MT6771 NVRAM

New NVRAM

6757/6763

imgsensor

- AE_Tuning_Para
- AWB_Tuning_Para
- camera_AE_PLineTable_imx386mipiraw.h
- camera_feature_para_imx386mipiraw.h
- camera_flash_awb_para_imx386mipiraw.h
- camera_flicker_para_imx386mipiraw.cpp
- camera_info_imx386mipiraw.h
- camera_isp_colortbl_imx386mipiraw.h
- camera_isp_lsc_imx386mipiraw.h
- camera_isp_regs_capture_imx386mipiraw.h
- camera_isp_regs_feature_imx386mipiraw.h
- camera_isp_regs_imx386mipiraw.h
- camera_isp_regs_preview_imx386mipiraw.h
- camera_isp_regs_video_imx386mipiraw.h
- camera_isp_tonemap_imx386mipiraw.h
- camera_tsf_data_imx386mipiraw.h
- camera_tsf_para_imx386mipiraw.h
- camera_tuning_para_imx386mipiraw.cpp

camera_3a

- ae_tuning_custom_main.cpp
- ae_tuning_custom_main2.cpp
- ae_tuning_custom_sub.cpp
- ae_tuning_custom_sub2.cpp
- af_tuning_custom.cpp
- awb_tuning_custom_main.cpp
- awb_tuning_custom_main2.cpp
- awb_tuning_custom_sub.cpp

6771

imgsensor

- Reserved
- Scene_Capture
- Scene_Capture_Binning
- Scene_Preview
- tuning_mapping
- Video_1080
- WeChatQQ_Capture
- WeChatQQ_Preview
- WeChatQQ_Video
- WeChatQQ_VideoCall
- Android.mk
- camera_3A_param_imx476mipiraw.h
- camera_AE_PLineTable_imx476mipiraw.h
- camera_AF_param_imx476mipiraw.h
- camera_COLOR_param_imx476mipiraw.h
- camera_feature_para_imx476mipiraw.h
- camera_FEATURE_param_imx476mipiraw.h
- camera_flash_awb_para_imx476mipiraw.h
- camera_FLASH_CALIBRATION_param_imx476mipiraw.h
- camera_FLASH_param_imx476mipiraw.h
- camera_flicker_para_imx476mipiraw.cpp
- camera_gis_para_imx476mipiraw.h
- camera_indexmgr_api.cpp

AP/MW资讯转 NVRAM Index

- ## 以 AE 为例:

(1) AP/MW 资讯转 Scenario (custom\mt6763\hal\camera_3a\aaa_common_custom.cpp)

Old

```cpp
unsigned int Scenario4AE(const ScenarioParam& sParam)
{
#if CAM3_STEREO_FEATURE_EN
  if (sParam.Sync2AMode == 2 ||
    sParam.Sync2AMode == 3 ||
    sParam.Sync2AMode == 4)
    return CAM_SCENARIO_CUSTOM4;
#endif
  if(sParam.HdrMode == 1 && sParam.TargetMode != AE_MODE_NORMAL) // HdrMode = 1, HDRMode::ON
    return CAM_SCENARIO_CUSTOM1;
  else if(sParam.HdrMode == 2 && sParam.TargetMode != AE_MODE_NORMAL) // HdrMode = 2, HDRMode::AUTO
    return CAM_SCENARIO_CUSTOM2;
  else{
    switch(sParam.SensorMode){
      case 0:
        return CAM_SCENARIO_PREVIEW;
      case 1:
        return CAM_SCENARIO_CAPTURE;
      case 2:
        return CAM_SCENARIO_VIDEO;
      default:
        return CAM_SCENARIO_PREVIEW;
    }
  }
}
```

(2) Scenario 转 NVRAM Index (custom\mt6763\hal\inc\camera_custom_nvram.h)

```cpp
static MUINT32 AENVRAMMapping[CAM_SCENARIO_NUM] = {
  static_cast<MUINT32>(CAM_SCENARIO_PREVIEW),  // PREVIEW
  static_cast<MUINT32>(CAM_SCENARIO_VIDEO),    // VIDEO
  static_cast<MUINT32>(CAM_SCENARIO_CAPTURE),  // CAPTURE
  static_cast<MUINT32>(CAM_SCENARIO_CUSTOM1),  // HDR
  static_cast<MUINT32>(CAM_SCENARIO_CUSTOM2),  // AUTO HDR
  static_cast<MUINT32>(CAM_SCENARIO_CUSTOM3),  // VT
  static_cast<MUINT32>(CAM_SCENARIO_CUSTOM4)   // STEREO
};
```

AP/MW资讯转 NVRAM Index

- 调用IdxMgr的query接口直接将AP/MW 资讯转 NVRAM Index
  (hardware\mtkcam\aaa\source\isp_50\wrapper\Hal3ARawImp.cpp)

  IdxMgr* pMgr = IdxMgr::createInstance(static_cast<ESensorDev_T>(m_i4SensorDev)); (detail)

  m_pIdxMgr->getMappingInfo(static_cast<ESensorDev_T>(m_i4SensorDev), rMapping_Info, rNewParam.i4MagicNum);

  MUINT32 u4AENVRAMIndex = m_pIdxMgr->query(static_cast<ESensorDev_T>(m_i4SensorDev), NSIspTuning::EModule_AE, rMapping_Info);

  MUINT32 u4AWBNVRAMIndex = m_pIdxMgr->query(static_cast<ESensorDev_T>(m_i4SensorDev), NSIspTuning::EModule_AWB, rMapping_Info);

  MUINT32 u4AFNVRAMIndex = m_pIdxMgr->query(static_cast<ESensorDev_T>(m_i4SensorDev), NSIspTuning::EModule_AF, rMapping_Info);

  MUINT32 u4FlashAENVRAMIndex = m_pIdxMgr->query(static_cast<ESensorDev_T>(m_i4SensorDev), NSIspTuning::EModule_Flash_AE, rMapping_Info);

  MUINT32 u4FlashAWBAENVRAMIndex = m_pIdxMgr->query(static_cast<ESensorDev_T>(m_i4SensorDev), NSIspTuning::EModule_Flash_AWB, rMapping_Info);

  MUINT32 u4FlashCaliNVRAMIndex = m_pIdxMgr->query(static_cast<ESensorDev_T>(m_i4SensorDev), NSIspTuning::EModule_Flash_Calibration, rMapping_Info);

- 传送 NVRAM Index 给 3A/Flash/ISP

  IAwbMgr::getInstance().setNVRAMIndex(m_i4SensorDev, u4AWBNVRAMIndex);

  IAfMgr::getInstance().setNVRAMIndex(m_i4SensorDev, u4AFNVRAMIndex);

  IAeMgr::getInstance().setNVRAMIndex(m_i4SensorDev, u4AENVRAMIndex);

  FlashMgr::getInstance(m_i4SensorDev)->setNVRAMIndex(FLASH_NVRAM_AE, u4FlashAENVRAMIndex);

  FlashMgr::getInstance(m_i4SensorDev)->setNVRAMIndex(FLASH_NVRAM_AWB, u4FlashAWBNVRAMIndex);

  FlashMgr::getInstance(m_i4SensorDev)->setNVRAMIndex(FLASH_NVRAM_CALIBRATION, u4FlashCaliNVRAMIndex);

  CAM_LOGD_IF(m_3ALogEnable, "[%s] NVRAM Index AE(%d) AWB(%d) AF(%d) F_AE(%d) F_AWB(%d) F_Cali(%d)", __FUNCTION__, u4AENVRAMIndex,
  u4AWBNVRAMIndex, u4AFNVRAMIndex, u4FlashAENVRAMIndex, u4FlashAWBNVRAMIndex, u4FlashCaliNVRAMIndex);
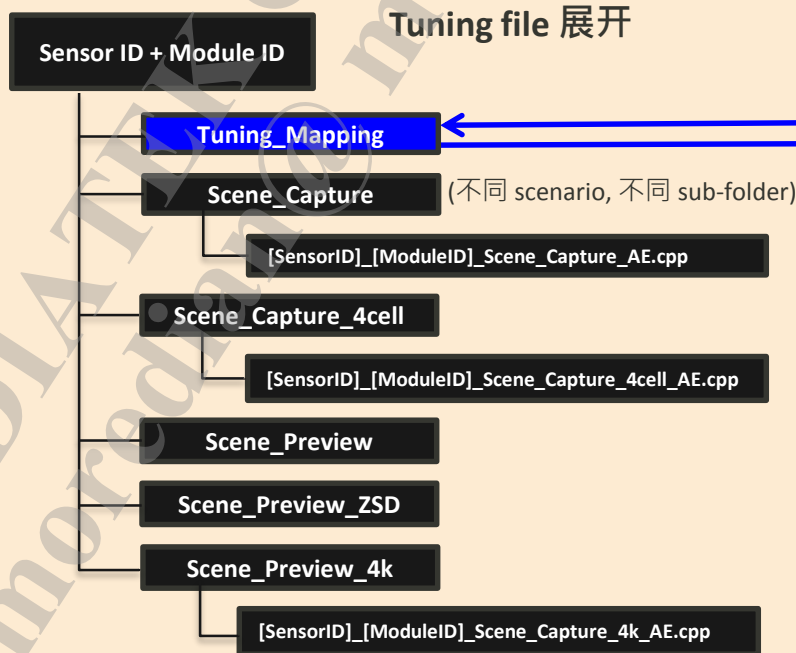
New

New NVRAM Mapping

编辑 Excel

Tool 做 Code-Gen

3A Flow

ScenarioMap

IspProfile	SensorMode	Scenario
Capture	Capture	Scene_Capture
Capture	Preview	Scene_Capture_4cell
Preview	Preview	Scene_Preview
Preview	Capture	Scene_Preview_ZSD
Preview	Video	Scene_Preview_4k

UserTable

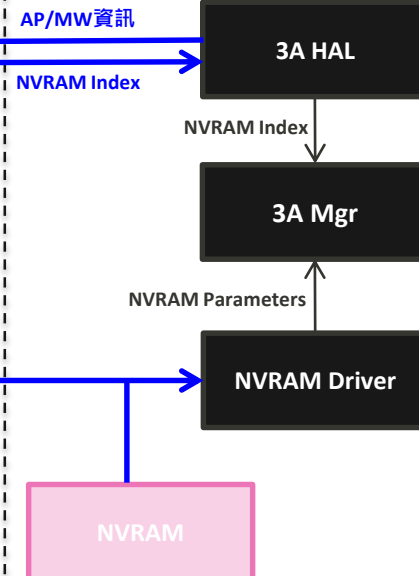| Scenario	AE
Scene_Capture	Scene_Capture
Scene_Capture_4cell	Scene_Capture_4cell
Scene_Preview	Scene_Capture_4cell
Scene_Preview_ZSD	Scene_Capture
Scene_Preview_4k	Scene_Preview_4k

Excel展开 by Module

IspProfile	SensorMode	Index	Folder	File	Scenario
Capture	Capture	0	Scene_Capture	AE	Scene_Capture
Capture	Preview	1	Scene_Capture_4cell	AE	Scene_Capture_4cell
Preview	Preview	1	Scene_Capture_4cell	AE	Scene_Preview
Preview	Capture	0	Scene_Capture	AE	Scene_Preview_ZSD
Preview	Video	2	Scene_Preview_4k	AE	Scene_Preview_4k

Tuning file 展开

Sensor ID + Module ID

Tuning_Mapping

Scene_Capture (不同 scenario, 不同 sub-folder)

[SensorID]_[ModuleID]_Scene_Capture_AE.cpp

Scene_Capture_4cell

[SensorID]_[ModuleID]_Scene_Capture_4cell_AE.cpp

Scene_Preview

Scene_Preview_ZSD

Scene_Preview_4k

[SensorID]_[ModuleID]_Scene_Capture_4k_AE.cpp

AP/MW

AP/MW 资讯 (ISP Profile, Sensor Mode, ...)

AP/MW資訊

3A HAL

NVRAM Index

NVRAM Index

3A Mgr

NVRAM Parameters
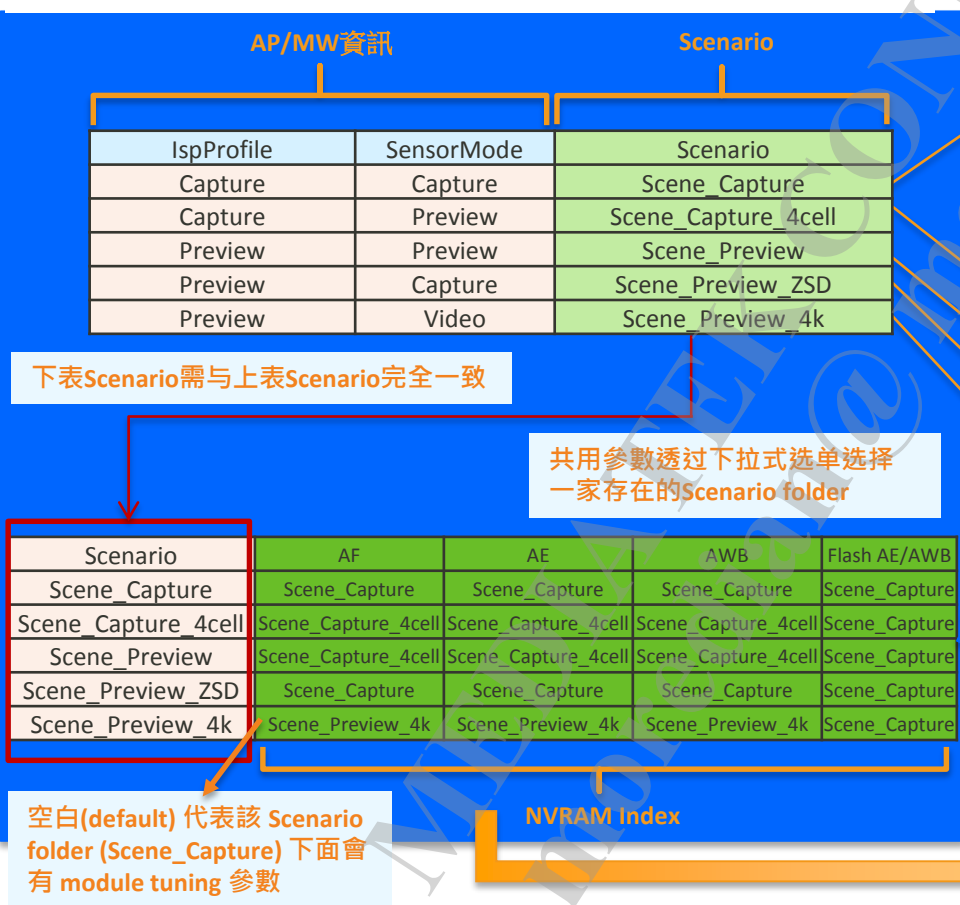
NVRAM Driver

NVRAM

编辑mapping EXCEL & Code-Gen

■ 编辑EXCEL

1. 不同 Sensor ID + Module ID，使用不同的 Excel
   • NVRAM_IF_[SensorID]_[ModuleID].xlsx

2. AP/MW 资讯 ➜ Scenario ➜ NVRAM Index

AP/MW资讯		Scenario
IspProfile	SensorMode	Scenario
Capture	Capture	Scene_Capture
Capture	Preview	Scene_Capture_4cell
Preview	Preview	Scene_Preview
Preview	Capture	Scene_Preview_ZSD
Preview	Video	Scene_Preview_4k

下表Scenario需与上表Scenario完全一致

共用参数透过下拉式选单选择
一家存在的Scenario folder

Scenario	AF	AE	AWB	Flash AE/AWB
Scene_Capture	Scene_Capture	Scene_Capture	Scene_Capture	Scene_Capture
Scene_Capture_4cell	Scene_Capture_4cell	Scene_Capture_4cell	Scene_Capture_4cell	Scene_Capture
Scene_Preview	Scene_Capture_4cell	Scene_Capture_4cell	Scene_Capture_4cell	Scene_Capture
Scene_Preview_ZSD	Scene_Capture	Scene_Capture	Scene_Capture	Scene_Capture
Scene_Preview_4k	Scene_Preview_4k	Scene_Preview_4k	Scene_Preview_4k	Scene_Capture

NVRAM Index

空白(default) 代表該 Scenario folder (Scene_Capture) 下面會有 module tuning 参数

■ Tool 做 Code-Gen

imgsensor

Sensor ID + Module ID (不同 sensor ID + Module ID, 不同 folder)

Scene Capture (不同 scenario, 不同 sub-folder)

- [SensorID]_[ModuleID]_Scene_Capture_AE.cpp
- [SensorID]_[ModuleID]_Scene_Capture_AF.cpp
- [SensorID]_[ModuleID]_Scene_Capture_AWB.cpp
- [SensorID]_[ModuleID]_Scene_Capture_Flash_AE.cpp
- [SensorID]_[ModuleID]_Scene_Capture_Flash_AWB.cpp
- [SensorID]_[ModuleID]_Scene_Capture_Flash_Calibration.cpp
- **Android.mk** (default参数)

Scene_Capture_4cell

Scene_Preview

Scene_Preview_ZSD

Scene_Preview_4k

Reserved (没使用到的 NVRAM Data)

Tuning_mapping

(AP/MW 资讯转 NVRAM Index 的 Mapping Function)

NVRAM_IF_[SensorID]_[ModuleID].xlsx

3A/Flash NVRAM 最大组数

- 3A/Flash NVRAM default 能使用最大组数定义在excel

  (MT6771_NVRAM_IF_COMMON.xlsx，ModuleInfo sheet)，如果使用的组数超过最大组数，需要修改excel然后重新code gen和build binary load。

- 3A/Flash NVRAM default 最大组数定义如下：

  ```
  #define AE_CAM_SCENARIO_NUM        (20)
  #define AF_CAM_SCENARIO_NUM        (10)
  #define AWB_CAM_SCENARIO_NUM       (10)
  #define FLASH_AE_NUM                (4)
  #define FLASH_AWB_NUM               (4)
  #define FLASH_CALIBRATION_NUM       (4)
  ```

如何将**Mapping Info** 转成 **NVRAM Index**

- 透过mapping function将 mapping info读进来
  (vendor\mediatek\proprietary\hardware\mtkcam\utils\mapping_mgr\cam_idx_mgr.cpp)
  m_pIdxMgr->getMappingInfo(static_cast<ESensorDev_T>(m_i4SensorDev), rMapping_Info, rNewParam.i4MagicNum);

- 将要查询的 3A/Flash/ISP module ID和 mapping info 一起送给 Query function去得到 NVRAM Index
  NVRAM Index = m_pIdxMgr->query(static_cast<ESensorDev_T>(m_i4SensorDev), EModule_ID, rMapping_Info);
  (Query function 里面有从 NVRAM 拿到 mapping 资讯和NVRAM Index对应资料 (excel code gen):

- 透过 Excel知道 NVRAM index跟 Scenario的关系
  (MT6771_NVRAM_IF.xlsx ➜ Module ID sheet ➜ 比對 "Index" 和 "Scenario" column)
  - 如果 Excel 跟 log 上面得到的 NVRAM Index不 match，确认使用的excel和测试用的是否匹配
  - 如果 Excel 上面的 index 不正确，确认 UserTable/ScenarioMap Sheet mapping 是否正确

- 开启下面的adb command去得知转换index
  adb shell setprop debug.mapping_mgr.enable 3

- Log显示如下 (enum定义 custom\mt6771\hal\inc\tuning_mapping\cam_idx_struct_ext.h)
  01-01 07:40:07.802039 610 11429 D MtkCam/MappingMgr: [query] [Dev:1-Mod:AE(23)] (Idx 0) (PF Preview, SM Capture, Bin 0, P2 0, FLASH 0, APP MTKCam, FD 0, ZOOM 1, LV 0, CT 0, ISO 0,)
  Hal3ARaw: [postCommand] NVRAM Index AE(0) AWB(0) AF(1) F_AE(0) F_AWB(0) F_Cali(0) OBC(20)

TuningAutoGen Tool

- ## Config Config.h

  - Config sensor, tuning custom path

```
//SensorList = [
//              'imx338_mipi_raw','s5k4e6_mipi_raw','i:
//           ]
SensorList = ['hi556_mipi_raw']
Platform = ['MT6771']
SensorExcelFolder = ['.\TuningExcel']
CommExcelFolder = ['.\TuningExcel']
DefaultDataFolder = ['Default']
OutFolder = ['.\TuningExcel']
//OutFolder = ['out']
```
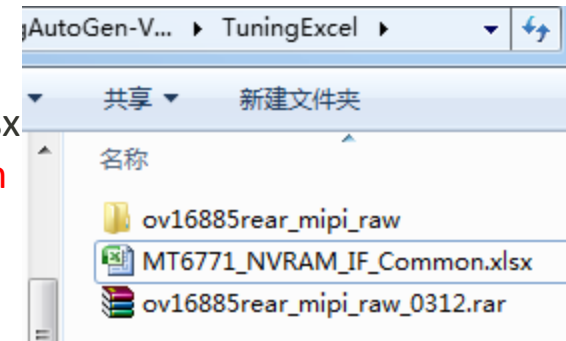
TuningAutoGen-V1.51

名称	修改日期	类型
Default	2018/4/3 10:16	文件夹
ExcelParser	2018/4/3 10:16	文件夹
IdxMgrParser	2018/4/3 10:16	文件夹
TuningExcel	2018/4/3 10:17	文件夹
TuningParser	2018/4/3 10:16	文件夹
config.h	2018/3/8 15:53	C-C++ 头文件
main.exe	2018/3/8 15:53	应用程序
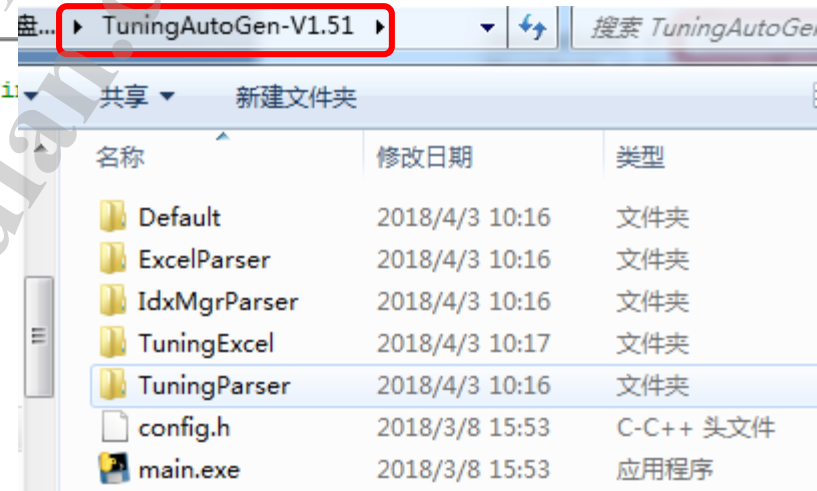
SensorList: One or more sensor for generated.
SensorExcelFolder: Tuning parameter folder by sensor.
CommExcelFolder: Tuning excel by platform, MT6771_NVRAM_IF_Common.xlsx
DefaultDataFolder: Default data for new generated file.

!! Do not modify common tuning excel MT6771_NVRAM_IF_Common.xlsx
如果有修改到，需要更新hal/inc/tuning_mapping/cam_idx_struct_ext.h
这支文件。

AutoGen-V ▸ TuningExcel ▸

名称
ov16885rear_mipi_raw
MT6771_NVRAM_IF_Common.xlsx
ov16885rear_mipi_raw_0312.rar

TuningAutoGen Tool

- Edit mapping info in MT6771_NVRAM_IF_{sensorname}.xlsx

  - Edit Sheet ScenarioMap & UserTable if needed, such as modify the Module mapping, Add or delete one scenario. We strongly recommend that you copy s5k3p8sx_mipi_raw for basic tuning para if there is no special request.

  - Do not edit MT6771_NVRAM_IF_Common.xlsx

IspProfile	SensorMode	FrontBin	P2Size	Flash	App	FaceDetection	LensID	DriverIC	Custom	Zoom	Scenario
Capture											
MFNR_Before_Blend											
MFNR_Single	Capture			No		No				IDX_00	Scene_Capture
MFNR_MFB											
MFNR_After_Blend											

Group	ISP				Color			
Scenario	ISP_MFNR	ISP_NBC_TBL	ClearZoom	CA_LTM	CCM	COLOR	AE
Scene_Capture	Scene_Capture	Scene_Capture	Scene_Capture	Scene_Capture	Scene_Capture	Scene_Capture	Scene_Capture
Face_Capture	Face_Capture	Scene_Capture	Scene_Capture	Face_Capture	Face_Capture	Face_Capture	Scene_Capture
Zoom_Capture	X	Scene_Capture	Scene_Capture	Zoom_Capture	Scene_Capture	Scene_Capture	Scene_Capture
Professional_Capture	X	Scene_Capture	Professional_Capture	Zoom_Capture	Scene_Capture	Scene_Capture	Scene_Capture

TuningAutoGen Tool

- 在MT6771_NVRAM_IF_{sensorname}.xlsx 的ScenarioMap里添加自己想要的Scenario（可自定义）。根据Frontbin、P2Size、Flash、APP、FaceDetection、LensID、DriverIC、Custom、Zoom等信息来描述Scenario。

IspProfile	SensorMode	FrontBin	P2Size	Flash	App	FaceDetection	LensID	DriverIC	Custom	Zoom	Scenario
Capture MFNR_Before_Blend MFNR_Single MFNR_MFB MFNR_After_Blend	Capture			No		No				IDX_00	Scene_Capture
Capture MFNR_Before_Blend MFNR_Single MFNR_MFB MFNR_After_Blend	Capture			No		Yes				IDX_00	Face_Capture
Capture MFNR_Before_Blend MFNR_Single MFNR_MFB MFNR_After_Blend	Capture									IDX_01 IDX_02	Zoom_Capture
Capture	Capture				Professional						Professional_Capture
Capture MFNR_Before_Blend MFNR_Single MFNR_MFB MFNR_After_Blend	Capture			Yes							Flash_Capture
Capture MFNR_Before_Blend											

UserTable | **ScenarioMap** | M!DBS | M!ADBS | M!OBC | M!BNR_BPC | M!BNR_NR1 | M!BNR_PDC | M!RM

TuningAutoGen Tool

- 定义好Scenario后，到User Table 里设置各个Module，共用之前某个Scenario的参数，还是需要单独用一组。

Group	3A		FLASH		FLASH_CALIBRATION	Tone
Scenario	AF	AWB	Flash_AE	Flash_AWB	Flash_Calibration	TONE
N3D_Video	Scene_Capture_Binning	Face_Capture	Flash_Capture	Flash_Capture	Flash_Capture	Scene_Capture
N3D_Capture	Scene_Capture_Binning	Face_Capture	Flash_Capture	Flash_Capture	Flash_Capture	Scene_Capture
Flash_Capture	Scene_Capture	Flash_Capture	Flash_Capture	Flash_Capture	Flash_Capture	Scene_Capture
Flash_Capture2	Scene_Capture	Flash_Capture	Flash_Capture	Flash_Capture2	Flash_Capture	Scene_Capture
FaceBeauty_Capture	Scene_Capture	Face_Capture	Flash_Capture	Flash_Capture	Flash_Capture	Scene_Capture
FaceBeauty_Capture_Binning	Scene_Capture	Face_Capture	Flash_Capture	Flash_Capture	Flash_Capture	Scene_Capture
Panorama_Capture	Scene_Capture	Face_Capture	Flash_Capture	Flash_Capture	Flash_Capture	Scene_Capture
Face_Unlock	Scene_Capture	Face_Capture	Flash_Capture	Flash_Capture	Flash_Capture	Face_Capture
Vivid Mode	Scene_Capture	Face_Capture	Flash_Capture	Flash_Capture	Flash_Capture	Scene_Capture
WeChatQQ_Capture	Scene_Capture	Face_Capture	Flash_Capture	Flash_Capture	Flash_Capture	Scene_Capture
WeChatQQ_Preview	Scene_Capture	Face_Capture	Flash_Capture	Flash_Capture	Flash_Capture	Scene_Capture
WeChatQQ_Video	Scene_Capture	Face_Capture	Flash_Capture	Flash_Capture	Flash_Capture	Scene_Capture
WeChatQQ_VideoCall	Scene_Capture	Face_Capture	Flash_Capture	Flash_Capture	Flash_Capture	Scene_Capture
3rd_1080P	Scene_Capture	Face_Capture	Flash_Capture	Flash_Capture	Flash_Capture	Scene_Capture
3rd_720P	Scene_Capture	Face_Capture	Flash_Capture	Flash_Capture	Flash_Capture	Scene_Capture
3rd_480P	Scene_Capture	Face_Capture	Flash_Capture	Flash_Capture	Flash_Capture	Scene_Capture
Russia_Scene_Capture	Scene_Capture	Face_Capture	Flash_Capture	Flash_Capture	Flash_Capture	Scene_Capture

TuningAutoGen Tool

- Execute Cmd:
  - main.exe

TuningAutoGen Tool

- Update Result
  - Update all the file in sub folder

注意：
0, tuning mapping文件夹描述参数对应关系，需完整合入。
1, tool生成的参数都是从defalut目录复制。
2, 修改UserTable，ScenarioMap，可能会导致参数index变化，合入参数请勿动到index。建议用tool copy参数。
3, 软件大版本升级，参数结构可能会有变化，需要对比合入。

TuningAutoGen Tool

ExcelParser: Warning Messages

☐ Error: Cannot open {$NVRAM_IF.xlsx}

    Error: Cannot open {$NVRAM_IF_Common.xlsx}

      • Please close {$NVRAM_IF.xlsx} and {$NVRAM_IF_Common.xlsx}

> Excel关闭再run tool

☐ Error: There are repeated Scenarios, please check ScenarioMap sheet
    • In ScenarioMap sheet of NVRAM_IF.xlsx, the data in column 'Scenario' should be unique.

☐ Error: UserTable[{$ScenarioName}] is not existed in ScenarioMap sheet.

    • In UserTable sheet of NVRAM_IF.xlsx, {$ScenarioName} in the 1st column 'Scenario' should be also shown in ScenarioMap.

> UserTable 和ScenarioMap中的
> Scenario个数和顺序必须相同

☐ Error: Folder:[{$ScenarioName}] is not existed in ScenarioMap

    • In UserTable sheet of NVRAM_IF.xlsx, {$ScenarioName} should be same as any one of Scenario name.

☐ Error: The amount of Scenario in UserTable and ScenarioMap must be the same.
    Error: The order of Scenario in UserTable and ScenarioMap must be the same.
    • Please check the sequence of Scenario column in between UserTable and ScenarioMap, the amount and order must be same.

☐ Error: [{$FileName}] in UserTable is not defined in FileInfo sheet, please check the naming match issue.

    • FileName(ex. ISP_RAW, TONE, ...) is shown in UserTable, but not shown in the File column in FileInfo. It must sync in 2 sheets.

☐ Warning: [{$ModuleName}] uses   7 indexes (116.7% of 6) *** (overflow risk) ***

> Nvram超过最大size

    • Overflow risk means the NvRam usage of index already over than the max size defined in ModuleInfo sheet of NVRAM_IF_Common.xlsx

☐ Warning: [{ScenarioName1}   ] and [{ScenarioName2}   ] overlap, please check factors between them

    • Factor combination cannot be same neither overlap. (Empty cell means ANY)
    • particular case: Scenario name starts with 'Default' will be ignored in this inspection.

> 两个scenario定义有overlap

Rule of Edit ScenarioMap

- 添加scenario
  - scenario名称需唯一，且在UserTable 和ScenarioMap两个sheet中相同的行数。描述Scenario的AP/MW 资讯 (ISP Profile, Sensor Mode, ...)需在MT6771_NVRAM_IF_Common.xlsx中

- 删除scenario
  - 需确保后面没有对这个scenario的某个模块参数的引用。

Scenario	CA_LTM	CCM	COLOR	AE	AF	AWB
Scene_Capt	Scene_Capture	Scene_Capture	Scene_Capture	Scene_Capture	Scene_Capture	Scene_Capture
Scene_Capture_4cell	Scene_Capture	Scene_Capture	Scene_Capture	Scene_Capture_4cell	Scene_Capture_4cell	Scene_Capture_4cell
Face_Capture	Scene_Capture	Face_Capture	Face_Capture	Scene_Capture	Scene_Capture	Scene_Capture
Face_Capture_4cell	Scene_Capture	Face_Capture	Face_Capture	Scene_Capture_4cell	Scene_Capture_4cell	Scene_Capture_4cell
Scene_Preview	Scene_Preview	Scene_Capture	Scene_Capture	Scene_Capture_4cell	Scene_Capture_4cell	Scene_Capture_4cell

Log Debug

- adb shell setprop debug.mapping_mgr.enable 3

```
MtkCam/MappingMgr: [query] [Dev:1-Mod:AE(23)] (Idx 0) (PF Preview, SM Capture, Bin 0, P2 0, FLASH 0, APP MTKCam, FD 0,
MtkCam/MappingMgr: [query] [Dev:1-Mod:AWB(25)] (Idx 0) (PF Preview, SM Capture, Bin 0, P2 0, FLASH 0, APP MTKCam, FD 0,
MtkCam/MappingMgr: [query] [Dev:1-Mod:AF(24)] (Idx 0) (PF Preview, SM Capture, Bin 0, P2 0, FLASH 0, APP MTKCam, FD 0,
MtkCam/MappingMgr: [query] [Dev:1-Mod:Flash_AE(26)] (Idx 0) (PF Preview, SM Capture, Bin 0, P2 0, FLASH 0, APP MTKCam,
MtkCam/MappingMgr: [query] [Dev:1-Mod:Flash_AWB(27)] (Idx 0) (PF Preview, SM Capture, Bin 0, P2 0, FLASH 0, APP MTKCam,
MtkCam/MappingMgr: [query] [Dev:1-Mod:Flash_Calibration(28)] (Idx 0) (PF Preview, SM Capture, Bin 0, P2 0, FLASH 0, APP
MtkCam/MappingMgr: [query] [Dev:1-Mod:OBC(2)] (Idx 20) (PF Preview, SM Capture, Bin 0, P2 0, FLASH 0, APP MTKCam, FD 0,
MtkCam/MappingMgr: [query] [Dev:1-Mod:DBS(0)] (Idx 22) (PF Preview, SM Capture, Bin 0, P2 1, FLASH 0, APP MTKCam, FD 0,
MtkCam/MappingMgr: [query] [Dev:1-Mod:ADBS(1)] (Idx 22) (PF Preview, SM Capture, Bin 0, P2 1, FLASH 0, APP MTKCam, FD 0,
MtkCam/MappingMgr: [query] [Dev:1-Mod:OBC(2)] (Idx 22) (PF Preview, SM Capture, Bin 0, P2 1, FLASH 0, APP MTKCam, FD 0,
```

Log印的Idx和excel中的Index需相同

参数所在的目录，文件

MT6771_NVRAM_IF_ov16885rearmipiraw.xlsx

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
1	IspProfile	SensorMode	FrontBin	P2Size	Flash	App	FaceDetection	LensID	DriverIC	Custom	Zoom	LV	CT	ISO	Index	Folder	File	Scenario
2	Capture MFNR_Before_Blend MFNR_Single MFNR_MFB MFNR_After_Blend	Capture			No		No				IDX_00				0	Scene_Capture	AE	Scene_Capture
3	Capture MFNR_Before_Blend MFNR_Single MFNR_MFB MFNR_After_Blend	Capture			No		Yes				IDX_00				0	Scene_Capture	AE	Face_Capture
4	Capture MFNR_Befo	Capture									IDX_01 IDX_02				0	Scene_Capture	AE	Zoom_Capture

Index of Para

```
const AE_NVRAM_T s5k3p8sxmipiraw_AE_0000 = {
    rDevicesInfo = {      //rDevicesInfo
        1024,    // u4MinGain, 1024 base =  1x
        16384,   // u4MaxGain, 16x
        40,      // u4MiniISOGain, ISOxx
        16,     // u4GainStepUnit, 1x/8
        12001,      // u4PreExpUnit
        30,      // u4PreMaxFrameRate
        12001,       // u4VideoExpUnit
        30,      // u4VideoMaxFrameRate
        1024,    // u4Video2PreRatio, 1024 base = 1x
        9144,     // u4CapExpUnit
        30,      // u4CapMaxFrameRate
        1024,    // u4Cap2PreRatio, 1024 base = 1x
        8628,     // u4Video1ExpUnit
        120,      // u4Video1MaxFrameRate
```

Case share

- Case 1，codebase中的MT6771_NVRAM_IF_Common.xlsx文件和tool中使用的不相同，导致参数index不符合预期

- Case 2，软件大版本升级，tuning_mapping文件夹下的结构体有变化，导致打开mapping_mgr 的log，进camera失败。

附录

```cpp
#if MTK_CAM_NEW_NVRAM_SUPPORT
    //EApp_T eApp;
    //EFaceDetection_T eFaceDetection;
    CAM_IDX_QRY_COMB rQueryCommandQ;
    rQueryCommandQ.eIspProfile = m_rParam.eIspProfile;
    rQueryCommandQ.eSensorMode = static_cast<NSIspTuning::ESensorMode_T>(m_u4SensorMode);
    if(m_bFrontalBin)
        rQueryCommandQ.eFrontBin = NSIspTuning::EFrontBin_Yes;
    else
        rQueryCommandQ.eFrontBin = NSIspTuning::EFrontBin_No;

    if(m_bFaceDetectEnable)
    {
        if (m_faceNum)
            rQueryCommandQ.eFaceDetection = NSIspTuning::EFaceDetection_Yes;
        else
            rQueryCommandQ.eFaceDetection = NSIspTuning::EFaceDetection_No;
    }
    rQueryCommandQ.eZoom_Idx = IspTuningMgr::getInstance().getZoomIdx(m_i4SensorDev ,m_rParam.i4ZoomRatio);

    IspTuningCustom* pIspTuningCustom = IspTuningCustom::createInstance((ESensorDev_T)m_i4SensorDev, m_i4SensorIdx);
    rQueryCommandQ.eApp = (EApp_T)pIspTuningCustom->map_AppName_to_MappingInfo();

    // check the flash state, and update to index map mgr
    FLASHResultToMeta_T* pFLASHResult = (FLASHResultToMeta_T*)m_pResultPoolObj->getResult(m_i4SttMagicNumber,E_FLASH_RESULTTOMETA);
    if(pFLASHResult != NULL) {
        if( pFLASHResult->u1FlashState == MTK_FLASH_STATE_PARTIAL ||
            pFLASHResult->u1FlashState == MTK_FLASH_STATE_FIRED){
            rQueryCommandQ.eFlash = EFlash_Yes;
        } else
            rQueryCommandQ.eFlash = EFlash_No;
    }

    IspTuningMgr::getInstance().setFlashInfo(m_i4SensorDev ,rQueryCommandQ.eFlash);

    IdxMgr::createInstance(static_cast<NSIspTuning::ESensorDev_T>(m_i4SensorDev))->setMappingInfo(static_cast<NSIspTuning::ESensorDev_

    CAM_IDX_QRY_COMB rMapping_Info;
    m_pIdxMgr->getMappingInfo(static_cast<ESensorDev_T>(m_i4SensorDev), rMapping_Info, m_rParam.i4MagicNum);
    MUINT32 u4AENVRAMIndex = m_pIdxMgr->query(static_cast<ESensorDev_T>(m_i4SensorDev), NSIspTuning::EModule_AE, rMapping_Info);
    MUINT32 u4AWBNVRAMIndex = m_pIdxMgr->query(static_cast<ESensorDev_T>(m_i4SensorDev), NSIspTuning::EModule_AWB, rMapping_Info);
    MUINT32 u4AFNVRAMIndex = m_pIdxMgr->query(static_cast<ESensorDev_T>(m_i4SensorDev), NSIspTuning::EModule_AF, rMapping_Info);
    MUINT32 u4FlashAENVRAMIndex = m_pIdxMgr->query(static_cast<ESensorDev_T>(m_i4SensorDev), NSIspTuning::EModule_Flash_AE, rMapping_I
    MUINT32 u4FlashAWBNVRAMIndex = m_pIdxMgr->query(static_cast<ESensorDev_T>(m_i4SensorDev), NSIspTuning::EModule_Flash_AWB, rMapping
```

Ae_mgr setNVRAMIndex

```cpp
IAwbMgr::getInstance().setNVRAMIndex(m_i4SensorDev, u4AWBNVRAMIndex);
IAfMgr::getInstance().setNVRAMIndex(m_i4SensorDev, u4AFNVRAMIndex);
IAeMgr::getInstance().setNVRAMIndex(m_i4SensorDev, u4AENVRAMIndex);
FlashMgr::getInstance(m_i4SensorDev)->setNVRAMIndex(FLASH_NVRAM_AE, u4FlashAENVRAMIndex);
FlashMgr::getInstance(m_i4SensorDev)->setNVRAMIndex(FLASH_NVRAM_AWB, u4FlashAWBNVRAMIndex);
FlashMgr::getInstance(m_i4SensorDev)->setNVRAMIndex(FLASH_NVRAM_CALIBRATION, u4FlashCaliNVRAMIndex);


MRESULT AeMgr::setNVRAMIndex(MUINT32 a_eNVRAMIndex, MBOOL bInit)
{
    if( m_u4AENVRAMIdx != a_eNVRAMIndex || bInit) {
        AE_LOG( "[%s()] m_eSensorDev: %d, m_u4AENVRAMIdx: %d -> %d bInit:%d\n", __FUNCTION__, m_eSensorDev, m_u4AENVRAMIdx, a_eNV
        m_u4AENVRAMIdx = a_eNVRAMIndex;
        m_pIAeFlowCCU->controltrigger((MUINT32) E_AE_FLOW_CCU_TRIGGER_APINFO);
        if(m_p3ANVRAM != NULL) {
            m_rAEInitInput.rAENVRAM = &(m_p3ANVRAM->AE[m_u4AENVRAMIdx]);
        } else {
            CAM_LOGE("Nvram 3A pointer is NULL\n");
        }
```

NVRAM struct

```c
#define AE_CAM_SCENARIO_NUM                (20)
#define AWB_CAM_SCENARIO_NUM               (10)

typedef struct
{
    //data structure version, update once structure been modified.
    UINT32 u4Version;

    // ID of sensor module
    UINT32 SensorId;

    //data content
    AE_NVRAM_T                      AE[AE_CAM_SCENARIO_NUM];
    AWB_NVRAM_T                     AWB[AWB_CAM_SCENARIO_NUM];
//    FLASH_AE_NVRAM_T              Flash_AE[FlASH_AE_NUM_2];
//    FLASH_AWB_NVRAM_T            Flash_AWB[FlASH_AWB_NUM_2];
//    FLASH_CALIBRATION_NVRAM_T    Flash_Calibration[FlASH_CALIBRATION_NUM_2];
    //SSS(reserved unused spaces(bytes)) = total-used;,
    //ex. SSS = 4096-sizeof(UINT32)--sizeof(NVRAM_AAA_T)-sizeof(NVRAM_bbb_T);
    //    UINT8 reserved[MAXIMUM_NVRAM_CAMERA_3A_FILE_SIZE-sizeof(UINT32)-sizeof(AE_NVRA
//    UINT8 reserved[MAXIMUM_NVRAM_CAMERA_3A_FILE_SIZE-sizeof(UINT32)-sizeof(AE_NVRAM_T)
    UINT8 reserved[MAXIMUM_NVRAM_CAMERA_3A_FILE_SIZE-sizeof(UINT32)-sizeof(AE_NVRAM_T)*A
} NVRAM_CAMERA_3A_STRUCT, *PNVRAM_CAMERA_3A_STRUCT;


typedef struct
{
    MUINT8          rFilePath[256];
    AF_NVRAM_T      rAFNVRAM;
    PD_NVRAM_T      rPDNVRAM;
    DUALCAM_NVRAM_T rDualCamNVRAM;
} NVRAM_LENS_DATA_PARA_STRUCT, *PNVRAM_LENS_DATA_PARA_STRUCT;

typedef struct
{
    UINT32 Version;
    FOCUS_RANGE_T    rFocusRange;
    NVRAM_LENS_DATA_PARA_STRUCT AF[AF_CAM_SCENARIO_NUM_2];
    UINT8 reserved[MAXIMUM_NVRAM_CAMERA_LENS_FILE_SIZE-sizeof(UINT32)-sizeof(FOCUS_RANGE_T)-s
} NVRAM_LENS_PARA_STRUCT, *PNVRAM_LENS_PARA_STRUCT;
```

IdxMgr qurey

```cpp
MUINT16 IdxMgr::query(NSIspTuning::ESensorDev_T eSensorDev, EModule_T mod, const CAM_IDX_QRY_COMB& qry)
{
    MINT32 idx = 0;
    MUINT16 rtnVal = 0;

    CAM_TRACE_FMT_BEGIN("IdxMgr_query_%d", mod);

    switch (eSensorDev)
    {
        case NSIspTuning::ESensorDev_Main:
            idx = 0;
            break;
        case NSIspTuning::ESensorDev_MainSecond:
            idx = 1;
            break;
        case NSIspTuning::ESensorDev_Sub:
            idx = 2;
            break;
        case NSIspTuning::ESensorDev_SubSecond:
            idx = 3;
            break;
        default:
            idx = 0;
            break;
    }

    if (m_pIdxMgrImpBase[idx])
    {
        rtnVal = m_pIdxMgrImpBase[idx]->query(mod, qry);
        IDX_LOGD_IF(m_bDebugEnable, "[Dev:%d-Mod:%s(%d)] (Idx %d) (PF %s, SM %s, Bin %d, P2 %d, FLASH %d, APP %s, FD %d, ZOOM %d,
            eSensorDev, strEModule[mod], mod, rtnVal, strEIspProfile[qry.eIspProfile], strESensorMode[qry.eSensorMode], qry.eFront
    }
    else
    {
        IDX_LOGE_IF(m_bDebugEnable, "[Dev:%d-Mod%d] Not initi
    }

    CAM_TRACE_FMT_END();

    return rtnVal;
}
```

adb shell setprop debug.mapping_mgr.enable 1

GetDefaultData

```cpp
namespace NSFeature {
  template <>
  UINT32
  SensorInfoSingleton_T::
  impGetDefaultData(CAMERA_DATA_TYPE_ENUM const CameraDataType, VOID*const pDataBuf, UINT32 const size) const
  {
    UINT32 dataSize[CAMERA_DATA_TYPE_NUM] = {sizeof(NVRAM_CAMERA_ISP_PARAM_STRUCT),
        sizeof(NVRAM_CAMERA_3A_STRUCT),
        sizeof(NVRAM_CAMERA_SHADING_STRUCT),
        sizeof(NVRAM_LENS_PARA_STRUCT),
        sizeof(AE_PLINETABLE_T),
        sizeof(NVRAM_CAMERA_STROBE_STRUCT),
        sizeof(CAMERA_TSF_TBL_STRUCT),
        0,
        0,
        0,
#if MTK_CAM_NEW_NVRAM_SUPPORT
        sizeof(NVRAM_CAMERA_IDX_STRUCT),
#endif
        sizeof(NVRAM_CAMERA_FEATURE_STRUCT),
        0,
        sizeof(NVRAM_CAMERA_FLASH_CALIBRATION_STRUCT)
    };

    if (CameraDataType > CAMERA_NVRAM_DATA_FLASH_CALIBRATION || NULL == pDataBuf || (size != dataSize[CameraDataType]))
    {
      return 1;
    }

    // ALOGI("Muse debug %d", CAMERA_ISP_DEFAULT_VALUE.ISPRegs.UDM[0].intp_crs.val);

    switch(CameraDataType)
    {
      case CAMERA_NVRAM_DATA_ISP:

#if MTK_CAM_NEW_NVRAM_SUPPORT
      case CAMERA_NVRAM_IDX_TBL:
        memcpy(pDataBuf, &idx_mod_array, sizeof(NVRAM_CAMERA_IDX_STRUCT));
        break;
#endif
```

```cpp
// copy to camera_custom_nvram.h
typedef struct NVRAM_CAMERA_IDX_STRUCT_T
{
    unsigned short idx_factor_ns[NSIspTuning::EDim_NUM];
    void * modules[NSIspTuning::EModule_NUM];
} NVRAM_CAMERA_IDX_STRUCT, *PNVRAM_CAMERA_IDX_STRUCT;
```

Tuning mapping data gen by tool base on mapping info in excel

ov16885rear_mipi_raw\tuning_mapping\cam_idx_data.h

Custmize app name

```
map_AppName_to_MappingInfo(){

    char AppName[512] = {'\0'};
    property_get("debug.appcontrol.name", AppName, "MTKCam");

    if(strstr(AppName, "Facebook")){
        return EApp_Facebook;
    } else if (strstr(AppName, "Line")){
        return EApp_Line;
    } else if (strstr(AppName, "QQ")){
        return EApp_QQ;
    } else if (strstr(AppName, "Wechat")){
        return EApp_Wechat;
    } else if (strstr(AppName, "Skype")){
        return EApp_Skype;
    } else if (strstr(AppName, "Normal")){
        return EApp_Normal;
    } else if (strstr(AppName, "Professional")){
        return EApp_Professional;
    } else if (strstr(AppName, "FaceBeauty")){
        return EApp_FaceBeauty;
    } else if (strstr(AppName, "HDR")){
        return EApp_HDR;
    } else if (strstr(AppName, "Panorama")){
        return EApp_Panorama;
    } else if (strstr(AppName, "Video")){
        return EApp_Video;
    } else if (strstr(AppName, "3rd_party")){
        return EApp_3rd_party;
    }
    else{
        return EApp_MTKCam;
    }
```

需要上层配合通过prop设置AppName

```
MINT32
IspTuningCustom::
map_P2inSize_to_MappingInfo(RAWIspCamInfo const& rCamInfo){
    if (rCamInfo.fgRPGEnable)
        return EP2Size_RRZO_00;
    else
        return EP2Size_IMGO;
/*
    input width: rCamInfo.rCropRz.i4RzWidth
    input height: rCamInfo.rCropRz.i4RzHeight
*/

/*
    typedef enum
    {
        EP2Size_IMGO,
        EP2Size_RRZO_00,
        EP2Size_RRZO_01,
        EP2Size_RRZO_02,
        EP2Size_1080P,
        EP2Size_720P,
        EP2Size_480P,
        EP2Size_NUM,
    } EP2Size_T;
*/
}
```

Enum definition

Dev	main/sub...	
Mod	ISP module (i.e. EModule_XXX).	
idx	对应module用到的参数index.	
PF	IspProfile.	EIspProfile_T
SM	Sensor mode, which is the sensor output size.	ESensorMode_T
Bin	是否有 frontal bin.	EFrontBin_T
P2	P2 Size, 客制化栏位, 根据 RAWIspCamInfo.CROP_RZ_INFO_T.i4RRZoutW及i4RRZoutW, 决定要Mapping至哪个EP2Size_T. Mapping function => isp_tuning_custom.cpp : map_P2inSize_to_MappingInfo()	EP2Size_T
Flash	是否打闪.	EFlash_T
APP	APP 种类, 客戶需先利用property或者SetParameter將APP名称传给Hal3A, 再下述Mapping function中根据APP名称, 决定要Mapping至哪个EApp_T. Mapping function => isp_tuning_custom.cpp : map_AppName_to_MappingInfo()	EApp_T
FD	有无人脸.	EFaceDetection_T
ZOOM	Zoom index.	EZoom_T
LV	AE LV (i4RealLightValue_x10 in AE_INFO_T).	ELV_T
CT	色温.	ECT_T
ISO	ISO值.	EISO_T
Custom	客制化栏位, 需先利用property或者SetParameter將所需资讯給Hal3A, 再自行根据需求将它Mapping至ECustom_T.	ECustom_T

mt6771 normal dump data

- Method 1，用Cameralog.apk进行
  - 1,用密匙(by项目)对apk进行签名
  - 2,安装apk
  - 3,push 配置文件到相应目录

- Method 2，直接用adb command

Camlogger-20180104.rar

mt6771_dump.bat

Raw dump cmd

- // raw dump

```
adb shell mkdir /sdcard/camera_dump/ -p
adb shell setprop debug.camera.SttBufQ.enable 60
adb shell setprop debug.camera.AAO.dump 1
adb shell setprop debug.camera.dump.lsc2.preview 1
adb shell setprop debug.camera.dump.p1.lsc 0
adb shell setprop debug.camera.copy.p1.lsc 1
adb shell setprop debug.camera.dump.JpegNode 1
adb shell setprop debug.camera.dump.p2 1
adb shell setprop debug.camera.dump.p2.profile 0
adb shell setprop debug.camera.dump.p2.debuginfo 2
adb shell setprop debug.mfll.dump.raw 1
adb shell setprop debug.dumpregister.enable 2
adb shell setprop debug.camera.dump.p2.out 0
adb shell setprop debug.camera.dump.p2.in 5
adb shell setprop debug.camera.dumpin.en 1
adb shell setprop debug.camera.ufo_off 1
```

mt6771 normal dump data

- Capture jpeg in normal app and the following data will saved in /sdcard/camera_dump/,load the data to ImagiqSimulator.
    - 131512685-0000-0001-main-Capture.tuning
    - 131512685-0000-0001-main-Capture_LSC2.lsc
    - 131512685-0000-0001-main-imgo__4672x3504_10_2.packed_word
    - 131512685-0000-0001-main.hw_aao
    - 131512685-0000-0001-main.lcso
    - 131512685-0000-0001.jpg

everyday genius