



# XCAM

## DATASHEET

### A Low-Resolution Dual Vision Module

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Approver	

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## 1. System Overview

Module	Sensor Type	Thermopile far-infrared sensor
	Available Spectrum	8-14 $\mu$ m
	Resolution	32 (H) $\times$ 32 (V)
	Pixel Size	90 $\mu$ m
	Maximum Frame Rate	7~9Hz
	Typical Target Temp.	-10~150 $^{\circ}$ C
	Target Temp. Range	-20~500 $^{\circ}$ C
	Maximum Temp. Range	-40~1000 $^{\circ}$ C
Environment	Working Environment Temp.	-20~65 $^{\circ}$ C
	Storage Environment Temp.	-40~85 $^{\circ}$ C
Interface	Power Supply	USB 5.0V ( $\pm$ 10% )
	Power Consumption	200mW (Typical)
	Signal Interface	(Android) Male USB-C
		(IOS) Male Lightning (available at Q4, 2018)
Output	RGB (Image) /Temp. Array	
Layout	Size	57 x 29.5 x 11.7 (mm)
	Thermal FOV (Field Of View)	33 $^{\circ}$ (H)
	CIS FOV	47 $^{\circ}$ (H)

## 2. Mechanical Specification

### 2.1. PCB Dimensions

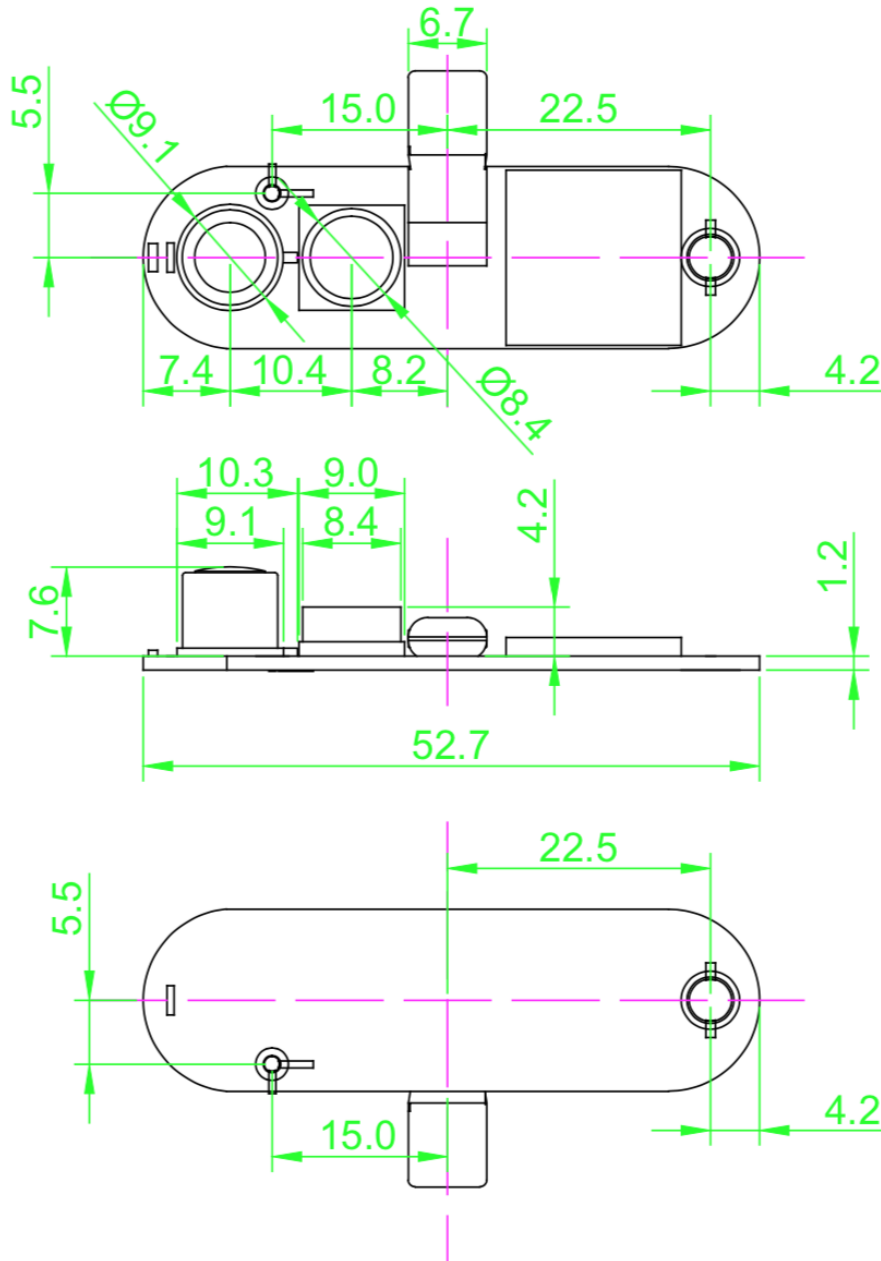


Figure 1 Dimensions of PCB



## 2.2. Product ID Dimensions

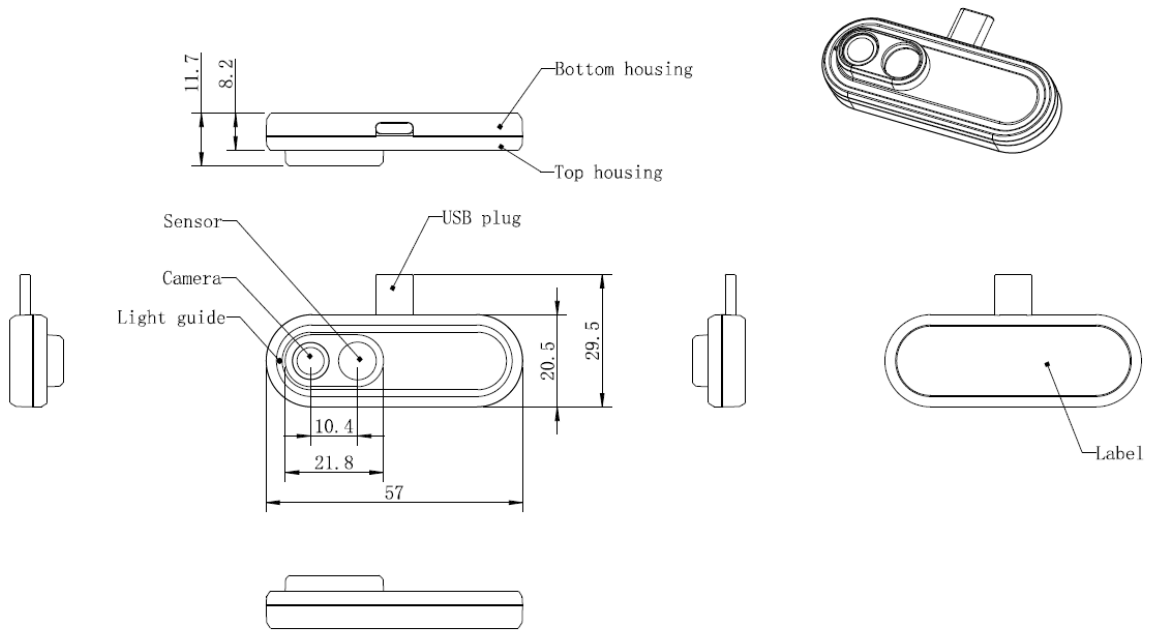


Figure 2 Product ID dimensions



### 3. Interface Description

PIN_1	USB_5V
PIN_2	USB_GND
PIN_3	USB_D-
PIN_4	USB_D+
PIN_5	SWD_IO
PIN_6	SWD_CLK
PIN_7	UART_TX
PIN_8	UART_RX

## 4. Communications Protocol

### 4.1. Firmware Design

Now there are two versions of Firmware(FW) for Mobile phone application and PC use respectively. FW for mobile phone application will fully support the Android software for Xcam. It's not suggested to use specified FW on a different platform as there may be some imaging issue under this case. The default working environment is declared in the FW files in the product package.

### 4.2. SDK Description

The XCAM SDK basically contains fundamental functions which supports for Nuvoton MCU N329- series library to control XCAM.

XCAM SDK is now available on GitHub.

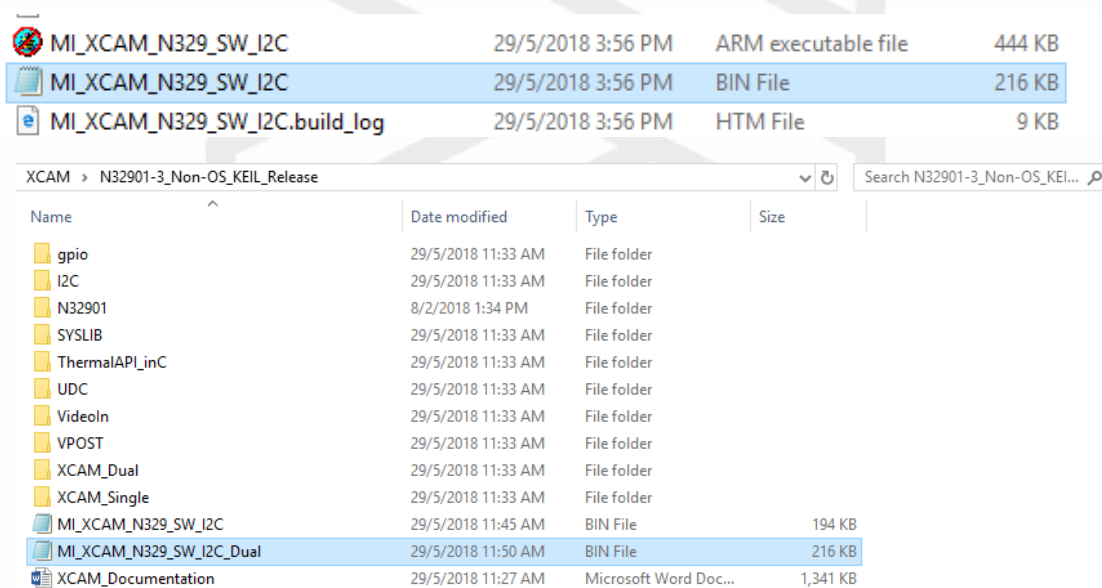
Prerequisites

- Install Keil uVision IDE with license, suggested MDK-ARM Professional V5.14+
- SDK project folder
- C Compiler (armcc)
- Support chip Toshiba TMPA900CMXBG

#### Getting Start

You can either open the project by Keil and compile to get binary file, otherwise the default binary file is also provided (MI\_XCAM\_N329\_SW\_I2C\_Dual.bin).

If build successful, the binary file can be found at (.\[Project URL]\XCAM\_Dual\example\HTPA32\KEIL\HTPA32\MI\_XCAM\_N329\_SW\_I2C\)



Name	Date modified	Type	Size
MI_XCAM_N329_SW_I2C	29/5/2018 3:56 PM	ARM executable file	444 KB
MI_XCAM_N329_SW_I2C	29/5/2018 3:56 PM	BIN File	216 KB
MI_XCAM_N329_SW_I2C.build_log	29/5/2018 3:56 PM	HTM File	9 KB

Name	Date modified	Type	Size
gpio	29/5/2018 11:33 AM	File folder	
I2C	29/5/2018 11:33 AM	File folder	
N32901	8/2/2018 1:34 PM	File folder	
SYSLIB	29/5/2018 11:33 AM	File folder	
ThermalAPI_inC	29/5/2018 11:33 AM	File folder	
UDC	29/5/2018 11:33 AM	File folder	
Videoln	29/5/2018 11:33 AM	File folder	
VPOST	29/5/2018 11:33 AM	File folder	
XCAM_Dual	29/5/2018 11:33 AM	File folder	
XCAM_Single	29/5/2018 11:33 AM	File folder	
MI_XCAM_N329_SW_I2C	29/5/2018 11:45 AM	BIN File	194 KB
MI_XCAM_N329_SW_I2C_Dual	29/5/2018 11:50 AM	BIN File	216 KB
XCAM_Documentation	29/5/2018 11:27 AM	Microsoft Word Doc...	1,341 KB

Figure 3 Location of default binary file

The XCAM\_Documentation.doc provides library structure, project setting and API in details.

#### 4.2.1. Binary File Download Guide

- 1) Copy the new FW binary file into the AutoWriter folder. The content of AutoWriter folder is similar Figure 4 as shown below.

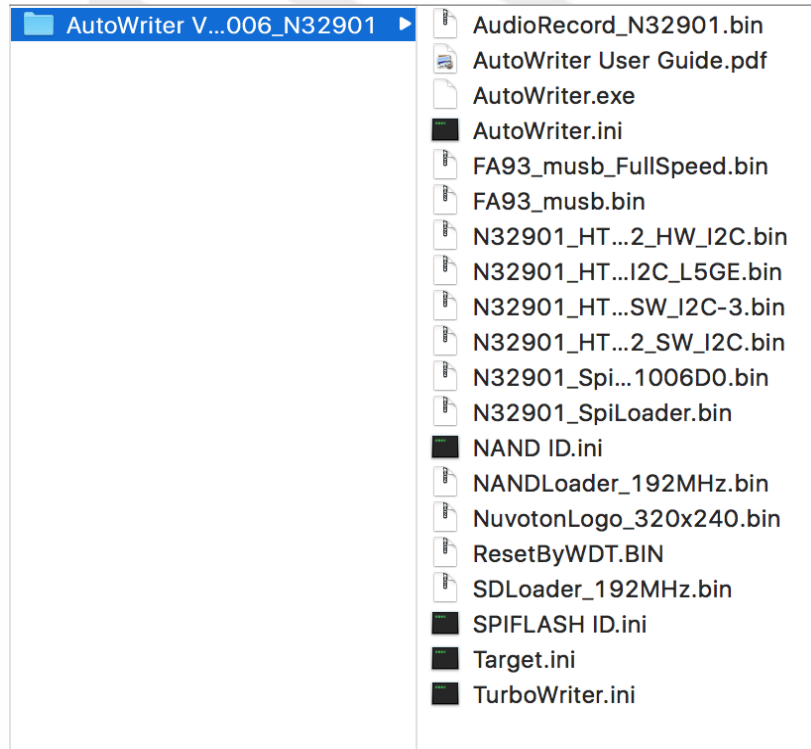


Figure 4 The AutoWriter folder

- 2) Modify the AutoWriter.ini with the new binary file's name and save the modification. The name of the binary file shall be covered exactly the same in the AutoWriter.ini.

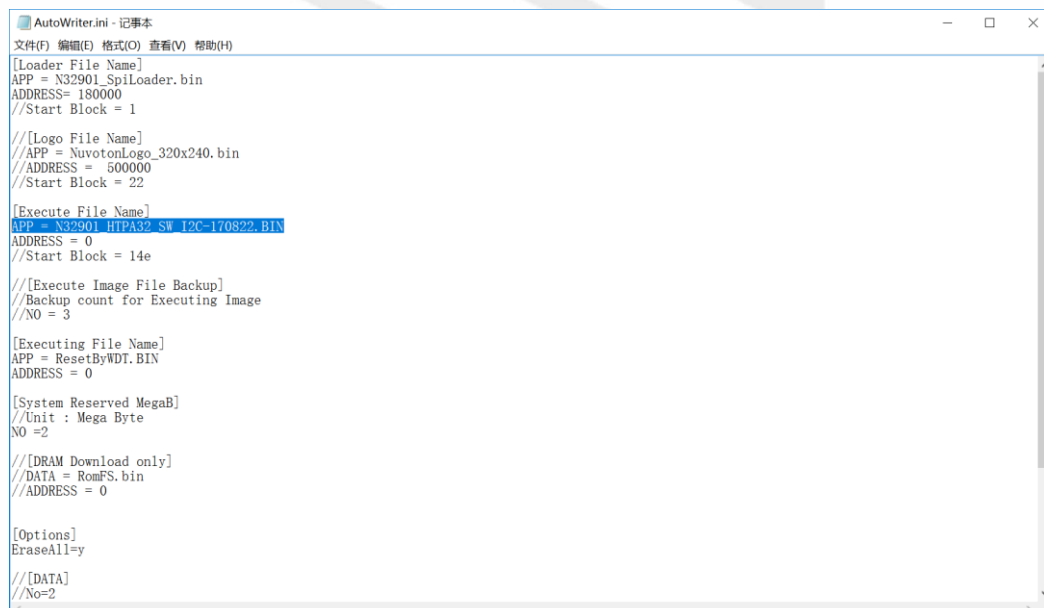




Figure 5 The AutoWriter.ini file

- Open the AutoWriter.exe and make sure the setting is in the SPI mode; the software shall be running before the hardware connected to the PC. The setting is as below:

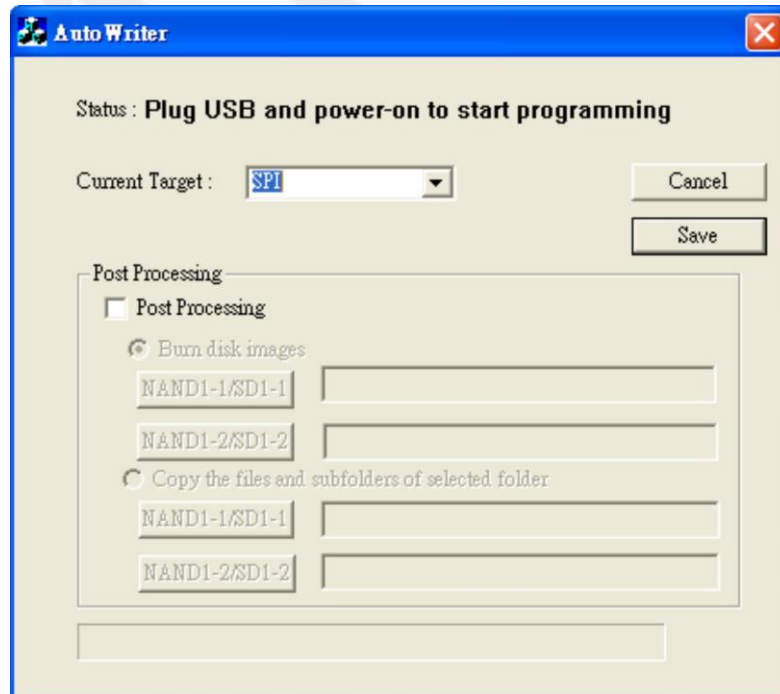


Figure 6 Setting SPI mode in AutoWriter.exe

- Short the modifying mode pads on the board first then connect the module to PC through the USB interface. You can short these two pins with a metal tweezer or anything stable enough to short the two pins on board, or even solder them together. But remember to separate the pins afterwards so that the module can work as an attaching device to PC or phone. The Mode-Switch pads are shown as below:

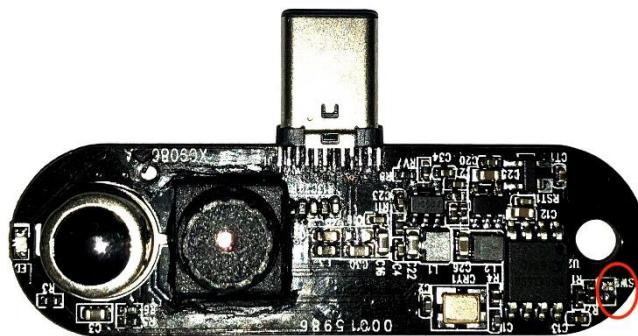


Figure 7 The two pins to enable modifying mode

- 5) The AutoWriter will burn the binary into the module automatically. Be reminded that during this period the modifying mode pads should be kept short. Please wait until the AutoWriter status is *Burn Success* as shown as below:

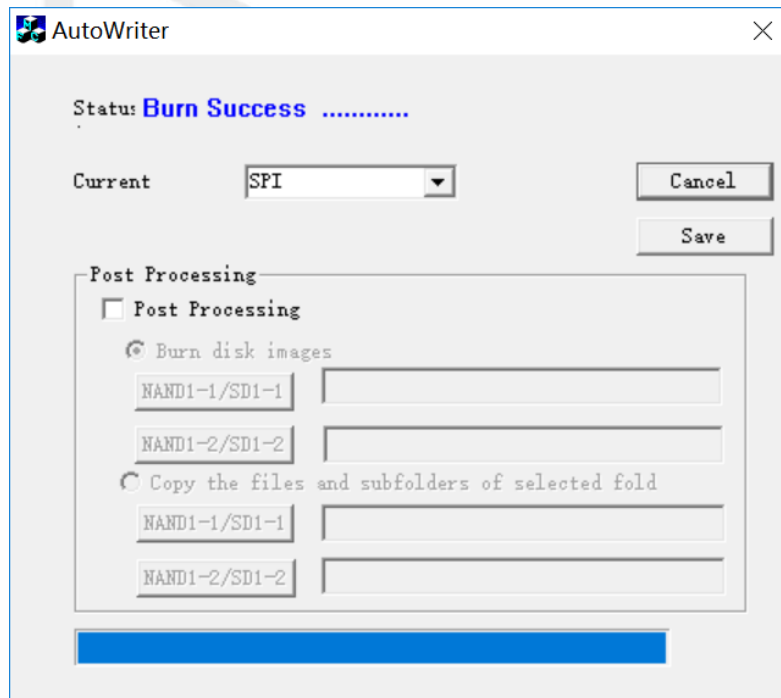


Figure 8 Burning the binary codes into the module

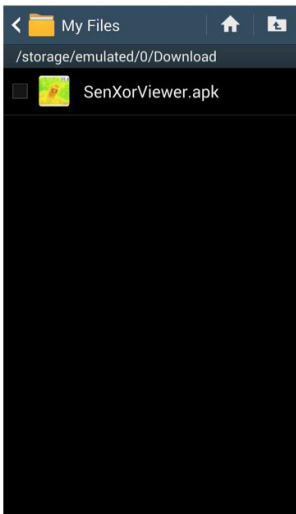
- 6) Disconnect the USB interface and end the shorting of the two pads. When you connect the module to phone or PC again, the module will run the New FW.



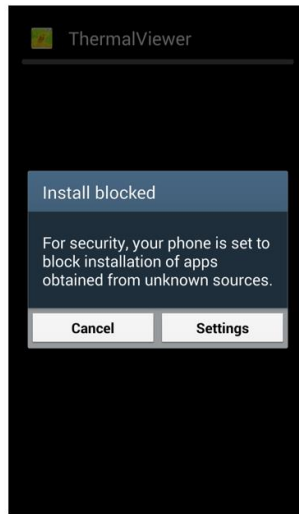
### 4.3. Software Description

SenXor Viewer is a simple software on mobile application to run with XCAM. Main function is to overlay the thermal image on the CIS image during video streaming in order to provide thermal information with or without showing thermal color by tapping on screen.

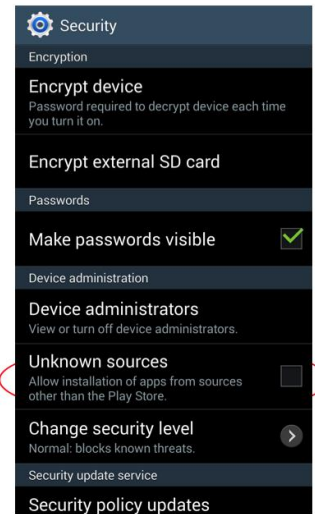
#### 4.3.1. Installation Procedure of SenXor Viewer



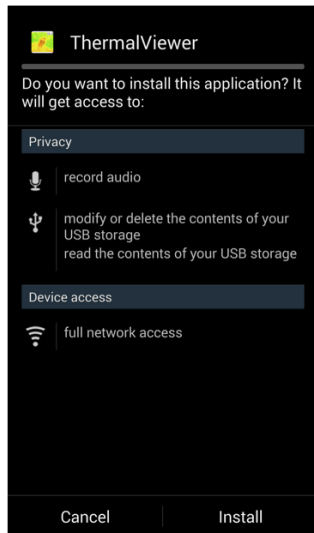
Step 1: Download the APK file to mobile



Step 2: Ask for permission for installation



Step 3: Grant the installation permission in device setting



Privacy access to USB and video

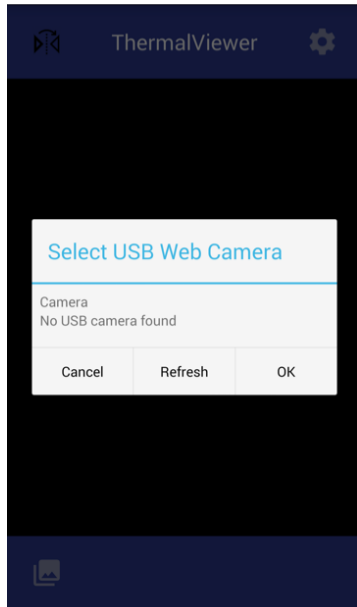


Install successfully

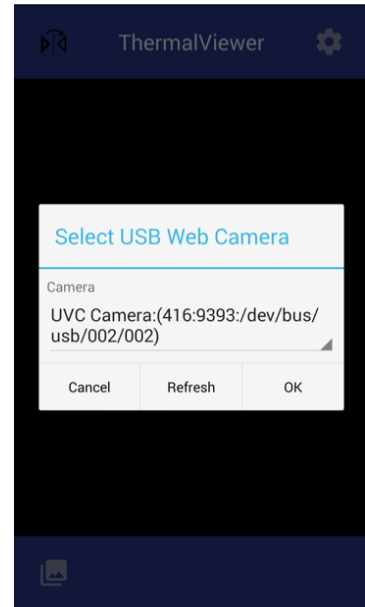
Figure 9 Installation steps of SenXor Viewer



### 4.3.2. Design of UI



No device plugged into USB



XCAM plugged into USB

**DO NOT FORGET TO ENABLE OTG !**

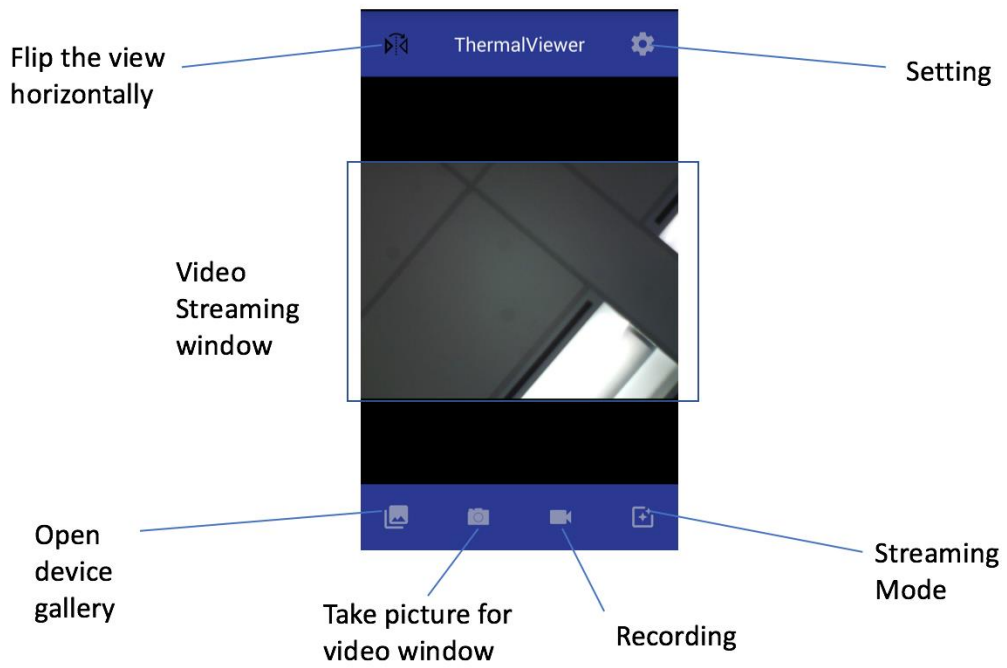


Figure 10 Screen captures of UI



### 4.3.3. Demonstration

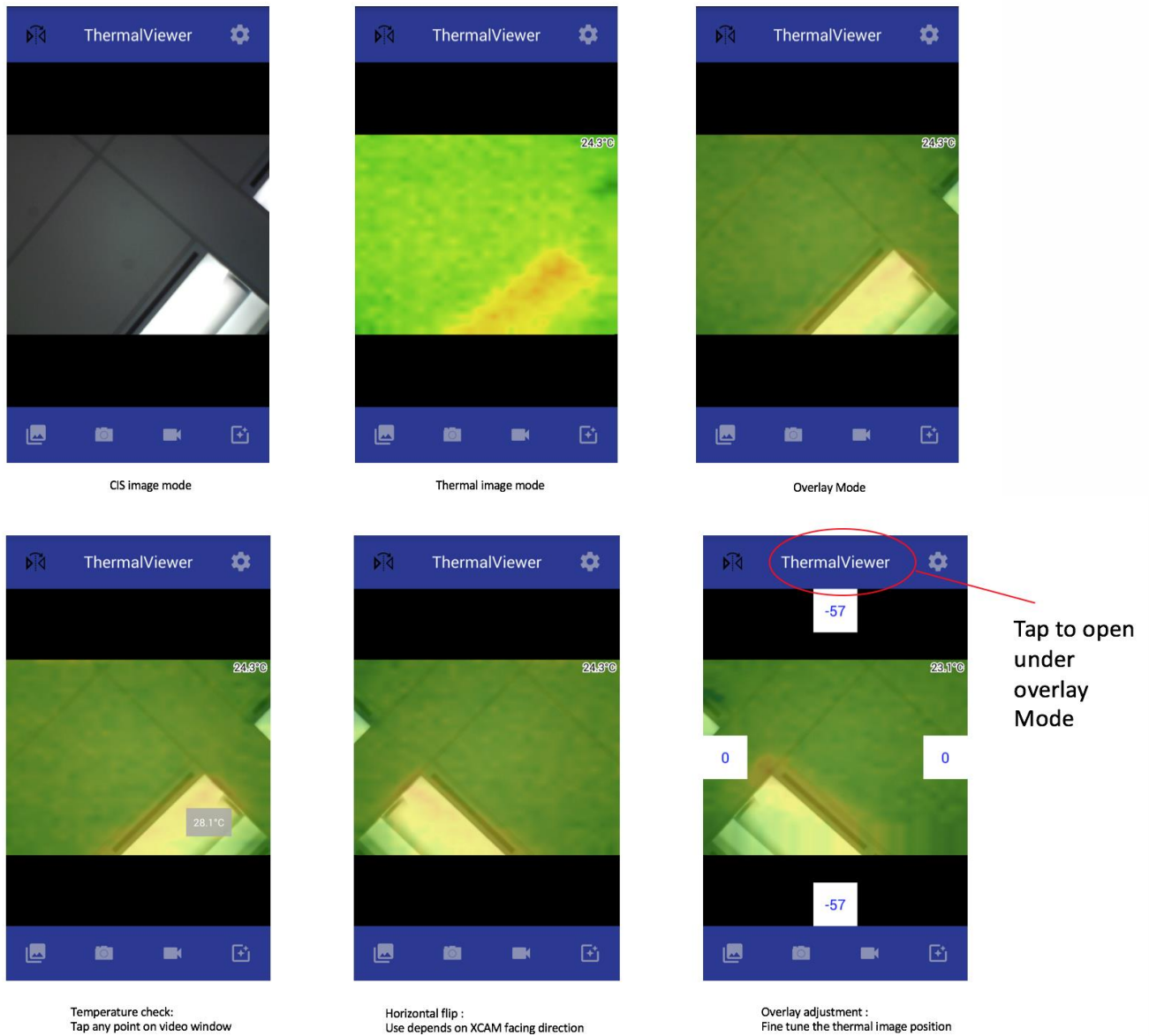


Figure 11 Screen captures of SenXor Viewer control



#### 4.3.4. Setting

Temperature Display Unit: Celsius / Fahrenheit  
Color Filter: RGB / Black and White  
Face Detection: On / Off

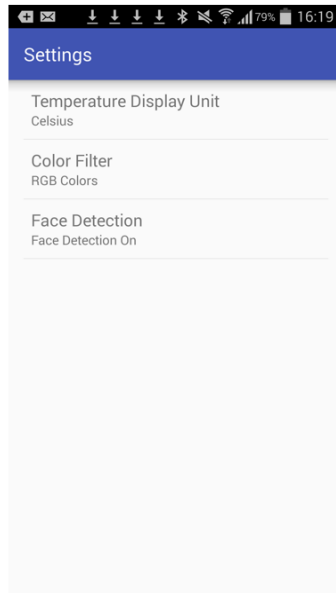


Figure 12 Settings of Display