

Image Intensifiers

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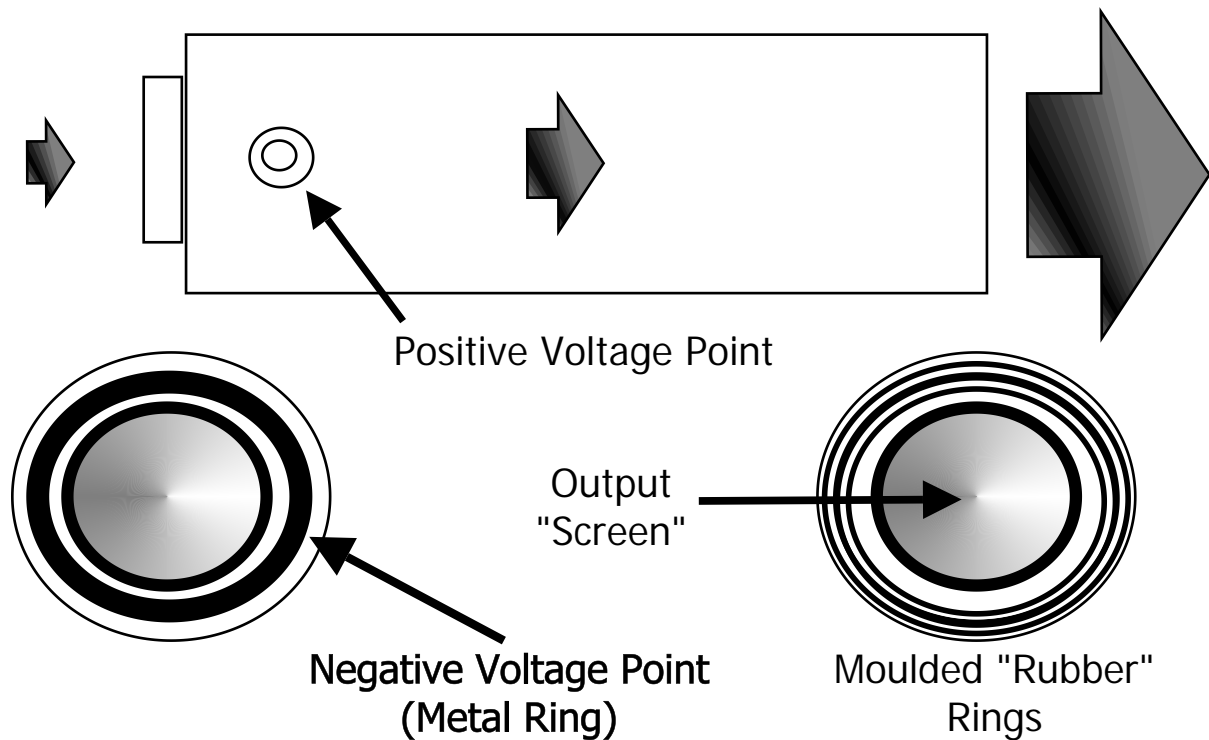


Image Intensifiers

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The Image Intensifier you have purchased is a Genuine Ex Military Instrument that was originally designed for use by Trained Military personnel.

This type of Image Intensifier first came into service during the late 1980's and was intended for use as a Hand Held "Spotting Scope"... Attached to a Rifle.. fitted into Artillery sights or when used in pairs as Night Time Driving Optics.

These instruments when New were specified to produce a LUMINANCE GAIN of upto 30,000 Times.... ie Light from ONE Candle would be Intensified to the level of light from 30,000 Candles !!

Their design included a fully automatic GAIN control which was intended to stabilise the light output to a level suitable for viewing with the Human eye.

Obvious care was taken to ensure the resulting light level was kept to a safe level... Imagine someone shining a torch into the tube... the resulting light of 30,000 torches could easily damage eyesight !

Although NOT Designed for use in Daylight we have not found any damage to result from such use.

How to construct a useable Night Sight

The following information is intended as a guide only.
Over the last few years we have seen the results of many customers ingenuity which have included:

Game control attached to Rifles for Game warden use
Security Observation
Astronomical Viewing attached to a Telescope
Animal watching... Badgers, Foxes etc

The type and size of lenses chosen for your assembly are entirely your choice.. indeed , all parts used in the construction depend on what you have available or wish to invest in.

The MOST IMPORTANT point to remember is that the parts used in constructing the Objective lens assembly... the "Input" side of the Intensifier MUST be 100% Light Proof. Any light entering the face of the tube will be Intensified... if the mounting tube is not light proof the tube will intensify this light as well as the light entering via the lens... this will result in loss of Intensification and reduced operation in every case.

Stage 1:

Firstly, identify a suitable method of housing the completed Intensifier. For Hand held or similar operation a Plastic tube is ideal... Many have used Plastic Water Pipe from DIY merchants to great effect. Sheet metal can be rolled into a tubular shape to fit the tube and then covered with a self adhesive sheet....

We have even seen one customers final unit that was constructed entirely from WOOD !

Stage 2:

Now you will need to decide what Objective lens you wish to use.. the Objective lens is the FRONT Lens... the lens where light enters the tube.

ANY Lens from a 35mm SLR will work fine with these tubes.. the choice of focal length being the most critical point in your decision. Remember the Intensifier tube itself does not MAGNIFY the scene you are looking at.. it does not "bring things closer"... the lens you choose does this job.

As a guide.. a standard 50mm lens will make object appear at the same distance as the naked eye.

A 100mm lens will make objects appear 2x closer

A 400mm Lens 4x Closer etc

A Zoom lens is an Ideal Candidate for use with an Image Intensifier.

If you already have a 35mm SLR, you will most Likely have a selection of lenses you may wish to use... in this case visit a camera shop to purchase an adaptor ring to suit your lens manufacturer... Mount the ring to the Intensifier resulting in the ability to change lenses to suit your needs.

Stage 3:

Whatever lens you choose it must be mounted at its focal length if the resulting image is to be in focus. The focal length of a 35mm SLR lens is 35mm... the rear lens element has to be 35mm from the face of the Intensifier tube... exactly the same distance from the rear element of the lens to the surface of the film in your camera.

To arrange for this spacing use any suitable form of lightproof tube.. plastic water pipe, even The inner cardboard tube from Toilet rolls have been used with success !

Take time to ensure the image on the eyepiece screen is in crisp focus before making any final assembly... and make sure the lens itself is correctly focussed on the object you are looking at... if the object is 20 feet away from you then set the focus ring on the lens to 20 feet !!!!

Stage 4:

Now we can move onto the Eyepiece.

The Human eye cannot focus at distances of less than about 12 inches... so we need a lens to allow us to focus at much closer distances.

Jewellers Eyeglasses are one low cost possibility... allowing the eye to focus on the "Output screen". Other alternatives include eyepieces from Binoculars, telescopes.. any lens that allows you to see the image on the output screen is perfectly useable.

Stage 5:

The application of Power to the Intensifier.

You will need a switch.. some wire.. and battery holder(s) to finalise construction.

These Intensifiers operate from around 3v to 7.5v DC... ideal for battery use.

You can use AA size Dry Batteries Batteries... AAA size... C size D size.. the choice is yours.... AA size being ideal giving long term use as well as keeping size to a minimum. Duracell AA batteries will last upwards of several days under normal conditions.

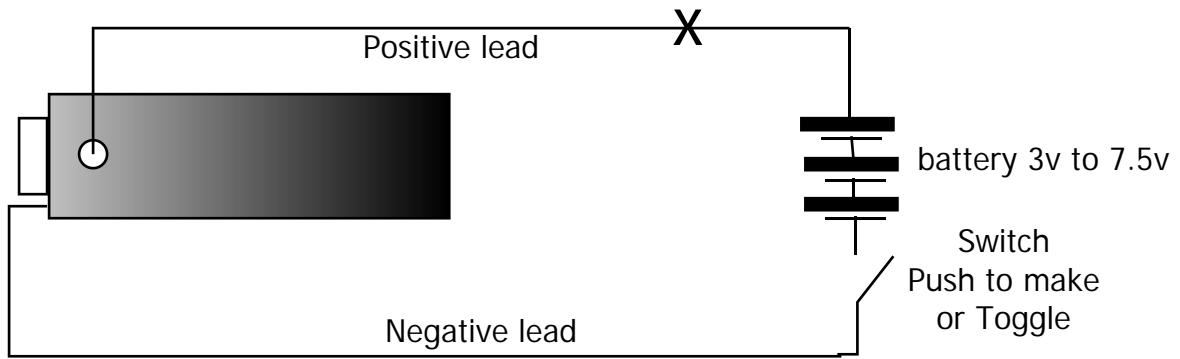
Nicad , NiMh or Lilon rechargeables can also be used if you wish to recharge your finished Intensifier.

Even Lithium 3v "Button cells" will work .. either singly or two in series.

You need to wire the batteries of your choice in SERIES with a switch to allow you to turn the Intensifier On and Off.

The POSITIVE end of the wiring is then connected to the contact found close to the front of the Intensifier... usually surrounded by a Yellow Plastic disc and slightly recessed under the outer tube surface. the wire can be soldered (dont get the contact get too hot for too long or the internal connection may come adrift)... it can be attached to a screw... the contact being threaded... people have even simply arranged for a Push Fit... the Intensifier take around 20mA under normal Night time operation so almost any method of making the connection will be OK.

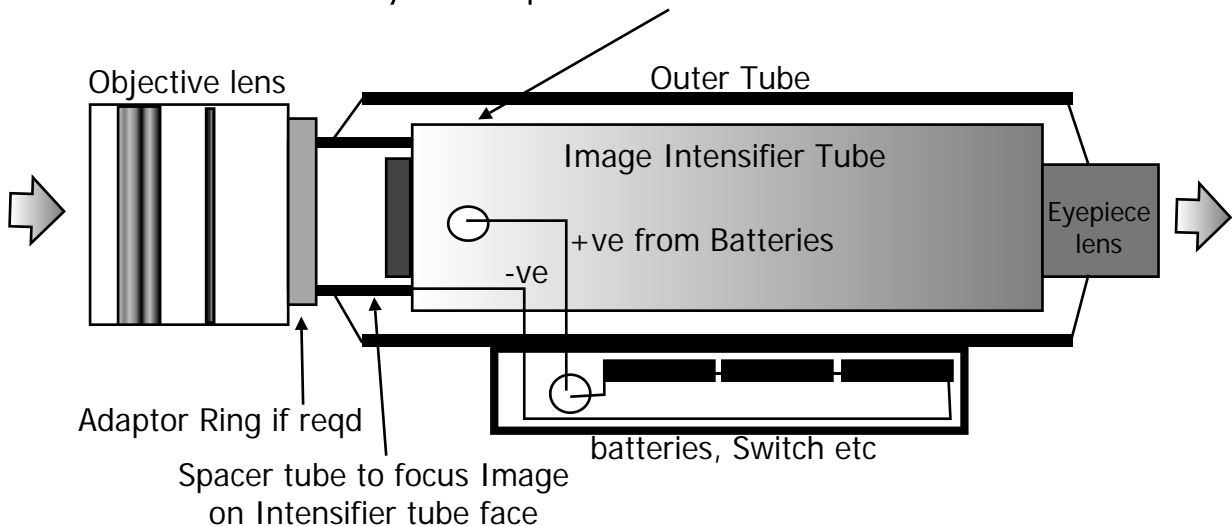
The NEGATIVE lead has to be connected to the metallic ring found around the front of the Intensifier. This ring is not easy to solder to... it has to be scraped clean if you wish to attempt to solder the lead to it. In all original designs this connection is made by using a flexible / springy phosphor bronze ring . A suitable ring can be incorporated into the design and sandwiched behind the Objective lens mounting tube before final assembly is made.



The Switch can be anything you wish to use...
 Puch Button "Push to make" types being ideal for a "trigger type" On / Off...
 Sub Miniture Toggle switches are ideal where you dont want to have to
 keep a button pressed... The choice is yours !

It is best to experiment with the Voltage applied to YOUR tube.
 Some of the original designs used a "brightness" control with which the
 overall Brightness and Gain of the Intensifier could be adjusted.
 A suitable variable resistor could be wired at Point X above if you wish
 to incorporate variable brightness in your design.
 Suitable values are 100ohm , 220ohm or 470ohm depending on the degree
 of control you desire. Experimentation is the key word here.

Space between Outer tube and Intensifier filled or packed.. Silicon Rubber,
 expanding foam, foam plastic... your choice... used to keep the Intensifier
 firmly fixed in position within the outer tube.



Another idea for mounting the Tube is to fit it into a rectangular Plastic
 box... the batteries etc can then be mounted inside the case.

If you are not a "DIY" type of person don't be disheartened.
 One customer has shown us his assembled Night sight... once he cut the lens
 spacer tube to size he taped everything together with Sellotape !!
 Even the batteries were taped to the outside of the tube..
 a messy job but it WORKED !!

Key Points to Remember

- 1) Ensure the lens spacer tube is 100% light proof and is cut to the correct length to focus the image and that the Objective Lens is set at the correct focus distance while checking focus BEFORE commencing final assembly
- 2) Ensure the batteries are easily accessible to allow replacement
- 3) Ensure the Battery leads are connected correctly...
 POSITIVE to the recessed connection
 NEGATIVE to the Metal ring around the tube face

Astronomical telescope Use

When using an Intensifier with a Telescope the images formed by the telescope lens system have to be focused on the Input Face of the tube.. and the telescope eyepiece has to be able to focus on the Output screen of the Intensifier.

Refractor telescopes can be cut across the main tube and the intensifier tube inserted into position between the lens elements. Before cutting the telescope please ensure you have located the correct position for the Intensifier. Remember the overall length of the telescope will increase by at least the length of the Intensifier tube

With Reflector telescopes the best method to adopt is to fit the Intensifier tube before the telescope eyepiece. Many Reflector Telescopes use a standard eyepiece fitting which can also accept a camera. if the Intensifier is placed in this position you will be able to use your existing eyepiece to focus on the Intensifier.