# MI VIF API

**Version 2.04**

# REVISION HISTORY

| Revision No. | Description | Date |
|---|---|---|
| 2.03 | • Initial release | 07/25/2018 |
| 2.04 | • Updated for accuracy | 06/13/2019 |

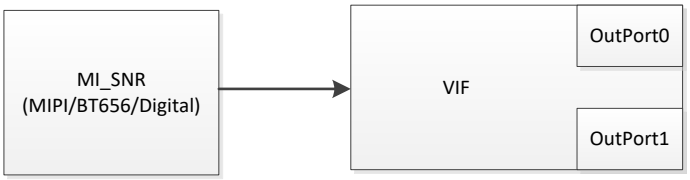
# TABLE OF CONTENTS

# 1. SCOPE

## 1.1. Module description

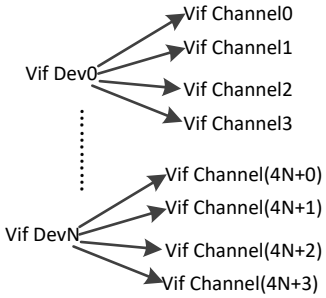
Video input (VIF) enables video input device, video input channel, binding video input channel and other functions.

## 1.2. Flow chart




Vif output port1 is only used in bt656 interface, and the width / height of output 1 is half of that of output 0

The mapping between MI_Vif device and channel is as follows：




328Q/329D/326D and 336D/336Q/339G chip N max=3,
325/325DE/327D and 335/337DE chip N max=2
Note：N is Device Id.

Only the first channel in the corresponding vifdev can be used in Mipi interface, and multi channel in vifdev can be used in bt656 interface composite mode

## 1.3. Keyword

N/A.

# 2. API REFERENCE

This function module provides the following API:

| API Name | Function |
|---|---|
| MI_VIF_SetDevAttr | Set VIF device attribute |
| MI_VIF_GetDevAttr | Get VIF device attribute |
| MI_VIF_EnableDev | Enable VIF device |
| MI_VIF_DisableDev | Disable VIF device |
| MI_VIF_SetChnPortAttr | Set VIF channel port attribute |
| MI_VIF_GetChnPortAttr | Get VIF channel port attribute |
| MI_VIF_EnableChnPort | Enable VIF channel port |
| MI_VIF_DisableChnPort | Disable VIF channel port |
| MI_VIF_Query | Query VIF channel port interrupt counts, average frame rate |
| MI_VIF_SetDev2SnrPadMux | Set VIF binding relation between device and sensor pad |

## 2.1. MI_VIF_SetDevAttr

- Description

  Set VIF device attribute.

- Syntax

  MI_S32 MI_VIF_SetDevAttr(MI_VIF_DEV u32VifDev, MI_VIF_DevAttr_t *pstDevAttr)

- Parameters

| Parameter Name | Description | Input/Output |
|---|---|---|
| u32VifDev | VIF device number.<br>Value range: [0, MI_VIF_MAX_DEV_NUM). | Input |
| pstDevAttr | VIF device attribute pointer. Static attribute. | Input |

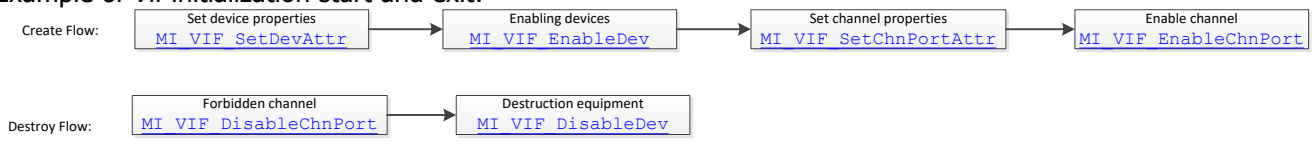
- Return Value
  - MI_OK: Successful
  - Non-zero: Failed, see error code for details

- Dependence
  - header file: mi_vif_datatype.h, mi_vif.h
  - lib: libmi_vif.a

- Note
  - This API is available after VIF device is disabled using MI_VIF_DisableDev.
  - The parameter pstdevottr is mainly used to configure the video interface mode of the specified Vif device, which is used to interface with peripheral cameras and sensors. The supported interface modes include BT.656, digital camera and Mipi sensor. Please refer to Section 3.10 data type for specific attribute meanings.

- Example

Example of Vif initialization start and exit:




```
STCHECKRESULT(MI_SNR_GetPadInfo(eSnrPadId, &stPad0Info));
STCHECKRESULT(MI_SNR_GetPlaneInfo(eSnrPadId, 0, &stSnrPlane0Info));

u32CapWidth = stSnrPlane0Info.stCapRect.u16Width;
u32CapHeight = stSnrPlane0Info.stCapRect.u16Height;
ePixFormat = (MI_SYS_PixelFormat_e)RGB_BAYER_PIXEL(stSnrPlane0Info.ePixPrecision,
stSnrPlane0Info.eBayerId);

/**********************************************
 init VIF
**********************************************/
```

```
MI_VIF_DevAttr_t stDevAttr;
memset(&stDevAttr, 0x0, sizeof(MI_VIF_DevAttr_t));

stDevAttr.eIntfMode = stPad0Info.eIntfMode;
stDevAttr.eWorkMode = pstVifDevAttr->eWorkMode;
stDevAttr.eHDRType = (MI_VIF_HDRType_e)pstVpeChnattr->eHdrType;
if(stDevAttr.eIntfMode == E_MI_VIF_MODE_BT656)
	stDevAttr.eClkEdge = stPad0Info.unIntfAttr.stBt656Attr.eClkEdge;
else
	stDevAttr.eClkEdge = E_MI_VIF_CLK_EDGE_DOUBLE;

if(stDevAttr.eIntfMode == E_MI_VIF_MODE_MIPI)
	stDevAttr.eDataSeq =stPad0Info.unIntfAttr.stMipiAttr.eDataYUVOrder;
else
	stDevAttr.eDataSeq = E_MI_VIF_INPUT_DATA_YUYV;

if(stDevAttr.eIntfMode == E_MI_VIF_MODE_BT656)
	memcpy(&stDevAttr.stSyncAttr, &stPad0Info.unIntfAttr.stBt656Attr.stSyncAttr,
sizeof(MI_VIF_SyncAttr_t));

stDevAttr.eBitOrder = E_MI_VIF_BITORDER_NORMAL;

STCHECKRESULT(MI_VIF_SetDevAttr(vifDev, &stDevAttr));
STCHECKRESULT(MI_VIF_EnableDev(vifDev));

MI_VIF_ChnPortAttr_t stVifPortInfo;
memset(&stVifPortInfo, 0, sizeof(MI_VIF_ChnPortAttr_t));
stVifPortInfo.stCapRect.u16X = stSnrPlane0Info.stCapRect.u16X;
stVifPortInfo.stCapRect.u16Y = stSnrPlane0Info.stCapRect.u16Y;
stVifPortInfo.stCapRect.u16Width =   stSnrPlane0Info.stCapRect.u16Width;
stVifPortInfo.stCapRect.u16Height = stSnrPlane0Info.stCapRect.u16Height;
stVifPortInfo.stDestSize.u16Width = u32CapWidth;
stVifPortInfo.stDestSize.u16Height = u32CapHeight;
stVifPortInfo.ePixFormat = ePixFormat;
//stVifPortInfo.u32FrameModeLineCount for lowlantancy mode

if(stDevAttr.eIntfMode == E_MI_VIF_MODE_BT656)
{
	stVifPortInfo.eFrameRate = E_MI_VIF_FRAMERATE_FULL;
	stVifPortInfo.eCapSel = E_MI_SYS_FIELDTYPE_BOTH;
	stVifPortInfo.eScanMode = E_MI_SYS_FRAME_SCAN_MODE_PROGRESSIVE;
}
STCHECKRESULT(MI_VIF_SetChnPortAttr(vifChn, vifPort, &stVifPortInfo));
STCHECKRESULT(MI_VIF_EnableChnPort(vifChn, vifPort));
/************************************************
call sys bind interface
************************************************/

/************************************************
exit call sys unbind interface
************************************************/
STCHECKRESULT(MI_VIF_DisableChnPort(vifChn, vifPort));
STCHECKRESULT(MI_VIF_DisableDev(vifDev));
```

- Related APIs

  MI_VIF_GetDevAttr

## 2.2. MI_VIF_GetDevAttr

- Description

  Get VIF device attribute.

- Syntax

  MI_S32 MI_VIF_GetDevAttr(MI_VIF_DEV u32VifDev, MI_VIF_DevAttr_t *pstDevAttr)

- Parameters

| Parameter Name | Description | Input/Output |
|---|---|---|
| u32VifDev | VIF device number.<br>Value range: [0, MI_VIF_MAX_DEV_NUM).<br>Note: devid of VIF must be set by 0 during binding | Input |
| pstDevAttr | VIF device attribute pointer. | Output |

- Return Value
  - MI_OK: Successful
  - Non-zero: Failed, see error code for details

- Dependence
  - header file: mi_vif_datatype.h, mi_vif.h
  - lib: libmi_vif.a

- Note

  This API will return fail if VIF device attribute is not configured

- Example

  none.

- Related APIs

  MI_VIF_SetDevAttr

## 2.3. MI_VIF_EnableDev

- Description

  Enable VIF device.

- Syntax

  MI_S32 MI_VIF_EnableDev(MI_VIF_DEV u32VifDev);

- Parameters

| Parameter Name | Description | Input/Output |
|---|---|---|
| u32VifDev | VIF device number. | Input |

- Return Value
  - MI_OK: Successful
  - Non-zero: Failed, see error code for details

- Dependence
  - header file: mi_vif_datatype.h, mi_vif.h
  - lib: libmi_vif.a

- Note
  - Enable must be after device attribute have be configured, or fail will be returned
  - Calling again is available, fail will not be returned.

- Example

  Please refer to MI_VIF_SetDevAttr.

- Related APIs

  MI_VIF_DisableDev

## 2.4. MI_VIF_DisableDev

- Description

  Disable VIF device.

- Syntax

  MI_S32 MI_VIF_DisableDev(MI_VIF_DEV u32VifDev);

- Parameters

| Parameter Name | Description | Input/Output |
|---|---|---|
| u32VifDev | VIF device number. | Input |

- Return Value
  - MI_OK: Successful
  - Non-zero: Failed, see error code for details

- Dependence
  - header file: mi_vif_datatype.h, mi_vif.h
  - lib: libmi_vif.a

- Note
  - Disable of VIF device is available after all binding channels of VIF have be disabled
  - Calling again is available, fail will not be returned.

- Example

  Please refer to MI_VIF_SetDevAttr.

- Related APIs

  MI_VIF_EnableDev

## 2.5. MI_VIF_SetChnPortAttr

- Description

  Set VIF channel port attribute.

- Syntax

  MI_S32 MI_VIF_SetChnPortAttr(MI_VIF_CHN u32VifChn, MI_VIF_PORT u32ChnPort, MI_VIF_ChnPortAttr_t *pstAttr);

- Parameters

| Parameter Name | Description | Input/Output |
|---|---|---|
| u32VifChn | VIF channel number. | Input |
| u32ChnPort | Port number | Input |
| pstAttr | VIF channel Port attribute pointer. | Input |

- Return Value
  - MI_OK: Successful
  - Non-zero: Failed, see error code for details

- Dependence
  - header file: mi_vif_datatype.h, mi_vif.h
  - lib: libmi_vif.a

- Note

  The purpose to use MI_VIF_SetChnPortAttr is to set port attributes like CapSize, DestSize, FrameRate.

- Example

  Please refer to MI_VIF_SetDevAttr.

- Related APIs

  MI_VIF_GetChnPortAttr

## 2.6. MI_VIF_GetChnPortAttr

- Description

  Get VIF channel port attribute.

- Syntax

  MI_S32 MI_VIF_GetChnPortAttr(MI_VIF_CHN u32VifChn, MI_VIF_PORT u32ChnPort, MI_VIF_ChnPortAttr_t*pstAttr);

- 
- Parameters

| Parameter Name | Description | Input/Output |
|---|---|---|
| u32VifChn | VIF channel number.<br>Value range: [0, MI_VIF_MAX_PHYCHN_NUM). | Input |
| u32ChnPort | Port number | Input |
| pstAttr | VIF channel port attribute pointer. Dynamic attribute. | Output |

- Return Value
  - MI_OK: Successful
  - Non-zero: Failed, see error code for details

- Dependence
  - header file: mi_vif_datatype.h, mi_vif.h
  - lib: libmi_vif.a

- Note

  Getting must be after setting, or MI_ERR_VIF_FAILED_NOTCONFIG will be returned

- Example

  Please refer to MI_VIF_SetChnPortAttr.

- Related APIs

  MI_VIF_SetChnPortAttr

## 2.7. MI_VIF_EnableChnPort

- Description

  Enable VIF channel port.

- Syntax

  MI_S32 MI_VIF_EnableChnPort (MI_VIF_CHN u32VifChn, MI_VIF_PORT u32ChnPort);

- Parameters

| Parameter Name | Description | Input/Output |
|---|---|---|
| VifChn | VIF channel number. | Input |

- Return Value
  - MI_OK: Successful
  - Non-zero: Failed, see error code for details

- Dependence
  - header file: mi_vif_datatype.h, mi_vif.h
  - lib: libmi_vif.a

- Note
  - Channel attribute must be configured first, VIF device bound with channel must be enabled
  - If VIF and DISP/VENC are bound, calling of this API can get video
  - Calling again to enable VIF channel is available, fail will not be returned.

- Example

  Please refer to MI_VIF_SetDevAttr.

- Related APIs

  MI_VIF_DisableChnPort

## 2.8. MI_VIF_DisableChnPort

- Description

  Disable VIF channel port.

- Syntax

  MI_S32 MI_VIF_DisableChnPort (MI_VIF_CHN u32VifChn, MI_VIF_PORT u32ChnPort);

- Parameters

| Parameter Name | Description | Input/Output |
|---|---|---|
| u32VifChn | VIF channel number. | Input |
| u32ChnPort | Port number | Input |

- Return Value
  - MI_OK: Successful
  - Non-zero: Failed, see error code for details

- Dependence
  - header file: mi_vif_datatype.h, mi_vif.h
  - lib: libmi_vif.a

- Note
  - After disabling of VIF channel port, this VIF channel port will stop get video, and VO and VENC bound will stop get video as well
  - Calling again to disable VIF channel is available, fail will not be returned.

- Example

  Please refer to MI_VIF_SetDevAttr.

- Related APIs

  MI_VIF_EnableChnPort

## 2.9. MI_VIF_Query

- Description

  Query VIF channel port interrupt counts, average frame rate….

- Syntax

  MI_S32 MI_VIF_Query(MI_VIF_CHN u32VifChn, MI_VIF_PORT u32ChnPort, MI_VIF_ChnPortStat_t*pstStat);

- Parameters

| Parameter Name | Description | Input/Output |
|---|---|---|
| u32VifChn | VIF channel number. | Input |
| u32ChnPort | Channel Port | Input |
| pstStat | Channel information structure pointer. | Output |

- Return Value
  - MI_OK: Successful
  - Non-zero: Failed, see error code for details

- Dependence
  - header file: mi_vif_datatype.h, mi_vif.h
  - lib: libmi_vif.a

- Note
  - This API can be used to query interrupt counts, channel enable/disable status, interrupt loss counts, VB fail counts, height/width of image
  - Frame rate got via this API is average frame rate over 1 second, VIF could calculate average frame rate every second, the precision of this value is not exact
  - User could query interrupt loss counts via this API. If this loss counts increase at all time, it meant VIF is abnormal

- Example

  none.

- Related APIs

  none.

## 2.10. MI_VIF_SetDev2SnrPadMux

- Description

  Set VIF binding relation between device and sensor pad

- Syntax

  MI_S32 MI_VIF_SetDev2SnrPadMux(MI_VIF_Dev2SnrPadMuxCfg_t stVifDevMap[], MI_U8 u8Length);

- Parameters

| Parameter Name | Description | Input/Output |
|---|---|---|
| stVifDevMap | Mapping relation between Dev and SensorPad | Input |
| u8Length | Dev Num | Input |

- Return Value
  - MI_OK: Successful
  - Non-zero: Failed, see error code for details

- Dependence
  - header file: mi_vif_datatype.h, mi_vif.h
  - lib: libmi_vif.a

- Note

  In default, mapping relation between vif Dev and SensorPad is vif Dev0 -> SensorPad0, vif Dev2 -> SensorPad1. If you want to use other Vif Dev or Sensor Pad, you need to set the corresponding connection relationship with MI_VIF_SetDev2SnrPadMux api.

- Example

Vif Dev0 binds SensorPad0, Dev1 binds SensorPad2, Dev2 binds SensorPad1，An example of binding relationship is as follows：

```
MI_VIF_Dev2SnrPadMuxCfg_t stVifDev[4];
stVifDev[0].eSensorPadID = E_MI_VIF_SNRPAD_ID_0;
stVifDev[0].u32PlaneID = 0xff;//oxff liner mode, 0: Long exposure, 1: Short exposure
stVifDev[1].eSensorPadID = E_MI_VIF_SNRPAD_ID_2;
stVifDev[1].u32PlaneID = 0xff;
stVifDev[2].eSensorPadID = E_MI_VIF_SNRPAD_ID_1;
stVifDev[2].u32PlaneID = 0xff;
stVifDev[3].eSensorPadID = E_MI_VIF_SNRPAD_ID_3;
stVifDev[3].u32PlaneID = 0xff;
MI_VIF_SetDev2SnrPadMux(stVifDev, 4);
```

- Related APIs

  none.

# 3. VIF DATA TYPE

VIF module relative data type definition:

| | |
|---|---|
| MI_VIF_IntfMode_e | Define interface mode of video Input device |
| MI_VIF_WorkMode_e | Define working mode of video Input device |
| MI_VIF_DataYuvSeq_e | Define YUV data sequence received from video Input device |
| MI_VIF_ClkEdge_e | Define clock edge received from video Input device |
| MI_VIF_BitOrder_e | Define data bit order of video Input device |
| MI_VIF_HDRType_e | Define HDR type of video Input device |
| MI_VIF_Polar_e | Define signal polarity |
| MI_VIF_SyncAttr_t | Define synchronization attribute |
| MI_VIF_DevAttr_t | Define attribute of video Input device. |
| MI_VIF_ChnPortAttr_t | Define VIF channel port attribute. |
| MI_VIF_ChnPortStat_t | Define VIF channel port status |
| MI_VIF_SNRPad_e | Define SensorPad Id |
| MI_VIF_Dev2SnrPadMuxCfg_t | Define binding relation between VIF device and SensorPad |

## 3.1. MI_VIF_IntfMode_e

- Description

  Define interface mode of video Input device

- Definition

```
typedef enum
{
    E_MI_VIF_MODE_BT656 = 0,
    E_MI_VIF_MODE_DIGITAL_CAMERA,
    E_MI_VIF_MODE_BT1120_STANDARD,
    E_MI_VIF_MODE_BT1120_INTERLEAVED,
     E_MI_VIF_MODE_MIPI
    E_MI_VIF_MODE_NUM
} MI_VIF_IntfMode_e;
```

- 
- member

| Member name | Description |
|---|---|
| E_MI_VIF_MODE_BT656 | Input data protocol is standard BT.656, port data Input mode is compound mode of brightness and color, quantity mode is single |
| E_MI_VIF_MODE_DIGITAL_CAMERA | Input data protocol is Digital camera 6, port data Input mode is compound mode of brightness and color, quantity mode is single |
| E_MI_VIF_MODE_BT1120_STANDARD | Input data protocol is standard BT.1120(BT.656+ double quantity), port data Input mode is division mode of brightness and color, quantity mode is double |
| E_MI_VIF_MODE_BT1120_INTERLEAVED | Input data protocol is BT.1120 interleave mode, port data Input mode is division mode of brightness and color, quantity mode is double |
| E_MI_VIF_MODE_MIPI | Input data protocol is MIPI |

- Note

  The current interface mode can be obtained from eintfmode in MI_SNR_GetPadInfo.

- Related Type

  MI_VIF_DevAttr_t
  MI_VIF_SetDevAttr

## 3.2. MI_VIF_WorkMode_e

- Description

  Define working mode of video Input device

- Definition

```
typedef enum
{
        /* BT656 multiple ch mode */
        E_MI_VIF_WORK_MODE_1MULTIPLEX,
        E_MI_VIF_WORK_MODE_2MULTIPLEX,
        E_MI_VIF_WORK_MODE_4MULTIPLEX,

        /* RGB mode for MIPI/Parallel sensor */
        E_MI_VIF_WORK_MODE_RGB_REALTIME,
    E_MI_VIF_WORK_MODE_RGB_FRAMEMODE,
        E_MI_VIF_WORK_MODE_MAX
} MI_VIF_WorkMode_e;
```

- member

| Member name | Description |
|---|---|
| E_MI_VIF_WORK_MODE_1MULTIPLEX | 1 way compound working mode. |
| E_MI_VIF_WORK_MODE_2MULTIPLEX | 2 way compound working mode, Input data protocol must be standard BT.656. |
| E_MI_VIF_WORK_MODE_4MULTIPLEX | 4 way compound working mode, Input data protocol must be standard BT.656. |
| E_MI_VIF_WORK_MODE_RGB_REALTIME | RGB Realtime mode for MIPI/Parallel sensor |
| E_MI_VIF_WORK_MODE_RGB_FRAMEMODE | RGB Framemode mode for MIPI/Parallel sensor |

- Note
  - Input data protocol must be standard BT.656 in 2 way or 4 way compound working mode No restriction in 1 way compound working mode
  - When this item is set to RGB_realtime, the backend can only bind MI_VPE module, and MI_VPE should also be set to realtime mode. There is no DRAM buffer between the two modules, the underlying hardware is directly connected, and the two modules do not support time-sharing multiplexing.
  - When this item is set to RGB frame, Vif writes buffer to the DRAM and sends it to the back-end module

- Related Type

  MI_VIF_DevAttr_t
  MI_VIF_SetDevAttr

## 3.3. MI_VIF_FrameRate_e

- Description

  Define relation between Output fps and Input fps.

- Definition

```
typedef enum
{
    E_MI_VIF_FRAMERATE_FULL = 0,
    E_MI_VIF_FRAMERATE_HALF,
    E_MI_VIF_FRAMERATE_QUARTR,
    E_MI_VIF_FRAMERATE_OCTANT,
    E_MI_VIF_FRAMERATE_THREE_QUARTERS,
    E_MI_VIF_FRAMERATE_NUM,
} MI_VIF_FrameRate_e;
```

- member

| Member name | Description |
|---|---|
| E_MI_VIF_FRAMERATE_FULL | Source over target is 1:1 Output. |
| E_MI_VIF_FRAMERATE_HALF | Source over target is 2:1 Output. |
| E_MI_VIF_FRAMERATE_QUARTER | Source over target is 4:1 Output. |
| E_MI_VIF_FRAMERATE_OCTANT | Source over target is 8:1 Output. |
| E_MI_VIF_FRAMERATE_THREE_QUARTERS | Source over target is 4:3 Output. |

- Note

  It's available just in BT656multiple ch mode

- Related Type

  MI_VIF_ChnPortAttr_t
  MI_VIF_SetChnPortAttr

## 3.4. MI_VIF_DataYuvSeq_e

- Description

  Define YUV data sequence received from video Input device

- Definition

```
typedef enum
{
    E_MI_VIF_INPUT_DATA_VUVU = 0,
    E_MI_VIF_INPUT_DATA_UVUV,
    E_MI_VIF_INPUT_DATA_UYVY = 0,
    E_MI_VIF_INPUT_DATA_VYUY,
    E_MI_VIF_INPUT_DATA_YUYV,
    E_MI_VIF_INPUT_DATA_YVYU,
    E_MI_VIF_DATA_YUV_NUM
} MI_VIF_DataYuvSeq_e;
```

- member

| Member name | Description |
|---|---|
| E_MI_VIF_INPUT_DATA_VUVU | YUV data Input via division mode, C quantity Input sequence is VUVU. |
| E_MI_VIF_INPUT_DATA_UVUV | YUV data Input via division mode, C quantity Input sequence is UVUV. |
| E_MI_VIF_INPUT_DATA_UYVY | YUV data Input via compound mode, sequence is UYVY. |
| E_MI_VIF_INPUT_DATA_VYUY | YUV data Input via compound mode, sequence is VYUY. |
| E_MI_VIF_INPUT_DATA_YUYV | YUV data Input via compound mode, sequence is YUYV. |
| E_MI_VIF_INPUT_DATA_YVYU | YUV data Input via compound mode, sequence is YVYU. |

- Note

  none.

- 
- Related Type

  MI_VIF_DevAttr_t
  MI_VIF_SetDevAttr

## 3.5. MI_VIF_ClkEdge_e

- Description

  Define clock edge received from video Input device

- Definition

```
typedef enum
{
        E_MI_VIF_CLK_EDGE_SINGLE_UP = 0,
        E_MI_VIF_CLK_EDGE_SINGLE_DOWN,
        E_MI_VIF_CLK_EDGE_DOUBLE,
        E_MI_VIF_CLK_EDGE_NUM
} MI_VIF_ClkEdge_e;
```

- member

| Member name | Description |
|---|---|
| E_MI_VIF_CLK_EDGE_SINGLE_UP | Clock single edge mode, sampling in up edge |
| E_MI_VIF_CLK_EDGE_SINGLE_DOWN | lock single edge mode, sampling in down edge |
| E_MI_VIF_CLK_EDGE_DOUBLE | VIF do sampling in double edge for double edge data |

- Note

  none.

- Related Type

  MI_VIF_DevAttr_t
  MI_VIF_SetDevAttr

## 3.6. MI_VIF_BitOrder_e

- Description

  Define data bit order of video Input device

- Definition

```
typedef enum
{
    E_MI_VIF_BITORDER_NORMAL = 0,
    E_MI_VIF_BITORDER_REVERSED
} MI_VIF_BitOrder_e;
```

- member

| Member name | Description |
|---|---|
| E_MI_VIF_BITORDER_NORMAL | Normal data bit order |
| E_MI_VIF_BITORDER_REVERSED | Reversed data bit order |

- Note

  none.

- Related Type

  MI_VIF_DevAttr_t
  MI_VIF_SetDevAttr

## 3.7. MI_VIF_HDRType_e

- Description

  Define HDR type of video Input device

- Definition

```
typedef enum
{
    E_MI_VIF_HDR_TYPE_OFF,
    E_MI_VIF_HDR_TYPE_VC,         //virtual channel mode HDR,vc0->long, vc1->short
    E_MI_VIF_HDR_TYPE_DOL,
    E_MI_VIF_HDR_TYPE_EMBEDDED, //compressed HDR mode
    E_MI_VIF_HDR_TYPE_LI,              //Line interlace HDR
    E_MI_VIF_HDR_TYPE_MAX
} MI_VIF_HDRType_e;
```

- member

| Member name | Description |
|---|---|
| E_MI_VIF_HDR_TYPE_OFF | HDR off |
| E_MI_VIF_HDR_TYPE_VC | virtual channel mode HDR,vc0->long, vc1->short |
| E_MI_VIF_HDR_TYPE_DOL | Digital Overlap High Dynamic Range |
| E_MI_VIF_HDR_TYPE_EMBEDDED | compressed HDR mode |
| E_MI_VIF_HDR_TYPE_LI | Line interlace HDR |

- Note

HDR type is related to the sensor. You can obtain the HDR type supported by the current sensor through ehdrmode of MI_SNR_GetPadInfo.

- Related Type

MI_VIF_DevAttr_t
MI_VIF_SetDevAttr

## 3.8. MI_VIF_Polar_e

- Description

Define signal polarity

- Definition

```
typedef enum
{
    E_MI_VIF_PIN_POLAR_POS,
    E_MI_VIF_PIN_POLAR_NEG
} MI_VIF_Polar_e;
```

- member

| Member name | Description |
|---|---|
| E_MI_VIF_PIN_POLAR_POS | High level active |
| E_MI_VIF_PIN_POLAR_NEG | Log level active |

- Note

  Available only for parallel sensor interface

- Related Type

  MI_VIF_SyncAttr_t

## 3.9. MI_VIF_SyncAttr_t

- Description

  Define synchronization attribute

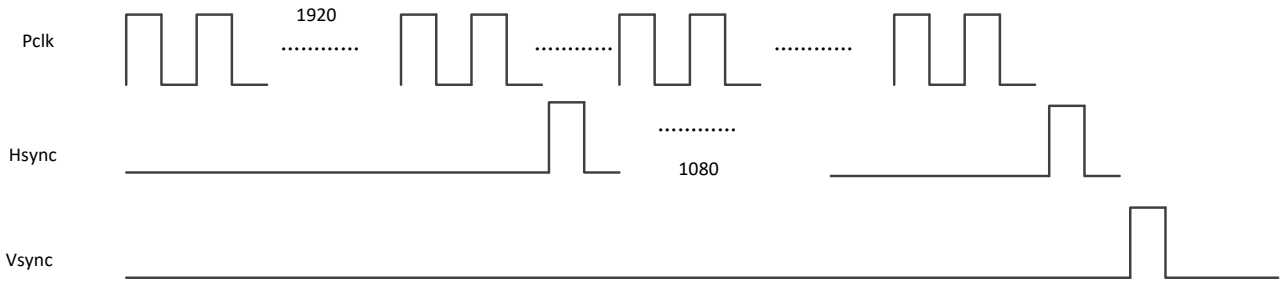
- Definition

```
typedef struct MI_VIF_SyncAttr_s
{
    MI_VIF_Polar_e    eVsyncPolarity;
    MI_VIF_Polar_e    eHsyncPolarity;
    MI_VIF_Polar_e    ePclkPolarity;
    MI_U32    VsyncDelay;
    MI_U32    HsyncDelay;
    MI_U32    PclkDelay;
} MI_VIF_SyncAttr_t;
```

- member

| Member name | Description |
|---|---|
| eVsyncPolarity | V sync. effective polarity |
| eHsyncPolarity | H sync. effective polarity |
| ePclkPolarity | Pixel Clock effective polarity |
| VsyncDelay | V sync. delay time |
| HsyncDelay | H sync. delay time |
| PclkDelay | Pixel Clock delay time |

At 1920x1080 resolution, PCLK / Hsync / Vsync are all high-level effective, and the waveform corresponding relationship is as follows:




Pclk: pixel clock, Every time a pixel is received, a clock is generated.
Hsync: Line synchronization, when valid, the received signal belongs to the same line.
Vsync: Field synchronization, when valid, the received signal belongs to the same frame.

- Note

  only for parallel sensor interface

- Related Type

  MI_VIF_DevAttr_t

## 3.10. MI_VIF_DevAttr_t

- Description

  Define attribute of video Input device.

- Definition

```
typedef struct MI_VIF_DevAttr_s
{
MI_VIF_IntfMode_e eIntfMode;
MI_VIF_WorkMode_e eWorkMode;
MI_VIF_HDRType_e        eHDRType;
MI_VIF_ClkEdge_e eClkEdge;
MI_VIF_DataYuvSeq_e eDataSeq;
MI_VIF_BitOrder_e eBitOrder;
/* adjust bit order layout */
MI_VIF_SyncAttr_t       stSyncAttr;
} MI_VIF_DevAttr_t;
```

- member

| Member name | Description |
|---|---|
| eIntfMode | Interface mode. |
| eWorkMode | Working mode. |
| eHDRType | HDR type |
| eClkEdge | Clock edge mode (up sampling, down sampling, double sapling). |

| Member name | Description |
|---|---|
| eDataSeq | Input data sequence (only support yuv), need to configure for DC mode, invalid for other modes. |
| eBitOrder | Vif data layout bit order |
| stSyncAttr | Synchronization attribute |

- Note

  none

- Related Type

  MI_VIF_SetDevAttr

## 3.11. MI_VIF_ChnPortAttr_t

- Description

  Define VIF channel port attribute.

- Definition

```
typedef struct MI_VI_ChnPortAttr_s{
    MI_SYS_WindowRect_t      stCapRect;
    MI_SYS_WindowRect_t stDestSize;
    MI_SYS_FieldType_e   enCapSel;
    MI_SYS_FrameScanMode_e nScanMode ;
    MI_SYS_PixelFormat_e ePixFormat;
    MI_VI_FrameRate_e    eFrameRate;
    MI_U32 u32FrameModeLineCount
} MI_VI_ChnPortAttr_t;
```

- member

  sub ports only support stDestSize, enDstFrameRate, other attributes will be ignored.

| Member name | Description |
|---|---|
| stCapRect | coordinates and width and height of capturing region(based on original device image) |
| stDestSize | destination image size. Must to be configured, the size cannot over outside ADC Input image, or VIF hardware may be abnormal |
| eCapSel | capturing frame selection for line-over mode, suggest capture bottom field when capturing of single field.<br>Must to set E_MI_SYS_FIELDTYPE_BOTH for each line-each mode. |
| eScanMode | Input scan mode (line-each, line-over) |
| ePixFormat | Pixel format, In bt656 format, only E_MI_SYS_PIXEL_FRAME_YUV422_YUYV is supported. |
| eFrameRate | Ratio of target fps over Input fps. |

| Member name | Description |
|---|---|
| | Set 0 to ignore fps control.<br>Output with 1:1,2:1,4:1,8:1,4:3 |
| u32FrameModeLineCount | Inform next stage about the processing moment , use with E_MI_VIF_WORK_MODE_RGB_FRAMEMODE |

- chip difference

| Member name | Description |
|---|---|
| stDestSize | VIF channel is able to scale, horizontal scaling down 2 multiple, vertical scaling down 2 multiple. |

- Related Type

  MI_VIF_SetChnPortAttr

## 3.12. MI_VIF_ChnPortStat_t

- Description

  Define VIF channel port status

- Definition

```
typedef struct MI_VIF_ChnStat_s
{
    MI_BOOL bEnable; /* Whether this channel is enabled */
    MI_U32 u32IntCnt; /* The VIFdeo frame interrupt count */
    MI_U32 u32FrmRate; /* current frame rate */
    MI_U32 u32LostInt; /* The interrupt is received but nobody care*/
    MI_U32 u32VbFail; /* Video buffer malloc failure */
    MI_U32 u32PicWidth;/* curren pic width */
    MI_U32 u32PicHeight;/* current pic height */
} MI_VIF_ChnPortStat_t;
```

- member

| Member name | Description |
|---|---|
| bEnable | Channel enable. |
| u32IntCnt | Interrupt count. |
| u32FrmRate | Average fps every 10s, the precision is not perfect. |
| u32LostInt | Interrupt loss count. |
| u32VbFail | VB fail count. |
| u32PicWidth | Picture width. |
| u32PicHeight | Picture heigh. |

- Note
  - Interrupt count can be used to detect no interrupt
  - Fps is average fps every 10s, VIF calculate average fps every 10s, the precision is not perfect.
  - If interrupt loss count increased all the time, it meant VIF is abnormal

- Related Type

  none.

## 3.13. MI_VIF_SNRPad_e

- Description

  Define SensorPad Id

- Definition

```
typedef enum
{
    E_MI_VIF_SNRPAD_NULL,
    E_MI_VIF_SNRPADID0,
    E_MI_VIF_SNRPADID1,
    E_MI_VIF_SNRPADID2,
    E_MI_VIF_SNRPADID3,
    E_MI_VIF_SNRPAD_NUM
}MI_VIF_SNRPad_e;
```

- member

| Member name | Description |
|---|---|
| E_MI_VIF_SNRPAD_NULL | SensorPad without binding |
| E_MI_VIF_SNRPADID0 | mapping HW device Sensor0 |
| E_MI_VIF_SNRPADID1 | mapping HW device Sensor1 |
| E_MI_VIF_SNRPADID2 | mapping HW device Sensor2 |
| E_MI_VIF_SNRPADID3 | mapping HW device Sensor3 |
| E_MI_VIF_SNRPAD_NUM | Over maximum Sensor Num |

- Note

  In default condition, VIF Dev0 is mapped to Sensor0, Dev1 is mapped to Sensor1.
  Refer to MI sensor api.doc, chapter 1.2 block diagram.

- Related Type

  MI_VIF_Dev2SnrPadMuxCfg_t

## 3.14. MI_VIF_Dev2SnrPadMuxCfg_t

- Description

  Define binding relation between VIF device and SensorPad

- Definition

```
typedef struct MI_VIF_VIFDev2SnrPadMuxConf_s
{
    MI_VIF_SNRPad_e eSensorPadID;     //sensor Pad id
    MI_U32 u32PlaneID;                //For HDR, 1 is short exposure, 0 is long exposure,
} MI_VIF_Dev2SnrPadMuxCfg_t;
```

- member

| Member name | Description |
|---|---|
| eSensorPadID | Sensor Pad Id |
| u32PlaneID | PlaneId, for HDR<br>1: long exposure,<br>0 short exposure<br>for liner is 0xff |

- Note

  In default condition, VIF Dev0 is mapped to Sensor0, Dev2 is mapped to Sensor1.默 In default condition, no need to call this API.

- Related Type

  MI_VIF_SetDev2SnrPadMux

# 4. VIF ERROR CODE

VIF API error code is defined in following table

Table 1: VIF API error code

| Error code | Macro definition | Description |
|---|---|---|
| 0xA0032001 | MI_ERR_VIF_INVALID_DEVID | Video Input device ID invalid |
| 0xA0032002 | MI_ERR_VIF_INVALID_CHNID | Video Input channel ID invalid |
| 0xA0032003 | MI_ERR_VIF_INVALID_PARA | Video Input parameter invalid |
| 0xA0032006 | MI_ERR_VIF_INVALID_NULL_PTR | Null pointer invalid |
| 0xA0032007 | MI_ERR_VIF_FAILED_NOTCONFIG | Video device or channel attribute is not configured |
| 0xA0108008 | MI_ERR_VIF_NOT_SUPPORT | Operation is not supported |
| 0xA0108009 | MI_ERR_VIF_NOT_PERM | Operation is not permitted |
| 0xA010800C | MI_ERR_VIF_NOMEM | Memory allocation fail |
| 0xA010800E | MI_ERR_VIF_BUF_EMPTY | Buffer empty |
| 0xA010800F | MI_ERR_VIF_BUF_FULL | Buffer full |
| 0xA0108010 | MI_ERR_VIF_SYS_NOTREADY | Video Input system is not ready |
| 0xA0108012 | MI_ERR_VIF_BUSY | Video Input system is busy |
| 0xA0032080 | MI_ERR_VIF_INVALID_PORTID | Video Input port ID invalid |
| 0xA0032081 | MI_ERR_VIF_FAILED_DEVNOTENABLE | Video Input device is not enable |
| 0xA0032082 | MI_ERR_VIF_FAILED_DEVNOTDISABLE | Video Input device is not disable |
| 0xA0032083 | MI_ERR_VIF_FAILED_PORTNOTENABLE | Video Input channel is not enable |
| 0xA0032084 | MI_ERR_VIF_FAILED_PORTNOTDISABLE | Video Input channel is not disable |
| 0xA0032085 | MI_ERR_VIF_CFG_TIMEOUT | Video configure timeout |
| 0xA0032087 | MI_ERR_VIF_INVALID_WAYID | Video way ID invalid |
| 0xA0032088 | MI_ERR_VIF_INVALID_PHYCHNID | Video physical channel ID invalid |
| 0xA0032089 | MI_ERR_VIF_FAILED_NOTBIND | Video channel is not bound |
| 0xA003208A | MI_ERR_VIF_FAILED_BINDED | Video channel is bound |