# **Recon 6XR**

## Multi Use Thermal Optic Monocular & Day Scope Clip-On

## Model: TC600 User Manual





Fusion Thermal, LLC www.fusionthermal.com

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#### 1. Description

The Fusion Thermal Recon 6XR is a multi-use thermal optic that is supplied with two different kinds of eyepieces. The first allows the unit to be used as a hand-held monocular for general observation. The second allows the unit to be used as an attachment in front of a traditional rifle scope, effectively turning your day scope into a thermal scope, a role commonly referred to as a Clip-On. Thermal imagers are different from traditional night vison devices as they may be used day or night and will work effectively so long as there is a temperature differential between a viewed subject and its surrounding environment. It does not need any external light source to function and works well in adverse weather conditions such as rain, fog, and smoke. It is highly effective at locating people and animals even if they are obscured by reasonable amounts of obstacles such as foliage. The Recon 6XR has a wide range of applications including predator hunting, nuisance animal hunting, wildlife observation, wounded game tracking, property security, water navigation, search and rescue operations, and terrain orientation.

## 2. Components and Controls



Fig. 1 Function introduction

## 2.1 Components

No.	Name	Function description	
1	Lens Cap	Lens protection and using for background correction	
2	Objective Lens	Arclight Ultra HD Geranium Lens	
3	Target Focus Knob	Used to bring your viewed subject into sharp focus.	
4	Power (P) Button	Power on/Power off/Standby/Up/Left	
5	Menu (M) Button	Entering menu/Parameter switch	
6	Correction (C) Button	Shutter correction/Background correction /Down/Right	
	Locking Ring (Clip-	Looks the alin on avanians on the thermal device	
$\bigcirc$	on Mode Only)	Locks the chp-on eyepiece on the thermal device.	
0	Bayonet-type ring	Used to lock the adapter ring between the thermal unit and	
0	(Clip-on Mode Only)	the day scope.	
	Clin on Eveniege	Clip-on eyepiece used to place the unit in clip-on mode and	
(9) Clip-on Eyepiece		ready the unit for use in front of your day scope.	

10	Battery Compartment	Open and close to install two CR123 batteries. Twist and		
Cover		pull to open. Push until you hear a click to shut and lock.		
(1)	Type-C Interface	Used for data communication and external power supply		

### **2.2** Controls

Operation in normal display mode			Operation in menu mode/calibration interface			
	Quick Press	Long Press		Quick Press	Long Press	
P(4) Button	Standby/	Power on /	P (4)	Adjust parameter		
I (4) Dutton	Wake-up	Power off	Button	/Scroll up options		
M (5) Button	Enter the Shortcut Menu	Enter the Advanced Menu	<b>M (5)</b> Button	Function switch/Parameter selection	Save and exit menu	
C (6) Button	Shutter Calibration	Background Calibration	C (6) Button	Adjust parameter/Scroll down options		
M (5) Button + P (4)		Monocular: Enter Stadiametric Rangefinder	P (4) Button M (5)	Increase the distance between measurement bars	Quickly zoom in Exit	
Button		(monocular mode only)	C (6) Button	Reduce the distance between measurement bars	Quickly zoom out	
P (4) Button + C (6) Button		Enter the compass calibration interface				

#### 3. Menu/Status Bar Icons

	Screen brightness adjustment, four levels
	Image mode: B (Black hot), W (White hot), R (Red hot), C (Pseudo
	Color)
	Image Sharpness: Levels 1-4
÷,	Monocular Digital Zoom: ×1 Optical, ×2 Digital, ×4 Digital
0	Ultraclear Mode
*	Bluetooth Option/ Bluetooth On
**	Bluetooth Connected
	Video Output Option
out	Video Output On
	Battery Type Selection
*	Gun Profile: G1, G2, G3, G4
Ð	Image Calibration
-;-	E-Zoom Center Adjustment
+	Blind Pixel Correction Option
$\mathbf{O}$	Factory Reset
•	Battery Capacity Indicator
Ŧ	Type-C Power Supply
	Orientation Shift

## 4. Specifications

Model	Recon XR		
Detector Parameters			
Detector Type	VOx Uncooled		
Resolution	640 x 512		
Pixel Size	12um		
NETD	≤50mk		
Frame Rate	50Hz		
Optics Parameters			
Objective Lens	50mm		
Field of View	8.8°×7.0°		
Magnification	Clip-on mode: 1X		
Magnification	Monocular Mode: 3X Optical, 6X & 12X Digital		
Diopter Adjustment	-5D~+5D		
Detection Range (yd/m)	2840 v.4 / 2507 m		
(Target size: 5.6' × 1.6')	2840 yu / 2397 m		
Display Parameters			
Туре	OLED		
Resolution	1080x960		
Electrical Parameters			
Battery	CR123×2		
Power Consumption	<1200mW		
Typical Battery Life	$\geq 4hr$		
External Interface			
USB Interface	Туре-С		
Video Output	PAL (RCA Port)		
External Power	Туре-С		

Functions			
Digital Compass	$\checkmark$		
Motion Sensor	$\checkmark$		
Remote Control	Bluetooth		
Physic Parameters			
IP Rating	IP67		
Weight (without batteries)	<17.9 oz.		
Dimension	6.5"×2.9"×2.6"		
Adapter Ring	M52×0.75		

## 5. System Features

- Quick conversion between clip-on mode and monocular mode;
- Quick mounting and removal of Clip-On;
- Detection Range up to 2840 yards;
- 1080x960 high resolution OLED display;
- Bluetooth remote control
- Four image modes white hot, black hot, red hot, pseudo color
- Three Magnification Levels (Monocular Mode): 3X Optical, 6X & 12X Digital;
- Type-C interface power supply and data transmission
- PAL analog video output
- Built-in Electronic Compass, Motion Sensor, Bluetooth
- IP67 protection level;
- Compact size;
- Light weight and high impact resistance;

#### 6. Operation System

#### 6.1 Turn On / Turn Off

Press and hold down **P** (4) button for 3s to turn on the Recon 6XR, the startup image appears on the display screen. After 6s, the device is turned on.

Press and hold down **P** (4) button for about 5 seconds to turn off. A countdown will appear in the viewer. Releasing prior to countdown completion aborts shutdown.

#### 6.2 Standby Mode

This unit feature a standby (power saving) mode. <u>quick press</u> the P(4) button to enter and exit standby mode. To preserve battery life unit will shut down after 30 minutes without any action when in standby mode.

#### 6.3 Status Bar

There is a status bar located at the bottom of the viewer screen. It displays information on important settings and operations, including: Image Color Mode, Screen Brightness Level, Digital Zoom, Gun Profile, Sharpness, Bluetooth, Ultraclear Mode, Video Out, Battery Status. <u>Note: Not all icons will appear at all times, some icons are specific to</u> <u>Monocular Mode and some to Clip-On Mode.</u>

#### 6.4 Shortcut Menu

A q<u>uick press</u> of the **M** (5) button brings up the Shortcut Menu. <u>There are four functions</u> <u>to the Shortcut Menu</u>: Screen Brightness Adjustment, Image Color Mode, Sharpness, Digital E-Zoom (Monocular Mode Only). Use **P** (4) button and the **C** (6) button to adjust the parameters of each function.

Shortcut menu interface shown in fig. 2.



Fig. 2 Shortcut Menu

- Screen brightness: 1~4 brightness level.
- Image mode: W (White hot), B (Black hot), R (Red hot), C (pseudo color).
- **Image sharpness:** 1-4 levels of sharpness.
- **<u>Digital E-zoom (monocular mode only):** ×1/×2/×3/×4.</u>

#### 6.5 Advanced Menu

Press and hold down the M (5) button for 3s to enter the Advanced Menu Interface (fig.

 From top to bottom the function options are Ultraclear Mode, Bluetooth, Video Out, Gun Profile, Battery Type, Point-of-Impact Fine Tuning, Screen Recenter Adjustment, Blind Pixel Correction, and Factory Reset, refer to table 1 for details.

	30°NE	30°H	40°V	
			North Contraction	
	(			
8	(ON)			
	··· ( <u>ON (</u> )			
	( <u>S1</u> ‡)	<b>B</b>		
	···· ( <u>3.7V</u> ‡)	5		A.S #
<b>•</b> ••	>			
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£9 m	an P			
<i>₩</i> ₩	3€ ×1 \$(	G1 🗚 3 🗄	🕴 👁 🎰 out 🗖	

Fig. 3 Advanced menu interface

#### **Operations:**

- In the Advanced Menu, <u>quick press</u> M (5) button to adjust the parameters of current selection or enter the secondary menu.
- > P (4) button is used to shift up or left, C (6) button is used to shift down or right;
- > Press and hold down M (5) button for 3s to exit advanced menu interface.

Icon	Name	Function	Description	Status
			Boost thermal sensitivity to	
			the max when using in poor	
	Ultraclear	ON/OFF	visibility conditions: cloudy,	Displays on
•	Mode ON/OFF		rainy, foggy, etc. <u>Not needed</u>	the status bar.
			or recommended for normal	
			use.	
•	Dhuataath	ON/OFF	Used to link with Bluetooth	Displays on
	Bluetooth	UIN/OFF	remote control, included.	the status bar.

Table 1 Advanced menu function description

	Video Output	ON/OFF	Transfer the analog video in PAL through the Type-C data cable.	Displays on the status bar.
•	Battery Type	3V/3.7V	Select 3V for disposable CR123 batteries or 3.7V for rechargeable.	Displays on the status bar.
**	Gun Profile	G1/G2/G3/G4	Up to four gun profiles may be memorized.	Displays on the status bar.
¢	Point-of- Impact Fine Tuning	Enter POI Fine Tuning Interface	Correct any Point-of-Impact shift between rifle scope and thermal unit.	POI Shift Correction Interface (fig. 4)
-;-	E Zoom Center Adjustment	Enter E Zoom Center Adjustment Interface	Eliminates any potential Point-of-Impact if using digital zoom.	E Zoom Center Adjustment (fig. 5)
+	Blind Pixel Correction	Repair blind pixels on the image	Refer to 6.8	Blind pixel Calibration Interface (fig. 6)
Q	Factory Reset	Restore Factory Settings	Y: Confirm, N: Cancel <u>Long press</u> <b>M</b> button to save and exit.	

## 6.6 Point-of-Impact Fine Tuning Interface (Clip-On Mode Only)

The viewing screen of your thermal unit was perfectly centered at the factory during production, and it is likely that you will experience little to no point-of-impact shift

when used in front of your day scope. However, given the limitless scenarios of use and scope mounting it is impossible for any thermal clip-on to claim that no point-ofimpact shift will ever occur. If while using as a clip-on you experience a change in your point-of-impact significant enough to warrant a correction the Recon 6XR allows you to reposition the thermal viewing screen to align it with your day scope crosshairs. A built-in software feature makes the process easy, and the unit will allow you to memorize up to four different screen repositions with the Gun Profile feature, represented by G1 (Gun 1), G2, G3 and G4.



Fig. 4 Image calibration interface

#### **Operation:**

- First step is to ensure your day rifle scope is properly sighted in prior to attaching the thermal unit.
- After your day rifle scope is sighted in attach the Recon 6XR onto the front of your day scope using the appropriate Rusan adapter. Make sure the thermal is properly aligned to your scope with the control buttons pointed directly upward, not tilted. Aim at a target set at 100 yards and shoot. Measure the horizontal distance (left and

right) and vertical distance (up and down) between the actual bullet point-of-impact and your original aiming point.

- After taking your measurement to determine the correction needed <u>long press</u> the M (5) button and enter the main menu. Scroll down to the sixth option, Circle Dot Crosshair Icon, and <u>quick press</u> the M (5) button to enter the Point-of-Impact Fine Tuning Interface. While in the interface you will see directional arrows on the display screen that will tell you if you are adjusting left and right as indicated by the (X Value) or up and down as indicated by the (Y Value). A <u>quick press</u> of the M (5) will allow you to switch between the X and Y so you can make corrections accordingly. To adjust the X or Y number value <u>quick press</u> of the P (4) button or the C (6) button. This will allow you to reposition the display screen and align it with your day scope zero.
- Tip: If your point of impact is too high you should <u>decrease</u> the value of the Y variable. For example, if your current setting for Y equals +2.4 adjust it to a smaller number like 0.00 or a negative number like -3.6, whatever is required to bring the point-of-impact down. If you are shooting too low adjust from a smaller number to a bigger number to bring the point-of-impact up.
- Tip: If your point of impact is too far left you should <u>decrease</u> the value of the X variable. For example, if your current setting for X equals +9.7 adjust it to a smaller number like 0.00 or a negative number like -4.8, whatever is required to bring the point-of-impact right. If you are shooting too far right adjust from a smaller number to a larger number to bring the point-of-impact left. For example, if your current setting for X equals -20.6 adjust it to a larger number like 0.00 or a positive number like +4.8, whatever is required to bring the point-of-impact left.
- After completing your screen repositioning, <u>long press</u> M (5) button to save your corrections and exit.

Note: You should never have to make an adjustment to your day rifle scope. All corrections for Point-of-Impact shift are done by repositioning the thermal display

screen<u>.</u>

Note: Before using the Point-of-Impact Fine Tuning Interface be sure to select a Gun Profile (G1, G2, G3 or G4) before making your adjustments. Doing so will memorize your adjustments for easy future use. (Refer to 6.5 for details)

#### 6.7 E Zoom Center Adjustment

If you are using the Recon 6XR with a traditional <u>variable magnification day scope</u> you should only use the optical zoom of your day scope to magnify the target. However, if you are using the Recon 6XR with a <u>fixed magnification scope</u> you can use the built-in digital zoom feature to magnify the target. If you plan to use this built-in digital zoom feature you should use the E Zoom Center Adjustment interface to eliminate any potential for minor shifts in Point-of-Impact that may occur by pixel shift as the screen zooms up digitally. This is easily accomplished by following the directions below. You will only need to do this once when you save it under a specific Gun Profile (ex. G1)

- Long press the M (5) button and enter the main menu. Scroll down to the seventh option, Three Line Dot Crosshair Icon, and <u>quick press</u> the M (5) button to enter the E Zoom Center Adjustment Interface.
- While looking thru your day scope move the thermals white reticle until it overlaps the reticle of your day scope. This is easily done by <u>quick pressing</u> the P (4) button or the C (6) button. A <u>quick press</u> of the M (5) allows you to switch between adjustments of left and right and up and down. (Figure 5.)
- When the two reticles align press and hold down M (5) button to save and exit. You will have now completed the task.



Fig. 5 Recenter Adjustment

#### **6.8 Blind Pixel Calibration Feature**

Unfortunately, as thermal owners one of the things we've got to expect is an issue know as blind pixilation. You will know you are experiencing it when a white or black dot suddenly shows up on your screen and won't go away even after you NUC the unit. These annoying little dots are normal and are to be expected at some point. Fortunately, they are also easy to fix with our built-in calibration feature.



Fig. 6 Blind Pixel Calibration Interface

- Long press the M (5) button and enter the main menu. Scroll down to the eighth option, Square Box with a Cross Icon, and <u>quick press</u> the M (5) button to enter the Blind Pixel Calibration Interface (fig.6). A cross cursor will appear in the center of the screen;
- Move the cursor up-down or left-right to select the blind pixel by <u>quick pressing</u> the P (4) button or the C (6) button. A <u>quick press</u> of the M (5) allows you to switch between adjustments of left and right and up and down.;
- After selecting the blind pixel, press P (4) and C (6) button at the same time to calibrate the blind pixel;
- Repeat the above operations to fix any additional blind pixels, and the status bar at the bottom of the screen will display the number of calibrated blind pixels;
- When the calibration is completed, <u>long press</u> M (5) button to exit the blind pixel repair feature.

#### **6.9 Compass Calibration**

> In the home screen, long press P (4) and C (6) button at the same time to enter the 17

compass calibration interface.

- An icon like a triaxial coordinate system appears on the screen (shown in fig. 7).
- Follow the icon prompt to rotate the thermal unit along three axes at least 360 degrees each axis in the 15 seconds.
- The unit will automatically complete the compass calibration process and exit after 15s.
- During the calibration process, <u>quick press</u> P (4) button to exit the compass calibration interface at any time.



Fig. 7 Compass Calibration Interface

#### 6.10 Stadiametric Rangefinder (Monocular Mode Only)

Stadiametric rangefinder is only for monocular mode which allows the user to estimate approximate distance to an object of known size.



Fig. 8 Stadiametric rangefinder interface

- In normal display mode, press and hold the P (4) and M (5) button for 3s at the same time to enter the stadiametric rangefinder interface (fig. 8).
- The display will show two horizontal lines for measurement, the icons and numbers of the measured distance for three objects on the right.
- > There are three predefined values for objects:
  - Deer height 5.5'
  - Hog height 2.6'
  - Hare height 8"
- While viewing the target bracket the target by pressing P (4) button or C (6) button until the target is entirely between the two measurement lines, including the head.
- > The distance to the target is automatically recalculated while moving the measurement lines and are displayed on the right side of the screen.
- $\blacktriangleright$  Exit the rangefinder mode with a <u>long press</u> of the **M** (5) button.

#### 7.1 Bluetooth Remote Control Connecting

- Turn on the Bluetooth of the device and the icon will show at the bottom of the screen.
- Long press the Power button on the remote control for 15 to 30s until the Bluetooth icon on the screen turns to . Release the power button after the connection is done. The remote control is ready to use.
- After connecting to the device, if the signal is disconnected in between, the Bluetooth remote control will continue to search for connection within 1 minute.
- Turn off the Bluetooth on the device, and the remote control will automatically shut down if no Bluetooth signal is found within 1 minute.

#### 7.2 NUC (Non-Uniformity Correction)

To maintain peak image quality thermal devices will occasionally need to perform a sensor temperature calibration commonly referred to as NUC (Non-Uniformity Correction) – Pronounced "Nuke". This required function maintains top performance and eliminates image defects such as vertical bars and phantom images. The user can perform a manual NUC at any time by a simultaneous <u>quick press</u> of **C** (6) button. This will activate the internal shutter and NUC the system. For a non-shutter, completely silent NUC, <u>long press</u> the **C** (6). However, if a non-shutter NUC is performed the user must cover the front lens with a hand, or preferably close the front lens cover so the sensor will have uniform surface to calibrate against.

#### 8. Preventive Maintenance

#### **8.1 Battery Installation**

- > It is necessary to power off before replacing the batteries.

- Turn the battery compartment knob (10) counterclockwise until it stops and lift to remove it.
- Install two CR123 batteries according to polarity instructions on the label inside the battery compartment as shown in fig. 9.
- Replace the battery cover and press until it clicks make sure the cover is closed on both sides.

#### Note:

- Please do not use batteries of different types or batteries with various charge levels.
  - After installation, please set the battery type in the advanced menu: 3.7V for Rechargeable Battery and 3V for Disposable Battery.



Fig. 9 Schematic diagram of battery installation

#### **8.2 Product Cleaning and Maintenance**

- Clean the Recon 6XR external body with a soft dry cloth or cloth damp with clean water.
- Clean optical glass surfaces with air duster, or cleaning cloths specifically designed for this purpose. Do not rub the lens with any device that might scratch the surface.

#### 8.3 Safety Regulation

Please use standard batteries. Do not throw the batteries away or put them into fire after usage.

- > Please use standard charger to prevent the product from damage.
- > Short circuit products are prohibited.
- It is prohibited to expose the product in high temperature environment more than 60°C.
- > It is prohibited to put the product into fire.

## 9. General Trouble Shooting

Trouble description	Probable reason	Trouble shooting	
Image blurring	The focal length of the objective lens does not suit.	Adjust the focal length of objective lens until the image becomes clear.	
	No image calibration for a long time.	Perform image calibration.	
Blurred vision	Scope distance inadequacy.	Adjust the scope distance of eyepiece until image becomes clear.	
No analog video	Analog video doesn't open.	Open analog video output.	
output	Data cable doesn't support data transmission.	Replace data cable.	
Fail to start up	Wrong battery polarity installation or depleted batteries.	Check the battery installation direction, replace batteries.	
	Insufficient external supply voltage.	Check the voltage of external power supply.	
The Clip-on eyepiece is stuck during installation.Eye relief mounting limit block isn't placed parallel to the rail slot and the position is dislocated.		Loose the eyepiece, push it back to square, and then rotate the mounting.	

Table 9-1 General	trouble	shooting
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★Please contact with our company relevant personnel as soon as possible if there are some abnormalities. Private disassemble is strictly prohibited.

## **10.Appendix**

### **10.1 User Interface Description**

- Custom interface and data cable are adopted to support type-c power supply, serial port and PAL video.
- Support type-c and battery power supply, support over-voltage and under-voltage reverse connection protection.

#### **10.2 Product Dimensions**

#### **10.2.1 Boundary Dimension**





Fusion Thermal, LLC 42411 Enterprise Lane Hammond, LA 70403

www.fusionthermal.com

Phone: (985) 375-1185

FUSION	THERMAL, LLC PRODUCT RE	GISTRATION CARD	
PRODUCT INFORMATION			
Product Name	Purchase Fr	om	
Purchase Date	Product Seri	Product Serial #	
	CUSTOMER INFORMA	TION	
Name			
Address			
City	Country	Zip	
Day Phone #	Home Phone #		
E-mail address			
	Customer Signature Require	d	