

# 软龙格图像采集卡

软件开发使用手册

版本:1.5

## 更新记录:

版本	日期	内容
1.1	2019-01-12	初版
1.2	2019-05-05	增加分块上传描述
1.3	2019-05-17	增加1T4光纤测试盒拆分多用,工装绑定描述
1.4	2019-05-23	①支持双光口 R11 (FPGA Version>= 4601 使用注意事
		项详见 1. 4. 2.   章节);②增加 CPHY 频率自动搜寻功
		能;以上两项 SDK 需更新至 20.0.0.55 版本及以上
1.5	2019-08-25	增加R19支持(SDK版本需20.0.0.61版本)

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## 1. 图像采集卡演示软件概括

## 1.1 主要特性

- ① 高速图像显示
- ② MIPI DPHY & CPHY 全兼容 DPHY 支持 1/2/4 lane 解码 CPHY 支持 1/2/3 Trio 解码
- ③ Sensor 控制可以使用 12C 或者 SP1
- ④ Sensor 点亮函数接口简单, 通俗易懂, 执行一条语句即可点亮

#### Sensor

- ⑤ Sensor 初始化通过 INI 文件配置
- ⑥ 支持采集卡 R10, R11, R19

### 1.2 软件架构

基于 Visual Studio 编译环境, MFC 框架, 简洁易懂, 让开发人员快速熟 悉 API 及 Sensor 点亮流程。

1.3 系统要求

操作系统: 64-bit Windows 操作系统

- Windows 7
- Windows 10
- Windows Server 2016
- 建议硬件配置:

处理器: Intel i5 9 代及以上版本, 6 核及以上(使用加速卡 CPU 核 数可降低) 内存双通道: 超过 4GB

主板带 PCIEx8 或者更高

1.4 软件使用说明

1.4.1 普通万兆网卡及图像采集卡驱动安装

(使用我司加速卡此步可跳过,加速卡驱动安装详见加速卡文件)

A. 将万兆 PCIE 卡安装至台式电脑的 PCIEx8 插槽或者 PCIEx16 以及光 纤模块插入万兆 PCIE 卡





B. 安装万兆 PCIE 卡驱动,双击"Install Drivers and Software" 点击下一步,直到安装完毕

s * ^	Name	Date modified	Туре
*	APPS	12/27/2018 3:35 PM	File folder
	DOCS	11/3/2018 2:18 PM	File folder
iggo	📙 NVMUpdatePackage	11/3/2018 2:18 PM	File folder
	PRO40GB	11/3/2018 2:18 PM	File folder
KDen	PRO100	11/3/2018 2:18 PM	File folder
		11/3/2018 2:18 PM	File folder
	PROXGB	12/27/2018 3:35 PM	File folder
	🗐 Autorun	8/22/2017 3:22 AM	Application
	🚯 Autorun.exe	8/22/2017 3:22 AM	XML Config
	📓 Autorun	8/22/2017 3:22 AM	Configuratio
	📄 index	7/21/2017 3:14 PM	HTM File
5	e legaldis	1/6/2017 5:24 PM	HTM File

Intel® Network Connections		×
(intel) Network	Connections	
	Install Drivers and Software	·
	View User Guides	
	View Release Notes	
Networking at Intel.com		Version: 22.6.6.0

C. 安装 Rolongo 光纤驱动,选择 RlgFiberBoxDriverInstall\_V5. exe, 已管理员模式此执行此文件, 直到安装完毕,显示 OK 状态

#### RIgFiberBoxDriverInstall\_V5.exe

RlgFiberBo	xDriverInstall ×
03:21:19.893	HrUninstallNetComponent: executing
03:21:20.096	Uninstall Driver Success.
03:21:20.096	HrUninstallNetComponent: executing
03:21:20.096	Couldn't get an interface pointer to INSECURE_NPCAP
03:21:20.096	Couldn't uninstall the network component.
03:21:20.096	Uninstall OLD Driver Fail.
03:21:20.112	lpFilename = C:\Users\ADMINI~1\AppData\Local\Temp\7zSC591.tmp\RLGBOXCAP.i
03:21:20.127	HrInstallComponent: executing, szComponentId = INSECURE_RLGBOXCAP
03:21:20.328	Install Driver Success.
4	
0	100%

D. 安装配置万兆网卡属性设置,选择 RlgFiberBoxAutoCfg\_V3. exe" 已管理员模式此执行此文件,直到安装完毕,显示 OK 状态,依据提示重启电脑; 若安装失败,接入我司光纤采集卡及打开 12V 电源,以及在"控制面板\网络和 Internet\网络连接"网卡状态显示为"正在识别…"或者"未识别的网络"再次 安装。

3:21:45.882	Max Processor Count = -1	
3:21:45.882	Processor Index = -1	
3:21:45.882	Set Network Card Config Success.	
3:21:45.914	Set Power Sche	7
3:21:45.929	** 里后电脑	S. C. State of the second s
):(A;;CCLCSW	RPWPDTLOCRRC ? 是否现在重启电脑??	RSDRCWDWO;;;BA)(A;;CCLC
3:21:45.929	D:(A;;CCLCSWRF	WRPWPDTLOCRSDRCWDWC
3:21:45.945	Set Fiber Server Yes No	
3:21:45.945	Set Network Co	3
		>

1.4.2 软件使用

A. ①配置程序加载的点亮参数路径, 找到 SensorConfgure.cfg, 设置

路径



| ID=2C88C5A3.80146117.02400000.74737200 Speed=9930 SPLITPGM\_2PROGRESS=0

SPLITPGM\_4PROGRESS=0 PROCESSID=0 FiberNum=2 PlatformType=16 //R11: 16 /R19: 20

[ImageShow] Cuda=0

进入 Demo 开发包的 bin\_demo\x64\Release 目录,选择 RolongoSDK. exe 若启动程序后提示"The device cannot be oppend,……"则需绑定当前连接的 采集卡序列号,若提示"Open Device success"(如图 7),则无需绑定;

<sup>(</sup>以上驱动文件下载路径详见附录 1.1)

绑定流程如下:点击Get Platform list->在 Device Serial Number下 拉框选择序列号(如果是连接多个工装,即拷贝多个程序目录,打开 RolongoSDK.exe 选择不同的序列号绑定)->Set Platform ID->弹出的对话框(如 图6执行步骤)选择"确定"->程序重启,再次打开应用程序。

Camera Chann	el 1	Sensor first bload fire	Platform FW Version:Unknow		
Camera Channel 2 Camera Channel 3		Sensor_fps/Upload_fps	0.0.0		
		Sensor_fps/Upload_fps	OS Version:		
🔽 Camera Chann	7 Camera Channel 4				
peration	I2C(Hex)	log			
OpenDevice	Slave: 0x 20	Write 05:23:43 05:23:43 05:23:43	Channel 1 -Camera booting file path ./SSK5E9.ini Channel 2 -Camera booting file path ./SSK5E9.ini Channel 3 -Camera booting file path ./SSK5E9.ini		
LoadParameter	Register: 0x 0202	05:23:4	Charner + Callera booung he party soccess in The device cannot be opened. Please check whethe		
StartPreview	Data: 0x	Read			
StopPreview	Type: 0x1608	-			
CloseDevice	Camera Channel: C1	•			
unction					
I2C Multi Write	I2C Multi Read	STest CurrentTest	SaveRAW		
atform Parameter					
vevice Serial numbe	a: [	-	Get Platform List Set Platform ID		
Grabber Transmit S	peed : 10000 (	Range:0~10000) SET			
10220					

图 5

Camera Channel 1 Camera Channel 2 Camera Channel 3 Camera Channel 4		Sensor fps/Upload fps	Platform FW Version:Unknow		
		Sensor_fps/Upload_fps	0.0.0.0		
		Sensor_fps/Upload_fps	OS Version:		
		Sensor_fps/Upload_fps			
Operation	I2C(Hex)	- log			
OnenDavies a	1	05:23:43	Channel 1 -Camera booting file path ./S5K5E9.ini		
OpenDevice	RolongoSDK		55X5E9.m		
LoadParameter			65K5E9.ini		
	as the ID is inconsis	test with the device acquiciti	on ID, plance restart the		
StartPreview	as the to is inconsis	tent with the device acquisiti	on ib, please restart the		
L	program to take eff	ect to support multiple devic	es		
StopPreview	program to take eff	ect to support multiple devic	es		
StopPreview CloseDevice	program to take eff	ect to support multiple devic	es 		
StopPreview CloseDevice	program to take eff	ect to support multiple devic	es		
StopPreview CloseDevice Function I2C Multi Write	I2C Multi Read	OSTest CurrentTest	es SaveRAW		
StopPreview CloseDevice Function I2C Multi Write Natform Paramete	I2C Multi Read	ect to support multiple devic OSTest	es SaveRAW		
StopPreview CloseDevice Function I2C Multi Write	IZC Multi Read	OSTest CurrentTest			
StopPreview CloseDevice Function I2C Multi Write Platform Paramete Device Serial number	IZC Multi Read	OSTest CurrentTest	es SaveRAW Get Platform List Set Platform ID		
StopPreview CloseDevice Function I2C Multi Write Platform Paramete Device Serial num Grabber Transmit	IZC Multi Read	OSTest CurrentTest 2.02400000.74737200 (Range:0~10000) SET	SaveRAW		

图 6

Conversit	E) Carrent (C) (C) (C) (C)	11 • bin,demo • x64 • Release • 49   1
d.	**	Reiongo SOK Demo Veri 2.0.0.13 Supported Image Grabben R11      Select Snage Channel     Comma Channel 1     Solo(2):386     Serior, fjork/solod, fjor     Comma Channel 2     Solo(2):080     Serior, fjork/solod, fjor     Comma Channel 3     Solo(0):100     Serior, fjork/solod, fjor     Comma Channel 4     Solo(0):100     Serior, fjork/solod, fjor
1 (anera) (a) (b) (b)	L Conversi	Operation         Dic/HeX         Big Situal Control         Situal Control<
		Rundom         Dic Multi Write         IDX Multi Read         OSTest         CurrentTreat         SaveRAW           Refform Preameter         Device Seral number:         S208A3A1.800CS3A2.02400000.74177200         Image: CarrentTreater Seral number:         Image: CarrentTreater Seral number:         Image: CarrentTreater Seral number:         Image: CarrentTreater Seral number:         Image: Carrent Seran number:         Image: Carrent Seral numbe

图 7

B. 配置点亮参数(若不懂模组点亮参数,可联系我司技术人员获取)

[HW\_Sensor] HW Voltage AVDD =  $2.8 //0 \sim 3.8$ HW\_Voltage\_DVDD =  $1.1 //0 \sim 3.8$ HW\_Voltage\_DOVDD = 1.8 //0~3.8 HW\_Voltage\_POW =  $1.1 //0 \sim 3.8$ HW\_Voltage\_AF = 2.8 //0~3.8 HW Voltage OTP =  $1.8 //0 \sim 10$ HW\_Voltage\_IOVDD =  $1.8 //0 \sim 3.8$ HW\_I2C\_Speed = 400 HW\_I2C\_IntervalTime = 100 HW\_Sensor\_MCLK = 50 // false: 上电低电平 true: 上电高电平 \*\*参数设置为 true 或者 false / HW RESET Active = true HW PWDN Active = true // 0x00: OV 0x10:SONY 0x20:Samsung 0x30: Hynix 0x40:Aptina 0> HW PowerupSequence = 0x10HW ENGINEER Mode = false HW UseDDR3 = true HW\_CPHY\_Mode=0x01 HW CPHY Rate=1.4583

1>. 电压设置

测试盒提供 6 组可编程电源 AVDD DVDD D0VDD POW AF OTP (可调范围及精度 参阅规格书)。10VDD 设置测试盒 GP10 输出电平,若不需要可不用设置,也可以 设置成跟 D0VDD 一样电平;

2>.12C 、MCLK、PWDN、REST 设置 HW\_12C\_Speed : 12C 速率单位 KHz, 1KHz~1MHz 可调 HW\_12C\_IntervalTime: 12C 指令间隔时间 HW\_Sensor\_MCLK: Sensor 时钟频率,单位 MHz,0~136MHz 可调 HW\_RESET\_Active: 设置 Sensor 上电时序电平, true 高电平, false 低电

平

平

HW\_PWDN\_Active: 设置 Sensor 上电时序电平, true 高电平, false 低电

4>. Sensor 上电时序设置及其他

HW\_PowerupSequence: 依据具体Sensor品牌选择,以下参数可配置

//0V=0x00, SONY=0x10, SANSUNG=0x20, HYN1X=0x30, APT1NA=0x40, ST=0x50, TOSH1BA=0x60, GCORE1NC=0x70, SUPERP1X=0x80, DONGBU=0x90, CUSTOM=0xFE, OTHER =0xFF

HW\_ENGINEER\_Mode: 工程人员调试图像是否有输出可以设置成 true, 产线 正常生产需设置成 false

HW\_UseDDR3:设置成 true

5>. CPHY 参数设置 【若为非 CPHY 的 Sensor, 可以不用设置】

HW\_CPHY\_Mode: //0x0: SENSOR 输出参考时钟; 0x1:SENSOR 不输出参考时 钟(9 线模式),目前常用设置 0x01

HW\_CPHY\_Rate: MIPI 数据传输速率,单位 Gsps/Trio

速率可以从 Sensor 厂提供的点亮参数文档获取(如下截图某 Sensor 参数 文档),或者我司速率搜寻工具(工具详见附录 1.4 SDK 20.0.0.56 版本及以上 支持 CPHY 速率自动搜寻,此参数设置为 0 即可)

Μ	od	e L	ist
	_	_	

_												
			Addition mode		RAW SIZE				INCK	OPSYCK system		
re	g mode1	mode2	Li aviene te l	N			Lane	DT_FMT	[MUs]	Pixel rate	Data rate	Data rate
			Horizontai	vertical	H	v			[PIRZ]	[Mpps]	[Msps/Trio]	Mbps/lane]
A	Normal	full size with remosaic	-	-	7360	5504	3	RAW10	24	480.00	700.00	1600.00
В	Normal	full size without remosaic	-	-	7360	5504	3	RAW10	24	480.00	700.00	1600.00
С	Normal	Binning	Analog addition average	og addition ave	3680	2752	3	RAW10	24	480.00	700.00	1600.00
D	Normal	Binning	Analog addition average	og addition ave	3680	2752	3	RAW10	24	346.97	506.00	1156.58
E	Normal	Binning	Analog addition average	og addition ave	3648	2736	3	RAW10	24	180.00	262.50	600.00
F	Normal	full size with remosaic	-	-	7360	5504	3	RAW10	24	1341.26	1956.00	4470.86
G	Normal	full size with remosaic	-	-	7360	5504	3	RAW10	24	658.29	960.00	2194.29
н	Normal	full size without remosaic	-	-	7360	5504	3	RAW10	24	1341.26	1956.00	4470.86
I	Normal	full size without remosaic	-	-	7360	5504	3	RAW10	24	658.29	960.00	2194.29

6>. 设置图像参数

```
[Image Sensor]
     Image Width
                   = 8000
     Image Height
                   = 6000
     Image_DataFormat = 0x12
     //0x01 Baylor8 BGGR 0x02 Baylor8 RGGB 0x03 Baylor8 GRBG 0x04 Baylor8 GBRG
     //0x11 Baylor10 BGGR 0x12 Baylor10 RGGB 0x13 Baylor10 GRBG 0x14 Baylor10 GBRG
     //0x41 Baylor12_BGGR 0x42 Baylor12_RGGB 0x43 Baylor12_GRBG 0x44 Baylor12_GBRG
     //0x51 Baylor14 BGGR 0x52 Baylor14 RGGB 0x53 Baylor14 GRBG 0x54 Baylor14 GBRG
     Image Interface = 0x60 //
     Image LaneNumber = 0x03
     Image DummyLeft=0
     Image DummyRight=0
     Image DummyTop=0
     Image_DummyBottom=0
     Image UploadROINumber=0
     Image_UploadROI1=0
     Image UploadROI2=0.3
     Image UploadROI3=0.55
     Image UploadROI4=0.75
     Image UploadROIAngle=38
     Image UploadROIWidth=400
     Image UploadROIHeight=300
     Image Width: 设置图像宽,单位像素
     Image_Height: 设置图像高,单位像素
     Image DataFormat:设置图像 Baver 格式,如下参数可配置
    //0x01 Baylor8_BGGR ,0x02 Baylor8_RGGB ,0x03 Baylor8_GRBG, 0x04
Baylor8 GBRG
    //0x11 Baylor10_BGGR ,0x12 Baylor10_RGGB, 0x13
Baylor10_GRBG , 0x14 Baylor10_GBRG
    //Ox41 Baylor12 BGGR, 0x52 Baylor12 RGGB, 0x53 Baylor12 GRBG,
0x54 Baylor12_GBRG
     //0x51 Baylor14 BGGR ,0x52 Baylor14 RGGB, 0x53
Baylor14_GRBG , 0x54 Baylor14_GBRG
     Image Interface: 设置图像传输格式,如下参数可配置
    //0x0F DPHY, 0x60 CPHY
     Image LaneNumber: 设置MIPI-CPHY或者MIPI-DPHY数据Lane数
     Image_DummyLeft: 设置图像左边的 Dummy Line
     Image DummyRight: 设置图像右边的 Dummy Line
                      设置图像上边的 Dummy Line
     Image DummyTop:
     Image DummyBottom:设置图像下边的 Dummy Line
     (在切割图像参数设置(以 RAW8 格式图像宽高设置)应遵循如下原则
Sensor 实际输出宽= Image_Width+ Image_DummyLeft+ Image_DummyRight;
Sensor 实际输出高= Image_Height+ Image_DummyTop + Image_DummyBottom)
```

7> 设置图像分块上传,依据实际计算的图像区域设置(比如 AF/AE 场景)

```
Image_UploadROINumber: 图像上传的视场个数(不是 ROI 个数)
Image_UploadROI1(N):设置上传的 ROI 视场位置(0~1.0)
Image_UploadROIAngle:设置 ROI 的角度(若是对角线, 4:3 Sensor 38 度
16:9sensor 29 度)
```

Image\_UploadROIWidth: 设置 ROI 的宽 Image\_UploadROIHeight:设置 ROI 的高

Cameral	Rolongo SDK Demo Ver: 2.0.0.13 Supported Image Grabber: R11
	Select Image Channel         Platform FW Version:4515_R11           IF Camera Channel 1         30.160/30.160         Sensor_fps/Upload_fps         Platform FW Version:4515_R11           240CCGA2.8018D444.02400000.74737201         OS Version:
Image_UploadR0INumber=3 Image_UploadR0I1=0 Image_UploadR0I2=0, 3 Image_UploadR0I3=0, 55 Image_UploadR0IAngle=38 Image_UploadR0IAngle=38 Image_UploadR0IWidth=400 Image_UploadR0IWidth=400	Operation       I2C(Hex)         Save:       0x         Save:       0x         Register:       0x         StartPreview       0202         Data:       0x         Register:       0x         Data:       0x         Type:       0x1608 •         CoseDevice       Camera Channel: C1         Camera Channel:       C1         CoseDevice       Camera Channel:         C1       •
[Register_Sensor] 0x40, 0x2000, 0x0000, 0x1616 0x40, 0x2000, 0x0021, 0x1616 0x40, 0x2002, 0x04a5, 0x1616 0x40, 0x2004, 0xb124, 0x1616 0x40, 0x2008, 0x0054, 0x1616 0x40, 0x2008, 0x0054, 0x1616 0x40, 0x2000, 0x01c2, 0x1616 0x40, 0x200e, 0x00c4, 0x1616 0x40, 0x200e, 0x00c4, 0x1616	I2C Multis Write       I2C Multis Read       OSTest       CurrentTest       SaveRAW         Platform Parameter       Device Serial number:       2400CC6A2.8018D+444.02400000.74737201       Get Platform List       Set Platform ID         Grabber Transmit Speed :       10000       (Range:0~10000)       SET         Split PGM       1 PGM 2 Camera (Progress ID: 0/1)       I PGM 1 Camera(Progress ID:0/1/2/3)       Progress ID:       0       SET

8> 设置 Sensor 初始化指令集

将 Sensor 初始化寄存器配置参数按照如下格式设置在 [Register\_Sensor] 与 [End] 之间

Sensor 从机地址,寄存器地址,寄存器值, 12C 模式;

12C 模式表示寄存器地址位数与寄存器值位数,如 0x0808 即表示寄存器地址 位数 8bit,寄存器值位数 8bit,还有 0x1608,0x0816,0x1616,0x1632,0x1664 等等

[Register\_Sensor] 0x6c,0x0103,0x01,0x1608 0x6c,0x3f3c,0x0002,0x1616 0x6c,0x3fe0,0x0001,0x1616 0x6c,0x0100,0x00,0x1608 0x6c,0x3fe0,0x0000,0x1616 0x6c,0x3042,0x1004,0x1616 0x6c,0x30d2,0x0120,0x1616 0x6c,0x30d4,0x0000,0x1616 0x6c,0x3090,0x0000,0x1616 0x6c,0x30fc,0x0060,0x1616 0x6c,0x30fe,0x0060,0x1616 0x6c,0x31e0,0x0781,0x1616 0x6c,0x3180,0x9434,0x1616 0x6c,0x317c,0xeff4,0x1616 0x6c,0x30ee,0x613e,0x1616 0x6c,0x3f2c,0x4428,0x1616 0x6c,0x3d00,0x0446,0x1616 0x6c,0x3d02,0x4c66,0x1616 [END]

C. Sensor 点亮出图

勾选⑥,程序启动后默认勾选,选择通道1出图;

因在上述步骤 A 已完成绑定工装及程序重启动作,图示④按钮 OpenDevice 无需点击;

若在程序启动前已完成步骤 C Sensor 点亮参数配置,图示①按钮 LoadParameter 无需点击,直接点击图示②StartPreview 按钮,若程序启动之 后,有修改步骤 C Sensor 点亮参数,需在点击开始出图按钮之前,先点击图示 ①LoadParameter 按钮;

停止出图点击图示③按钮 StopPreview;

开始出图执行成功之后,会在图示⑥标示位置显示 Sensor 出图帧率,及上 传帧率 (如图 10);

Camera Channel 1	29.586/29.586	Sensor_fps/Upload_fps Platform FW Version:4005			
Camera Channel 2	30.189/30.189	Sensor_fps/Upload_fps	3208A3A1.809C53A2.02400000.74737200		
Camera Channel 3	30.160/30.160	_ Sensor_fps/Upload_fps	OS Version:		
Camera Channel 4	30.160/30.160	Sensor_fps/Upload_fps			
OpenDevice     Image: Constraint of the second	i:: 0x 20 i:: 0x 0202 :: 0x 0x1608 ▼ ra Channel: C1 ▼	Write         05:49:47_ 05:49:47_ 05:49:47_ 05:49:47_ 05:49:47_ 05:49:47_ 05:49:47_ 05:49:47_ 05:49:47_ 05:49:47_ 05:49:47_ 05:49:47_	Camera 2 initial success, initial time:219(ms) Camera 3 initial success, initial time:219(ms) Camera 1 initial success, initial time:219(ms) Camera 1 preview time:359(ms) Camera 1 preview time:359(ms) Camera 1 Grab First Frame time:31(ms) Camera 4 preview time:390(ms) Camera 4 preview time:406(ms) Camera 3 Grab First Frame time:78(ms) Image 1		
I2C Multi Write	ulti Read OSTest	CurrentTest	SaveRAW		
atform Parameter	BA3A1.809C53A2.024000	000.74737200 ▼	Get Platform List Set Platform ID		

#### 图 9





D. 拆分多用

支持拆成四个进程(四只单摄软件)使用或者两个进程(两只双摄 软件)使用。

2 进程(2AP)设置方法: 勾选1 PGM 2 Camera(标识①) -> 设置进程 ID (范围 0/1 标识③) -> SET ④ ->点击确定按钮重启程序 如图 11

4 进程(4AP)设置方法:勾选 1PGM 1 Camera(标识②) -> 设置进程 ID (0~3 标识③) -> SET ④ ->点击确定按钮重启程序 如图 12

Operation	I2C(Hex)	
OpenDevice	Slave: 0x 20 Write	05:49:47_Camera 2 initial success, initial time:219(ms) 05:49:47_Camera 3 initial success, initial time:219(ms) 05:49:47_Camera 1 initial success, initial time:219(ms)
LoadParameter	Register: 0x 0202	05:49:47_Camera 2 preview time:359(ms) 05:49:47_Camera 1 preview time:359(ms) 05:49:47_Camera 2 Corab time:31(mc)
StartPreview	Data: 0x Read	05:49:47_Camera 4 Grab First Frame time:31(ms) 05:49:47_Camera 4 preview time:390(ms)
StopPreview		05:49:47_Camera 3 preview time:406(ms)
	RolongoSDK	s)
CloseDevice		4
	As Your Split 4 Progress to conne	ect one R11 Please restart the PGM
Function		
I2C Multi Write		
-Platform Parameter	-	确定
Device Serial number	: 3208A3A1.809C53A2.02400000.747372	00 Cet Platform List Set Platform ID
Grabber Transmit Spe	eed : 10000 (Range:0~10000)	SET
Solit PGM 1 1 PGM 2 Camera (Pr	rogress ID: 0/1) POPGM 1 Camera(Pro	gress ID:0/1/2/3) Progress ID: 0 3 SET 4

÷.	Sensor job SUV Cemo Ver: 2000.13 supported image oraboer: A11           - Select Image Channel           If Camera Channel 1           30.097/20.097           Sensor _fm(Lpload_fps           12084.34.099(53A2.02400000.74727200           05 Version:	
	Operation         120(Hox)           Control Control         Save: Ox         20           Save: Ox         2002         Write           Save: Ox         2002         Detail: Ox           StapPreview         Type: Ox160         Read           ObsetPrice         Control Control         Save: Ox           ObsetPrice         Control Control         Save: Ox	•
	Plantism         TDC Multi Read         OST est         Current/Test         SaveBAW           Plantism Parameter         Device Senial number:         2008/L3A1.809/CS3A2.02400000.74737200         Image: Control of Co	

图 11

		OS Version:
ConsOrvice 12C(Hex) ConsOrvice 0x 20 Consorvice 0x 100 Consorvice 0x 1	Winte         D6:070:28           D6:070:28         D6:070:28           D6:070:28         D6:070:28           D6:070:28         D6:070:21           Read         D6:070:21           D6:070:21         D6:070:21           Read         D6:070:21           CurrentTest         D000.74727200	Orannel 1 Camera booting file path(55/559 in Grannel 2 Camera booting file path(55/559 in Channel 3 Camera booting file path(55/559 in Channel 3 Camera booting file path(55/559 in Camera 2 Interview the::300(m) Camera 2 Interview th
	CoerdParker         Save:         0x         20           LoadParameter         Register:         0x         0202           StapPreview         Data:         0x         7           CloseDevice         Camera Channel:         01         0           Function         IZC Multi Write         IZC Multi Read         OSTest           Perform Parameter         Device Senial number:         S008A34.109/CS3A2.02400           Grabber Transmit Speed :         10000         (Range)	Com/Cervor         Save:         0x         20         Write:         00500728, 0050078, 00500000000, 005000000000, 00500000, 00500000000

图 12

E.开短路测试(OS Test)

点击 OSTest 按钮进入开短路测试配置页面如图 11;

支持正向对地测试,负向对电源测试,两两短路/开路测试;

用户依据模组连接的通道选择 Camera1 或者 Camera2 或者 Camera3, Camera4, 若需单独测试某个 MIPI 通道开短路状态, 转接板的四个 MIPI 通道地需分开;

测试步骤:

1. 选择测试的 MIPI 通道

11. 选择正向对地(或者负向对电源,两两短路测试)

III. 选择需测试 PIN 脚图示 或者使用 PIN ALL Select 功能全选

VI.选择参考地(仅正向对地测试设置)或者参考电源(仅负向对电源设置),正向对地测试参考地一般选择 DGNDO,负向对电源测试参考电源一般选择 DOVDD V. 点击 test

测试完显示测试值及结果

0.	Description	Test	CAM ID	Spec min(mV)	Spec max(mV)	Result(mV)	Status(pas
1	LAN0-P	2	0	200	800	347.326	pass
2	LAN0-N	2	0	200	800	356.190	pass
3	MCP	2	0	200	800	356.996	pass
4	MCN	2	0	200	800	356.190	pass
5	LAN1-P	2	0	200	800	357.802	pass
6	LAN1-N	2	0	200	800	356.996	pass
7	LAN3-P	2	0	200	800	3300.000	fail
8	LAN3-N	2	0	200	800	3300.000	fail
9	LAN2-P	2	0	200	800	3300.000	fail
10	LAN2-N	2	0	200	800	3300.000	fail
11	IO-02	2	0	200	800	3300.000	fail
12	IO-I0	2	0	200	800	3300.000	fail
13	PWDN	2	0	200	800	485.934	pass
14	DVDD	2	0	200	800	280.440	pass
15	IO-00	<b>~</b>	0	200	800	3300.000	fail
16	SCL	2	0	200	800	484.322	pass
17	DOVDD	2	0	200	800	354.579	pass
18	SDA	2	0	200	800	516.557	pass
19	AVDD	2	0	200	800	311.868	pass
20	POW	2	0	200	800	3300.000	fail
21	RST	2	0	200	800	3300.000	fail
22	AF	2	0	200	800	3300.000	fail
nera Cł	hanel: 🔽 Came	ra1 🔽 Ca	mera 2 🗌 Camera	a3 🗍 Camera4			
ction:	GND-Resitiv	e Test	DOVDD-Negtive Tes	+ 🔲 Short Circuit Te	•st 🗆		
						Test	
PIN All	Select Referer	nce GND: D	GND0 💌 Refere	ence power source:	DOVDD 👻 🖣		

图 13

F. 电流测试

点击进入"CurrentTest"即可测试工作电流及待机电流;

工作电流量测步骤如下:

- 1. 模组在点亮状态,选择图示标示①
- 2. 勾选 Camera1 或者不勾选 , 图示标示②
- 3. 勾选要测量的电源 PIN 脚,图示标示③
- 4. 点击 CurrentMeasure 按钮,图示标示④
   (此 Demo 工具仅做 MIPI 通道 0,1 演示,若需其他通道可自行修改代码 TestTimes 建议设置值 256)

Select Image Chann	nel 1	Current M	leasure				×	
Operation	120	AVD V	xD: 42.920					-
OpenDevice	Slav	DO/	VDD: 0.000					
LoadParameter	Reg	I⊽ AP;	0.000 3	5				
StartPreview	Data	VPP	0.000					
StopPreview	Тури	POV	W: 0.000					
CloseDevice	Came	□ Stand	fbyCurrentMeasure 4	unit:uA)				>
Function		₩ Work	CurrentMeasure	A) DelayTime:	5000	ms		
I2C Multi Write	I2C N	🔽 Came	sa 2	TestTimes:	128			
Platform Parameter Device Serial numb	er: 200			Current		×	Cancel	

图 14

待机电流量测步骤如下:

1模组在关闭状态,选择图示标示①

2 勾选 Camera1 或者不勾选 , 图示标示②

3 勾选 Sensor 进入 Standby 条件及测量的电源 PIN 脚,图示标示③及④

4 点击 CurrentMeasure 按钮,图示标示⑤

(此 Demo 工具仅做 MIPI 通道 0,1 演示, 若需其他通道可自行修改代码 TestTimes 建议设置值 384)

Camera Ch	Current Measure	1
1. comero en	Current Measure A	74737200
peration	AVDD: 2016;420	
OpenDevice		:44.ini
LoadParameter	✓ DOVDD:   → → → → → → → → → → → → → → → → → →	(ms)
StartPreview		)x300,error: 0
StopPreview	₩ POW: 0.000	
CloseDevice	PWDN I RESET MICK DVDD	
unction	StandbyCurrentMeasu     it:uA)       WorkCurrentMeasure(unit:mA)     DelayTime:         StandbyCurrentMeasure(unit:mA)     DelayTime:	
12C MUID WITH	Camer 2 TestTimes: 128	
atform Parame		

图 15

G. 保存 RAW 图

步骤如下:

模组在点亮状态,点击图示标示①按钮,即在程序目录生成一张 RAW 图,如图示标示②

Cameral 💿 🖃 🖾	Camera2	0 0 2			- 44	-
		Rolongo SDK Demo	Ver: 2.0.0.13 Suppo	rted Image Grabber: RI	1	-
s.	4	Select Image Channel	29.665/29.665	Sensor_ballphad_ba Sensor_ballphad_ba	Platform PW Version:4005 [3208A3A1.809C53A2.02400000.74737200 OS Version:	9
RobongoSDK.exe RokongoSDK.exe RolongoSDK.exe RolongoSDK.iobj RolongoSDK.iobj RolongoSDK.iobj BolongoSDK.pdb SSK3E9.ini	2019/5/5/623 RAW 2019/5/5/623 RAW 2019/5/5/624 R2MR 2019/5/5/454 R2MR 2019/5/5/452 MANAI 2019/5/5/23-33 IOB/3 2019/5/5/23-33 IDDB 2019/5/5/454 PDB 2019/5/5/454 PERR	Coerdon IX Coerdense San Coerdense Reg Santhaventer Reg Santhaventer Typ Coerdense Cam	e: 0x 20 etern 0x 0202 etern 0x 0202 etern 0x 0x 0 etern 0x 0008 ern 0hannel: C1	Write         06:075:31, 06:075:31, 06:075:32, 06:075:32, 06:075:32, 06:075:32, 06:073:35, 06:073:35, 06:073:35, 06:073:35, 06:073:35, 06:073:35, 06:073:35, 06:073:35, 06:073:35, 06:073:35, 06:073:35, 06:073:35, 06:073:35, 06:073:35, 06:073:35, 06:075:31, 075:31	Camera 1 initial success, initial time:250(ms) Camera 2 preview time:200(ms) Camera 2 preview time:200(ms) Camera 2 color http://www.time.200(ms) Camera 2 color http://www.time.200(ms) Camera 2 notial success, notial time:200(ms) Camera 2 color http://www.time.200(ms) Camera 2 color http://	
<u> </u>	3019/3/5 6:09 Cf 6 3	Function     IZC Multi Write     IZC 1     Platform Parameter     Device Senial number:     Zindber Transmit Speed 1     Split PGM     I PGM 2 Camera (Progret	4.45 Read 057 284341.809C5342.024 20000 (Ra as 3D: 0/1) 1 1959	est CurrentTest 00000.74737200 2 nge:0~10000) SET 4 i Canera@rogress ID:0/1/2	SeverBAN()	1

图 16

H双光口设置参数

PROCESSID=0 FiberNum=1

若使用双口模式在 SensorConfgure.cfg 中 DeviceInfo->FiberNum=2; \*提醒 若只使用一个光口①硬件上光纤线+光模块需插在 Fiber1, Fiber2 光纤 线需断开;②软件上 SensorConfgure.cfg 中 DeviceInfo->FiberNum=1(如果未 设置默认是1根光纤线模式)

```
    SensorConfgure.cfg - 记事本

文件(F) 编辑(E) 格式(O) 查看(V) 帮助(H)
    [LoadingPath]

CameraCH1="./IMX586_CPHY_48M_Remosaic.ini"

CameraCH2="./IMX586_CPHY_48M_Remosaic.ini"

CameraCH3="./IMX586_CPHY_48M_Remosaic.ini"

CameraCH4="./IMX586_CPHY_48M_Remosaic.ini"
    [DeviceInfo]
    ID=240182A2.8018D444.02400000.74737200

Speed=9930

SPLITPGM_2PROGRESS=0

SPLITPGM_4PROGRESS=0
```

## 2. SDK 整合范例流程

2.1 获取图像采集卡 ID



\*API 接口参数说明,查阅 HisFX3Platform.h 获取当前 PC 连接的采集卡数量及序列号

## 2.2 图像采集卡初始化



\*API 接口参数说明, 查阅 HisFX3Platform.h HisFX3OpenDevice第二个形参赋值2.1章节获取的ID或者烧录ID(烧录ID详见后 续描述);

\*R11拆分多用(2AP或者4AP),需在调HisFX30penDevice之前调 HisFX3SplitBox

流程: HisFX3SetCurrentPlatformType -> HisFX3SplitBox ->HisFX3OpenDevice

> 拆成2AP模式,HisFX3SplitBox(2,ProcessID) ProcessID为AP索引,取值范围0/1 设置为0,点亮R11 MIPI通道0与1 设置为1,点亮R11 MIPI通道2与3 (R11 MIPI通道硬件定义详见附录2) 每个AP代码执行流程一致,仅ProcessID设置不同

拆成 4AP 模式, HisFX3SplitBox (4, Process ID) Process ID 为 AP 索引, 取值范围 0/1/2/3 设置为 0, 点亮 R11 MIPI 通道 0
设置为 1, 点亮 R11 MIPI 通道 1
设置为 2, 点亮 R11 MIPI 通道 2
设置为 3, 点亮 R11 MIPI 通道 3
(R11 MIPI 通道硬件定义详见附录 2)
每个 AP 代码执行流程一致, 仅 ProcessID 设置不同

\*R11 1 台电脑拖多个 R11 使用时,使用硬件烧录 ID 进行软件匹配(采集卡 ID 烧录软件详见附录 1.2) 无需使用采集卡序列号方式进行匹配当ID烧录成0, HisFX30penDevice 第2个形参设置为"boxindex(0)"
→ HisFX3OpenDevice(0,"boxindex(0)")
依次类推

\*HisFX30penDevice 第一个形参(int boxindex=0)依据软件连接的采 集卡个数设置,若一个采集卡一个软件(或者采集卡拆分多用 2AP 或者 4AP 模式)->设置为零

若使用双光口测试盒(R11 固件>=4601 SDK Version 20.0.0.55 版本 及以上),在HisFX3SetCurrentPlatformType 之后调用 HisFX3SetFiberNum(光纤线依据插入的条数设置) R19 SDK Version >=20.0.0.61 <\*建议使用最新版本的 SDK>

2.3 关闭图像采集卡

HisFX3CloseDevice

\*API 接口参数说明,查阅 HisFX3Platform.h 仅在应用程序关闭调用,或者应用程序已初始化完采集卡,采集卡突 然断电或光纤线断开,若想应用程序不关闭重启,再次初始化采集卡 需先调 HisFX3CloseDevice 再初始化采集卡 判定采集卡是否有通讯异常调用HisFX3IsConnected

## 2.4 Sensor 点亮



\*API 接口参数说明, 查阅 HisFX3Platform. h

上述 Display 非采集卡接口,从采集卡传输上来的 RAW 图,如果要显示在软件,先做插值算法,将 RAW 转 BMP, BMP 绘制在窗口。

*HisFX3GrabFrame*第6个形参[imageFormat]设置的参数不同(参考 enum \_HisFX3\_BaylorMode此枚举定义)可以获取与输入(输入即为点亮参数结构 体 struct \_HisFX3\_PreviewStruct中的\_HisFX3\_BaylorMode dataFormat成员变量 设置值)不一致的图片格式;

可支持格式如下:

<ol> <li>Bayer8(eg:0x01/0x02/0x0</li> </ol>	3/0x0	4/0x07)	设置如下参数
HisBaylor8_BGGR	=	0x01,	
HisBaylor8_RGGB	=	0x02,	
HisBaylor8_GRBG	=	0x03,	
HisBaylor8_GBRG	=	0x04,	
HisBaylor8_MONO	=	0x07,	

②双字节的 Bayer10/Bayer12/Bayer14(详细参看\_HisFX3\_BaylorMode 枚 举定义)

③MIPI RAW 格式 设置为 HisBaylor\_Compact

④插值 RGB 格式设置为 HisRGB\_RGB24

(若需双线性插值算法的图需和HisRGB\_Bilinear 取 或运算, eg:

HisRGB\_RGB24 |HisRGB\_Bilinear)

⑤插值 BGR 格式设置为 HisRGB\_BGR24

(若需双线性插值算法的图需和HisRGB\_Bilinear 取 或运算, eg:

HisBGR\_BGR24 |HisRGB\_Bilinear)

\*HisFX3StartPreview与HisFX3GrabFrame最后一个形参cam,设置参考如下:

1AP点4 Camera模式或者1AP任意2Camera模式:

cam ID 从O开始依次增加, cam=0 为MIPI通道0, cam=1 为MIPI通道1, cam=2 为MIPI通道2, cam=3 为MIPI通道3 (R11 MIPI 通道硬件定义详见附录 2)

1AP点2 Camera模式(R11拆分2AP 固定MIPI通道详见2.2描述): 当HisFX3SplitBox 进程(AP)索引设置为0时, cam 取值范围0/1, cam=0 为MIPI通道0, cam=1 为MIPI通道1; 当HisFX3SplitBox 进程(AP)索引设置为1时, cam 取值范围0/1, cam=0 为MIPI通道2, cam=1 为MIPI通道3; (R11 MIPI通道硬件定义详见附录 2)

1AP点1 Camera模式 (R11 拆分4AP) cam 在4只AP中都设置为0: 当HisFX3SplitBox 进程(AP)索引设置为0时, cam 取值范围0, 对应 MIPI通道0 当HisFX3SplitBox 进程(AP)索引设置为1时, cam 取值范围0, 对应 MIPI通道1 当HisFX3SplitBox 进程(AP)索引设置为2时, cam 取值范围0, 对应 MIPI通道2当HisFX3SplitBox 进程(AP)索引设置为3时, cam 取值范围 0, 对应MIPI通道3 (R11 MIPI通道硬件定义详见附录2)

HisFX3GrabFrame 返回的错误代码如下: HisFX3Error\_UpFrame /\*! 上传错误帧\*/ HisFX3Error\_DecodeLaneNum /\*!解码LANE数不正确\*/ HisFX3Error\_DecodeDataFormat /\*! 解码数据格式不正确\*/ HisFX3Error\_DecodeWidthHeight /\*! 图像宽高解码不匹配\*/ HisFX3Error\_NoImageData /\*!< 没有图像数据\*/ HisFX3Error\_IsNotOpen /\*!< 设备还未打开\*/ HisFX3Error\_CreateEvent /\*!< 创建事件失败\*/ HisFX3Error\_WaitEventAbort /\*! 等待事件异常退出\*/ HisFX3Error\_Parameter /\*!< 参数错误 \*/ HisFX3Error\_IsNotStart /\*还未执行StartPreview函数或者 StartCapture\*/ HisFX3Error\_MemNotEnough /\*!< 内存空间不满足要求\*/

## 2.5 Sensor 关闭

HisFX3StopPrevie

\*API 接口参数说明,查阅 HisFX3Platform.h 目前此接口下电时序为固定模式(如下图示),若需其他可以与我司技 术人员联系,或者参看如下图示下电流程代码。

HisFX3PortDecoderOnOff(boxGlobal.boxs[b].previewPara[c].port, false, cam);
if (rel = HisFX3StopCapture(cam)) return rel;
if (boxGlobal.boxs[b].previewPara[c].blsSetRST && (rel = HisFX3PullReset(!boxGlobal.boxs[b].previewPara[c].bReset_Act
if (boxGlobal.boxs[b].previewPara[c].blsSetPWDN && (rel = HisFX3PullPWDN(!boxGlobal.boxs[b].previewPara[c].bPWND
if (boxGlobal.boxs[b].previewPara[c].blsSetMCLK && (rel = HisFX3SetMCLK(0.0, cam))) return rel;
if (rel = HisFX3SetVolt(0.0f, boxGlobal.boxs[b].previewPara[c].uiVoltSetFlag & _HisFX3_Platform_VlotOn_AVDD, cam)) ret
if (rel = HisFX3SetVolt(0.0f, boxGlobal.boxs[b].previewPara[c].uiVoltSetFlag & _HisFX3_Platform_VlotOn_DVDD, cam)) re
if (rel = HisFX3SetVolt(0.0f, boxGlobal.boxs[b].previewPara[c].uiVoltSetFlag & _HisFX3_Platform_VlotOn_DOVDD, cam)) r
if (rel = HisFX3SetVolt(0.0f, boxGlobal.boxs[b].previewPara[c].uiVoltSetFlag & _HisFX3_Platform_VlotOn_AF, cam)) return
if (rel = HisFX3SetVolt(0.0f, boxGlobal.boxs[b].previewPara[c].uiVoltSetFlag & _HisFX3_Platform_VlotOn_OTP, cam)) retu
if (rel = HisFX3SetVolt(0.0f, boxGlobal.boxs[b].previewPara[c].uiVoltSetFlag & _HisFX3_Platform_VlotOn_POW, cam)) retu
if (rel = HisFX3SetVolt(0.0f, boxGlobal.boxs[b].previewPara[c].uiVoltSetFlag & _HisFX3_Platform_VlotOn_V5, cam)) return
if (rel = HisFX3SetVolt(0.0f, boxGlobal.boxs[b].previewPara[c].uiVoltSetFlag & _HisFX3_Platform_VlotOn_V12, cam)) retur

2.6 开短路测试

正向对地测试:

HisFX3OSPositiveTest

HisFX3OSNegtiveTest

两两短路测试

HisFX3OSShortTest

开路测试

HisFX3OSOpenTest

\*API 接口参数说明, 查阅 HisFX3Platform. h

2.7 12C 操作

单条 12C 读写

HisFX3WriteIIC, HisFX3ReadIIC

页模式 12C 操作

HisFX3PageWriteIIC , HisFX3PageReadIIC

12C 批量操作模式

HisFX3BatchWriteIICNoLimit , HisFX3BatchReadIICNoLimit

\*API 接口参数说明,查阅 HisFX3Platform.h \*形参 cam 设置参考 2.4 描述

\* EEPROM读写调用HisFX3PageWriteIIC 或者HisFX3PageReadIIC 内部自带 ACK检查机制, 若代码连续调用此接口中间无需添加延时。

## 2.8 工作及待机电流测试

HisFX3MeasureCurrent

\*API 接口参数说明, 查阅 HisFX3Platform. h

第四个形参unsigned int samples = 256,测试工作电流建议赋值256,待机

电流建议设置384 \*形参 cam 设置参考 2.4 描述

## 附录 1

1. 万兆网卡,光纤采集卡驱动,网卡属性自动设置软件下载路径

中国内陆区域下载路径: (百度网盘) 链接: https://pan.baidu.com/s/1KDcW146RpATuwtYA52LVGw 提取码: Oup6

其他区域下载路径: (谷歌云端硬盘) 链接: https://drive.google.com/open?id=1aH3A9VJj\_EMHmGzYQTKYTWWK2yu275m-

## 2. 采集卡 ID 烧录软件

中国内陆区域下载路径: (百度网盘) 链接: https://pan.baidu.com/s/1tn1T18E08h-aotkFjlMcyA 提取码: 6s1f

其他区域下载路径: (谷歌云端硬盘) 链接: https://drive.google.com/open?id=1MixVc-7JPumlaREI1suy\_34Pkp4EVybN

### 3. CPHY Data Rate 搜寻工具

中国内陆区域下载路径: (百度网盘) 链接: https://pan.baidu.com/s/1v9aHfyhlxdvESMZ6Mi8WJA 提取码: 16j7

其他区域下载路径: (谷歌云端硬盘) 链接: https://drive.google.com/open?id=1gecgV-otLtG9wzybw6uy7y0aC6TnYXxe 附录2



R11

MIPIO 仅支持 DPHY MIPI1 支持 CPHY/DPHY MIPI2 支持 CPHY/DPHY MIPI3 仅支持 DPHY

R19

MIPIO 支持 CPHY/DPHY MIPI1 支持 CPHY/DPHY MIPI2 支持 CPHY/DPHY MIPI3 支持 CPHY/DPHY