FAT SHARK
RC VISION SYSTEMS

ATTITUDE V4
MODEL FSV1048

USER MANUAL

Revision B 05/22/2017

For more product information, please visit:
www.fatshark.com

Contents

Introduction

Congratulations on purchasing Fat Shark Attitude V4 10th anniversary edition headset integrated with OLED display modular receiver, DVR recording/playback and 3-axis head tracking. To ensure your continued enjoyment, please take the time to thoroughly read through this operating manual before using.

Product Compatibility

This headset 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 to for us to have tested with every product combination and some troubleshooting may be required if mix/matching components. The Attitude V4 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

Attitude V4 Headset

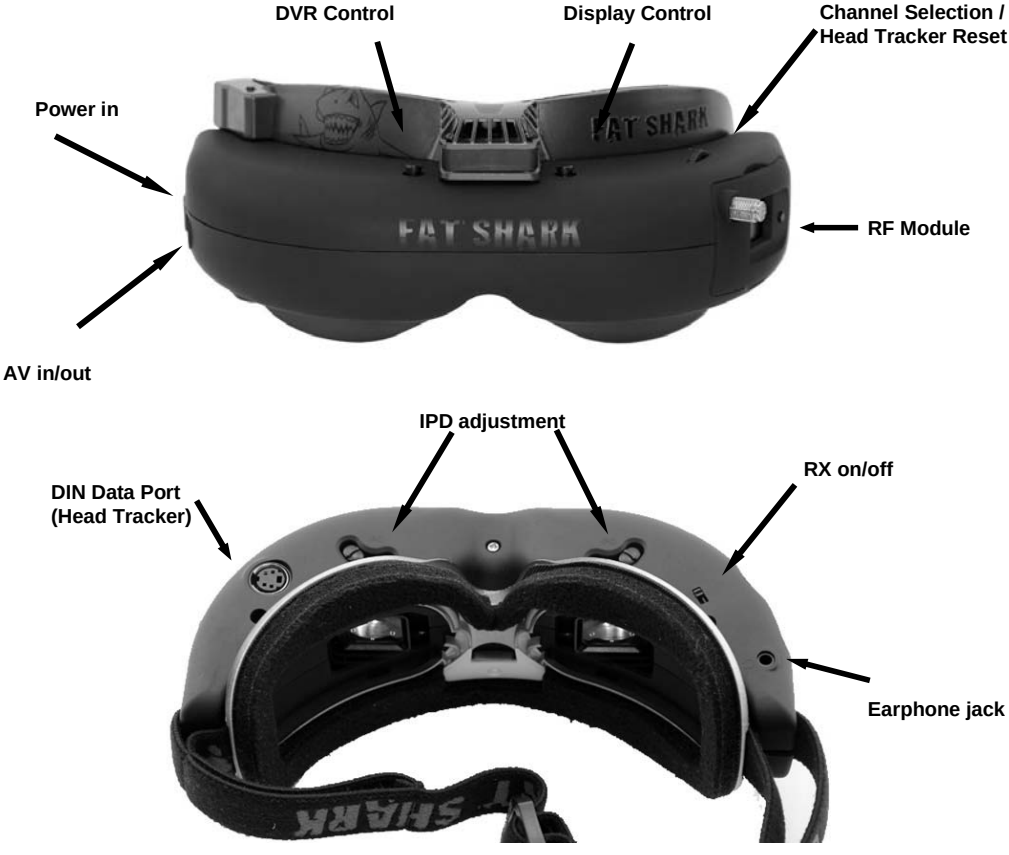
5G8 Receiver Module with OLED display (32ch with RaceBand)

SpiroNET Circular Polarized Antenna

1000mAh Battery with LED indicator (and discharge lead)

Quick Start Manual

Controls Diagram



Controls

Brightness/contrast control: Pressing left/right increases/decreases display contrast. Pressing forward/back increases/decreases display brightness.

RX power switch: The receiver module power is controlled by this switch. Turn off RX module to avoid video conflict with video source via the AV cable.

Channel select: Rocking the channel select switch forward and back will cause the channel to incrementally increase/decrease. Audio beep sounds on channel change. A long beep sounds on channel top and bottom limits. See OLED section for more details.

Head tracker menu/reset: Activated by a vertical press on the channel rocker switch.

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

Volume control: There is no volume control - volume level is set at high. Please use with adjustable earphone accessory for volume control.

DVR Operation

1. SD card MUST be formatted before use to ensure stable recording.
2. DVR is for analog recording only, no HD recording.
3. Do not place alternative files that you want to keep into the DVR. The DVR may not recognize the file space and write over your files. Use dedicated SD card.

Recording:
After powering goggles, turn on DVR by depressing vertically and holding the DVR control button for 1 full second (**long press)**.
RED LED should now show solid.
Ensure SD card is inserted and **short press** to start recording (RED LED will slowly FLASH (~2 times/second). Single beep on record start.

Short press again stops recording (turns to solid RED LED). Double beep on record stop.

Playback
Note: requires turning off external receiver and removing any other AVin sources (to not conflict with menu navigation OSD).
After turning on DVR and in stop record mode (SOLD RED LED) depress and hold DVR button for 1 second (**long press**) to enter menu.

Menu Navigation
Playback (press right to enter)
Now can see: Preview shot with file number
press **up/down** to change file number
press **right** to play
Up/down controls playback speed/direction
Right press pause/play
Left press, back to main menu

Format (press right to enter)
Execute (press right)

Record (press right)
Now can see:
default (no recording until press the button to start)
auto start (auto start recording when power on)
auto start continuous (auto start recording when power on and overwrite the file if space is full)
press **up/down** to select the recording mode
press **right to enter** to confirm

Pressing **left** from main menu exits menu

Trinity Head tracker

For a complete and up to date list of compatible RC radios and their setup, a head tracking sticky thread is maintained at www.FPVlab.com under SPONSORS GATE/FAT SHARK

Operation notes:
Head tracker initiates in pause mode. Head tracker reset button needs to be depressed and held to start camera motion. Default range motion is normal. Your radio may support extended motion but may result in errant behavior.

Menu navigation and settings:

Beep code	**Mode**
1 short beep:	P/T/R on ch 5/6/7
2 short beep:	P/T/R on ch 6/7/8
3 short beep:	Long beep then enter P/T only channel setting sub menu 1 short beep: P/T only on ch 5/6 2 short beep: P/T only on ch 5/7 3 short beep: P/T only on ch 5/8 4 short beep: P/T only on ch 6/7 5 short beep: P/T only on ch 6/8 6 short beep: P/T only on ch 7/8 No selection: exit menu
4 short beep:	Long beep then enter reverse servo direction sub menu 1 short beep: reverse pan direction 2 short beep: reverse tilt direction 3 short beep: reverse roll direction No selection: exit menu
1 long beep:	adjust servo center point: press to gain manual control of the camera with the headset. Adjust camera to desired center position and press button to set new camera center. Note that if your servos are not near the center point before adjusting, the servo travel may be limited in one direction.
1 short beep:	Long beep then enter pan ratio sub menu 1 short beep: ratio = 1:1 2 short beep: ratio = 1:1.5 No selection: exit menu
2 short beep:	Long beep then enter tilt ratio sub menu 1 short beep: ratio = 1:1 2 short beep: ratio = 1:1.5 No selection: exit menu
3 short beep:	auto pause on/off (if movement exceeds 90 degree, put HT in pause mode)
4 short beep:	Long beep then enter motion limits sub menu 1 short beep: standard range = 1.04 ms – 2.0ms (center = 1.52ms +/- 0.48) 2 short beep: extended range = 0.8ms–2.24ms (center=1.52ms +/- 0.72) No selection: exit menu
5 short beep:	Long beep then enter cycle time sub menu 1 short beep: standard cycle (8CH PPM, 20ms) 2 short beep: rapid cycle (3CH PPM, 8ms) No selection: exit menu
6 short beep:	Restore factory defaults
2 long beep:	no selection made, automatically exits menu

OLED 5G8 RX

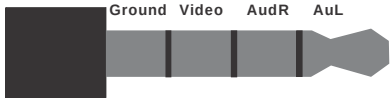
Channel Chart: See Specification section at end

Operation:

- When power on, the receiver module will stay on last saved channel, single short press the button on receiver to start auto scan active channel within the current band.
- Long press receiver button 0.5s will enter into spectrum analyzer interface, single short press the receiver button to move to the next band，long press receiver button 0.5s to confirm band selection.
- During auto scan process, cursor will flash on each channel# in order, if press “CH + / -” buttons on headset can interrupt the scan process and to select wanted channel.

AV in/out Port

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.

1000mA Battery Pack

The latest Fat Shark 1000mAh pack with a row of stylish blue LED indicators allows you to visually check its remaining capacity (4 levels) to prevent a sudden power/vision lost. It seats securely in the headset strap pocket. The soft silicone battery cable extends out of the top of the pack to avoid contact with head strap. Barrel connector cable features high strand count wire for flexibility and long life. Wire stress is minimized by the additional rubber gasket around the cable exit. Balancing circuit is already built inside, for charging, only need to connect the barrel connector via the supplied adapter cable to RC charger.

Note: this battery can still be charged via the barrel connector with the original Fat Shark headset battery charger.

Battery Charging

This lithium polymer battery pack is equipped with an internal cell balancing circuit that allows the battery to be charged from standard RC battery chargers. Charge the battery by connecting the barrel connector via the supplied adapter cable and setting the charger for 7.4V, 1000mAh Li-Po, 1A (1C). Some RC chargers require a balance lead connector to be connected to the charger, or else the charging attempt will result in an error. ***The balance lead on the battery is not a true balance lead and is only used for powering the optional fan faceplate.*** To charge this battery set your LiPo charger to Fast Charge mode, which usually disables the balance lead requirement (set at 7.4V – 2cell - maximum 1A). On some LiPo chargers none of the above procedures will work. In that case you can set the RC charger to NiMH mode and set max charge rate to 1A (1C).

Note (1): In NiMH mode the charger may fail to announce completing the charge. You should be able to estimate your battery charge amount by either timing (a fully depleted battery will charge in 1 hour at 1C) or monitoring the mA charge rate on the RC charger display (will drop to almost zero as it becomes full). Remember, you can always remove the battery from the charger and depress the battery level indicator button to check the charge level.

Note (2): If battery becomes fully discharged or shorted, an internal safety circuit will trip. To reset the battery, tap 9V direct to the barrel connector via the discharge adapter cable's banana connector. This will instantly reset the battery and it can be recharged as normal.

General Lithium Polymer safety and handling instructions:

- NEVER balance charge this LiPo battery.
- NEVER leave a LiPo battery unattended while being charged or discharged.
- ALWAYS monitor the battery and charger during the entire charging process.
- ALWAYS charge LiPo batteries in a fireproof location.
- ALWAYS have a lithium approved "class D type" fire extinguisher available.
- NEVER charge LiPo batteries at currents greater than the "1C" rating of the battery ("C" equals the rated capacity of the battery).
- NEVER continue to charge LiPo batteries if the charger fails to recognize full charge. Overheating or swelling of the LiPo cells is an indication of a problem and the battery should be disconnected from the charger immediately and placed in a fireproof location
- ALWAYS discontinue charging or discharging a LiPo immediately if at any time you see smoke or the battery starting to swell up and leave it in a safe fireproof location for approximately 30 minutes.

Accessories

600TVL CCD Camera (FSV1231/1232)

The 600L CCD Camera utilizes 1/3" SONY CCD imager for fantastic light handling and color fidelity. The camera cable has an integrated control stick for navigating the camera OSD to fine tune your personal preferences. Fat Shark branded plastic shell is sleek and lightweight and the bracket is designed for easy mounting to a pan servo as well as compatible with Fat Shark's pan/tilt/roll mount (accessory). V3 case now is also added with top pivot for mounting on ImmersionRC Vortex racing quad. An extra no control stick cable is included for lightweight or space limited installs. 2.9mm IR coated wide angle 125 degree FOV (diagonal); ideal for fixed camera piloting. Camera is NTSC/PAL optional.

Diopter Lens (FSV1601)

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

Adjustable Earphones (FSV1605)

For simplicity and minimalist controls, the Attitude V4 does not have volume control. Audio is outputting at max volume and needs to be adjusted to comfortable level via adjustable volume earphones.

AV Cable (FSV2003)

This 3 RCA Male to 4-pole Right Angle Cable allows you output the wireless signal from your Fat Shark headset to an external monitor or recording device. It can also be used to connect and display alternative video sources in the goggles.

Head Tracker Data Cables

Due to the various number of radios and aftermarket products, data cables are not included in the set. The following model numbers can be purchased through your retailer:
FSV2112: Futaba type radios (square connector)
FSV2113: JR type radios (3.5mm 3p prong)
FSV2114: ezUHF cable (PS/2 to PS/2)
FSV2115: Spektrum radios

Specifications

Headset Specifications

Optics:	
FOV (field of view):	32°diagonal (Image size: 1.3m @ 2m)
Type:	Plastic optic module
Interpupillary Distance (IPD):	59 to 69 mm (adjustable)
Optional Diopter Lens Inserts:	-2, -4, -6 dpt
Display:	Full color LCD polarized LED backlit
	Binocular display (640 X 480 VGA)
	NTCS/PAL auto selecting
Audio:	Stereo
	(Requires adjustable volume earphone)
User Controls:	Channel selection/ head tracker reset
	Mode selection (wired/wireless)
	Contrast/ brightness control
	DVR control
	HT control
Electrical:	
Power supply:	7 - 13 V (2S/3S supply)
Power consumption:	400mA wireless
	220mA direct mode (RX off) (@7.4V nominal)
Battery:	7.4V, 1000mAh Li-po battery with LED indicator
DVR:	Analog Video Recording (no audio or HD recording)
	MicroSD support to 32 GB
	Record Rate: 6Mbps (MJPG compression, 30 fps, AVI)
	File playback (native recording, no codec support)
	Upgradeable via SD card
	PAL/NTSC continuous scan auto detect/mode change
	Auto save if power removed
RF Modules (Optional):	multi channel and band support (modular RF)
Head Tracker:	9DOF 3-axis
Interface:	3.5mm AV in/out port
	Power in port
	3.5mm stereo earphone port
	Mini DIN head tracker data port
Accessories:	5G8 32ch RaceBand RF module with OLED display
	5G8 SpiroNET CP antenna
	7.4V, 1000mAh Li-po battery with LED indicator
	Battery discharge adapter
Mechanical:	Ergonomic molded headset w/ adjustable headband
Dimensions:	168 x 83 x 71mm
Weight:	193 g
Packaging:	
Size:	616g, 202 x 139 x 100mm

5G8 Receiver w/ OLED Display Specifications:

Electrical:

	OLED display:	Band, Channel and Frequency / Antenna Indication / RSSI
☐	Push Button:	Band / Channel Selection
☐	Supply Power:	3.3~5 V
☐	RX Sensitivity:	≤ -90 dB
☐	RF Input Level:	-90 dBm~+5 dBm
☐	Video Format:	NTSC/PAL

Operation:

Operating Temperature: -10~65 °

Mechanical:

Size: 42 x 25 mm

Weight: 11.4g

Channel Chart:

Band Sign	Name	CH1	CH2	CH3	CH4	CH5	CH6	CH7	CH8
F	Fat Shark	5740	5760	5780	5800	5820	5840	5860	5880
R	RaceBand	5658	5695	5732	5769	5806	5843	5880	5917
A	Band A	5865	5845	5825	5805	5785	5765	5745	5725
E	Band E	5705	5685	5665	5645	5885	5905	5925	5945

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.

Warranty

The system can be exchanged for a new unit within 7 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.

Trouble Shooting

If your problem can't be solved here, please visit our support forum at www.FPVLAB.com under SPONSORS GATE/ FAT SHARK RC VISION SYSTEMS. Any direct support enquires will be first directed to this forum for the benefit of all customers.

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 - Ensure lens cap is removed from camera - Trying to power a 12V camera with the 5V TX supply (need to connect 12V camera direct to RC pack.
Complete white screen	LCD driver has failed and needs to be replaced under warranty. Contact your retailer.
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 but can hear beeps (can enter and navigate beep menu)	- Ensure headset is turned on before RC radio - Review controller manual for correct settings - Check servos are plugged into correspondingly selected channels
Head tracker not working, and no beeps (can't enter nor navigate beep menu)	- Cable was modified and resulted in voltage applied to signal line (fried HT) - Mated to an aftermarket channel mixer and wired wrong resulting in voltage applied to signal line - Incorrect installation of aftermarket UHF RC system resulting in voltage applied to signal line.
Head tracker stops working after short time	Auto disengage function activated. Follow menu instructions to turn off.
Short range	- Ensure 5.8Ghz antenna were installed - Turn off transmitter and 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
White dots on LCD display	You were careless and left goggles exposed to sun. Sun burnt off LCD color filter.