



# FlipFactory®

## FLIPFACTORY ENCODING FOR IPTV & VOD APPLICATIONS

This App Note applies to FlipFactory version 6.1, 7.1 and later

- Synopsis ..... 2
- Support for Leading Set Top Boxes ..... 3
- Qualifying FlipFactory for IPTV Set Top Boxes and VOD Workflows ..... 3
- VOD Transport Stream Codecs..... 4
  - Movie Codecs ..... 4
  - Video Codecs..... 4
  - Audio Codecs..... 4
- Creating an IPTV Factory..... 5
- Creating a CableLabs-Compliant VOD Factory ..... 9
- Creating MEF Files for IPTV Encoding..... 14
- Creating Configuration Files ..... 16
- Audio Channel Management in IPTV and VOD Transport Streams ..... 18
  - Audio Channel Mixing and Mapping Example ..... 18
- Creating DVB Subtitles in IPTV Media..... 19
- Copyright and Trademark Notice..... 20

# Synopsis

IPTV (Internet Protocol TV) and VOD (Video On Demand) is growing briskly, as broadcasters and content owners work to meet the demand for publishing media at any time on any platform.

No single IPTV or VOD standard ensures compliance with all set top boxes and distribution systems. Some vendors provide specific standards for their STB platform – for example, Microsoft’s Mediaroom. Additionally, publishers often deliver content to 3rd-party VOD platforms or set-top boxes, creating a requirement to provide metadata in a prescribed format. In these applications, testing is required to determine if specific video, audio, and multiplexing parameters require adjustment for proper delivery and playout.

To meet IPTV and VOD requirements, media – often long-form media, especially movies – must be encoded to multiple formats and bit-rates. In many cases, broadcasters also need to add graphics for channel branding, and sub-titles for foreign language programming, or to meet legal requirements; for example, for hearing-impaired viewers.

For the U. S. VOD market, VOD content should be compliant with CableLabs ([www.cablelabs.com](http://www.cablelabs.com)) Video-On-Demand specifications for video, audio, and metadata. In Europe and other regions of the world, the term VOD is often used in a broader context, to include both broadcast video and video delivered via the Internet to a wide variety of platforms. This app note focuses on producing CableLabs V1.1/2.0-compliant media for broadcast on cable systems.

FlipFactory is an ideal platform for automated production and delivery of VOD and IPTV media. In most cases, FlipFactory provides the functionality, performance, and metadata production and wide range of video and audio transcoding codecs that enable broadcasters and content owners meet the strong and diverse demands of the IPTV and VOD markets.

FlipFactory has long provided the ability to generate IPTV and VOD-compliant video in various MEG2- and H.264- based products. The recently added IPTV Transport Stream product enables H.264 encoding of media for IPTV applications; VOD Transport Stream enables you to encode MPEG2 to produce CableLabs V1.1/2.0-compliant VOD media.

FlipFactory provides audio support for IPTV with Dolby Digital 2 Channel, Dolby Digital 5.1 Channel/AC3, MPEG1 Layer 2, and AAC, plus Direct Convert MPEG1 Layer 2 and AC3. FlipFactory provides audio support for VOD with MPEG1 Layer 2, Dolby Digital 2 Channel and Dolby Digital 5.1 Channel/AC3, plus Direct Convert MPEG1 Layer 2 and AC3.

The IPTV codec also enables you to insert DVB subtitles. For details, see Telestream’s app note entitled “Creating DVB Subtitles in FlipFactory”.

To produce IPTV video, use FlipFactory Pro SD or HD, Option I. For VOD video production, use FlipFactory Pro SD or HD, Option V.

**Note:** *This app note assumes that you know how to create and configure factories in FlipFactory and that you know how to submit jobs. If you don’t know how to configure factories or manually submit jobs, please review the FlipFactory User’s Guide for details.*

**Note:** *This app note applies to FlipFactory versions: v6.1, v7.1 and later. It does **not** apply to version v7.0 because v6.1 uses MEF files, v7.1 and later use CFG files, and v7.0 has no provision for MEF or CFG files.*

# Support for Leading Set Top Boxes

Telestream works with our customers to test FlipFactory-generated IPTV files for compatibility with set top boxes that they must support. FlipFactory has been successfully used in workflows to generate compatible files for the following platforms/STBs:

- Microsoft Mediaroom – WM9 or WM9A and H.264
- Tiscali UK, Neuf Telecom France, Darty France, Swisscom, BBC iPlayer.

## Qualifying FlipFactory for IPTV Set Top Boxes and VOD Workflows

If you're planning to use FlipFactory to transcode media for a new IPTV platform or set-top box (STB) or you have special workflow requirements for IPTV or VOD applications, Telestream welcomes your investment in testing and qualifying FlipFactory for your specific application.

To enable us to assist you better, we suggest that you...

1. Communicate with Telestream's Customer Service to advise us of your testing and qualification project, and to determine if Telestream has worked with the platform or STB vendor.
2. Make sure that you have the proper FlipFactory edition and licenses before starting testing.
3. Configure a factory to conform to the platform/STB requirements or VOD workflow, and run test transcoding jobs to determine if the encoder produces compliant media with no changes. Please communicate your success with Telestream Customer Service, so that we can confirm your success and add it to the list of validated platforms/STBs.
4. If you are unable to produce compliant media, contact Telestream Customer Service with your results. In addition to the basic Customer Service information, please provide the following:
  - a. The vendor and product name of the platform/STB or VOD workflow requirements
  - b. Written specifications for encoding requirements
  - c. Sample files that play and perform correctly on the system in question
  - d. Sample files of your input media
  - e. Specifications of the factory you've configured.

Telestream will analyze what must be changed in the codec or other components of FlipFactory to properly produce media for the target platform/STB. Testing of files is most successful when Telestream has cooperation from the vendor of the platform or STB.

# VOD Transport Stream Codecs

When you select a VOD Transport Stream product, FlipFactory provides a wide variety of MPEG2 VOD transport stream movie and video codecs, and several audio codecs, to meet the broad range of requirements for various VOD applications.

## Movie Codecs

**Note:** *The movie codecs are available only when you have purchased a VOD Server license from Telestream. Select from these movie codecs when you want multiple (up to 4) audio streams in your media, or you want to set an explicit mux rate (total bit rate).*

The Preset VOD Stream and ATSC VOD Stream codecs are generally recommended as shortcuts for creating CableLabs 1.1/2.0-compliant MPEG2 SD and HD media. If you know what your specifications are, choose from these movie codecs to meet your needs.

MPEG2 VOD Stream	Preset VOD Stream
MPEG2 HD (4:2:0) VOD Stream	ATSC VOD Stream
MPEG2 HD (4:2:0) VOD Stream	

## Video Codecs

Use these video codecs in conjunction with audio codecs to produce VOD SD and HD media when you do not have a VOD server license or when you want to perform either video or audio direct convert operations. The use of video and audio codecs limits you to a single audio stream.

MPEG2 ML@MP CBR	MPEG2 HD 4:2:0 CBR
MPEG2 HD 4:2:2 CBR	MPEG2 4:2:2 CBR
VOD Direct Convert	

## Audio Codecs

Use these codecs in conjunction with the selected video codec to produce VOD SD or HD media, and to perform direct convert operations.

MPEG1 Layer 2	Dolby 5.1/AC3 Audio
AES Audio	AC3 Direct Convert
MPEG1 Layer 2 Direct Convert	

**Note:** *Only one audio stream is permitted in FlipFactory version 6.1*

# Creating an IPTV Factory

To produce IPTV media, Telestream recommends that you create a factory utilizing the IPTV Transport Stream product, which provides only IPTV-compliant options. In this example, no Process/Analyze tools are added. To use P/A tools for your media, add them to your own factory.

**Note:** *FlipFactory supports the production of single program transport stream files. Transport stream files produced in FlipFactory can only contain one program.*

To create and configure a factory based on the IPTV Transport Stream product, follow these steps:

1. Log into FlipFactory in an account of your choice, and add a new factory.
2. Name the new factory *IPTV*, for example.
3. To submit media to this factory, either add a monitor (e.g., Local Folder or Network Folder monitor) or submit media manually, via the Submit Job window. You can accept media from any FlipFactory-supported system; the source not material to IPTV video production.
4. Create a new product, and name it *IPTVOut* (or other appropriate name).
5. In the Product selector panel, select IPTV Transport Stream as the product.
6. Open the IPTVOut folder and select the Codecs folder to display the codecs selector panel. The IPTVOut folder displays the IPTV Stream as the only codec.
7. Now, open the Codecs folder and select the IPTV Stream codec to display its editor panel.

**Note:** *Portions of the editor panel are displayed in each of the figures in this example.*

**Figure 1. Preset IPTV Stream Codec (Part 1)**

The screenshot displays the 'iptv Stream' configuration window. It features several sections with adjustable parameters:

- Video Codec:** A dropdown menu set to 'H.264 Main Profile'.
- Rate:** A dropdown menu set to 'Specify Total Bit Rate'.
- Stream Mux Rate:** A slider control with a value of 1400000, ranging from 512000 to 8000000 Bits/Second.
- Frame Width:** A slider control with a value of 352, ranging from 352 to 1280 pixels.
- Frame Height:** A slider control with a value of 240, ranging from 240 to 720 pixels.
- Video Profile:** A dropdown menu set to 'NTSC'.
- Frame Rate:** A text field showing '29.97 frames/second'.
- Interlacing Settings:** A dropdown menu set to 'Progressive Output'.
- Program Map Table PID:** A slider control with a value of 480, ranging from 16 to 8190, labeled 'PMT PID Value'.
- VIDEO PID:** A slider control with a value of 481, ranging from 16 to 8190, labeled 'TS PID Value'.

8. **Video Codec.** The IPTV codec is selected differently than most codecs. In the IPTV codec, you select which profile – set of capabilities – the H.264 codec operates in:
- Main Profile (for broadcast/storage applications frame sizes up to 1280 x 720)
  - High Profile (for high definition applications, with relatively high compression capability; frame sizes up to 1920 x 1080)
  - MEF/CFG file import, for controlling the codec via an external specification file. (MEF is used for FlipFactory version 6.1, and CFG for FlipFactory version 7.1 and later).

**Note:** *The MEF file import features enables you to create MainConcept MEF profiles for video encoding parameters using the FlipFactory MEF File Generator, and then import the MEF file into FlipFactory when submitting a job to control the encoding process. For details about creating MIF files, see [Creating MEF Files for IPTV Encoding on page 14](#).*

9. **Rate.** Select Total Bit Rate or Video Bit Rate from the dropdown menu. Select Total Bit Rate to control the total output **Stream Mux Rate**. When this option is selected, the exact mux rate of the output stream is specified; the video rate is inferred by using the specified mux rate and subtracting the sum of the audio rates and a specific amount for stream overhead.

For example, if a mux rate of 2Mb is selected and a single audio stream is defined with a bitrate of 192Kbits/sec; the video bit rate is calculated as 2,000,000 - 192000 - Overhead. The resulting value (approximately 1,700,000) is the value of the video bitrate.

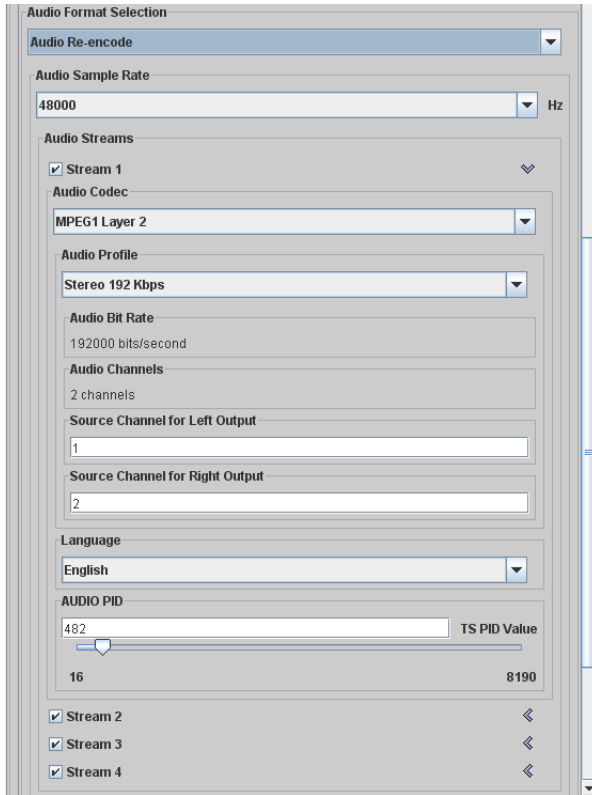
The alternate mode, Specify Video Bit Rate, provides control over the characteristics of the video stream. In this mode, the **Video Bit Rate** is specified; the overall mux rate is inferred from the total video rate and the audio rate, plus an overhead amount.

For example, if the exact video rate is specified as 1,000,000 bps and a single stream of audio is specified with a rate of 192Kbps, the resulting multiplexing rate is calculated as 1,000,000 + 192,000 + overhead, providing a calculated mux rate of approximately 1,500,000 bps.

Using these methods reduces the potential of miscalculation and resulting underflow errors.

10. **Frame Width and Frame Height.** Select the Frame resolution to indicate the spatial dimensions that the output video will adhere to. In Main Profile, the maximum frame size is 1080 x 720. In High profile, the maximum frame size is 1920 x 1080.
11. **Video Profile.** Video profile allows you to specify NTSC or PAL frame rates.
12. **Interlace Settings.** Select Interlaced or Progressive. If you select Interlaced, you need to specify the Output Field Order as well.
13. **Program MAP Table PID.** Select the appropriate Program MAP Table PID or retain the default setting. This value is a decimal value – if you have a value in hex notation, convert the hex value to decimal and select it. For each program there is a PMT and an associated PID.
14. **Video PID.** Select the Video PID value. Each elementary stream in a transport stream is identified by a 13-bit video PID. The associated PCR PID – Program Clock Reference – is always assigned the same value as the video PID value you specify. PID's must be unique.

**Figure 2. Preset IPTV Stream Codec (Part 2)**



- 15. Audio Format Selection.** Select Audio Re-encode or Audio Direct Convert from the drop-down menu.

When you select Audio Direct Convert, a single stream of audio is presented. This single stream is specified as the type of source stream that will be presented to the encoder. If you want to rewrap an audio stream from an original file, this is the option you should select. The audio codec in this mode allows MPEG 1 Layer 2 or AC3 Direct Convert (re-wrapping). You can also control the audio PID and language specification.

- 16. Audio Sample Rate.** When you select Audio Re-encode, select 48kHz or 44.1kHz. In most cases, the audio sample rate is set to 48kHz for Preset and ATSC VOD streams.
- 17. Audio Streams.** Check the number of streams (1 through 4) you're providing for this media. The audio streams can be selectively enabled, each with distinct characteristics (for example: audio format, parametric data, PID control, channel mapping, etc.).
- 18. Audio Codec.** Select the audio codec: MPEG 1 Layer 2, AAC, or Dolby 5.1/AC3 Audio.

For each codec, there are an extensive number of parameters, each detailed in the online help page for the Preset VOD Stream codec. For an example of comprehensive mixing and mapping, see [Audio Channel Management in IPTV and VOD Transport Streams on page 18](#).

**Figure 3. Preset IPTV Stream Codec (Part 3)**

The screenshot shows a configuration window for an IPTV stream codec. It includes the following settings:

- Motion Estimation Factor:** A slider set to 80, with 'Low Quality/Faster Encode' on the left and 'High Quality/Slower Encode' on the right.
- Enable Advanced Settings:** A checked checkbox.
- Transport ID:** A slider set to 0, with 'Transport ID Value' on the right and values 0 and 65535 at the ends.
- Program Number:** A slider set to 1, with 'Program Entry Number' on the right and values 1 and 65535 at the ends.
- Enable Bandwidth Reservation Options:** A checked checkbox.
- Target Overhead Rate (in %):** A slider set to 30, with values 0 and 40 at the ends.
- Reserved Bandwidth (in bits/sec):** A slider set to 102400, with values 1024 and 1048576 at the ends.
- Enable PMT Stream Ordering Options:** A checked checkbox.
- PMT Stream Ordering:** A dropdown menu set to 'List Audio Streams Prior to Video Streams'.
- File Extension:** A dropdown menu set to 'mpg'.

19. **Motion Estimation Factor.** Adjust to improve encoding speed or picture quality. The higher the value, the better the compressed frames appear, but the longer the compression takes.
20. **Enable Advanced Settings.** Check to display advanced controls.
21. **Transport ID.** Default 0. Adjust the Transport ID value when you're creating multi-transport stream – muxing multiple transport stream files from FlipFactory into a single transport stream file outside of FlipFactory. Or, you have equipment-specific values you need to assign.
22. **Program Number.** Default 1. Set a different Program Entry Number value if necessary.
23. **Enable Bandwidth Reservation Options.** Check to specify either the **Target Overhead Rate**, as a percentage, or total **Reserved Bandwidth**, in bits per second.
24. **Enable PMT Stream Ordering Options.** For certain STBs, you may need to set stream video and audio stream ordering in the Program Map Table.
25. **File Extension.** Select the extension from dropdown menu (default mpg).
26. Click Save to update the FlipFactory database for this factory.

Optionally, set up filters to make modifications to the output media. For example, if you're producing spots or commercials for IPTV, you can use the ITU Loudness filter to control volume. For details, see the FlipFactory App Note "Measuring & Adjusting ITU-R BS.1770 Loudness".

FlipFactory can be configured to deliver media to a wide variety of servers and on-air systems, and optionally, notify the systems as well. Setting up a destination is beyond the scope of this app note. For details, see the FlipFactory User's Guide (click Help in the FlipFactory console).

With the IPTV factory configured, you should submit test media and approve it for satisfactory product generation before putting the factory into production.



# Creating a CableLabs-Compliant VOD Factory

To produce CableLabs-compliant VOD MPEG2 SD or HD media, Telestream recommends that you create a factory with the VOD Transport Stream product, to provide VOD-compliant options. To use optional P/A tools for your media, add them to your own factory.

**Note:** *FlipFactory supports the production of single program transport stream files. Transport stream files produced in FlipFactory can only contain one program.*

To create and configure a factory based on the VOD Transport Stream product, follow these steps:

1. In the FlipFactory console, log into in an account of your choice, and add a new factory.
2. Name the new factory *VOD*, for example.
3. To submit media to this factory, either add a monitor (e.g., Local Folder or Network Folder monitor) or submit media manually, via the Submit Job window. You can accept media from any FlipFactory-supported system; the source not material to VOD video production.
4. Create a new product, and name it *VODOut* (or other appropriate name).
5. In the Product selector panel, select VOD Transport Stream as the product.
6. Open the *VODOut* folder and select the Codecs folder to display the codecs selector panel. For a CableLabs 1.1/20.0-compliant VOD SD media workflow, select Preset VOD Stream as the codec. For a CableLabs 1.1/2.0-compliant HD media workflow, select the ATSC VOD Stream codec, and configure it accordingly.

**Note:** *Telestream provides several movie, video, and audio codecs you can use to create other forms of MPEG2 media for VOD applications. Only the movie codecs allow you to set a specific, constant mux rate. The movie codecs permit as much audio bandwidth as you specify; video is dropped accordingly. When using video and audio codecs, you are limited to a single audio stream. In this example SD workflow, the VOD Preset VOD Stream codec is presented, with advanced settings.*

7. Now, open the Codecs folder. Select the Preset VOD Stream codec to display its editor panel.

**Note:** *Due to the significant options available in this codec, you need to scroll down to display them all. Portions of the editor panel are displayed in each of the figures in this example.*

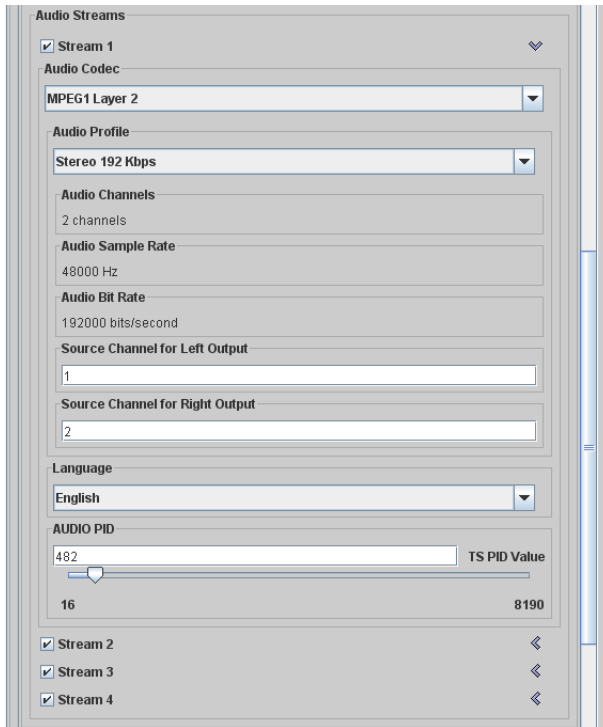
**Figure 4. Preset VOD Stream Codec (Part 1)**

8. **Total Bit Rate and Video Bit Rate.** Total Bit Rate and Video Bit Rate are set to 3,750,000 bps, and 3,180,000 bps, respectively. These values can not be changed.
9. **GOP Structure.** Select the GOP structure for your output.
10. **Output Field Order.** Select the proper output field order for your media.
11. **Enable GOP Configuration.** If required, enable GOP configuration, and select Open or Closed GOP.
12. **Video Profile.** Select the video profile of your output from the dropdown menu.

**Figure 5. Preset VOD Stream Codec (Part 2)**

13. **Program MAP Table PID.** Select the appropriate Program MAP Table PID or retain the default setting. This value is a decimal value – if you have a value in hex notation, convert the hex value to decimal and select it. For each program there is a PMT and an associated PID.
14. **Video PID.** Select the Video PID value. Each elementary stream in a transport stream is identified by a 13-bit video PID. The associated PCR PID – Program Clock Reference – is always assigned the same value as the Video PID value you specify.
15. **Audio Sample Rate.** Select 48kHz or 44.1kHz to meet your requirements. In almost all cases, audio sample rate is set to 48kHz for Preset and ATSC VOD streams.

**Figure 6. Preset VOD Stream Codec (Part 3)**



16. **Audio Streams.** Check the number of streams (1 through 4) you're providing for this media. The audio streams can be selectively enabled, each with distinct characteristics (for example: audio format, parametric data, PID control, channel mapping, etc.).

**Note:** *The Preset VOD stream codec should only have 1 audio stream, or 2 audio streams at most. When producing 5.1/AC3 audio, you may have to limit your audio to one stream. Supplying more than two audio streams significantly increases the risk of causing underflows in the output transport stream. If you require CableLabs-compliant output and require more than two audio streams; you should use the VOD stream codec.*

Click the arrow on the right of each stream to display and configure details for each stream:

17. **Audio Codec.** Select the audio codec for this stream: MPEG 1 Layer 2, AES, or Dolby 5.1/AC3 Audio.

For each codec, there are an extensive number of parameters. Each parameter is detailed in the online help page for the Preset VOD Stream codec. For an example of comprehensive mixing and mapping, see [Audio Channel Management in IPTV and VOD Transport Streams on page 18](#).

**Figure 7. Preset VOD Stream Codec (Part 4)**

The screenshot shows a software interface for configuring VOD stream codec settings. At the top, there is a section titled "Motion Estimation Factor" with a slider set to 80. Below this is a "Low Quality/Faster Encode" vs "High Quality/Slower Encode" indicator. The "Enable Advanced Settings" section is checked. The "Transport ID" section has a slider set to 0. The "Program Number" section has a slider set to 1. The "Enable ATSC PSIP Table Insertion" section is checked. The "Enable Closed Caption Insertion" section is checked, and the "Select Desired Caption Type" dropdown menu is set to "ATSC Captions".

18. **Motion Estimation Factor.** Adjust the slider to improve encoding speed or improve picture quality. The higher the value, the better the compressed frame will appear, but the longer the compression will take.
19. **Enable Advanced Settings.** Check to display advanced controls.
20. **Transport ID.** Default 0. Use the slider to set the Transport ID value, when necessary because you are creating multi-transport stream by muxing two or more transport stream files produced by FlipFactory into a single transport stream file outside of FlipFactory. Or, you may have equipment-specific values you need to assign.
21. **Program Number.** Default 1. Use the slider to set a different Program Entry Number value if necessary, for your production requirements.
22. **Enable ATSC PSIP Table Insertion.** Check to enable Program Status Information Insertion. PSIP is information typically displayed in channel guides, for example. FlipFactory provides templated tables and limited PSIP data, and inserts the table and data into the stream. Most of the information in PSIP is not known at transcoding time. It is generally the role of the broadcaster to provide relevant PSIP table data, usually at or near transmission time.
23. **Enable Closed Caption Insertion.** Select the option to use when inserting closed captions into the stream, from the dropdown menu.

**Figure 8. Preset VOD Stream Codec (Part 5)**

The screenshot shows a configuration window for VOD stream codecs. It includes a slider for 'Maximum PCR Interval (ms)' at 75, a checked box for 'Enable Bandwidth Reservation Settings' with a 'Reserved Bandwidth (Overhead Percentage)' slider at 10, a checked box for 'Enable PMT Stream Ordering Options' with a dropdown for 'PMT Stream Ordering' set to 'List Audio Streams Prior to Video Streams', a dropdown for 'File Extension' set to 'mpg', and a dropdown for 'Aspect Ratio' set to '4:3'.

24. **Maximum PCR Interval.** Default 75 ms (within ATSC allowable range). The DVB rate is different. When creating DVB-based content (in Europe, for example), set the PCR interval value to make the material DVB compliant (DVB compliant is 40ms or less).
25. **Enable Bandwidth Reservation Options.** Check to manually control the reserved bandwidth if, for example, you need more bandwidth for video and audio.
26. **Enable PMT Stream Ordering Options.** For certain STBs, you may need to set stream video and audio stream ordering in the Program Map Table.
27. **ETV Preservation** (not shown). Check to enable ETV packet preservation. You may want to modify audio or video, but you want to preserve the remaining ETV stream data. This option is enabled by a specific license – contact Telestream Customer Service for details. Input media must be a transport stream with ETV packets present, so that the ETV packet data (ETV streams) is passed through the VOD transcode process to the output media.
28. **File Extension.** Select the extension from dropdown menu (default mpg).
29. **Aspect Ratio.** Select the aspect ratio bit within the MPEG2 sequence extension from the dropdown menu. Supported aspect ratios: 4:3, 16:9, 2.21:1, 1:1.
30. Click Save to update the FlipFactory database for this factory.

Optionally, set up filters to make modifications to the output media. For example, if you're producing spots or commercials for VOD, you can use the ITU Loudness filter to control volume. For details, see the FlipFactory App Note "Measuring & Adjusting ITU-R BS.1770 Loudness".

FlipFactory can be configured to deliver media to a wide variety of servers and on-air systems, and optionally, notify the systems as well. Setting up a destination is beyond the scope of this app note. For details, see the FlipFactory User's Guide (click Help in the FlipFactory console).

With the VOD factory configured, you can submit media and test it for VOD compliance, before putting the factory into production.

# Creating MEF Files for IPTV Encoding

In addition to configuring the H.264 codec directly in FlipFactory, you can also configure the H.264 codec using Main Concept's H.264 Encoder Configuration Utility.

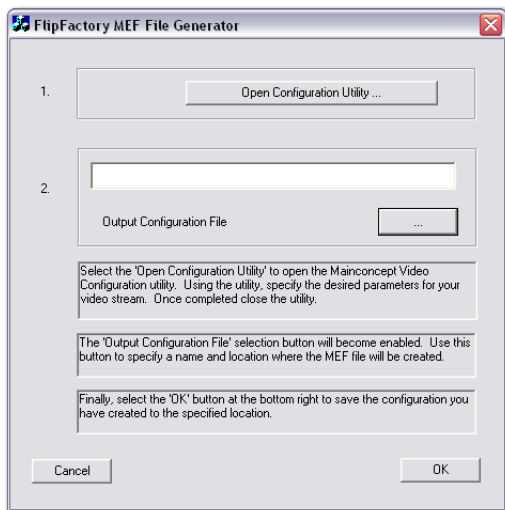
**Note:** *MEF files only apply to FlipFactory version v6.1. If you are using FlipFactory 7.1 or later, see [Creating Configuration Files on page 16](#).*

**Note:** *Using the configuration utility provides you a broader range of codec configuration options. For example, you may want experiment with encoding quality for specific applications, by fine-tuning the H.264 codec settings. To utilize your custom settings in FlipFactory, you use the utility to save your settings in an MEF file. Then, specify the MEF file in your factory, which imports it – to control the H264 codec – during job processing. You can save the MEF file directly in a monitored folder, or you can save it elsewhere, and move the file to the target monitor at a later time. If you are submitting the MEF file to a FactoryArray, make sure that the monitored folder has been made accessible by all FlipFactory servers in the FactoryArray.*

To create and configure an MEF file, follow these steps:

1. Run the FlipFactory MEF File Generator, in <Default Drive (usually C:)\Program Files\Telestream\FliFactory\Encoders\lptv\H264ConfigurationDialog.exe. When the MEF File Generator runs, it displays the following window:

**Figure 9. FlipFactory MEF File Generator**



2. Click Open Configuration Utility to launch the MainConcept H264 Configuration Utility:

**Figure 10. MainConcept H264 Configuration Utility**

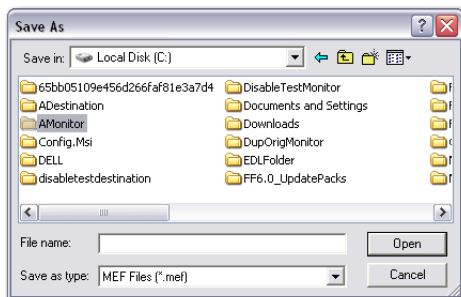


3. Use the H.264 Configuration Utility to configure the codec with settings you need to produce video that meets your specifications.

**Note:** The H.264 Configuration Utility is for advanced users, and permits the widest possible range of configurations, including configurations that do not comply with IPTV requirements.

4. When you have completed your configuration, click OK to close the Configuration Utility.
5. On the FlipFactory MEF File Generator, click the button in the Step 2 box on the window displaying the ellipses (...) to display the Save As dialog.

**Figure 11. Saving your MEF file**



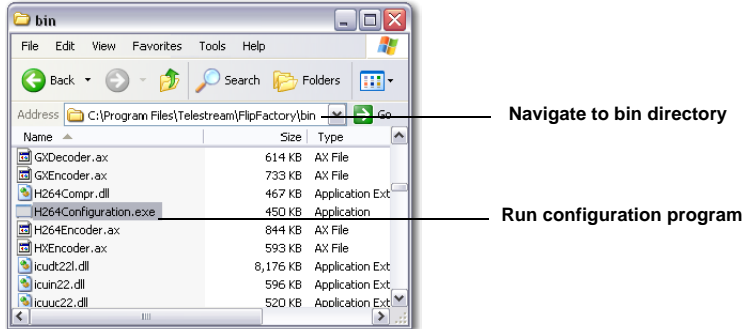
6. Locate the drive or server and directory where you want to save the MEF file. Name the file, and click OK.
7. Click the OK button to save the MEF file in the specified directory and close the application.

**Note:** Remember the server, directory path, and the name of your MEF file, so that you can reference it in the codec editor panel in your IPTV factory. If on a different server, FlipFactory must have authenticated access to the directory as a share.

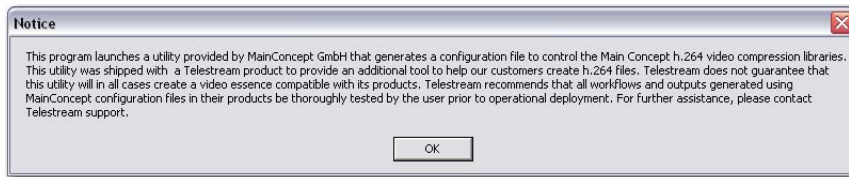
# Creating Configuration Files

**Note:** CFG files only apply to FlipFactory version v7.1 and later. If you are using FlipFactory v6.1, see [Creating MEF Files for IPTV Encoding on page 14](#).

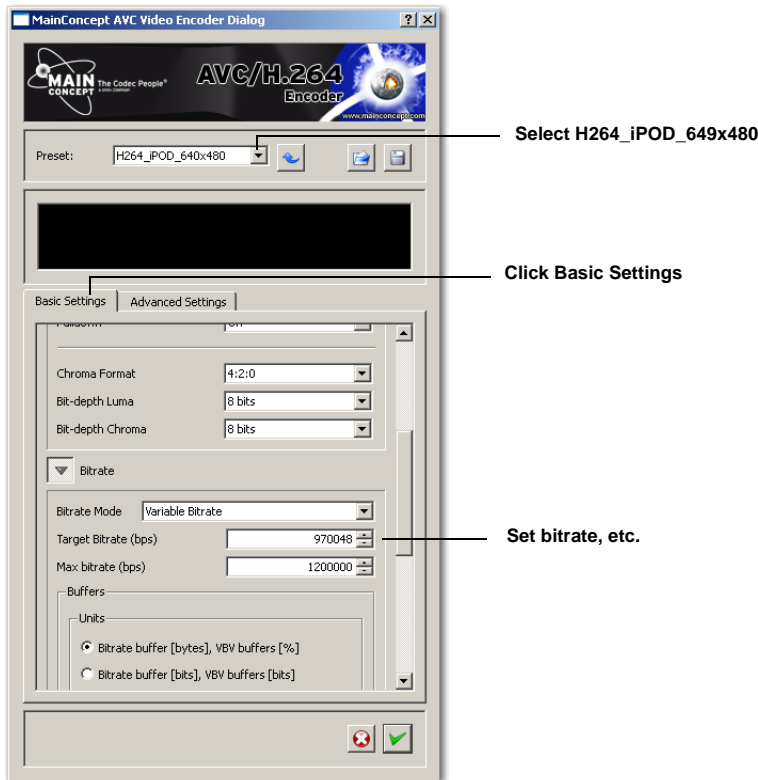
1. Start up the Main Concept configuration tool by navigating to *C:\Program Files\Telestream\FipFactory\bin*, then run the application file *H264Configuration.exe*:



2. When the Notice dialog box displays, Click OK:

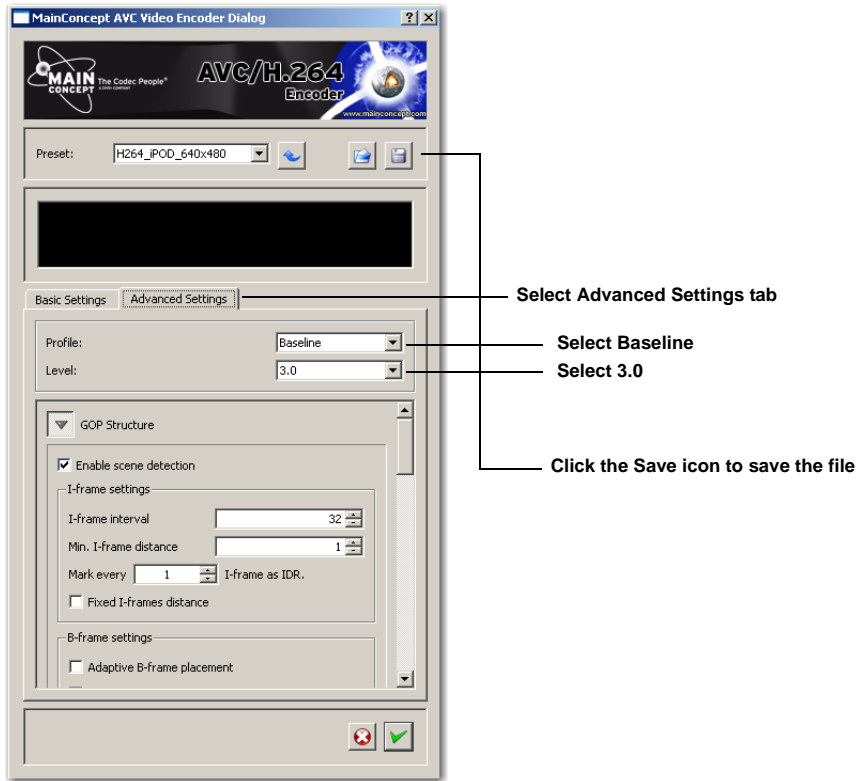


3. Select H264\_iPOD\_640x480 from the Preset drop-down list, click the Basic Settings tab, and set the bitrate:



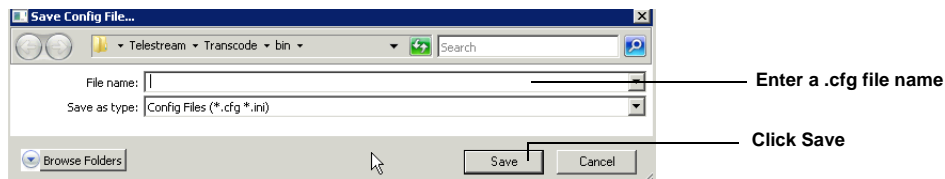


4. Select the Advanced Settings tab, select *Baseline* from the Profile drop-down list and *3.0* from the Level drop-down list, then click the Save icon:

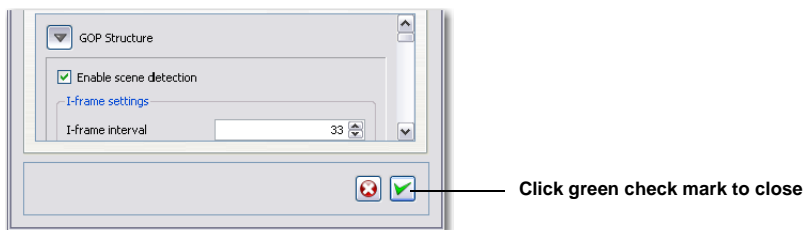


**Note:** *H264\_iPOD\_649x480* forces a specific configuration of settings. Other configurations can be created by modifying these settings as needed.

5. When the Save dialog box displays, enter a .cfg file name and click Save:



6. Repeat steps 4 and 5 above to create other required configuration files (one for each desired bitrate), then click the green check mark to close the configuration program:



# Audio Channel Management in IPTV and VOD Transport Streams

Audio channels can be enabled and disabled, mixed, and mapped during encoding, in both IPTV and VOD encoder workflows. Use the Audio Format Selection section of the IPTV Stream Codec editor panel to manage source output audio channels. The combination of both stage one and stage two audio management tools provides comprehensive mixing and mapping of your audio to meet your workflow requirements.

You can manage audio channels at two distinct stages, when your factory is set up to produce IPTV or VOD transport streams via one of the selected movie codecs. The first stage is input file audio channel assignment and mixing during the decoding process, and transfer of the mapped and mixed input channels for use by the encoding process. The Audio Channels filter is the tool that you enable in your factory to provide this input audio channel management.

The second stage of audio channel management (available via movie codecs) is audio channel assignment during the encoding process of the output file (channel mixing is not permitted in this stage – only routing, or assignment). The tool you use is the Audio Format Selection section of the selected movie codec editor panel.

## Audio Channel Mixing and Mapping Example

In this example workflow, you are creating transport stream media for IPTV or VOD, and you need to create two audio streams – one with Dolby 5.1 audio, and one with MPEG1 Layer 2 audio (a voice/music mix) in your output file.

Input media in this example has 6 discrete channels of PCM audio, ready to be used for AC3 5.1 audio, arranged in the following manner:

- Channel 1 – left voice
- Channel 2 – right voice
- Channel 3 and 4 – background music
- Channel 5 and 6 – no sound.

**Using the Audio Channels Filter.** First, enable the Audio Channels filter. Then, mix and map the input channels to the output channels for both Dolby and MPEG1 Layer 2 audio.

To maintain all 6 channels for Dolby production, you simply specify a 1:1 mapping of all channels – no changes are necessary.

To provide correct input for the MPEG1 Layer 2 audio, mix all four audio channels in to left and right stereo. (Recall that input channels 1 and 2 are voice; 3 and 4 are music). Set Output Channel 7 = 1 + 2 + 3 + 4 and set Output Channel 8 = 1 + 2 + 3 + 4. Thus, channel 7 and channel 8 provide mixed input for a two channel stereo mix.

**Configuring the Audio Format Selection in the IPTV Stream Codec.** Now, the input channels have been mixed and mapped properly for both Dolby and MPEG1 Layer 2 audio.

To encode audio stream 1 as Dolby 5.1 from channels 1 through 6, you enable and open stream 1 and select the Dolby 5.1/AC3 Audio codec.

The audio profile is set to 3/2 (L, R, C, Ls, Rs, LFE), and the source channels are by default set to 1:1. Channel 1 and 2 are already set 1:1, which is correct for left and right voice. Set Center to 1 + 2 (to mix left and right voice). Set channel 4 to 3, and 5 to 4 (for background music), and set LFE as 3 + 4. Make other audio adjustments for this Dolby stream as necessary.

To encode audio stream 2 as MPEG1 Layer 2 Audio from channels 7 and 8, you enable and open channel 2 and select the MPEG1 Layer 2 Audio codec.

The audio profile is set to Stereo @ 192 Kbps – adjust as necessary. Set Source Channel for Left Output to 7, and Source Channel for Right Output to 8 to provide the correct mapping. Make other audio adjustments for this stream as necessary.

Disable Stream 3 and 4, and save the factory.

## **Creating DVB Subtitles in IPTV Media**

FlipFactory increases video production efficiency by offering an integrated solution for both open and DVB subtitle processing in all transcoding workflows. DVB subtitling, a special licensed option, is integrated directly into your factories, making it easy to implement single-language, multi-language, and multi-stream subtitle bitmap insertion into transport streams.

For details, see Telestream's app note entitled "Creating DVB Subtitles in FlipFactory".

# Copyright and Trademark Notice

©2010 Telestream, Inc. All rights reserved. No part of this publication may be reproduced, transmitted, transcribed, altered, or translated into any languages without written permission of Telestream, Inc. Information and specifications in this document are subject to change without notice and do not represent a commitment on the part of Telestream.

Telestream, Vantage, Flip4Mac, FlipFactory, Episode, ScreenFlow, Wirecast, GraphicsFactory, MetaFlip, MotionResolve, and Split-and-Stitch are registered trademarks and Pipeline, Launch, and Videocue are trademarks of Telestream, Inc. All other trademarks are the property of their respective owners.