8.avi
	16:52:49.72	0:00:01.00	*****
	16:52:50.72	+0:01:40.22	*****



## 6. Execution of Command in Schedule

The following information is displayed in schedule in the field with the Wait Signal command (see picture below):

- the Start column displays time when command starts to be executed (1), time is defined automatically depending on duration of the previous schedule command;
- the Duration column displays Timeout parameter value; if value is absent then it equals to zero (2);
- the Name column displays name of a command specified by user (3).



The Wait Signal command has several features:

1. The command is executed according to schedule.
2. Start of command execution does not interrupt audio/video playback launched by the previous command in schedule, for example, if previous schedule command is a command with unspecified duration (VideoInput or Default Picture).
3. Time of command execution is defined by the Timeout parameter value specified in the Duration column in FDO nAir schedule:
  - if Timeout is zero then the command is executed unlimited time until GPI signal is received;
  - if Timeout is not zero then the command in schedule is executed:
    - till specified time period is over;
    - till receiving signal earlier than specified time period happens.
4. When the Wait Signal command is complete the next one starts to be executed.





## 7. Example of Schedule and GPI-In Signals Indication

➡ **Example:** The picture below displays prepared schedule for execution. The schedule is paused (1).

Two Wait Signal commands are prepared:

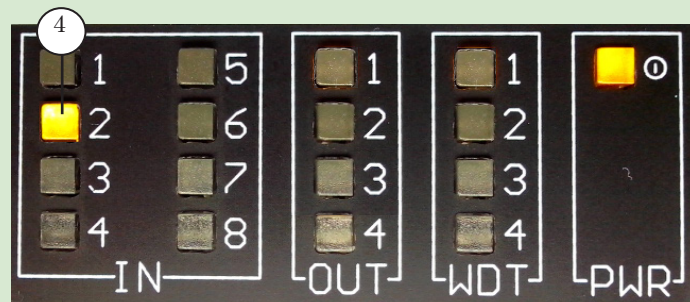
1. The Wait Signal command with assigned Resume Schedule/Autodetect action that deals with GPI-In\_1 signal.

The command is inserted in the schedule (2). Value of the Timeout parameter is zero (3).

2. The Wait Signal command with assigned Start of Schedule that deals with GPI-In\_2 signal is not displayed in the schedule.

State	Start	Length	Name
	19:21:17.57		*****
	19:21:17.40	0:00:01.00	
	19:21:18.40	=0	
	19:21:18.40		
	19:21:18.47		1 ADs
	19:21:23.60	0:00:52.24	Commercial #1.avi
READY	19:22:15.74	0:00:15.76	Commercial #2.avi
	19:22:31.40	0:00:15.60	Commercial #3.avi
	19:22:47.10	0:00:15.72	Commercial #4.avi
READY	19:23:02.62	0:00:05.00	
	19:23:03.62	=0	
	19:23:03.62		1 ADs
READY	19:23:03.62	0:00:52.24	Commercial #5.avi
	19:23:55.96	0:00:15.76	Commercial #6.avi
	19:24:11.62	0:00:15.60	Commercial #7.avi
	19:24:27.32	0:00:15.72	Commercial #8.avi
	19:24:43.04	0:00:01.00	
	19:24:44.04	=0	****

The GPI-In\_2 signal (4) from external device is received.





When the GPI-In\_2 signal is received:

1. The Start of Schedule action (equal to the Start command (5)) is implemented. Schedule starts to be executed.
2. The VideoInput 1 command (6) is executing.
3. The Wait Signal command with assigned Resume Schedule/Autodetect action (7) starts to be executed.

5

State	Start	Length	Name
	19:21:17.57		*****
	19:21:17.40	0:00:01.00	0.10
	19:21:18.40	=0:00:01.00	
	19:21:18.40		1 ADs
	19:21:18.47		Inserting of commercials via button
READY	19:21:23.60	0:00:52.24	0.10
	19:22:15.74	0:00:15.76	0.10
	19:22:31.40	0:00:15.60	0.10
	19:22:47.10	0:00:15.72	0.10
READY	19:23:02.62	0:00:01.00	0.10
	19:23:03.62	=0:01:40.22	
	19:23:03.62		1 ADs
READY	19:23:03.62		Inserting of commercials via button
	19:23:03.62	0:00:52.24	0.10
	19:23:55.96	0:00:15.76	0.10
	19:24:11.62	0:00:15.60	0.10
	19:24:27.32	0:00:15.72	0.10
	19:24:43.04	0:00:01.00	0.10
	19:24:44.04	=0:01:40.22	*****

As timeout parameter in this example is zero then signal executed via VideoInput 1 command is broadcasted. Broadcasting continues till operator activates GPI-In\_1 signal. The first block of commercials clips (Commercial #1 – Commercial #4) is broadcasted on air. Then passthrough video starts to be broadcasted again. Schedule waits operator' signal to be inserted on air of the following commercials block. Etc.





## The Send Signal Command

The Send Signal commands are used to control external devices via schedule.

The present section describes an example of such command use: inserting regional commercials into external air signal of the general broadcasting station.

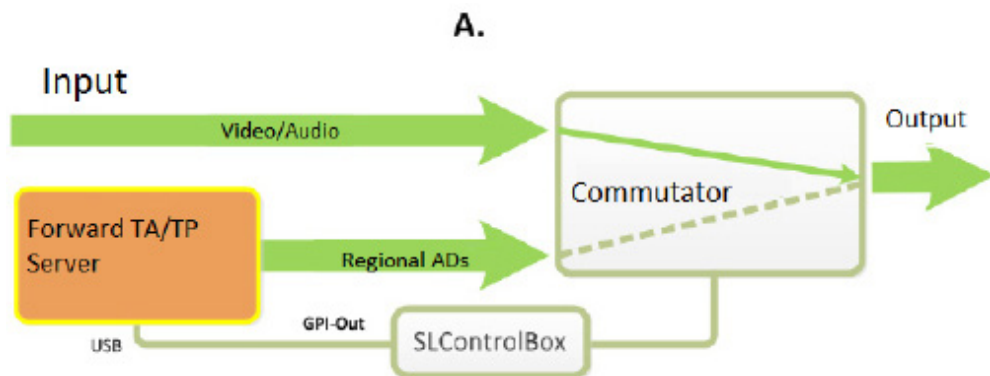
The scheme is the following.

The following signals come to commutator inputs directly:

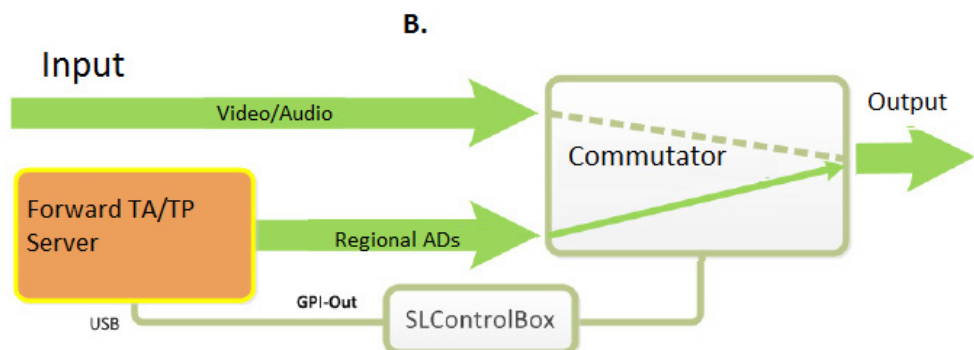
- air signal from general station;
- output signal from server adjusted (for example, in time) to insert regional commercials blocks.

There are also SLControlBox device plugged to server and commutator additionally.

At broadcasting signal from the general station (picture A) the signal passes via commutator on air.



At start of broadcasting regional block received from server a GPI signal is sent to commutator. The signal switches commutator inputs in order to send server signal on air (picture B).



At the end of regional block executing server sends a GPI signal to commutator. The signal executes reverse switching to broadcasting signal from the main broadcasting station.



The Send Signal commands are inserted in FDO nAir schedule in order to send GPI signals to commutator.

## 1. Types of Signals of the Send Signal Command

There are 3 types of signals that can be sent to external device via schedule by means of one Send Signal command:

- Close contacts;
- Open contacts;
- Impulse: close contacts, then open contacts in some time (time period is specified via the Duration parameter).

The Close contacts and Open contacts commands usually combine each other:

- the first signal switches commutator to the "active" state, i.e. the state when regional commercials block is broadcasted on air;
- the second signal in the pair returns commutator to a "passive" state, i.e. signal from the general broadcasting station is broadcasted on air.

The Impulse signals can be also used in pair where one signal switches external device to active state, another signal – to passive state.

The choice of signal type depends on scheme of plugging external device (more information on this issue see in the Examples subsection of the present section).

**Note:** There is only one GPI-Out line for the Close contacts and Open contacts pair of signals (one the same identifier). The Impulse signals require two GPI-Out lines (identifiers with different indices).





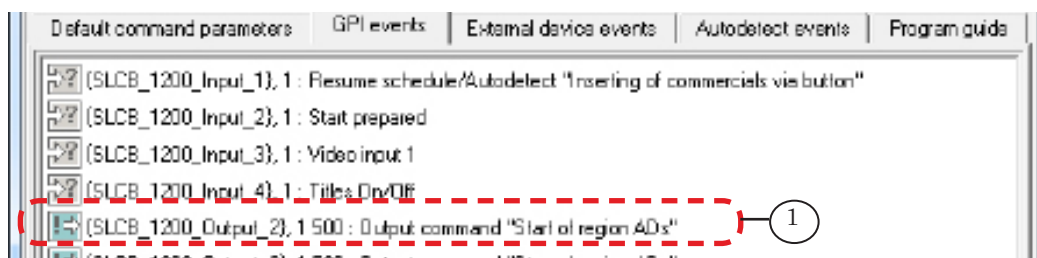
## 2. Command Parameters

The Send Signal commands in the Settings window on the GPI Events tab have the following format (1):

 {SLCB\_XXXX\_N\_Output}, AC Dur : Output command "**Command name**"

where:

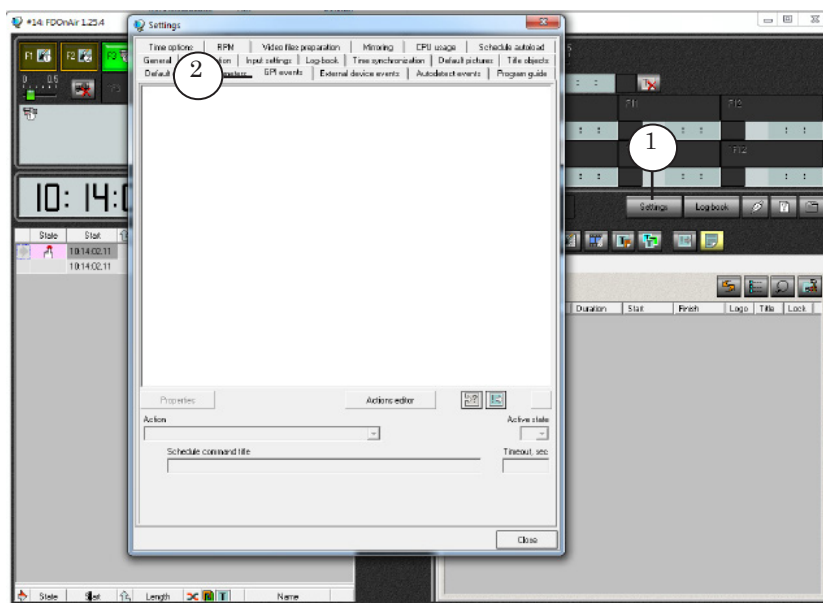
-  denotes the Send Signal command. The command is customized incorrectly and won't be executed if it is marked by .
- **SLCB\_XXXX\_N\_Output** is output GPI signal identifier, where:
  - **SLCB\_** is identifier of device that generates GPI signal (SLCB denotes SLControlBox);
  - **XXXX** is a serial number of device;
  - **N** is an index of used GPI signal (from 1 up to 4);
- **AC** is value of the Active state parameter that defines active state of plugged device:
  - 0 – contacts are open;
  - 1 – contacts are closed.
- **Dur** is the Duration parameter value (defines duration of pulse in ms);
- **Command name** is title of command. When adding the Send signal command to FDO nAir schedule its name is displayed in the Name column of the table with schedule.



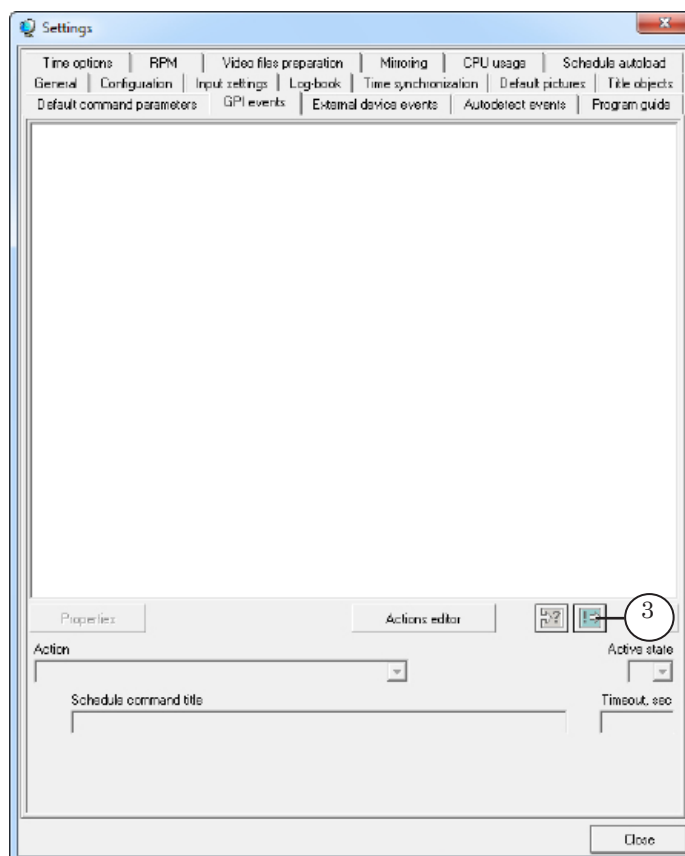


### 3. Configuration of Command

1. Click Settings (1) in the FDO nAir main application window.
2. Pass to the GPI Events tab (2) in the appeared window.

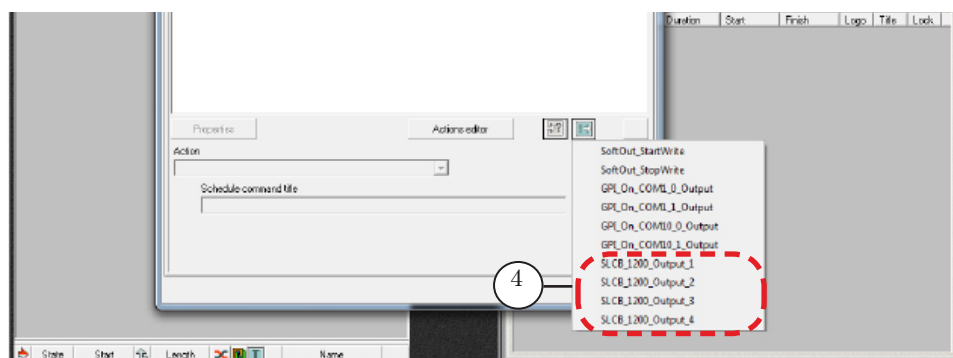


3. Click  on the GPI Events tab.



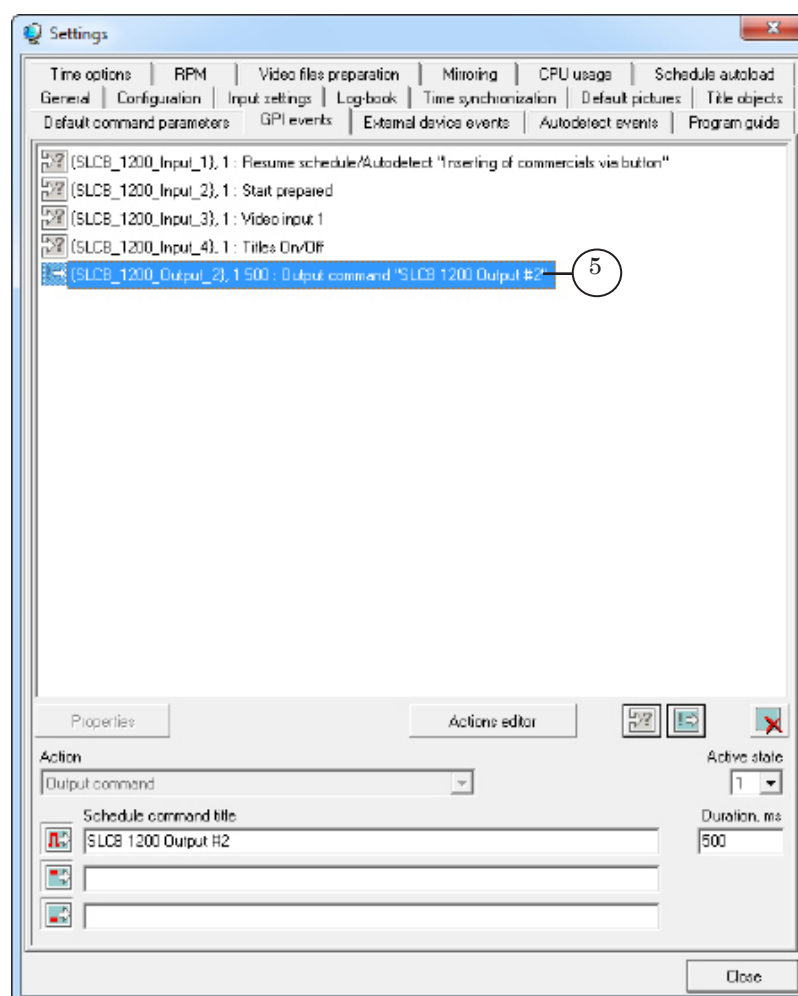


4. Select identifier of GPI-Out signal (4) used in command in the appeared list.



✓ **Important:** At specifying line index be sure that the line is not used for WatchDog of another board or for GPI-Out signal in FDO nAir.




New command is added to the list with commands automatically (5).

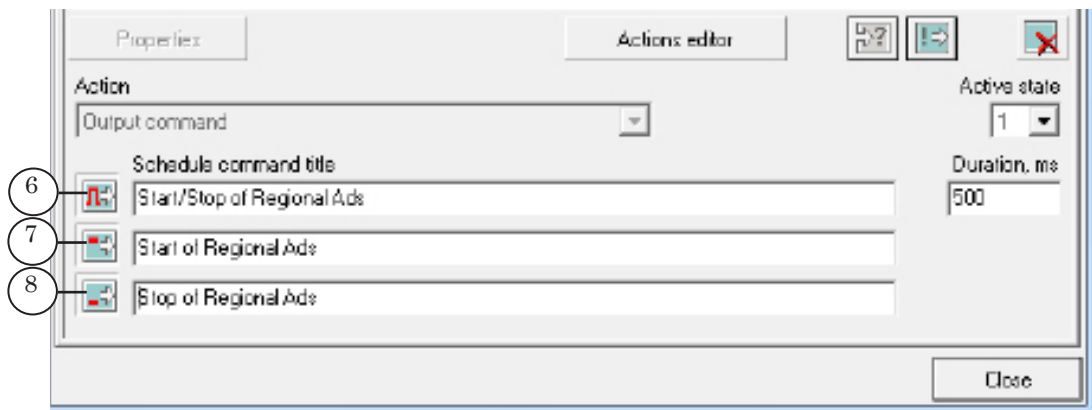




5. Edit command according to requirements of used device.

1. Select necessary signals among 3 described below types and then configure them. Click corresponding button and type text to describe signal purpose (when adding this command into schedule this text is added to the Name column):

- the  GPI denotes sending pulse (for this first switch controllable device to active state, then to passive state (6) in specified period of time (the period is specified via the Duration parameter));
- the  GPIO on denotes switching controllable device to active state (7);
- the  GPIO off denotes switching controllable device to passive state (8).



2. Specify what state of controllable device is active via the Active State drop-down list (9):

- 1 is when contacts are closed;
- 0 is when contacts are opened.

3. If type of signal is impulse then specify its duration (msec) in the Duration field (10).



6. Close the window by clicking Close (11).



- Note:** The choice of signal type to be sent and corresponding commands depends on properties of external device (commutator).
1. If commutator implements switching and opening/closing contacts simultaneously then insert 2 Send Impulse GPI signals in FDO nAir schedule.
  2. If commutator switches according to state (for example, commutator is in active state till contacts are closed and switches to passive state at their opening) then insert pair of GPIO n – GPIO off signals (see Examples).

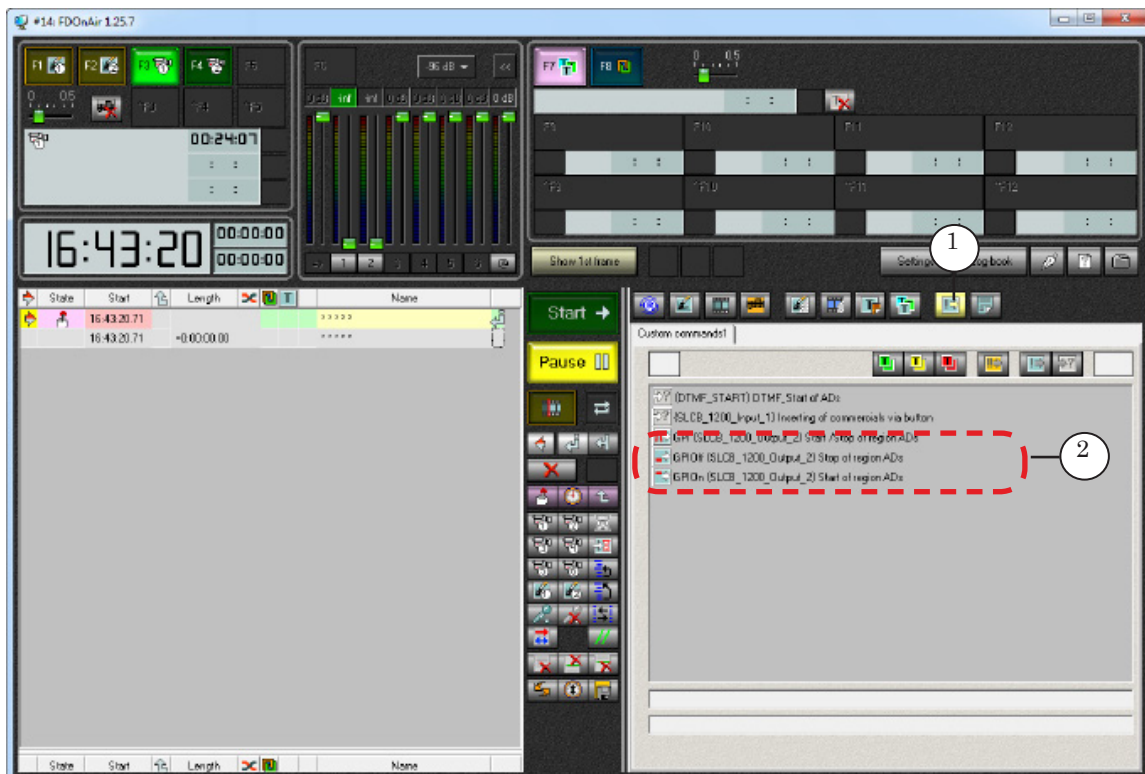
The Send Signal command is configured.

#### 4. Check of GPI-Out Commands and Their Indication

Adding the Send Signal commands to FDO nAir schedule is implemented via the Custom Commands page opened by clicking  (1).

List of commands that can be added to schedule is displayed at the Custom Commands page.

The page can display up to 3 commands (according to signal type to be sent) of the Send Signal type with one the same identifier (2).

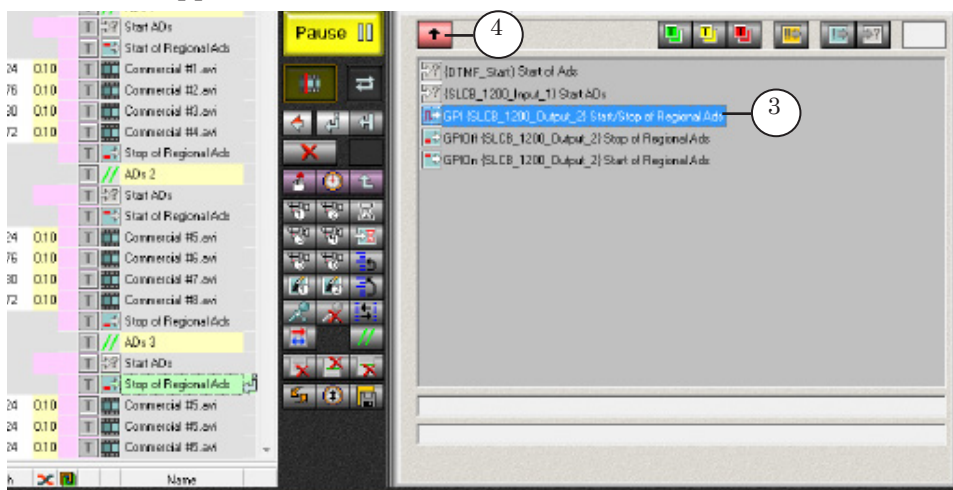


The Send Signal Command



Complete the following to check work of commands before their adding to schedule.

1. Select line with command (3) by its clicking. The button (4) appears.



2. Click this button, the command must be activated. SLConrolBox indicator of the OUT group located on the front panel indicates activation of the command. Light of indicator corresponds to active state of the Send Signal command if configuration is correct.

Command	GPI-Out indicator state before command activation	GPI-Out indicator on command
GPI (impulse)	<ol style="list-style-type: none"> <li>1. Indicator is not lightened.</li> <li>2. Indicator is lightened.</li> </ol>	<ol style="list-style-type: none"> <li>1. Indicator is switched on, lightened till some time specified as Duration and lightens off.</li> <li>2. After receiving command and after Duration period is off it lightens off.</li> </ol>
GPIOn	<ol style="list-style-type: none"> <li>1. Indicator is not lightened.</li> <li>2. Indicator is lightened.</li> </ol>	<ol style="list-style-type: none"> <li>1. Indicator is on and is lightened.</li> <li>2. Indicator is continued to be lightened.</li> </ol>
GPIOff	<ol style="list-style-type: none"> <li>1. Indicator is not lightened.</li> <li>2. Indicator is lightened.</li> </ol>	<ol style="list-style-type: none"> <li>1. Indicator is not lightened.</li> <li>2. Indicator is off.</li> </ol>

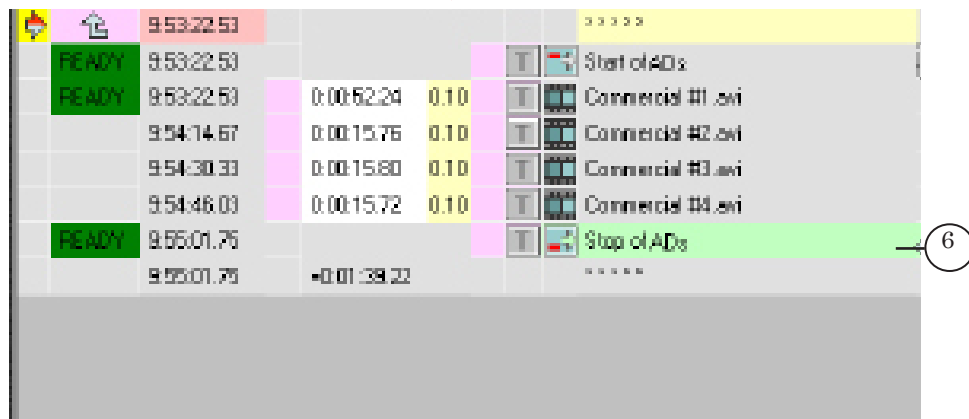
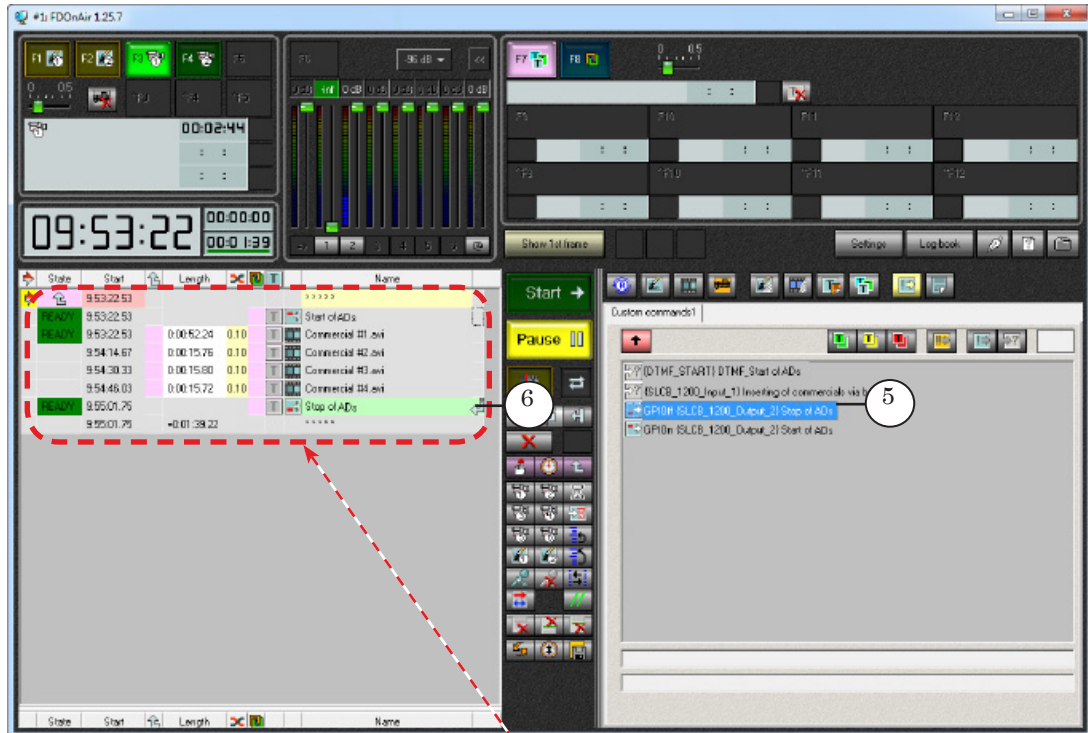
3. Plug external commutator to device and customize it according to supplied instruction. Test it via the Send Signal command of manual control.





## 5. Adding Commands to Schedule

Double-click line with command (5) to add tested (and customized) Send Signal command to schedule. The command is inserted (6).

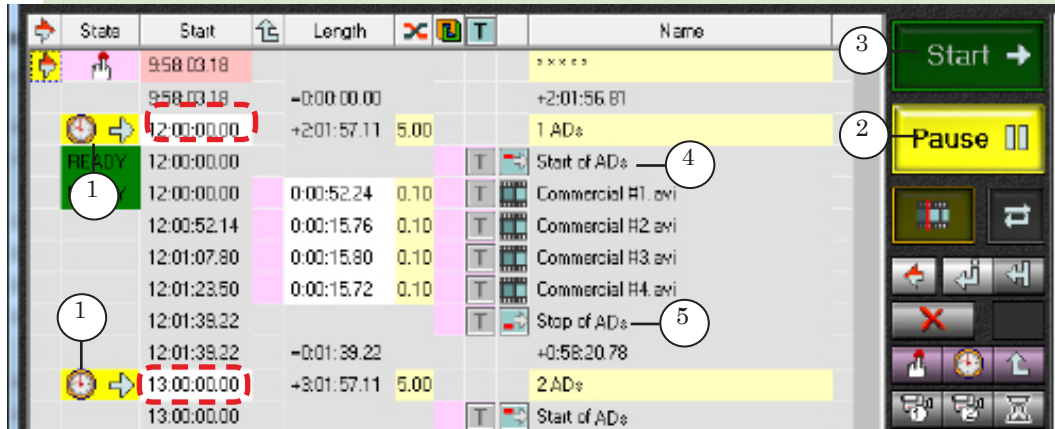


The Send Signal command is executed at specified time in schedule.

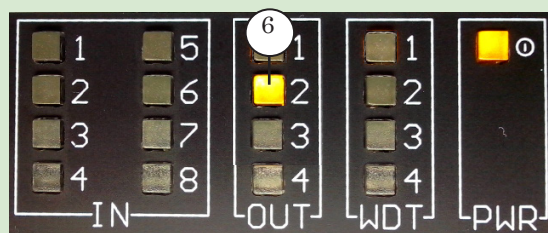


## 6. Examples of Schedule


- ➡ **Example:** You can insert your own (regional) commercials into external air signal via the Send Signal command.
- Let us consider an example of schedule (Scheme is given at the beginning of the the "Send Signal Command" section, pictures A and B).
1. The main signal comes from external channel through commutator (picture A).
  2. Moment of commercials insertion can be specified, for example, via the Wait Specified Time command (1) in active state. Active schedule is paused (2). When clicking Start (3) schedule starts to be executed: it waits specified time (12:00:00:00), then schedule continues to be executed.
  3. The next Send Signal command with specified Start\_of\_ADs name (4) switches commutator to active state (picture B). Commercials block (Commercial #1 – Commercial #4) is broadcasted on air.
  4. The block is finished by the Send Signal command (5) that switches commutator to passive state: broadcasting signal from the general station directly (picture A).
  5. FDO nAir schedule is a sequence of "blocks for insertion" similar to the given below. The next block starts at 13:00:00:00, etc.

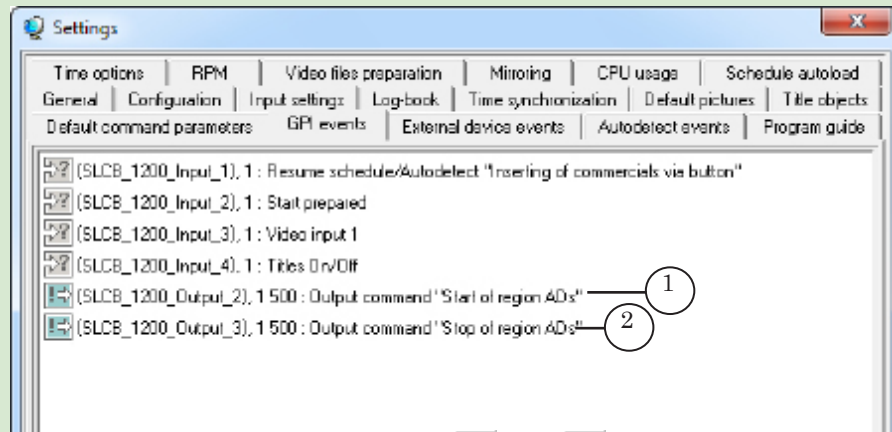




The Send Signal command with the Start\_of\_ADs name in the given example closes contacts of commutator. Then during broadcasting commercials block contacts are closed. In this case indicator is lightened.

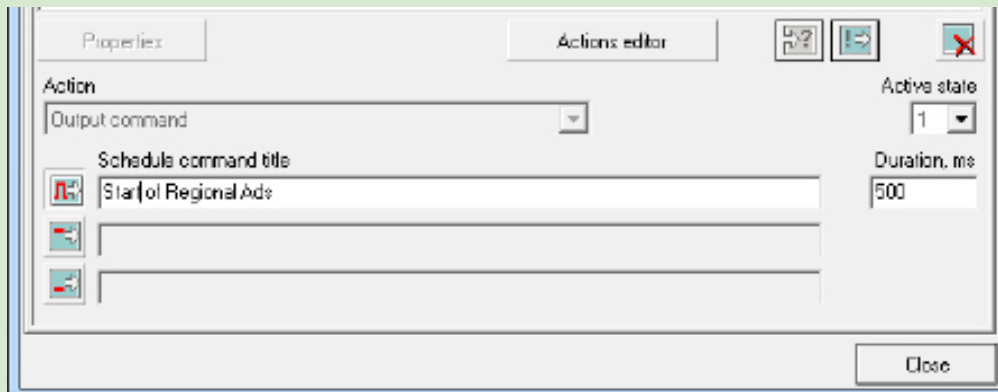




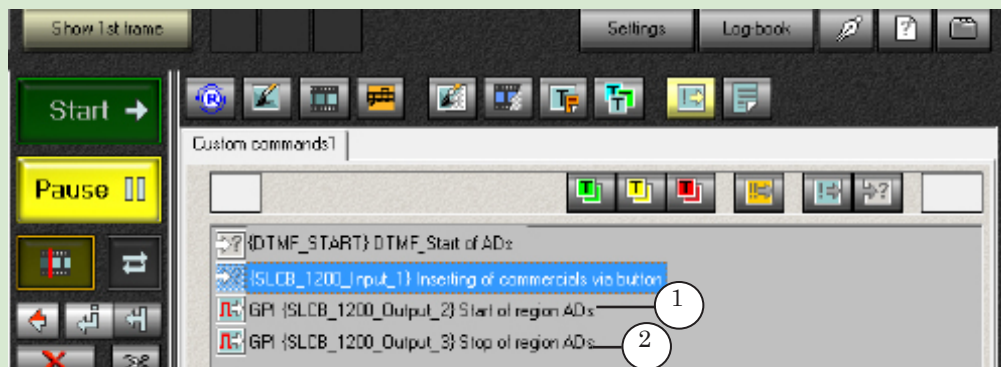
- ➔ **Example:** If it is not necessary to have contacts close always for commutator to be in active state and if switching is implemented at the moment of closing then use two GPI-Out output lines with Send Signal commands of the impulse  type. Complete the following to use such signals:
1. Configure two GPI-Out signals on the GPI Events tab with the Start\_commercials (1) and Stop\_commercials (2) names for output.




2. Disable unused buttons ( and ) at configuring each signal.



In this case file page looks like:

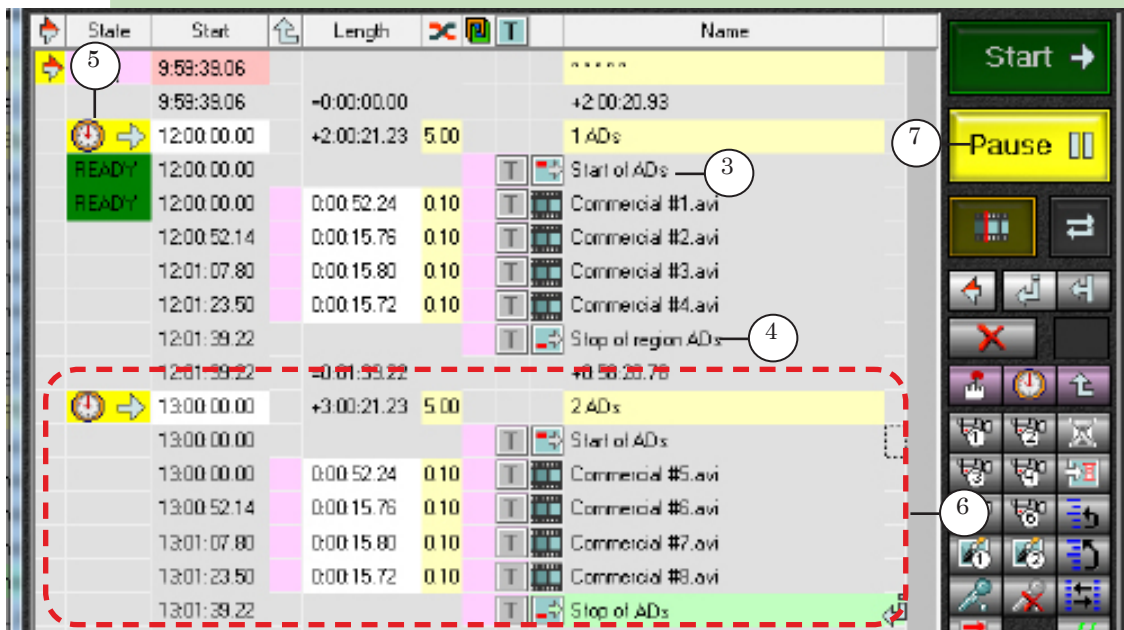




3. Add the Send Signal commands of the impulse type  to schedule to send control signals to commutator:
  - Start\_commercials command is necessary to switch commutator to active state (pic. B) – before commercials block (3).
  - Stop\_commercials command is necessary to switch commutator to passive state (pic. A) – after commercials block (4).
4. You can insert the Wait particular time command (5) that starts each inserted block if you know definite time of block broadcasting.

The whole schedule consists of inserted blocks (6). Each of them has different specified time of start.

The given below picture displays schedule prepared to be played. The schedule is paused (7).



The screenshot shows a video scheduling software interface with a timeline and a control panel. The timeline has columns for State, Start, Length, and Name. A red dashed box highlights a block labeled '2 ADs' starting at 13:00:00.00 and ending at 13:01:39.22. The control panel on the right includes buttons for Start, Pause, and various navigation functions. Circled numbers 3, 4, 5, 6, and 7 point to specific elements in the interface.

State	Start	Length	Name
READY	9:59:39.06	-0:00:00.00	Start of ADs
READY	12:00:00.00	+2:00:21.23	1 ADs
	12:00:00.00	0:00:52.24	Commercial #1.avi
	12:00:52.14	0:00:15.76	Commercial #2.avi
	12:01:07.80	0:00:15.80	Commercial #3.avi
	12:01:23.50	0:00:15.72	Commercial #4.avi
	12:01:39.22		Stop of region ADs
	12:01:39.22	-0:01:39.22	Stop of region ADs
	13:00:00.00	+3:00:21.23	2 ADs
	13:00:00.00		Start of ADs
	13:00:00.00	0:00:52.24	Commercial #5.avi
	13:00:52.14	0:00:15.76	Commercial #6.avi
	13:01:07.80	0:00:15.80	Commercial #7.avi
	13:01:23.50	0:00:15.72	Commercial #8.avi
	13:01:39.22		Stop of ADs



5. Click the Start button (8) to start schedule.  
Execution position (9) switches to line with the Wait particular time command. Commercials blocks are broadcasted on air at 12-00 (10) and 13-00 (11) correspondingly.

State	Start	Length	Name
	10:00:37.93		xxxxx
	9:50:37.54	=0:00:00.00	+2:09:22.45
READY	12:00:00.00	8:58.18 5.00	1 ADs
READY	12:00:00.00		Start of ADs
	12:00:52.14	0:00:52.24 0.10	Commercial #1.avi
	12:01:07.80	0:00:15.76 0.10	Commercial #2.avi
	12:01:23.50	0:00:15.80 0.10	Commercial #3.avi
	12:01:39.22	0:00:15.72 0.10	Commercial #4.avi
READY	12:01:39.22		Stop of ADs
	12:01:39.22	=0:01:39.22	+0:58:20.78
READY	13:00:00.00	8:58.18 5.00	2 ADs
	13:00:00.00		Start of ADs
	13:00:52.14	0:00:52.24 0.10	Commercial #5.avi
	13:01:07.80	0:00:15.76 0.10	Commercial #6.avi
	13:01:23.50	0:00:15.80 0.10	Commercial #7.avi
	13:01:39.22	0:00:15.72 0.10	Commercial #8.avi
	13:01:39.22		Stop of ADs
	13:01:39.22	=0:01:39.22	xxxxx

The Send Signal command with the Start\_commercials name closes contacts of commutator via impulse in the given example. Corresponding OUT indicator on SLControlBox front panel is lightened only till time period specified via the Duration parameter on the GPI Events tab. During the rest time of block playing indicator of used line is not lightened. The Send Signal command with the Stop\_commercials name opens contacts of commutator. Indicator is lightened till time specified by the Duration parameter for this signal.



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## Useful Links

### **ForwardT Software set: description, download, documentation, solutions**

<http://www.softlab-nsk.com/forward/index.html>

### **Support**

<http://www.softlab-nsk.com/forward/support.html>

e-mail: [forward@sl.iae.nsk.su](mailto:forward@sl.iae.nsk.su)

[forward@softlab-nsk.com](mailto:forward@softlab-nsk.com)

[forward@softlab.tv](mailto:forward@softlab.tv)

### **Forum**

<http://www.softlab-nsk.com/forum>

### **Additional Documentation**

[FDConfig2. Program for Control and Customizing FDEExt Boards \(FD322/FD422/FD842\) Work Parameters.](#)

[FDOntAir. Broadcasting Automation.](#)

[FDOntAir. Additional Sections.](#)

[FDOntAir: Mirroring, Remote Control.](#)

[FDOntAir Commands List. Broadcast Automation.](#)

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