

Subtitles

The SL NEO platform allows automatic generation and multiplexing of closed and open captions. Information is relevant for the [2.5.52](#) version and later. Closed captions require a special decoder for viewing, while open captions are inserted over the image.

In EU and Russia, the following technologies for captioning are used: Teletext, IP (DVB) and Open Captions.

Supported Captioning Technologies

Technology	Description
CEA-608	The standard was developed in 70s for captioning in the NTSC format. The standard supports 7-bit encoding, thus does not support Russian language. Data is encoded in a b&w series of impulses transmitted in the 21th line of the first field and 284th line of the second field in the video signal. Each field allowed transmitting up to 2 caption channels: CC1+CC2 and CC3+CC4. Due to bandwidth limitations, transmitting only 2 channels is usually supported (CC1 and CC3): the first channel is used for transmitting captions, second one - for EPG. Total bandwidth is 960 bps.
CEA-708	Closed captions in the NTSC standard. This one is a modern type of captions transmitted via VANC; it supports encoding in UTF8 with transmitting up to 16 services. Data transfer rate is 9600 bps.
CEA-708 with 608 Compatibility Bits	Closed captions in the NTSC standard. When broadcasting 708 captions in this mode, 608 data is added as 608 compatibility bits to the CEA-708 data packet. If an analogue signal is used for channel distribution, only the part with 608 captions is transmitted: in all other cases, 708 packets are transmitted fully.
Teletext	The transfer system for digital data within an analogue TV signal, HD/SD SDI signals and DVB IP/ASI transport streams; can be used for distribution of closed captions. The SL NEO platform supports the following specifications: <ul style="list-style-type: none"> • OP-42 - captioning in PAL systems (PAL16x9). Important! If the option Administrator Control Panel→Video IO Boards→Playout_N→General→Use VANC is activated in SD Playout, generation will be implemented by the OP-47 standard. This must be considered when configuring receiving and encoding equipment. • OP-47 (SMPTE RDD-08) is a European standard for transmitting closed captions in an HD signal, based on limited characteristics from a broader WST (World System Teletext) specification. Teletext supports transmitting 40 symbols per line, but first 2 symbols are used to open a visible line, so there are 38 symbols available for displaying captions. Every color change adds a necessary space.
Open Captions	Open captions are inserted over the image at the moment of forming the Program Channel or Playout service output signal.
IP (DVB/ATSC)	When forming a transport stream in the PAL format, captions packets are sent by the DVB standard, while NTSC uses the ATSC data transfer standard.

Selecting Captions Processor

Depending on a task, captions may be overlaid in different software modules:

- Overlaying in **Program Channel** – for captioning local broadcasting or at the moment of a regional insert.
- Overlaying in **Playout** – for local captioning of the passing signal with no inserts.
- Overlaying in **IP Playout** – for forming DVB captions.

Loading Captions

Rules for Renaming Files

The structure of naming captions files is the following: `MediaID_N_LANG.ext`, where:

- **MediaID** – MediaID of the video file,
- **N** – number of the caption track (optional),
- **LANG** – language code in the format [ISO-639-2](#).
- **ext** – extensions of a file with captions (described in the table “Supported Input Formats”).

Example:

- `Mr_Popper_Penguins.mp4` – video-clip,
- `Mr_Popper_Penguins_rus.srt` – captions in Russian,
- `Mr_Popper_Penguins_eng.srt` – captions in English.

or

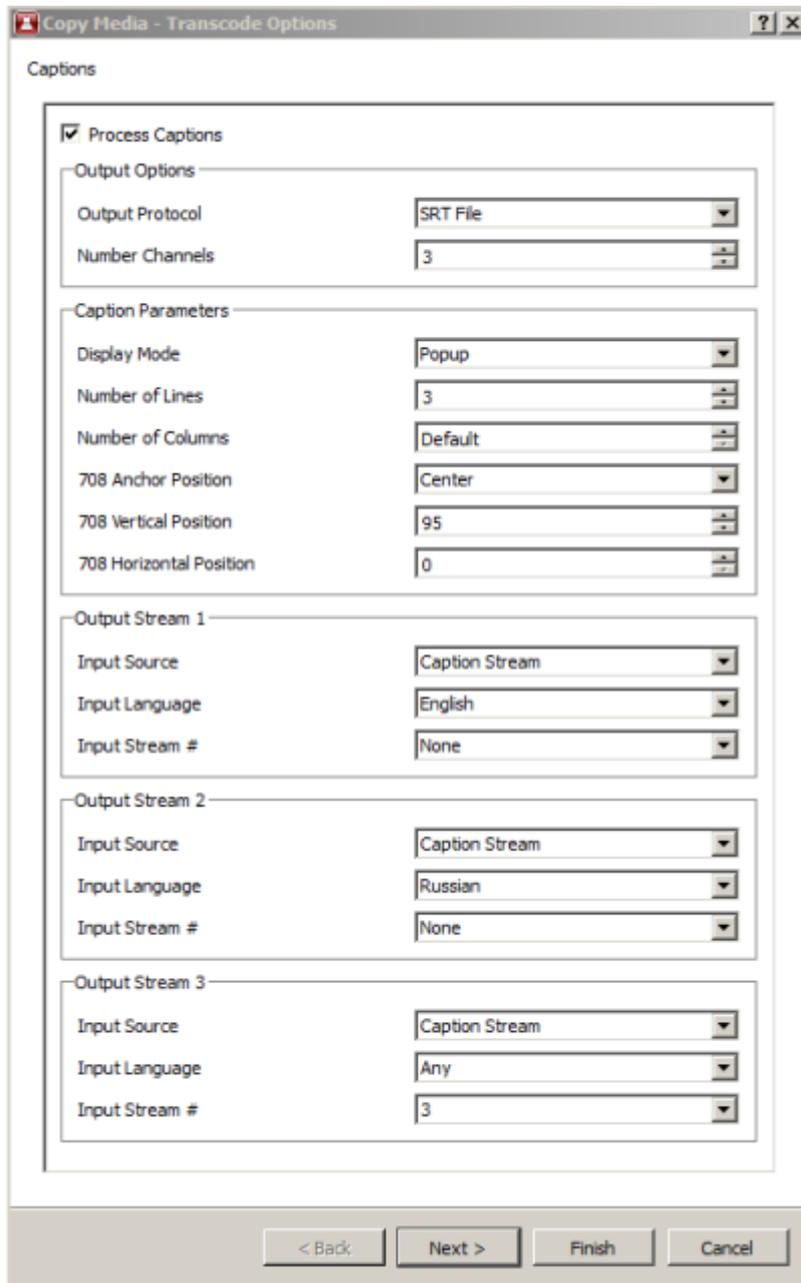
- `Mr_Popper_Penguins_1_rus.srt` – captions in Russian, placed to the first track,
- `Mr_Popper_Penguins_2_eng.srt` – captions in English, placed to the second track.

Supports Input Formats

Extension	Description
SRT	The text format of captions, used in the SubRip application.
SMI	Text format of captions by Microsoft, used for formatting text similarly to HTML and CSS.
TTML	Timed Text Markup Language – format of captions developed by W3C on the XML basis.
STL	Format of exchange the captions data according to EBU Tech 3264

Import to Database

Captions may be added to the file at the stage of import to the media database. Files with captions must be located in the folder with the video-clip at the moment of import.

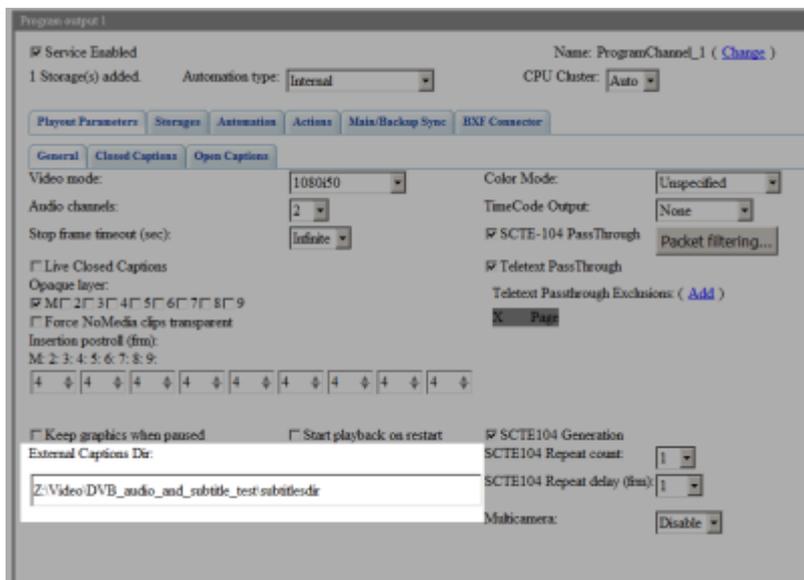


Option	Description
Process Captions	Activates import of captions
Output Options - selecting the output technology	
Output Protocol	Selecting the technology for saving captions to the database: <ul style="list-style-type: none"> • SRT File - SRT files will be placed to the media database. • CEA-608 - captions will be encoded to the VANC area. • CEA-708 - captions will be encoded to the VANC area. • CEA-708 with 608 Compatibility Bits - captions will be encoded to the VANC area.
Number Channels	The number of output caption tracks.
Caption Parameters - displaying settings for 608 and 708 captions	
Display Mode	Displaying mode
Number of Lines	The number of simultaneously displayed lines.

Option	Description
Number of Columns	 Fix Me!
708 Anchor Position	 Fix Me!
708 Vertical Position	 Fix Me!
708 Horizontal Position	 Fix Me!
Output Stream N - settings of output tracks with captions	
Input Source	The source of captions for the output track. Possible values: <ul style="list-style-type: none"> • Caption Stream - from an SRT file • CEA-XXX - from a VANC area of the video file with CEA-608/CEA-708 captions. Setting "Output Protocol=SRT File" during import for a file containing CEA-608/CEA-708 captions in VANC will lead to Caption Extraction: an srt file with captions will be created at the output.
Input Language	Selecting an output track with captions by language.
Input Stream #	Selecting an output track with captions by index. The option is available if Input Language=Any. (Possible values: None, 1-8)

This option may be used in cases, when captions are played via Program Channel. If displaying captions is implemented through the Playout service, you must use the dynamic load of captions.

Dynamic Loading



If files with captions are loaded dynamically, they are placed in a file folder on the disk. For example: Z:\Subtitles. A path to the folder is specified in services settings:

Service	Setting	Description
Program Channel	Administrator Control Panel→Manage→Program Outputs→Program_N→Playout Parameters→General→External Captions Dir	

Service	Setting	Description
Playout	Administrator Control Panel→Manage→Video IO Boards→Playout_N→General→External Captions Dir	
Storage	Administrator Control Panel→Manage→Storages→Storage_N→External Captions Dir	Reading is implemented during execution of a request for displaying captions from a corresponding service. Preview of captions is supported in the Filemonitor window of AirManager/MediaConnect.



If language settings coincide, files with captions from the folder have a priority over embedded captions and the ones in the media database.

Configuring Generation of Captions

Closed Captions

To start configuring closed captions, activate generation of captions and select an output protocol in the configuration of Program Channel or Playout services.

Program output 1

Service Enabled Name: Program_7 ([Change](#))

1 Storage(s) added. Automation type: CPU Cluster:

Render Captions

Output Options

Output Protocol:

Insert Captions:

Display Mode:

Number of Lines:

Number of Columns:

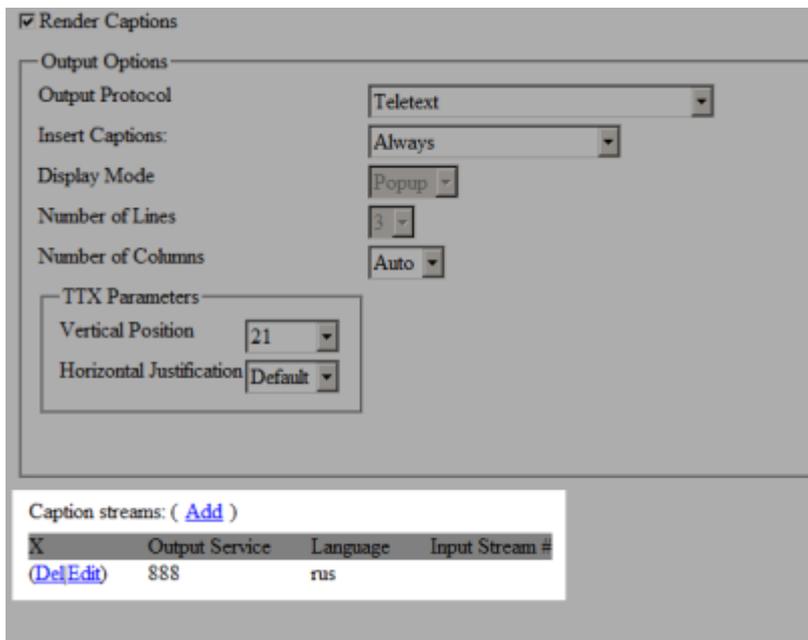
TTX Parameters

Vertical Position:

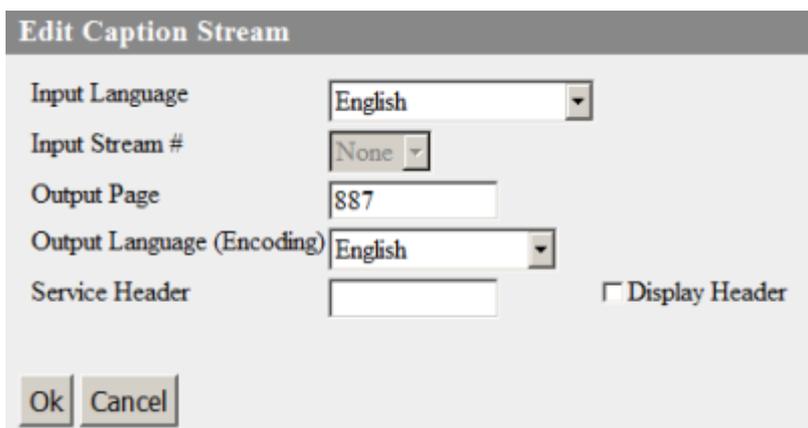
Horizontal Justification:

Parameter	Description
Render Captions	Activates generation of closed captions. The feature requires additional licensing . Make sure your license provides this feature. Activating the option without an appropriate license will switch the server to the demo-mode.
Output Protocol	Protocol of displaying captions: <ul style="list-style-type: none">• CEA-608• CEA-708• CEA-708 with 608 Compatibility Bits• Teletext
Insert Captions	The order of displaying captions: <ul style="list-style-type: none">• Never - displaying captions is off,• Always - data on availability of captions is always displayed,• Only When Captions Exist - data on captions is displayed only in case of availability of files with captions.
Display Mode	A variant of visualization of captions displaying: <ul style="list-style-type: none">• Scroll• Popup
Number of Lines	The number of simultaneously displayed lines.
Number of Columns	The number of symbols in a line (do not exceed the number of symbols defined by the selected Output Protocol standard).
Vertical Position	Setting the vertical position of displaying captions; value is set in rows 1-24. Added in version 2.5.48 .
Horizontal Justification	Setting the horizontal position of displaying captions. If captions already have alignment parameters, use the Default value. Possible values: <ul style="list-style-type: none">• Default - by default,• Right - right-aligned,• Center - center-aligned,• Left - left-aligned. Added in version 2.5.48 .

Teletext



If teletext was used as the output protocol, the Caption streams area will be available for adding/editing captions output tracks. One track equals one teletext page (one language).



The dialogue for adding a caption output track.

Parameter	Description
Input Language	Selecting an input caption track by the language.
Input Language	Selecting an input caption track by the index. The option is available if Input Language=Any.
Output Page	The number of the output teletext page for the given captions language.
Output Language (Encoding)	Defines encoding of displayed symbols: Latin or Cyrillic.
Service Header	Setting text of a header displayed during teletext output.
Display Header	Activates displaying Service Header

Teletext Options

Teletext PassThrough

Teletext Passthrough Exclusions: ([Add](#))

X Page

Broadcast Service Options

Generate Broadcast Service Data

Initial Page

Network Identification Code

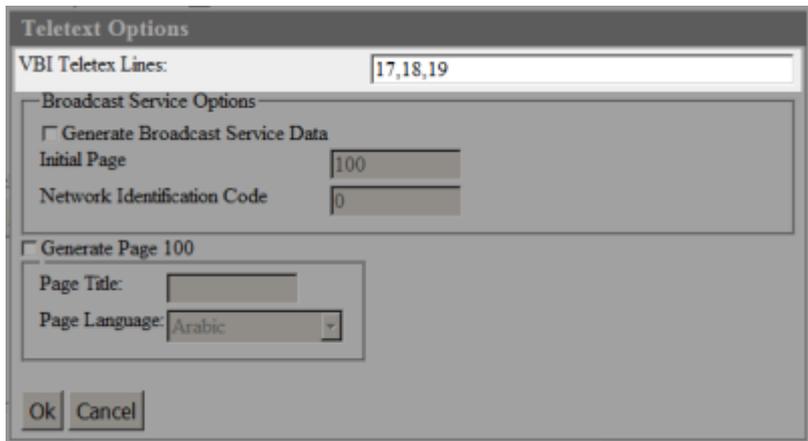
Generate Page 100

Page Title:

Page Language:

If the system of displaying captions in teletext is used autonomously (the channel doesn't have teletext), it is necessary to turn on output of service packets and generation of the 100th page in the window Administrator Control Panel→Manage→Video IO Boards→Playout_N→General→Teletext Options... or Administrator Control Panel→Manage→Program Channels→Program_N→General→Teletext Options...

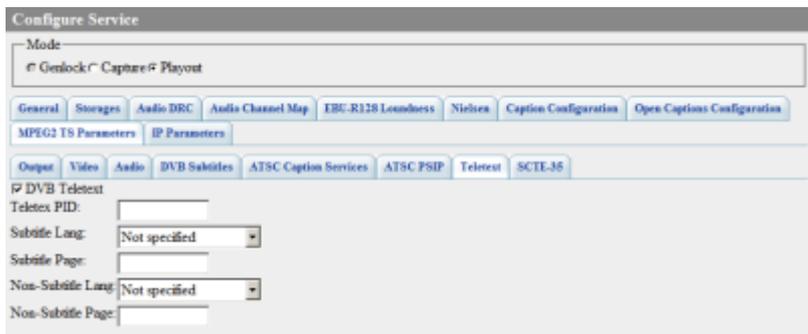
Parameter	Description
Teletext PassThrough	Activating teletext data pass-through from the source in the background layer. More details on configuring Teletext PassThrough .
Teletext Passthrough Exclusions	Specifying numbers of pages to be excluded from sending to the program channel output. More details on configuring Teletext Passthrough Exclusions .
Generate Broadcast Service Data	
Initial Page	Specifying the teletext start page number (must be equal to 100).
Network Identification Code	The identification code assigned to the broadcaster by regulatory authorities.
Generate Page 100	Activate generating an image placeholder for the 100th page. The start page is necessary for correct work of decoding equipment. This option must be active, if pages with teletext captions are formed in the channel with no teletext output.
Page Title	Text displayed at the 100th page.
Page Language	Selecting the page language.



Besides, you can define VBI Lines to be used to transmit teletext in Teletext Options of the Playout service. Number of lines must be comma-separated. If the value is empty, the service will define lines automatically.

Teletext in IP

If teletext is displayed in the IP format (transcoding an SDI signal containing teletext or direct IP broadcasting), you must define settings of conversion to DVB Teletext in IP Playout service settings: Administrator Control Panel→Manage→Video IO Boards→Playout_N→MPEG2 TS Parameters→Teletext.



Parameter	Description
DVB Teletext	Activates encoding teletext to an IP stream.
Teletex PID	Identifier of the stream with teletext captions.
Subtitle Lang	 Fix Me!
Subtitle Page	 Fix Me!
Non-Subtitle Lang	 Fix Me!
Non-Subtitle Page	 Fix Me!

Open Captions

Program output 1

Service Enabled Name: ProgramChannel_1 ([Change](#))

1 Storage(s) added. Automation type: CPU Cluster:

[Playout Parameters](#) [Storages](#) [Automation](#) [Actions](#) [Main/Backup Sync](#) [BXF Connector](#)

[General](#) [Closed Captions](#) [Open Captions](#)

Display Open Captions

Roll up buffer:

Font face: Font size:

Font color: Font opacity:

Bold Italic

Background color: Backgroup opacity:

Outline: Outline width:

H Alignment: V Alignment:

Horizontal adjustment: Vertical adjustment:

Line spacing %: Character spacing %:

Display Mode:

Caption streams: ([Add](#))

X	Language	Index
(Del Edit)	rus	-1
(Del Edit)	eng	-1

Parameter	Description
Display Open Captions	Turn on generating and displaying open captions. The feature does not require additional licensing.
Roll up buffer	Setting the number of simultaneously displayed lines.
Font face	Selecting a font for displaying captions.
Font size	Font size
Font color	Font color
Font opacity	Font opacity. 100 - completely opaque.
Bold	Making the selected font bold.
Italic	Making the selected font italic.
Background color	The backing color under captions.
Background opacity	Backing opacity under captions. 100 - completely opaque.
Outline	Outline font, color selected from the drop-down list.
Outline width	Setting the outline width.
H Alignment	Setting horizontal alignment of text: Left, Center, or Right.
V Alignment	Setting vertical alignment of text: Top, Center, or Bottom.
Horizontal adjustment	Horizontal adjustment of text: positive values - right, negative values - left.
Vertical adjustment	Vertical adjustment of text: positive values - bottom, negative values - top.

Parameter	Description	
Line spacing %	Setting the line spacing.	
Character spacing %	Setting the character spacing.	
Display Mode	Selecting the variant of text appearing: <ul style="list-style-type: none"> • Scroll - new captions appear by bottom-up scrolling, • Popup - new captions replace old ones on screen. 	
Caption streams - configuring captions tracks. Switching output is implemented by the program channel action Set Open Captions Stream		
Source stream Lang	Selecting an input track with captions by language.	
Source stream Idx	Selecting an input track with captions by index. The option is available, if Source stream Lang=Any (possible values: None, 1-16).	

IP DVB

Configuring is described in the article: [Configuring Generation of Closed Captions in DVB Transport Streams](#).

Editing Captions

Creating and editing captions can be implemented by both third-party editing apps and client software NewsCut that includes all [necessary instruments](#).

Methods of Control

Control of Teletext in Output Signal

Oscilloscope

Control of Teletext closed captions in the SDI signal can be implemented by a TV oscilloscope (Tektronix WFM2300 was used as an example).

Control of Teletext packets in the ANC Data Inspector mode. Select the displaying mode: MEAS→Menu→Display Type→ANC Data Disp.→ANC Data Disp.

ANC Data Inspector

Name	DID/SDID	Presence	Status	Location
S299-1 Aud Grp 1	E7/--	Present	OK	Field F1 / Line 161
S299-1 Ctrl Grp 1	E3/--	Present	OK	Field F1 / Line 9
S2016-3 AFD-Bar	41/05	Present	OK	Field F1 / Line 12
RDD8 OP47(SDP)	43/02	Present	OK	Field F1 / Line 13

Detail View Mode: Watch List Time Elapsed Since Last Reset: 0 d, 00:12:57

Format: Free TV Australia OP-47 (SDP) Presence: **Present**

DID: 43 (143) Type: 2 Field: 1 Line: 13 Sample: --

SDID: 2 (102) DC: 58 (23a) Link: -- Stream: Y

Exp/Act Chksum: 27f / 27f Error: **OK**

```

032 | 120 120 120 120 120 120 120 120 120 120 120 120 120 120 120
048 | 120 120 120 120 120 120 274 209 2d4 29f
064 |

```

1080i 50 SDI Input 1A Ref: Ext Missing  Mar 01 19:24:27 **Tektronix** ID: WFM2300_210890 Embd: PPPP TC: Disabled Volume: 0 %

Visual control of Teletext is implemented in the window for image output (PICT).

WST Page 777



Hoisted the jib,
threaded the needle backwards.

1080i 50 SDI Input 1A Ref: Internal  Mar 01 19:27:11 **Tektronix** ID: WFM2300_210890 Embd: PPPP TC: Disabled Volume: 0 %

Activate displaying closed captions in the window menu (PICT→Menu→CC/Teletext Sel.→Auto) and select the number of a Teletext page containing captions (PICT→Menu→TtxtB Page→Page

number).

Multiscreen Client Application

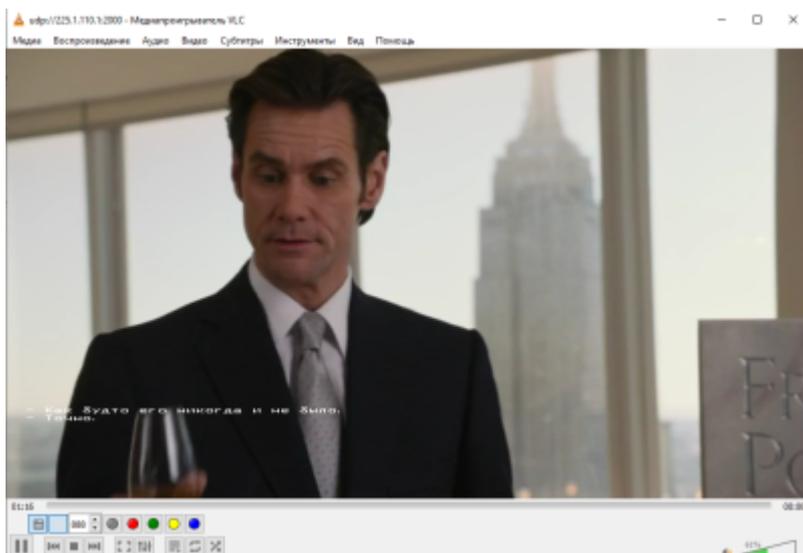
Viewing Teletext closed captions in server output signals may be implemented by the Multiscreen client application. Captions displaying settings are similar to the ones in the [Airmanager](#) app.

Multiscreen Processors

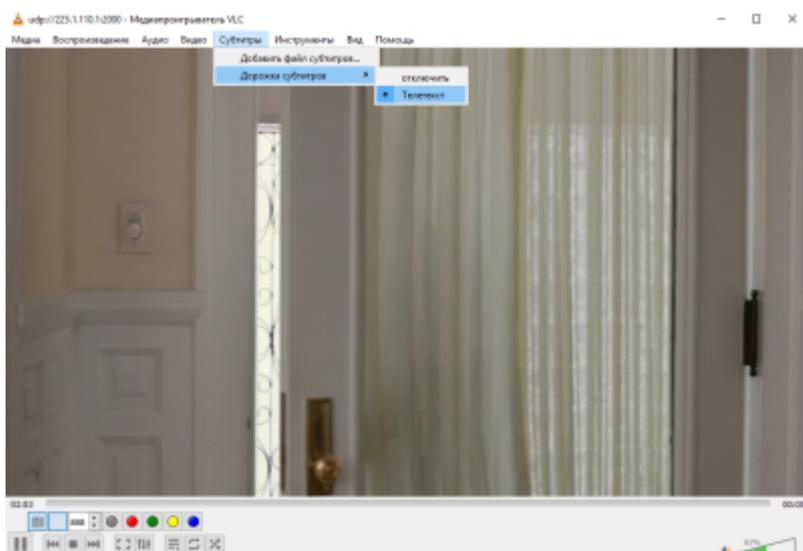
Displaying closed captions for SDI and IP streams is supported in multiscreen processors [SL NEO 8000](#).

VLC Player

Viewing Teletext closed captions in IP streams is possible in the VLC player.



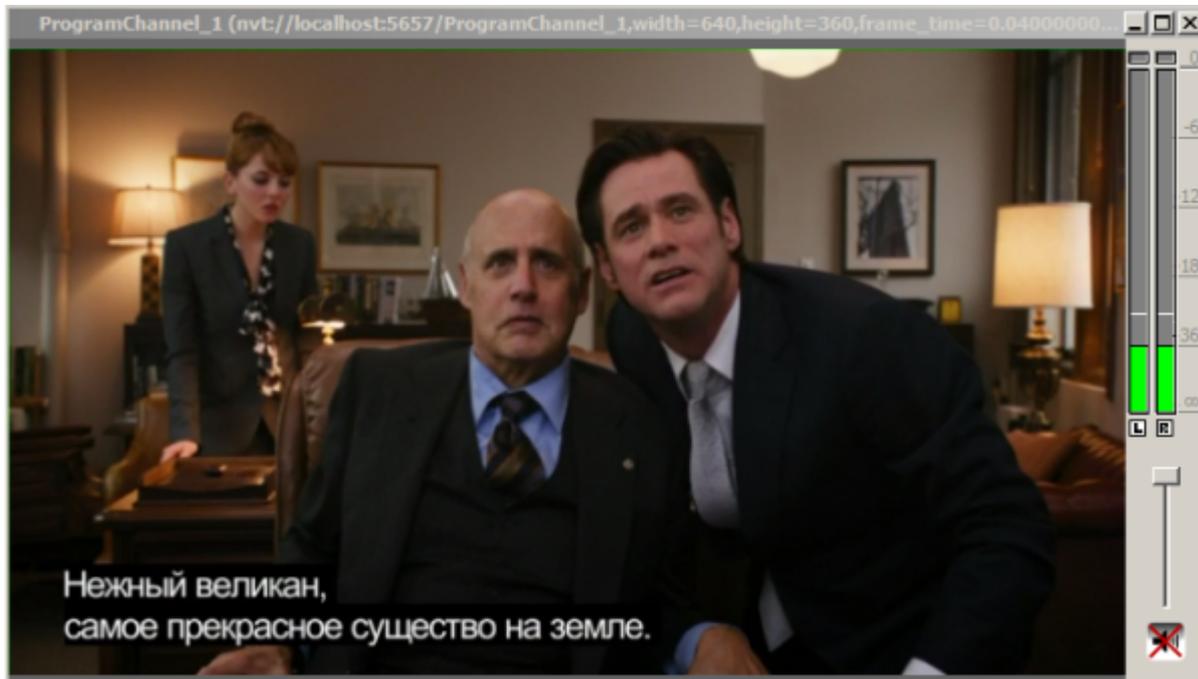
Select Teletext in “Menu→Subtitle→Sub Track”.



After this, you will see a panel to select a teletext page: enter 888.

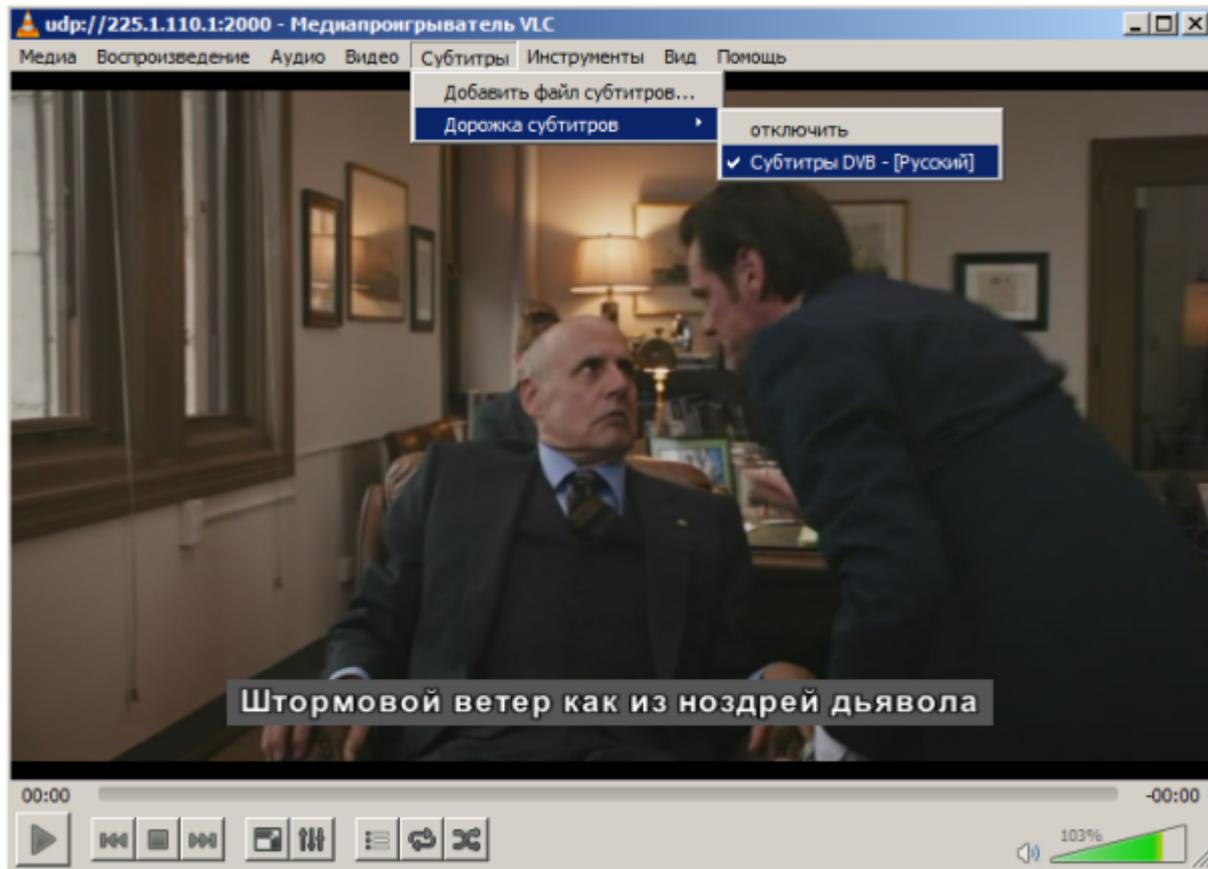
Control of Teletext in Output Signal

Open captions can be managed by the Multiscreen client application. In the list of services, select the service that outputs open captions.

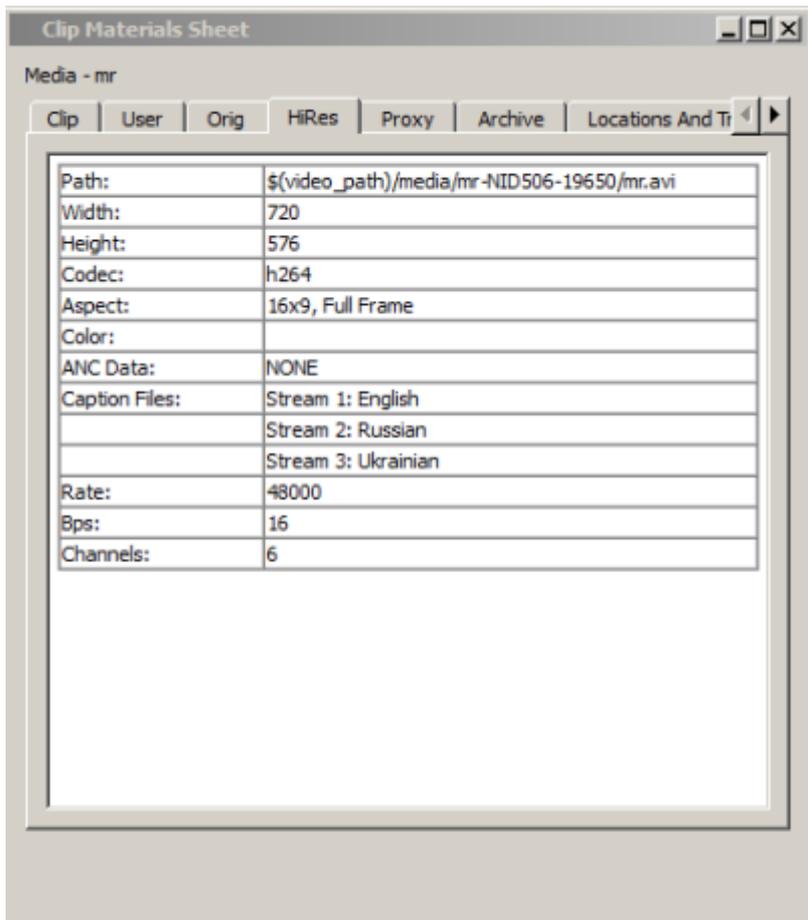


Control of DVB in Output IP Stream

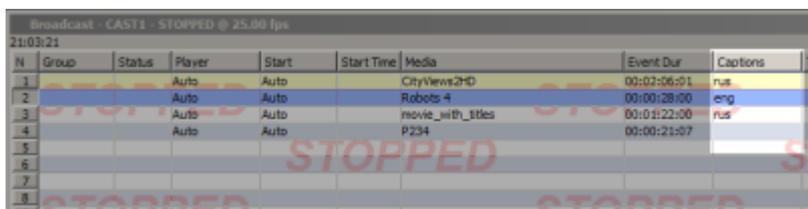
Open the IP stream in the VLC player. Select: "VLC→Subtitle→Sub Track→DVB Subtitle- [language]."



Control of Subtitles for Database Clips ===== Airmanager and Media Connect applications allow [ANC data control](#) in File Monitor and Clip material Sheet windows, and viewing captions loaded to the media database, embedded to a video-file and connected via "External Captions Dir" of the media database service in the [FileMonitor](#) window. Managing captions in external SRT files of the media database is also implemented in the Clip Material Sheet→Caption Fields" window.

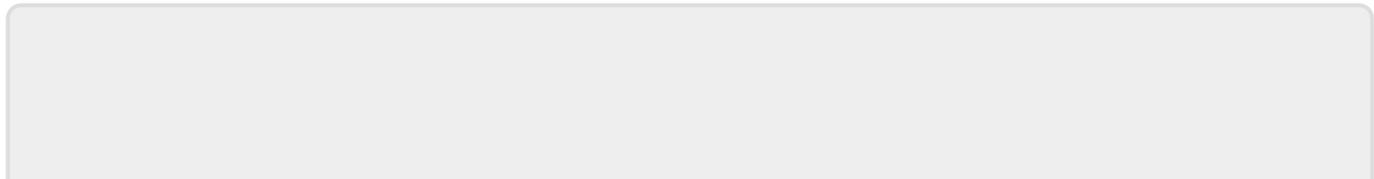


Control of captions is also available in the playlist window: the Captions column displays available subtitle tracks.



Materials

- [Test AVI-file with SRT-files of subtitles.](#)
 - [free_tv_op_47_052018.pdf](#)
 - [free_tv_op_42_122012.pdf](#)
- GOST 50861-96 Teletext system. Basic parameters. Measuring methods.
 - GOST R 57763-2017 - subtitles for the deaf or hard of hearing (SDH)



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