서식 있음: 들여쓰기: 왼쪽 0 글자

Demo Application UI Guide (NxQuickRearCam)

Version 01.60.0

Display Audio

Solution Team

Release information

The following changes have been make to this document.

Change History

Date	Change
28 Feb. 2019~~04 Dec. 2017~~	First release for v1.0.0~~First release for v0.6.0~~

서식 있는 표

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Contents

Chap 1. Overview 1

1.1 Overview 1

1.2 Block Diagram 1

1.3 Application UI 2

1.4 Configuration File 32

Chap 2. Camera Library 65

2.1 Overview 65

2.2 APIs 65

Chap 3. History 1310

3.1 Known Issue 1310

3.2 To do list 1310

Chap 1. Overview 1

1.1 Overview 1

1.2 Block Diagram 1

1.3 Application UI 1

Chap 2. Camera Library 3
2.1 Overview 3
2.2 APIs 3

Chap 3. History 6
3.1 Known Issue 6
3.2 To do list 6

Chap 1. Overview

1.1 Overview

이 문서는 Display Audio 의 Demo Application 인 NxQuickRearCam 에 대해서 설명한 문서이다. NxQuickRearCam 은 Kernel Layer 의 NxQuickRearCam Camera application 의 동작을 이어받아서 동작하도록 되어있다.

Demo Application 에서는 차량용 Rear Camera System 을 modeling 하기 위하여 GPIO pin 한 개를 후방 기어로 modeling 하였으며, 이를 통하여 application 이 camera 영상은 display 하도록 되어 있으며 software deinterlace engine 을 실행되도록 구성되어있다.포함하고 있다.

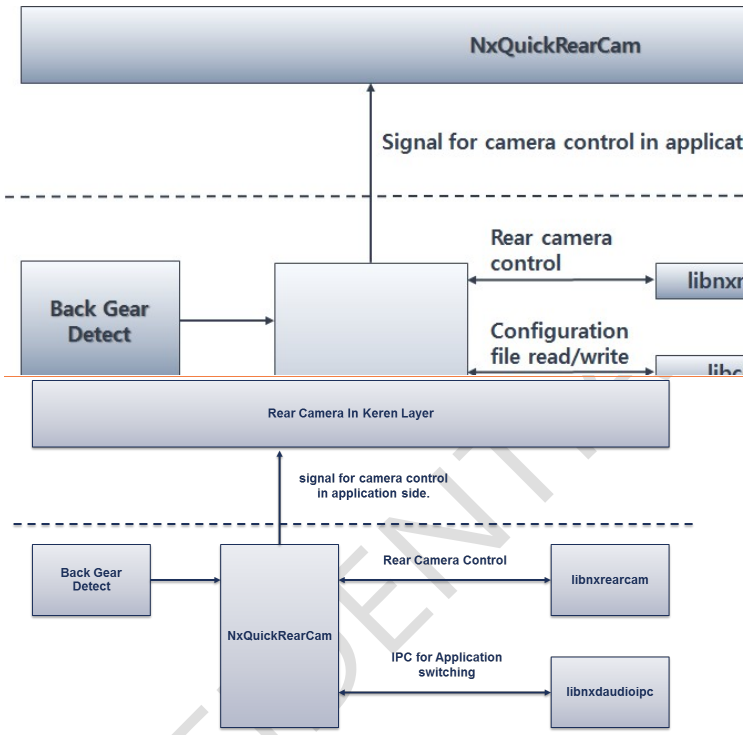
* NxQuickRearCam : booting 완료(NxLauncher 실행을 포함) 전, backgear 와 연동되는 camera service 를 제공하기 위한 application.

서식 있음: 양쪽

1.2 Block Diagram

NxQuickRearCam 은 아래와 같이 구성되어있다. Application 시작시에 kernel layer 의 CameraQuickRearCam Application 으로부터 제어권을 얻어 오기 위한 signal 을 발생시킨다. 이로부터 NxRearCamapplication 은 자체적으로 back gear 를 detection 하며 NxQuickRearCamcamera 영상을 display 하도록 구성되어 있다.아 실행되도록 구성되어있다.

서식 있음: 양쪽

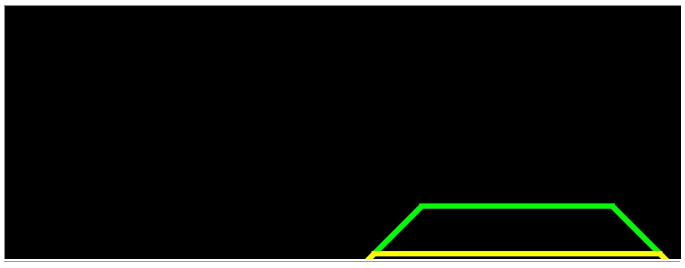


서식 있음: 가운데

1.3 Application UI

Application 화면은 다음과 같으며 화면상에 Camera 영상과 Parking Guideline 이 같이 주사된다.

서식 있음: 양쪽



서식 있음: 가운데

서식 있음: 왼쪽

1.4 Configuration File

서식 있음: 양쪽

Configuration file(rearcam_config.xml)은 camera 및 display 를 위한 configuration 값들이 포함되어 있다. Configuration file 은 "/nexell/daudio/NxRearCam/"에 위치한다 파일이 존재하지 않을 경우, application 은 default value 들로 실행된다.

Configuration file 의 형식은 다음과 같다.

[rearcam_config.xml]

```
<?xml version="1.0" encoding="UTF-8"?>
<map>
    <string name="module">1</string>
    <string name="use_intercam">1</string>
    <string name="cam_width">704</string>
    <string name="cam_height">480</string>
    <string name="video_layer_idx">0</string>
    <string name="crtc_idx">0</string>
    <string name="cam_display_x">0</string>
    <string name="cam_display_y">0</string>
    <string name="cam_display_width">1024</string>
    <string name="cam_display_height">600</string>
    <string name="deinterlace_engine">1</string>
    <string name="deinter_param">3</string>
    <string name="lcd_width">1024</string>
    <string name="lcd_height">600</string>
    <string name="pgl_enable">1</string>
    <string name="backgear_enable">1</string>
    <string name="gpioIdx">163</string>
    <string name="quick_running">1</string>
```

```
</map>
```

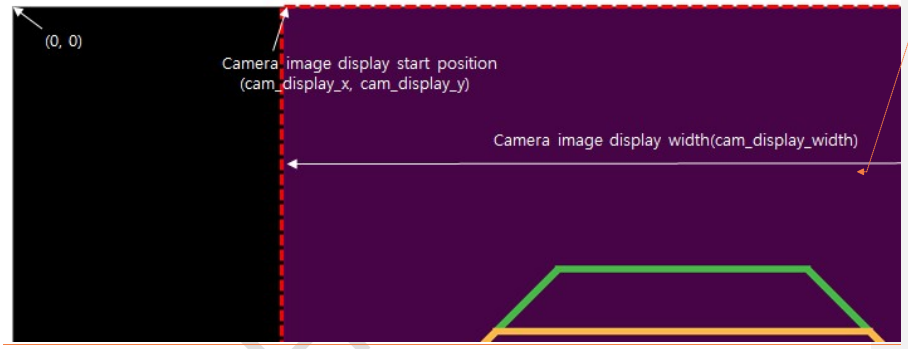
Configuration	Description
module	Camera senor module number
use_intercam	Interlace camera 사용 여부 0 : not use interlace camera 1 : use interlace camera
cam_width	Camera image width
cam_height	Camera image height
video_layer_idx	Camera image가 rendering될 layer index. 본 application에서는 video layer에 rendering되므로 0으로 setting되어야 함
crtc_idx	몇 번째 crtc를 사용할 것인지에 대한 index로 하나의 display device만 지원되면 0으로 setting되어야 하며 두 개 이상의 display device를 사용할 경우 선택적으로 원하는 display device의 index를 setting
cam_display_x	Camera image를 display할 위치의 시작 x position
cam_display_y	Camera image를 display할 위치의 시작 y position
cam_display_width	Camera image display width
cam_display_height	Camera image display height
deinterlace_engine	Interlace camera를 사용할 경우 적용할 deinterlace engine 0: none 1: Nexell deinterlace engine 2. TS deinterlace engine
deinter_param	Motion detect sensitivity. TS deinterlace engine을 사용할 경우 적용되는 parameter
lcd_width	display device의 display width
lcd_height	display device의 display height
pgl_enable	Parking guide line을 drawing할 것인지 결정 0 : parking guide line을 그리지 않음 1 : parking guide line을 그림
backgear_enable	Backgear 연동을 할 것인지 결정

	0 : backgear 연동하지 않음 1 : backgear 연동 함
gpioIdx	Backgear와 mapping되어 있는 gpio의 number
quick_running	QuickRearCam의 사용 여부 0 : QuickRearCam을 사용하지 않음 1 : QuickRearCam을 사용함

서식 있음

아래는 display position 및 size 와 관련된 configuration parameter 들을 설명하기 위한 그림이다.

서식 있음: 들여쓰기: 왼쪽 2.13 글자



Camera image 가 display 되는 region 은 display device 가 지원하는 full 영역을 사용할 수도 있고, camgera image 의 aspact ratio 를 고려하여 camera image 가 display 되는 region 을 설정할 수도 있다.

서식 있음: 들여쓰기: 왼쪽 5.67 글자

Chap 2. Camera Library

2.1 Overview

Camera 의 동작을 제어하기 위한 library libnxrearcam.so 가아 제공되며, 사용방법은 API 들은 아래와 같다.

2.2 APIs

2.2.1 NX_RegisterBackGearEventCallBack()

`void NX_RegisterBackGearEventCallBack(void *pAppData, void (*callback)( int32_t))`
Description Register callback function for action when backgear is detected.
Parameter void *pAppData : pointer of app data void (*callback)(int32_t) : callback function
Return Value None

서식 있음: 글꼴: 굵게 없음

서식 있음: 글꼴: 굵게 없음

서식 있음: 표준

2.2.2 NX_StartBackGearDetectService ()

`int32_t NX_StartBackGearDetectService( int32_t nGpio, int32_t nChkDelay )`
Description Start backgear detection service.
Parameter int32_t nGpio : index of gpio for backgear int32_t nChkDelay : interval time for checking gpio status
Return Value Zero is successful, -1 is failed

서식 있음: 표준

2.2.3 NX_StopBackGearDetectService()

`void NX_StopBackGearDetectService()`
Description Stop backgear detection service

Parameter
None
Return Value
None

~~2.2~~

서식 있음: 표준

2.2.4 NX_RearCamInit()

int32_t NX_QuickRearCamInit (NX_REARCAM_INFO *p_VipInfo, DISPLAY_INFO* p_dspInfo, DEINTERLACE_INFO *p_deinterInfo)
Description
Initialization
Parameter
NX_REARCAM_INFO* p_VipInfo : configuration for camera DISPLAY_INFO* p_dspInfo : configuration for display DEINTERLACE_INFO* p_deinterInfo : configuration for deinterlace
Return Value
Zero is successful, -1 is failed.

- NX_REARCAM_INFO

```
typedef struct _NX_REARCAM_INFO{
        int32_t iType;              //camera type : CAM_TYPE_VIP
        int32_t iModule;            //camera module index
        int32_t iSensor;            //sensor
        int32_t iClipper;           //clipper
        int32_t bUseMipi;           //using mipi
        int32_t bUseInterCam;       //using interlace camera
        int32_t iFpsNum;            //frame per sec
        int32_t iFpsDen;            //denominate value of fps
        int32_t iNumPlane;          //number of plane
        int32_t iWidth;             //camera input width
        int32_t iHeight;            //camera input height
        int32_t iCropX;             //crop x position
        int32_t iCropY;             //crop y position
        int32_t iCropWidth;         //crop width
        int32_t iCropHeight;        //crop height
        int32_t iOutWidth;          //decimator width
        int32_t iOutHeight;         //decimator height
} NX_REARCAM_INFO;
```

- DISPLAY_INFO

```
typedef struct tagDISPLAY_INFO{
        uint32_t iConnectorIdx;     //drm connector index
```

```
    int32_t iPlaneIdx;          //drm plane index
    int32_t iCrtcIdx;           //drm crtc indexc
    uint32_t uDrmFormat;        //drm data format
    int32_t iSrcWidth;          //width of input image
    int32_t iSrcHeight;         //height of input image
    int32_t iCropX;             //crop x position
    int32_t iCropY;             //crop y position
    int32_t iCropWidth;         //crop width
    int32_t iCropHeight;        //crop height
    int32_t iDspX;              //display position
    int32_t iDspY;              //crop start x position
    int32_t iDspWidth;          //crop start y position
    int32_t iDdspHeight;        //crop width
    int32_t iCropHeight;        //crop height
    int32_t iPlaneId_PGL;       //plane ID for drawing parking guide line
    int32_t uDrmFormat_PGL; //data format for drawing parking guide line
    void*       m_pNativeWindow;    //only for surface view rendering at android application
} DISPLAY_INFO;
```

- DEINTERLACE_INFO

```
typedef struct tagDEINTERLACE_INFO{
    int32_t iWidth;             //width of input image
    int32_t iHeight;            //height of input image
    int32_t iEngineSel;         //deinterlace engine – 0 : none 1:nexell deinterlace 2: Thunder soft deinterlace
    int32_t iCorr;              // correlation value of motion detection sensitivity for Thunder soft deinterlace
} DEINTERLACE_INFO;
```

~~int32_t NXDA_ShowRearCam(~~
~~CAMERA_INFO *pCamInfo,~~
~~DISPLAY_INFO *pDspInfo~~
~~);~~

~~Description~~

~~Show Rear Camera.~~

~~Parameter~~

~~- pCamInfo : Camera Information~~
~~- pDspInfo : Display Information~~

~~Return Value~~

~~Please describe return value.~~

서식 있음: 들여쓰기: 첫 줄: 4 글자

2.2.5 NX_RearCamDeInit ()

서식 있음: 다단계 번호 매기기 + 수준:3 + 번호 스타일: 1, 2, 3, … + 시작 번호: 1 + 맞춤: 왼쪽 + 맞춤 위치: 0 cm + 들여쓰기 위치: 2.5 cm

```
int32_t NX_RearCamDeInit()
```

Description

Rear cam deinit
Parameter
None
Return Value
Zero is successful, -1 is failed.

서식 있음: 표준, 글머리 기호 또는 번호 없이

2.2.6 NX_RearCamStart()

int32_t NX_QuickRearCamStart()
Description
Start rendering rear camera images.
Parameter
None
Return Value
Zero is successful, -1 is failed.

~~2.2.1 NXDA_HideRearCam()~~

~~void NXDA_HideRearCam(~~ ~~void~~ ~~);~~
~~**Description**~~
~~Hide Rear Camera.~~
~~**Parameter**~~
~~None.~~
~~**Return Value**~~
~~None~~

2.2.7 NX_RearCamGetStatus

int32_t NX_QuickRearCamGetStatus()
Description
Get status
Parameter
None
Return Value
0 : stop 1 : init 2 : running

~~2.2.2 NXDA_RegRenderCallback()~~

~~void NXDA_RegRenderCallback(~~

~~void *pApp~~
~~int32_t (callback)(void *, int32_t, void*, int32)~~
~~);~~

~~Description~~

~~Register Rear Camera render callback.~~

~~Parameter~~

~~. pApp : private handle.~~
~~. callback : redering callback.~~
~~int32_t callback(void* pApp, int32_t type, void* data, int32_t dataSize)~~
~~-. pApp : private handle.~~
~~. type : callback function type. (CB_TYPE_BUFFER, CB_TYPE_HIDE, CB_TYPE_SHOW)~~
~~. data : send data for callback.~~
~~-. dataSize : size of data~~

~~Return Value~~

~~None~~

2.2.8 NX_RearCamGetVersion

```
int32_t NX_QuickRearCamGetVersion()
```

Description

Get NxQuickRearCam version information

Parameter

None

Return Value

Version information

Major : ((return value) & 0xFF000000) >> 24
Minor : ((return value) & 0x00FF0000) >> 16
Revision : ((return value) & 0x0000FF00) >> 8
Reservation : ((return value) & 0x000000FF)

~~2.2.3 NXDA_RegControlCallback()~~

```
void NXDA_RegControlCallback(
        void *pApp,
        int32_t (callback)(void *, int32_t, void *, int32_t)
);
```

~~Description~~

~~Register Rear Camera control callback.~~

~~Parameter~~

~~. pApp : private handle.~~
~~. callback : redering callback.~~
~~int32_t callback(void* pApp, int32_t type, void* data, int32_t dataSize)~~
~~-. pApp : private handle.~~
~~-. type : callback function type. (CB_TYPE_BUFFER, CB_TYPE_HIDE, CB_TYPE_SHOW)~~

- data : send data for callback. - dataSize : size of data
Return Value None

2.2.4

서식 있음

2.2.52.2.9 NX_RearCamSetDisplayPosition NXDA_StartBackGearDetectService()

int32_t NXDA_StartBackGearDetectService(int32_t nGpiox, int32_t nChkDelayy, int32_t w, int32_t h);
Description Set display position of camera images Start back gear detection service.
Parameter - nGpiox : : GPIO port numberstart x-position. - nChkDelayy : start y-position - w : display width. - h : display heightGPIO check delay (mSec)
Return Value Zero is returned.

서식 있음: 들여쓰기: 첫 줄: 0.5 글자

2.2.6 NXDA_StopBackGearDetectService()

void NXDA_StopBackGearDetectService(void);
Description Start back gear detection service.
Parameter None.
Return Value None.

2.2.7 NXDA_RegisterBackGearEventCallback()

void NXDA_RegisterBackGearEventCallback(void *pAppData, void (*callback)(void *pAppData, int32_t nOnOff)

); **Description** Please describe this function.
Parameter - pAppData : private handle. - callback : register back gear detection callback. void (*callback)(void *pAppData, int32_t nOnOff) - pAppData : private handle. - nOnOff : back gear status.
Return Value None.

Chap 3. History

3.1 Known Issue

-. Not yet.

3.2 To do list

-. ~~Audio Focus 전환 시나리오 적용.~~