



## TEST PATTERN GENERATOR

# TPG8

User's Manual

2007



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#### 1. PRODUCT DESCRIPTION AND OPERATION

#### **1.1 Generator application**

**TPG-8** is a compact, portable device with extreme usability, designed to generate test video signals based on test patterns or other static video images stored in the device memory.

**TPG-8** can be used to assess resolution, dynamic range, colour rendition in video monitors, digital video recorders, digital video security, TV, cable video systems and nonlinear editing systems after digitisation and compression.

**TPG-8** forms test patterns via USB-interface and stores them in its memory.

Test Pattern Generator TPG-8 can be used to:

- Assess the video monitors rendering quality, including video-frequency band; video monitor linearity, gamma correction, optimal contrast ratio and brightness;
- Measure the recording and playback speed in digital video monitors, network video servers and computer video surveillance systems;
- Control the signal quality of long cable commutation (adjust wave impedance parameters, far-end echoes, etc.);
- Monitor the recording and playback qualities of video recorders and other devices for analog transmission and playback;
- Evaluate vertical and horizontal image resolution, dynamic range and colour rendition after image digitisation under various standards (JPEG, MPEG-2, MPEG-4, Wavelet, JPEG 2000, etc.) and compression levels;
- Estimate geometric distortions after video image digitisation;
- Detect video signal dynamic range and level.

#### **1.2 Specifications**

Video signal meets GOST 7845-92 and ITU-R BT.470-4 "Television Systems" (former CCIR Report 624) requirements.

TPG-8D Video Outputs: S-Video, YUV.

TPG-8SDI Video Outputs: S-Video, Composite, YUV and SDI with integrated test audio signal at 1 kHz, sinusoid shape.

- Differential output signal (SDI) level comes to 800±80mV.
- Maximum length of coaxial cable for SDI signal transmission (Belden 1694A) is 300m.
- Test sine-wave audio signal frequency (1 kHz) integrated into digital stream.
- Integrated EDH packages for error recognition and handling.
- Supports SMPTE 125M, ITU-R BT.601, SMPTE 259M, SMPTE 272M, ITU-R BT.1305, SMPTE RP-165, and ITU-R BT.1034 standards.

Eight video image test patterns or static video images, graphics. Test images are loaded via USB port.

Switchable output formats PAL and NTSC.

Digital video processing.

Custom level of output video signal, from 0.5V to 2V, with 0.1V resolution.

There is possibility of changing of output signal voltage from the generator's' keyboard within the range of 0.2V - 1.5V. Default voltage value is 1V.

Power options - external power adapter, USB power or three bundled NiMH AA type batteries (6 hours operation).

Power adapter: - output voltage of 5±0.2V;

- power 5W minimum.

Auto charge of batteries from USB or external power adapter.

Maximum power consumption:

- 1W - from batteries;

- 3W - from power adapter.

Batteries approximate charging time: 16 hours.

Operational conditions:

- ambient temperature 10°C to 35°C;

- maximum relative humidity 80%;

- air pressure 84 kPa to 107 kPa (630 to 800 Mmhg).

Size: 190×77×26 mm. Weight: 270 g.

#### 1.3 Package contents

Item	Qty	Notes
Test Pattern Generator (TPG8D or TPG-8SDI)	1	
NiMH AA type battery	3	
Power adapter	1	
"TPG-8 Navigator" software	1	on one CD-ROM
USB cable	1	
User's manual	1	



#### 1.4 Generator operation

To activate the generator, press "On" button, to switch off press "Off" button. When the power supply is on the green LED lights up on the front panel.

Pressing "P1"..."P8" buttons will display the corresponding image previously stored in generator's flash memory. "PAL" and "NTSC" buttons are used to change the image standard.

Output signal level can be modified by pressing " $\uparrow$ " and " $\downarrow$ " buttons. Initial 1V level of video signal can be set by pressing "1.0V" button.

Switching to component output mode and back (to VBS, CVBS, and S-Video output modes) is done by pressing " $\uparrow$ " and " $\downarrow$ " keys simultaneously. The connection must be made according to Fig.5. In addition, the S-Video to BNC connector is necessary in order to use the component output. Diagram of the connector is shown in Fig.1.



Fig.1 S-Video to BNC connector

To use **TPG-8SDI** generator in component video output mode the S-Video to BNC connector shown in Fig.2 would be required.



Fig.2 S-Video to BNC connector for TPG-8SDI generator

When the batteries are significantly discharged (if there remains approximately 10 - 30 minutes before total discharge and shutdown), the power indicator green LED turns red. In this case you should charge the batteries. To charge the batteries plug in the power supply. The power supply must stay on while charging the internal batteries.





Fig.3. Test pattern generator



Fig.4. Generator keyboard layout

In addition to static images the generator can display frame sequences. To display a frame sequence it is necessary to record a 100x100 pixels image sequence into any generator cell (50 frames for PAL and 60 frames for NTSC). Select the first frame file, the rest of the frames would be recorded by the program automatically.



Recorded frame sequence can be displayed:

- on black background: press the button corresponding to the number of the memory cell, which contains the necessary frame sequence;

- on top of static image: press two buttons simultaneously – one of which corresponds to the number of a static image and the other to the number of a memory cell containing the necessary frame sequence.

**TPG-8SDI** version can generate PAL and NTSC 4:2:2 test images (13.5 MHz, SMPTE 125M, ITU-R BT.601) digitalized for transmission on basis of SDI standard (SMPTE 259M-C–1997). In accordance with SMPTE 272M and ITU-R BT.1305 standards, the test sine-wave 1 kHz audio signal frequency is integrated into ANC data segment. Besides, EDH data are integrated into SDI data stream used for error recognition and handling on receiving side (SMPTE RP-165, ITU-R BT.1034).

#### **1.5 External connectors**

Generator top panel appearance is shown in Fig.5. This panel contains VBS, CVBS, S-Video, and YUV video output connectors.



**TPG-8SDI** generator version top panel connectors layout (Fig.5): 1 – SDI output connectors; 2 – S-Video/Y, U output connectors; 3 - CVBS/V output connectors.

Generator bottom panel appearance is shown in Fig.6. It contains:

- power adapter connection socket (1);
- USB data exchange LED indicator (2);
- USB cable connection socket (3).



Fig.6 Generator bottom panel



#### 1.6 "TPG-8 Navigator" software

The application allows to:

- Record test patterns (supported file formats: .bmp, .tga, .jpg, .tif, and .d1 (custom format)).
- Preview previously recorded test patterns.
- Adjust device settings: system selection, change output signal level.

TPG-8 Navigator interface screenshot.

TPG8 Navigator	<u>ſ</u> `ĸŨĸŨĸŨĸŨĸŨĸŨĸŨĸŨĸŨĸŨĸĬ
TPG8 Settings	
System PAL	Stream Labs
Level 0	
TPG8 Mode	
Preview all pictures	2 3 4 5 5
Write Read Display	4.23
TPG8 Pictures	
Pict1 Pict2 Pict3 Pict4	
Pict5 Pict6 Pict7 Pict8	
Picture Info	
TPG8 Status: Remove from PC	
🔽 Use Video Interlace Filter	
Show Preview Window	
Close	

#### **TPG-8 Settings**

**System** - PAL/NTSC system selection. **Level** - Change of output signal level.

#### **TPG-8 Mode**

Preview all pictures - Preview all previously recorded test pattern images in reduced size.

Write - Record test pattern onto device active memory (Pict1-Pict8).

**Read** – Read test pattern from device active memory (Pict1-Pict8).

Display – Display test pattern recorded onto device active memory (Pict1-Pict8).



#### **TPG-8 Pictures**

Device active memory area selection (Pict1-Pict8).

#### **Picture Info**

Information field containing parameters of a test pattern stored in device active memory area (Pict1-Pict8).

#### **TPG-8 Status**

Device current status and indication of test patterns operation flow.

Use Video Interlace Filter - Enable/Disable the interface filter for test pattern dithering.

Show Preview Window - Show/Hide test pattern preview window.

Work with test patterns.

- 1. Select device active memory area (Pict1 Pict8 keys). The information field displays parameters of the test pattern currently stored in this area.
- 2. Once having selected the active memory area you can perform the following actions:
  - Record any new test pattern onto memory area (Write key);
  - Read test pattern stored in memory area (test pattern will be displayed in Preview Window) (Read key).
  - Display test pattern on the monitor connected to Video Out connector (Display key).

#### **CAUTION:**

Never use non-rechargeable cells instead of supplied batteries.

Always use the generator only with standard power adapter.



#### 2. TROUBLESHOOTING

Conditions	Possible cause	Possible solutions
"Power Supply" LED does not light when "On" button is pressed.	1. Batteries are not installed.	Install batteries according to installation diagram on the casing.
	2. Batteries are installed improperly.	Install batteries according to installation diagram on the casing.
	3. Batteries are totally discharged.	Connect the network adapter and press "On" key.
The image displayed does not correspond to the required.	Video signal output standard does not correspond to the standard of the stored image.	Select video signal output standard by pressing "PAL" or "NTSC" key.