

# MoviePlayer API User's Guide

Version 1.0.0

## MoviePlayer API User's Guide

Solution Team



## Release information

The following changes have been made to this document.

### Change History

Date	Change
19 Feb. 2018	V1.0.0 Modified API functions (AVSync)
11 May 2015	v0.91.0. Insert Scenario
21 April 2015	First release for v0.90.0

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## Chap 1. Overview

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### 1.1 Overview

이 문서는 Android/Linux 환경에서 Filter Library 를 사용하여 각종 동영상 및 음악 파일을 재생하기 위한 API 의 사용법을 설명한 문서이다.

---

### 1.2 지원범위

#### 1.2.1 . Container

##### 1.2.1.1 Movie Container

- ASF, AVI, MKV, MP4, RM(RealMedia), FLV, MPEG-PS, MPEG-TS

##### 1.2.1.2 Audio Container

- Mp3, flac, aac, ogg, wav, wma

#### 1.2.2 Video Codec

- H.264 : 1920x1080, 30fps
- H.263 : 1920x1088, 30fps
- MPEG2: 1920x1080, 30fps
- MPEG4: 1920x1080, 30fps
- FLV: 1920x1080, 30fps
- RealVideo: 1920x1080, 30fps
- VC1(WMV9): 1920x1080, 30fps

#### 1.2.3 Audio Codec

- MP3 : ~48KHz, ~320Kbps, 2Ch
- AAC : ~96KHz, ~320Kbps, 5.1Ch
- AC3 : ~48KHz, ~256Kbps, 5.1Ch
- OGG : ~48KHz, 2Ch
- RealAudio : ~48KHz, ~256Kbps, 2Ch
- WMA : ~48KHz, ~192Kbps, 2Ch
- FLAC : ~96KHz, 2Ch
- PCM : ~96KHz, 2Ch

- DTS : ~96KHz, ~256Kbps, 5.1Ch
- COOK ; ~48KHz, ~256Kbps, 2Ch

## 1.3 Environment

이 API 의 동작 환경은 다음과 같다.

### 1.3.1 CPU

- S5P4418
- S5P6818

### 1.3.2 OS

- Lollipop
- Linux(Kernel Version 4.4.x)

### 1.3.3 External Depend

- FFmpeg library (2.1.4)
- Audio Decoder (FFmpeg)

### 1.3.4 Library

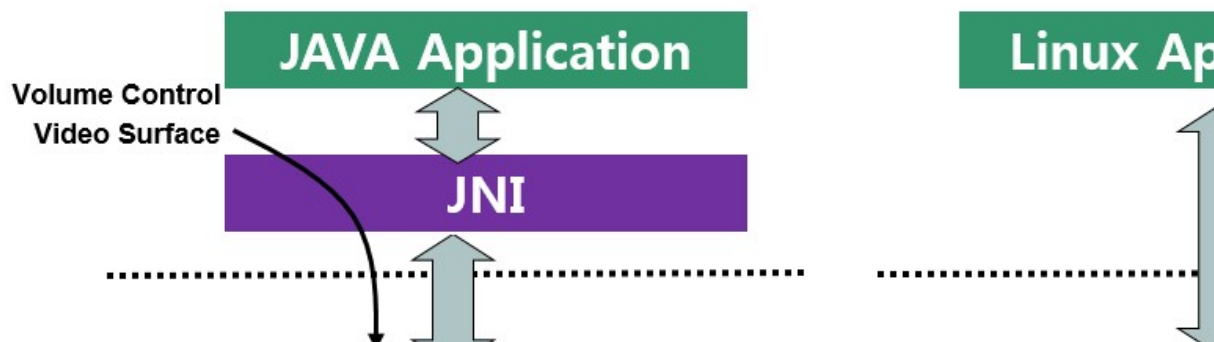
- FFmpeg library: libavutil-2.1.4.so, libavresampld-2.1.4.so, libavdevice-2.1.4.so, libavcodec-2.1.4.so, libswscale-2.1.4.so, libswresample-2.1.4.so, libavfilter-2.1.4.so, libavformat-2.1.4.so
- Filter library :libnxfilter.so, libnxfilterhelper.so, libnxmpmanager.so
- Video decoder module driver & library : nx\_vpu.ko, libnxvpu.so
- Video memory allocator library : libnxvmem.so
- Theora parser library: libtheoraparser.so, libtheoraparser\_and.so
- Additional library (Linux)
  - V4L2 library : libnxv4l2.so, libnxdsp.so
  - Fine scaler library : libnxscaler.so

## Chap 2. Structure

### 2.1 Overview

Library 의 사용에 대한 전체 구조를 설명한다.

### 2.2 Structure



Android : Video Control, Volume Control 은 Android 에서 제어한다.

Example Code 는 hardware\samsung\_slsi\slsiapi\apps\NxPlayerBasedFilter 에 있다.

Linux : Video Control, Volume Control 은 Player API 를 통해서 제어한다

Example Code 는 linux/platform/s5p4418/app/NxFilterPlayers 에 있다.

Consol 환경에서 테스트할수 있다.



## Chap 3. APIs

### 3.1 Overview

API 에 대한 세부 설명이다.

### 3.2 API Details

#### 3.2.1 NX\_MPOpen

Description:

Memory allocation 및 handle initialization

Prototype:

```
MP_RET NX_MPOpen(
    MP_HANDLE * phMp,
    void (*cbEvent)(void *pObj, uint32_t EventType, uint32_t EventData, uint32_t param),
    void *cbPrivate )
```

Parameters;

MP\_HANDLE \*phMp: Movie player handle (input/output).

void (\*cbEvent) :callback function(input) : End Of Stream/ Error 가 발생했을 때  
callback function 을 통해 메시지가 전달된다.

CallBack Message 는 NX\_MoviePlay.h 참고.

Return value:

Error Code.

MP_ERR_NONE MP_ERR
-----------------------

#### 3.2.2 NX\_MPClose

Description:

Memory free.

Prototype:

```
void NX_MPClose( MP_HANDLE hMp)
```

Parameters:

MP\_HANDLE hMp: Movie player handle (input/output)

Return value:

None.

### 3.2.3 NX\_MPSetUri

Description:

Uri setting

Prototype:

```
MP_RET NX_MPSetUri( MP_HANDLE hMp, const char *pUri)
```

Parameters;

MP\_HANDLE hMp: Movie player handle (input/output).

Const char \*pUri: Uri(input).

Return value:

Error Code.

MP_ERR_NONE MP_ERR MP_ERR_INPUT_FILE
--

### 3.2.4 NX\_MPGetMediaInfo

Description:

Media 정보를 얻어 옴.

Prototype:

```
MP_RESULT NX_MPGetMediaInfo(MP_HANDLE hMp, MP_MEDIA_INFO *pInfo)
```

Parameters:

MP\_HANDLE hMp: Movie player handler(input/output).

MP\_MEDIA\_INFO \*pInfo : media information(output).

Return value:

If exist media information , return MP\_ERR\_NONE. Otherwise return MP\_ERR.

#define PROGRAM_MAX	16
#define MAX_TRACK_NUM	10
typedef struct MP_TRACK_INFO {	
int32_t	iTrackIndex; // Track Index
int32_t	iTrackType; // VIDEO:0, AUDIO: 1
int32_t	iCodecId;
int64_t	iDuration; // Track Duration
int32_t	iWidth; // Only VideoTrack

```

        int32_t          iHeight;          // Only VideoTrack
        int32_t          iFrameRate;       // Only VideoTrack
        int32_t          iChannels;        // Only AudioTrack
        int32_t          iSampleRate;      // Only AudioTrack
        int32_t          iBitrate;         // Only AudioTrack
    } MP_TRACK_INFO;

typedef struct MP_PROGRAM_INFO {
        int32_t          iAudioNum;
        int32_t          iVideoNum;
        int32_t          iSubTitleNum;
        int32_t          iDataNum;
        int64_t          iDuration;
        MP_TRACK_INFO    TrackInfo[MAX_TRACK_NUM];
} MP_PROGRAM_INFO;

typedef struct MP_MEDIA_INFO{
        int32_t          iProgramNum;
        int32_t          iAudioTrackNum;
        int32_t          iVideoTrackNum;
        int32_t          iSubTitleTrackNum;
        int32_t          iDataTrackNum;
        MP_PROGRAM_INFO  ProgramInfo[PROGRAM_MAX];
} MP_MEDIA_INFO;

```

### 3.2.5 NX\_MPAddVideoTrack

#### 3.2.5.1 Android

Description:

이 함수는 Video Track 을 추가하는 함수이다. NX\_MPGetMediaInfo ()로부터 얻어온 media information 을 기반으로 track 의 index 를 추가하여 재생하고자 하는 track 의 pin 을 생성한다.

Track Index 는 MP\_TRACK\_INFO 구조체의 iTrackIndex 이다.

Prototype:

-. Android Case

```
MP_RESULT NX_MPAddVideoTrack (
```

```

MP_HANDLE hMp,
int32_t iTrack,
ANativeWindow *pWindow,
MP_DSP_CONFIG *pInfo )

```

-. Linux Case

```

MP_RESULT NX_MPAddTrack(
    MP_HANDLE hMp,
    int32_t iTrack,
    MP_DSP_CONFIG *pInfo,
    Int32_t bHdmi = false)

```

Parameters:

MP\_HANDLE hMp: Movie player handler(input/output).

int32\_t iTrack: TrackInfo 의 iTrackIndex 를 의미한다(input).

ANativeWindow \*pWindow : NativeWindow(input).

-. Android Surface 의 Native Window 를 사용할 때 사용한다. 만약 사용하지 않으면 NULL 입력한다.

-. Video Track 인 경우 재생하고자 하는 Surface 의 Native Window 를 할당한다.

-. Audio Track 인 경우에는 NULL 을 입력한다.

MP\_DSP\_CONFIG \*pInfo : DSP Config(input)

-. MLC 를 사용할 때 사용한다. 만약 사용하지 않으면 NULL 입력한다.

-. Video Track 인 경우 재생하고자 하는 MLC 의 Display Information 을 할당한다.

-. Audio Track 인 경우에는 NULL 을 입력한다.

bHdmi : Linux 에서 Hdmi 를 사용시 사용(input) (true→HdmiOn, false→HdmiOff)

Android 경우는 false 설정한다.

Return value:

Error Code.

```

MP_ERR_NONE
MP_ERR
MP_NOT_SUPPORT_AUDIOCODEC
MP_NOT_SUPPORT_VIDEOCODEC
MP_NOT_SUPPORT_VIDEOWIDTH
MP_NOT_SUPPORT_VIDEOHEIGHT

```

```

typedef struct MP_DSP_RECT {

```

```

        int32_t          iX;
        int32_t          iY;
        int32_t          iWidth;
        int32_t          iHeight;
    } MP_DSP_RECT;

    typedef struct MP_DSP_CONFIG {
        int32_t          iPort;      // 0:LCD, 1:HDMI
        int32_t          iModule;    // 0:MLC0, 1:MLC1
        MP_DSP_RECT      srcRect;    // Source Crop Region
        MP_DSP_RECT      dstRect;    // Destination Position Region
    } MP_DSP_CONFIG;

```

### 3.2.6 NX\_MPAddAudioTrack

#### 3.2.6.1 Android

Description:

이 함수는 Audio Track 을 추가하는 함수이다. NX\_MPGetMediaInfo ()로부터 얻어온 media information 을 기반으로 track 의 index 를 추가하여 재생하고자 하는 track 의 pin 을 생성한다.

Track Index 는 MP\_TRACK\_INFO 구조체의 iTrackIndex 이다.

Prototype:

-. Linux Case

```

MP_RESULT  NX_MPAddTrack(
                MP_HANDLE hMp,
                int32_t iTrack,
                MP_DSP_CONFIG *pInfo,
                const char *pDeviceName)

```

Parameters:

MP\_HANDLE hMp: Movie player handler(input/output).

int32\_t iTrack: TrackInfo 의 iTrackIndex 를 의미한다(input).

MP\_DSP\_CONFIG \*pInfo : DSP Config(input).

char \*pDeviceName : audio device name

Return value:

Error Code.

```

MP_ERR_NONE
MP_ERR
MP_NOT_SUPPORT_AUDIOCODEC
MP_NOT_SUPPORT_VIDEOCODEC

```

```
MP_NOT_SUPPORT_VIDEOWIDTH
MP_NOT_SUPPORT_VIDEOHEIGHT
```

```
typedef struct MP_DSP_RECT {
    int32_t      iX;
    int32_t      iY;
    int32_t      iWidth;
    int32_t      iHeight;
} MP_DSP_RECT;

typedef struct MP_DSP_CONFIG {
    int32_t      iPort;      // 0:LCD, 1:HDMI
    int32_t      iModule;    // 0:MLC0, 1:MLC1
    MP_DSP_RECT  srcRect;    // Source Crop Region
    MP_DSP_RECT  dstRect;    // Destination Position Region
} MP_DSP_CONFIG;
```

### 3.2.7 NX\_MPClearTrack

Description:

모든 track 을 delete 함.

Prototype:

```
MP_RESULT NX_MPClearTrack(MP_HANDLE hMp, )
```

Parameters:

MP\_HANDLE hMp: Movie player handler(input/output).

Return value:

If success returns MP\_ERR\_NONE, otherwise returns MP\_ERR.

### 3.2.8 NX\_MPPlay

Description:

Play start.

Prototype:

```
MP_RESULT NX_MPPlay( MP_HANDLE hMp )
```

Parameters:

MP\_HANDLE hMp: Movie player handler (input/output).

support yet)

(This functionality is not available yet.)

Return value:

If success returns MP\_ERR\_NONE, otherwise returns MP\_ERR.

### 3.2.9 NX\_MPStop

Description:

Play stop.

Prototype:

MP\_RESULT NX\_MPStop(MP\_HANDLE hMp)

Parameter:

MP\_HANDLE hMp: Movie player handler(input/output).

Return value:

If success returns MP\_ERR\_NONE, otherwise returns MP\_ERR.

### 3.2.10 NX\_MPPause

Description:

Play pause.

Prototype:

MP\_RESULT NX\_MPPause(MP\_HANDLE hMp)

Parameter:

MP\_HANDLE hMp: Movie player handler(input/output).

Return value:

If success returns MP\_ERR\_NONE, otherwise returns MP\_ERR.

### 3.2.11 NX\_MPSeek

Description:

Play seeking

Prototype:

MP\_RESULT NX\_MPSeek(MP\_HANDLE hMp, int64\_t iSeekTime)

Parameter:

MP\_HANDLE hMp: Movie player handler (input/output).

Int64\_t iSeekTime: Seek time in milli-seconds(input).

Return value:

If success returns MP\_ERR\_NONE, otherwise returns MP\_ERR.

### 3.2.12 NX\_MPGetDuration

Description:

Media 의 play duration 을 얻어 옴.

Prototype:

MP\_RESULT NX\_MPGetDuration(MP\_HANDLE hMp, int64\_t \*pDuration)

Parameters:

MP\_HANDLE hMp: Movie player handler (input/output)

Int64 \*position: Contents duration in milli-seconds. (output)

Return value:

If success returns MP\_ERR\_NONE, otherwise returns MP\_ERR.

### 3.2.13 NX\_MPGetPosition

Description:

Current play position 을 얻어 옴.

Prototype:

MP\_RESULT NX\_MPGetPosition(MP\_HANDLE hMp, int64\_t \*pPosition)

Parameters:

MP\_HANDLE hMp: Movie player handler (input/output).

Int64\_t \*pPosition: Current play time in milli-seconds (output).

Return value:

If success returns MP\_ERR\_NONE, otherwise returns MP\_ERR.

### 3.2.14 NX\_MPAddSubDisplay

Description:

이 함수는 Video 를 MLC 에 직접 rendering 하는 경우 다른 MLC 장치에 복제하여 display 하기 위한 함수이다.

Prototype:

```
MP_RESULT NX_MPAddSubDisplay (
    MP_HANDLE hMp,
    Int32_t iTrack,
    MP_DSP_CONFIG *pInfo
)
```

Parameters:

MP\_HANDLE hMp: Movie player handler(input/output).

Int32\_t iTrack: NX\_MPAddTrack() 에서 사용한 iTrack 을 사용한다. (input).

MP\_DSP\_CONFIG \*pInfo: (input).

Return value:

If success returns MP\_ERR\_NONE, otherwise return MP\_ERR.

```
typedef struct MP_DSP_RECT {
    int32_t ix;
```



```

        int32_t          iY;
        int32_t          iWidth;
        int32_t          iHeight;
    } MP_DSP_RECT;

    typedef struct MP_DSP_CONFIG {
        int32_t          iPort;      // 0:LCD, 1:HDMI
        int32_t          iModule;    // 0:MLC0, 1:MLC1
        MP_DSP_RECT      srcRect;    // Source Crop Region
        MP_DSP_RECT      dstRect;    // Destination Position Region
    } MP_DSP_CONFIG;

```

### 3.2.15 NX\_MPClearSubDisplay

Description:

Add 된 SubDisplay 장치를 제거한다.

Prototype:

```

MP_RESULT NX_MPClearSubDisplay (
                                MP_HANDLE hMp,
                                Int32_t iTrack
                                )

```

Parameters:

MP\_HANDLE hMp: Movie player handler(input/output).

Int32\_t iTrack: NX\_MPAddTrack() 에서 사용한 iTrack 을 사용한다. (input).

Return value:

If success returns MP\_ERR\_NONE, otherwise return MP\_ERR.

### 3.2.16 NX\_MPSetDspCrop

Description:

이 함수는 MLC 로 직접 rednering 하는 경우의 source image 를 crop 하는 함수이다.

Prototype:

```

MP_RESULT NX_MPSetDspCrop (
                                MP_HANDLE hMp,
                                Int32_t iTrack,
                                MP_DSP_RECT *pRect
                                )

```

Parameters:

MP\_HANDLE hMp: Movie player handler(input/output).

Int32\_t iTrack: NX\_MPAddTrack() 에서 사용한 iTrack 을 사용한다. (input).

MP\_DSP\_RECT \*pRect: (input).

Return value:

If success returns MP\_ERR\_NONE, otherwise return MP\_ERR.

### 3.2.17 NX\_MPSetDspPosition

Description:

이 함수는 MLC 로 직접 rendering 하는 경우 rendering 되는 image 의 position 을 조절하는 함수이다.

Prototype:

```
MP_RESULT NX_MPSetDspPosition (
    MP_HANDLE hMp,
    Int32_t iTrack,
    MP_DSP_RECT *pRect
)
```

Parameters:

MP\_HANDLE hMp: Movie player handler(input/output).

Int32\_t iTrack: NX\_MPAddTrack() 에서 사용한 iTrack 을 사용한다. (input).

MP\_DSP\_RECT \*pRect: (input).

Return value:

If success returns MP\_ERR\_NONE, otherwise return MP\_ERR.

### 3.2.18 NX\_MPSetVideoLayerPriority

Description:

이 함수는 MLC 로 직접 rendering 하는 경우 Video Layer 의 priority 를 조절하기 위한 함수이다.

Prototype:

```
MP_RESULT NX_MPSetVideoLayerPriority (
    MP_HANDLE hMp,
    Int32_t iTrack,
    Int32_t iModule,
    Int32_t iPriority
)
```

Parameters:

MP\_HANDLE hMp: Movie player handler(input/output).

Int32\_t iTrack: NX\_MPAddTrack() 에서 사용한 iTrack 을 사용한다. (input).

Int32\_t iModule: Display Module (input). MLC0→0, MLC1→1

Int32\_t iPriority: (input). 0, 1, or 2

Return value:

If success returns MP\_ERR\_NONE, otherwise return MP\_ERR.

### 3.2.19 NX\_MPSetVolume (Linux Only)

Description:

audio volume 조정.

Prototype:

```
MP_RESULT NX_MPSetVolume(MP_HANDLE hMp, int32_t iLevel)
```

Parameters:

MP\_HANDLE hMp: Movie player handler. (input/output)

Int32\_t iLevel: Volume value.(range 0 ~ 100, 0 means mute) (input)

Return value:

If success return MP\_ERR\_NONE, otherwise return MP\_ERR.

### 3.2.20 NX\_MPMakeThumbnail

Description:

Thumbnail 을 만듦

Jpeg(VPU).

Prototype:

```
int32_t NX_MPMakeThumbnail(
    const char *pInFile,
    const char *pOutFile,
    int32_t maxWidth,
    int32_t maxHeight,
    int32_t timeRatio
)
```

Parameters:

const char \*pInFile: In File (input).

const char \*pOutFile: Out File(input).

int32\_t maxWidth: Max Width (input).

int32\_t maxHeight: Max Height (input).

int32\_t timeRatio: Time Ratio (input).

Return value:

If success return MP\_ERR\_NONE, otherwise return MP\_ERR.

### 3.2.21 NX\_MPGetVersion

Description:

Version 정보를 얻어 옴.

Prototype:

```
int32_t NX_MPGetVersion (void)
```

Parameters:

None.

Return value:

MSB| Major( 8bit ) - Minor( 8bit ) - Revision( 8bit ) - Reserved( 8bit ) |LSB.

### 3.2.22 NX\_MPSetDspMode

Description:

Display mode 를 setting 함.

Prototype:

```
MP_RESULT NX_MPSetDspMode (
    MP_HANDLE hMp,
    int32_t iTrack,
    MP_DSP_CONFIG *pInfo,
    int32_t iDspMode )
```

Parameters:

MP\_HANDLE hMp : Movie player handler. (input/output)

int32\_T iTrack: track number. (input)

MP\_DSP\_CONFIG \*pInfo : display configurations. (input)

int32\_t iDspMode : display mode(input).

0: default, 1: only LCD, 2: only HDMI, 3: Only TVOUT,

4: LCD+HDMI, 5: LCD\_TVOUT

Return value:

If success return MP\_ERR\_NONE, otherwise return MP\_ERR.

### 3.2.23 NX\_MPSetRenderCallback

Description:

외부 rendering 을 하는 경우 rendering callback 함수를 setting 함.

Prototype:

```
MP_RESULT      NX_MPSetRenderCallBack (
                MP_HANDLE hMp,
                int32_t iTrack,
                void (*cbQtUpdateImg)(void *pImg))
```

Parameters:

MP\_HANDLE hMp : Movie player handler. (input/output)  
 int32\_T iTrack: track number. (input)  
 MP\_DSP\_CONFIG \*pInfo : display configurations. (input)  
 void (\*cbQtUpdateImg)(void \*pImg) : 외부 rendering function (input)

Return value:

If success return MP\_ERR\_NONE, otherwise return MP\_ERR.

### 3.2.24 NX\_GetState

Description:

Player 의 status 를 얻어 옴.

Prototype:

```
int32_t NX_GetState (MP_HANDLE hMp )
```

Parameters:

MP\_HANDLE hMp : Movie player handler. (input/output)

Return value:

Player status ( 0: stop, 1: play, 2: pause, 3: ready).

### 3.2.25 NX\_MPVideoMute

Description:

Video mute on/off 및 video mute off 인 경우 display init.

Prototype:

```
MP_RESULT      NX_MPVideoMute (
                MP_HANDLE hMp,
                int32_t bOnoff,
                MP_DSP_CONFIG *pInfo )
```

Parameters:

MP\_HANDLE hMp : Movie player handler. (input/output)\

int32\_t bOnoff : video mute on/off flag.(input)

MP\_DSP\_CONFIG \*pInfo : display configurations.(input)

Return value:

None

### 3.2.26 NX\_MPSetAVSync

Description:

This function controls the AVSync.

Prototype:

```
MP_RESULT      NX_MPSetAvSync (
                                MP_HANDLE hMp,
                                Int64_t syncTimeMs)
```

Parameters:

MP\_HANDLE hMp : Movie player handler. (input/output)\

Int64\_t syncTimeMs: +,- ms.(input)

+: audio is faster.

-: audio is slower.

Return value:

If success return 0, otherwise return error

### 3.2.27 NX\_MPGetVideoSpeedSupport

Description:

This function checks if video speed is available.

- Support file: .avi, .mkv, .mp4

- Support codec: h264, mpeg4

.

Prototype:

```
MP_RESULT      NX_MPGetVideoSpeedSupport (
                                MP_HANDLE hMp,
                                )
```

Parameters:

MP\_HANDLE hMp : Movie player handler. (input/output)\

Return value:

If support return 0, otherwise return error

### 3.2.28 NX\_MPSetVideoSpeed

Description:

This function controls the video speed.

Prototype:

```
MP_RESULT    NX_MPSetVideoSpeed (  
                MP_HANDLE hMp,  
                float Speed  
            )
```

Parameters:

MP\_HANDLE hMp : Movie player handler. (input/output)\

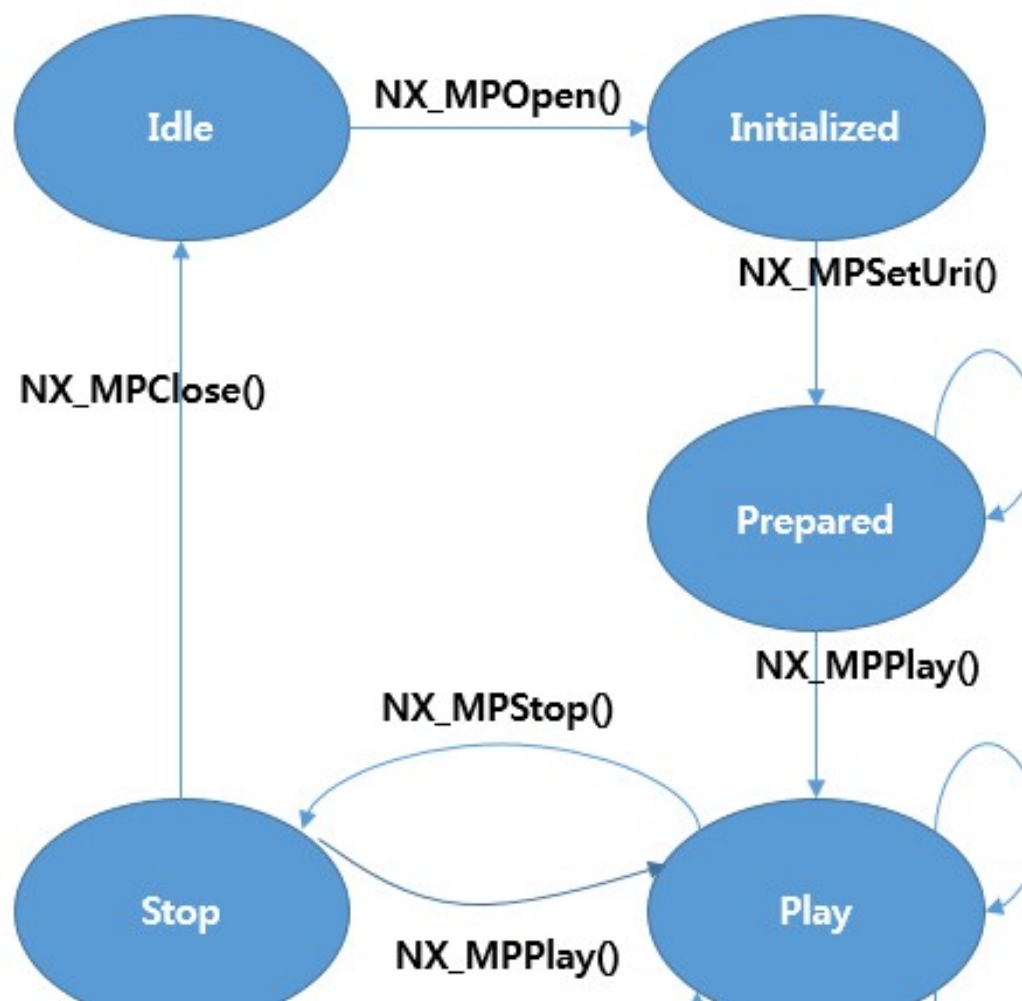
float Speed: 2,3,4,5,6,8...(input)

Return value:

If success return 0, otherwise return error

## Chap 4. State Diagram

### 4.1 Media Player State Diagram





## Chap 5. Scenario

### 5.1 Video Only, Audio Only, Video + Audio (Android)

#### 5.1.1 Video Surface

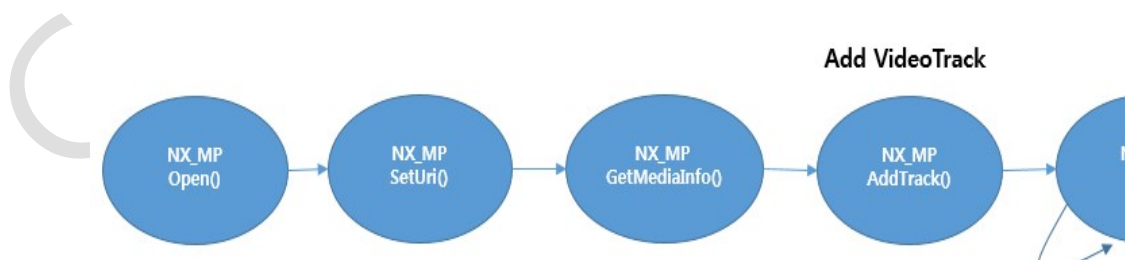
Android Surface 를 사용해서 Display 하는 Scenario 이다.

##### 5.1.1.1 Video Only

Surface 를 사용하는 경우는 NX\_MPAddTrack() 함수 인자를 Android Surface(NativeWindow)을 전달해야 한다.

아래 그림은 Video Only 함수 호출 순서이다.

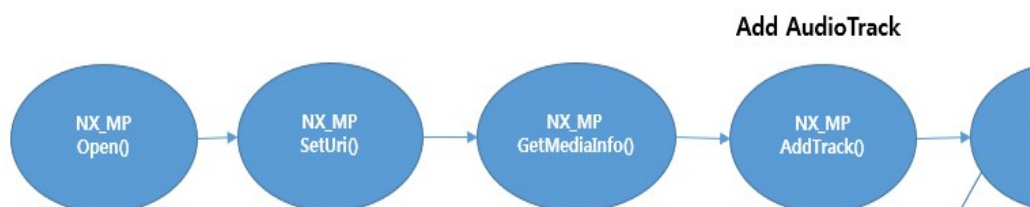
#### Video Only



##### 5.1.1.2 Audio Only

Android 경우 Volume 제어는 Android System 에서 제어한다.

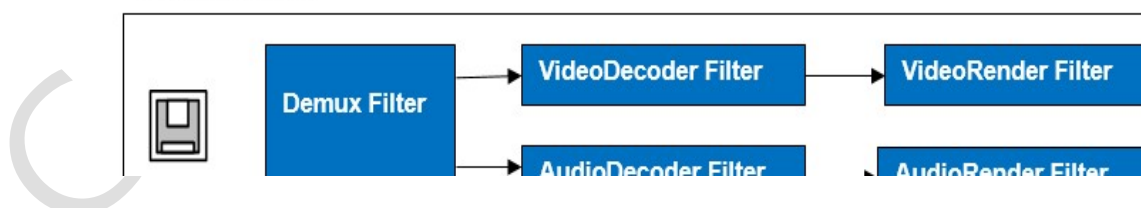
아래 그림은 Audio Only 함수 호출 순서이다.

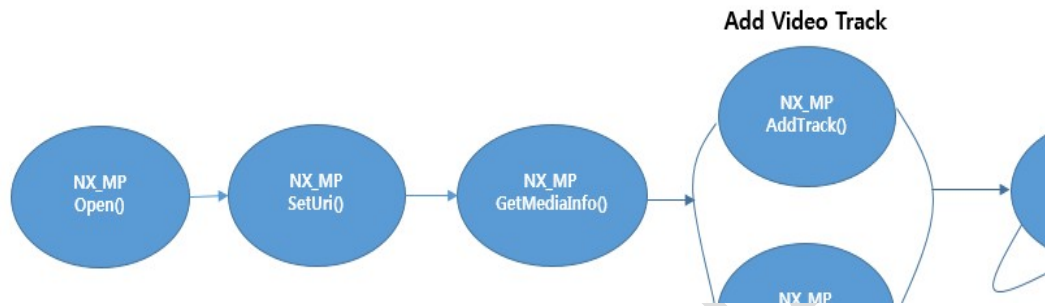
**Audio Only****5.1.1.3 Video + Audio**

Surface 를 사용하는 경우는 NX\_MPAddTrack() 함수 인자를 Android Surface(NativeWindow)을 전달해야 한다.

Android 경우 Volume 제어는 Android System 에서 제어한다.

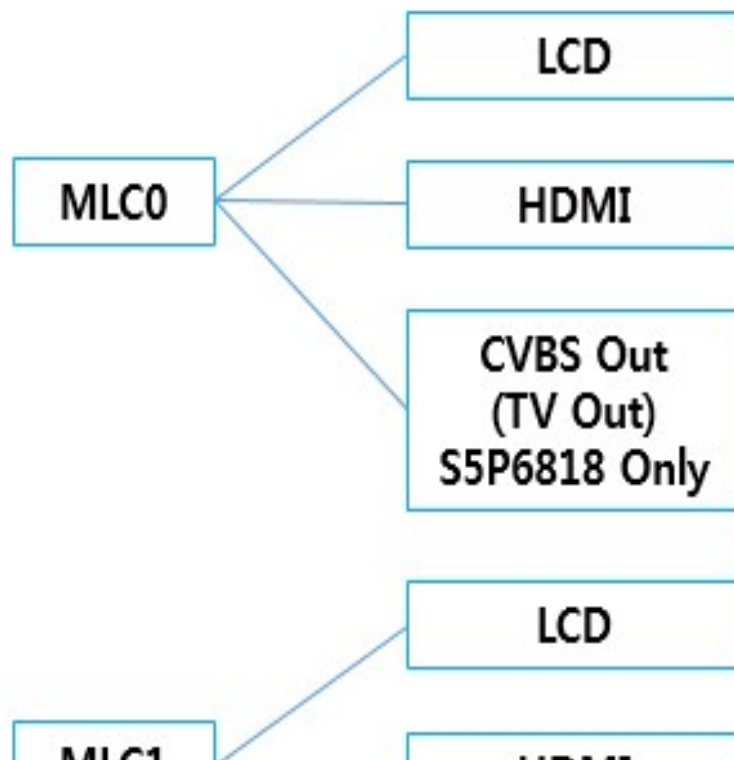
아래 그림은 Video + Audio 인 경우 함수 호출 순서이다.

**Video + Audio**



### 5.1.2 Video MLC

Android 에서 MLC 를 사용해서 Display 하는 Scenario 이다.



### 5.1.2.1 Video Only

MLC 를 사용하는 경우는 NX\_MPAddTrack() 함수 인자를 MP\_DSP\_CONFIG \*pInfo 을 설정한후 전달해야 한다.

아래그림은 MLC 를 사용해서 Display 할때 사용하는 함수 호출 순서이다.

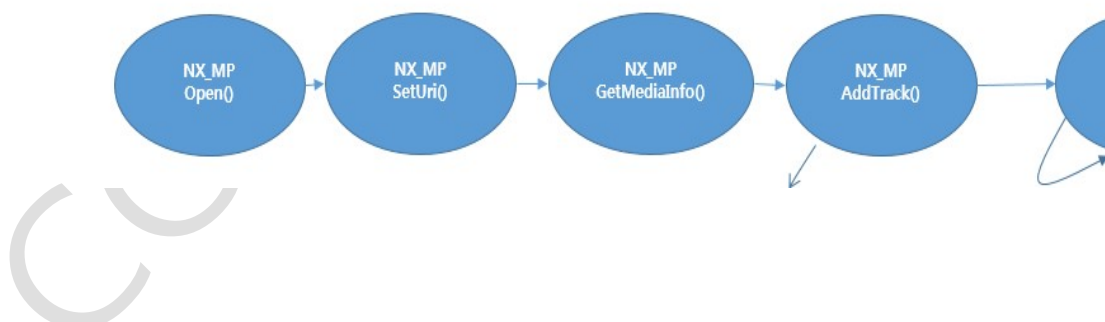
DualDisplay(LCD + HDMI ) 인 경우는 NX\_MPAddSubDisplay() 함수를 사용한다.

- Display
- 1. LCD
- 2. HDMI
- 3. LCD + HDMI

#### Video Only



LCD/HDMI



## 1. LCD + HDMI



### 5.1.2.2 Video + Audio

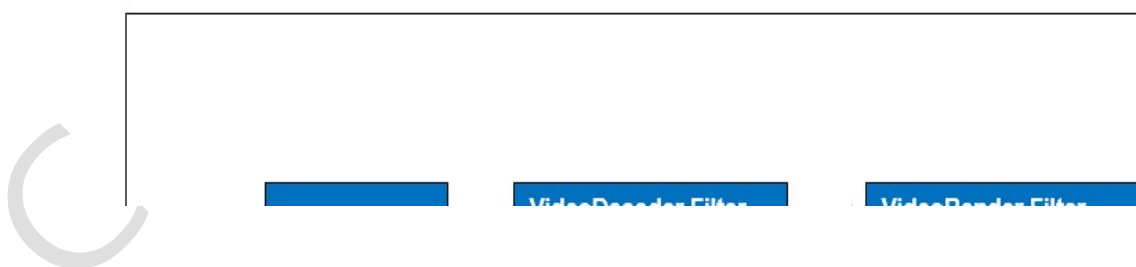
MLC 를 사용하는 경우는 NX\_MPAddTrack() 함수 인자를 MP\_DSP\_CONFIG \*pInfo 을 설정한후 전달해야 한다.

아래그림은 MLC 를 사용해서 Display 할때 사용하는 함수 호출 순서이다.

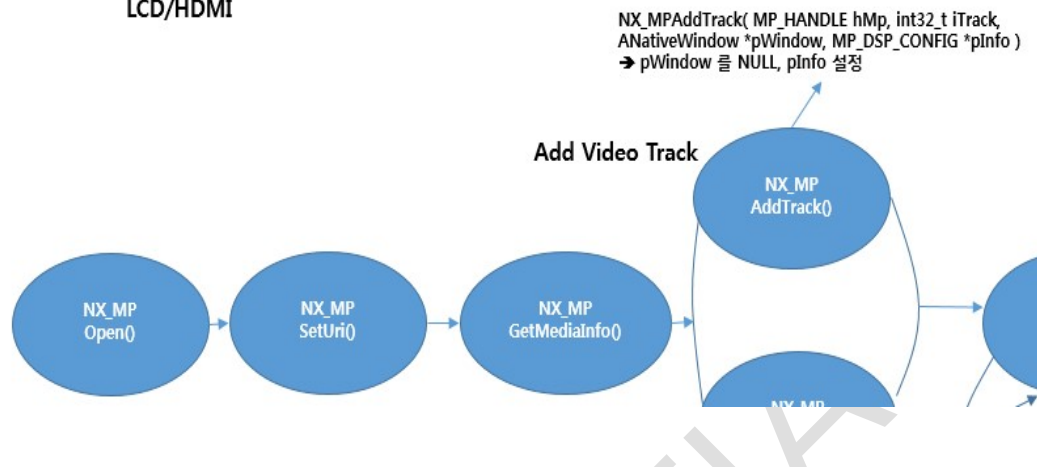
DualDisplay(LCD + HDMI ) 인 경우는 NX\_MPAddSubDisplay() 함수를 사용한다.

- Display
- 1. LCD
- 2. HDMI
- 3. LCD + HDMI

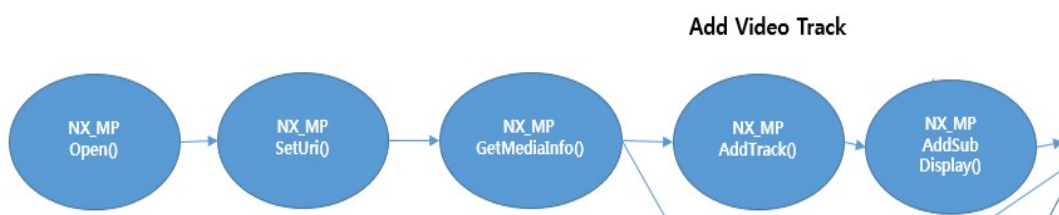
### Video + Audio



## LCD/HDMI



## 1. LCD + HDMI



## 5.2 Video Only, Audio Only, Video + Audio (Linux)

### 5.2.1 Video MLC

Linux 에서 Display 는 MLC 를 사용한다.

아래는 Linux 에 관련된 Scenario 이다.

Linux 에서는 Volume Control 은 NX\_MPSetVolume()함수를 통해서 제어한다.

#### 5.2.1.1 Video Only

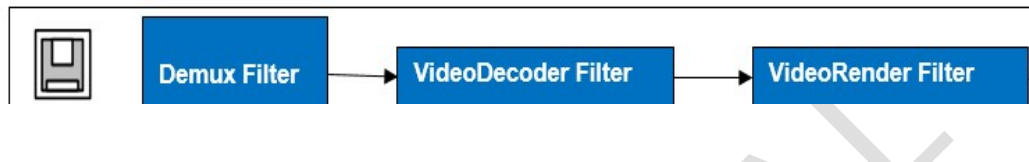
NX\_MPAddTrack() 함수 인자를 MP\_DSP\_CONFIG \*pInfo 을 설정한후 전달해야 한다.

아래그림은 Video Only 일때 Display 하기위한 사용하는 함수 호출 순서이다.

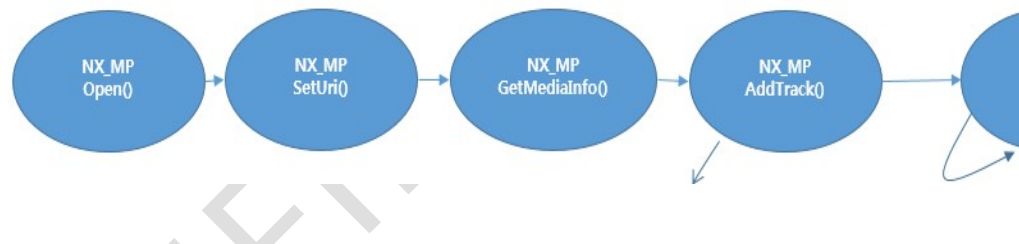
DualDisplay(LCD + HDMI ) 인 경우는 NX\_MPAddSubDisplay() 함수를 사용한다.

- Display
- 1. LCD
- 2. HDMI
- 3. LCD + HDMI

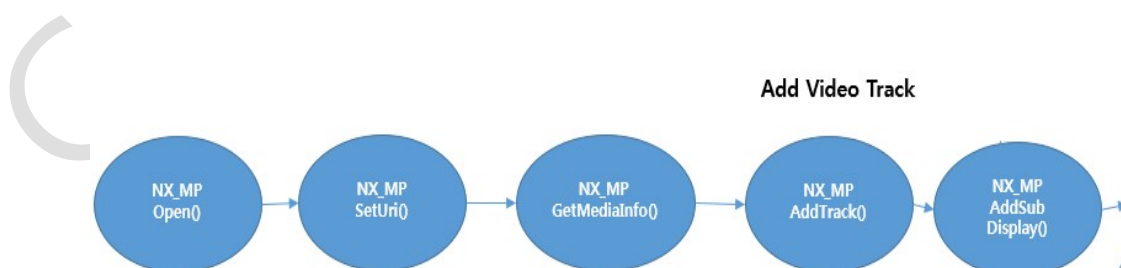
#### Video Only



#### LCD/HDMI



#### 1. LCD + HDMI



### 5.2.1.2 Video + Audio

NX\_MPAddTrack() 함수 인자를 MP\_DSP\_CONFIG \*pInfo 을 설정한후 전달해야 한다.

아래그림은 MLC 를 사용해서 Display 할때 사용하는 함수 호출 순서이다.

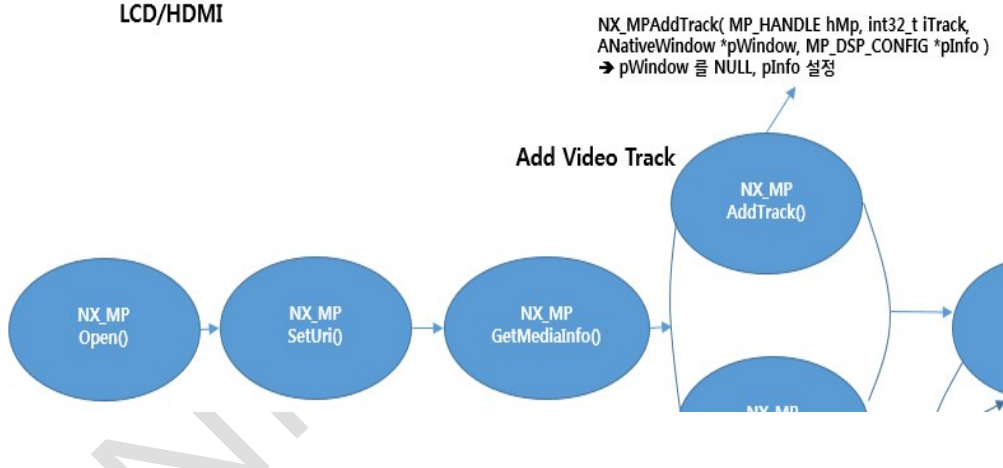
DualDisplay(LCD + HDMI) 인 경우는 NX\_MPAddSubDisplay() 함수를 사용한다.

- Display
1. LCD
  2. HDMI
  3. LCD + HDMI

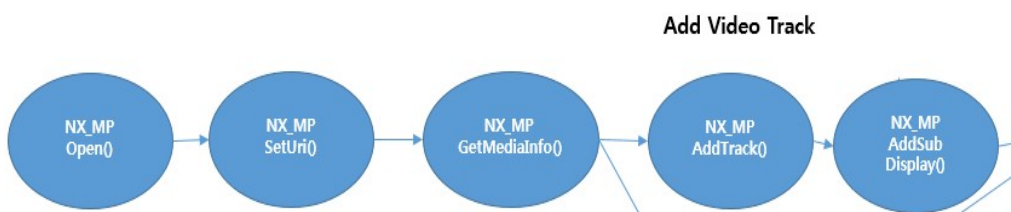
Video + Audio



LCD/HDMI



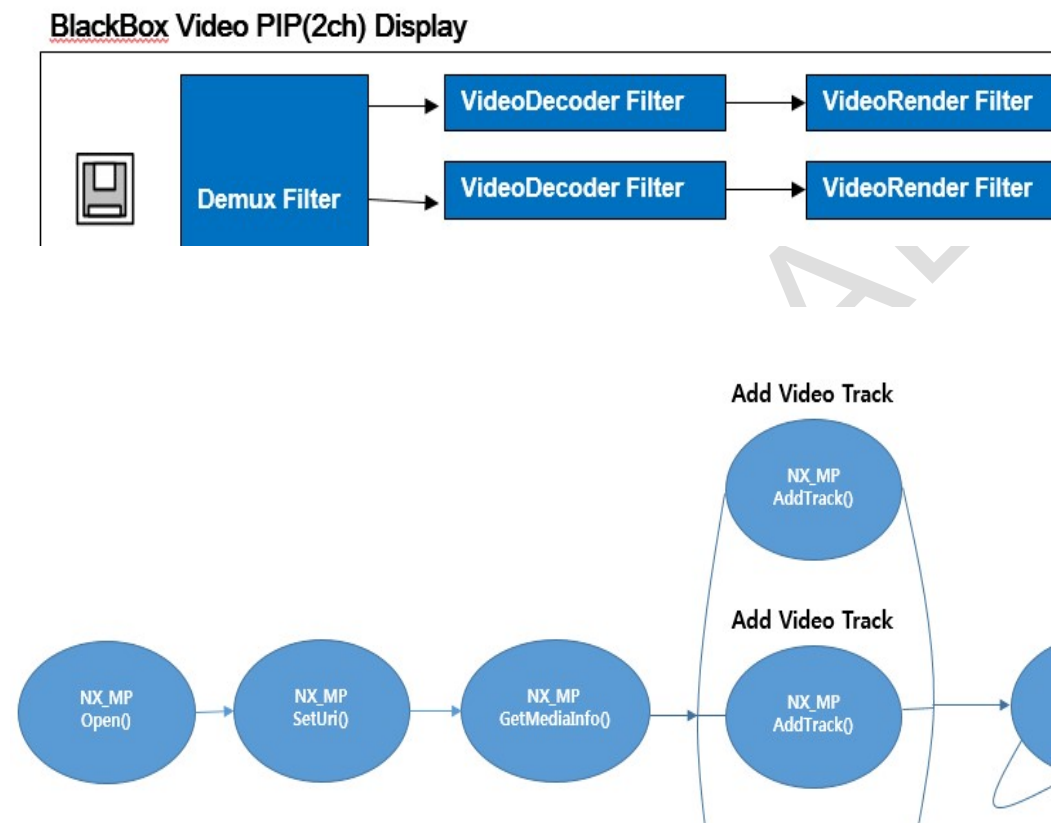
1. LCD + HDMI





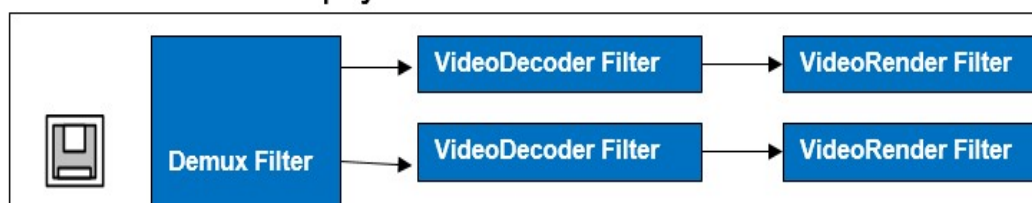
### 5.3 BlackBox Video PIP(2ch) Display (Android)

BlackBox 인 경우는 Nexell 에서 제공한 BlackBox 를 사용해서 인코딩한것만 PIP 를 제공한다.



### 5.4 BlackBox Video 2ch Display (Linux)

**BlackBox Video 2ch Display**

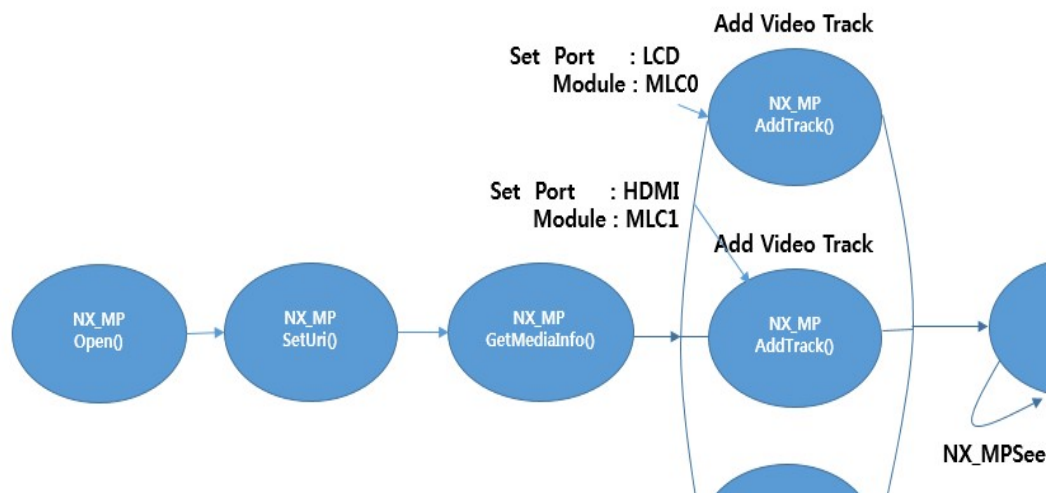


아래 그림은 BlackBox 에서 2ch Display 를 실행하기 위한 함수 호출순서이다.

1. 1ch Video Track 은 LCD, NX\_MPAAddTrack() 에서 Port: LCD, Module: MLC0 을 설정한다.

2. 2ch Video Track 은 HDMI., NX\_MPAddTrack() 에서 Port: HDMI, Module: MLC1 을 설정한다
3. Audio Track 을 NX\_MPAddTrack() 사용해서 Audio Track 을 추가한다..
4. Play 를 실행한다.

#### 1. LCD + HDMI



## Chap 6. **Known Issues**

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### **6.1 To Do List**

- HEVC S/W Codec 지원.

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### **6.2 Known Issues**