



# USER'S MANUAL

**S3C6400/6410**

**MP4 File Source Filter**

**June 30, 2008**

**REV 0.01**

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## **S3C6400/S3C6410 ARM1176JZF Application Processor MP4 File Source Filter User's Manual, Revision 0.01**

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Samsung Electronics Co., Ltd.

San #24 Nongseo-Dong, Giheung-Ku

Yongin-City Gyeonggi-Do, Korea

449-900

TEL: (82)-(331)-209-0527

FAX: (82)-(331)-209-0837

Home-Page URL: [Http://www.samsung.com/](http://www.samsung.com/)

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# 1 Introduction

## 1.1 Purpose

This document is prepared for the purpose of describing the mp4 file source filter. It is based on the mp4 parser library in 'mpeg4-ip-1.5.0.1' and modified here for building under WinCE environment.

## 1.2 Scope

The scope of this document is to describe

- Brief description of the mp4 file
- Functional specification and pin types
- Registry file

## 1.3 Intended Audience

Intended Audience	Tick whenever Applicable
Project Manager	Yes
Project Leader	Yes
Project Team Member	Yes
Test Engineer	Yes

## 1.4 Definitions, Acronyms, and Abbreviations

Abbreviations	Description
API	Application Program Interface

## 1.5 References

Number	Reference	Description
1	ISO/IEC 14496-12	ISO base media file format
2	ISO/IEC 14496-14	MP4 file format
3	ISO/IEC 14496-15	Advanced Video Coding (AVC) file format
4	QuickTime File Format Specification	QuickTime File Format Specification
5	mpeg4ip-1.5.0.1	





## 2 mp4 file

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### 2.1 Overview

The MP4 library provides an API to create and modify mp4 files as defined by ISO-IEC:14496-1:2001 MPEG-4 Systems. This file format is derived from Apple's QuickTime file format that has been used as a multimedia file format in a variety of platforms and applications. It is a very powerful and extensible format that can accommodate practically any type of media.

The basic structure of an mp4 file is that the file is a container for one or more tracks. These tracks contain one type of media, such as audio or video. Each track has its own timeline, samples, and properties. An example of a sample is a frame of video. The file describes how to synchronize the timelines of the tracks and the aggregate properties of the tracks.

The MP4 library is focused on providing an easy to use API for the mp4 file format. It has been used with an encoder, a server, a player, and a number of mp4 utilities. However, it may not be adequate for multimedia editors that wish to work directly with mp4 files. It can be used by these type of tools to export an mp4 file. (The library is open source so contributions of extensions to the library are welcome.)

In providing an easy to use API not all the information in the mp4 file is directly exposed via the API. To accommodate applications that need access to information not otherwise available via the API there are file and track level generic get and set property routines that use arbitrary string property names. To use these routines you will need to be familiar with the mp4 file specification or be willing to wade thru the output of `MP4Dump()` to determine what you want. See `MP4GetIntegerProperty()` for more details.

## 3 Functional Specifications

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### 3.1 File Types

The MP4 File Source Filter supports the ISO base media file format and its

- mp4 (ISO/IEC 14496-12, ISO/IEC 14496-14, ISO/IEC 14496-15)
- mov (Apple QuickTime File Format)
- 3g2

### 3.2 Codec Types

Category	Codec Types	
Video Codec	MPEG4	ISO/IEC 14496-14
	H.263	
	H.264	ISO/IEC 14496-15
Audio Codec	MPEG4 AAC	ISO/IEC 14496-14
	AMR-NB	

### 3.3 Functional Capabilities

#### 3.3.1 Video and Audio Contents Frame Extraction

The multimedia file container such as mp4, mov and 3g2 can contain media contents like video, audio, and some additional information like hinted track.

The MP4 file source filter extracts the media contents only. It supports video-only, audio-only and video/audio types. If the media is not a supported codec type, the filter output pin will not be created for that content.

#### 3.3.2 Seek

The output pins of the MP4 file source filter are inherited from CSourceSeeking.

## 4 MP4 File Source Filter

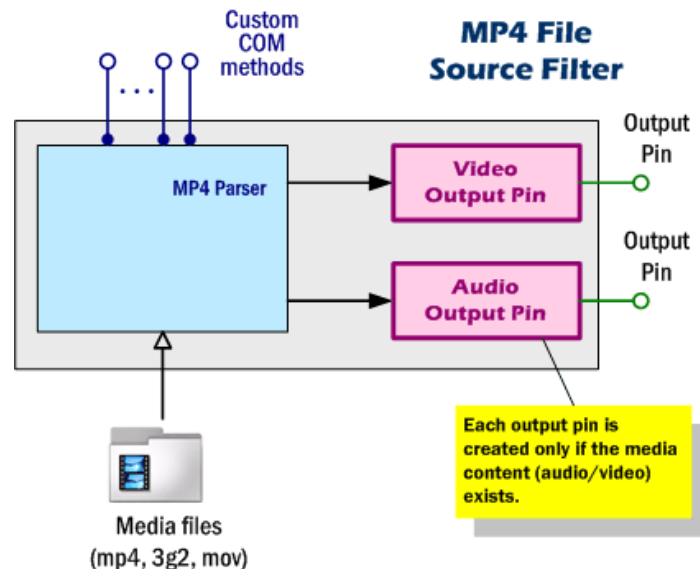


Fig. 4-1 MP4 File Source Filter Structure

The MP4 File Source Filter structure is shown in Fig. 4-1. It has the MP4 parser and two output pins for audio and video. Each output pin is created only if the media content (audio/video) exists and they are supported codec types.

The media file (mp4, 3g2, mov) is loaded and processed by MP4 parser. It extracts the playback information and fetches the media samples. The output pin delivers the media sample to the descending filter (which is usually decoder filter.)

### 4.1 MP4 Parser

Function	Description
Mp4 file loading and header processing	On creation with the media file name, the mp4 parser loads the media file and processes its headers. It keeps the playback information such as width/height, duration, frame rate.
Output pin creation	
Video stream information extraction	The video information in mp4 header is often wrong. The MP4 parser extracts the information directly from the video stream header.
Video/audio frame sample extraction	On request from the output pin, it extracts the video/audio frame sample and copies it to the output pin buffer.

Table 4-1 MP4 Parser Functions

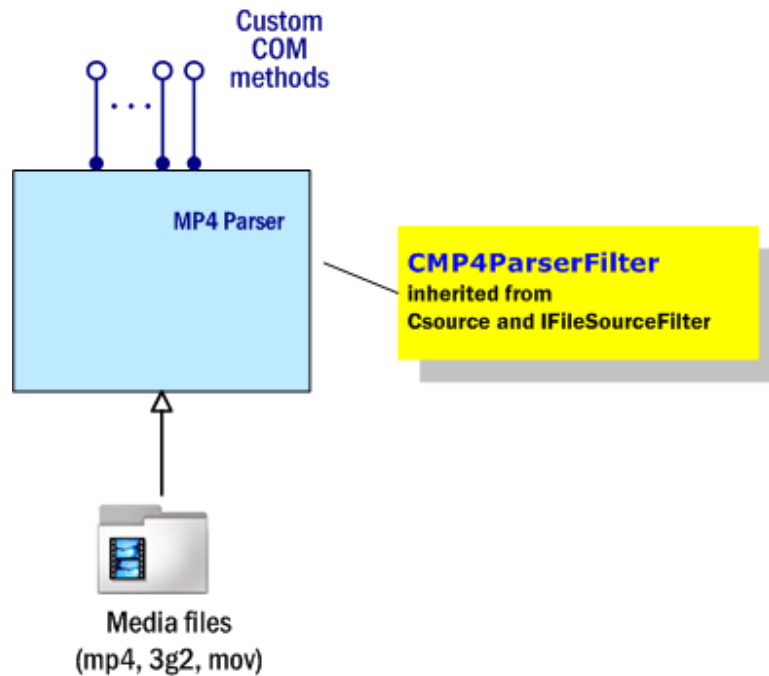


Fig. 4-2 MP4 parser class (CMP4ParserFilter)

The CMP4ParserFilter class implementing the MP4 file source filter is inherited from CSource class and IFileSourceFilter interface.

## 4.2 Video and Audio Output Pins

Function	Description
Media sample delivery	The output pin's <code>FillBuffer</code> function is called back by the filter graph manager. Inside that function, the media sample at an indicated time is copied from the MP4 parser and delivered to the descending filter. The sample time is stamped on the media sample.

Table 4-2 Video and Audio Output Pin Functions

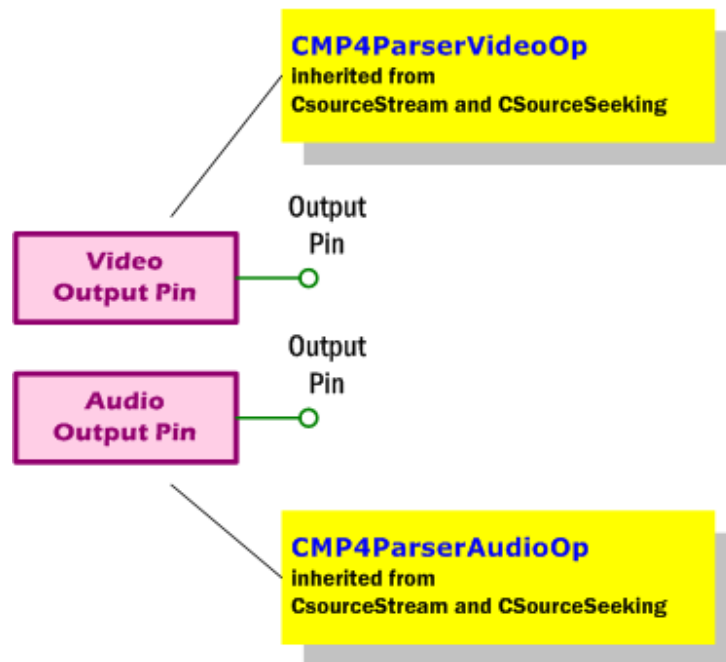


Fig. 4-3 Video and Audio Output pin class (CMP4ParserVideoOp, CMP4ParserAudioOp)

The CMP4ParserVideoOp and CMP4ParserAudioOp classes implementing the DirectShow output pin are inherited from CSourceStream and CSourceSeeking classes.

## 5 CLSIDs

### 5.1 CLSIDs of MP4 File Source Filter

Name	GUID	Defined in
CLSID_SSAP_MP4Parser_Filter	{1a821b27-d2f4-4e22-9496-3c7d0f612ec0}	SsapMp4Parser.h

### 5.2 CLSIDs of Pin Media Types

	Name	GUID	Defined in
MEDIATYPE	Stream	{e436eb83-524f-11ce-9f53-0020af0ba770}	uuids.h
MEDIASUBTYPE	m4v	{59fcbec7-524f-11ce-9f53-0020af0ba770}	SsapMp4Parser.h
	h263	Same as m4v	SsapMp4Parser.h
	h264raw	{7807c3af-524f-11ce-9f53-0020af0ba770}	SsapMp4Parser.h

	Name	GUID	Defined in
MEDIATYPE	Audio	{e436eb83-524f-11ce-9f53-0020af0ba770}	uuids.h
MEDIASUBTYPE	EAACPLUS	{7f7aa702-7343-49d0-a550-8°0cd7cbde23}	SsapMp4Parser.h
	AmrDec	{4c7012d9-2e06-4306-8cb0-39996b99f09b}	SsapMp4Parser.h

#### 5.2.1 Video Stream Delivery

The video stream is delivered in the format shown in Fig. 5-1. Each sample is extracted from the 'mdat' atom field and delivered to the ascending filter (generally decoder filter.) Only the first sample (sample ID=1) is merged with stream header. Stream header is VOS(Video Object Sequence)/VO(Video Object)/VOL(Video Object Layer)/UserData for MPEG4. Since the h.263 does not have the stream header, the first sample is delivered without merge. The stream header of h.264 is SPS/PPS. When the h.264 stream is contained in mp4 file, each sample has starting four octets indicating the length of the sample. The MP4 file source filter modifies the length octets to h.264 delimiter (00 00

00 01) Please note that the mpeg4 stream contained in mp4 file already has its samples start with mpeg4 delimiter (00 00 01) not the length octets.

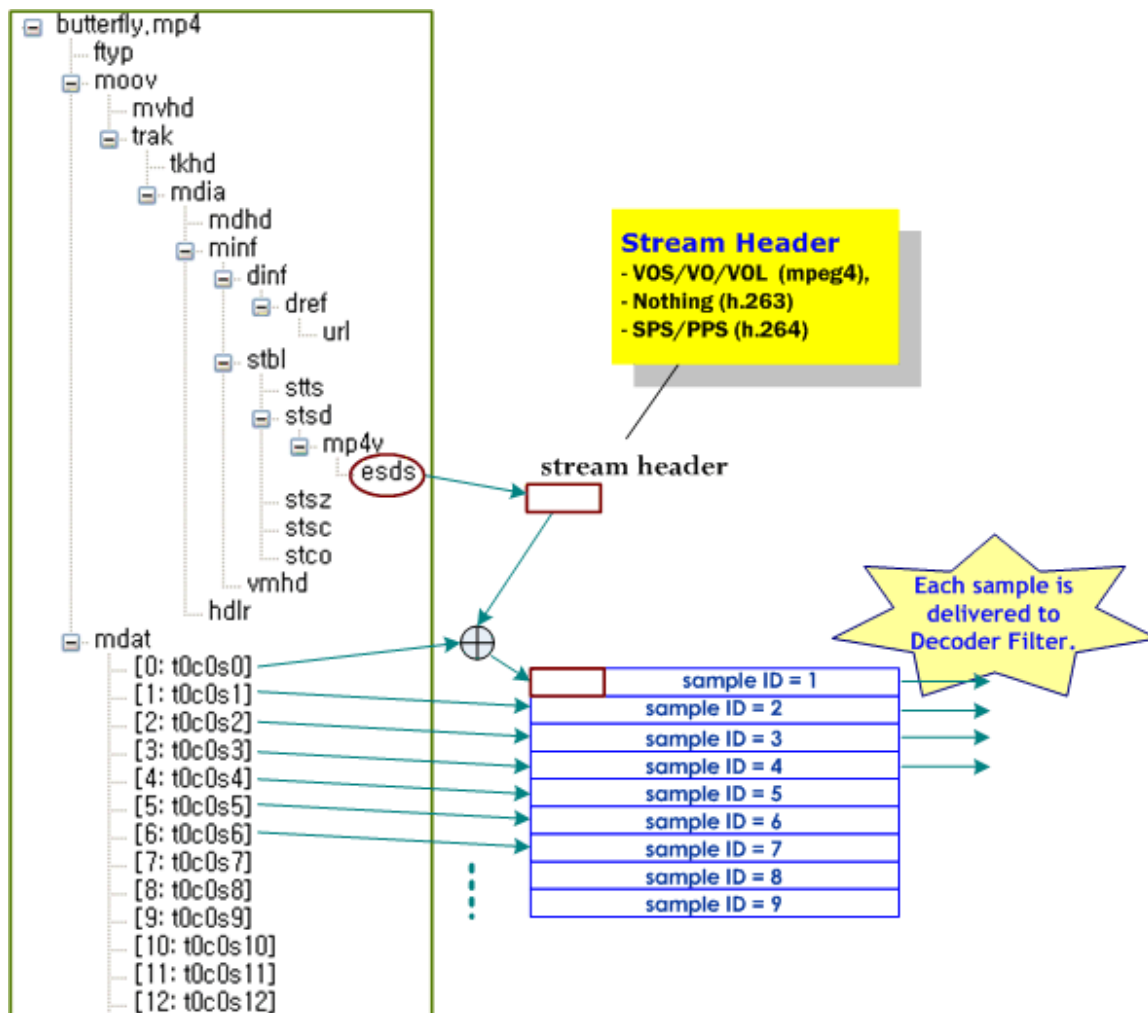


Fig. 5-1 Video Stream Delivery Format

## 5.2.2 Audio Stream Delivery

The audio stream is delivered in the format shown in Fig. 5-2. Each sample is extracted from the 'mdat' atom field and delivered to the ascending filter (generally decoder filter.) The audio description data is delivered through MediaType structure that is separate from the samples. In case of MPEG4-AAC, the audio description data is two byte octets. It contains 'audio\_object\_type', 'sampling\_freq\_index', 'channel\_configuration'. AMR-NB description data is also two byte octets which is mode set.

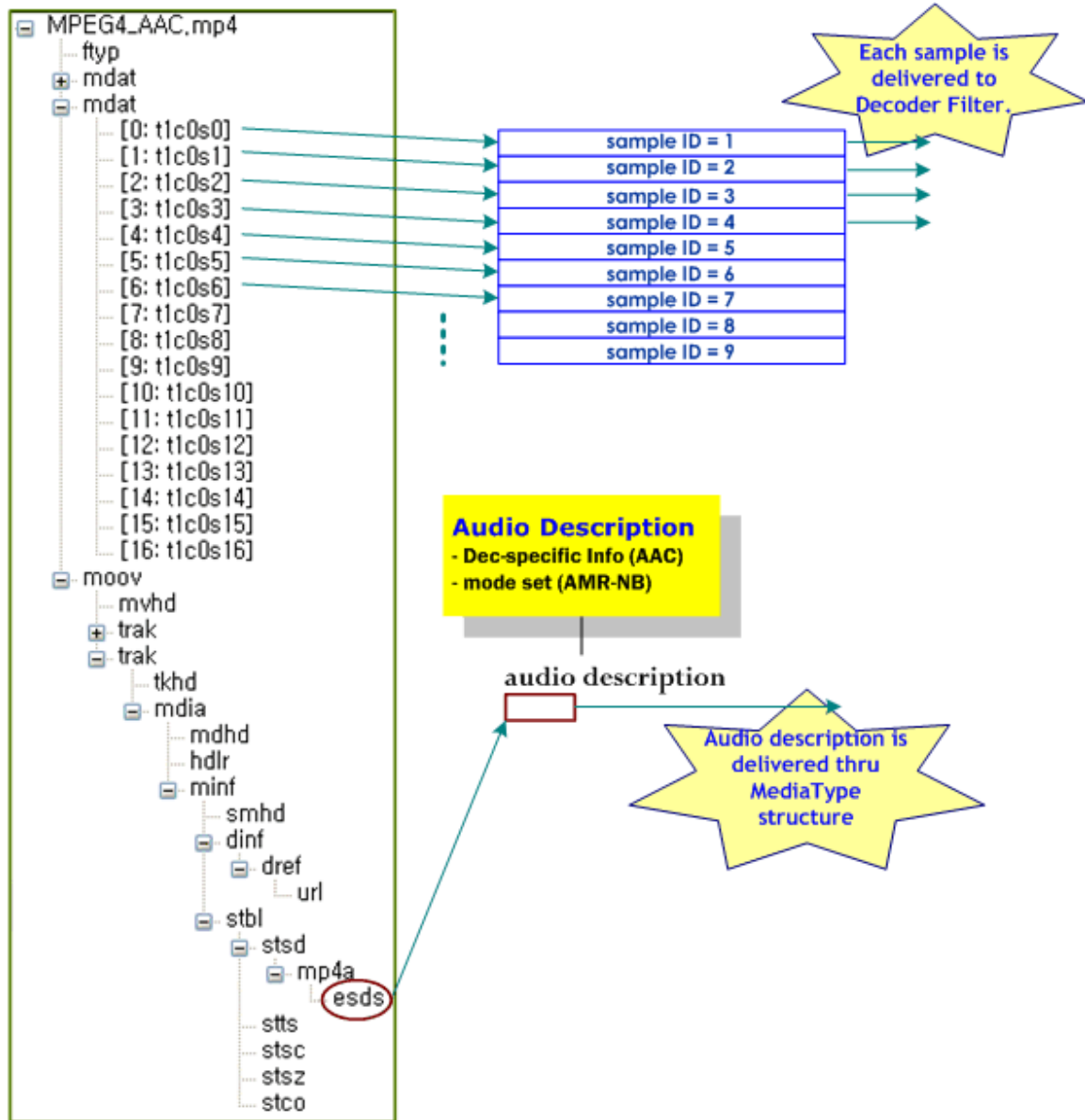


Fig. 5-2 Audio Stream Delivery Format



## 6 DirectShow Filter Installation

### 6.1 MP4 File Source Filter Registry Setting

#### Registry file

```
;-----SsapMp4Parser Filter-----
[HKEY_CLASSES_ROOT\Filter\{1A821B27-D2F4-4e22-9496-3C7D0F612EC0}]
    @="MP4 File Parser"

[HKEY_CLASSES_ROOT\CLSID\{1A821B27-D2F4-4e22-9496-3C7D0F612EC0}]
    @="MP4 File Parser"
    "Merit"=dword:00200000

[HKEY_CLASSES_ROOT\CLSID\{1A821B27-D2F4-4e22-9496-3C7D0F612EC0}\InprocServer32]
    @="SsapMp4Parser.dll"
    "ThreadingModel"="Both"

[HKEY_CLASSES_ROOT\CLSID\{1A821B27-D2F4-4e22-9496-3C7D0F612EC0}\Pins]

[HKEY_CLASSES_ROOT\CLSID\{1A821B27-D2F4-4e22-9496-3C7D0F612EC0}\Pins\Output]
    "Direction"=dword:00000001
    "IsRendered"=dword:00000000
    "AllowedZero"=dword:00000000
    "AllowedMany"=dword:00000000
    "ConnectsToPin"="Input"

[HKEY_CLASSES_ROOT\CLSID\{1A821B27-D2F4-4e22-9496-3C7D0F612EC0}\Pins\Output\Types]
[HKEY_CLASSES_ROOT\CLSID\{1A821B27-D2F4-4e22-9496-3C7D0F612EC0}\Pins\Output\Types\{e436eb83-524f-11ce-9f53-0020af0ba770}]
[HKEY_CLASSES_ROOT\CLSID\{1A821B27-D2F4-4e22-9496-3C7D0F612EC0}\Pins\Output\Types\{e436eb83-524f-11ce-9f53-0020af0ba770}\{59fcbec7-524f-11ce-9f53-0020af0ba770}]
[HKEY_CLASSES_ROOT\CLSID\{1A821B27-D2F4-4e22-9496-3C7D0F612EC0}\Pins\Output\Types\{e436eb83-524f-11ce-9f53-0020af0ba770}\{7807c3af-524f-11ce-9f53-0020af0ba770}]
```