

SOUNDCODE WATERMARKING

Introduction

Cifrasoft SoundCode is an acoustic watermarking solution which allows embedding imperceptible digital information (codes) into audio content or audio track of video content.

Cifrasoft SoundCode watermarking solution is suitable for number of applications, including, but not limited to:

- Automatic content recognition (ACR) for “Second screen”, gaming, and loyalty applications, which require synchronization between a piece of content and mobile app
- Media assets tracking and piracy prevention
- TV or radio audience measurements

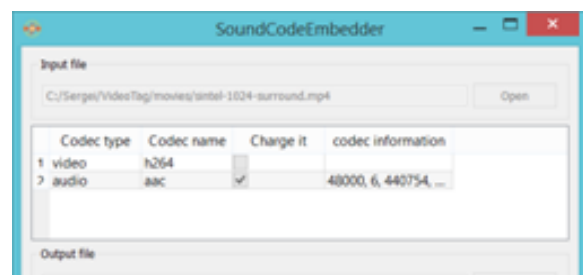
Cifrasoft SoundCode watermarks can survive typical distortions that arise in analogue or digital TV broadcast chain, various types of lossy audio compression or transcoding, and over-the-air acoustic channel distortions.

SoundCode Solution Overview

Cifrasoft SoundCode watermarking solution consists of software or hardware watermark embedders and SDKs for developing mobile, desktop or web applications with watermark decoding functionality.

There are two ways to insert SoundCode acoustic watermarks into audio or video content:

- Embed acoustic watermarks in pre-recorded audio or video files using Cifrasoft SoundCode software embedder tool.
- Embed acoustic watermarks in real-time audio- or video-stream using SDI or AES/EBU real-time hardware embedder.



Cifrasoft SoundCode Software Embedder

Cifrasoft SoundCode software watermark embedder is a simple to use software tool for embedding imperceptible acoustic watermarks into audio or video files. The watermark information that is embedded may be static and simply be the content ID, or it can have dynamic elements such as a counter field indicating the time of transmission or a location within a program.

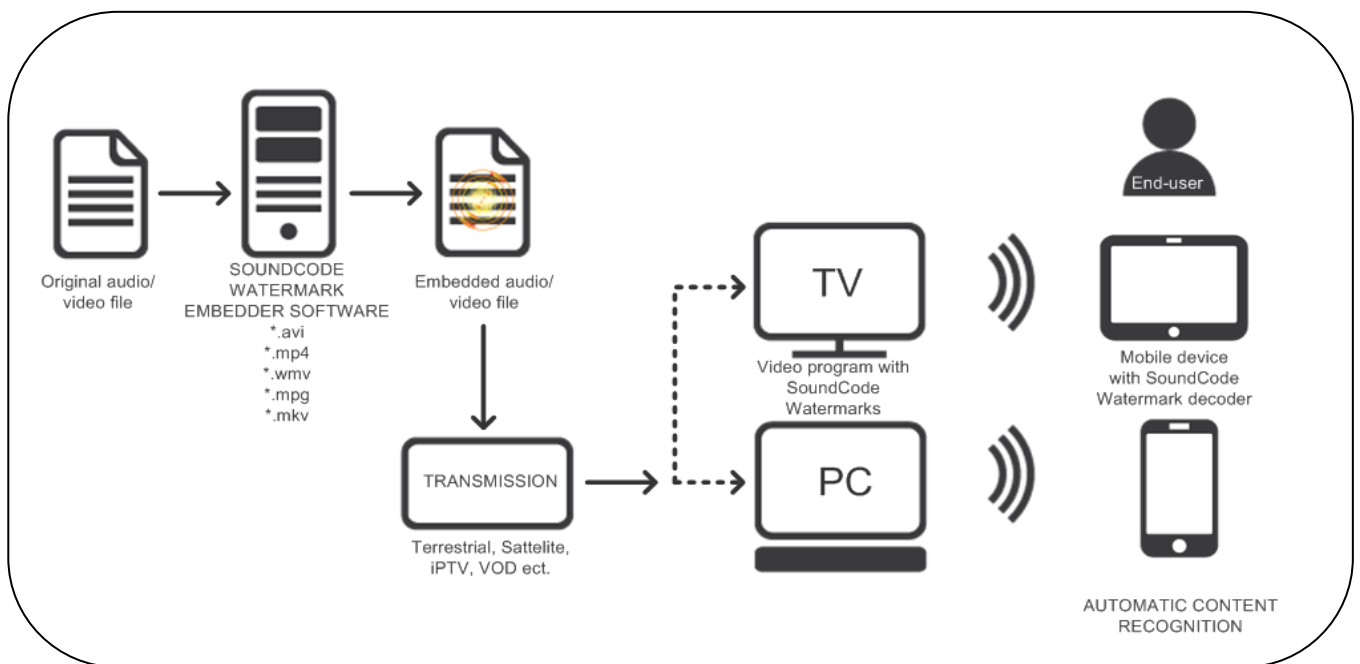


Fig. 1. Off-line SoundCode watermark embedding workflow

SoundCode Software Embedder

Software Embedder is available as GUI-based Windows 7/8/10 tool or as command-line utility for Windows/Linux/Mac OS. It supports multiple audio and video codecs and file containers, such as MP2, MP3, MPG, AVI, AAC, OGG, MP4, WAV including multichannel audio. It also provides an option to trade-off audio distortion imperceptibility level and watermark detection robustness.

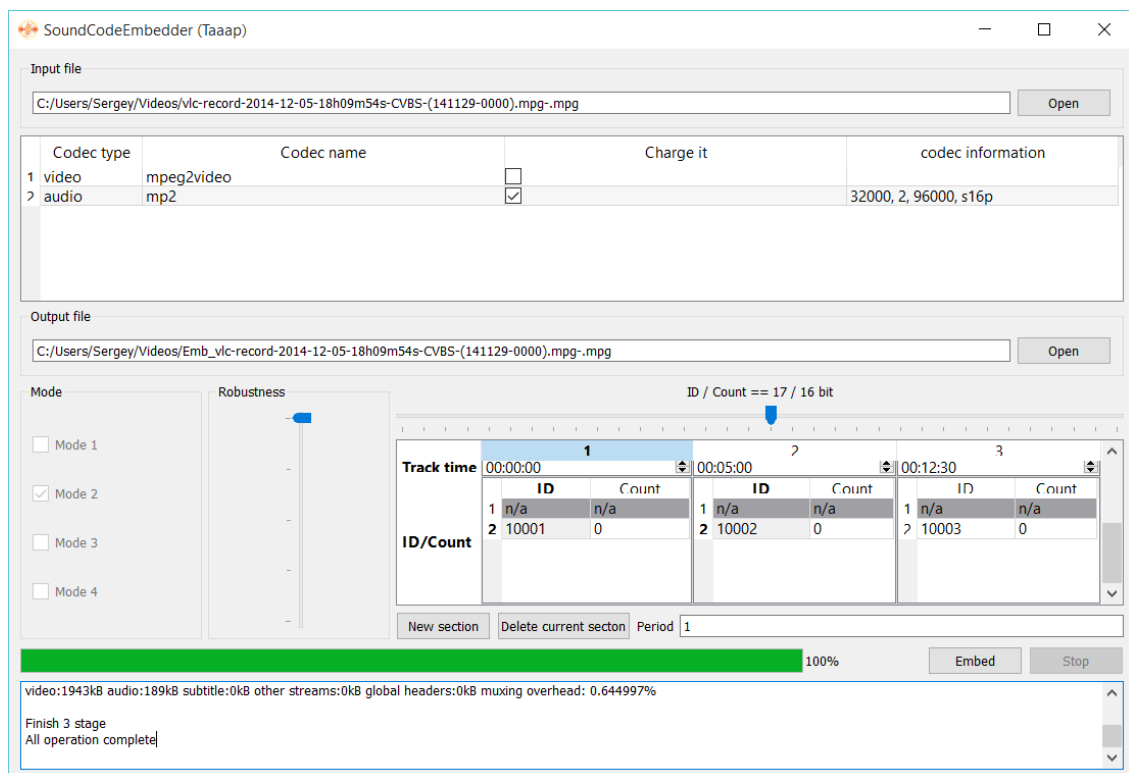


Fig. 2. GUI version of watermark embedder

Real-time Watermark Embedder

Cifrasoft SoundCode Embedder CS-001/AES is a hardware solution which allows embedding imperceptible SoundCode watermarks into real-time digital audio stream via AES/EBU interface.

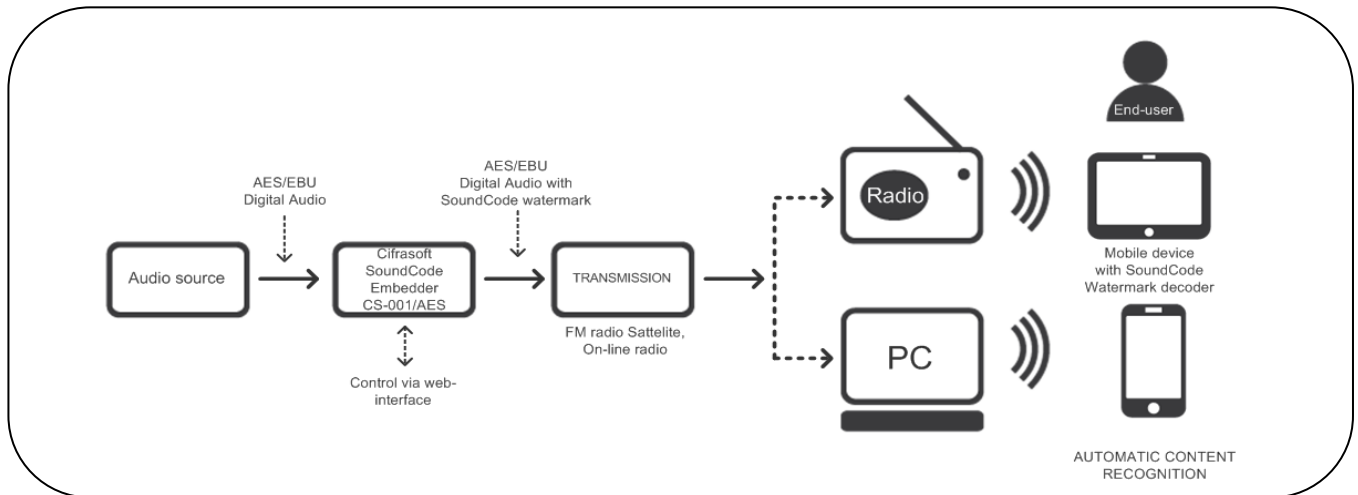


Fig. 3. Real-time SoundCode watermark embedding workflow for audio broadcasting

Embedder CS-001/AES can also be used in combination with third-party AES embedder/ disembedder to provide real-time watermark embedding into digital video stream via SDI or HD-SDI interface.

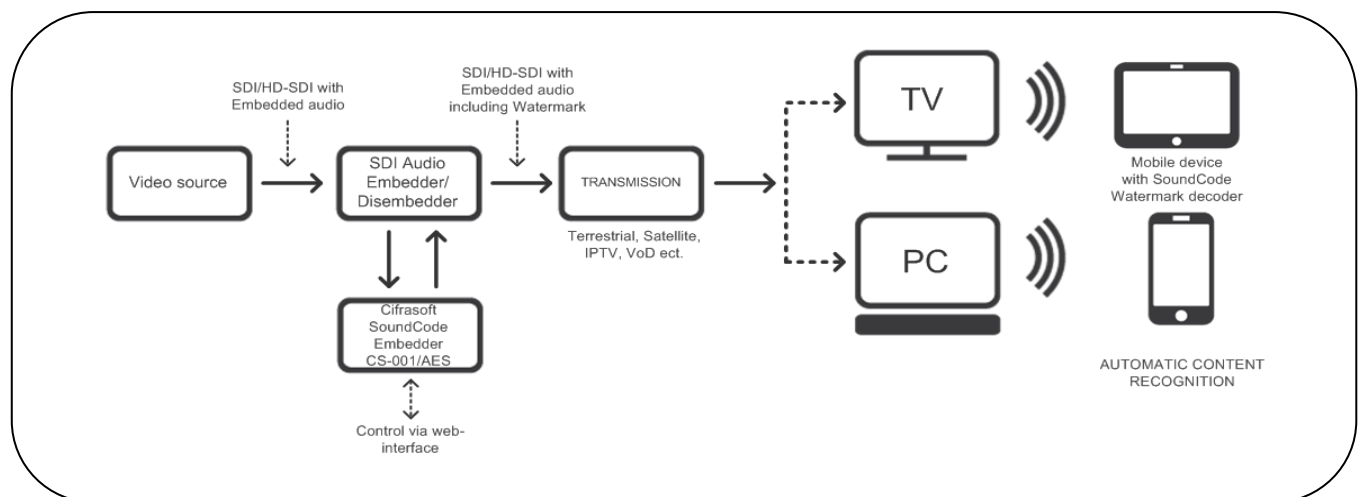
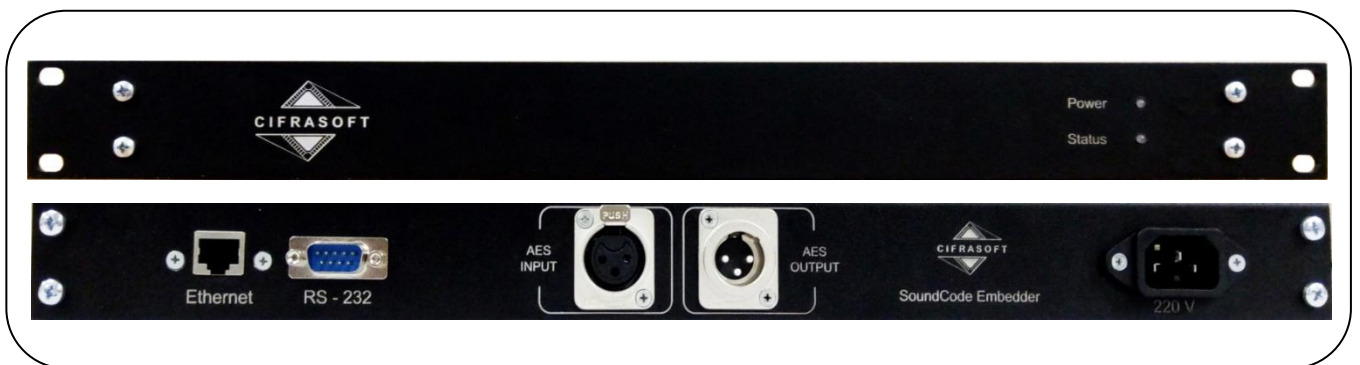


Fig. 4. Real-time SoundCode watermark embedding workflow for video broadcasting

Real-time Watermark Embedder Features

SoundCode Embedder CS-001/AES offers:

- Dual channel (stereo) watermark embedding
- AES/EBU input and output interfaces
- Ethernet connection for remote control via IP
- Compact rack-mountable 1U casing



Time

System time: Sat Sep 24 10:35:04 UTC 2016
RTC time: Sat Sep 24 10:35:05 2016 -0.570061 seconds

Network settings

8.8.8.8

ip: 192.168.67.97
mask: 255.255.255.0
gateway: 192.168.67.1

Soundcode settings

sync channel settings

samplerate: 44100

Channel 0 state (left)	Channel 1 (right):
ON <input type="checkbox"/>	ON <input type="checkbox"/>
Auto ON <input checked="" type="checkbox"/>	Auto ON <input checked="" type="checkbox"/>

Channel 0 settings	Channel 1 settings
ID: 97	ID: 97
ID length: 23	ID length: 23
Robust: 5	Robust: 5

Settings

Fig. 5. SoundCode Embedder CS-001/AES and its control web-interface

SoundCode Mobile SDKs

Cifrasoft SoundCode mobile SDK allows developers to quickly build mobile applications that identify tagged audio-visual content in real-time without interaction with server back-end. SoundCode mobile SDK offers:

- iOS and Android libraries for SoundCode watermark decoding
- API documentation
- Source code of demo applications

In addition, an optional Framework Application can be used to build simple SecondScreen and companion apps without native coding.



Technical specifications

General features

- Robust performance in noise
- Fast recognition time: (2-4 sec)
- Watermark payload: 33bit
- Payload update rate: every 6 seconds
- Watermark tracking accuracy: up to ± 0.5 sec
- Survives typical distortions that arise in TV/radio broadcast chain
- Typical operating distance between sound source and mobile device in over-the-air channel: 5-8 meters
- Feature and parameter customization available upon request

Software Embedder features

- Windows XP/7/8/10 GUI application or Windows/Linux/Mac OS console utility
- Supports multiple audio and video codecs and file formats: MP2, MP3, MPG, AVI, AAC, OGG, MP4, WAV, MKV
- Supports files with multichannel audio tracks
- Processing speed: 15x – 50x faster than real-time

Real-time Embedder features

- Audio interface: AES/EBU (stereo)
- Processing delay: 40ms
- Can be used for SDI/HD-SDI via external third-party AES/EBU embedder/disembedder
- Management interface: web-based control panel through IP interface
- Monitoring: SNMP
- Dimensions: 425x360x44mm

For more information on ACR products see:
www.cifrasoft.com/secondscreen