nanoStream Live Video Encoder

The Easiest and Fastest Way to Create High Quality Internet Video Streaming!
For Video Conferencing, Flash Video Streaming, WebTV, IPTV, 3D Stereoscopic Video

nanoStream Live Video Encoder is a video capture and encoding software for streaming live video and audio to internet based media servers and other network clients. It is compatible to latest generation video encoding standards and supports highest quality h.264 and mpeg video encoding, as well as Flash streaming (RTMP) and iPod/iPhone (MP4) compatible encoding modes, up to Full HD highest quality streaming.

Several Extensions are available, for video mixing, file streaming / ad insertion, 3d stereoscopic video, and additional coding formats; WindowsMedia, MPEG-2 and VP8.

nanoStream supports internet broadcast scenarios such as live entertainment, sports, concerts, news, educational content. nanoStream is your best choice to supply plugins if you are planning to create internet streaming solutions for WebTV, IPTV, video conferencing, VOD.
Working perfectly together with internet streaming servers like Wowza Media Server and Flash Media Server, streaming to Mobile devices like iPhone, Silverlight and other playback clients is possible. If you want the best quality internet streaming solution, nanocosmos is your partner.

The Encoder is based on applications and plugins and is also available as a ready-to-use installation kit. The modular architecture based on DirectShow is available as a Software Developer Kit (SDK) for integrating live video encoding and streaming functionality into custom applications. The Plugins are compatible to most browser architectures, including Internet Explorer, Firefox, Safari and Chrome (currently Windows only).

Contact and further Information

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Integration and Development Services

We provide professional developer support for custom integrations.

Custom Applications, consulting and support

With our long-term expertise in digital video applications and custom development for professional video customers, we are able to provide high quality, high performance custom applications, consulting and support services.

Table of Contents

1. What comes with nanoStream Live Encoder Toolkit

Package Contents:

- Live Video Encoder Application (LiveEnc.exe)
- Live Video Encoder Command Line Application LiveEncCmd.exe
- Web Browser Based Encoder / nanoStream.html
- Plugins (Active X and NPAPI) for Development
- DirectShow filters

Functionality:

Live Video Encoding from Camera Sources
H264/AAC Video and Audio Encoders
RTMP Streaming to Flash and Wowza Media Servers
Compatible to internet, mobile streaming and HDTV: iPhone, Android, HDTV
Batch / server based encoding with XML configuration

Add-ons:

MP4 Encoding / iPhone compatible
MPEG2 Encoding
RTSP Streaming
UDP TS Multicast and Point to point streaming
3D/Stereoscopic encoding and streaming
Screen Capture Driver
Video Overlay Filter for Text/Bitmaps

Sample SDK Source Code:

Additional sample source is available for integrating nanoStream into custom applications.
Supported platforms: VisualC++, VisualC#, VisualBasic.NET and others.

Please contact us for further details.

This manual is valid for nanoStream V. 2.x

1.1. Live Video Encoder Application

1.1.1 Encoding / Streaming Application

The Live Video Encoder is available as a setup installer Package with applications and tools to show the functionality of nanoStream.

1.2. Browser based encoding / Live Encoder

Browser based Encoding with Javascript Support

The complete nanoStream functionality is available as a browser plugin or Active X control.

The Live Video Encoder functionality may be integrated into a browser by loading the plugin into a HTML web page. The plugin then may be controlled by Javascript to change the settings and start and stop encoding and preview.

There are 2 plugins available, an Active-X control for Internet Explorer, and a NPAPI plugin for other browsers, such as Firefox, Safari and Chrome. See the example web pages for further information and test.

1.3 3D/Stereoscopic Modes

3D/Stereoscopic live video capture and streaming is supported by using 2 identical camera setups.
The following 3D/Stereoscopic modes are supported:

- Side-by-side left/right
- Side-by-side top/bottom
- Interlaced lines
- Interlaced columns
- Anaglyph

3D/Stereoscopic encoding is only available as additional Add-on to the Live encoder package.
See separate documentation - Please contact us for further information

1.3. Sample Web Pages

1.3.1 Live Encoder Test Web Page

(nanoStream.html)

The sample page nanoStream.html shows the simple integration of the Live Video Encoder into a HTML page with a Javascript interface.

1.3.2 Web Based Playback with Flash Player

(live.html)

Shows Flash based playback of a live video stream from a Wowza or Flash Media Server.

For playback H264 video from a client web page, a simple Flash based web page may be used. It contains a Flash SWF based Streaming video player.
A sample web page is included.

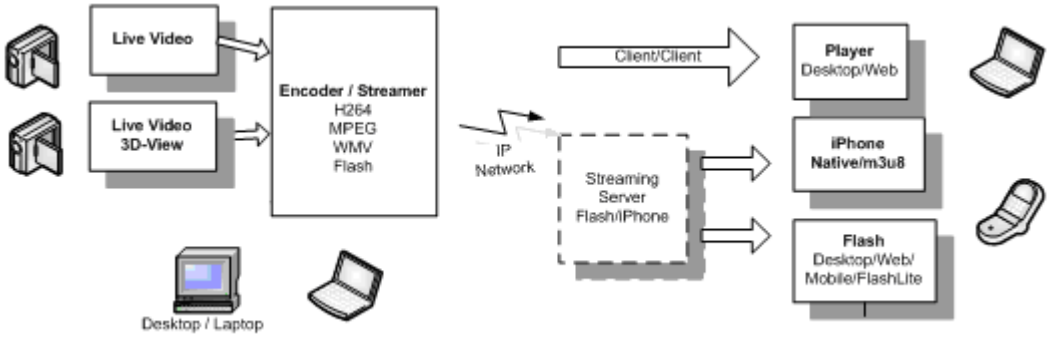
1.3.3 LiveEncoder+Flash

(nanoFlash.html)

Shows interaction between a Flash application (swf) and nanoStream via Javascript (switching camera input)

2. Technical Overview

Live Video and Audio is captured and encoded with H.264 and AAC. The resulting multiplexed stream may be saved to disk into a MP4 file or streamed to a RTMP server such as Wowza or Flash Media Server.



2.1 Possible video output formats

- H264 / Flash compatible:
    - RTMP Live Stream, e.g. rtmp://myserver.com/live+myStream
    - RTMPT (RTMP tunneled through HTTP) support for fire-walled setups

  See Flash Media Server or Wowza documentation for how to setup live streaming with these servers

- MP4/H264: Write to a local file, e.g. c:\TEMP\capture.mp4
  Supported bit rates: 128 kBit/s … 100 MBit/s

- MPEG-2:
    - Write to a local file, e.g. C:\TEMP\capture.m2v / mpg
      Supported bit rates: 1 MBIt … 100 MBit/s

    - MPEG-2 UDP Streaming, e.g. udp://local.server:1234,
      compatible to other players, e.g. vlc

2.2 Compatibility:

- Full H.264, AAC and MP4 support, compatible to iPhone and iPod
- RTMP-Compatible to Wowza and Flash Media Server
- Compatible to several playback clients
- Several extensions available for 3D/Stereoscopic streaming, MPEG2, VP8 and more

2.3 Software requirements:

- Microsoft® Windows® XP/SP2, Vista or Windows 7 (32 bit or 64 bit)
- 2GB RAM
- 1024x768 screen size

2.4 Hardware requirements:

- Intel Pentium 4 / AMD X2, we recommend Core2 Duo
- Recommended for HD capture: Intel Core i7 or Xeon
- Microsoft DirectShow compatible video device
  (tested with several Blackmagic Decklin and several Web Cams)

2.5 Live Video Playback

nanoStream is compatible to existing standards, so playback is possible with several player applications:
RTMP stream: Flash based web page together with FlashMediaServer or Wowza
MPEG-2 and MP4: Any DirectShow compatible player, e.g. WindowsMediaPlayer
MPEG-2 UDP: DirectShow compatible or other players, tested with VLC

3. How to install and start nanoStream Live Video Encoder / Installation and Setup

The installation of the Live Video Encoder may be performed in different ways:

3.1. Application Installer/setup package

The Application installer contains the complete Windows application, plugins, codecs and tools.

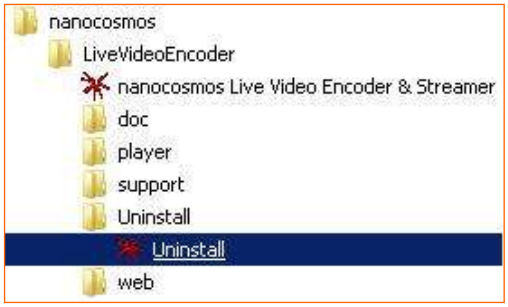
1. The installer package is either delivered by electronic delivery or can be downloaded from a web page.
2. Install nanoStream Live Video Encoder by starting 'nanoLiveVideoEncoder-vers-nr.exe'
3. Application will be installed (default path: C:\Programs\nanocosmos\LiveVideoEncoder)
4. To start the application from the Windows Start Menu:
   All programs → nanocosmos → LiveVideoEncoder → nanocosmos Live Video Encoder & Streamer

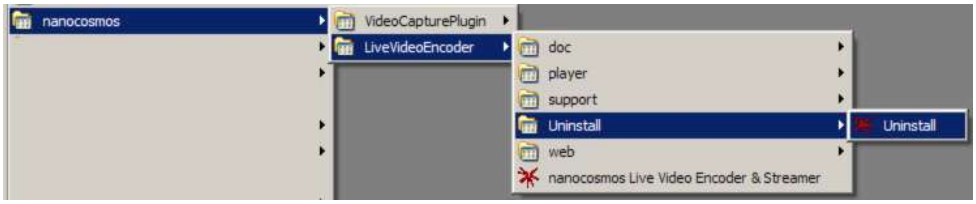
See below for installation instructions for the web application / plugins.

3.3 Uninstallation

To uninstall the Application and Plugins completely,
please uninstall from Windows Control Panel.
Note: when the Firefox plugin is installed as Add-On, please
remove the Add-on from the Firefox Add-on settings as well.

3.3.1 Uninstall Application





4. How to use nanoStream Video Live Encoder

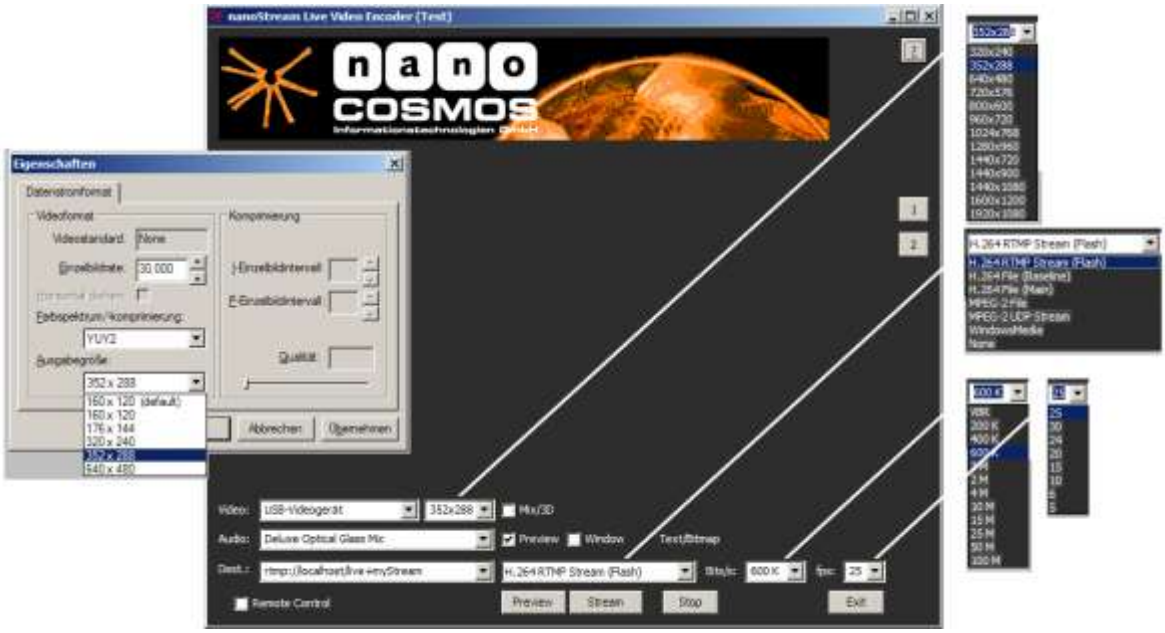
Basic usage

The encoder usage is based on the following steps:

- Select video and audio capture device(s)
- Select video image pixel size (e.g. 640x480)
- Select preview mode (window or in-application)
- Select Encoding Quality (bit rate)
- Select output format (URL or file, e.g. “rtmp://server/live/stream”, “c:\temp\out.mp4”)
- Start Streaming

4.1. Encoding / Streaming Application

The Live Video Encoder application provides parts of the functionality of the complete toolkit to encode and/or stream live video and audio from locally installed capture devices.
You find all parameters for encoding: Video device / Size, Audio, Destination, Format, Bits/s, fps
The application integrates the SDK components, Browser Plugins and DirectShow filters, which provide even more functionality as the Live Video Encoder application.
(see 5. How to integrate nanoStream Live Encoder)



Encoding Setup

The main quality parameters are

- Video Capture Pixel Size (Resolution), e.g. 640x480
- Video Encoding Bit Rate (e.g. 500 kBit/s)

Advanced Encoding Parameters:

- Video Encoder Key Frame Distance (GOP Size, I Frame Distance, P Frame Distance)
- Video Encoder Profile (Baseline, Main Profile)

Pre-Processing Option:

- Deinterlace
- Rescale (Native Hardware Video Capture Size to a custom pixel resolution)
- Text/Bitmap Overlay
- 2-Channel Video Mixer / Picture-in-Picture

Encoding / Streaming Setup

RTMP URLs need to be formatted as
rtmp://hostname/application+stream

Local Files

Local File Encodings can be written in these formats:

- Mp4 (H.264/AAC)
- M4v (iPod / mp4)
- MPG (TS)
- M2v (Elementary)
- WMV
- Webm (VP8 codec required)

Playback RTMP Streams with Flash based web pages

For playback H264 video from a client web page, a simple Flash based page, a simple Flash/Actionscript may be used. A sample web page is included.

4.2. Encoding and Streaming Formats

RTMP:
Works perfectly with Wowza Media Server or Flash Media Server.
URL format:
rtmp://server/app+stream

RTSP:
Mode 1: Streaming uplink to a Wowza Server
URL format:
rtsp://server:1935/app/stream

Mode 2: Live Video Encoder in Server Mode
URL format:
rtsp://server:port/streaming

Example:
rtsp://127.0.0.1:8554/streaming

UDP Transport Streams:
URL format:
udp://server:port/dummy.ts
Example: udp://localhost:1234/1.ts
UDP Elementary Stream (Video Only): Example: udp://localhost:1234

5. Additional Features

See the separate documentation for further info.

5.1 Desktop Sharing / Screen capture

With screen sharing, it is possible to encode and stream live presentations of slides and application demonstrations.

5.1 Video Mixing

It is possible to mix 2 video sources into a combined stream
a) Picture-in-picture
b) side-by-side
c) source switch from video source #1 to video source #2
d) 3d stereoscopic mixing

5.2 Video Overlay

The following features are available:
a) Text overlay / sub titles
b) Picture overlay with alpha blending

5.3 File based streaming

Instead using a live camera source, It is possible to use an input file and encode and stream it.

5. Playback of Video Streams

5.1 RTMP Playback

RTMP Web based Playback with Flash

Flash uses the RTMP protocol and needs a Media Server such as Wowza or Flash Media Server

Encoder URL: rtmp://server/app+stream

Player URL:

Server: rtmp://server/app
Stream: stream

RTMP Playback with Windows Applications
(New in Release 2.0):
For DirectShow based applications such as Windows Media Player, a RTMP Source Filter is included, which allows opening rtmp:// urls directly from the application. Contact us for further information.

5.2 RTSP Playback from Live Video Encoder RTSP Server

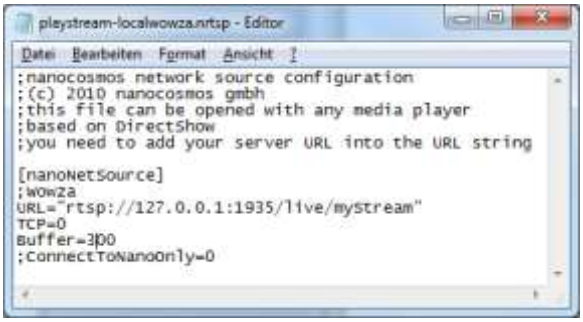
RTSP-URLs
rtsp://server:8554/app
Example: rtsp://localhost:8554/streaming

5.3 Streaming Playback with dummy RTSP and UDP files

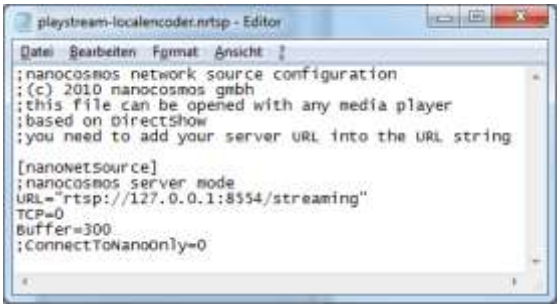
If your player application not directly supports RTSP or UDP, nanoStream provides dummy files which can be opened and configured for the correct streaming urls.
Note: this only works with DirectShow based player architecture, such as Windows Media Player.
The files are called “playstream.nanostream” for UDP and “playstream.nrtsp” for RTSP.

Opening these files will run the media player and ask for a URL. You can also pre-define your stream URLs and create new dummy files for your configuration.

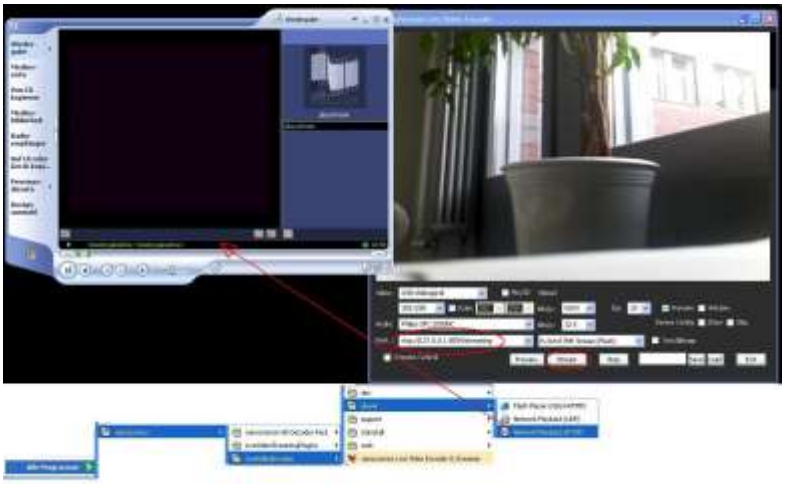
Example: local RTSP playback from Wowza Server



Example: local RTSP playback from Live Video Encoder (without Server)



1. start the application „nanocosmos Live Video Encoder & streamer”
2. enter URL “rtsp://localhost:8554/streaming”
3. start streaming
4. start MediaPlayer
   startmenue -> nanocosmos-LiveVideoEncoder-bin-player-NETWORK PLAYBACK (RTSP)
   or file: nanocosmos\LiveVideoEncoder\bin\playstream.nrtsp



6 Web Application – Browser Based Video Encoder

6.1 Browser based download/auto-installation / Client Installation (Add-on method)

a sample web page is included for auto-installation of CAB or XPI file format, or as a downloadable setup package.

The installer installs the live encoding application, plugins and DirectShow modules.

Web based installation for clients (encoding units)

Installer package from Website

just use the link to the installer on sample web page ‘nanoStream.html’

Browser based download/auto-installation (Add-on method)

LiveVideoEncoder may be installed on clients by commonly used Add-on installation methods.
Opening the browser on a web page offers a message to the user to be able to download and install the browser Add-on.

Internet Explorer

Auto-Installation via
CAB-File
“nanostream.cab”

Alert: “The Website wants to install the following add-on …”
Please verify:
“Install this AddOn for all Users on this Computer…”

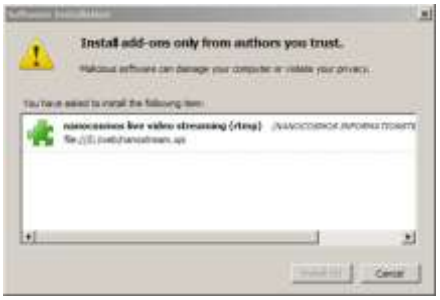
The installed AddOn is listed:
InternetExplorer/Tools/Manage Add ons
Show: all add-ons

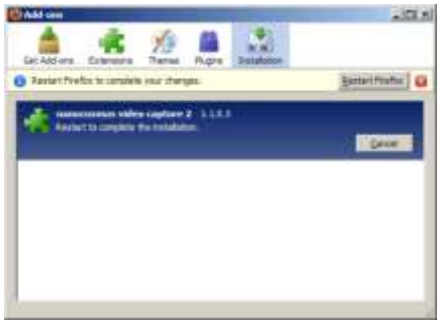
Uninstall

In the Internet Explorer Add-on window you can only disable the Plugin.
To uninstall the Plugin please uninstall from Start Menu or Windows Control Panel (see below)

Firefox
Auto-Installation via XPI-File
“nanostream.xpi”

Alert: “ Additional plugins are required …”
Install Missing Plugins





The installed AddOn is listed:
Firefox/Extra/Add ons

Uninstall
You can uninstall from
Firefox/Extra/Add-Ons
or uninstall the Plugin from
Windows Control Panel

How to test the Browser Auto Installation

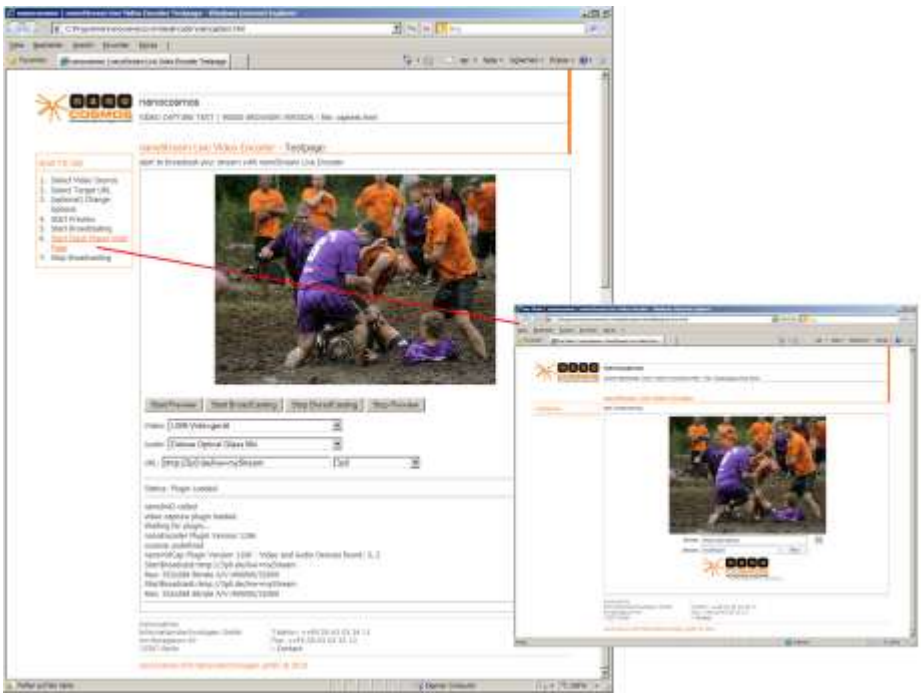
You need to uninstall the Application and Plugins from your system. When you open the example web pages the auto-Installation starts.

Uninstall Plugin

6.2. Browser Based Encoding / Streaming

Browser based encoding
The Live Video Encoder functionality may be integrated into a browser by loading the plugin into a HTML web page. The plugin then may be controlled by Javascript to change the settings and start and stop encoding and preview.

There are 2 plugins available, an Active-X control for Internet Explorer, and a NPAPI plugin for other browsers, such as Firefox, Safari and Chrome.



See the example web pages for further information and test.

Playback with Flash based web pages
For playback H264 video from a client web page, a simple Flash based page, a simple Flash/Actionscript may be used. A sample web page is included.

7. Integration Service
Live Video Encoder – Browser Integration

NOTE: SDK / Developer license is needed for this functionality.

7.1 Browser based usage with HTML and Javascript

The Live Video Encoder core components are available as plugins for Internet Explorer and NP-API based browsers (Firefox, Safari, Chrome).
See the separate documentation LiveVideoEncoder-Plugin-JScript.pdf and sample web pages for further help.

7.2 How to use the Installed Files for Web Based Encoding

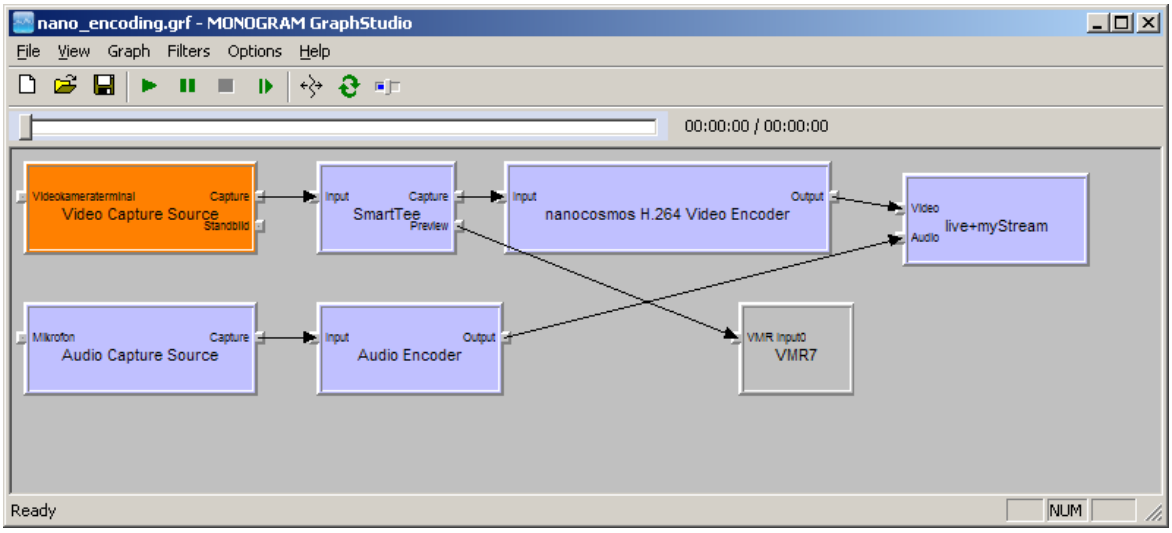
Structure of Installed Files

C:\Programs\nanocosmos\LiveVideoEncoder

\js	included Javascript API files properties and functions to control nanoStream with Javascript: **nanoEncoder.js**
\liveEncoder	Example web page for Browser based Encoding with JavaScript interface **nanoStream.html** **Mixtest.html** (for 3D-Tests, not available in the core Live encoder package and only supported upon special request.)
\liveEncoder+Flash	Example web page for Interaction of Camera Sources from Flash (swf) and nanoStream via Javascript **nanoFlash.html**
\livePlayerFlash	Example web page Browser based player with Flashplayer **Live.html**

8. DirectShow based usage with GraphEdit / GraphStudio

All Live Video Encoder components are available as DirectShow filters and may be used within DirectShow applications. We recommend using GraphStudio as a replacement for GraphEdit, as RTMP URLs may be set easily with this software. (http://blog.monogram.sk/janos/tools/monogram-graphstudio/)



Setting DirectShow properties from C++

The H.264 parameters may be set by calling the InanoCodecOpts interface.
The RTMP output path may be set by calling the SetFileName() method of the default DirectShow FileSinkFilter interface.

9. nanoStream SDK Components

Note: Not all modules are contained in all configurations. Please ask for availability and prices.

- **Live Video Capture Active-X Control (npvidcap.ax)**
  Active-X-Control compatible with Internet Explorer and other ActiveX technologies
  API compatible to Javascript, C/C++, NET/C#, VisualBasic, Delphi, and others
- **Live Video Capture NP Plugin (np_vidcap.dll)**
  Plugin for Mozilla/Netscape based browsers, Javascript interface (Firefox, Safari, Chrome)
- **nanocosmos H.264 video encoder (Filename: nh264enc.ax)**
  DirectShow video encoder filter for encoding live video to H.264
- **nanocosmos AAC audio encoder (Filename: naacenc.ax)**
  DirectShow audio encoder filter for encoding live audio to AAC
- **nanocosmos MP4 File Writer**
  DirectShow filter for creating MP4 files with H.264 support
- **nanocosmos RTMP Network Writer (Filename: nRtmpRenderer.ax)**
  DirectShow filter for streaming to Wowza and Flash Media Servers
  Example URL: rtmp://localhost/live+myStream
- **HD / UDP Streaming** Filters
  DirectShow Streaming components for HD video streaming in Local Area Networks:
  Point-to-Point, Broadcast, Multicast support
  Example URL: udp://localhost:1234
- **WindowsMedia Encoding and Streaming**
  Streaming component compatible to Microsoft WindowsMedia Video Formats:
- **Additional Extensions:**
  - **nanocosmos Stereoscopic 3D-Video Mixer** supporting Side-by-side/Interlaced/Color Anaglyph modes
  - **Video Resizer** for resizing and deinterlacing video
  - **Overlay Filter** for blending of, Texts, Bitmaps, Tickers, etc.
  - **Desktop Capture / Screen Grabber** Filter for Application Streaming e.g. Games (upon request)
  - **Remote Control** Function for Keyboard Feedback
  - **Player/Clients** for DirectShow/Applications or Browser-Plugin or Flash based
  - **Live Video Encoder Application**
    Reference Application to show functionality in a simple end user program