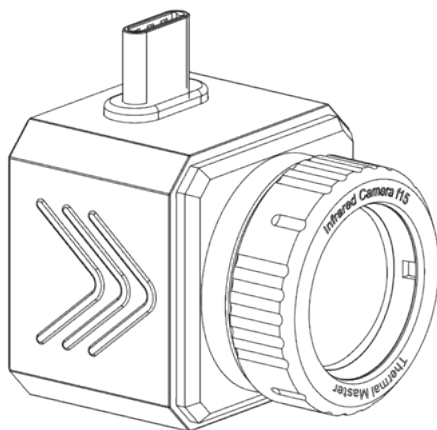




## Thermal Master X3

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# QUICK START GUIDE



Thermal **Master**

## Precautions for Safe Use

- Please protect the device from vigorous vibration, or impacts by falling objects, and keep the device away from magnetic field interference.
- Do not aim the lens at a strong thermal light source, such as the sun or other high-temperature targets, to avoid damage to the lens or thermal imaging detector.
- Please keep it properly after use. To prevent device failure, disassembling the device shell without permission is strictly prohibited.
- The lens and the Type-C connector are prone to damage. Do not knock, pry, puncture, or scratch them.
- Do not use the product in extremely cold, extremely hot, dusty, or high-humidity environments. The recommended service temperature is  $-10^{\circ}\text{C}\sim+50^{\circ}\text{C}$ .
- Please restore the device in a dry, non-corrosive gas environment and away from direct sunlight.
- Please keep the packaging materials properly in case you need to return the device to the Agent or send it back to the manufacturer in its original package if issues arise.
- If the device fails, please contact the Agent from whom you purchased the device or reach out to our after-sales service office (refer to the last page of this booklet for details). Do not disassemble or modify the device in any way. We assume no responsibility for any problems caused by unauthorized modifications or repairs.

## 1. Product Overview

X3 is equipped with Thermal Master's 12  $\mu\text{m}$  renowned HD VOx thermal imaging detector, coupled with a 15 mm (21.2mm equivalent @17 $\mu\text{m}$  detector) adjustable alloy lens. Its night vision detection capabilities far surpass those of conventional thermal imaging night vision devices. Additionally, it incorporates self-developed image processing chips and boasts a 384 $\times$ 288 HD infrared resolution. Paired with the RazorX exclusive image algorithm, it ensures a clearer field of view and sharper images. The device operates at a high frame rate of 60Hz, resulting in smoother imaging. Moreover, the body is made entirely of alloy, making it solid and durable.



**1640 Yards**  
Detection



**15X**  
Zoom



**20 in 1**  
Pro Tactical DIY Thermal



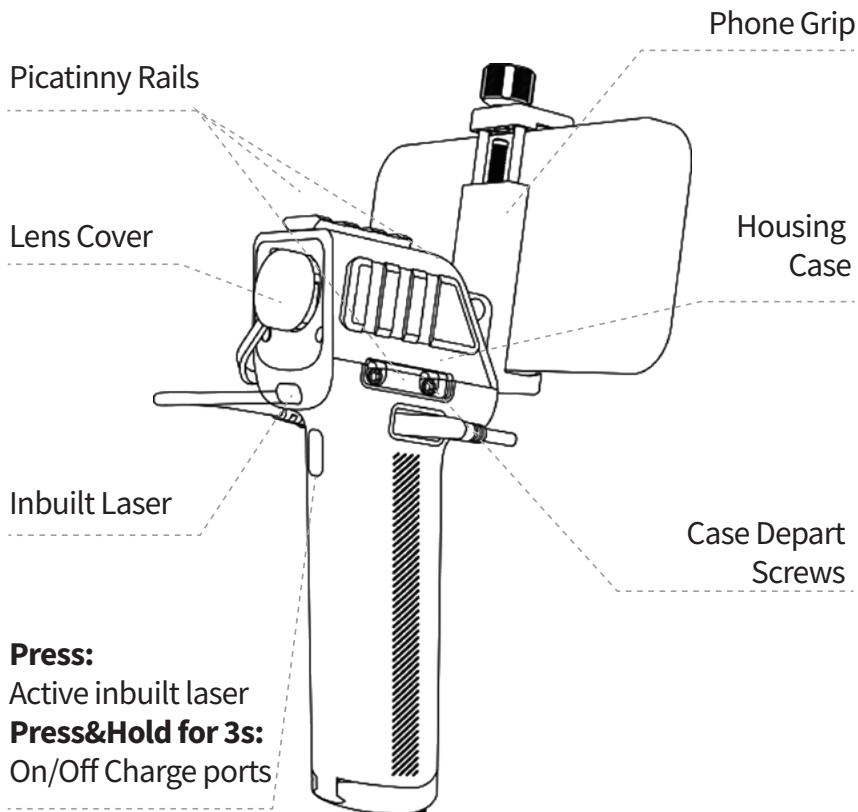
**384 $\times$ 288**  
IR Resolution



**60Hz**  
Frame Rate



**25mK**  
Sensitivity



Fasten Knob

Extension &  
Charge Cable

Charge Port 1

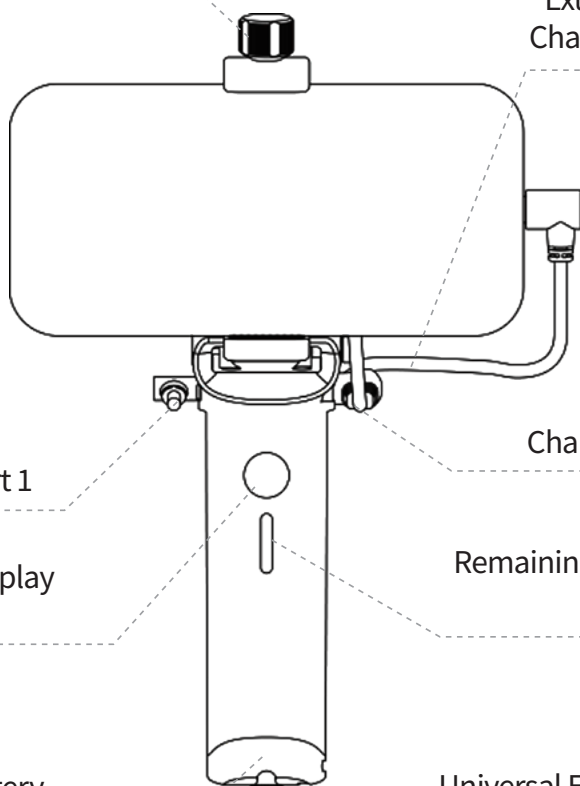
Charge Port 2

Battery Display  
Button

Remaining Battery  
Display

Inbuilt Battery  
Compartment Cap

Universal Expansion  
Screw Hole



## 2.Preparations

### 2.1 Software Downloading

This device must be used together with the app in order to access infrared observation, thermography, and other functions from the app. Please scan the QR code below to obtain the latest version of the app.

Alternatively, search for “Thermal Master” in the app store to download the corresponding software.



### 2.2 Connection Setup

Ensure that all permissions required by the installed app are enabled on your phone. Otherwise, some functions may not be available. These include storage, camera, audio recording, and location permissions for managing the infrared photo album, using the visible light camera, accessing the video-taking function, and acquiring latitude and longitude data, respectively. Before plugging into the device, ensure that the OTG storage function has been turned on. When using OPPO, vivo, OnePlus, realme, or iQOO smartphones, you will need to manually turn on this function. However, most other smartphones have this

function enabled by default.

Once the device is plugged in and recognized by your phone, you will see a prompt asking, "Do you allow the Thermal Master to access the USB device?" and tap OK.

If the app has been opened and cannot detect the device, the following interface is displayed. This means that some functions are disabled.



## 3.Specifications

| Detector                            |                                               |
|-------------------------------------|-----------------------------------------------|
| Resolution                          | 384×288                                       |
| Pixel Pitch                         | 12μm                                          |
| NETD                                | ≤40mK@25°C, F#1.0                             |
| Operating Band                      | 8~14μm                                        |
| Performance                         |                                               |
| Frame Rate                          | 60Hz                                          |
| Operating Temperature               | -20°C~60°C                                    |
| Storage Temperature                 | -40°C~85°C                                    |
| Typical Power Consumption           | 480mw                                         |
| Processor                           | Self-developed ASIC chip                      |
| Lens                                |                                               |
| Focal Length                        | 15mm                                          |
| Aperture                            | F1.0                                          |
| FOV                                 | 17.25°×13.04°                                 |
| Focusing                            | Manual focusing                               |
| Temperature Measurement Performance |                                               |
| Measurement range                   | 0~100°C                                       |
| Temperature Correction              | Distance, ambient temperature, and emissivity |
| Shell                               |                                               |
| Dimensions                          | 26.2×26.2×31.5(mm)                            |
| Color                               | Gray                                          |
| Weight                              | < 30g                                         |
| Interface                           | USB type C                                    |

**Note:** The parameters are updated on August 16, 2023, and are subject to change without notice.

**Note:** The above temperature measurement parameters are obtained in the laboratory environment.

## 4. Software Function

### 4.1 Main Screen Introduction

The app's home screen includes left and right function areas and an image area in the middle. The function areas include Setting, Album, Terrain Mode, Hotspot Tracking, Image Capture, Color Palette, Reticle, Image Mode, and LRF buttons.

The image area displays real-time images. By double-tapping the image, you can enter full-screen mode and indulge in the high image quality. Users can zoom in on the screen using a two-finger gesture, allowing for enhanced visibility within a range of 1~15x.



### 4.2 Settings

The Setting menu includes Temperature Setting, PIP, Infrared PIP, Infrared Image Flip, Infrared Image Rotation, Automatic Shutter Switch, Environmental Variable Correction, Display Setting, Shoot Setting, General, and Help.

#### 4.2.1 Temperature Setting

##### (1) Temperature Display

By turning on this function, you can view the real-time temperature on the screen. When turning on/off the function, there is a

short transition period, which is accepted as typical.

## **(2) Temperature Unit**

The temperature unit can be selected as Celsius (° C), Fahrenheit (°F), or Kelvin (K).

### **4.2.2 PIP**

Dual-Spectrum enables the presence of a small window in the image display area to simultaneously display the image taken by the phone camera. The small window supports drag operation.

To switch the front and rear camera of the phone, tap the reversal icon in the small window.

### **4.2.3 Infrared PIP**

By enabling the infrared PIP function, users can capture and magnify the central part of the image four times, displaying it on the home screen. The small window supports drag operation.

### **4.2.4 Infrared Image Flip**

By turning on this function, users can achieve a mirror effect on the screen. By turning off this function, users can restore the normal display.

### **4.2.5 Infrared Image Rotation**

Users can rotate the image by 0° , 90° , 180° , and 270° around the center.

### **4.2.6 Automatic Shutter Switch**

When the switch is turned on, the image will be automatically corrected in the video shooting scenario according to the default settings. When the switch is turned off, users can use the manual shutter for image correction during extended video shooting sessions. Users are recommended to turn it on during daily use.

### **4.2.7 Environmental Variable Correction**

In the environmental variable correction function, users can

choose to adjust the parameters in the default mode, and select the emissivity according to the material of the target object in the use scene. With this function, you can add custom modes, change the mode name and parameters, and select modes you have defined to quickly switch between different radiometric scenarios for temperature measurement demand.

Difference between default mode and custom mode: The default mode cannot be deleted and can be restored to the preset temperature measurement parameters of the product;

Emissivity: provides the surface emissivity of eight common objects and allows customized object surfaces (for details about the emissivity of common objects, refer to the attached page). The allowed emissivity range is  $0.01 \sim 1.00$ .

Distance correction: corrects temperature measurement based on the input distance to the measured object. The allowed distance range is  $0.25\text{m} \sim 5\text{m}$ . For a distance greater than 5m, select 5m, but the measurement accuracy cannot be guaranteed.

Ambient temperature correction: corrects temperature based on the input ambient temperature of the current device. The allowed ambient temperature range is the temperature range supported by the device.

#### **4.2.8 Display Setting**

In Display Setting, users can choose to display information as needed by selecting Location Display, Longitude and Latitude Display, Weather Display, Time Display, Speed Display, or Compass Display.

#### **4.2.9 Shoot Setting**

When taking photos, users can choose whether to display temperature data and background information in the Shoot Setting. If temperature data or background information is not

needed, it can be left unchecked. If temperature data or background information is needed, check the corresponding option to display it on the photo.

When taking videos, users can choose whether to display temperature data and background information in the Shoot Setting. If temperature data or background information is not needed, it can be left unchecked. If temperature data or background information is needed, check the corresponding option to display it on the video.

#### **4.2.10 General**

On the General screen, users can set the language, watermark, and theme.

The default language follows the system. Users can select Chinese, English, or Russian.

Watermark: is displayed in the upper left corner of the screen as the phone rotates. Users can choose to disable the watermark.

Theme Setting: allows users to choose between Following the System, Day, or Night themes.

#### **4.2.11 Help**

On the Help screen, users can access information on various aspects such as About Us, Privacy Policy, Help Document, Feedback, Software Version, Firmware Version, SN Code, and Firmware Version Update Checks.

### **4.3 Album**

Tap to view the photos and videos taken. You can share or delete any photo(s) and video(s) in the Album of the app.

Users can select multiple images and videos by simply tapping on the upper right corner. Specifically, you can conveniently choose up to 9 files at once for batch sharing and deletion.

## 4.4 Terrain Mode

By tapping Terrain Mode, you can choose Rain Fog, Plain, City, Jungle, or Bird Watching mode based on the specific usage scenarios and preferences.

X3 is compatible to all terrains environment.

## 4.5 Hotspot Tracking

By tapping the Hotspot Tracking button, you will see a cross-tracking point in the infrared thermal image, which is used to track the highest temperature point on the screen.

## 4.6 Image Capture

Tap Image Capture button, photo and video from the infrared image, visible light image (dual-spectrum enabled), and temperature measurement elements (temperature measurement enabled) in the displayed area can be captured and saved to the Album.

## 4.7 Color Palette

The software comes with preset options for green-hot, red-hot, iron-red, white-hot, and black-hot. Select different palettes as users prefer or as required.

The choice of palette does not have any impact on temperature measurement.



## 4.8 Reticle

By tapping the reticle button, users will see the reticle along with buttons for position control and size control on the screen.

The reticle is used to precisely target objects. Users can tap and drag the reticle or make slight adjustments by tapping the position control button's four directional arrows (up, down, left, right). Users can also tap the plus and minus buttons of the size control to zoom in and out of the reticle.

By tapping the Lock button in the size control, users can lock the reticle's position. By moving it left or right, you may switch between the reticle's 8 distinct shapes. Furthermore, you can adjust the reticle's color by sliding it up or down. The colors that are accessible are white, purple, blue, red, and green. By tapping the Unlock button, users can freely move the reticle.

## 4.9 Image Mode

Tapping the eye button, you can switch the image modes between High Definition mode(Blue Eye) which is widely used for cold or wet weather and Highlight mode(Red Eye) which is widely used for hot or dry weather.

## 4.10 LRF Functions

The X3 can be equipped with Thermal Master LRF 600 (separate product, optional) laser range finder. Once the LRF is connected to phone via Bluetooth, the two buttons at right corner will be activated, and users can apply continued distance reading and target indication at the same time.

# 5.FAQs

## ① Why does my Thermal Master X3 not respond after being plugged into the phone?

Please troubleshoot in this order:

- a) Ensure that your phone runs with Android 6.0 or later
- b) Verify that the OTG option is available on your phone and is enabled. If you are using OPPO, vivo, OnePlus, realme, or iQOO, search "OTG" in Settings and manually turn it on. This function is automatically turned off after 10 minutes of inactivity. On most other phones, OTG is turned on by default and can be used directly.
- c) Ensure that you have downloaded the Thermal Master app and granted all permissions required by the app.
- d) Unplug and plug in the Thermal Master X3. If it still does not respond, contact our after-sales services.

### **② Why is my screen upside down or in an incorrect direction?**

Our app supports 90-degree rotation in four directions and mirror adjustment. You can tap the Settings button on the home screen to enter the menu for operations. For details, refer to 4.2.4 of this booklet.

### **③ What should I do in the event of a blurry screen?**

Given the operating characteristics of uncooled infrared detectors, you need to refresh the screen using the shutter, that is, tapping the Shutter icon. This helps produce clearer images. The Thermal Master X3 is equipped with a manual focus lens, enabling users to fine-tune the lens rotation to achieve optimal image clarity.

### **④ Can I use the Thermal Master X3 to observe objects underwater, outside glass windows, under clothes, or under the skin?**

The Thermal Master X3 mainly detects an infrared wavelength range of 8~14um. So it cannot observe objects through water or ordinary glass and can only measure temperatures on the surfaces of clothes and skin.

**⑤ Does the Thermal Master X3 pose radiation hazards to the human body?**

No. The Thermal Master X3 does not actively emit any hazardous radiation but only collects the heat information of objects. It can be used with peace of mind.

**⑥ How should I increase accuracy in temperature measurement?**

- a) Adjust the focal length until images have optimum sharpness
- b) Correct distance, ambient temperature, humidity, reflected temperature, and emissivity (the emissivity table of common objects is available online)
- c) Select products with appropriate focal lengths. The larger the focal length, the longer the detection distance (because the ability of the atmosphere to absorb infrared waves is that the longer the distance, the greater the energy attenuation, and the lower the accuracy of temperature measurement)

**⑦ Why does my screen have horizontal, vertical, or wavy lines or ghost images?**

It is generally caused by poor interface contact or external electromagnetic interference of the signal. You can solve the problem through the following steps:

- a) Restart the mobile phone, unplug and reconnect the thermal camera
- b) Directly connect to the mobile phone or connect with an extension cable
- c) Test with another mobile phone. If the problem persists, return the device to the after-sales service for troubleshooting.

**⑧ Is it normal to always hear a "click" sound inside after connecting the thermal camera?**

Yes, it is. This is the shutter sound of the thermal camera to refresh the image (also called correction). For the blurred image, click it manually for a clearer image and more accurate temperature measurement. When the device is just connected to the mobile phone, the shutter will sound several times. After being used for a few minutes, the inside of the device reaches the thermal balance, and the shuttering frequency will decrease.

## 6. Product Services

### 6.1. Service Commitment

Thermal Master Technology Co., Ltd. is committed to providing quality training, maintenance, and technical support for customers. The Company wishes to maintain a long-term relationship with the customers. It continues to offer systems of the latest version and effective, timely support, retraining, and consulting services based on customer needs to help maximize customers' economic benefits.

### 6.2. After-Sales Contact

Email: [support@thermalmaster.com](mailto:support@thermalmaster.com)

Tel: +1(346) 247-6555

Website: [www.thermalmaster.com](http://www.thermalmaster.com)



(Official website)



(After-sales service)

## 7. Warranty Certificate

### Warranty Card

Dear user,

We will offer a two-year free repair or replacement service for any device failure under normal use.

The term "failure under normal use" generally refers to product defects from the factory or natural wear and tear caused by the user's normal use without intentional or negligent factors, excluding failures or damages due to any improper operation, unauthorized disassembly, or violation of the Precautions for Safe Use.

In case of any fault of your purchased product, please return it to the Agent in time or contact our after-sales service directly.

The warranty would be void if the users themselves disassemble or modify the devices within the warranty period.

Thermal Master Technology Co., Ltd.

May 2024

## 8.Emissivity Table

| Material                     | Emissivity |
|------------------------------|------------|
| Human Skin                   | 0.98       |
| PCB Integrated Circuit Board | 0.91       |
| Concrete                     | 0.92       |
| Porcelain                    | 0.92       |
| Rubber                       | 0.95       |
| Wood                         | 0.90       |
| Asphalt                      | 0.96       |
| Brick                        | 0.93       |
| Gravel                       | 0.90       |
| Soil                         | 0.92       |
| Cardboard                    | 0.90       |
| White Film Paper             | 0.93       |
| Water                        | 0.96       |
| Snow                         | 0.85       |
| Marble                       | 0.94       |
| Polished Glass               | 0.94       |
| Cathodic Aluminum Oxide      | 0.55       |
| Iron Oxide                   | 0.64       |
| Oxidized Steel               | 0.79       |
| Oxidized Stainless Steel     | 0.85       |

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Thermal Master may update this manual as a result of product upgrades or other needs. For the latest manual, please contact Thermal Master Technology. Thermal Master suggests you use this manual under the guidance of professionals.

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