

## BATTERY CHARGING

Recharging the battery after every use is recommended. As a general rule of thumb, charge the battery for twice the amount of time as it was used. The VS 500 underwater viewing system has a DC charging port located just above the battery door on the right side of the monitor face. The charger that was supplied with the VS 500 system is a 500 mA DC charger with a male jack. To charge your system, simply plug the male jack of the charger into the plug in port in the face of the monitor and then plug the charger into a 110 volt AC wall outlet. The 7 amp, 12 volt battery that was supplied with the VS 500 system should take about 15 hours to charge from a completely discharged state. The charger incorporates a Charge Alert feature to alert the user to when the battery reaches full capacity. This is accomplished when the green LED light shuts off on the face of the charger. The charger does not shut off automatically but will output a trickle charge indefinitely. It is recommended, however, that the charger be disconnected from the monitor when the Charge Alert green LED is no longer on. It's recommended that you remove the battery door while charging to allow for increased air ventilation through out the battery compartment.

If your viewing image appears cloudy or fuzzy, check your battery charge. One of the major symptoms of a dead or near dead battery is the degradation of your viewing image. Try charging your battery or if the battery is unable to hold a charge, replace it with a new one of the same specification. If you need to remove the battery, unplug the two battery terminals from the battery. Unscrew both the screws located in the upper right and left corner of the battery compartment. This will allow you to remove the battery strap from the battery. After removing the strap, lift the battery up slightly with a finger on either side of the battery and slide the battery towards you. This should allow for easy removal of the battery. To replace the battery, lift the battery up and slide into the battery compartment until the front of the battery drops down into the compartment. Replace the battery strap by using the two screws supplied and tighten until moderate resistance is felt.

## DIRECTIONAL VIEWING INDICATOR

The viewing direction indicator is located in the upper left-hand corner of the monitor screen and utilizes an icon shaped as an arrow to indicate the direction the camera is pointing. This is accomplished by the use of two magnetic compasses that talk back and forth through software that continuously calculate the differential. There are two very important criteria to making the system work accurately: 1). The monitor and camera have to be level. The sensors will not accommodate an angle greater than ten degrees. Therefore the monitor needs to be flat on the ice to work properly. If the monitor is sitting at an angle of more than ten degrees, then the viewing direction shown will not be accurate. The camera when hung by the cable will be accurate. The angle of the ice arm over the ice hole will have no bearing on whether the camera is hanging level. However, if you hold the camera in your hand and are rotating the camera, it may not be level and therefore you will notice an inaccuracy in the viewing indicator. 2). The sensors that are located in the monitor and camera are affected by metal. Like any compass, metal can cause the magnetic sensors to become inaccurate. When using the viewing indicator, make sure the monitor and camera are not located near any metal objects.

The viewing indicator utilizes eight different stop points in calculating viewing direction. As a result of the limited stop points, there may be some inaccuracies that result when the camera falls between the various stop points. If used properly, the VS 500 system provides an excellent reference for determining relative viewing direction.

## SPECIFICATIONS

<b>BATTERY:</b>	12 volt DC, 7 Amp hr.
<b>CHARGER:</b>	12 volt DC, 500 mA
<b>CAMERA:</b>	
<b>Image Sensor:</b>	1/3" Sony CCD (B/W)
<b>Resolution:</b>	400 HORIZONTAL LINES
<b>Light Sensitivity:</b>	.001 LUX HI-VU LED'S on
<b>Field Of View:</b>	90 Degrees
<b>MONITOR:</b>	
<b>CRT:</b>	5.5" Diag. Flat Screen High Resolution
<b>CURRENT DRAW</b>	
<b>ON (no illumination):</b>	700 mA
<b>IR-Vu (non-visible infrared):</b>	775 mA
<b>HI-Vu (visible multi-color):</b>	750 mA

## WARRANTY

To activate your warranty, you must send the original sales receipt or Xerox copy with the warranty card. The warranty will be void without the accompanying sales receipt. For a period of one year from date of purchase MarCum Technologies will provide free parts and labor on any defects in materials or workmanship, with exception of the following conditions: damaged or cut cables, lost components, damage due to unauthorized modifications, repairs, or misuse.

The manufacturer must perform all warranty work or repairs. If your underwater viewing system requires service, call us at the number listed below to receive a Return Authorization Number (RMA) and return shipping address. **DO NOT** return the unit to our PO Box in Monticello. UPS will not deliver to a PO Box. This return procedure has been implemented because we may be able to save you the inconvenience of returning the unit. Some problems may be resolvable by a technician over the phone. If the unit is sent back to MarCum Technologies for repair, mark the Return Authorization Number on the outside of the package and enclose a letter stating the problem with your return address and daytime phone number.

For your convenience save the original box and packing materials for use if factory return is required. For warranty repair and/or service call **(763) 512-3987**.



## UNDERWATER VIEWING SYSTEM



## VS 500 Instruction Manual

## ***INTRODUCTION***

Thank you for purchasing the VS 500 underwater viewing system from MarCum Technologies.

Welcome to the world of underwater viewing. MarCum Technologies has incorporated the latest technology in producing the most compact and technologically advanced underwater viewing system available. Hunt for underwater treasure or locate the "spot on the spot" for great fishing.

There are hundreds of uses for your new VS 500 underwater viewing system. Now you'll actually be able to see what's below the surface of your favorite lake.

## ***FEATURES***

The VS 500 underwater viewing system utilizes an on screen display that displays the various modes of underwater lighting, percentage of battery charge remaining, low battery warning icon, and relative viewing direction. See the appropriate section of this manual for specific information regarding the on screen displays.

The VS 500 viewing system has various modes of illumination that provide enhanced visibility for varying light conditions. The different lighting options can be selected through the keypad located on the face of the monitor. Depending on the amount of natural light available, you can choose between no illumination (ON), Infrared non-visible illumination for stealth viewing (IR-VU), or multi-colored visible illumination (HI-VU). Even in the most dimly lit conditions you can identify fish, structure, or objects with ease.

The VS 500 is available with a choice of either 60 or 100 feet of Kevilar reinforced underwater camera cable. Your VS 500 system comes with a detachable camera that plugs and unplugs at the rear of the monitor. A handy cable reel for convenient cable storage is provided with the system.

The VS 500 includes the newest innovation in underwater viewing by providing a motorized steering system for changing the viewing direction of the camera right from the keypad on the monitor. This enables the user to utilize an ice hole (for viewing) up to fifteen feet away from the monitor location.

The 5.5 inch black and white CRT monitor has excellent resolution allowing viewing with great clarity and detail. Controls for adjusting vertical hold, contrast, and brightness are located at the rear of the monitor behind the rubber plug. Adjustments can be made by removing the plug and rotating the knob either clockwise or counter clockwise to obtain the desired picture. The rubber plug should remain in place in the recessed area at all times to prevent moisture from entering the monitor housing.

The VS 500 has a video-out jack located at the rear of the housing under the rubber plug in the same recessed area as the monitor adjustment controls. The video-out jack can be utilized by purchasing a cable of desired length with male RCA jacks from a local retailer of video or audio equipment. The cable can be plugged into either a larger monitor or T.V. for a larger viewing image or can be used to record onto a VCR or camcorder. To record onto a camcorder you must have a camcorder with a video-in port.

The underwater camera comes with weights installed on the bottom of the camera housing. These weights are required to provide the appropriate ballast for use in the both open water and during ice fishing. Do not use the camera without these weights

A high quality padded "Soft Pack" carrying case incorporates a built in collapsible viewing shroud to enhance viewing in bright light conditions. The front of the Soft Pack can be opened to allow for viewing when not exposed to harsh light (i.e. when viewing in an enclosed ice house). The versatile "Soft Pack" system provides protection from the elements as well as allows for the easy storage of all camera accessories. A draw string pouch on the back of the "Soft Pack" holds the camera cable while two side pouches accommodate the camera with attached steering Fin and the Motorized Ice Arm with ratcheted steering clip.

The battery included with the system is a 12 volt, 7amp hour sealed lead acid electrolyte battery that will provide approximately 8.5 hours of viewing time when fully charged.

Viewing time will vary dependent on the condition of the battery as well as the illumination mode used, i.e.: 9.0 hours for ON (no illumination), 7.5 hours for IR-VU (non-visible infrared), and 8.0 hours for HI-VU (visible multi-color). A 500 mA DC wall charger is supplied to recharge the battery to full capacity. Recharging the battery to full capacity after every use is recommended. For further battery charging information, please see the "Battery Charging" section of this manual.

## ***GETTING STARTED***

Remove your VS 500 monitor from the Soft Pack by first opening the front of the case. This is accomplished by pulling the flap at the top and sides of the Soft Pack until the Velcro strips separate. Reach into the Soft Pack on top of the monitor and grab the molded inset handle about halfway back. Pull the monitor forward tilting the top towards you until it comes out of the Soft Pack case. Place the monitor on a flat surface and open the battery compartment door located on the front lower section of the monitor case. This is done by gently applying downward pressure on the grooved finger inset at the top of the battery door and pulling forward. Connect the battery leads to the battery terminals i.e.: red lead to battery positive and black lead to battery negative. Replace battery door and place monitor back into padded Soft Pack case. Close front of case by re-attaching Velcro strips. Turn the Soft Pack to the backside and remove the cable reel from the back pouch.

Reach into the lower left corner of the rear pouch and undo the Velcro door. This allows access to the plug-in port for the camera. Plug the camera cable into the upper plug-in port. Take notice that the plug-in is not round but has a flat side. This is designed to assist in lining up the pins with the sockets in the plug and help eliminate the bending of connector pins. Do not force the plug into the receptacle, you may have it mis-aligned. There will be some resistance when plugging in the camera due to the molded seal rings located on the plug, however, if lined up properly, this should go together quite easily. The port marked as ACC is for plugging in the cable to operate the motorized ice arm that steers the camera.

You should not attempt to plug the camera into this location. Once that camera is plugged into the monitor, you can replace the camera cable into the rear storage pouch and pull the drawstring for a snug fit. Place the camera with the attached weights in the storage pouch on the left side as viewed from the front. Place the Motorized Ice Arm into the vertical storage pouch on the right side as viewed from the front.

Attach the clip to the cable or store in the pouch on the left with the camera.You are now ready to head to the lake. Once you reach your destination, remove the cable reel from the rear storage pouch and remove the required length of cable. Open the front of the Soft Pack so that the monitor and keypad are fully exposed. Turn the camera power on by depressing the ON button on the keypad. The system will power up and the monitor screen will display "OVS SYSTEM START-UP". Once the start-up message clears from the screen the monitor will display the picture that's being transmitted by the camera. Lower the camera into the water to the desired depth and secure the cable with the Motorized Ice Arm to prevent depth changes. As with all CRT displays, bright light can washout the display making viewing difficult. If this occurs, rotate the system so that the light source is not directly on the monitor screen.

In extreme bright light conditions it may be necessary to use the viewing shroud to shield the monitor from the light source. To use the viewing shroud, remove the protective cap from the face of the shroud located on the front of the padded Soft Pack. Grab the face of the view shroud and pull towards you until all three collapsible parts are fully extended. The shroud is not fully extended until you hear the telltale click of each part as it locks into place. This clicking locks the shroud into position so it won't collapse on its own. To collapse the shroud to its original position, push on the face of the shroud until all three parts collapse inside each other and then the replace the protective cover.

The depth of field, the distance the camera can see underwater, depends on the clarity of the water and available light at the depth the camera is used. In extremely clear water the depth of field can be several feet and in cloudy or muddy water the depth of view can be reduced to only a few inches due to particles suspended in the water.

## ***ON SCREEN DISPLAYS***

The VS 500 utilizes a series of ON SCREEN icons to indicate user options and system information.

### **Lighting Options**

The underwater viewing system utilizes two different lighting options, IR-VU and HI-VU. Infrared (IR-VU) can be selected by depressing the button labeled LIGHT on the keypad. The IR-VU icon will appear in the upper right hand corner of the screen for three seconds before disappearing. The Infrared light source has now been activated. Infrared light is not visible to the human eye but is visible to the camera and offers an excellent light source for certain conditions. To change the lighting to HI-VU (multi colored lights) press the button on the keypad labeled LIGHT and the icon in the upper right hand corner will display HI-VU. This will activate the high intensity multi-colored LED lights. To turn off the multi-colored lights, depress the LIGHT key one more time and the OFF icon will appear in the upper right hand corner. The selection of different lighting options is set-up in a progressive series so you must filter through the IR-VU to reach HI-VU and through HI-VU to reach lights OFF. Lighting considerations: Infrared works well in clear water or in low light conditions (dusk or dawn) or when fish appear to be in a negative or neutral mood and react negatively to the bright HI-VU lights. HI-VU should be used in extreme low light conditions or in water that isn't conducive for an Infrared light source.

### **Battery Status**

The condition of charge remaining in your battery can be monitored by depressing the key labeled BATT located on the keypad. The percentage of charge remaining will appear in the upper right hand corner of the monitor and remain on the screen for a three second interval.

### **Low Battery Warning**

When the battery charge remaining falls below ten percent, a low battery warning icon will flash in the upper right corner of the monitor. The low battery icon will remain on the screen and continue to flash until the system eventually shuts down. If the battery charge remaining gets too low, the picture will get fuzzy or blurred before it completely shuts down. It's recommended that the battery be charged after every use and not remain in a discharged state too long before recharging.

### **Viewing Direction**

A viewing direction indicator will appear on the screen in the upper left hand corner of the monitor when the system first fires up. The indicator will remain on the screen indefinitely until the DIR key is depressed on the keypad to remove it. To put the icon back up on the screen, simply depress the DIR key on the keypad. The direction indicator has an arrow that points in the direction the camera is viewing regardless of the monitor position.

## ***ICE FISHING APPLICATION***

A folding Motorized Ice Arm with a ratcheted steering clip is included with the VS 500 to enhance your viewing through the ice. The Motorized Ice Arm holds the cameras depth and steers the viewing direction of the camera when positioned over an ice hole. To prepare the Motorized Ice Arm for use, plug the connector from the ice arm into the ACC port on the backside of the monitor. This can be done by raising the Velcro door located at the left on the inside of the mesh compartment used to store the camera cable. The ACC plug in port is the lower of the two available ports. Turn the system ON by depressing the ON key.

Once the system fires up, use the arrow keys at the bottom of the keypad to rotate the bobbin gear in the ice arm until the smaller portion (Part A) of the gear is centered in the opening. Remove the smaller portion (Part A) by placing your finger under the smaller portion of the gear and apply upward pressure until the smaller portion pops out. Place the cable into the open slot and replace Part A by placing it above the opening and applying downward pressure until it snaps into place. Close the Ice Arm by rotating the smaller arm underneath counter clockwise until the entire arm has been straightened. At this point the ice arm is ready to be placed over the ice hole as shown on the outside of the original package. You are now ready to set the depth for viewing by attaching the steering clip to the cable above the ice arm.

To attach the ratcheted steering clip, apply moderate pressure to the wings and simultaneously slide the cable into the hole in the middle of the clip. Release pressure on the wings and cable will be held firmly in place. The clip must sit in the ratcheted area of the bobbin gear with the camera cable rising straight above the clip for at least 4 inches. If the cable is angled too severely above the clip, the clip won't sit flat in the ratcheted area resulting in poor contact and difficulty in steering. If viewing adjustments are required, push either arrow key located on the face of the monitor to steer the camera until the desired viewing direction is achieved. Suggestion: Do not rotate the camera in only one direction. To avoid twisting the cable, do not rotate the camera more than 360 degrees before reversing direction.

A suggestion on how best to utilize your viewing system while ice fishing. Drill two holes 3 to 4 feet apart. Lower your bait into one hole while placing the camera in the other hole pointing in the direction of your fishing lure. Set the depth and angle of viewing so that your lure appears in the middle of the viewing screen. Good Fish'n!

## ***OPEN WATER APPLICATION***

A Fin has been included with your system for use in open water. When using the system from a boat or in water with current, it is recommended that the Fin be attached to help stabilize and steer the camera in the correct direction. The camera should be used at slow speeds while drifting, or while under propulsion from a trolling motor or outboard motor. The Fin is designed to be reversible and can be mounted behind the camera housing with the Fin pointing upward for forward viewing or in front of the housing with the Fin pointing downward for viewing backwards.

The camera can be attached to a down rigger cable by the use of a down rigger release attached through the holes on the backside of the camera housing. The Fin should be used in front of the camera lens and pointing downward when attached to a down rigger cable. The Fin can be attached by sliding the rail of the Fin into the slots in the lead ballast weights at either the front or rear of the weights depending on your desired viewing direction. A stainless bolt and nut are provided to attach the Fin firmly to the lead ballast weights. When using the Fin & Weight, be careful to keep the camera out of heavy weeds, brush, or large rocks.

If the camera becomes hung up, back up from the direction you were traveling and slowly try to back the camera out of the snag. Do NOT pull upward with force unless all other avenues have been pursued.