DIGITAL VIDEO LAB

Operation Manual.
HD/SD SDI Master Control Switcher DSC938

Contents

HD/SD SDI Master Control Switcher DSC938

Product Overview

 The DSC938 Digital Video Switcher is a powerful but easy to use and cost-effective solution that serves your production needs. Thanks to its convenient construction, the DSC938 is suitable for portable or mobile applications.

The DSC938's rich functional capabilities allow to use it for live broadcast, show, presentation, interviewing as well as for production in studios.

Great attention was given to the visibility and intuitive control of the device.

DSC938 is the continuation of a series of compact SDI switchers from the "Digital Video Lab", usage of new element basis with improved and optimized functions.

This series is characterized by maximum ease of use and in addition meets requirements of the professional equipment.

The peculiarity of the DSC938 is new original blocks: a block of PiP effects (up to 4 windows on a background); Two Chroma Key's channels (with original automatic setting); Two Video player's channels (two built-in video players with high quality VC-3 on the SD card): two Still Pictures.

Each of these blocks is always ready for use and has the same rights and capabilities as any other inputs (the total number of the mixer's inputs with the sources BLACK and BARS is -18?).

All inputs have corresponding buttons on the Preview and Program lines on the control panel, which can be switched between each other and any other sources with any available transitions of the switcher.

The mixer is available in two versions: the first version is structurally designed in the typical for professional use form –main unit and control panel. The second version - is the portable mobile video studio.

Features

- Each input features its own frame synchronizer, which allows you to use cameras or other devices that do not feature Genlock as well as input video from computer sources.

  The audio input signals also pass through the synchronizers.

- The mixer has 4 analog audio inputs (XLR connectors) which can be configured as 2 stereo inputs or 4 Mono.

- The mixer has 2 analog audio outputs (XLR connectors).

- The possibility of adjusting the dynamic range for digital and analog audio.

  Input and output audio signals can be selected by the user with nominal levels -6, -12, -18, -24 dBFs (from the OSD menu).

- The possibility of assigning any input audio channels to any buttons of video sources (For example - one audio channel for 4 switchable video inputs).

  This mode is useful for working with an external analog audio mixer and shown in the annex (p.60).

  The configuration is carried out from the PC.

- Two built-in video players with high quality VC-3 on the SD card.

- The possibility of playing video files and video playlists with "HD Playout" via HMDI inputs of the switcher.

- The possibility of mixing sound synchronous with video with a choice the type of sound transition - V or Y.

- Built-in background color signal, including "Black" and "Bars", which are operated as independent sources and have the buttons on the Preview and Program lines on the control panel.

- Two built-in Still Pictures, which are operated as independent sources and have the buttons on the Preview and Program lines on the control panel.

  A total of 32 still pictures can be stored in the SD card.

- The possibility to include technological still picture on all inputs of the mixer.

  That is each of the inputs can be switched to the still picture mode (For each input its own still picture).

A total of 24 still pictures can be stored in the non-volatile memory of the switcher from   the PC.

- Built-in 1 kHz audio source with level <mark>0 db</mark>, intended for testing and adjustment the level of sound channels. It accompanies the internal source BARS.

- Built in MultiView. The multiview output lets you see all 10 inputs of video, 2 video players and 2 built-in still pictures on a single HMDI TV/monitor or SDI monitor! You can see all of your cameras, tally indicators, graphics, preview and final program output all on the same display at the same time. Also, the Multiview has indications of the input and output analog and embedded SDI signals of the sound levels.

  Menu (OSD) can be displayed on the Multiview also.

  You can switch on and operate the menu (OSD) from the control panel.

- The possibility of assigning the Multiview on any outputs of the switcher.

- An additional HMDI output on which can be assigned any sources and Multiview.

- Picture-in-Picture effect (PiP).

  It is possible to enable the PIP's preset, which is a combination of up to 4 windows included in the background.

  It is possible to change the following smaller windows settings:

  Size, Crop, Edging Color, Border Width, Location, Sources for smaller windows and for backgrounds).

  All settings of the PIP's presets are made and stored in the "Switcher Control" program from the PC.

  4-th PIP's presets are written in the non-volatile memory of the switcher and saved during restarts.

  4-th presets can be enabled on with the "PIP PRESET1-PIP PRESET4" buttons.

  It is possible to change the sources in the PIP's windows from the control panel, and quickly turn on or turn off the PIP's windows either on the Preview or on the Program.

- Two independent Chroma Key's channels (with original automatic setting).

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- It is possible to overlay the PiP's preset and Titles simultaneously on the video output signal.
- Two independent Logos.

  1 Logo can be dinamic.

  Total 8th logos can be uploaded   from the PC in the switcher's non-volatile memory and then to assign on independent buttons   "Logo 1" and "Logo 2".

  Each of the logos can be placed on the screen in an arbitrary place with the "Switcher Control" program from the PC.

  Logos   can be changed from a PC and from console of the switcher.
- 1 Clock can be switch ON/OFF   with independent button.

  Clock can be placed on the screen in an arbitrary place with the "DSC-938 Switcher Control" program from the PC.
- The possibility of assigning signals from any inputs to all outputs of the switcher.
- "TALLY" signals output .
- F/W Upgrade; upload Still pictures; upload Logo and Clock, control panel via Ethernet connection.
- Quick configuration is made directly from the control panel and the on-screen displayed menu on the multiscreen. The device configuration and rarely used settings are made from the PC only.
- Transitions: 16th WIPE special effects with reverse mode and Mix.

  For each effect button, you can independently set the width of the transition border, the border color and the transition speed.
- It is possible to select the speed of the transition, including promptly from the control panel of the switcher.
- It is possible to remote control with "DSC-938 Switcher Control" program (virtual control panel) from the PC.
- It is possible to choose with DIP-switch method of connection of the main unit and control panel:

  The 1-st method via RS-232.

  The 2-nd method via Ethernet connection.
- It is possible to connect a reserve +12B (9-15B) power supplier.

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- Wireless or wired via Ethernet Intercom system for 4 users – Option;
- Wireless "TALLY" – Option;
- Encoder H264 –Option;
- 4K Multiview (4 windows) - Option.

Switcher's design

The mixer is available in two versions: the first version is structurally designed in the typical for professional use form –main unit and control panel.

The second version - is the portable mobile video studio.

Physical Installation of the main unit is 2 Rack Unit Size.

Pic. Front panel of the DSC-938.

Pic. Rear panel of the DSC-938.

Pic. Portable mobile video studio DSC-938.

Input and output signals

Video Inputs:
Inputs In1- In6, In9 and In10 - 8x HD/SD SDI , which can configured as 4x HD/SD SDI+ 4 xCVBS (IN3-IN6), 1x HMDI(DVI-D), 1x HMDI(DVI-D)/ Title**.**
Audio Inputs:
4 channels XLR balanced (works with external audio mixer) and   can be setup as 2 Stereo pairs or 4 Mono's inputs .
10 x Embedded audio (2 Ch.) via SDI or HMDI.

Video Outputs:
Output 1 – Output 4- 4xHD/SD SDI, SDI (BNC)
1x HMDI(DVI-D) output Multi View and 1 x HMDI(DVI-D) output assignable as Multi View Output, Program;   Preview; Program Logo Free; Program Logo +Titles Free, AUX.

Each of 4 SDI и 1 HMDI (DVI-D) Outputs of the switcher can be assigned as:
1. Program output (PGM);

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2. Program output (PGM) without Logos and Titles;
3. Preview output (PVW);
4. Program output (PGM) without Logos (Logo Free);
5. Any Inputs of the switcher (AUX);
6. MultiView.

Audio Outputs

1 Channels XLR balanced.
Output SDI Embedded Audio -One Stereo-pair
(Group and Pair can be selected).
HMDI Out Embedded Audio.
Each audio source, including embedded and analog,
can be associated with any or several video sources.
Audio follows Video switching operation.
Audio level control of the   all inputs and master audio level output
via On Screen Display (OSD) Menu and DV-Lab's Switcher Utilities.   DSC-938
has 8 SDI inputs and 2HMDI(DVI-D).

4 Inputs (IN3-IN6) can be switched as SDI inputs or CVBS inputs from Menu
(OSD) or DV-Lab's Switcher Utilities.

All Inputs have frame synchronizers.

In SD mode the switcher can to use HD and SD sources simultaneous and
make transitions between them.

Also technological slides can be assigning instead of the each input:
technological slides uploads on IN1-IN8 from PC and IN9-IN10 from SD card.

All outputs can be switched from HD mode to SD mode.

For SD mode, you can select 2 formats -4: 3 or 16: 9.

Video signal processing in the switcher is performed with a 10-bit resolution.
For the option selected of the Outputs setup, the output SDI signals always
contain an embedded audio signal, if there is one in the video signals.

Preview and Program signals have each own audio signals.

Audio signals are assigned to the buttons from the Menu and from the PC with
DV-Lab's Switcher Utilities.

A group and a pair of the SDI audio signals sets with DV-Lab's Switcher
Utilities from the PC.

MultiView

In order to work successfully with the switcher requires a display with a screen resolution of 1920 × 1080i pixels and HMDI input.
These might be the Full HD LCD TVs or computer monitors that have HMDI or DVI inputs   and supports the resolution of 1920X1080i 50 Hz.
The display is not included in the supply.
But the portable mobile version of the DSC-938 has own display.

The Multiview output lets you see all 10 inputs of video, 2 video players and 2 built-in still pictures on a single HMDI TV/monitor or SDI monitor.
You can see all of your   cameras, tally indicators, graphics, preview and final program output all on the same display at the same time.
 Also, the Multiview has indications of the input and output analog and embedded SDI signals of the sound levels.
Menu (OSD) can be displayed on the Multiview also.
You can switch on and operate the menu (OSD) from the control panel.

Service information on the MultiView screen:

1) Channel names for input windows and PGM / PVW labels for output windows.
2) Indications of the selected inputs (for PGM / PVW / PIP).
3) The type of the current transition effect (seven pictures are displayed, Corresponding to the seven buttons on the remote control (six selected Wipes and MIX),
The current effect is marked with a backlight.
4) Indication of the type of audio mixing at the Program output (V or X).
5) Current time.
6) On-screen menu (displayed over the top of other windows when switched on).
7) Audio signal indicators.
8) Information about the type of switcher's control:
PC CONTROL or Console CONTROL.

CONSOLE Indications:

The yellow indicator shows which source is selected on the Preview.

The red indicator shows which source is selected on the Program.

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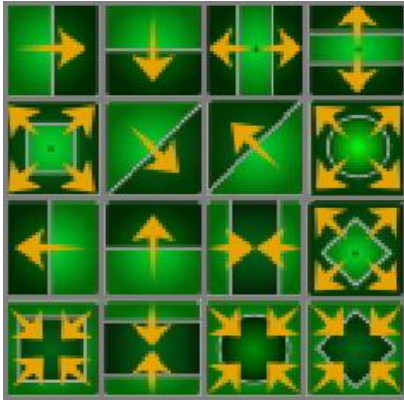
WIPE transition. The selected transition effect is indicated by highlighting the corresponding icon on the MultiView.

Mix transition. The selected transition effect is indicated by highlighting the corresponding icon on the MultiView.

Indication of the type of audio mixing at the Program output X (A/B cross fade)
"X" is a transition with simultaneous reduction of one signal and an increase the other.
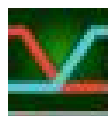
Indication of the type of audio mixing at the Program output V(Fade out A then Fade in B).
«V»- is a transition with fade out of one signal and then fade in the other.

Titles, PiP1, PiP2

Labels on the thumbnail "Titles", "Chroma1", "Chroma1" ,"PiP1", "PiP2" - show which sources are selected as video effects "PiP","Croma" or Titles.

The type of switcher's control.
 PC CONTROL or Console CONTROL.

"PC Control" appears when the switcher is connected to the PC and the "PC Control" button is pressed.
In this mode, operation from the remote control is blocked. And control is transferred to the virtual console program.
If the "PC Control" button is not pressed (not lit), the switcher is operate from the remote control and the on Multiview displays "Console Control".

Control Panel Overview

HD/SD SDI Master Control Switcher DSC938
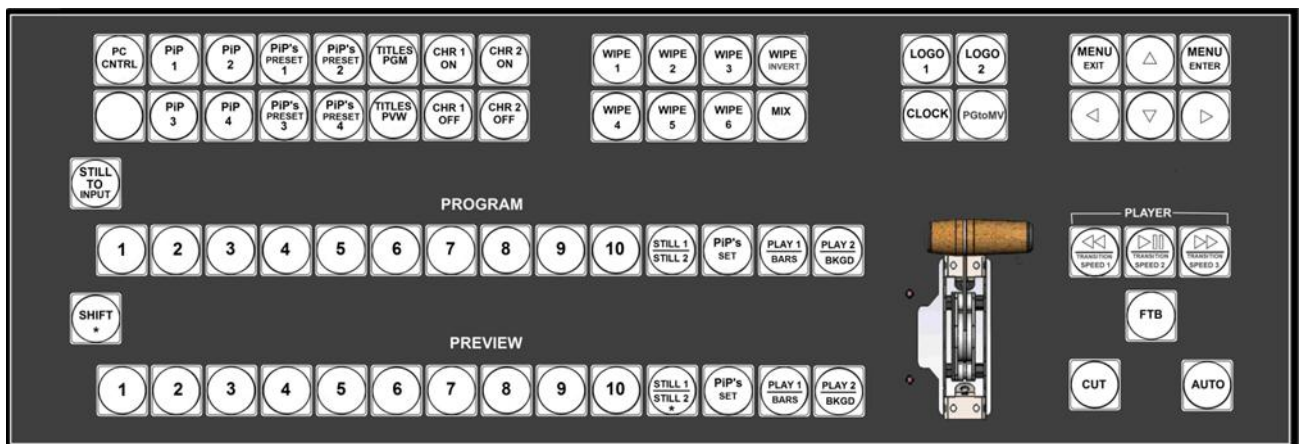
The control panel is connected to the main unit by a cable with DB9M connectors.

The cable length can be up to 20 m.

Also, the control panel can be connected to the base unit via Ethernet.

In this case, must be connected (+ 12V) power supplier to the control panel.

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DB-9 F Connector for connecting
the remote control to the main unit

Connector for connecting +12 V power supplier

Connector RJ-45 for connecting
the remote control to the main unit via Ethernet

DIP switcher for selecting type of the connecting
to the main unit:via DB-9 F connector or via Ethernet
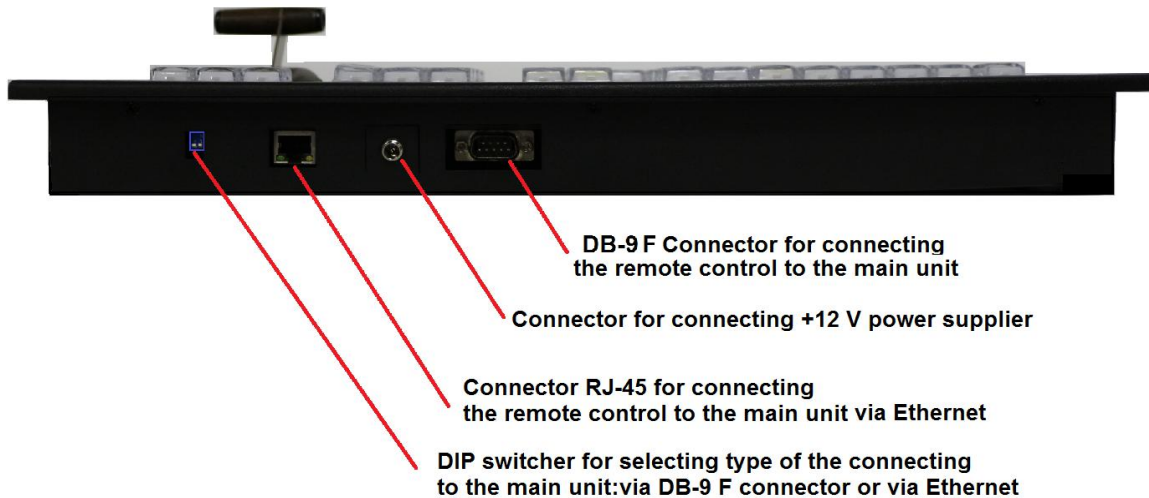
Pic. Rear side of the control panel.

The free utility for docking the control panel with a mixer is called ControlPanelConfig.exe, which can be downloaded from the following link:

http://dv-lab.com/files/files3/ControlPanelConfig.zip
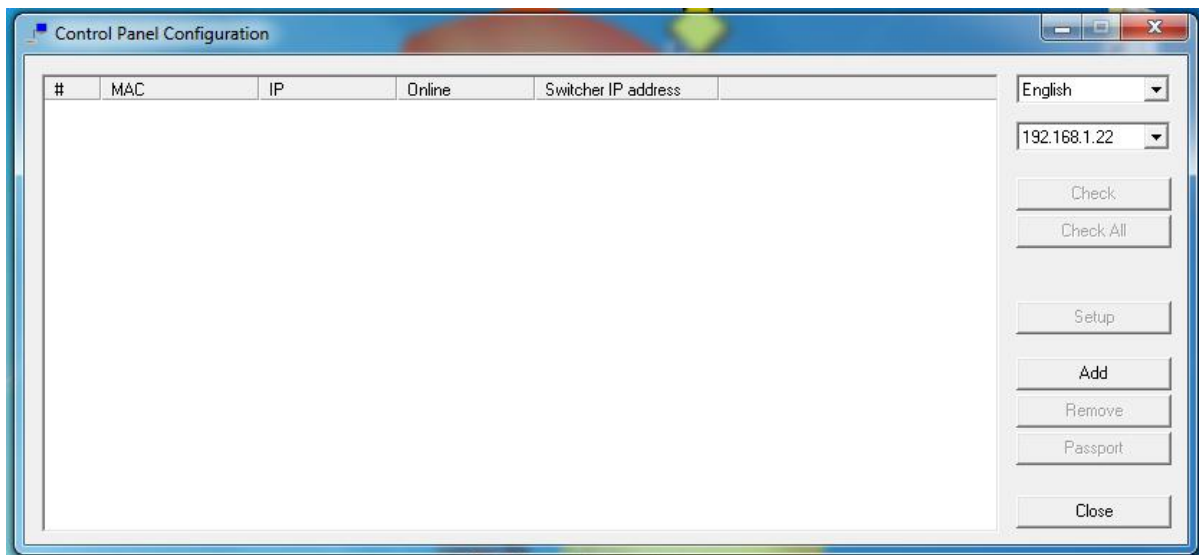
Pic. free utility for docking the control panel with a mixer ControlPanelConfig

On the rear panel of the console is a DIP switch, which switching the type of the connecting mode to the main unit via DB9F or Ethernet.
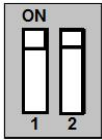
 - When the control panel is connected to the mixer via DB-9 F, the DIP switch is turned on in the upper position.
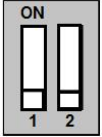
 - When the control panel is connected to the mixer via Ethernet, the DIP switch is turned on in the lower position.

PROGRAM Line
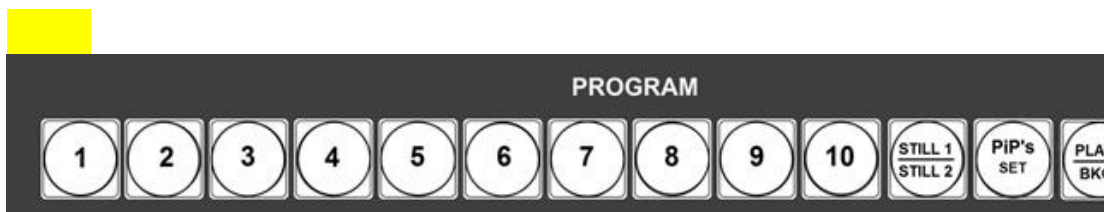
The Program line of buttons is the active channel, this is the live output.

The active channel will appear as the Program Output (PGM).

You can switch or CUT from one video source to another directly on the Program line.

You will see the multi view PGM output change as you press different keys along this top line of buttons.

PRESET Line

The Preset line is the cued channel, this channel will appear in the PST or Preview window.

The Preset line selection decides which input will be transitioned next when using any of the transition controls.

The configuration of the inputs is carried out from the PC by the "DV-Lab" software utility and from Menu (OSD) on the MultiView


Operation Buttons:
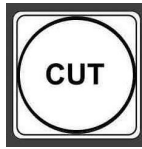
CUT

This performs a simple immediate switch from the current main source to the selected sub source.

The selected transition wipe or dissolve is not used.
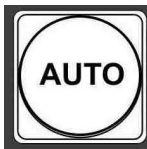
AUTO This performs an automated switch from the current program source to the selected preset source. The selected transition wipe or dissolve will also be used. The timing of the transition is set by the chosen Speed button.
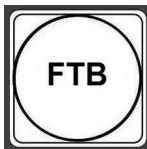
FTB - Fade To Black.
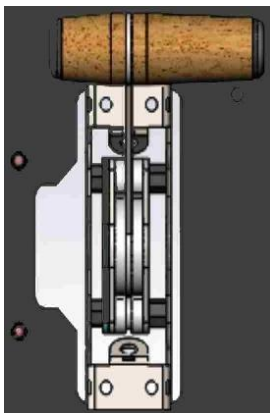
T-BAR.

This performs a manually controlled transition from the current program source to the selected preset source. The selected transition wipe or dissolve will be used. When the T-Bar has travelled as far as it can go, the transition between sources is complete. The T-Bar has indicators next to it, which light when the

transition is complete. The T-Bar can be operated in one of two modes which are chosen by a menu option.
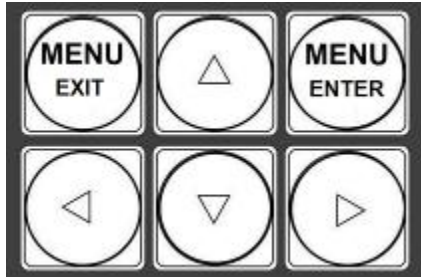
OSD MENU Options

When the **"Menu" button** is pressed the Main Menu list is ON and displayed on the Multi-view Display.

With the cursor buttons you can navigate through the menu items and change the parameters.

Once the chosen setting has been confirmed with the **ENTER** button it is stored within the switcher's non-volatile memory.

"MENU EXIT" button or any buttons of the switcher except "Preview"-BUS's buttons is

switching OFF OSD Menu.

PGM to MVW – switching On the full-size image of the Program output on the MultiView.
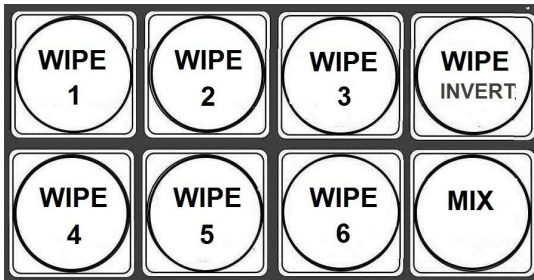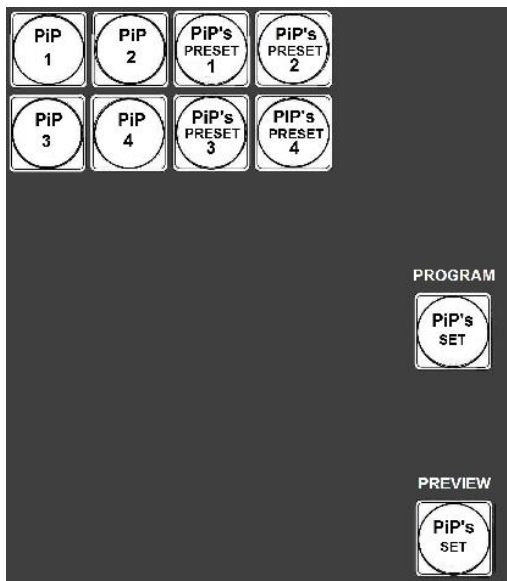
Transition Selection

MIX Pressing this button selects a basic **A/B Dissolve** for the next transition.

6 Wipe's buttons- Pressing this button you can to select one of the 6 Wipe's effects. Total 16 WIPE Patterns, which you can assign to the 6 Wipe's buttons from PC.

"WIPE INVERT" button changes the direction of the chosen WIPE.


PiP ("picture in picture") control

The operative control of PIP's windows is carried out from the control panel using the buttons "PIP's SET" in the Program line and in the Preview line. The "PS's PRESET1"-"PS's PRESET4" buttons select the PIP preset that you want to enable.

With buttons PiP1-PiP4 you can switch on or switch off the windows in the PIP's presets and also quickly change the sources in the windows of the PIP's presets.


TITLES APPLICATION

Pressing this button "Titles PVW" (including the overlay of captions on the preview output) and "Titles PGM" (enabling the overlay of titles to the program output).
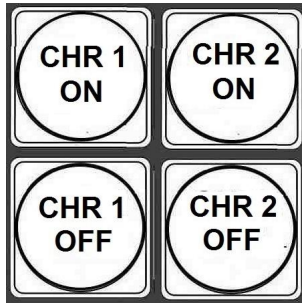
CHROMA effects control. The "CHROMA 1,2 ON"buttons are used to switch ON the Chroma 1 (2) mode and select the "Foreground" and "Background".

The "CHROMA 1,2 OFF "buttons are used to switch OFF the Chroma 1 (2) mode.
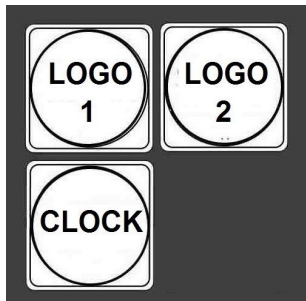
LOGO1, LOGO2 u CLOCK.

The **LOGO 1** and **LOGO 2 and Clock** buttons are used to display preselected logos on Preview and Program outputs. When the buttons are active the selected logos and clock is shown. These logos and clock are selected from the switcher's memory and positioned using a "DV-Lab" software utility.

"PC CNTRL"-This button enables the transfer of control from the PC.When the button is pressed, the switcher is controlled by the "Virtual Switcher" from the PC.

The **"STILL TO INPUT"** button allows the user to toggle between the still image of the Frame Store or the live video input also connected to that same video channel.

Shift-modifier button, which allows you to not increase the number of buttons and increase the number of switched inputs/sources and also allows performing several functions with one button.
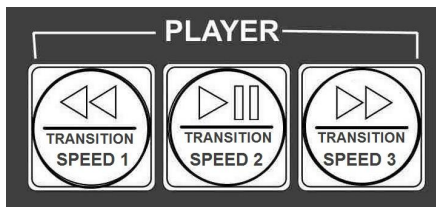
Player's controls buttons and transition speed control.

Main Unit – Rear Panel

Pic. Main Unit – Rear Panel

HMDI(DVI-D). MULTIVIEW OUT (OUT6)

ETHERNET
This RJ45 Ethernet port is used to connect the DSC-938 to a PC for remote control, or to update

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the unit's firmware, or to configure the switcher, or for connecting the control panel.

CONSOLE

This 9pin D-Sub connector is used to connect the Control Panel / Keyboard to the rear of the DSC-938 Main unit.

TALLY

Разъем DB-15F (10 ключей)

AUDIO INPUTS

4 channels XLR balanced (works with external audio mixer) and can be setup as 2 Stereo pairs or 4 Mono's inputs.

AUDIO OTPUTS

2 analog audio outputs (connectors XLR)

Grounding Terminal

When connecting this unit to any other component, make sure that it is properly grounded by connecting this terminal to an appropriate point.

DC IN +12 V connectors.

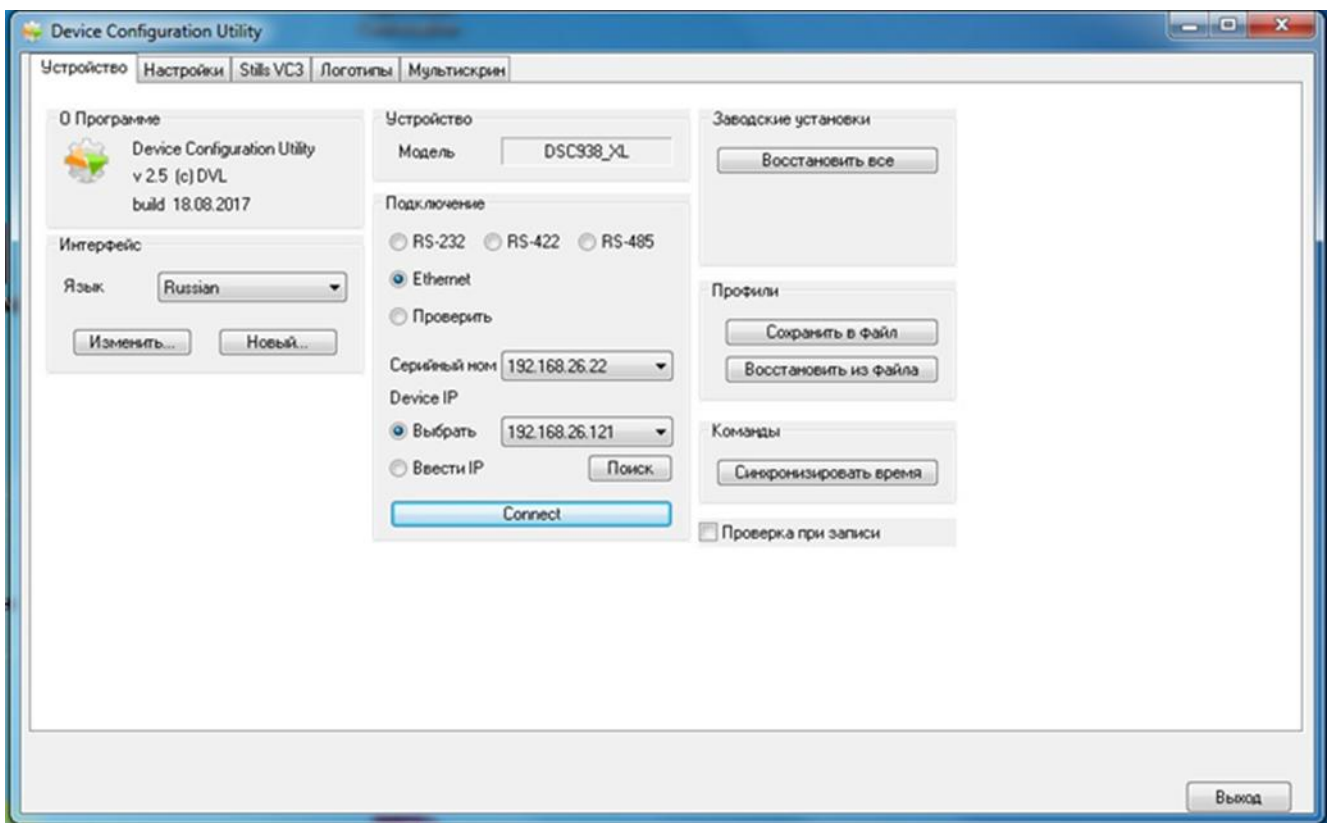## HD/SD SDI Master Control Switcher DSC938

Supplied software

All programs come with switchers and are free.

Also, programs and descriptions for them can be downloaded from the manufacturer's   website at the following link:

http://dv-lab.com/ru/tehpodderzhka

The "DSC config" program is used to configure all Parameters, logos, clock and still pictures and e.t.c.

"DSC Remote -Virtual control panel"
Allows you to control from PC the all functions of the real control panel.
Also **"DSC Remote -Virtual control panel"** have built-in "Playout HD" program, which   allows to play video files.
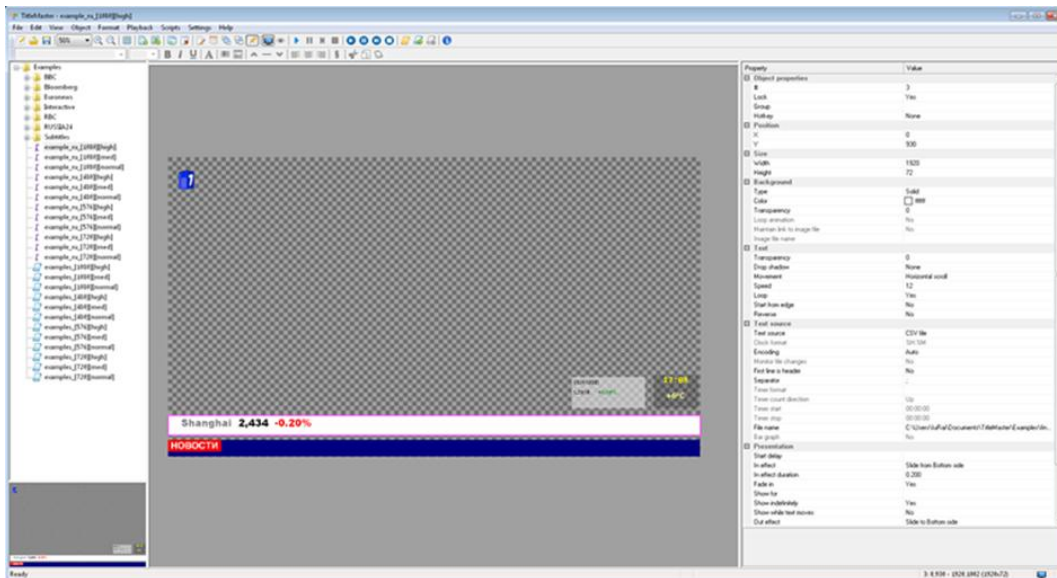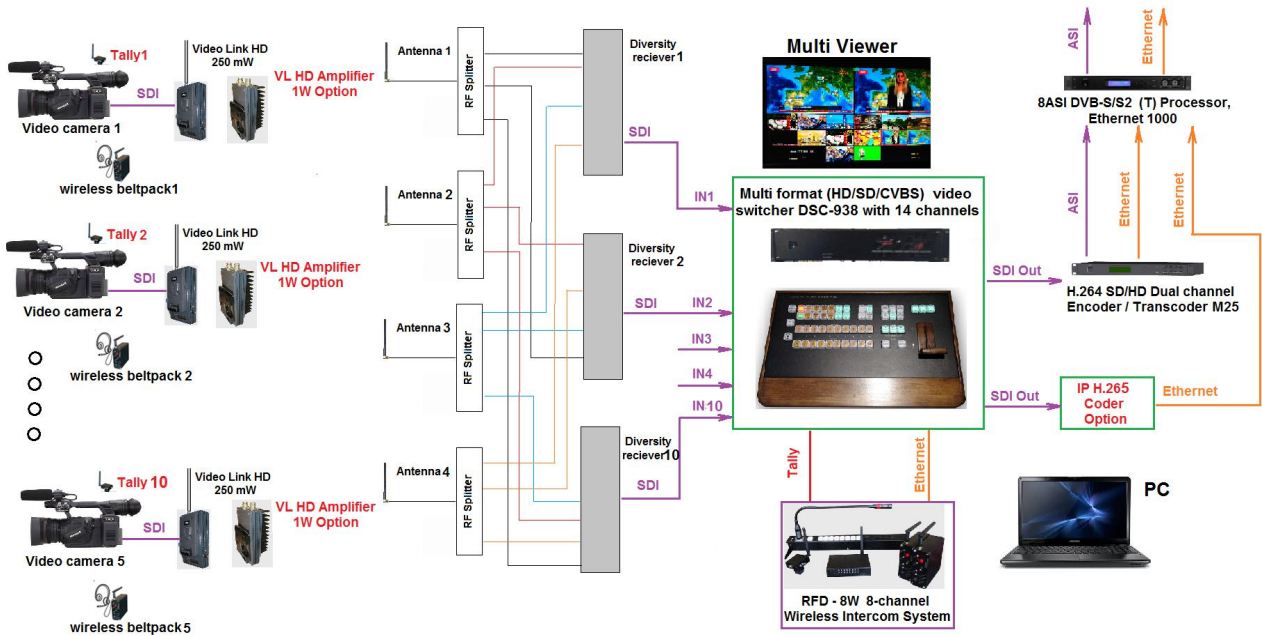
«TitleMaster» utility.

Program allows you to add titles, pictures and video files from the computer to the switcher.

Connection diagram of the DSC938

Pic. An example of a connection scheme for the DSC-938 with
a wireless Video Link HD system.

Specification.

Brand			DV-Lab
Model			**HD/SD SDI Master Control Switcher DSC938**
M/E			1
Design			main frame + console or mobile version
Video Format	HD - Input:		1080 50i
			1080 50p/ 25p
	SD - Input:		576 50i(4:3), 576 50i(16:9)
	HD -Output:		1080 50i
	SD - Output:		576 50i(4:3), 576 50i(16:9)
Input format conversion:			all inputs can to resize HD signals to SD , HD/p to HD/I in any supportes formats of the DSC-938. <u>Please notice</u> , that all inputs can not to resize SD signals to HD
Signal Processing			10-bit, 4:2:2 Digital component
Connectivity			
Video Inputs	Total	Sources	Total 14 sources: 10 external -8 3G/HD/SD SDI or 4 HD/SD SDI+ 4 CVBS ,1 HDMI(DVI), 1 HDMI(DVI)/ Title, 4 internal -2 media players and 2 still pictures
		Inputs	Total 10: 8 -3G SDI(BNC) and 2- HDMI (DVI-D) : IN1- IN6 and IN9- IN10 HD/ SD SDI (BNC) ; IN7-IN8- HDMI(DVI-D),
	CVBS		IN3-IN6 can be CVBS (BNC)
	HDMI		2 HDMI(DVI-D)
Frame synchronizer			Built in frame synchroniser for each input.
Video Outputs	Total		6
	SDI		4xHD/SD SDI,SDI (BNC) outputs assignable to Program ; Preview; Program Logo Free; Program "Clean Feed" (Logo +Titles Free);
	HDMI		1 x HDMI(DVI-D) outputs assignable to Multi View Output,Program ; Preview; Program Logo Free;Program "Clean Feed"(Logo +Titles Free), 1xHDMI(DVI-D)-Multiview
Multi-View Monitoring			1 HDMI(DVI-D),built-in multiview monitoring (1920x1080i resolution); Aulio Level Indicators - Each input + PGM + PVW (left / right)
Audio Inputs			4 channels XLR balanced (works with external audio mixer) and can be setup as 2 Stereo pairs or 4 Mono's inputs 10 x Embedded audio (2 ch) via SDI or HDMI
Audio Outputs			Audio Output: 2 channels XLR balanced. Output SDI Embedded Audio -One Stereo-pair (Group and Pair can be selected). HDMI Out Embedded Audio.
Audio Processing			20 and 24 bit
Audio Level adjustment			Each audio source, including embedded and analog, can be associated with any or several video sources. Audio follows Video switching operation. Audio level control of the all inputs and master audio level output via On Screen Display Menu and PC DVLab Switcher Utilities
Interfaces	Ethernet 100 (1 x RJ45)		F/W Upgrade; Upload Still image and Logos , Keyboard Controller
	Tally Output		D-Sub 15 pin,1 x 10/100 BaseT or via Ethernet connection
	RS-232		1x RS-232 on 9-pin D-sub female controls and power supply for Keyboard Controller up to 20 m

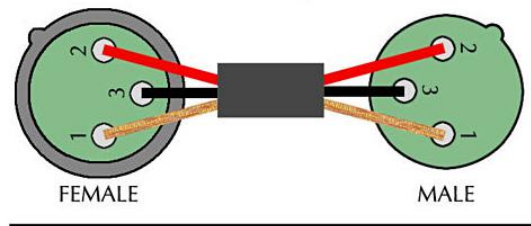| Brand	DV-Lab
Model	HD/SD SDI Master Control Switcher DSC938
General	
Effect / Keyers	WIPE, MIX, CUT, FTB
T-Bar	1
Chroma Key	works like independent source
Titels	Titles via HDMI mixer's input with "DV-Lab"'s soft- "Title Master" from PC
PIP	4
Built-in Video Player	Dual player(VC3) on SD card, 2 players works like 2 independent sources
Built-in LOGO insertions	2 Logos and 1 Clock, up to 8 logos can be uploaded from PC in the mixer's memory and then asign on independent buttons "Logo 1" and "Logo 2". Clock can be switch on/off with independent button. Logo's and Clock's location can be setup from a PC and from console of the switcher.
Built-In Still Store	2 Still-images can be assigned on 2 independented buttons (Slide 1/2), works like 2 independent sources. Up to 32 slides can be uploaded from SD card. Also technological slides up to 24 can be asign instead of the each inputs. Up to 24 slides can be uploaded from PC to the mixer's non volatile memory.
Pattern Generator	BLACK and Color BARS and audio signal source (1KHz, 0dB)
PC contol	with soft DSC-938 Switcher Control Panel from PC
Options	H.264 Encoder,4 K 2X2 MultiView,ReserveCamera,Channel Unit, Intercom
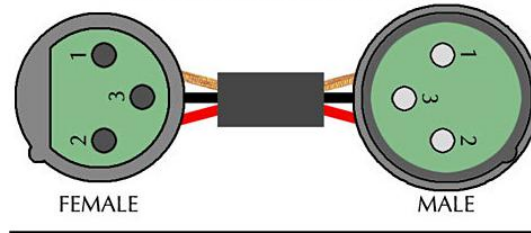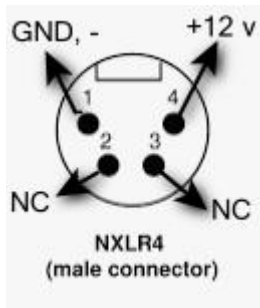
Power connector +12v

Balanced Audio (3 pole XLR)
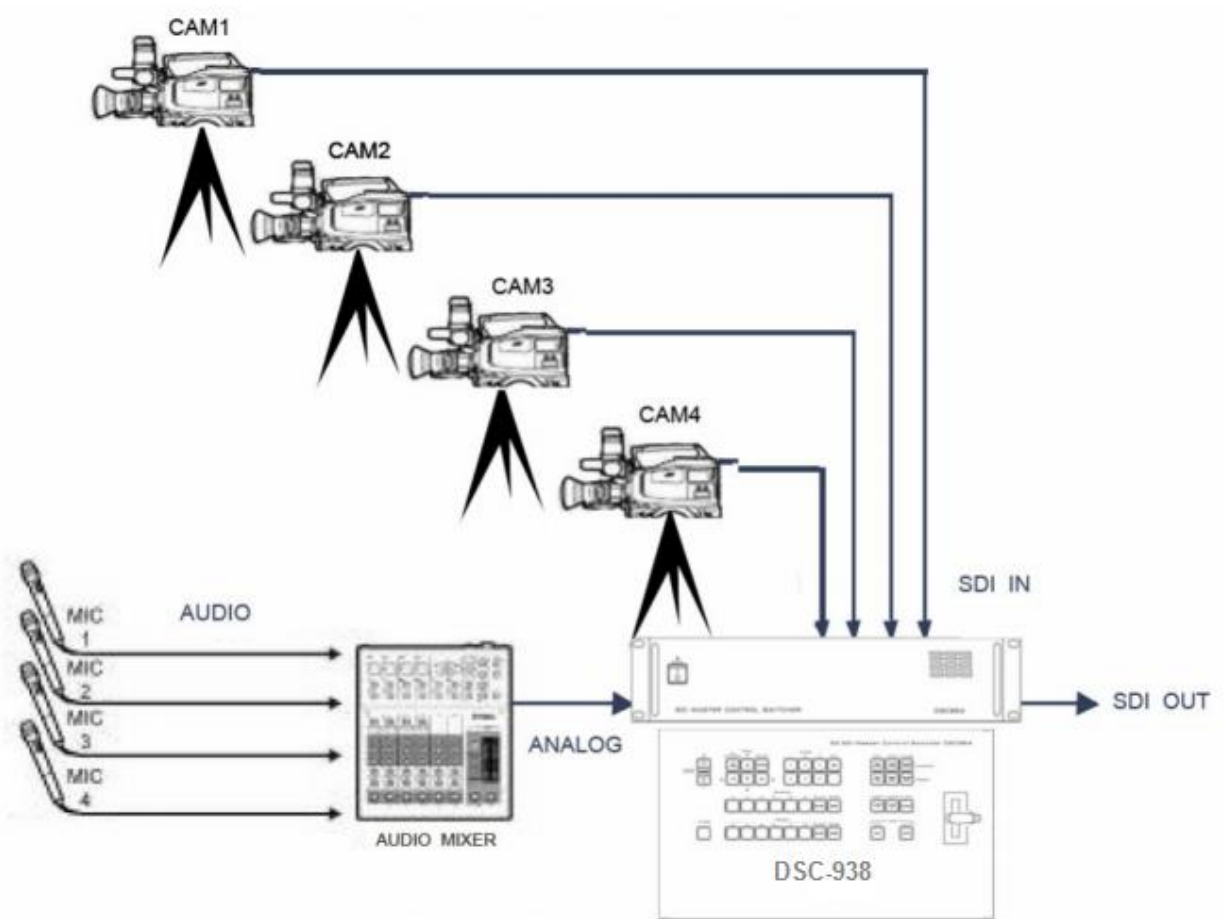
Connection diagram of the analog audio Output