



SKYLARK 3000 SCTE 104/35

Quick Configuration Guide

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Abstract. This document explains how to configure SKYLARK 3000 Ad Server for automated advertisement and program insertion using SCTE-104 in SDI or SCTE-35 in IPTS.

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1. Generation of SCTE-104/35 Messages

Note: This function is optional and requires additional licensing for its activation.

SCTE-104 messages provide the ability for automating the insertion of commercials, thus containing the control information for the regional broadcasting systems.

SCTE-104 data is formed in the twelfth line of the VANC interval of the baseband output, this is the SD/HD SDI signal of the SKYLARK 3000 server.

When using an IP Transport Stream output in the SKYLARK server, the MPEG-encoder forms an additional PID in the transport stream, according to the SCTE-35 protocol.

Using SCTE-104 messages as a part of SDI or SCTE-35 messages as a part of transport stream, allows the regional system to identify the received program and event insertion details, to define (with frame accuracy) the time of the beginning and the end of the local insertion, and dynamically select the specific blocks or media IDs to be played from the central server.

Moreover, the use of SCTE messages provides confidentiality and safety for unauthorized insert of commercials. Regional broadcasting systems that use the technology of automatic insert, functioning in unattended mode, do considerably decrease the operational costs.

SCTE-104/35 messages are generated right before the changeovers to commercials, and before the end of every regional block. In the case of manual transitions to commercials during the live broadcasts at the central station, the generation of messages is done instantly and send with the signal, providing frame accurate switching.

The possibilities of SKYLARK 3000 platform allow reading off data for generation of messages directly from the playlist columns; up to ten SCTE-104/35 parameters, including **splice_event_id** (the identifier of the ad block).

With SCTE 35/104 there is no need for using external hardware inserters with GPI-interfaces that do not guarantee frame accuracy of the message.

When inserting SCTE-35 messages into TS, additional five (5) extra Kbit/s of the channel for sending the transport stream may be required.

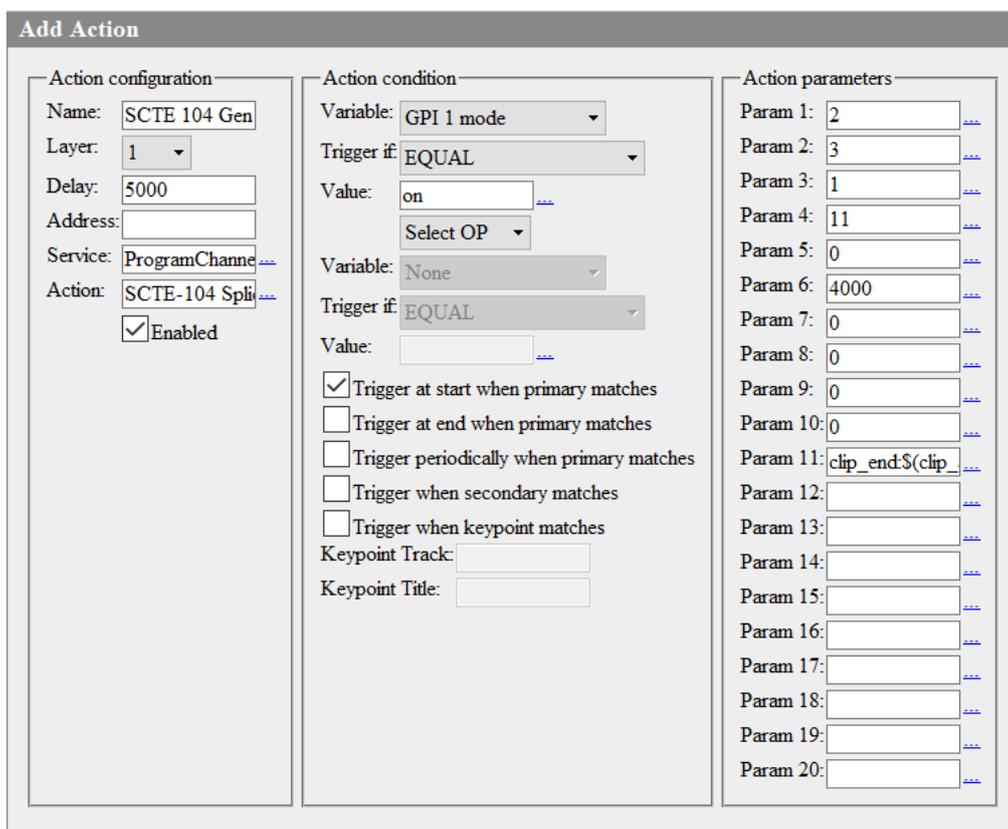
1.1 Creating Rules for the Generation of SCTE 104/35 Messages in the Central Server

In this section describes how to configure two basic rules for generating the messages that automate the insertion of local content and reconnection to the master program. The first rule is for the generation of the SCTE-104/35 message in the column of the specific playlist event, while the second rule is to generate another SCTE-104 message before another specific event.

The first rule will generate the message that launches the regional ad block, the second rule will generate the message that closes the block.

For managing the generation of messages, you may use every playlist column, in where you can specify the condition on/off – usually **GPI 1...8** mode or **Keyer 1...8** mode are used. For sending the ID of the advertising block to the regional systems, you may use one more playlist columns, in which you may enter the text data - **GPI 1...8 Value, Comment, Group Name, Type**, etc. For our example, we have chosen the column **GPI 1 mode**. The value in in this column will trigger the command for generating the message; also choose the column **GPI 1 Value** (GPI 1 V in the playlist) for specifying the ID of the regional block.

Configuring the first rule is implemented from the **Administration web-console** of the SKYLARK 3000 server (http://server_IP:7901), menu item **Manage**, tab **Program Outputs**. Find the item **Actions** in the chosen channel Program Channel, then find the field **Playlist events** and choose **Add Action**. A window prompts where the parameters for a new rule (Action) for the generation of a message before the start of the advertising block is displayed.



Add Action

Action configuration	Action condition	Action parameters
Name: <input type="text" value="SCTE 104 Gen"/>	Variable: <input type="text" value="GPI 1 mode"/>	Param 1: <input type="text" value="2"/>
Layer: <input type="text" value="1"/>	Trigger if: <input type="text" value="EQUAL"/>	Param 2: <input type="text" value="3"/>
Delay: <input type="text" value="5000"/>	Value: <input type="text" value="on"/>	Param 3: <input type="text" value="1"/>
Address: <input type="text"/>	<input type="text" value="Select OP"/>	Param 4: <input type="text" value="11"/>
Service: <input type="text" value="ProgramChanne..."/>	Variable: <input type="text" value="None"/>	Param 5: <input type="text" value="0"/>
Action: <input type="text" value="SCTE-104 Spli..."/>	Trigger if: <input type="text" value="EQUAL"/>	Param 6: <input type="text" value="4000"/>
<input checked="" type="checkbox"/> Enabled	Value: <input type="text"/>	Param 7: <input type="text" value="0"/>
	<input checked="" type="checkbox"/> Trigger at start when primary matches	Param 8: <input type="text" value="0"/>
	<input type="checkbox"/> Trigger at end when primary matches	Param 9: <input type="text" value="0"/>
	<input type="checkbox"/> Trigger periodically when primary matches	Param 10: <input type="text" value="0"/>
	<input type="checkbox"/> Trigger when secondary matches	Param 11: <input type="text" value="clip_end:\$(clip_"/>
	<input type="checkbox"/> Trigger when keypoint matches	Param 12: <input type="text"/>
	Keypoint Track: <input type="text"/>	Param 13: <input type="text"/>
	Keypoint Title: <input type="text"/>	Param 14: <input type="text"/>
		Param 15: <input type="text"/>
		Param 16: <input type="text"/>
		Param 17: <input type="text"/>
		Param 18: <input type="text"/>
		Param 19: <input type="text"/>
		Param 20: <input type="text"/>

Find the field **Name** in the **Action Configuration** area and enter the desired name for the rule. In the field **Layer** choose **"1"** (the main full screen layer of the program channel), in the field **Delay** set the time value for the delay from the start of the rule to the event end in milliseconds. If you need to generate the message four seconds before the event ends, you should enter a value greater than four seconds into the field Delay (for example, **5000 ms**).

In the field **Address**, set the IP address of the server, or leave the field empty if the value is localhost. Choose the service name by the button **...** in the field Service. In our example, it is Program Channel #1 (ProgramChannel_1 in the list).

Click the button **...** in the field **Action** in order to choose the function that will be executed in the current rule, in this case **SCTE-104 Splice Request**.

In the **Action condition** are, find the field **Variable** and specify the playlist column that will trigger the message generation. In our example, we choose **GPI 1 mode**, set the trigger as "EQUAL", and enter "on" in the field **Value**. Activate the parameter "**Trigger at end when primary matches**". The values implemented in the "**Action condition**" are refers to the parameters that will trigger the rule, in this case when the value "on" is set in the playlist in the GPI 1 column. The rule starts five seconds before the end of the main playlist event of the playout.

In the **Action parameters** area the eleven parameters of the generated message are specified:

- **Param 1: AS_index** - identifies the source of message - the broadcasting system. Ranges of numbers from 0 to 255 (0 is used, if the index is not needed).
- **Param 2: DPI_PID_index**, 16bit integer (from 0 to 65535). The value = 0, if DPI_PID_index is not needed.
- **Param 3: splice_insert_type** - the 8bit integer (from 0 to 255) that defines the type of operation for insert of commercials. Values of the parameter:
 - reserved - 0
 - spliceStart_normal - 1 (is specified in the rule for the start of the ad block)
 - spliceStart_immediate - 2
 - spliceEnd_normal - 3 (is specified in the rule for the stop of the ad block)
 - spliceEnd_immediate - 4
 - splice_cancel - 5
- **Param 4: splice_event_id**, 32bit integer (from 0 to 4294967295), the identifier of the advertising block. For reading off from the playlist column at the central station, you should choose the column from the list by the button ..., or specify the playlist column in the format \$(gpi1_val) - GPI 1 Value in our example.
- **Param 5: unique_program_id**, the 16bit integer (from 0 to 65535), the identifier of a program, according to SCTE-35.
- **Param 6: pre_roll_time** the 16bit integer (from 0 to 65535) that defines the insert point: the time from the moment of generation of the message till the moment of insert, in milliseconds.
- **Param 7: break_duration** the 16bit integer (from 0 to 65535) that defines the insert duration in tenths of seconds. The value "0" doesn't set the duration and makes the parameter inactive.
- **Param 8: avail_num** the 8bit number (from 0 to 255), the identifier according to the SCTE-35 standard. The value "0" makes the parameter inactive.
- **Param 9: avails_expected** the 8bit number (from 0 to 255), the identifier according to the SCTE-35 standard. The value "0" makes the parameter inactive.

- **Param 10: *auto_return_flag*** the value “0” makes the parameter inactive, the value “1” activates the parameter. The function is defined by the SCTE-35 standard.
- **Param 11:** the parameter that provides frame-by-frame accuracy when generating a message. It allows users to set the shift relatively to the beginning or the end of the playlist event that generates the message. Values of the parameter:
 - Empty field - the message will be generated immediately.
 - *clip_start*: \$(clip_anchor)/OFFSET, where OFFSET is the shift of the moment of generating the message relatively to the end of the on-air event in the format HH:MM:SS:FF
 - *clip_end*: \$(clip_anchor)/OFFSET, where OFFSET is the shift relatively to the end of the on-air event, for example, the value clip_end:\$(clip_anchor)/-00:00:04:00 will generate the message four seconds before the end of the playlist event. The time value in the field Delay (the window Action Configuration in the rule settings) should exceed the OFFSET value for a few hundreds of msec (for example, 500).

You should implement the same adjustments for the second rule that forms the message before the end of the ad block, and for all other program channels that need messages.

1.2 Generation of VANC-data for SDI output in the Central Server

For forming SCTE-104 messages in the baseband output signal of the SKYLARK 3000 server, the generation of data in the VANC-interval (SMPTE 291M standard) should be turned on.



The procedure is implemented from the **Administration web-console**: menu section **Manage**, tab **Video IO Boards**. Choose the Playout channel that displays the current format (for example, SDI/Embedded, 1080i), click Edit, and activate the parameter **Use VANC** in the window Configure Service.

Press **Apply Changes** at the top part of the Administration console window. The playout channels will stop and reload with the new configuration. SCTE generation settings is finished.

1.3 Check the Presence of SCTE-104 Messages and Correctness of their Positioning

Software of the SKYLARK 3000 platform allows you to check the presence of SCTE-104 messages in the output SDI and correctness of their positioning without the additional hardware/software resources.

After configuring the rule, you should record the SDI output signal (with messages from the server output) into a file, sending the stream formed by the service Program Channel to the input of the recording service.



The window File Monitor of the application Air Manager allows viewing the record frame-by-frame, define the presence of VANC-batches, check the presence and the positions of messages in the recorded signal. Activation of the mode for displaying the VANC-batches is implemented in the menu for configuring Air Manager: **File-> Configure-> Preview-> item Show ANC.**

For testing, you may use the avi-file (576i 25 fps DV) that contains the values of the time code in the video.

2. Reception of SCTE-104/35 Messages

Note: This function is included with Skylark input and program license.

The basic functionality of SKYLARK 3000 for regional inserts includes:

- Seamless insert of the local commercials for DVB ASI/IP TS and SD/HD SDI interfaces.
- Possibility of cross-conversions between ASI-IP-SDI.
- IP TS includes transcoding of signal. Codec and bitrate may be modified, or add overlay tickers, logos and graphics to the reissuing content.
- Manual and automatic load of playlists with advertisements, where the content may be transcoded, loudness levels normalized or audio tracks shuffled.
- Rebroadcasting teletext signals from the central station when replacing commercials.
- The program bypass in the mode UDP IP Multicast, with the backup scheme N+N.
- The hardware bypass in the ASI and SDI modes (the relay in I/O boards, or external devices).
- The “client-server” architecture enables monitoring and managing multiple SKYLARK 3000 media servers over the network.
- The built-in protected content storage and Media DB together with the integration of external systems for storing content such as NAS or DAS.

The principle for regional inserts is the following:

The SKYLARK 3000 Ad server, which rebroadcast at the regional station, works “on pass” and is constantly analyzing the audio-signal input received from the central station.

The built-in analyzer of the Capture service checks if there are any messages in the input stream. When detects a message, then generates the control command associated to the received message and executes it based on the playlist.

The server then broadcasts the playlist of the local ad blocks and implements the program switching from the server input.

The end of the ad block may be detected in the same way. In this case, the server will form a command to stop the playlist with commercials and implement reverse switching to the input line.

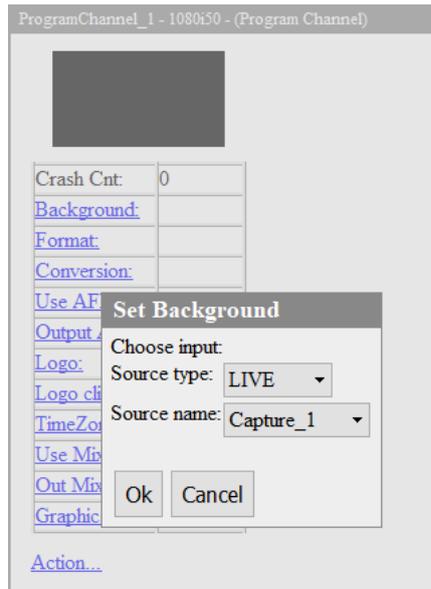
SCTE-35 messages may be received and decoded by the SKYLARK 3000 server from DVB ASI or UDP IP sources of input signals.

SCTE-104 messages may be received and decoded by the server from VANC-data as a part of input SD/HD SDI signals.

Let us consider one of the possible working modes of the server: work “on pass” - one input channel receiving the signal from the central playout channel and rebroadcasting the signal.

2.1 Link the Capture service with the Program service

When the playlist with regional commercials is stopped, the signal from the input is broadcasted to the output. When the playlist is being executed, file playout replaces the input signal. For setting this mode, you should configure the playout channel and set a background-source for it - the capture service will implement this task. This option is configured from the web-console of the server - menu item **Status**, tab **Program Channel**. In the **Background** field of the Program Channel specify the type of source **LIVE** and choose the desired capture service that receives the signal from the central server.



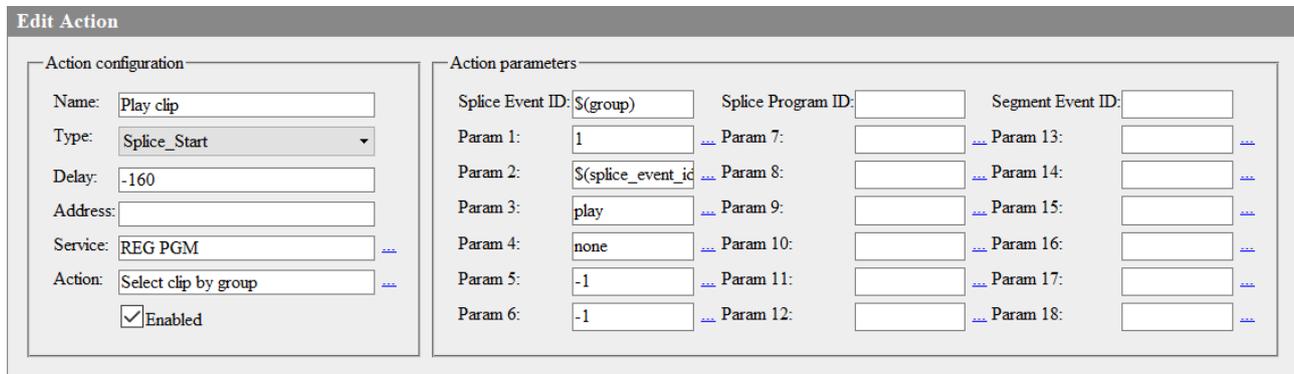
SCTE-104 and SCTE-35 commands are received by the capture service Capture. When receiving the message, the capture service forms the command defined in the Action that is executed by other modules of the SKYLARK 3000 platform. For the playback of a regional Ad block, the command is sent to the address of the playout service Program Channel. Other commands may also be formed for other modules - for example, for the record of regional commercials, to the address of the module File Recorder.

2.2 Configure the Rule to Start the Playlist

The procedures for adjusting the receiving messages and forming the commands to the modules of the SKYLARK 3000 platform are identical for the SCTE-104 and SCTE-35 formats. In the first case, the capture service interacts with the input SDI board; the board should support receiving VANC-data. In the second case, the capture service is configured for receiving the IP or ASI transport stream. When receiving multi-program TS by the server, the signal should be previously converted to a single-program transport stream with the help of Easy Muxer software.

Adjustment of the capture service *Capture* for receiving SCTE commands and sending commands to the service of playlist execution Program Channel is implemented from the web-console of the server: menu section **Manage**, item **Video IO Boards**. Choose the item **No actions Defined** in the appropriate window of the capture service (Capture), then press **Edit**.

Select **Add Action** from the window **Edit Action**, and choose the **SCTE-104/35** option and press. In the new window, enter parameters of the rule for the analysis of messages and managing the service Program Channel.



Please find beneath the description of fields:

- **Name:** an arbitrary name for the rule (in our example *play clip*).
- **Type:** defines if is a starting or ending action message. *Splice Start* from the drop-down list defines the start.
- **Delay:** the time of delay in milliseconds, for frame-by-frame accuracy of the start of commercials. When receiving SCTE-104/35 commands, the analyzer automatically pins the dubbed input commands (with the decreasing delay) and considers the time of pre-roll, set in the command. In the given example the value “-160” has been defined empirically;
- **Service:** the title of the Program Channel service, which is selected (in the example - REG PGM), from the list by the button [...]
- **Action:** the defined action or rule that is triggered. *Select clip by group* – is the action that selects the first clip in the group for playout. The type of action is chosen from the drop-down list clicking in the button [...]. Other action could be *Select clip by current time* where clip chosen would match the time when message is received.
- **Param 1:** the number of the layer in which the server will implement playout of commercials: “1” indicates the first full screen layer;
- **Param 2:** the value *Splice Event ID* - from the drop-down menu;
- **Param 3:** the command “play” for playout, right after choosing the block by the number sent from the central station;
- **Param 4:** “none”, if no actions are planned in case of absence of the advert clip;
- **Param 5:** “-1”;
- **Param 6:** “-1”.

2.3 Configure the Rule to Stop the Playlist

The second rule is configured analogously to the rule of processing the start message.

Edit Action

Action configuration	Action parameters
Name: <input type="text" value="Stop clip"/>	Splice Event ID: <input type="text"/> Splice Program ID: <input type="text"/> Segment Event ID: <input type="text"/>
Type: <input type="text" value="Splice_End"/>	Param 1: <input type="text" value="1"/> ... Param 7: <input type="text"/> ... Param 13: <input type="text"/>
Delay: <input type="text" value="-160"/>	Param 2: <input type="text"/> ... Param 8: <input type="text"/> ... Param 14: <input type="text"/>
Address: <input type="text"/>	Param 3: <input type="text"/> ... Param 9: <input type="text"/> ... Param 15: <input type="text"/>
Service: <input type="text" value="REG PGM"/>	Param 4: <input type="text"/> ... Param 10: <input type="text"/> ... Param 16: <input type="text"/>
Action: <input type="text" value="Stop"/>	Param 5: <input type="text"/> ... Param 11: <input type="text"/> ... Param 17: <input type="text"/>
<input checked="" type="checkbox"/> Enabled	Param 6: <input type="text"/> ... Param 12: <input type="text"/> ... Param 18: <input type="text"/>

The parameters are described as follows:

- Name: The arbitrary name for the rule (in our example stop clip);
- Type: *Splice_End* from the drop-down list; indicates the end of the communication.
- Service: The name of the service Program Channel, which is responsible for playout of the playlist (in the example - REG PGM);
- Action: Stop from the drop-down menu by pressing the button [...], will stop the playlist to resume the broadcast of the master PGM signal.

2.4 Play Recorded Events from the Central Server

Working “on pass” with the input signal from the central station is not the only way of operating. Whenever you delaying the received live signal is necessary (including the variable), the SKYLARK 3000 platform allows you to playback the fragments of the previously recorded broadcast in the main full screen layer (playlist), detect messages in it and implement insert of commercials in the first graphic layer, overlapping the recorded broadcast.

Configuring the module Program Channel is implemented from the control web console: menu section *Manage*, item *Program Outputs*. You should choose the tab *Actions*, then - *Main Layers Events*, and click *Add Action*. Choose the type *SCTE-104/35* and press *OK*.

In the new window, by the analogy with the described earlier settings of the Capture service, enter the parameters of the rule for the analysis of messages and managing the service Program Channel for the main full screen layer.

2.5 Monitor information contained in SCTE messages.

Appearance of SCTE messages in the input stream is displayed as the message in the window MESSAGE of the capture service (is opened by the right clicking on the icon of SKYLARK 3000 server software in the tray).

An example of the report about appearance of the message for the start of the ad block:

```
splice_info_section: pid: 500, splice_insert:
splice_insert_type: 1
splice_event_id: 42417000
unique_program_id: 0
```

```
pre_roll_time: 7440  
break_duration: 0  
avail_num: 0  
avails_expected: 0  
auto_return_flag: 0
```

The parameter **splice_insert_type: 1** tells that the message is designated for the start of the advertising block.

The parameter **splice_event_id: 42417000** indicates the number of the group (the number of the ad block) for playout. The Ad block as the group with the same number should be present in the regional playlist. This specific block will be called for playout by the corresponding command.

The parameter **pre_roll_time: 7440** indicates the time of delay, set at the sending side from the moment of receiving the message until the broadcast of the advertising block.

An example of message about the end of the advertising block

```
splice_info_section: pid: 500, splice_insert:  
splice_insert_type: 3  
splice_event_id: 42417000  
unique_program_id: 0  
pre_roll_time: 7560  
break_duration: 0  
avail_num: 0  
avails_expected: 0  
auto_return_flag: 0
```

The parameter **splice_insert_type: 3** tells that this message is for the end of the advertising block.

The parameter **splice_event_id: 42417000** indicates the number of the group (ad block) that should be stopped.

The parameter **pre_roll_time: 7560** indicates the time of delay, set at the sending side from the moment of receiving the message until the end of the advertising block.
Adjustment of rules for sending commands to the record service.

2.6 Configure the Rule to Record the Live Signal

Processing the message for the start of the recording block:

Edit Action	
<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>Action configuration</p> <p>Name: <input type="text" value="Rec start"/></p> <p>Type: <input style="border: none; background-color: #ccc; width: 100%;" type="text" value="Splice_Start"/></p> <p>Delay: <input type="text" value="-1000"/></p> <p>Address: <input type="text"/></p> <p>Service: <input type="text" value="REC"/></p> <p>Action: <input type="text" value="Append item"/></p> <p><input checked="" type="checkbox"/> Enabled</p> </div> <div style="width: 50%;"> <p>Action parameters</p> <p>Splice Event ID: <input type="text"/> Splice Program ID: <input type="text"/> Segment Event ID: <input type="text"/></p> <p>Param 1: <input type="text" value="7500"/> Param 7: <input type="text"/></p> <p>Param 2: <input type="text" value="manual"/> Param 8: <input type="text"/></p> <p>Param 3: <input type="text"/> Param 9: <input type="text"/></p> <p>Param 4: <input type="text"/> Param 10: <input type="text"/></p> <p>Param 5: <input type="text"/> Param 11: <input type="text"/></p> <p>Param 6: <input type="text" value="start"/> Param 12: <input type="text"/></p> <p>Param 13: <input type="text"/></p> <p>Param 14: <input type="text"/></p> <p>Param 15: <input type="text"/></p> <p>Param 16: <input type="text"/></p> <p>Param 17: <input type="text"/></p> <p>Param 18: <input type="text"/></p> </div> </div>	

- **Name:** The desired name for the rule (in our example *rec start*);
- **Type:** *Splice_Start* from the drop-down list;
- **Delay:** “-1000” for advancing the start of recording for one sec relatively to the time of executing the insert of the regional commercials;
- **Service:** The system name of the service, which will be recording the ad block (in the example - *REC*);
- **Action:** Append item from the drop-down list;
- **Param 1:** The timing of record;
- **Param 2:** manual the type of start;
- **Param 6:** start for executing the start of recording in the same command.

2.7 Configure the Rule to Stop the Record of the Live Signal

Processing the message for the end of the recording of the block:

Edit Action	
<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>Action configuration</p> <p>Name: <input type="text" value="Rec stop"/></p> <p>Type: <input style="border: none; background-color: #ccc; width: 100%;" type="text" value="Splice_End"/></p> <p>Delay: <input type="text" value="3000"/></p> <p>Address: <input type="text"/></p> <p>Service: <input type="text" value="REC"/></p> <p>Action: <input type="text" value="Stop"/></p> <p><input checked="" type="checkbox"/> Enabled</p> </div> <div style="width: 50%;"> <p>Action parameters</p> <p>Splice Event ID: <input type="text"/> Splice Program ID: <input type="text"/> Segment Event ID: <input type="text"/></p> <p>Param 1: <input type="text"/> Param 7: <input type="text"/></p> <p>Param 2: <input type="text"/> Param 8: <input type="text"/></p> <p>Param 3: <input type="text"/> Param 9: <input type="text"/></p> <p>Param 4: <input type="text"/> Param 10: <input type="text"/></p> <p>Param 5: <input type="text"/> Param 11: <input type="text"/></p> <p>Param 6: <input type="text"/> Param 12: <input type="text"/></p> <p>Param 13: <input type="text"/></p> <p>Param 14: <input type="text"/></p> <p>Param 15: <input type="text"/></p> <p>Param 16: <input type="text"/></p> <p>Param 17: <input type="text"/></p> <p>Param 18: <input type="text"/></p> </div> </div>	

- **Name:** The arbitrary name for the rule (in our example *stop*);
- **Type:** *Splice_End* from the drop-down list;
- **Delay:** “3000” - for advancing the start of recording for three sec relatively to the time of executing the insert of the regional commercials;
- **Service:** The system name of the record service, which will be recording the ad block (in the example - *REC*);

- **Action:** Stop from the drop-down menu.

Press Apply Changes at the top part of the server control console, to save the settings. Herewith, the services are restarted and new configuration applied.