



Subtitling on Pass-through Channels

Introduction

In the context of subtitling, 'pass-through channels' refer to channels that are received and retransmitted either in real time or with a short delay. This configuration is used extensively by cable and satellite operators where channels from other broadcasters are combined onto their platform at a headend.

Scope

Where a channel is delivered to multiple headends in different countries there is a requirement to localize the video by adding subtitles in the local language.

This White Paper describes a range of methods by which this can be achieved and the advantages and disadvantages of each.

In some cases there will be a requirement to transcode from one subtitle format to another. This is covered in more detail in the Subtitle Transcoding White Paper.

Both SD and HD services are covered in this white paper.

Open or Closed Subtitles

There are two main categories of subtitles, open and closed.

Open subtitles are added into the visible part of the video image and cannot then be changed. The process of adding or 'burning in' the subtitles can be done before transmission by the original broadcaster or during transmission at one or more of the headends. Open subtitles are only suitable where a single language is required and in the context of this White Paper this is one option for the output from the headend.

Closed subtitles are subtitles that are carried in part of the broadcast signal that is not normally visible to the viewer. Special receiving equipment either at a headend or at the viewer's site is required to select and display the subtitles. Closed subtitling has the advantage that more than one language can be supported as well as hard of hearing subtitles (closed captions). In the context of this White Paper closed subtitles are used to deliver several simultaneous subtitle languages to the headend or directly to the viewer.

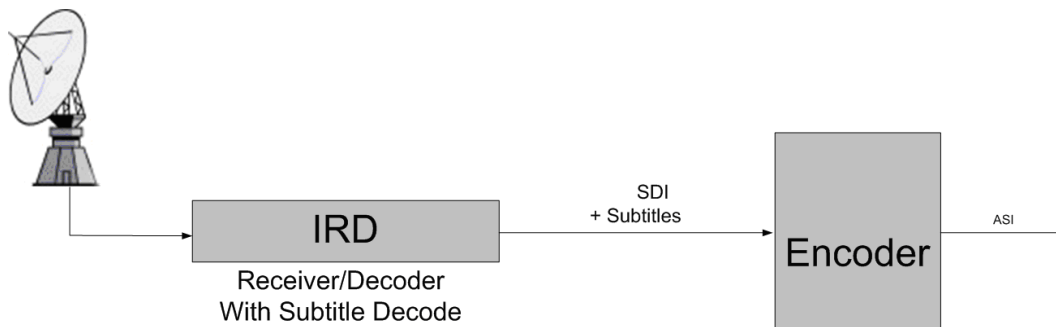


1. Open Subtitles - using a professional decoder (IRD) at a headend.

Closed subtitles for a range of languages are supplied by the original broadcaster in a suitable format such as Teletext, DVB bitmap, Imtext or line 21 (EIA-608) closed captions.

At each headend a professional receiver/decoder (IRD) decodes the video and adds the required subtitle language into the picture. The resulting combined video with open subtitles is then re-encoded for broadcast.

This is a very common architecture for SD broadcast but currently there is a very limited supply of suitable HD professional decoders.



Advantages:

- **No separate subtitle inserter required.**
- **Suitable for situations where the video encoding standard needs to be changed.**
- **No special subtitle decoder required by viewers**

Disadvantages:

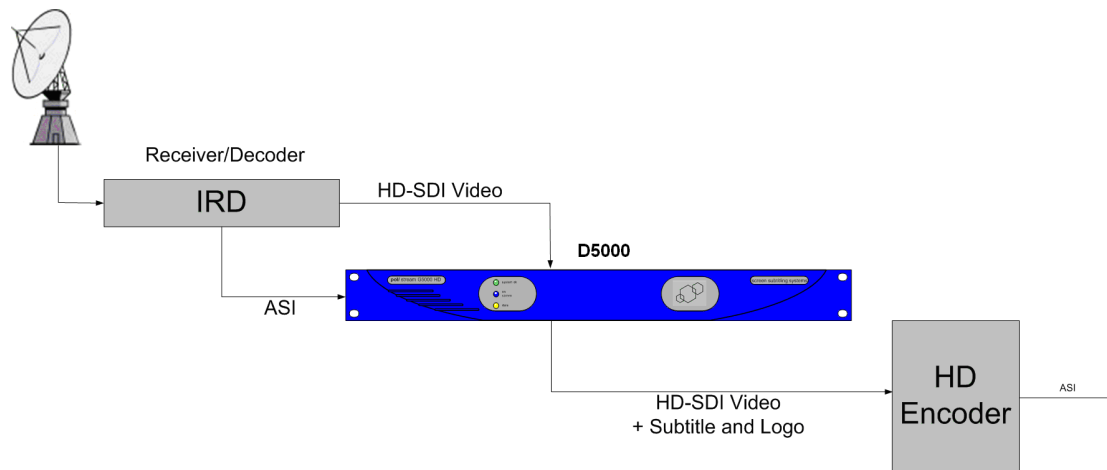
- **The video must be decoded and recoded:**
 - **Cost of equipment – especially for HD**
 - **Loss of video quality**
 - **Delay in the video path**
- **Very limited availability of IRDs with subtitle support in HD.**



2. Open Subtitles - using a subtitle inserter at a headend.

Closed subtitles for a range of languages are supplied by the original broadcaster in a suitable format such as Teletext, DVB bitmap or Lmitext.

At each headend a professional receiver/decoder (IRD) decodes the video and a separate subtitle inserter unit (D5000) adds open subtitles into the video. The resulting combined video with open subtitles is then re-encoded for broadcast. The subtitle language is selected from those supplied by the original broadcaster.



Advantages:

- **High quality subtitle text.**
- **Animated or static logos.**
- **Other localization components can also be added such as tickers and clocks.**
- **Suitable for situations where the video encoding standard needs to be changed.**

Disadvantages:

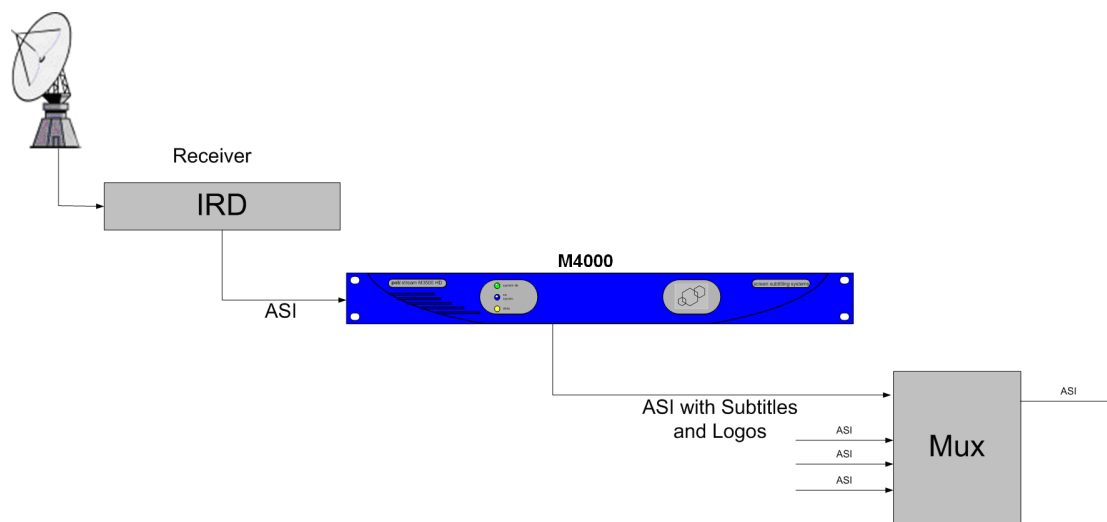
- **The video must be decoded and recoded:**
 - **Cost of equipment – especially for HD**
 - **Loss of video quality**
 - **Delay in the video path**



3. Open Subtitles – using an MPEG2 subtitle inserter at a headend.

Closed subtitles for a range of languages are supplied by the original broadcaster in a suitable format such as Teletext, DVB bitmap or Imitext.

At each headend a professional receiver (IRD) generates a decrypted compressed transport stream (ASI) and a separate MPEG-2 subtitle inserter unit (M400) adds open subtitles into the compressed video. The subtitle language is selected from those supplied by the original broadcaster.



Advantages:

- The video signal is not decoded and stays in MPEG-2 format.
- Multiple video channels can be modified in a single unit (SD only).
- Static logos can be added.
- Minimal through delay.
- Cost saving on decoders, encoders and multiplexes.
- The original broadcaster maintains control of the final video image.

Disadvantages:

- Short through delay (approx. 800mS)
- Currently only available for MPEG-2 streams
- Small increase in video bit rate

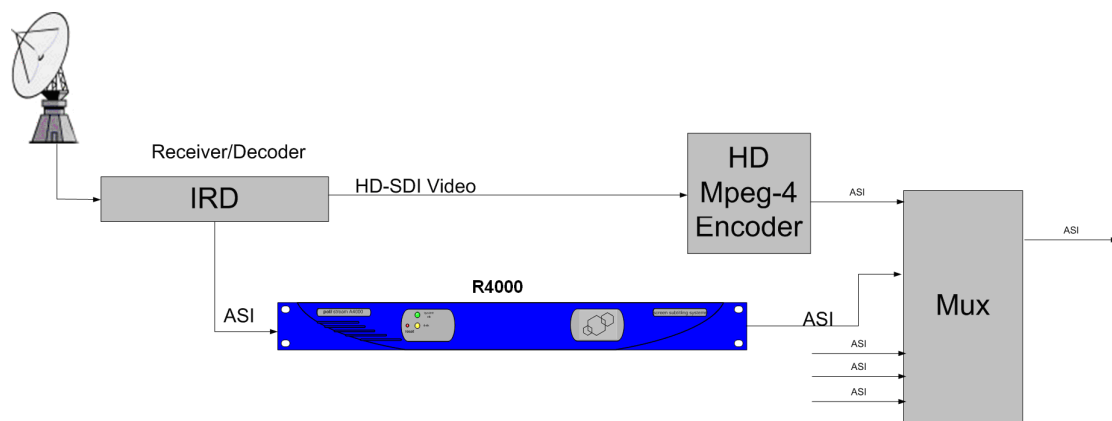


4. Closed Subtitles – with video format conversion.

Closed subtitles for a range of languages are supplied by the original broadcaster in a suitable format such as Teletext, DVB bitmap, Imitext or Line 21 (EIA 608) closed caption.

In this case the subtitles are delivered as closed subtitles and the viewer, with a suitable receiver or STB, can select which language subtitles they wish to see. This configuration applies when the video format needs to be converted (eg NTSC to PAL, HD to SD, Mpeg-2 to Mpeg-4) at the headend.

At each headend a professional receiver/decoder (IRD) decodes the video. Subtitle data is removed from the broadcast signal and then re-inserted into the recoded output (R4000). A delay is added to the subtitle stream to match the delay in the video path.



Advantages:

- **Subtitle format conversion available:**
 - Teletext to DVB
 - Imitext to DVB

Disadvantages:

- **Viewers must have suitable decoders.**
- **The video must be decoded and recoded:**
 - **Cost of equipment – especially for HD**
 - **Loss of video quality**
 - **Delay in the video path**



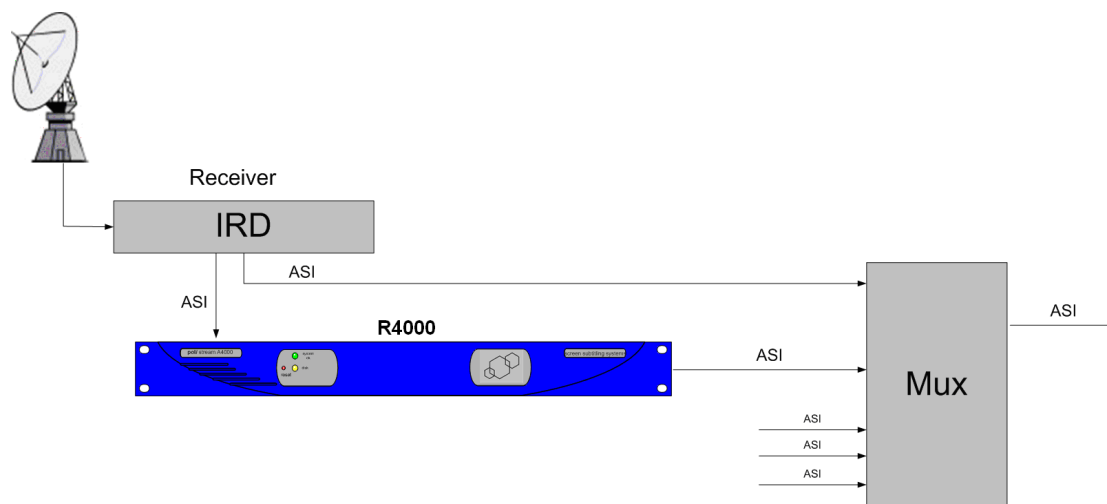
5. Closed Subtitles – with re-multiplexing and subtitle transcoding.

Closed subtitles for a range of languages are supplied by the original broadcaster in a suitable format such as Teletext, DVB bitmap, Imitext or Line 21 (EIA 608) closed captions.

In this case the subtitles are delivered as closed subtitles and the viewer, with a suitable receiver or STB, can select which language subtitles they wish to see. No video format conversion is required.

At each headend a professional receiver generates a transport stream (ASI) which is then re-multiplexed with other services to produce the required output multiplex(es).

If required, subtitle format conversion can be performed at this point (R4000):
For example to convert from Teletext to DVB Bitmapped subtitles. See the Subtitle Transcoding White Paper for more details.



Advantages:

- **Cost saving on decoders, encoders and multiplexes.**
- **The video signal is not decoded and stays in MPEG-2 format.**
- **Subtitle format conversion available:**
 - **Teletext to DVB**
 - **Imitext to DVB**
- **Lower cost.**

Disadvantages:

- **Viewers must have suitable decoders.**



Delays and Content Control.

Where channels are rebroadcast there is often a requirement to delay the service or to exercise some degree of control over the content of the channel.

Where the video signal stays in the compressed domain as in points 3 and 5 (above) a delay can be added to the ASI transmission path.

Where the video signal is decoded to uncompressed video as in points 1, 2 and 4 (above) then any delay needs to be in the SDI (or HD-SDI) path, normally in a video server.

Once uncompressed video is available then content control can be added. This allows video editing, splices and insertions with relatively short pass through delays of only 30-60 minutes.

Screen Subtitling Systems Ltd. can offer solutions for both delays and content control complete with subtitle support.