IPOut, ASIOOut

Digital Streaming Options for Forward T Products

User’s Guide

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Introduction

The IPOut/ASIOut plugins are add-ons to the following SoftLab-NSK products based on FD300/FD322/FD422/FD842 I/O board: Forward TT, Forward TA, Forward TP. Using the IPOut/ASIOut plugins allows you to provide video and audio in MPEG-2 transport stream in addition to analog TV broadcasting (analog, SDI).

The IPOut/ASIOut options capture audio and video from the board, convert the signal to a MPEG-2 transport stream (with MPEG-2 or AVC compression), and transmit the stream over IP or ASI.

There are several variants of the products of this group (see the Table below). Each variant is designed to work with a certain compression standard and type of interface that transmits the stream to the network. The products are software systems (IPOut/ASIOut Software) or hardware-software (IPOut/ASIOut Software and an FD422 board) systems.

<table>
<thead>
<tr>
<th>Interface</th>
<th>Compression Standard</th>
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Note: More in-depth information on FD422 boards can be found in the «FDConfig2. Program for control and customizing of FDExt boards work parameters».

This document contains the following information about working with the IPOut and ASIOut options:

- general scheme of use;
- order of installation and configuration;
- examples of configuring solutions based on the Forward TA product and the IPOut/ASIOut options.
General information

1. Broadcasting Scheme

The IPOut/ASIOut options are add-ons to the following products: Forward TT, Forward TA, Forward TP.

If the base product is Forward TA, the general scheme could be the following (see picture):

1. Functions of the main product:
   1. The FDOnAir program (1) is used to organize the broadcast (scheduled broadcasting, insertion of ads and local programs, title overlay, control over broadcast).
   2. The capture, processing, and broadcasting the TV signal on air is done using the FD300/FD322/FD422/FD842 board (2).

2. Functions that require the IPOut/ASIOut options:
   at the same time as the analog or SDI signal is being broadcast, the audio and video from the board output are converted to a stream (3) in either the MPEG-2 or AVC compression format and then sent to the network (4) through an IP (IPOut) or ASI (ASIOut) interface.

2. Used programs

The IPOut/ASIOut software contains programs for configuring and providing streaming broadcast.

Operation parameters configuration, encoding schemes control, data streams transmission, – all these are performed using one of the programs:

- SLStreamer Lite – has a basic functionality for configuring broadcast schemes and their operation control;
SLStreamer Pro – has an advanced, in comparison with SLStreamer Lite, functionality. Using this program is advisable, e.g. when it is necessary to automatically control the start and stop of the streaming broadcast by the schedule specified.

For detailed information regarding the programs and how to use them, see the user’s guide «SLStreamer Lite, SLStreamer Pro. Programs for configuring, monitoring, and managing digital broadcasting schemes».

3. Licenses

A license is permission to use a specific function of a product. The following licenses can be applied to the IPOut/ASIOut plugins (1 license per 1 output channel):

- MPEG2 encoder – for data compression following the MPEG2 standard;
- AVC encoder – data compression following the AVC standard.

The set of working licenses is defined by the current registration. A registration key is included with the purchased product as a reg file (to learn how to activate the registration see the installation and set up section).

4. Graphs and templates

Data reception, processing, and transmission schemes in SLStreamer Lite and SLStreamer Pro programs are presented graphically and referred to as graphs. A graph is a set of nodes. Each node corresponds to a certain device, program module, or processed program.

A template is a standard graph draft that presents a certain scheme. Templates are handy to create typical schemes: select a template and adjust its elements according to a specific situation, that is specify the required parameters of audio and video compression, specific IP addresses, etc.

The IPOut/ASIOut plugins contain the standard set of templates, designed for creating typical schemes for transforming analog signals into digital format and broadcasting.

<table>
<thead>
<tr>
<th>Name</th>
<th>Description (data type, interface)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Encoder_Analog_IP</td>
<td>Analog signal MPTS, IP</td>
</tr>
<tr>
<td>Encoder_Analog_ASI</td>
<td>Analog signal MPTS, ASI</td>
</tr>
<tr>
<td>Encoder_Analog_ASI+IP</td>
<td>Analog signal MPTS, ASI- and IP-interface</td>
</tr>
</tbody>
</table>
IPOut. Installation and set up

1. Pre-installation notes

1. The IPOut software is installed using a plugin installer. The plugin installer file: ForwardTxPlugins_Setup_x_x_x.exe, where x_x_x is the version number.

   Note: Installers for the current versions and instructions on installation can be found on SoftLab-NSK’s website in the «Download» section: http://softlab.tv/forward/download.html.

2. The version of the main product software and the plugin must be the same. It is recommended to use the most recent version of the software.

3. The instructions in this manual assume that you have already installed the main product (Forward TT/Forward TA/Forward TP) on a broadcasting server. If this is not the case, first install the main product, activate its registration, set up the broadcasting server. For instructions on installing the main product, please see the corresponding user’s guides, including those placed on the SoftLab-NSK’s website in the «Download» section http://softlab.tv/forward/download.html:
   - «FD322 board. Solution for analog TV broadcasting» for the FD322 board;
   - «Insertion of local content into passthrough signal (one broadcasting channel, SDI signal). Customizing of solution based on Forward TA SDI» – for the FD422 board;
   - «FDConfig2. Program for control and customizing of FDExt Boards work parameters» – user’s guide to setting up FD322/FD422/FD842/FDVrt boards;
   - «FDConfiguration. FD300 board settings» user’s guide to setting up FD300 boards.

2. General workflow

The IPOut option is installed in addition to a main product from the Forward Tx product line. To install it, complete the following steps:

1. Activate the IPOut plugin registration. To do this, double click the registration file (*.reg) that you received along with the plugin, agree to add the information contained within to the Windows Registry.

2. Install the IPOut/ASIOut software components (for more information see section «3. Installation of the IPOut/ASIOut software»).
3. Register a DirectShow filter contained within the ForwardT Software. Which filter you need to register depends on which board the broadcasting server (FDOnAir program) is on:
   1. If a FD300 board is used, register the DirectShow filter used to capture audio/video from the board – the A/V Capture filter. Go to section «4. Registration of DirectShow filters (FD300 board based server)».
   2. If a FD322/FD422/FD842 board is used, make sure that the necessary board configuration is used. Go to section «5. DirectShow filters (FD322/FD422/FD842 board based server)».

4. Restart the computer.

✔️ **Important:** The new settings (active DirectShow filters, active registration, etc.) are activated only after restarting the computer.

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3. Installing the IPOOut/ASIOOut software

**Note:**
1. This guide applies only to software versions starting from 5.3.0.
2. We highly recommend using the newest version of the software available. If this is impossible, please note that software versions earlier than 5.3.0 are installed differently. Please contact the SoftLab-NSK’s tech support for information on installing earlier versions.
3. All necessary software components and additional instructions can be found on the company’s site, on the «Download» page: [http://www.softlab-nsk.com/forward/download.html](http://www.softlab-nsk.com/forward/download.html).

To install the IPOOut/ASIOOut software components, complete the following:

1. Start the plugin installer `ForwardTxPlugins_Setup_x_x_x.exe`, where `x_x_x` is the software version.

2. The Setup Wizard window will appear. Follow the Wizard’s instructions.
3. Pay attention to information regarding any changes to the software version being installed.

4. When on the step of choosing components, flag the IPOut/ASIOut files option.

5. To create desktop shortcuts for the IPOut/ASIOut software programs, flag the corresponding option.
6. To start the installation of the chosen software, press the Install button.

7. The installer will install all the necessary files onto the computer. All of the files will be placed into the `~\Plugins\IPOutOption` folder, where `~` is the full path to the folder which contains the ForwardT Software.

8. To close the Wizard, press the Finish button.
9. Press the OK button to restart your computer.

10. After restarting your computer, the SLStreamer Lite and SLStreamer Pro shortcuts will be added to your desktop.
4. Registration of DirectShow filters (FD300 board based server)

If the broadcasting server (FDOnAir) works on a FD300 board, you need to activate the DirectShow A/V Capture filter.

Note: If your broadcasting server works on a FD322/FD422/FD842 board, see the following section.

✔️ Important: The DirectShow filter must be activated before starting the SLStreamer Pro (SLStreamer Lite) program and setting up broadcasting schemes (graphs).

To register the DirectShow filter, complete the following:
1. Close all programs that use the board (FDOnAir, FDCapture, etc.).
2. Start the FDConfiguration program. This can be done using the desktop shortcut or through the Start menu: Programs > ForwardT Software > Board Setup > FD300 Configuration (for more information see the «FDConfiguration. FD300 board settings» user’s guide).
3. In the main window of the program, choose the board for which you wish to register the DirectShow filter from the Boards' Indexes list (1).
4. Press the Advanced button (2).
5. In the newly opened window, flag the A/V Capture filter (3) in the Use Direct Show filters group.

6. Press the OK button (4) to close the settings window.

7. To save the settings and to exit the FDConfiguration program, press the OK button (5) in the main window.

8. Restart the computer so that the registration information can start taking effect.

✓ **Important:** In order to activate the DirectShow filter you must restart the computer.
5. DirectShow filters (FD322/FD422/FD842 board based server)

If the broadcasting server is based on a FD322 board (analog signal) or a FD422/FD842 board (SDI signal), then there is no need to specifically activate any DirectShow filters. Output capture from FD322/FD422/FD842 boards is always allowed.

**Note:** If your broadcasting server works on a FD300 board, see the previous section.

The set of active DirectShow filters depends on the chosen board configuration. Any changes to the settings are made through the FDConfig2 program (see the «FDConfig2. Program for control and customizing of FDExt boards work parameters» user’s guide for more information).

**Note:** If it is necessary to capture audio and video from an **Input** of the board, the **Capture input 1** (Input #1) or **Capture input 2** (Input #2) functions must be active. In order for them to be active, in the FDConfig2 program window choose the board (1) and mode (2), and then flag the corresponding options in the **Device enabling** group (3).

Depending on the board and mode, the names of the options can be insignificantly different from those featured above.
ASIOOut. Installation and set up

1. Pre-installation notes

   1. The ASIOOut software is installed using a plugin installer. The plugin installer file: ForwardTxPlugins_Setup_x_x_x.exe, where x_x_x is the version number.

   Note: Installers for the current versions and instructions on installation can be found on SoftLabNSK's website in the «Download» section: http://softlab.tv/forward/download.html.

   2. The version of the main product software and the plugin must be the same. It is recommended to use the most recent version of the software.

   3. The instructions in this manual assume that you have already installed the main product (Forward TT/Forward TA/Forward TP). If this is not the case, first install the main product, activate its registration, set up broadcasting server. For instructions on installing the main product, please see the corresponding user’s guides, including those placed on the SoftLabNSK's website in the «Download» section http://softlab.tv/forward/download.html:

      - «FD322 board. Solution for analog TV broadcasting» for the FD322 board;
      - «Insertion of user content into passthrough signal (one broadcasting channel, SDI signal). Customizing of solution based on Forward TA SDI» – for the FD422 board;
      - «FDConfig2. Program for control and customizing of FDExt boards work parameters» – user’s guide to setting up FD322/FD422/FD842/FDVrt boards;
      - «FDConfiguration. FD300 board settings» user’s guide to setting up FD300 boards.

   Note: If installing the main product and plugin at the same time, you can combine the two installation processes: first activate the registrations of the main product and plugin, then install and set up all the software components.

2. General information

   The ASIOOut option is installed in addition to a main product from the Forward Tx line. The installation process is as follows:

   1. Complete the following steps if your ASIOOut option contains an FD422 board:
      1. Turn off your computer. Disconnect it from its power source. Install the FD422 board into the PCI-E slot of the motherboard.
Important: Before installing the board you must disconnect the computer from all power sources. Turn off its power supply, remove the power cable from the socket.

2. Turn on the computer. If a window pops up requesting installing drivers for the new hardware, decline. The FD422 board drivers will be installed later, when installing the ForwardT Software.

2. Complete the following steps if you need to install the FD422 board drivers (the main product is based on another board: FD300/FD322/FD842) or if the currently installed version of the ForwardT software is outdated and it is necessary to renew it:
   1. Deinstall the ForwardT software. In order to start the deinstallation, use the Start menu command: All programs > ForwardT Software > Uninstall ForwardT Software.
   2. Install the newer version of ForwardT software. In order to do this, start the ForwardTSoftware_Setup_x_x_x.exe program, where x_x_x is the version number, and follow the Setup Wizard’s instructions.
   3. Using the New Hardware Wizard (that is started automatically) install the FD422 board drivers.

3. Activate the ASIOOut plugin registration. In order to do this, double click on the registration file (*.reg) that you received with the plugin, agree to add the information contained within the file to the Windows Registry.

4. Install the IPOut/ASIOOut software components. For more information see section «3. Installation of the IPOut/ASIOOut software» below.

5. Set up the FD422 board configuration, the output of which will be used as an ASI-interface to transfer the transport stream with the TV program to the receiving end. For more information see section «4. FD422 board set up» below.

6. If the broadcasting server (the FDOonAir program) is based on a FD300 board, register the DirectShow A/V Capture filter. For more information see section «4. Registration of DirectShow filters (FD300 board based server)» in the «IPOut. Installation and set up» chapter.

7. Restart the computer.

Important: The new settings (active DirectShow filters, active registration, etc.) are activated only after restarting the computer.
3. Installation of the IPOut/ASIOut software

To install the IPOut/ASIOut software components, complete the following steps:

1. Start the plugin installer ForwardTxPlugins_Setup_x.x.x.exe, where x.x.x is the version number.

2. The Setup Wizard will start. Follow the Wizard’s instruction. When on the step of choosing components, flag the IPOut/ASIOut files option.

3. The installer will install all the necessary files onto the computer. All of the files will be placed into the ~\Plugins\IPOutOption folder, where ~ is the full path to the folder which contains the ForwardT Software.

4. After closing the Wizard by pressing Finish, restart your computer.

5. After restarting your computer, the SLStreamer Lite and SLStreamer Pro shortcuts will be added to your desktop.
4. FD422 board set up

4.1. Set up procedure

When working with the ASIOut plugin, it is necessary to set up the FD422 board configuration, the output of which will be used as an ASI-interface to transfer the transport stream with the TV program to the receiving end.

Important: The board configuration must be set up before setting up graphs in the SLStreamer Pro (SLStreamer Lite) program.

Complete the following steps:

1. Close all programs that use the board (FDOnAir, FDCapture, etc.).

2. Start the FDConfig2 program. This can be done using the desktop shortcut or through the Start menu: Programs > ForwardT Software > Board Setup > FDConfig2 (for more information see the «FDConfig2. Program for control and customizing of FDExt boards work parameters» user’s guide).

3. In the main window (1) of the program, choose the FD422 board for which output the ASI mode needs to be activated.

4. Set up the chosen board’s mode using the Mode (2) and Device enabling (3) groups. Possible set up variations depend on the overall configuration of the broadcasting server and
what boards are used for the output:
- one FD422 board for SDI and ASI signal output in parallel – the SDI+ASI output mode (see paragraph 4.2 below);
- several boards: one for analog or SDI signal output, and the chosen FD422 board is used only for ASI signal output – the ASI in/out mode (see paragraph 4.3 below).

![Important: When setting up the configuration, it is important to note what licenses you have.](image)

5. To save the settings and exit the FDConfig2 program, press the OK button (4).

4.2. SDI + ASI output

Note: This solution can be configured if there is a combination of Forward TA (SD-SDI) product + the ASIOut option.

If one FD422 board will be used for output (one output will be SDI, the other ASI):

1. In the Mode drop-down list, select the SDI + ASI output item (1).
2. Make sure that all the options are flagged in the Device enabling group (2).

The purpose of board connectors in the selected mode can be seen in the figure (3).
4.3. ASI in/out

If several boards will be used for output – the output of the chosen board will only be used as an ASI interface, the broadcasting server (FDOnAir) is on another board (FD300/FD322/FD422/FD842):

1. In the Mode drop-down list, select the ASI in/out item (1).
2. Make sure that in the Device enabling group the correct options are flagged, according to your licenses:
   - if you have a license for one ASI channel, only one of the two options should be flagged: ASI Output #1/ASI Output #2 (2);
   - if you have a license for two ASI channels, both options should be flagged.

The purpose of board connectors in the selected mode can be seen in the figure (3).
Examples of Configuring the Solutions

1. General procedure

We’ll assume that the broadcasting server is set up, the FDOOnAir program contains a broadcasting schedule which will be executed. In order to transmit the program onto the network in a MPEG-2 transport stream in parallel with an analog broadcast, complete these following additional steps (for more information on each step see the corresponding sections below):

1. Using the SLSt reamer Pro (SLSt reamer Lite) program create and set up a coding and transfer scheme – a graph. For more information see the following sections:
   - «IP output. Configuration and management» – an example set up of transmitting the stream into an IP network. The graph is set up using a template in the SLSt reamer Lite program;
   - «ASI output. Configuration and management» – an example set up of transmitting the stream in an ASI signal. The graph is configured without using a template in the SLSt reamer Pro program.

Note For more information on working with graphs, see the «SLSt reamer Lite, SLSt reamer Pro. Programs for configuring, monitoring, and managing digital broadcasting schemes» user’s guide.

If there are no specific requirements for the parameter settings, it is recommended to use the default settings.

2. Using the SLSt reamer Pro (SLSt reamer Lite) program, start the transmission of the stream containing the TV program into the network by starting up a graph.

3. In order to control the output, use the following tools:
   - you can view the data being transmitted into the IP network using, for example, the VLC media player;
   - to monitor and analyze the streams in the output ASI signal you can use special analyzer programs (for example DekTec applications).
2. IP output. Configuration and management

2.1. General information

In this section the instructions assume that the broadcasting server is based on a FD300 board (analog signal) and that in addition to the analog signal it is necessary to transmit the broadcast into an IP network using the UDP protocol and compress video to MPEG2 format.

Products used: Forward TA (FD300) + IPOut/MPEG2.

The scheme is set up in the SLStreamer Lite program using the Encoder_Analog_IP template.

Note: The instructions for setting up a graph without using a template in the SLStreamer Pro program are located in the following section, using the set up of an ASI output as an example.

Information about the broadcasting server’s configuration is necessary to set up a graph. Let’s assume that the FDOnAir program is set up (FDOnAir > Settings > Configuration) for work with board FD300 #1 (1), and that the Sound1 audio output (2) is chosen for audio.
2.2. Starting the SLStreamer Lite program. Creating a graph

1. Start the SLStreamer Lite program. Use the desktop shortcut, or the Start menu: All programs > ForwardT Software > Plugins > SLStreamer Lite.

2. To add a graph, press the Create new graph button (1).

3. In the newly opened window, name the graph (2). In the drop-down list (3), select the Encoder_Analog_IP template. Press OK (4) to save the new settings.

4. A new tab (5) with the specified graph will appear. The graph is created using the selected template, in order to encode audio and video from an analog output and to transmit the stream into a IP network.

5. The configuration mode will automatically turn on. While in this mode, configure each node of the graph (see next paragraph).

Note: If the configuration mode is turned off, press the Graph Set up button (6) in order to turn it on.
2.3. Configuring graph nodes

One after another, from left to right, configure each node in the graph.

For each node: to open their settings, double click on a node, or right click on a node and select Properties (1) in the opened menu.

1. Input: Analog (Input device):
   1. In the Input device Properties window, select the device from which the stream will be captured in order to be transmitted into the IP network. In our example this is Board 1: Output (1) (the output of the FD300 board number 1, according to the FDOnAir program’s settings).

   ![Input Device Properties](image)

   Note: If the drop-down list (Type) does not contain the necessary device, make sure that the necessary DirectShow filters have been registered and the board is properly configured.

   2. Press Properties (2).

   3. In the opened Properties window, make changes, if necessary, to the parameter settings: image format (3) and disabling/enabling other formats if the chosen format is not supported (4).
4. Successively close the Properties windows by pressing OK (5, 6) in order to save any changes.

2. Local, 0 (Input program):
   1. In the Input Program Properties window, select the necessary audio and video streams for further processing by flagging them (1).

   ![Input Program Properties window]

   2. Press OK (2) to close the window and save all changes.

3. Encoder: MPEG2 + MPEG1 (Encoder):
   1. In the Encoder Properties window choose the necessary video compression format (1) according to the licenses owned and the audio compression format (2).

   ![Encoder Properties window]

   2. Press the Properties (3) button for the video encoder settings.

   3. In the opened MPEG2 Encoder Properties (AVC Encoder Properties) window set up the encoding parameters, including:
      - Mode bitrate (4) – constant (CBR) or variable (VBR) bit rate;
      - Average bitrate (5) – necessary average bitrate (bit/sec). Default: 5999616 bit/sec (~6 Mbit/sec);
      - Field order (6) – field order.
4. Press OK (7) to save all changes and close the window.
5. In the Encoder Properties window press the Properties button (8) to set up the audio encoder settings.
6. In the opened MPEG1 Encoder Properties (AAC Encoder Properties) window set up the encoding parameters, including:
   - Audio mode (9) – the stereo channel compression mode;
   - Bitrate (10) – the audio stream bitrate, kbit/sec.
7. Press OK (11) to save all changes and close the window. Close the Encoder Properties window by pressing OK.

4. Program, 1 (Output program):
   1. In the Output Program Properties window set the parameters of the program that will be transmitted in output transport stream: name (1) and number (2). The number will be used to identify the program on the receiving end.
   2. The audio, video, and other packet identifiers (PID) are automatically set in our example (3). If you need to set a different PID for a specific stream, flag the necessary stream and change the default value.

3. Press the OK button (4) to save all changes and close the window.

5. Output: IP (Output device):
   1. In the Output device Properties window select the necessary
type of device in the drop-down list (1). In our example we select the SL RTP/UDP type in order to organize the transmission of the stream into an IP network using the UDP protocol.

2. Press the Properties button (2).
3. In the opened Properties window, set up the parameters for transmitting a stream into an IP network, including:
   - the IP-address (3) to which you will be transmitting (the address of the computer that receives the stream or multicast address);
   - the port number (4);
• in the drop-down list (5) select the IP-address of the network interface (Ethernet card) which will be used to transmit the stream into the network;
• transport protocol (6) – in our case, UDP. If it is necessary to use a protocol with FEC (Forward Error Correction, Pro-MPEG CoP3/SMPTE 2022-1 standard) support, select the ProMpegCop3r2 option, which will be included in the list if you have selected the SL RTP/UDP device type on the previous step.

Note: 1. It is important to note that using a protocol with FEC increase the traffic because of transferring additional data.
2. The receiving end must also support protocol with FEC.

• output stream type (7) – Transport stream or DVB (if it is necessary to transmit service tables defined in the DVB standard, for example, EIT);
• transport stream bitrate (8) – a value of 0 means that the bitrate will be assigned automatically.

5. Press the OK button (9) to save all changes and close the window. Close the Output Device Properties window by pressing OK.

2.4. Completing the configuration

To finish configuring the graph, press the Finish graph configuration button (1). Press Yes (2) to confirm and save all changes.
2.5. Starting the graph

1. To start the graph, press the Start graph button (1).

2. By switching the graph into the Active mode, the corresponding encoding and transmitting scheme starts working.
   The Graph was Started message (2) will appear with the starting time and PID listed.

3. If you need to stop the graph, press Stop graph (3).
2.6. Control view

To be sure that the output program is being transmitted to the given address, you can start a control view.

Note: In our example the VLC media player (version 2.0.6) is used for the control view. This is a free program for viewing videos, and it can be downloaded from: www.videolan.org.

1. Open the VLC media player.

2. Select Media (1), and then Open Network Stream (2).

3. In the opened window enter the stream URL, which can be found in the Output Device node settings (see paragraph «2.3. Configuring graph nodes» above):
   - transport protocol (1). In our case, UDP;
   - stream IP-address (2);
• port number (3).


5. The player will start showing the program being broadcasted.
3. ASI output. Configuration and management

3.1. General information

The instructions in this section are based on working with one FD422 board: the broadcasting server is based on a FD422 board (SDI signal), and in addition, it is necessary to broadcast the TV program in the ASI signal through the output of the same board. The video compression format used is MPEG2.

Products used: Forward TA SD-SDI (FD422) + ASIOut/MPEG2.

The SLStreamer Pro program will be used to set up the graph.

Information about the broadcasting server’s configuration is necessary to set up a graph:

1. In the FDConfig2 program the FD422 Board #1 (1) is configured to work in the SDI+ASI output mode (2).

![Diagram of FDConfig2 program showing configuration settings]

Note: In the SDI+ASI output mode the output SDI signal will be transmitted through Output #1 (3), the ASI signal through Output #2 (4).

2. The FDOnAir program is set up to work with board FD422 #1 (5).

![Diagram of FDOnAir program showing configuration settings]
3.2. Starting SLStreamer Pro. Creating a graph

1. Start the SLStreamer Pro program. Use the desktop shortcut, or the Start menu: All programs > ForwardT Software > Plugins > SLStreamer Pro.

2. Make sure that the program is connected to the Scheduler – the Connection button (1) is inactive. If the button is active, press it in order to connect.

**Note**

1. The Scheduler is a system service designed to control the schemes of receiving, processing, and streaming audio/video and store the descriptions of the schemes.
2. It may be necessary to set the host address on which the Scheduler is running by pressing the Connection settings button.

3. To add a graph, press Create new graph (2).

4. In the opened window, set a name for the graph (3). Press OK (4) to confirm any changes.

5. A request to create a task with the new graph will appear automatically. Press Yes (5) in order to add the task.

**Note:** Tasks are used to start and stop graphs.
6. In the list of graphs the name of the new graph (6) will appear, in the list of tasks, the new task (7). The Graph configuration mode (8) will automatically turn on.

3.3. Adding and managing graph nodes

Note: For more information on working with graphs, see the «SLStreamer Lite, SLStreamer Pro. Programs for Configuring, Monitoring & Managing Digital Broadcasting Schemes» user’s guide.

While in Graph configuration mode, add and configure the graph nodes from left to right until you get a graph that looks like the one pictured below.
1. Input Device:
   1. Press Add Input Device (1).

   2. In the opened window set the node name (2). In the drop-down list (3) choose a device – the output video/audio of which will be captured. In our example this would be FD422 Board 1: SDI Output. Press OK (4).

   Note: If the list (Type) does not contain the necessary device, make sure that all necessary DirectShow filters are registered and the board in question is properly configured.

   3. In the opened window change the parameter settings if necessary: image format (5) and disabling/enabling other formats if the chosen format is not supported (6). Press OK (7) to save all changes and close the window.

   Examples of Configuring the Solutions
2. **Input Program:**
   1. Right click the Input device node (1) and select Add program (2).

   ![Diagram of SLStreamer Pro interface](image)

   2. In the Add Input Program window, set the node name (3). Select the necessary audio and video streams for further processing in the table (4) by flagging them.

   ![Add Input Program window](image)

   **Note:** The amount of audio streams (as well as language identifiers, etc.) transmitted from the board output depends on the FDConfig2 program settings.

   3. Press OK (5) to finish node set up.
3. Encoder:
   1. Right click the Input program node (1) and select Add encoder (2).

2. In the Add Encoder window, select a video compression format (3) according to the licenses owned and the audio compression format (4). Press OK (5).

3. The MPEG2 Encoder Properties (AVC Encoder Properties) window will automatically pop up. Set up the video encoding parameters, including:
   - Mode bitrate (6) – constant (CBR) or variable (VBR) bit rate;
   - Average bitrate (7) – necessary average bitrate (bit/sec). Default: 5999616 bit/sec (≈6 Mbit/sec);
   - Field order (8) – field order.

Press OK (9) to save all changes and close the window.
4. The MPEG1 Encoder Properties (AAC Encoder Properties) window will automatically pop up. Set up the audio encoding parameters, including:
   - the stereo channel compression mode (10);
   - the audio stream bitrate, kbit/sec (11).

Press OK (12) to save all changes and close the window.
4. Output program and Output device:
   1. Right click the Encoder node (1) and select Add output program (2).

2. The Add Output Program window will appear. If no output device has been added to the graph, the Device list (3) will be empty. Press Add (4).

3. In the Add Output Device window set the node name (5) and choose the device (6) that will be used for output. In our example this is FD422 Ch2 Board 1: ASI.

Press OK (7) to save all changes and close the window.
4. In the opened Properties window, set the parameters of the transport stream generating. Including the parameters of the multiplexer:

- type of output stream (8) – Transport stream or DVB;
- stream bitrate – a value of 0 means that the bitrate will be assigned automatically.

Press OK (10) to close the window and add the device to the graph.

5. In the Add Output Program window select the aforementioned device in the list (11).

Set the identifiers of the program that will be transmitted in output transport stream: name (12) and number (13). The
number will be used to identify the program on the receiving end.
The audio, video, and other packet identifiers (PID) are automatically set in our example (14). If you need to set a different PID for a specific stream, flag the necessary stream and change the value.
Press the OK button (15) to save all changes and close the window.

3.4. Completing the configuration
To finish configuring the graph, press the Finish graph configuration button (1). Press Yes (2) to confirm and save all changes.

3.5. Starting the graph
In our example the graph task was created automatically when creating the graph (see paragraph «3.2. Starting SLStreamer Pro. Creating a graph»).

Note: If the task does not exist, create it. For more information see the «SLStreamer Lite, SLStreamer Pro. Programs for Configuring, Monitoring & Managing Digital Broadcasting Schemes» user’s guide.

To add a task to the schedule, complete the following:
1. Choose the task in the list (1).
2. Press Add task to schedule (2).
3. In the Add task to schedule window:

**Note:** The window shown here is the new version. For work with the old version of the window, see the «SLStreamer Lite, SLStreamer Pro. Programs for Configuring, Monitoring & Managing Digital Broadcasting Schemes» user’s guide.

1. Choose the type of start (3):
   - Once – the task starts once, at a specific time, and ends at a specific time;
   - Daily – the task is started/stopped every day at the same time;
   - Weekly schedule – the task is started/stopped on a given schedule that differs for work days and weekends;
   - Daily schedule – the task follows a schedule for each day of the week.

2. Set the start and end time of the task in the From and To fields (4) respectively. If the daily schedule type was chosen, set the start/end times for each day.

3. Press Add task to schedule (2).

**Note:**

1. The To field value must be at least 10s bigger than the From field value.
2. For all types except Once the end time must differ from the start time by at least 1 sec. (For example, if the translation should last 24 hours, set the following values: From: 00.00.00, To: 23.59.59).
3. Starting a task might take a few seconds, keep that in mind when setting up the start time.
3. Press OK (5) to confirm all new settings and close the window.

4. The new task will be added to the schedule (6). The table will show the start (7) and end time (8) as well as the current status (9) – Stopped, Running.

5. The graph will start and stop according to the task. Information about its work will be shown in the protocol field (10). By switching the graph into the Active mode, the corresponding encoding and transmitting scheme starts working.

Make sure that the graph has started successfully. If not, then during the start of the graph or its run time the message Failed to start graph (11) will appear.

Closing the SLStreamer Pro program will not affect the current status of the tasks and graphs.

6. The task can be manually stopped at any time by deleting the task from the schedule (select the task and press Delete (12)).
Helpful links

**Description of products, software download, documentation, ready solutions:**
For ForwardT products:
   http://softlab.tv/rus/forward/forwardt_all.html
For ForwardTS products:
   http://softlab.tv/forward/streaming.html

**Technical Support**
E-mail: forward@softlab.tv
   forward@sl.iae.nsk.su
   forward@softlab-nsk.com

**Forums**
http://www.softlab-nsk.com/forum

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12 October, 2017.