



# Fiberwaves IP CORRELATOR

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*This is an "All In One" powerful IP solution including:*  
Playout, Broadcasting, Transcoding, LOGO  
Insertor, Subtitling Insertion, Mosaic  
Monitoring, MPTS to SPTS demux

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## Main Features

Fiberwaves IP Correlator Solution is a complete Digital video production solution .The solution is based on client-server architecture which provides stability and usability advantages.

It allows for optimum CPU balancing using today's multi-core systems. the server controls all outputs and data access while the client manages the playlist, visibility ,and dynamic switching .

The Solution provide the following key features :

### Playout and broadcasting features:

The solution allow creating and configuring new channels. The client can easily add and schedule movies for each created channels. The media files are verified by the client application before being accepted for playout . The playout solution provides an easy and flexible interface for creating new schedules and importing and exporting schedules. The broadcaster then broadcast all assigned schedules to the configured UDP IP.

The playout solution has a very powerful way to link to the Transcoding and logo insertion solution which acts as an input client by broadcasting UDP streams which are then used by the transcoding solution for logo insertion and bitrate or codec configuration .

### Transcoding features

The transcoding solution is a separate solution which can take input stream from the broadcaster or any stream injector. The input stream could be Multiple program stream or Single program stream .The output transcoding stream is always a single program UDP stream .The transcoding solution allow changing codec (the supported codec are mpg2video and H264) ,bitrates ,resolution and aspect ratio of the input stream. The output video could have SD, HD, or Full HD resolution.

### Logo Insertion features

The solution allow the client to add text and images as an overlay on a UDP video stream. The solution provide an easy way to create separate subtitles for each UDP input and configure those subtitles. by being able to configure color, font ,scale ,border



,position , background and scroll options, The user will feel comfortable designing logos.

when the user add the logo to his playlist the logo is automatically inserted on the video stream ,there is no need to restart any stream .this is due to the event handling between client and server.

The solution also provide another type of logo insertion which is known as pid insertion.the user can add subtitle stream on his program by selecting the subtitle file to add and a new subtitle stream will be added to the program stream .This feature is useful for movie translation .the solution allow adding multiple subtitle file to the same movie.

#### **MPTS to SPTS features**

The solution takes multiple program stream and transform it to single program stream by specifying for each program a new UDP IP. This feature is achieved without encoding the input stream. The user can choose to start and stop the output streams independently .

#### **Mosaic and supervision features**

The solution allow monitoring output UDP streams by playing outputs in real time. this is known as Mosaic view. The user can configure different mosaic groups ,and can also choose which group to monitor .

#### **Detailed features**

The solution is mainly classified into two solutions which works independently or together depending on the needs, The "Playout and broadcasting solution" and the "Transcoding and Logo insertion solution" .

#### **The Playout and the broadcasting solution**

The solution provides all key feature for creating and configuring new services,schedule manipulation ,and broadcasting based on assigned schedules .

The below use cases show briefly what can be done in this solution.

## Creating and configuring services

The System manager user interface is a GUI interface which allow the user to do the following:

- view the list of created services: The user can view the list of all created services and can click on a service to view its details configuration as seen in the screen shot below

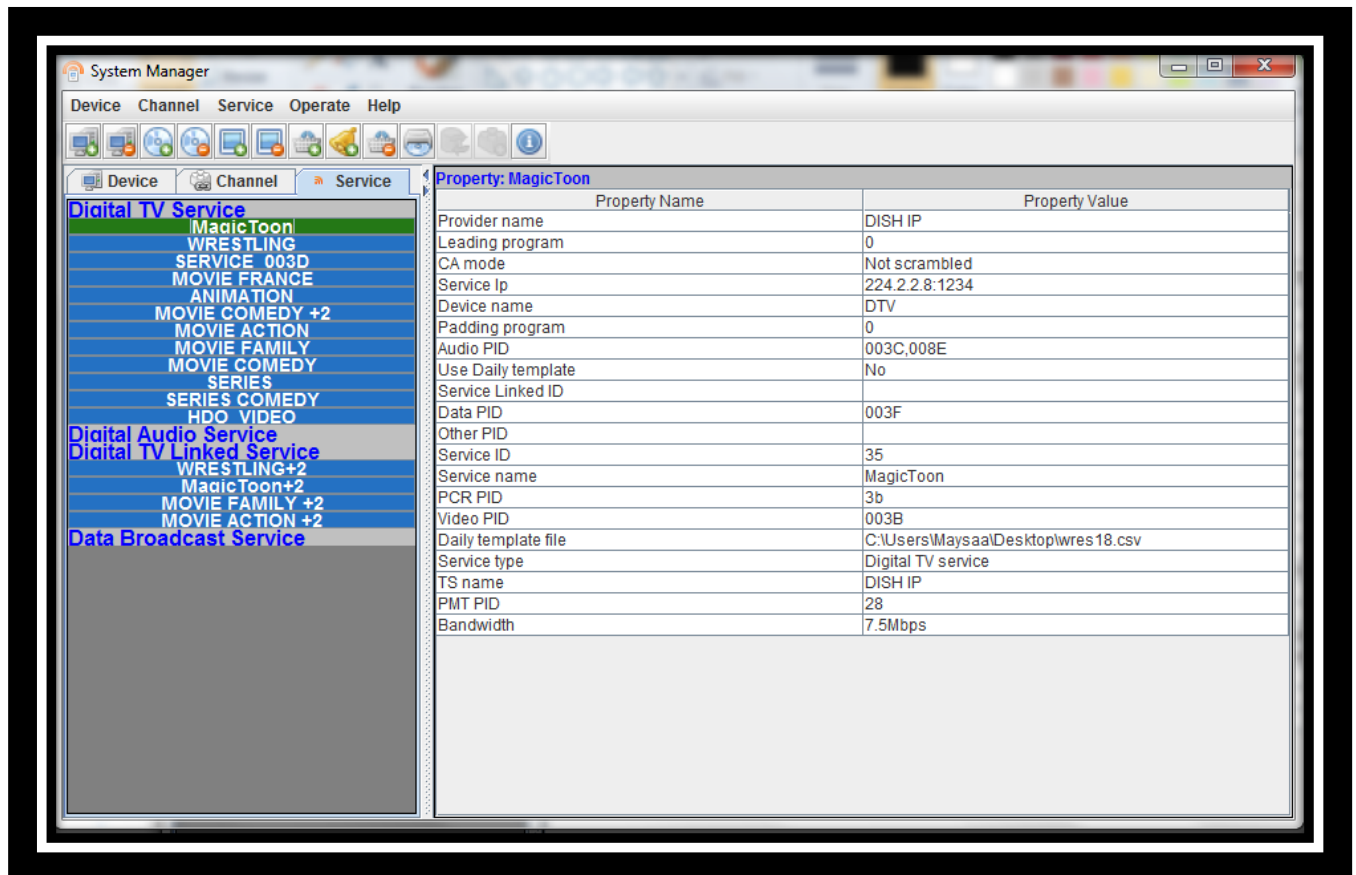
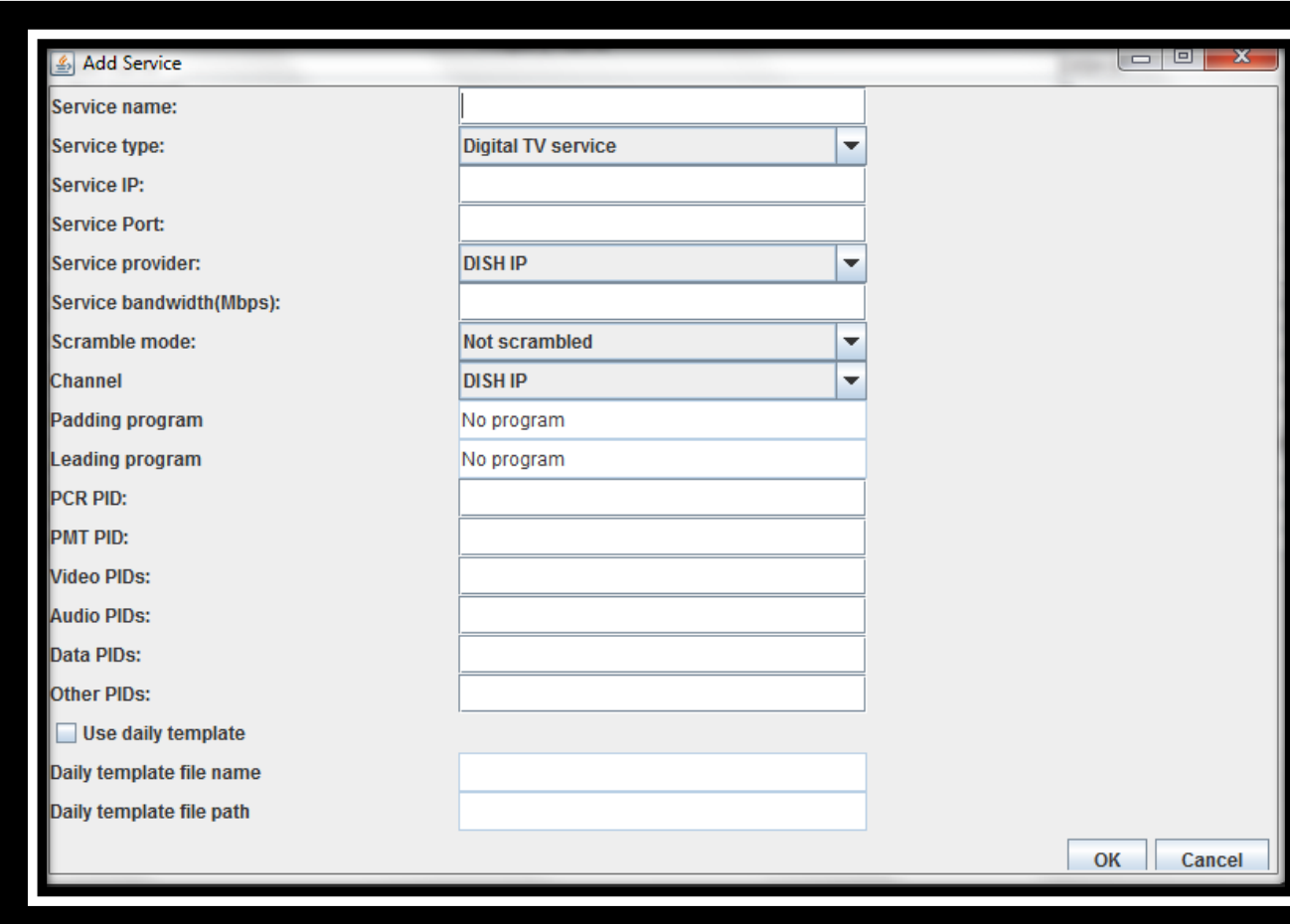


Figure 1 :Services

- Create new service : the user can choose to create new service by entering the service configuration parameters like UDP IP,video PID,audio PID,etc.To do so the user can click on service menu and then add new service .A new window appears allowing the user to configure the new service



The 'Add Service' dialog box contains the following fields and options:

- Service name: [Empty text box]
- Service type: Digital TV service (dropdown menu)
- Service IP: [Empty text box]
- Service Port: [Empty text box]
- Service provider: DISH IP (dropdown menu)
- Service bandwidth(Mbps): [Empty text box]
- Scramble mode: Not scrambled (dropdown menu)
- Channel: DISH IP (dropdown menu)
- Padding program: No program
- Leading program: No program
- PCR PID: [Empty text box]
- PMT PID: [Empty text box]
- Video PIDs: [Empty text box]
- Audio PIDs: [Empty text box]
- Data PIDs: [Empty text box]
- Other PIDs: [Empty text box]
- Use daily template
- Daily template file name: [Empty text box]
- Daily template file path: [Empty text box]

Buttons: OK, Cancel

Figure 2 :Add Service

- Create linked service: a linked service is a service which is linked to another service but with a constant time difference ,therefore the linked service has same schedule as the original service but with shifted time . to create a linked service the user click on service menu then new linked service .In the new window which appear the user has to specify the original service and the time constant.

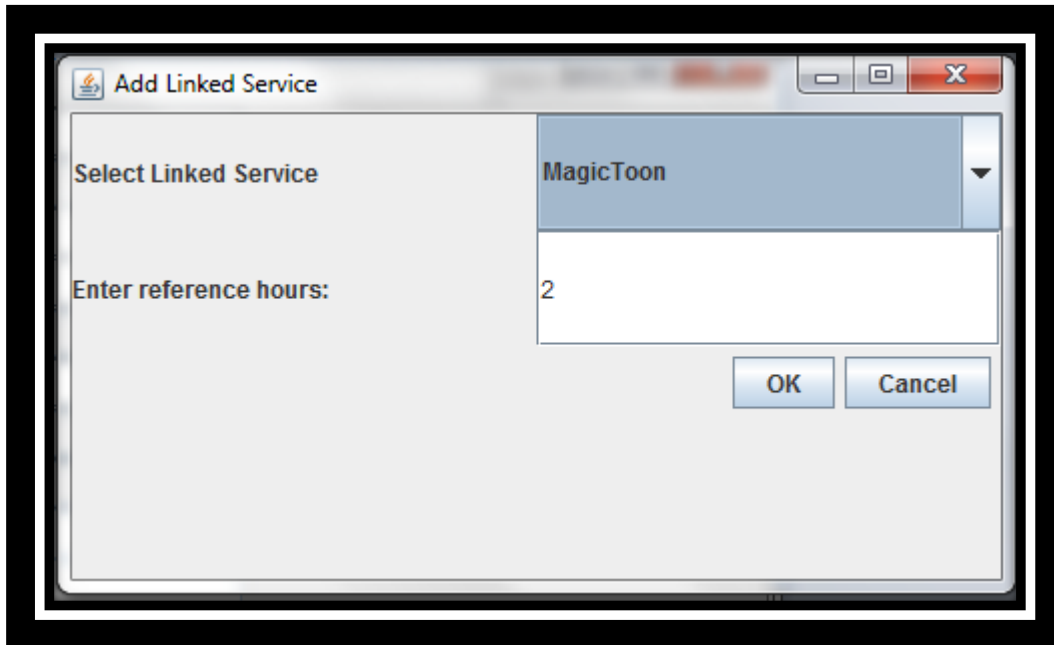


Figure 3 :Add Linked Service

### Movie Program manipulation

The Program manager is a user interface which allow adding, deleting ,and classifying movies .The movie has to be added in the system before being scheduled.

The movie or the program file format should be off type m2t,m2ts,or ts file.

The Program manager main functionality are listed below:

- View list of already inserted programs: The user can view all programs which are already inserted ,inaddition he can search for program by name,content type,inserted date,or by duration.



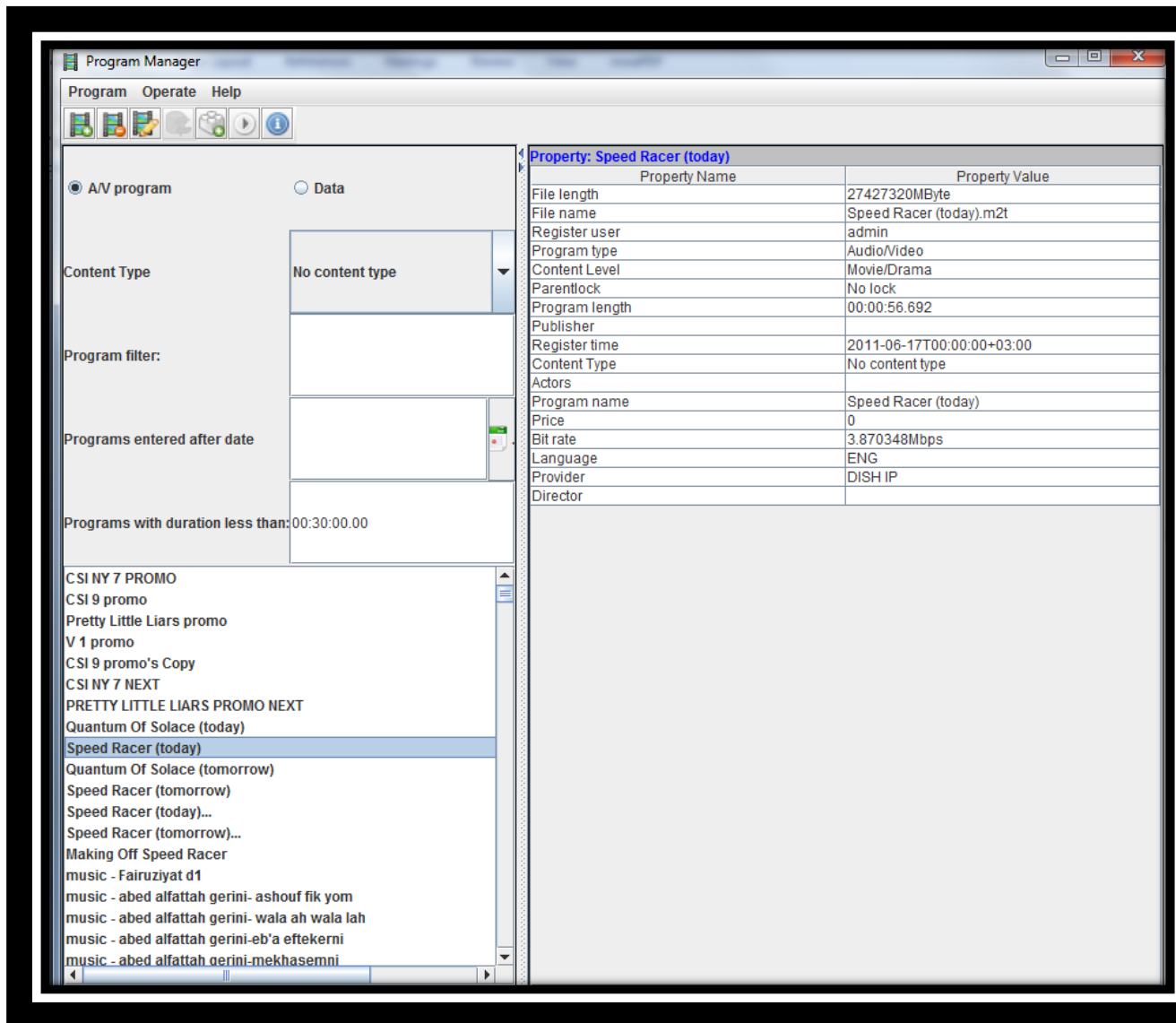
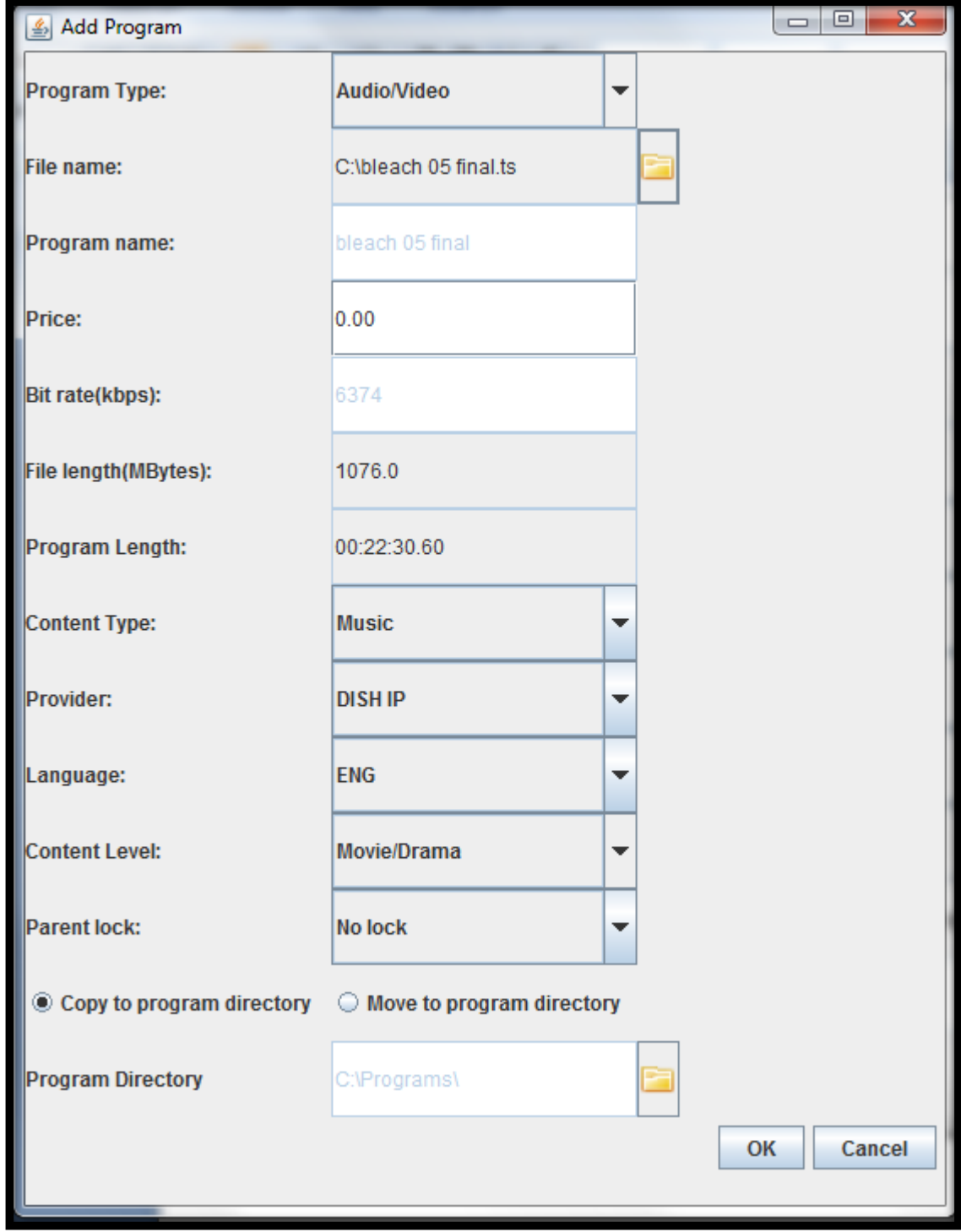


Figure 4 :Programs

- Add new program: the user can insert new movie program to the system by clicking on program menu then add program. after entering the movie file path the system directly shows the movie duration and bitrate.



The 'Add Program' dialog box contains the following fields and options:

Program Type:	Audio/Video
File name:	C:\bleach 05 final.ts
Program name:	bleach 05 final
Price:	0.00
Bit rate(kbps):	6374
File length(MBytes):	1076.0
Program Length:	00:22:30.60
Content Type:	Music
Provider:	DISH IP
Language:	ENG
Content Level:	Movie/Drama
Parent lock:	No lock
<input checked="" type="radio"/> Copy to program directory <input type="radio"/> Move to program directory	
Program Directory	C:\Programs\

Buttons: OK, Cancel

Figure 5 :Add Program

- Modify or delete existing program

the user can select a program from the list then click in the program menu to choose to delete or modify existing program.

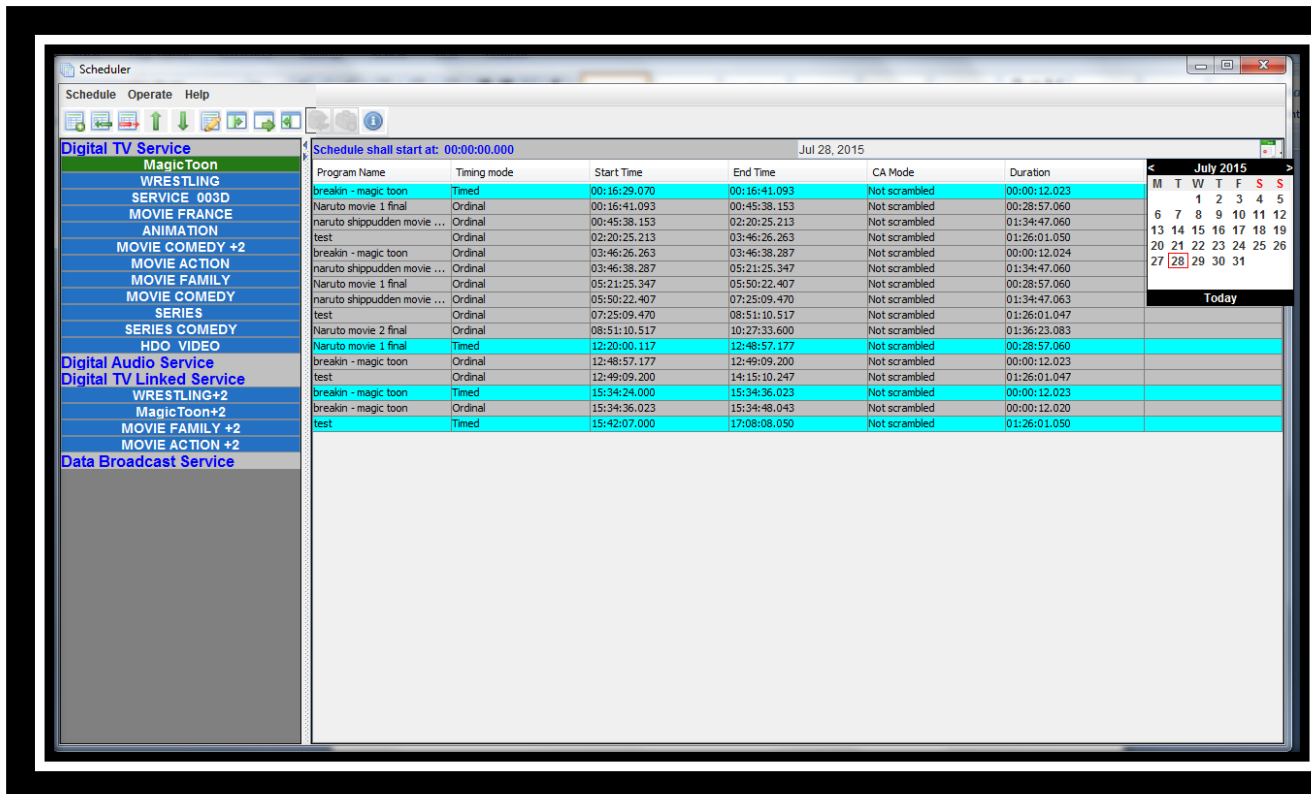
- Add subtitle file as PID to the program  
The user can select the program from the list then click on the add subtitle file in the operate menu ,then choose the subtitle file from the file browser.
- Playback: the user can play the program before being broadcasted by clicking on play icon in the toolbar after selecting the program to play.

## Schedule Management

The scheduler is a user interface which allow the user to create schedules for services for a given date .

below is a list o functionalities :

- View schedule for selected service and selected date: the user can select the a service and a date to view the schedule



The screenshot shows the Scheduler application window. The main area displays a table of scheduled programs for July 28, 2015. The table has columns for Program Name, Timing mode, Start Time, End Time, CA Mode, and Duration. The programs listed include 'breakin - magic toon', 'Naruto movie 1 final', 'naruto shippudden movie ...', 'test', and 'Naruto movie 2 final'. The left sidebar shows a tree view of services, with 'Digital TV Service' selected. A calendar for July 2015 is visible in the top right corner, with the 28th highlighted.

Program Name	Timing mode	Start Time	End Time	CA Mode	Duration
breakin - magic toon	Timed	00:16:29.070	00:16:41.093	Not scrambled	00:00:12.023
Naruto movie 1 final	Ordinal	00:16:41.093	00:45:38.153	Not scrambled	00:28:57.060
naruto shippudden movie ...	Ordinal	00:45:38.153	02:20:25.213	Not scrambled	01:34:47.060
test	Ordinal	02:20:25.213	03:46:26.263	Not scrambled	01:26:01.050
breakin - magic toon	Ordinal	03:46:26.263	03:46:38.287	Not scrambled	00:00:12.024
naruto shippudden movie ...	Ordinal	03:46:38.287	05:21:25.347	Not scrambled	01:34:47.060
Naruto movie 1 final	Ordinal	05:21:25.347	05:50:22.407	Not scrambled	00:28:57.060
naruto shippudden movie ...	Ordinal	05:50:22.407	07:25:09.470	Not scrambled	01:34:47.063
test	Ordinal	07:25:09.470	08:51:10.517	Not scrambled	01:26:01.047
Naruto movie 2 final	Ordinal	08:51:10.517	10:27:33.600	Not scrambled	01:36:23.083
Naruto movie 1 final	Timed	12:20:00.117	12:48:57.177	Not scrambled	00:28:57.060
breakin - magic toon	Ordinal	12:48:57.177	12:49:09.200	Not scrambled	00:00:12.023
test	Ordinal	12:49:09.200	14:15:10.247	Not scrambled	01:26:01.047
breakin - magic toon	Timed	15:34:24.000	15:34:36.023	Not scrambled	00:00:12.023
breakin - magic toon	Ordinal	15:34:36.023	15:34:48.043	Not scrambled	00:00:12.020
test	Timed	15:42:07.000	17:08:08.050	Not scrambled	01:26:01.050

Figure 6 :Schedule

- Add Program to schedule: The user can add program to schedule by selecting the program and entering the start date. to do so the user shall click on the add program from the schedule menu and fill in the required information in the new window which appears.  
note that when changing the start date the end date is automatically changed depending in the movie duration

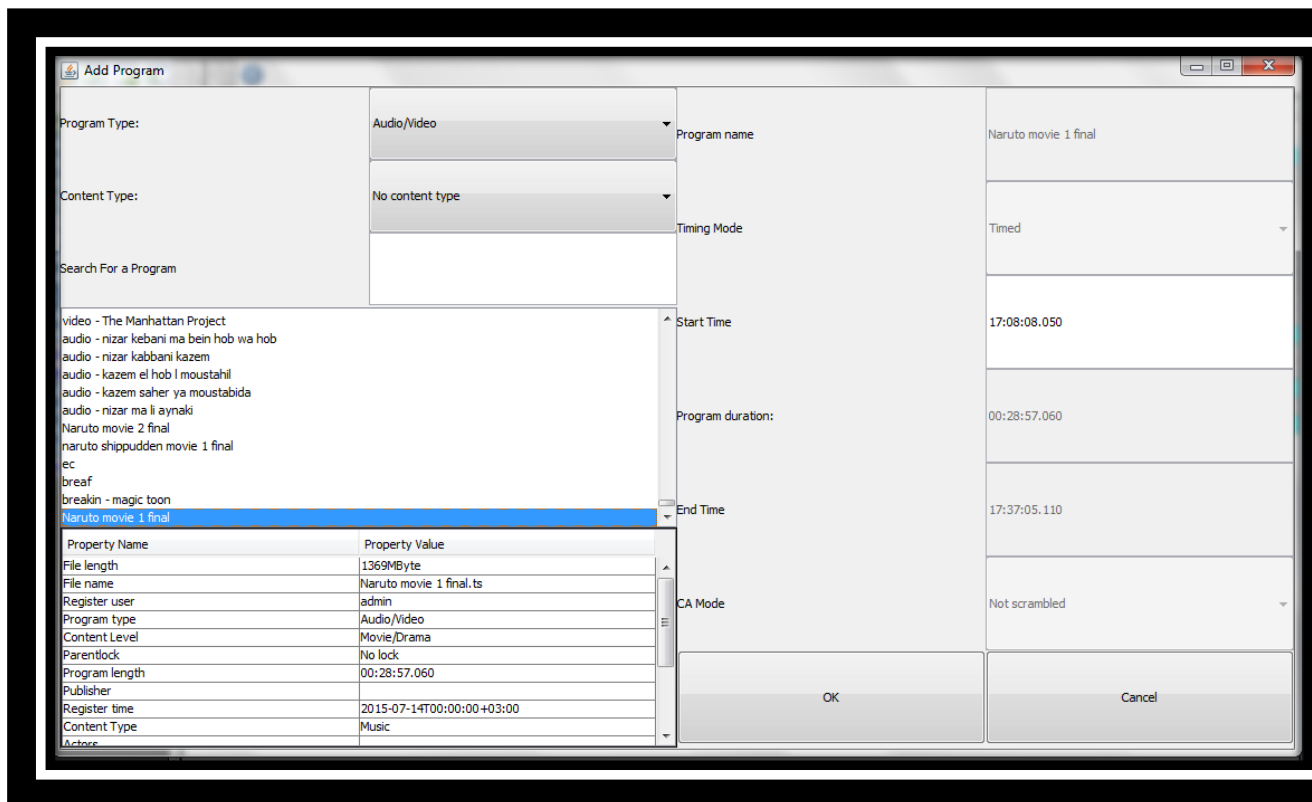


Figure 7 :Add Program to Schedule

- Insert Program : The user can choose to insert program directly after another program ,this can be done by selecting the program to insert before ,then right click and select insert program.

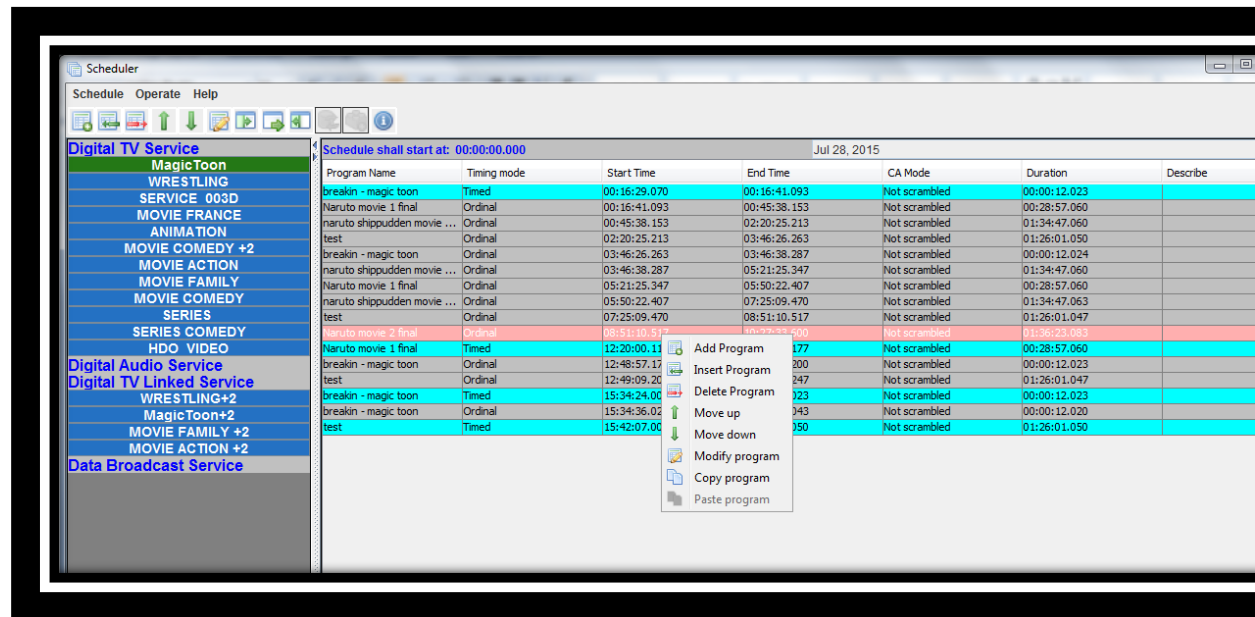


Figure 8 :Insert Program to Schedule

- Modify ,Delete Program from schedule: The user can also select a program from the schedule to delete or modify as shown in the figure above.
- Move up and down: the user can easily select a movie to move up or down in a schedule  
note that we cannot move up the first timed movie. and we cannot move down the last movie in schedule.
- Import schedule: The user can import saved schedules by selecting the CSV file to import then selecting from the checkbox the timed intervals to import. two options might happen while importing a schedule.
  - 1- overlap : this happens when the imported schedule overlap with the existing one ,in this case the scheduler will ask the user if he wants to delete the existing schedule if yes then the existing schedule will be deleted and the new schedule will be replaced.
  - 2- no overlap: this happens when the selected timed intervals do not coincide with the existing ones ,in this case the new timed intervals will be added to the existing schedule.  
note that the import will also check the overlap with next day schedule.

Steps to import schedule:

1:from schedule menu select import schedule

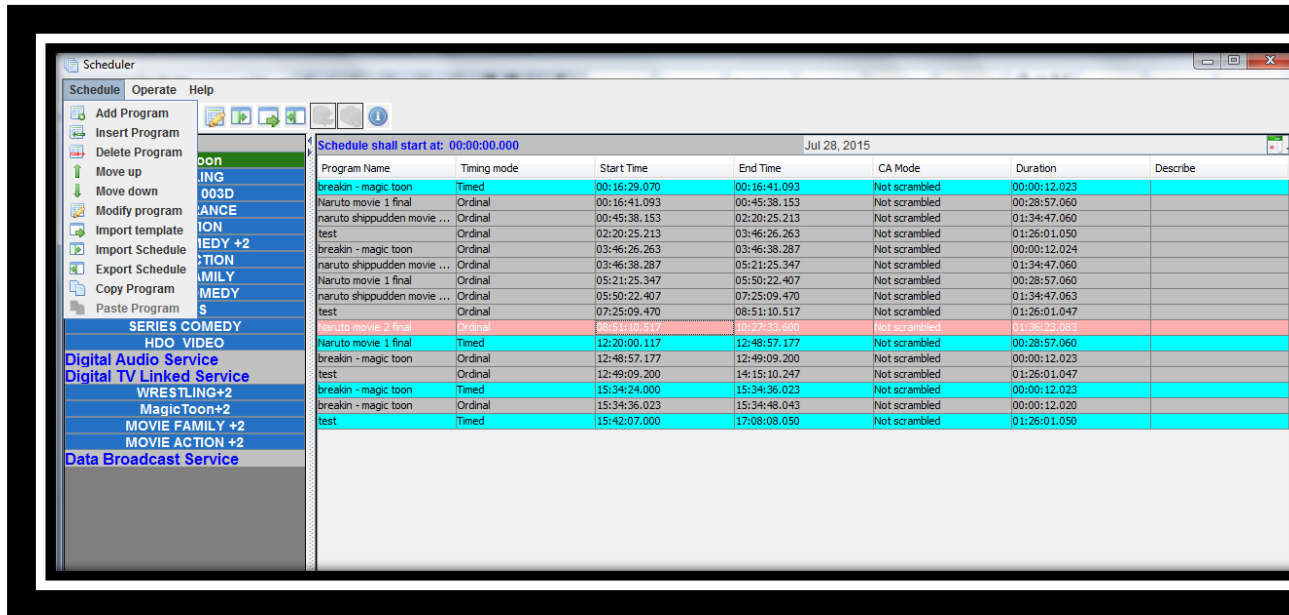


Figure 9 :Schedule menu

2:From the file browser select the file to import

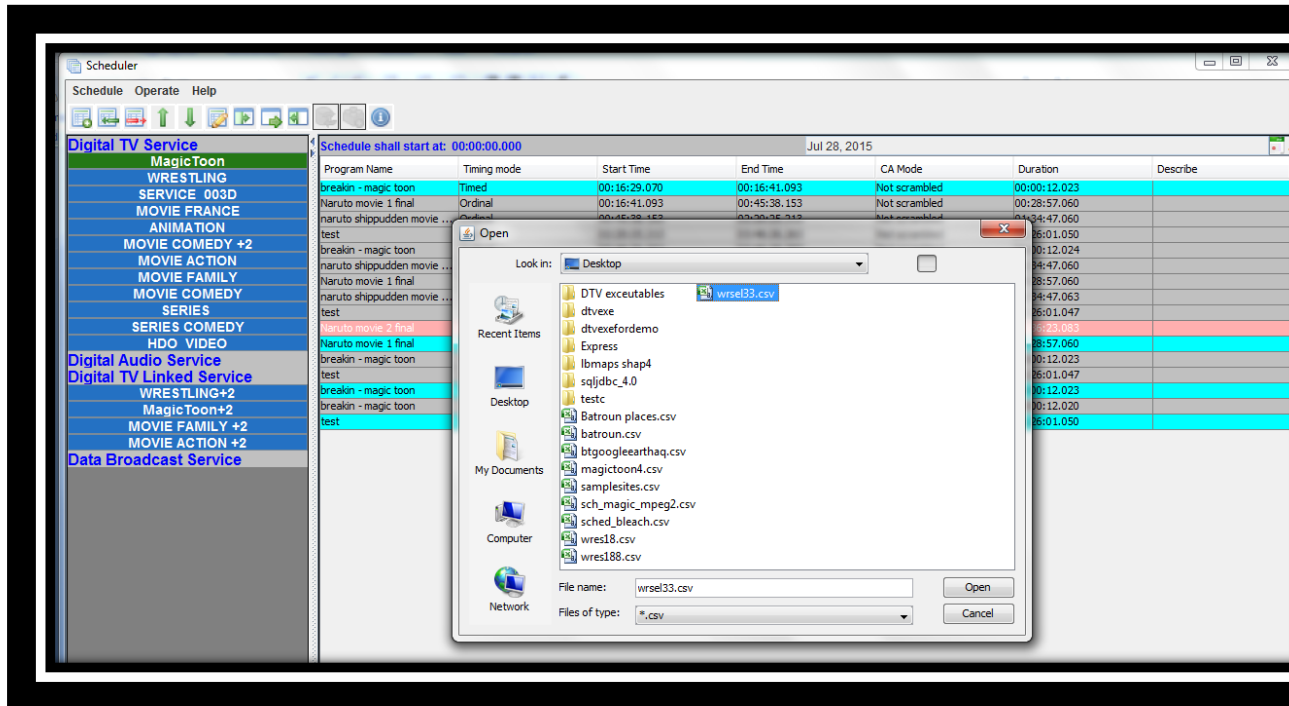


Figure 10: Schedule Browser

3:Then select interval to import :

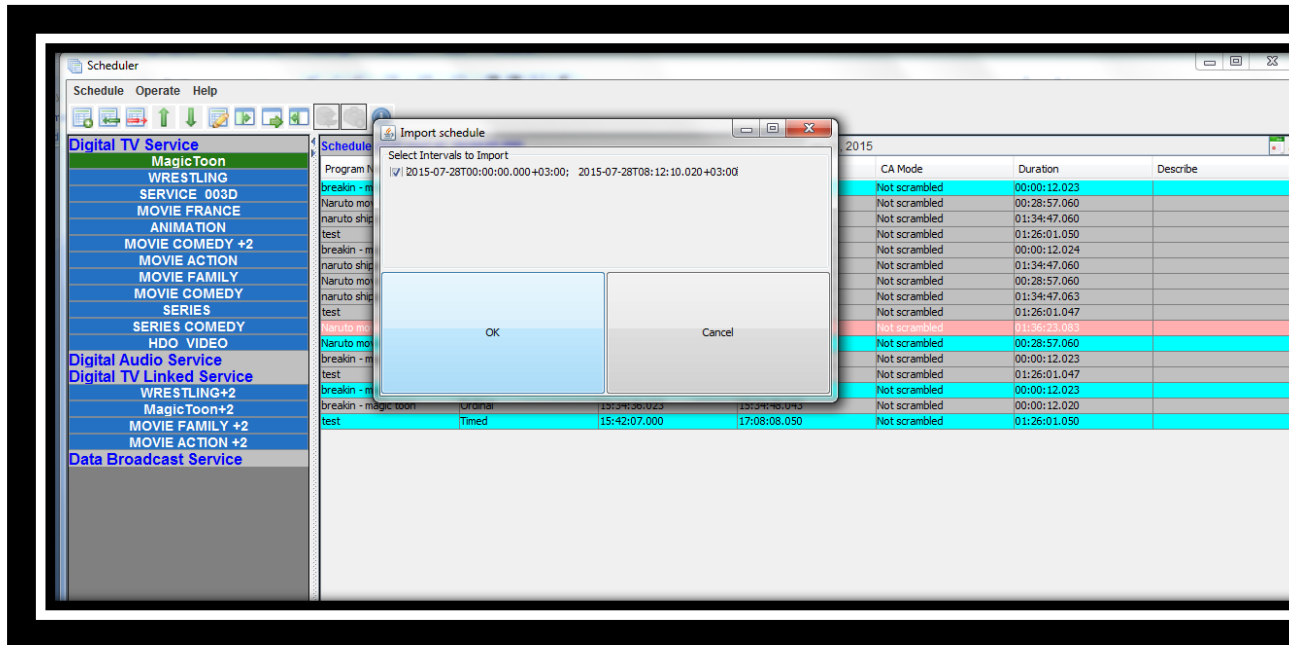


Figure 11 :Import Schedule

If there is overlap the following warning appears

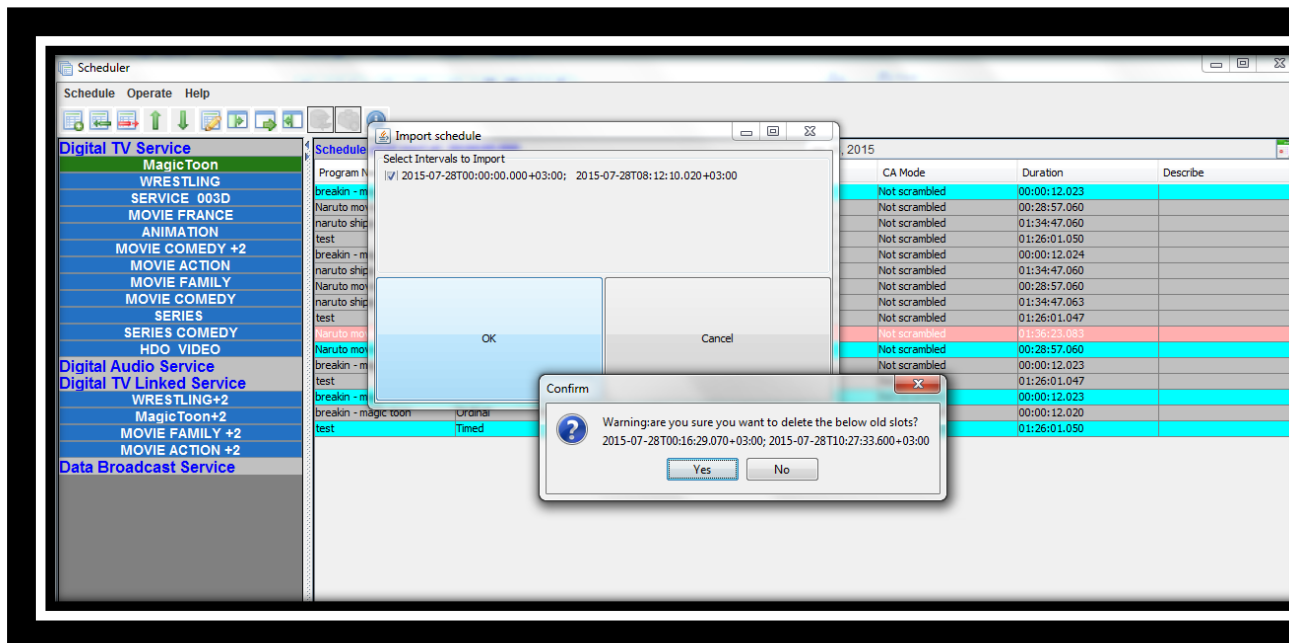


Figure 12 : warning on import

- Export schedule: The user can choose to export a schedule to a CSV file for importing it on another date or service.

Steps to export schedule:

1:from schedule menu select export schedule

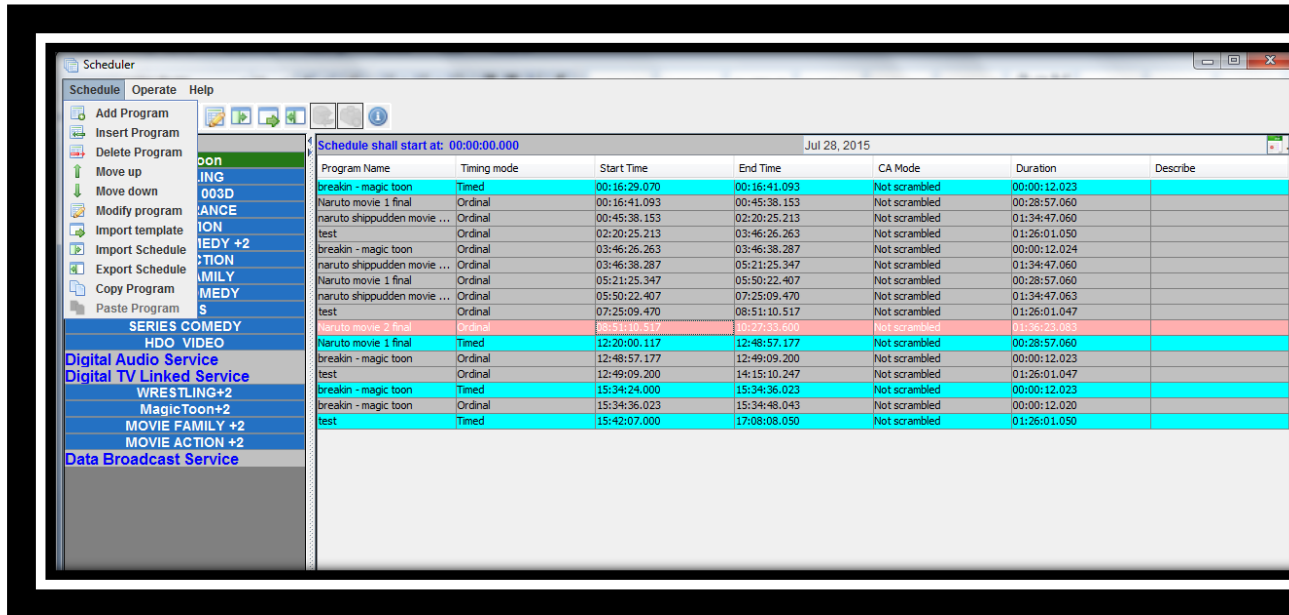


Figure 13 :schedule menu

2:Then select the Timed intervals to export

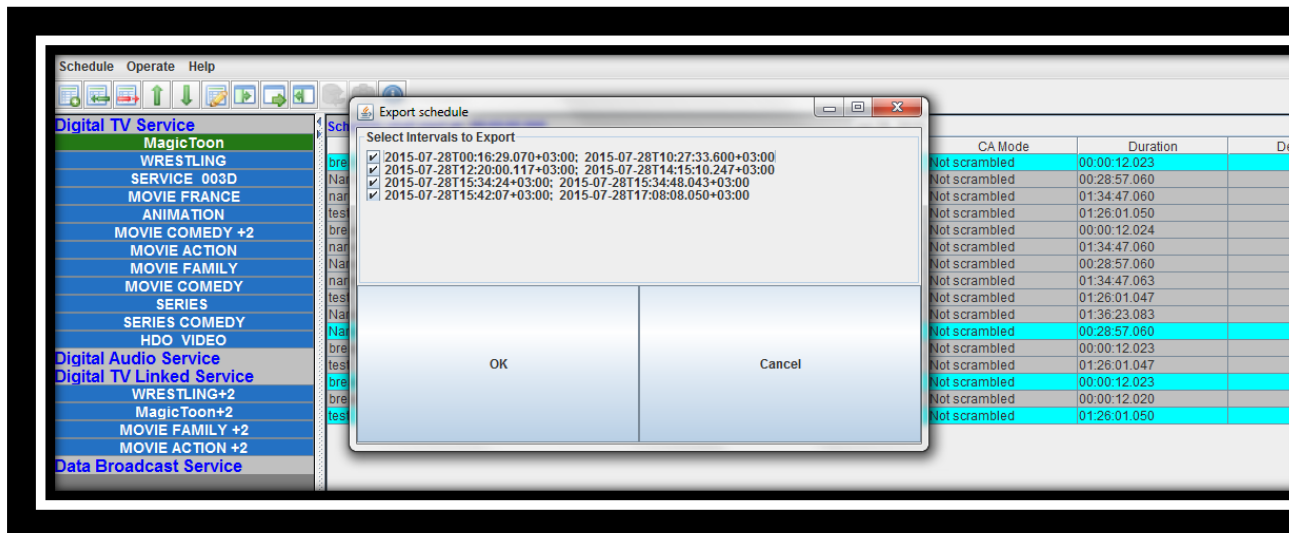


Figure 14 :Export Schedule

3:Then from the file browser choose the CSV file to save the schedule in



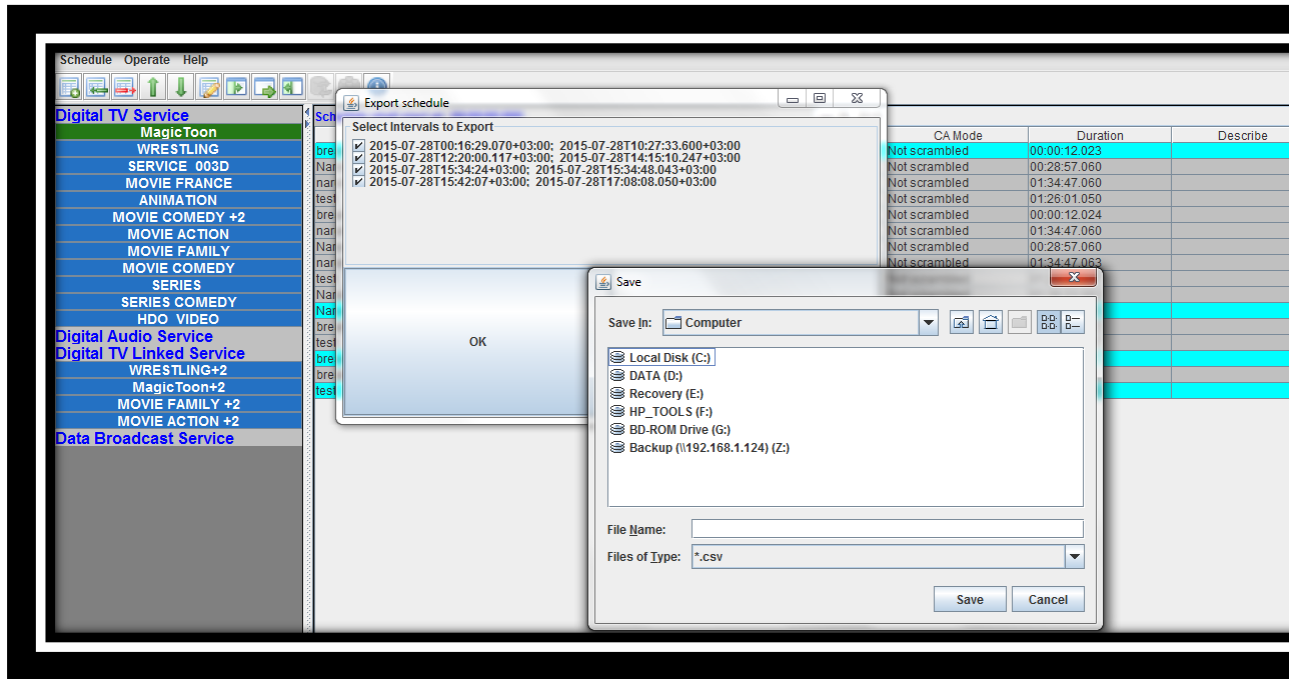


Figure 15 :Export browser

## Broadcasting

The Broadcaster is an interface used to start or stop broadcasting of all services .When starting broadcast ,all scheduled services will start streaming according to their schedule to their corresponding UDP IP.



Figure 16 :Broadcast

## The Transcoding and the logo insertion solution

The solution allow transcoding and adding Subtitles on Input UDP streams .The input stream could be Multiple program or Single program transport stream .

The output transcoded stream is always a single program UDP stream .the transcoding solution allow changing codec (the supported codec are mpg2video and H264) ,bitrates ,resolution ,and aspect ratio of the input stream. The output video could have SD, HD, or Full HD resolution.

The below use cases show briefly what can be done in this solution.

## Output Management

The output Manager user interface which provide full flexibility for the user to manage all input and output UDP streams .In a way the user can easily add input streams ,view detail properties for the added streams, configure different output streams for each input ,start or stop each output separately, and the most important thing monitor outputs in groups which could be configured easily.

- Adding Input Stream: To add input stream ,go to the output menu then click on add input ,in the new window that appear fill in the UDP IP of the input that you wish to add and click on OK ,the new input stream will be shown directly in the list of input streams. The user can click on the input stream to view its properties.

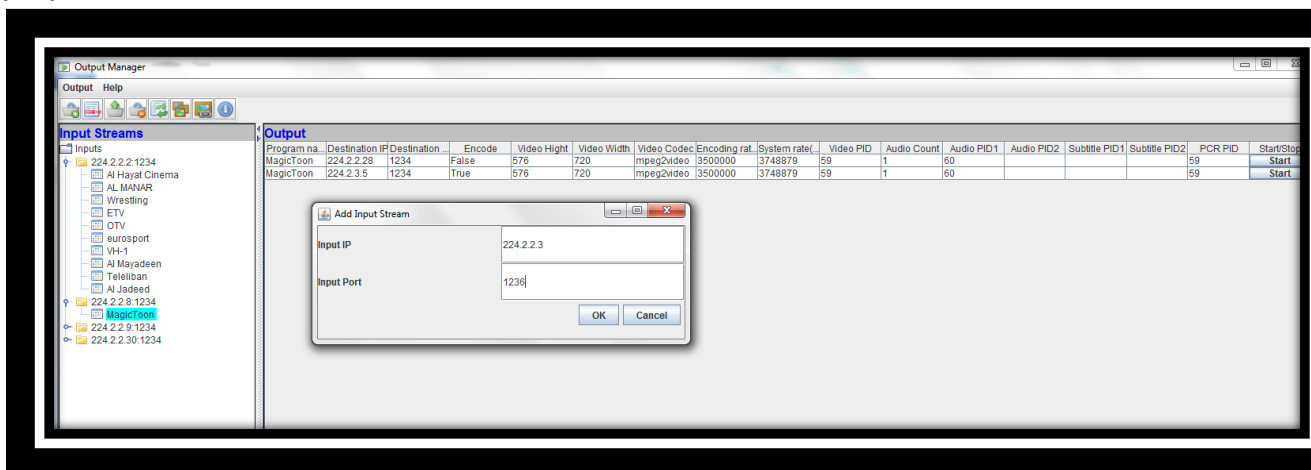


Figure 17 :Add Input Stream

- Adding output: The user shall select the program name from the input stream and click on add output from the output menu to add output for the selected program .As seen in the figure above there are 2 types of input streams either Multiple program stream or single program .When adding an output the user can choose to add the output without transcoding or with transcoding .The two options will be detailed below.

Adding output with transcoding :when choosing this option the user can change codec,bitrates,resolution ,and add logos on the new output stream. The user can also set new PIDs for video ,audio and subtitle streams.

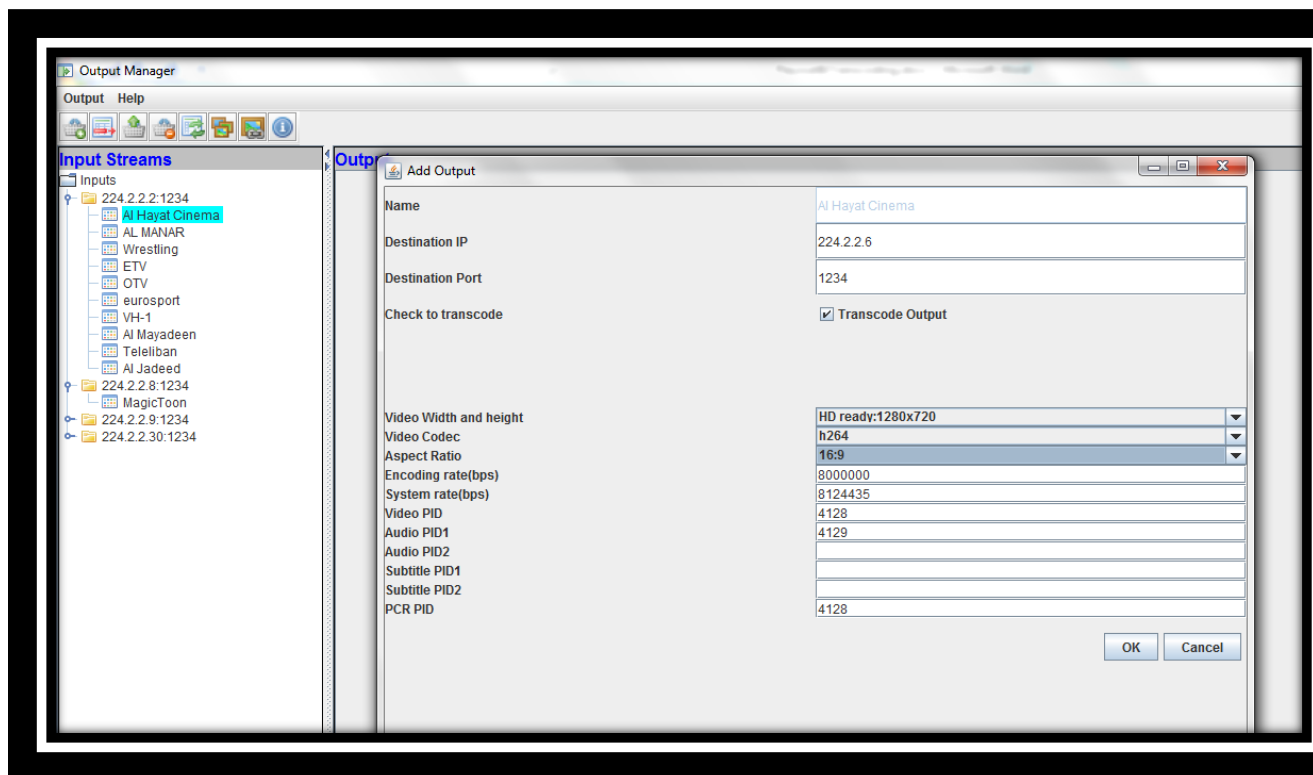


Figure 18 :Add Output Stream with transcoding

Adding output without transcoding option: when choosing this option the user can not change any parameter of the input stream .this is useful when changing from MPTS to SPTS ,with full control over the output SPTS .

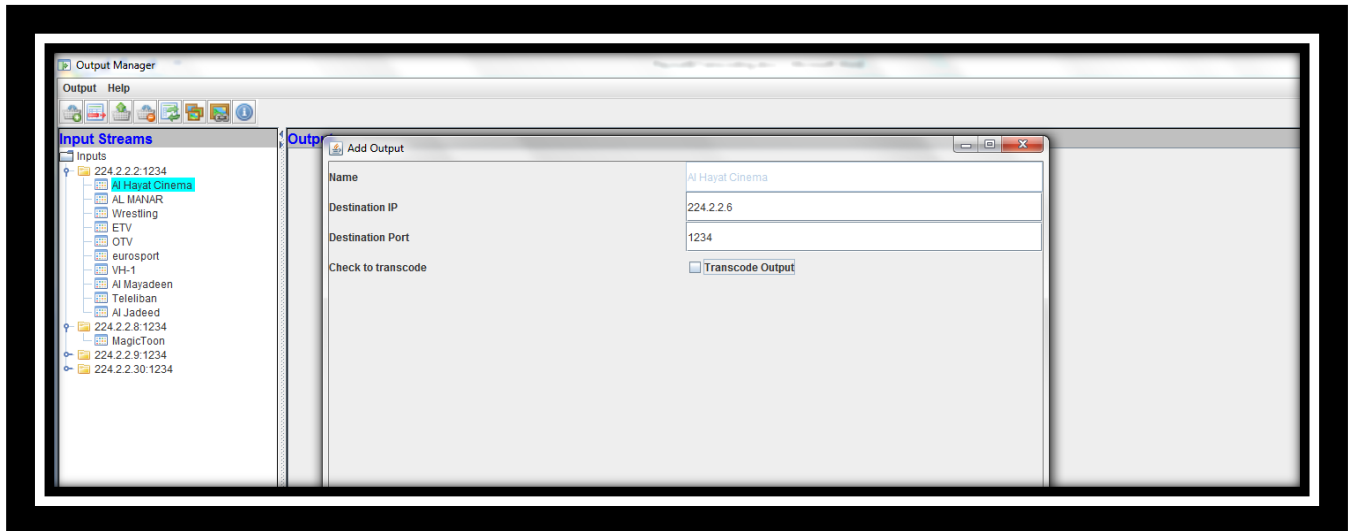


Figure 19 :Add Output Stream without Transcoding

The added outputs will be seen in output list as shown in the figure below:

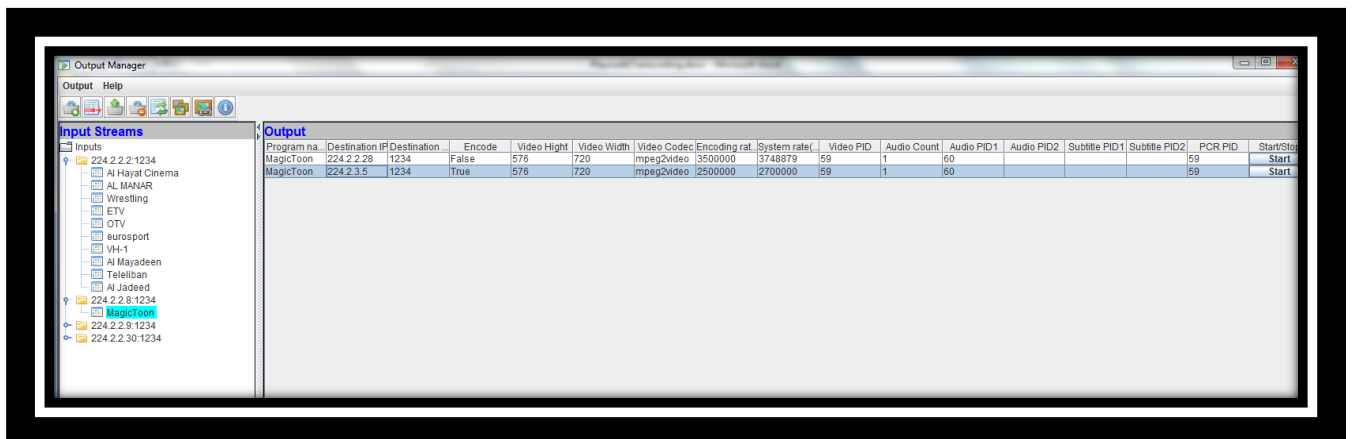


Figure 20 :Outputs

- Changing output parameter: The user can change output bitrates , group ,can stop or start an output, or can delete output .

To change output bitrates :select the output from the output table and then click on change output rates in the output menu and fill in the new bit rates

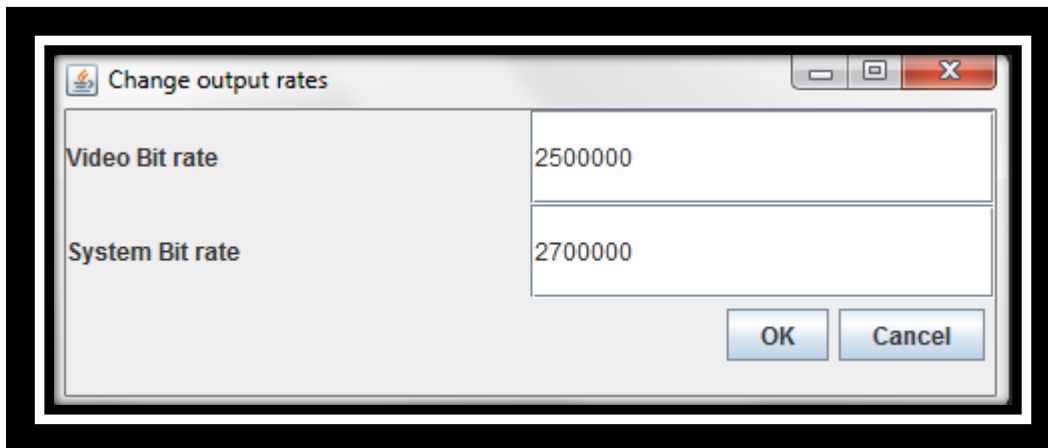


Figure 21 : Change output rates

when changing rates for an already started output the new effects will directly apply to the output without having to stop and start the output again.

To Start and Stop output :from the output table click on start or stop button next to each output.

To Delete an output: select the output from the output table and then click on delete output in the output menu .

To change output mosaic group: select the output from the output table and then click on Change output mosaic group in the output menu .Then select from the drop down list the new group.

The mosaic group is used to monitor outputs in groups .

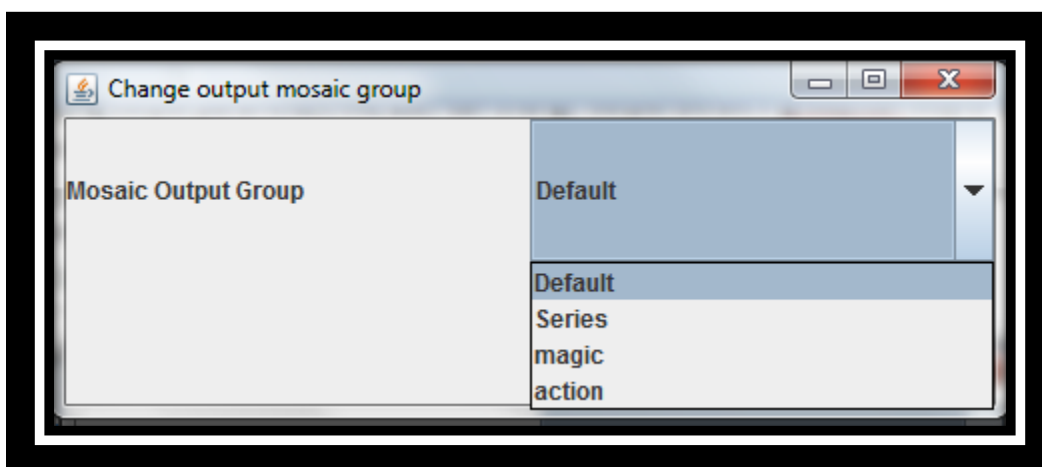


Figure 22 : Change Output Mosaic groups

- Mosaic Output management: In the output manager toolbar Click on the Mosaic Output management icon a new window will appear allowing the user to add new mosaic group ,remove group, or view mosaic of the selected group as seen in the figure below.

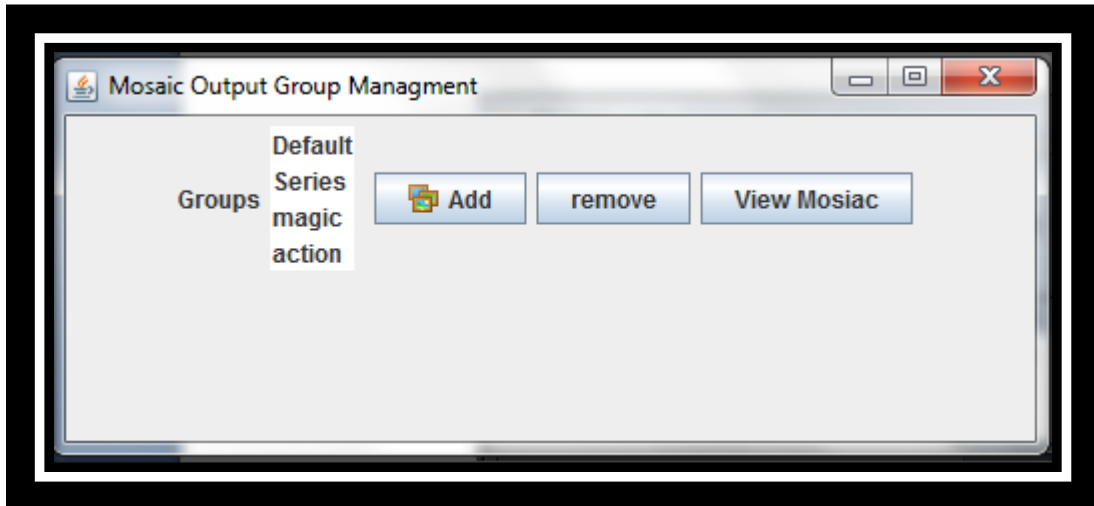


Figure 23 :Mosaic Group Management

The Mosaic view depends on the number of outputs in the group, so for a group of 4 output the view will look like the image below

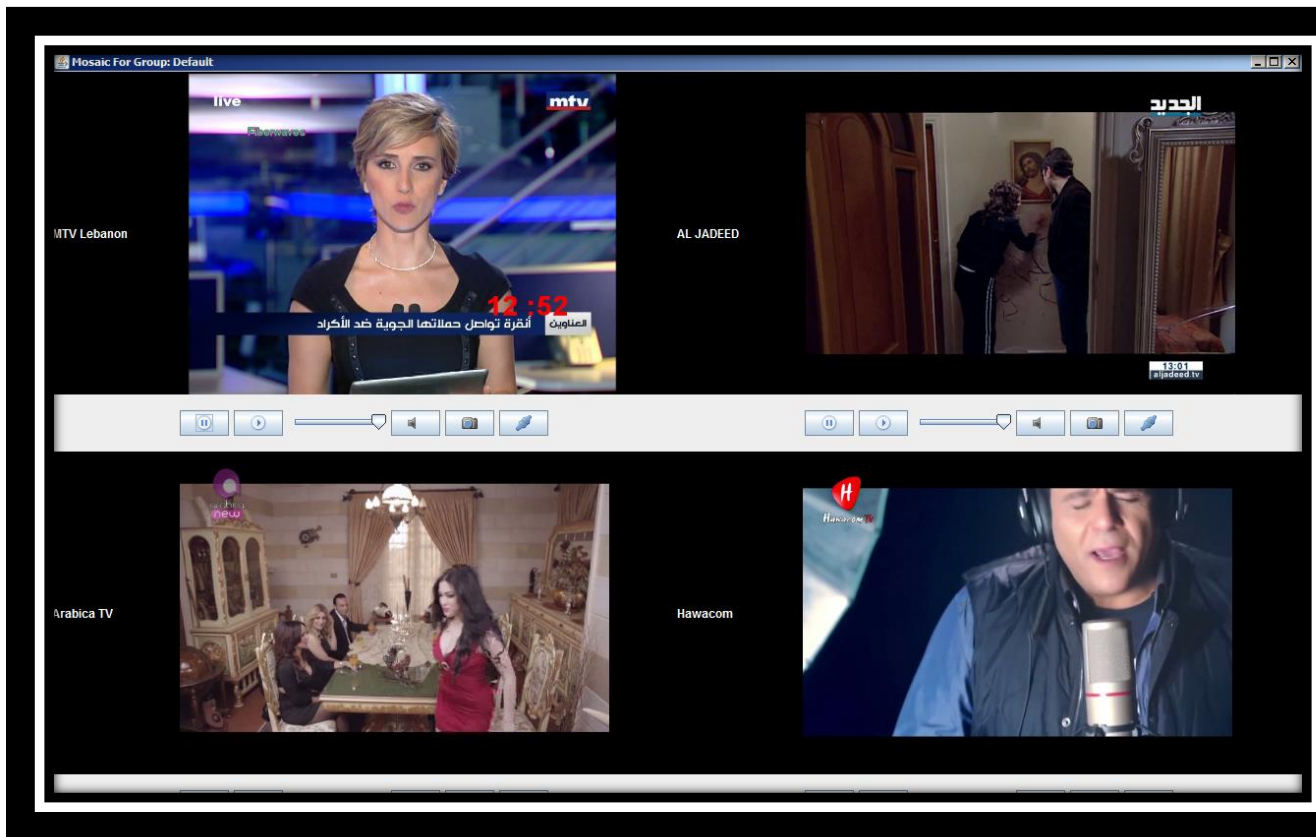


Figure 24 :Mosaic View 2X2

## Logo Insertion

The Logo insertion is divided into two main interfaces:

1-The Subtitle Manager: is responsible for creating different type of subtitles for each output . In which, The user can preview ,edit, or delete existing subtitles.

2-The Play Logo Manager :is responsible for scheduling the created subtitles on a given start and stop time.

note :when scheduling subtitles for outputs which are already started .the new effects will directly take place without having to stop and start the output again.

## Adding Subtitles

There are two types of subtitles: text subtitles and logo subtitles .

1:To add text subtitles the user shall select the output which he wants to add the subtitle to and then click on add text subtitle from the subtitle menu .In the new window which appear the user shall fill in the subtitle information: name,content,postion,scroll options,font options,and background options.

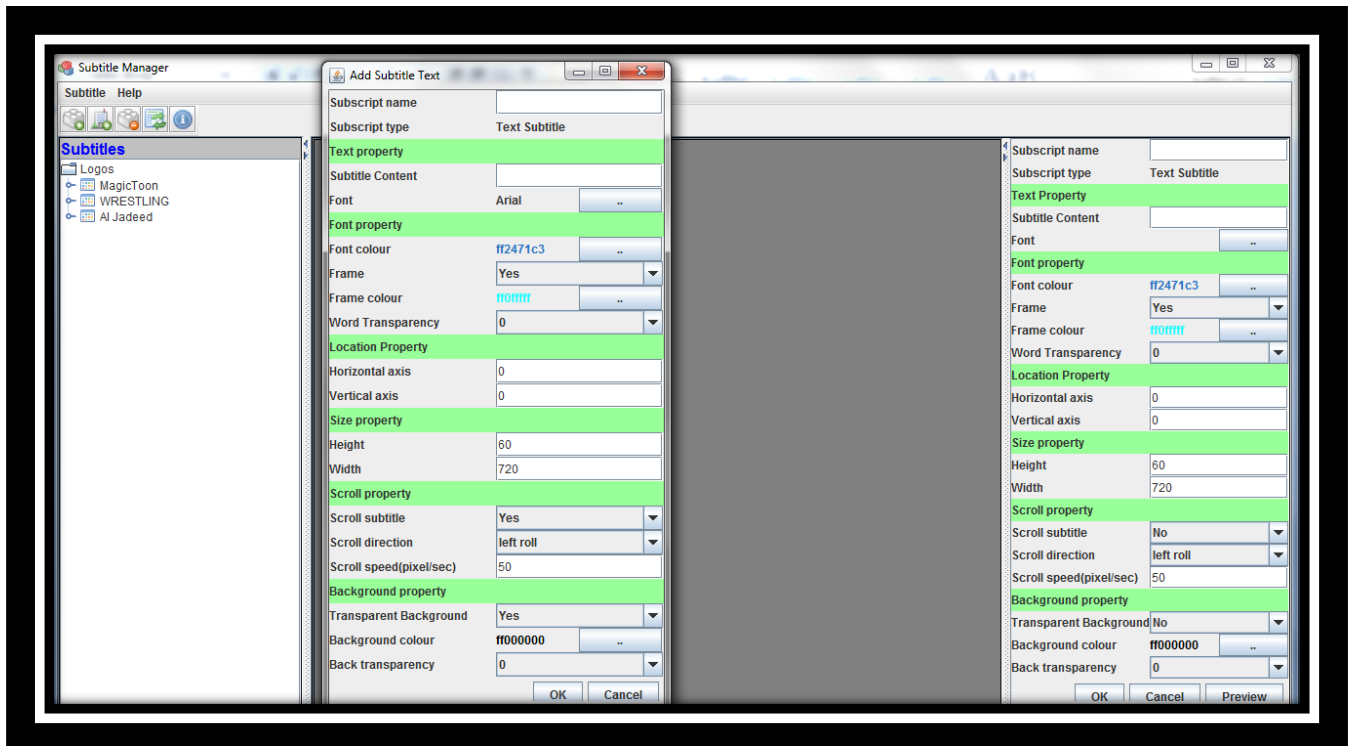
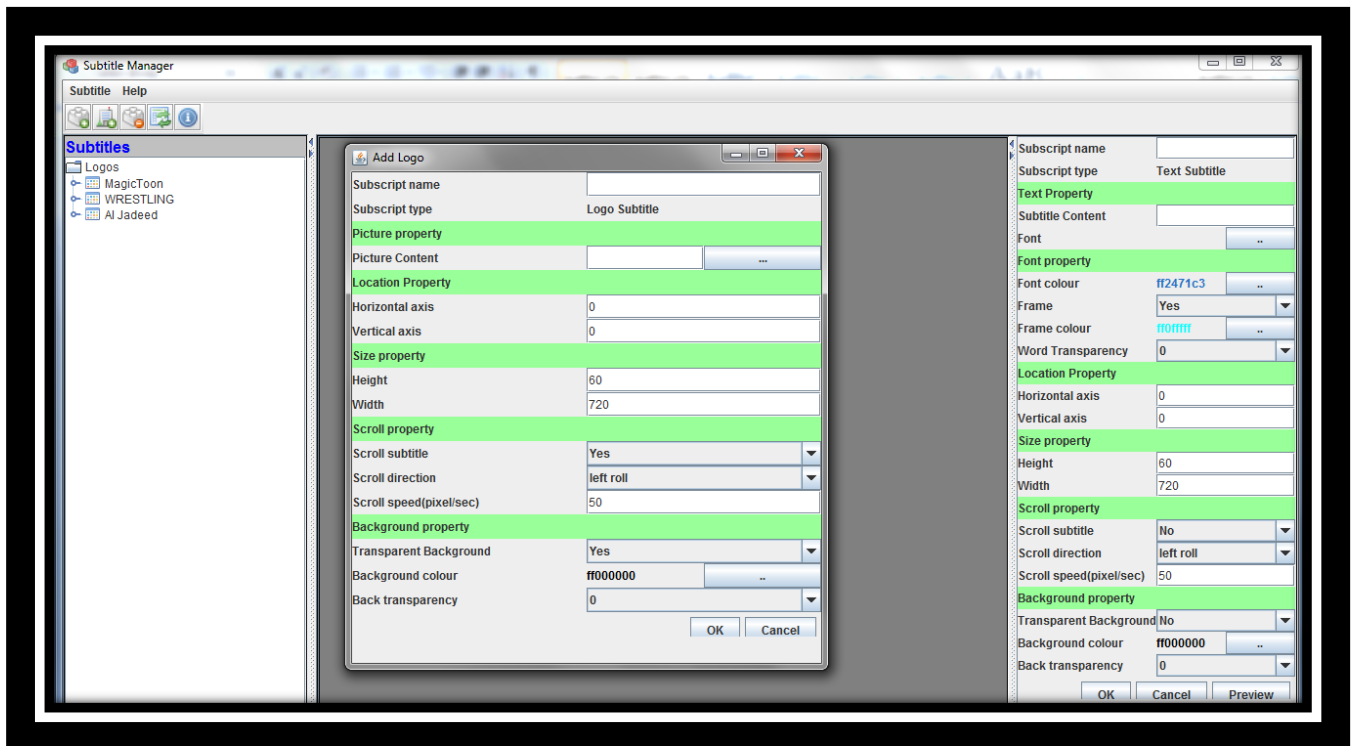


Figure 25 :Add Subtitle Text

2: To add logo subtitles the user shall select the output which he wants to add the subtitle to and the click on add logo subtitle from the subtitle menu .In the new window which appear the user shall fill in the subtitle information: name,image location ,postion,scroll options, and background options.





**Figure 26 :Add Subtitle Logo**

the added logos will directly appear under its corresponding output in the subtitles list as shown in the figure below, in addition the user can change subtitle properties from the right panel to preview or directly update subtitles

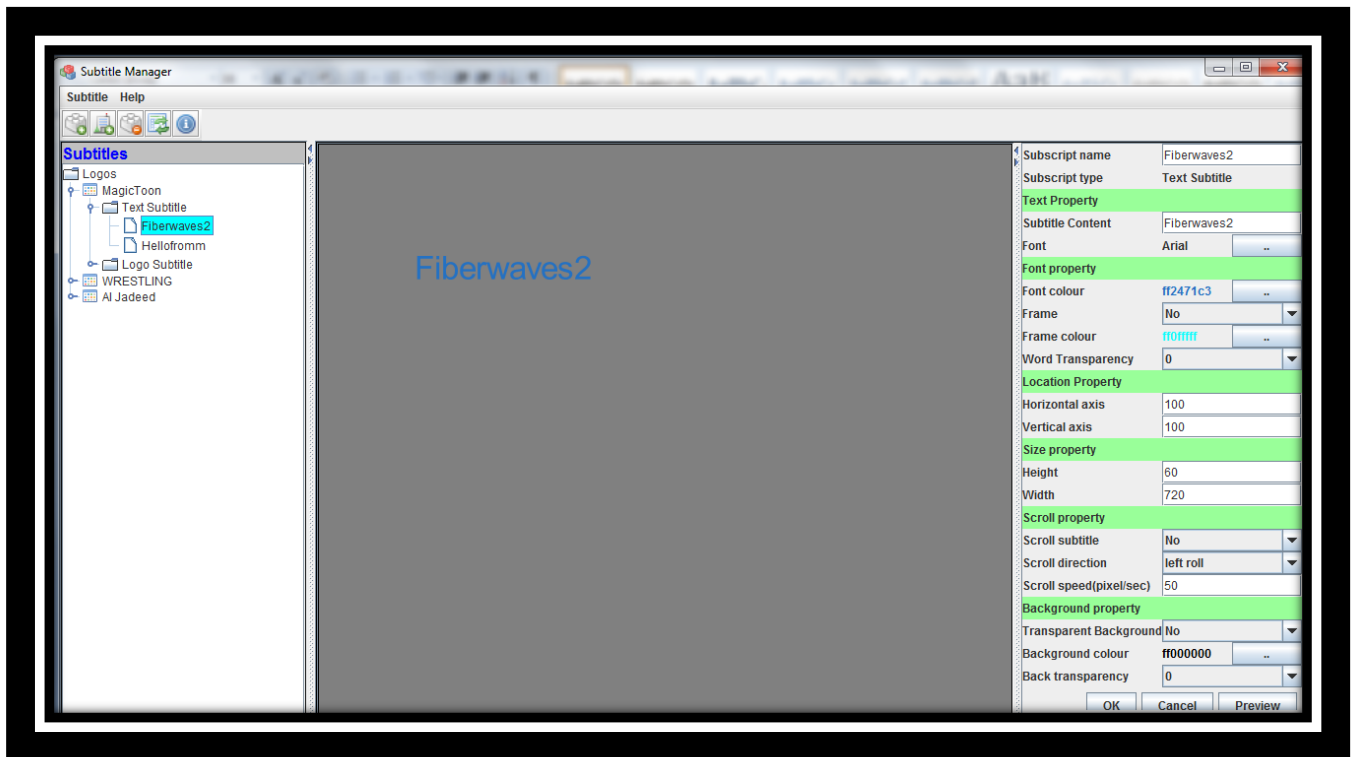


Figure 27 :Preview Subtitle

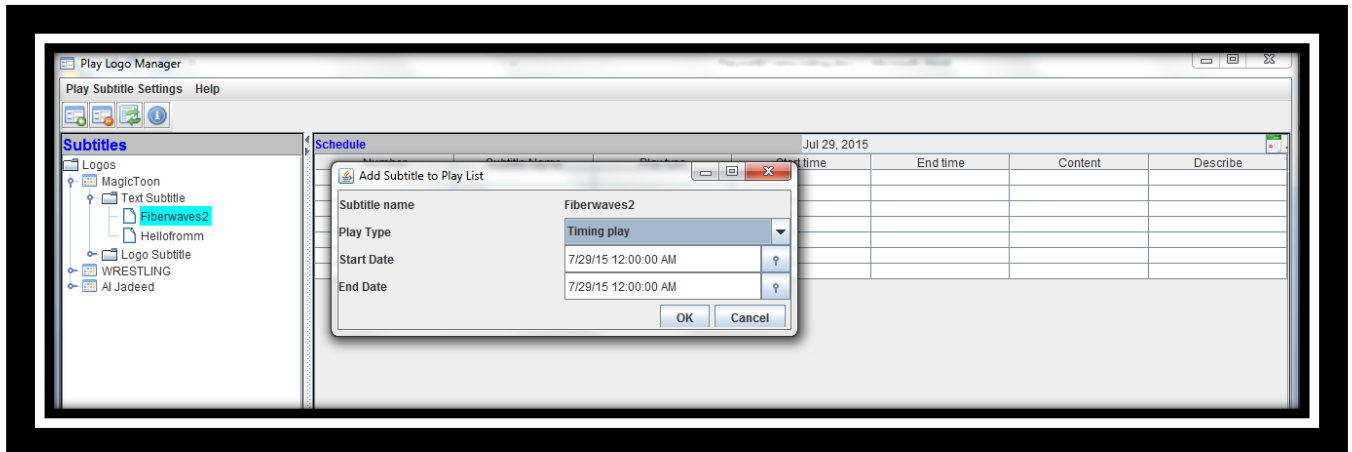
### Update or delete subtitles

The User can select the subtitle from the subtitle list and then click on the subtitle menu to update or delete the selected subtitle.

### Scheduling subtitles

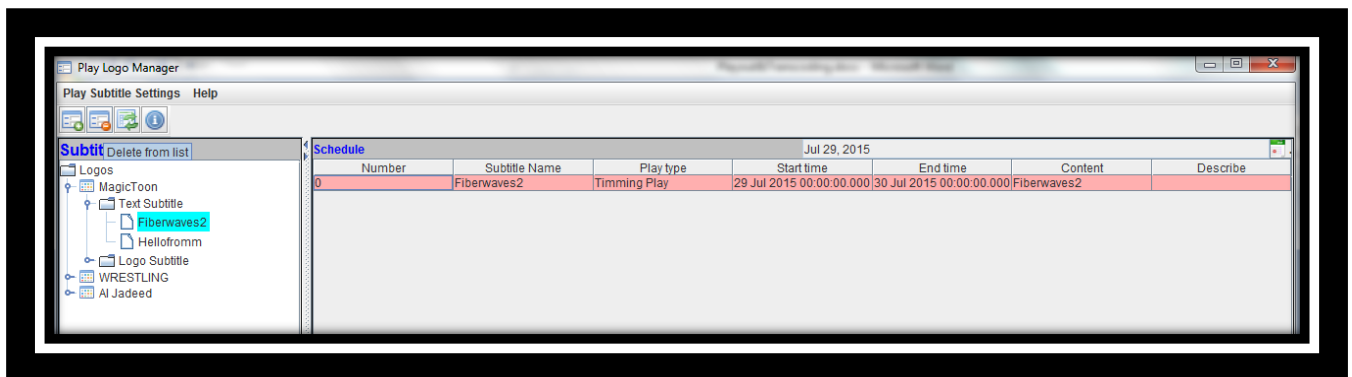
The Play logo manager interface is responsible for adding, deleting ,and viewing subtitles schedules

1:To Schedule a subtitle :from the subtitle list select the subtitle then click on add subtitle to playlist from playlist menu .From the new window enter the start and end time if you have chosen "timing play" mode or enter only the start date if you have chosen "always playing" mode.



**Figure 28 :Add Subtitle to Playlist**

2:To delete a subtitle schedule from the playlist select the subtitle playlist from the schedule then click on delete from the toolbar or menu



**Figure 29 :Delete Subtitle**

3:To View Output subtitle schedule for a given date :select the output from the subtitle list and the date from the calendar and the subtitle schedule will directly appear displaying for each subtitle the start and end time .

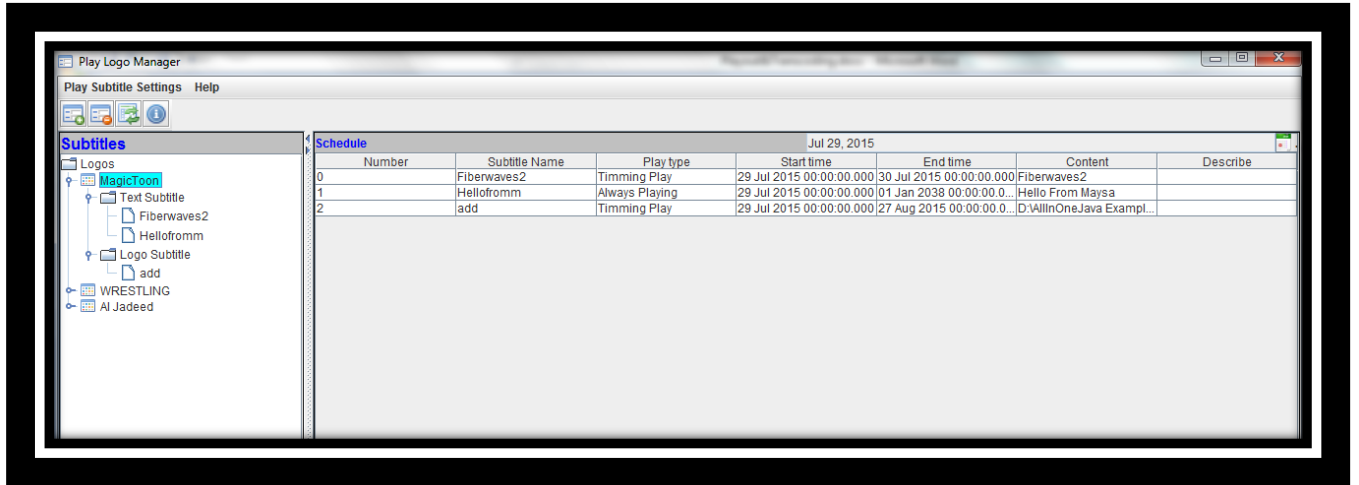


Figure 30 :Playlist