

FAT SHARK

RC VISION SYSTEMS

PREDATOR FPV GOGGLE

USER MANUAL



Contents

Product contents	3
Controls	5
Head tracker.....	5
Turnigy 9X Radio Setup.	6
Futaba Radio setup	7
Head tracker operation	7
AV in/out Port	7
AV Cable Pinout	7
Recording Video	8
Using an external receiver:.....	8
Battery Charging	8
Accessories	9
100mW 5G8 Transmitter	9
Pan Tilt Camera.....	9
Diopter lens.....	9
Specifications	10
Operational advice	11
Trouble shooting.....	12
Warranty.....	12

Introduction

Congratulations on purchasing the Fat Shark Predator VGA FPV video goggles with integrated 5G8 wireless receiver and advanced M.I.G. (magnetic, inertial, gyro) head tracking technology. To ensure your continued enjoyment, please take the time to thoroughly read through this operating manual before using.

Product Compatibility

The Predator has been designed to adhere to established video standards and is compatible with any product also adhering to accepted video standards. Due to the high number of different manufacturers and variation in quality, it's impossible for us to have tested with every product combination and some troubleshooting may be required if mix/matching components. The Predator has been thoroughly tested with ImmersionRC gear. For best results and no compatibility issues, Fat Shark recommends ImmersionRC gear for your accessory products.

IMPORTANT!!!! Product Warning!!!!

DO NOT LEAVE HEADSET EXPOSED TO DIRECT SUNLIGHT. SUNLIGHT WILL MAGNIFY THROUGH THE OPTICS AND BURN HOLES IN THE LCD COLOR FILTER THIS WILL NOT BE COVERED BY WARRANTY. KEEP GOGGLES IN PROTECTIVE CASE WHEN NOT IN USE

Product contents

Carry case



Predator Headset



Data cable



AV cable



5G8 Antenna



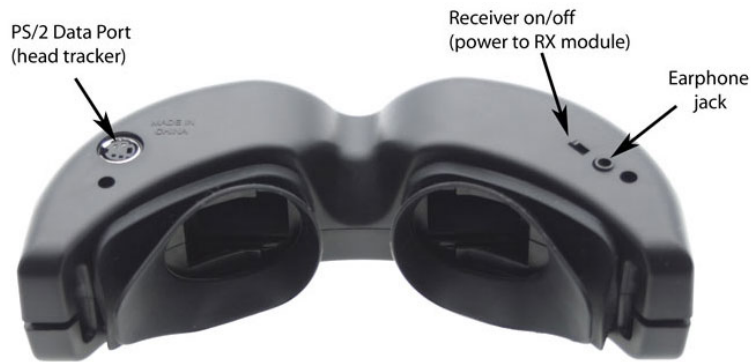
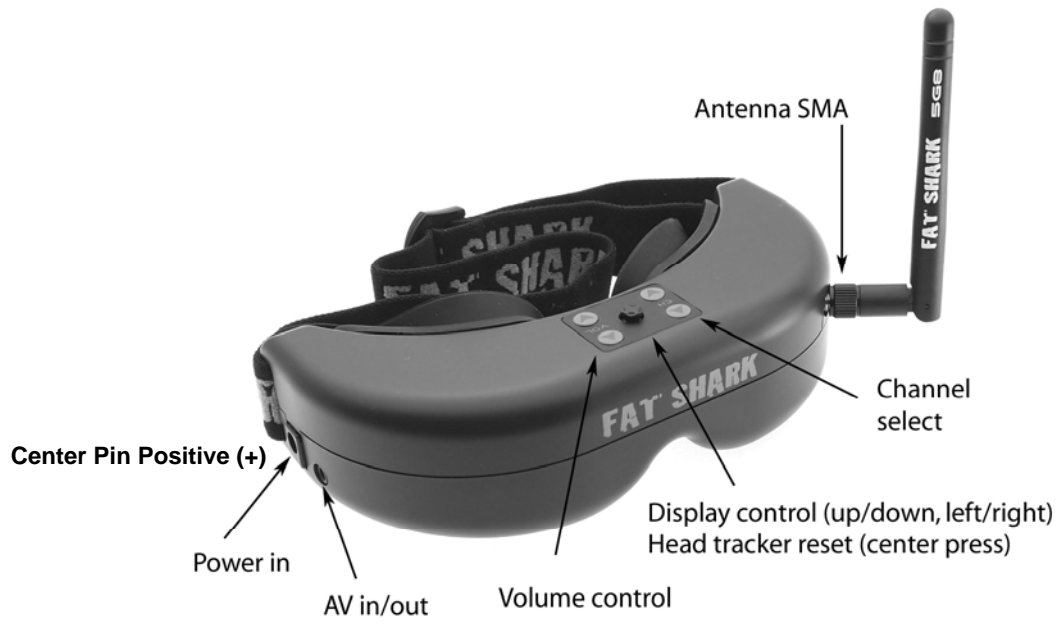
Discharge adapter
Battery (not included)



Manual



Controls Diagram



Controls

Brightness/contrast control: pressing left and right increases/decreases display contrast. Press forward/back increases/decreases brightness.

RX power switch: The receiver module power is controlled by this switch. If viewing video source via the AV cable; the RX module needs to be turned off to avoid image conflict.

Channel select: Pressing channel up/down buttons will cause the channel to incrementally increase/decrease. Audio beep sounds on channel change. A long beep sounds on channel top and bottom limits.

Note: Predator uses an Airwaves brand RF module. Fat Shark only guarantees compatibility with transmitters using Airwaves brand modules.

Predator is compatible with Fat Shark and ImmersionRC transmitters.

CH1: 5740 MHz CH2: 5760 MHz CH3: 5780 MHz CH4: 5800 Mhz
CH5: 5820 MHz CH6: 5840 Mhz CH7: 5860 MHz

Low battery warning: Audio warning if input voltage drops below 6.8V

Volume control: each press of button increments volume up or down. Standard earphones can be used with the Predator (not included).

Head tracker

IMPORTANT: Headset must be turned on BEFORE connecting data cable to RC controller otherwise HT will not initiate correctly.

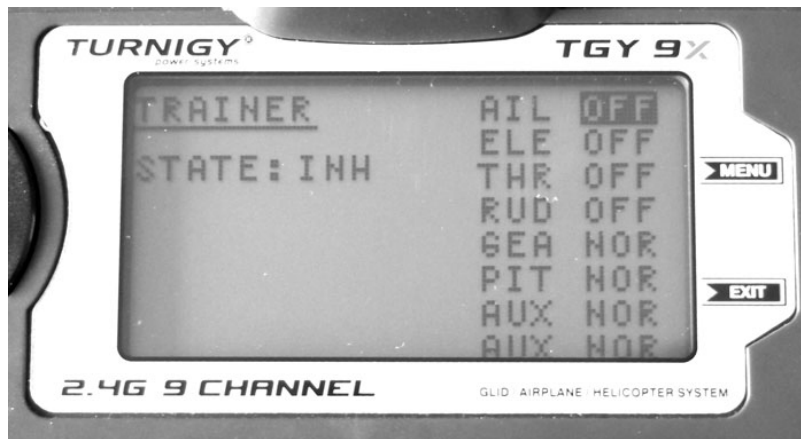
Menu Setup: The head tracker can be configured to output the pan/tilt signals on channels 5 – 8 of the student PPM stream. To enter the setup menu, hold down the head tracker button before applying power to the headset (release button immediately after powering).

The head tracker will beep and enter menu mode and beep according to the following chart. Press the HT button a 2nd time during the pause after the menu choice beep code to select. Head tracker will automatically exit menu after a selection has been made and begin operating.

Beep code	Mode
1 short beep	Pan/tilt on CH 5/6 (factory default)
2 short beep	Pan/tilt on CH 5/7
3 short beep	Pan/tilt on CH 5/8
4 short beep	Pan/tilt on CH 6/7
5 short beep	Pan/tilt on CH 6/8
6 short beep	Pan/tilt on CH 7/8
7 short beep	Adjust servo center point*
1 long beep	Reverses pan/tilt servo direction
Loops back to top if no selection made	

Turnigy 9X Radio Setup.

- Connect battery to headset (make sure data cable is disconnected from radio before powering or it will not initiate properly).
- Connect Data cable and turn on radio.
- Enter TRAINER submenu and setup as below screen shot (shown for head tracker on default channels 5 and 6).
Note GEAR (CH 5) and PIT (CH6) are set to NOR
- Optional (for interest only): Exit and enter DISPLAY submenu to see graphic output of head tracker servo signal.
- Plug pan and tilt servos into appropriate channel of RC receiver.



* **Adjusting the servo center point:** Due to the design of servos, the native center point may vary from servo to servo. The Turnigy 9X cannot compensate so the center offset must be adjusted in HT menu as follows:

- Set pan tilt brackets onto servo spur as close to center as possible.
- Enter HT menu (described above)
- On 7 beep, press HT button
- Head tracker will now be active and can control pan tilt. Aim camera in desired center position and re-press HT button.
- Headset will beep 2X to confirm adjusted center offset
- Disconnect battery and restart before using.

Note: center offset is limited to +/- 20 degrees (thus the necessity to setup servos as close to center as possible before adjusting). If there is no 2X beep after confirming offset, the offset adjust was unsuccessful.

Futaba Radio setup

(Futaba data cable accessory required)

Note: With optional Futaba data cable, the head tracker can work with higher end Futaba radios that support selective student channel mixing.

- Connect Data cable and turn on radio.
- Enter TRAINER menu and assign desired head tracking channels to FUNC (must be set on FUNC). Default is CH 5//6.
- Individual servo direction can be set in REVERSE menu (reverse not available for 7C users, must reverse direction in HT menu).
- Servo center point can be adjusted in Futaba servo off set menu (or use HT menu #7 to set servo center offset).

When connecting via the Futaba cable, the headset battery pack is not needed as the radio will supply power to the headset through the cable.

Head tracker operation

The head tracker will automatically start tracking upon applying power to the headset (regardless whether or not you intend to use it).

- Look forward and level then press the Head Tracker button to center (note, on 1st press HT may drift off momentarily during calibration cycle, hold head steady until camera returns to center).
- Repressing the HT button during use re-centers the camera position.
- External interference (from RC controller, other devices) may temporarily cause errant readings in the magnetic sensor and cause drift. If error between camera and direction your head occurs, hold your head steady in one position and head tracker will autocorrect to that position. After auto correction, continue to use normally.

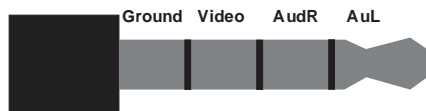
Head Tracker Pause Function

A useful function when launching planes is to fix the head tracker output in the center position. This allows you to get orientated to your camera view before initiating the head tracker.

To pause and hold head tracker in the center position; hold down the HT button for 4 seconds (4 seconds to pause, 4 seconds to reactivate).

AV in/out Port

AV Cable Pinout



RCA Connector: Yellow: Video, White: Audio Left, Red: Audio Right

Recording Video

Connect AV cable to AV out port on right side of headset. Connect recording device to cables and set up as per manufacturer directions.

Note: Cables pins are not all the same (see above chart), be sure to connect to headset using the included cable.

Using an external receiver:

Use the AV cable to connect headset to the RCA AV port of external devices.

To share the base station power supply with your goggles, pick up a 3m Dominator AV cable accessory from your retailer.

Note; internal receiver must be shut off to properly display external AV.

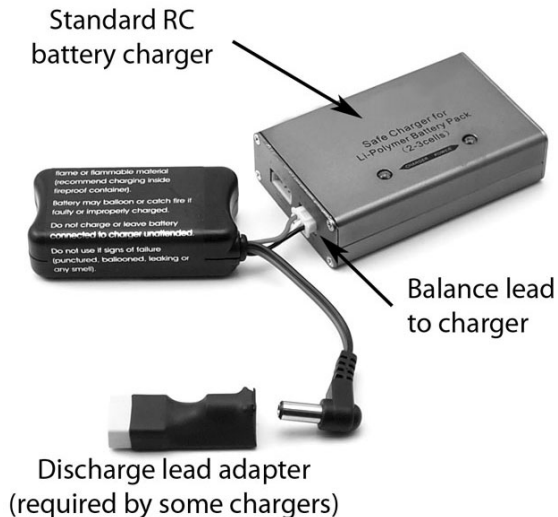


Battery Charging

The 700mAh 7.4V lithium polymer battery pack is equipped with a 3 pole balance charger lead that allows the battery to be charged off standard RC battery pack chargers (not included). Follow your charger instructions for setting up for 700mAh 7.4V Li-po.

Note: some chargers require the discharge cable to be connected. Use the enclosed discharge lead adapter for these types of chargers.

Note: If the charger fails to announce charge complete, but is showing battery voltage at 8.4V, the charge can be considered finished



DO NOT LEAVE BATTERY ATTACHED TO CHARGER WHEN CHARGER IS NOT PLUGGED IN.

Accessories

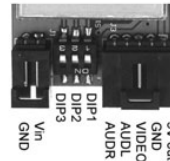
100mW 5G8 Transmitter

Get up to 500m range with the cool running switch regulated 100mW transmitter. It is designed to be plug/play with Fat Shark cameras. For best performance we recommend the ImmersionRC 600mW transmitter.



7 Channel 3p DIP switch

DIP 3	DIP 2	DIP 1		
0	0	0	CH1	5740MHz
0	0	1	CH2	5760MHz
0	1	0	CH3	5780MHz
0	1	1	CH4	5800MHz
1	0	0	CH5	5820MHz
1	0	1	CH6	5840MHz
1	1	0	CH7	5860MHz



AV in: Connect to 5p camera Molex connector

Power out: 5V Power output as shown on TX label to power camera

Voltage in: 6-12V

CAUTION: IF TX DOES NOT HAVE ADEQUATE VENTILATION. THE TX MAY AUTO SHUTOFF IF OVERHEAT

Pan Tilt Camera

Maximize the immersion experience by adding a pan/tilt camera to your FPV system. Camera servos plug into spare channel of your RC receiver and are controlled by the M.I.G. head tracker inside your Predator goggle. Camera is plug/play with Fat Shark and ImmersionRC transmitters.



Diopter lens

For near sighted users, diopter lens insert sets are available that include -2, -4 and -6 dpt. See below insert instructions. Lens orientation is not critical.



- Remove eye cup
- Insert diopter lens
- Replace eye cup

Specifications

Optics:

- FOV 25 degrees diagonal
- Interpupillary (IPD) distance: 63.5mm (fixed)
- Optional diopter lens inserts available in -2, -4, -6 dpt

Audio:

- Stereo

User Controls:

- Channel selection
- Contrast/brightness
- Volume adjustment
- Head tracker reset/menu control

Electrical:

- Power supply, 7-13V (2S/3S supply)
- Power consumption: 200/350mA (direct/wireless)

Battery:

- 7.4V 700mAh lithium polymer with safety circuit.

System:

- NTSC/PAL auto select
- Interlaced only (not progressive scan)

Mechanical:

- Ergonomic molded shape.
- Rubber eye cups for ambient light reduction.
- Weight: 163g
- Adjustable headband

Display

- Two full color micro VGA LCD's (640 X 480 lines)
- Resolution 922,000 pixels per eye

Head Tracker

- Magnetic, Inertial and gyro

Receiver

- 5.8Ghz 7ch

Interface

- 3.5mm 4p AV in/out port
- Power in port
- 3.5mm 3p Earphone port
- PS/2 head tracker port

Operational advice

- **For best performance**, select a channel that has the least amount of interference. While the transmitter is turned OFF, turn on the video headset and look at the screen as you check each channel. Clear channels will have a consistent static background. Channels with interference will have horizontal static lines.
- **Always perform a range test before flying**. This includes AV and RC controls. Some RC receivers can be affected by the proximity of other electronic devices particularly the AV TX.
- Try to space out your components as much as possible to avoid interference to your RC control range (keep stuff away from RX)
- Until experienced, practice flying in a familiar area to avoid becoming disorientated.
- Due to antenna characteristics, there is a “null” in line with antenna direction. You may experience excessive video breakup when flying overhead
- 5.8Ghz signal strength drops off very fast, stay safely within solid AV range.
- **For maximum distance** it is very important that a clear line of sight exists between the transmitter and the video headset. 2 of the worst causes of interference are human bodies and reinforced concrete.
- Place your TX antenna in open area in a vertical orientation
- **Multipathing** (reflections off buildings/ tall objects) causes signal cancellation and result in broken video. Fly in open areas away from buildings or other tall structures (i.e. barns, hills).
- **5.8Ghz AV with 2.4Ghz RC controllers:** 2.4Ghz may cause harmonic interference on Ch2 – Ch7 of the 5.8Ghz AV (Ch1 not affected). The headset has been equipped with a high pass filter that will allow the system to work with CE certified 2.4Ghz RC controllers. However, the filtering may be insufficient to remove noise from overpowered non CE certified controllers. If you experience interference from your RC radio, change the AV channel to channel 1.
- Although you don't require any license to operate this device, you are still legally responsible for operating in a responsible manner.

Trouble shooting

Observation	Possible cause/solution
No image, display is completely dark	- No power supplied. Check power connections.
No image, display is glowing dark grey	- If using wireless module, turn on RX power on bottom of headset. - If using AV in cable, check video source. - Ensure TX is on and camera connections solid
Lots of interference lines (horizontal lines)	- Choose a cleaner channel.
Lots of interference lines (horizontal lines) when using 5.8Ghz receiver	Check to see if cause is harmonic interference from 2.4Ghz RC controller (turn radio on/off). - Use CH1 on TX/headset (Ch1 not affected by 2.4Ghz) - check correct frequency antenna is used
Head tracker not working	- Ensure headset is turned on before RC radio - Review controller manual for correct settings - Check servos are plugged into correspondingly selected channels
Short range	- Ensure 5.8Ghz antenna was installed - Check for other sources of interference - Ensure transmitter has clear LOS to headset. Test in wide open area, away from any obstructions
Short range (con't)	- Ensure that a compatible antenna is installed. Do not use other manufacture antenna, they may be dual band or may be reverse SMA (no center pin to connect to receiver)
White dots on LCD display	You were careless and left goggles exposed to sun. Sun burnt off LCD color filter.
Lens fogs up	Cooler optical lens are heated by your humid face causing condensation. Pre warm goggles by wearing on head.

Warranty

The system can be exchanged for a new unit within 30 days for any manufacturing defects if returned in new condition. The video headset will be warranted for repair for 2 years if no signs of excessive use. Buyer will be responsible for shipping costs. If beyond the warranty period we will provide repair services.