



The Spectre Instruction Manual

Thank you for purchasing a Tek Gear product.
Please keep this manual handy for future use.

CONTENTS

CONTENTS	2
SAFETY NOTICE	4
BATTERY PACK SAFETY NOTICE	4
SAFETY INSTRUCTIONS	5
SOME PEOPLE SHOULD NOT USE THIS PRODUCT	5
IMPROPER USE MAY CAUSE SERIOUS INJURY	6
GENERAL SAFETY HINTS	6
ELECTRICAL HAZARD WARNINGS	7
MAIN FEATURES OF THE SPECTRE	8
CHECKING THE CONTENTS	9
THE SPECTRE	10
OVERVIEW	10
GOGGLES/HUD	10
CONTROL MODULE	11
BATTERY CHARGER	13

GENERAL OPERATING INSTRUCTIONS	14
PREPARATION	14
UNPACKING THE DEVICE	14
CHECKING, CHARGING AND CHANGING THE BATTERY	14
USING THE SPECTRE WITH AN EXTERNAL POWER SUPPLY.	15
CONNECTING THE HUD AND CONTROL UNIT	15
USING THE SPECTRE AS A NIGHT VISION DEVICE	16
ATTACHING THE CONTROL MODULE	16
SWITCHING ON THE SPECTRE	16
ADJUSTING THE INTERPUPILARY DISTANCE	16
OPTICAL ALIGNMENT PROCEDURE	16
SWITCHING ON THE INFRARED LIGHT	17
ADJUSTING BRIGHTNESS AND CONTRAST	17
USING THE DIFFERENT MODES	18
USING THE 8X DIGITAL ZOOM	18
USING THE SPECTRE AS A MONITOR	18
MAINTENANCE AND CLEANING INSTRUCTIONS	19
TROUBLESHOOTING	20
TECHNICAL DATA	21
WARRANTY	22

SAFETY NOTICE

WARNING: TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT OPEN THE CONTROL UNIT OR DISPLAY UNIT. NO USER SERVICEABLE PARTS ARE INSIDE.

Children under the age of fifteen may not use this product.

We strongly advise you to get familiar with The Spectre Head Up Display and its capabilities before you use it for the first time.

The Spectre is a high end viewing device and requires some setup and user customization before it can be optimally used. Please try the Spectre and adjust it in a controlled environment before using it in real world conditions.

Battery Pack Safety Notice

CAUTION: Do not expose to high temperatures (not more than 60°C/140°F).
Do not disassemble.
Do not incinerate.
Dispose of depleted cells properly.

Replace battery pack with Tek Gear approved battery pack only.

Keep away from children.

SAFETY INSTRUCTIONS

Read Instructions - All the safety and operating instructions should be read before the product is operated.

Retain Instructions – The instruction manual should be retained for future reference. An online copy can be found at <http://www.tekgear.com>

Heed Warnings – All warnings on the product and in the operating instructions should be adhered to.

Follow Instructions – All operating and use instructions should be followed.

Before Cleaning – Unplug this product, or detach the battery, before cleaning.

Attachments – Do not use attachments that are not recommended by the product manufacturer as they may cause hazards.

Power Sources – This product should be operated only from the type of power source indicated on the marking label. If you are not sure of the type of power supply, please contact your distributor or the manufacturer directly.

SOME PEOPLE SHOULD NOT USE THIS PRODUCT

Children under 15 years of age.

The product may interfere with development of their eyes and visual system.

Anyone who as ever experienced convulsive or epileptic fits or loss of consciousness from light flashes or oscillations.

This product could cause the same symptoms for those people.

Anyone who cannot see the whole image clearly, or who wears glasses that make it hard to see the whole screen clearly, or who has an eye movement disorder or visual field disorder.

Under those conditions, using this product for a long time could damage their eyes.

Anyone with a heart disorder, high blood pressure, visual field impairment, or an eye movement or alignment disorder.

If you have any of these conditions, consult a doctor before using this product, and stop using it immediately if you feel ill.

IMPROPER USE MAY CAUSE SERIOUS INJURY

Under some conditions, viewing with the Night Vision HUD may cause:

Nausea	Eye pain or eye fatigue	Dizziness
Headache	Neck and Shoulder pain	Feeling ill
Motion Sickness	Disturbance of hand-eye coordination	

If you experience any of these symptoms, stop viewing and rest until you recover. These symptoms could temporarily disturb your vision or balance. Do not try to operate a vehicle, walk, or move around until you feel better.

Do not use this product while you are actively moving, such as walking, skating, riding a bicycle, or operating a motor vehicle.

This could interfere with your vision or balance and cause a serious or fatal accident.

Do not use this product when you are subject to strong vibrations, such as in a car on a bumpy road.

This may cause dizziness, nausea, headaches, or motion sickness.

Do not use this product continuously for long periods.

Continuous use for long periods of time may damage your eyes.

Do not use this product if the image does not appear clear and stable in both eyes.

If the product is malfunctioning or you are not wearing it properly, viewing it could be hazardous.

GENERAL SAFETY HINTS

Avoid to get entangled by using the cable.

Use the supplied belt pack for the electronics module and wear the cable close to your body.

Securely wear the Spectre.

To ensure, that the glasses do not fall off during usage, please wear them only with the elastic strap.

The Night Vision Device is not always active.

Please note, that you are not able to see your environment through the Night Vision Camera when the power unit is connected to an external TV, Video or PC-source so avoid moving.

Insure you have adequate power for Night Vision activities.

Take care that the battery is completely recharged. With a full charged battery you can see about 2 hours in the dark. Please take care and insure that you are back in safe surroundings within this time, or provide yourself with replacement batteries to extend the operational time of the Spectre to match your Night Vision activities.

ELECTRICAL HAZARD WARNINGS

- To avoid any risk of electrocution, do not bring any part of the Spectre in contact with water when the power unit is connected to an AC outlet (e.g. when recharging batteries, using an external TV, Video or PC source.)
- Avoid using and storing the Spectre in wet, humid, dusty and smoky surroundings.
- Do not use the glasses at temperatures under 10°C or over 40°C.
- Avoid dropping or mechanical shock, as frame and displays may be deformed.
- Always switch off and unplug the Spectre when it is not in use.
- In case of damage contact your retailer. Any required service on this product should be performed by qualified service personnel.

MAIN FEATURES OF THE SPECTRE

- New type of personal display that utilizes ultra low lux CCDs to enable night vision.
- High resolution Liquid Crystal on Silicon (LCoS) microdisplays for high quality video presentation.
- Can be connected to a wide variety of video components including: Computer, Thermal Camera, video camera, VCR, and DVD.
- Compact, light weight design with carrying case.
- Flip up design to get the unit out of the way when normal vision is required.
- Wide field of view equivalent to a 62" screen at 6½ feet.
- Can be worn over glasses or goggles.
- Can be worn on a bare head, helmet, or hard hat without any modifications.
- Optional AC operation.
- "Brightness" and "Contrast" of the image can be adjusted.
- 6 x 950nm invisible illuminators.
- 8x digital zoom.

CHECKING THE CONTENTS



1. Spectre HUD
2. Battery Charger
3. Video Cables, AC adapter, cleaning cloth
4. Shoulder Strap for Case
5. Control Module and battery
6. Carrying Case

THE SPECTRE

Overview

The Spectre is a night vision device utilizing the newest generation of opto-electronic components. The Spectre enables you to see in low light and no light environments. It allows you to move around safely.

The Spectre has a built-in 8x digital zoom. With 8 steps, the zoom allows you to look at details on far away objects. The effect is similar to binoculars.

The Spectre can also be connected to external devices, such as Thermal Imagers, GPS, video sets, DVD players and computers so that you can view the images inside the HUD.

The Spectre consists of the goggles, or the HUD, a power unit with power supply, and a cable connects both parts. The set also includes a main power adapter with charger. It also comes in a handy transport case and a belt pouch.

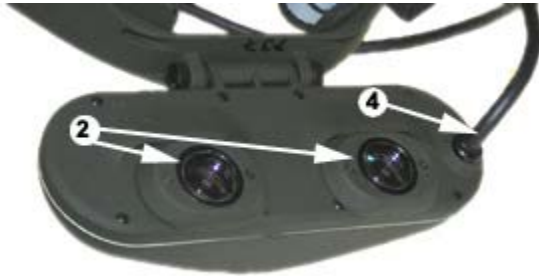
Goggles/HUD

The HUD contains a light sensitive, low lux, black **and white camera (1)**, which records the images around you and transmits them to two micro-**displays (2)** inside the HUD.



Six 950nm infrared LED's (3) beside the camera can also be switched on to illuminate the area, if required. This additional lighting is invisible to the unaided eye.

The cable (4) is permanently attached to the HUD and is screwed onto the control module by means of a detachable plug contact.



Control Module

The control module contains the following elements:

1. Plug connection for HUD cable
2. Push button for power
3. Removable Ni-MH rechargeable battery
4. Connector for power supply underneath the battery. (see further)
5. Dial for manual adjustment of brightness
6. Double function dial: for manual adjustment of contrast or for digital zoom, depending upon the mode (see further).



The cable that is attached to the HUD has a plug that must be plugged into the connector (1).

The push button (2) on the top of the power unit is used to switch the Spectre on and off. When the device is switched on, a light underneath the button will light up.

The removable Ni-MH rechargeable battery (3) enables you to use the Spectre for up to 2 hours. The additional use of the infrared light will nominally reduce this operating time. When in SVGA mode, the standard battery lasts for 4 hours of operation.

When the battery is removed, an input connector (4) for an external power supply is accessible. (see further)

The dial on the left (5) of the plug connection enables manual adjustment of brightness. The dial on the right (6) of the plug connection has a double function: it enables manual adjustment of contrast or adjusts the level of digital zoom.

The control module also contains:

1. 5-pin DIN connector for S-video input
2. 15 pin D-Sub connector for SVGA input
3. Three mode indicator LED's
4. Video Mode toggle push button
5. Infrared activation push button
6. Indicator lamp illuminated when IR lights are on



Battery Charger

The Spectre includes a removable Ni-MH rechargeable battery and a power supply unit. It takes approx. 50 min to charge the battery from empty to full if you use the adapter supplied with the system.



The battery charger unit has control lights. When loading the unit with a battery to be charged, the **red light** will turn **on**, but only momentarily. It will turn off after a few seconds (never more than one minute). If the red light does not go out, it indicates a defect or malfunction. If the AC input voltage from the wall is incorrect or unstable, the red light will illuminate as well.

When charging starts the **green light** will be **on**. When charging is completed, the **green light** will begin to **flash**.

The **yellow light** is related to temperature control. If it turns on, the maximum temperature allowed has been reached, and charging is temporarily interrupted. You may leave the battery in the charge unit without any danger, until charging is complete (i.e.: green light flashing).

GENERAL OPERATING INSTRUCTIONS

Preparation

Unpacking the Device

Please unpack the devices and compare with the contents list to insure that all parts are included. Please contact your dealer if any parts are missing.

Checking, charging and changing the Battery

Before you use the Spectre for the first time, please fully charge the battery:

Remove the battery from the control module by pushing the locking tab down carefully with one hand and sliding the battery out of the casing with the thumb of your other hand.



Place the battery in the charger so that the brass-colored contacts of the battery and charger match. Press the battery lightly until you feel it lock into place.

The green control lamp on the front of the charger should light up. When the green control lamp begins to flash, the charging process is completed and the battery is fully charged. Replace the battery in the control module.

Please make sure that the contacts of the battery and the control module match. Holding the battery flat, push it into the power unit as far as the mark. Press down on the battery lightly with your thumb and at the same time continue pushing it completely into the control module until it locks into place.



Using the Spectre with an external power supply.

It is possible to use an external power source to power the unit. An AC/DC transformer is built into the battery charger and can be used to power up the unit with AC power. The DC output plug (4) fits in the connector at the battery location of the power unit (visible when the battery is removed).

Connecting the HUD and Control Unit

First connect the HUD to the control unit. The cable is permanently attached to the HUD. Insert the plug at the loose end of the cable into the socket at the top of the control unit. The gap in the cable plug must point toward the bottom of the power unit. Insert the plug in the socket and turn the metal ring clockwise to tighten it.



USING THE SPECTRE AS A NIGHT VISION DEVICE

Attaching the Control Module

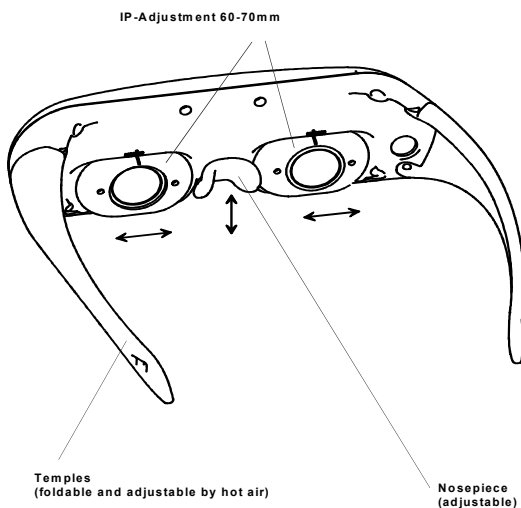
Place the control unit in the belt pouch that is supplied with your Spectre. This belt pouch can be attached to your belt. Alternatively, you may prefer to put the control unit in a pocket or backpack.

Switching on the Spectre

Switch the Spectre on by pressing the push button on the top of the control unit. When the Spectre is switched on, the button is illuminated.

After switching on the Spectre, the device is in Passive Night Vision mode: in this mode the internal low lux camera is selected.

Adjusting the Interpupillary Distance



The Spectre utilizes a high performance “narrow exit” optical system. The narrow exit pupil focuses all of the light through the optic and onto your pupil. It does not illuminate any other part of your face. Proper alignment is critical to insure a crisp bright image.

Optical Alignment Procedure

Sit in a fully lit area with the HUD and control module connected and with a fully charged battery or AC adapter attached.

Insure that the contrast and brightness dials on the control module are not set to their minimum or maximum position. 50%-70% of maximum would be optimal.

Put on the HUD in its active or “flipped down” position.

Turn the unit on.

Close one eye.

Adjust the optic in front of your open eye so that you see a bright clear picture.

Repeat this procedure with the other eye.
Open both eyes and set the contrast and brightness so that the image looks crisp.

Switching on the Infrared Light

In low or no light conditions, the built in infrared LEDs will illuminate the scene and increase your visibility while wearing the HUD. To switch on the infrared illuminators, press the **push button (5)** on the side of the control unit. The red LED **(6)** beside the button will light up.

Check the image in the HUD. If the infrared light does not make a noticeable improvement in the image, it is not necessary to use the LEDs under your current lighting conditions. Switch the illuminators off to reduce power consumption.



Adjusting Brightness and Contrast

Adjust **brightness (2)** and **contrast (1)** with the dials to the left and right of the HUD cable connection. Turn the dials until have an image that you find best. After a little practice, you will be able to find the best position of the dials quickly.

Please note that you have to repeat this procedure if lighting conditions or visibility changes. You will also have to adjust the contrast once you have used the digital zoom. (more on this later)



Using the Different Modes

There are many functions built into the Spectre's control module. You can activate these functions by toggling the push-button switch (PBS) (5) located underneath the cover flap on the right hand side of the control unit.

The Spectre's start up or standard mode is night vision where the built in camera is the image source. In this mode the two dials beside the cable connection control the brightness and the contrast. The left green LED (3L) reminds you of this mode being on.



Using the 8x Digital Zoom

This feature allows you to digitally magnify the image of the built in camera in your HUD. It is an easy way to bring viewed objects (virtually) closer.

When pushing the push-button switch **PBS** once, the digital zoom is activated. A green frame will appear around both microdisplays in the HUD to indicate that zoom is active. The contrast dial has now become the zoom dial. Rotate the dial to increase or decrease the digital magnification. When in zoom mode, contrast cannot be adjusted.

Using the Spectre as a Monitor

You can also use The Spectre to view images from video, TV, DVD or computer. To do so, the external device must be connected to the control module with a proper adapter cable. When an external device is connected, the built in camera will be deactivated. For this reason, it is recommended that you are seated while in these modes.

To activate the S-Video/ composite video, mode the PBS must be depressed twice. The middle green light (3M) will be illuminated. The control module automatically detects the presence of S-video or composite in NTSC or PAL formats. If no compatible video signal is connected, this LED will blink.

To activate the SVGA mode, the PBS must be pushed a third time. The right green light (3R) will be illuminated. The control module requires a PC SVGA signal: 800x600 @ 60 Hz, 75 Hz, 85 Hz or 100 Hz.

MAINTENANCE AND CLEANING INSTRUCTIONS

To clean the HUD and control unit, use a damp cloth. A light rinsing agent may be added to the water. Do not use any detergents.

To clean the optical parts of the HUD (ocular lenses, camera lens, infrared LED's) use a dry, clean cloth. A cleaning cloth for this purpose is provided with The Spectre kit.

TROUBLESHOOTING

Problem	Cause	Remedy
No image	Control module switched off	Switch on Spectre with main push button
	No connection between HUD and control unit	Switch off device, plug HUD connection cable into socket and turn metal ring to tighten
	Video cable connected, but no video source selected	Either connect a video source and select compatible mode for this video signal with PBS or unplug the video cable in order to see with built-in camera
Snowy image or no image	Very dark light conditions while IR-LED not turned on	Switch on IR-LED with pushbutton
Blinking red border in displays; blinking Power-LED	Low battery	Switch off device and recharge battery
Only dark, or only white image	Incorrect brightness. Brightness dial and/or contrast dial are on Max. or min. position.	Adjust by using brightness dial and/or contrast dial
Completely white image	After having used digital zoom, contrast knob is at an extreme position.	Readjust contrast
Image dark or image is blurred	Camera lens not clean	clean lens

All other problems should be performed by a trained and authorized service provider!

TECHNICAL DATA

HUD	
Camera	Black and White
Standard lens	for 1-to-1 vision
Display	SVGA microdisplay
	480,000 color pixels
	Equivalent 1,440,000 dots
Field of view approx.	40° diagonal
Operating temperature	- 10°C to + 40°C
Interpupillary distance	60-70 mm adjustable
Optical user adaption	correction lens attachable
Control Module	
Brightness/contrast	manually adjustable
Contrast	manually adjustable
IR-light	On/Off
Digital magnifier	built-in electronic zoom
Mode switch	4 modes
Standard mode	with built-in camera
Second mode	same + digital zoom
Third mode	Composite video, S-video in NTSC or PAL
Fourth mode	SVGA 800 x 600 @ Hz 60/75/80/100
Weight	approx. 380 g (incl. battery)
Dimensions W x H x D	105 x 155 x 25 mm
Operating temperature	- 10°C to + 40°C
Battery	changeable Ni-MH, 6V/2, 1Ah
Charging time	approx. 50 min, with enclosed power supply
Operating time (approx)	with internal camera 2h (-¼ h for LED)
	in video-mode 2h
	in SVGA-mode 4h

WARRANTY

Limited Warranty

Tek Gear warrants products against defects in material or workmanship as follows:

Products: Tek Gear will repair products with new or refurbished parts, or replace the product free of charge, for a period of 365 days from the date of sale in the event of a defect in materials or workmanship.

Repairs: Tek Gear will repair or replace defective parts used in the repair or replacement of this product with new or refurbished parts, free of charge, for a period equal to the remainder of the original limited warranty period on the original product, or for 30 days after the date of the repair, whichever is longer.

This warranty only covers failures due to defects in materials and workmanship which occur during normal use. The warranty does not cover damages which occurred in shipment, cosmetic damage, damage that is attributable to acts of God, failures which are caused by products not supplied by the warrantor, or failures which result from accident, misuse, abuse, neglect, mishandling, faulty installation, misapplication, improper installation, operation or maintenance, alteration, modification, introduction of sand, humidity or liquids, line power surge, improper voltage supply, lightning damage, or subjecting the product to operating/environmental conditions in excess of the maximum values or below the minimum values set forth in the applicable specifications, or products serviced by anyone other than Tek Gear. The warranty is invalid if the factory-applied serial number has been altered or removed from the product. This warranty does not cover products sold AS IS or WITH ALL FAULTS. This warranty excludes consumable parts such as fuses, batteries and power supplies.

There are no express warranties except as listed above. Repair or replacement as provided under this warranty is the exclusive remedy of the purchaser. Tek Gear shall not be liable for lost profits, lost sales, loss of use of the product, or other incidental or consequential damages resulting from the use of this product, or arising out of any breach of this warranty. All express and implied warranties, including warranties of merchantability, fitness for a particular purpose and title, are limited to the applicable warranty period set forth above.