INTRODUCTION Determining the Options and Capabilities of your Model PRODUCT DESCRIPTION • Surface Unit4 • Communicator Panel 4 PREPARATION	2 2 4 6
<ul> <li>General 6</li> <li>ASSEMBLING EQUIPMENT</li> <li>Installing New Batteries 6</li> <li>Plugging In the Transducer 8</li> <li>Plugging In the Optional Noise Reduction Headset 9</li> <li>Plugging In the Hand-Held Microphone 10</li> </ul>	6
<ul> <li>Plugging In an External Recording Device 10</li> <li>Plugging In an External Power Source 10</li> <li>WHAT TO EXPECT WHEN COMMUNICATING UNDERWATER</li></ul>	0
<ul> <li>OPERATION</li></ul>	2
MAINTENANCE	9
<ul> <li>Connectors 19</li> <li>SPECIFICATIONS</li></ul>	0 1
DISCLAIMER	2 3

Rev 02/21



### **INTRODUCTION**

Congratulations! You have just purchased the most sophisticated surface/underwater communication system on the market.

The DIVELINK Surface Unit is a wireless voice communicator used by surface personnel to talk with divers who are using DIVELINK Diver Units. (For details of the Diver Unit, see the DIVELINK manual entitled *DIVER UNIT, MODEL COM-UC-x-x-x.*)

Employing the latest in micro-electronics technology, the Surface Unit has been engineered to be as simple to use as possible. All adjustments for sound quality are fully automatic. The operator need only adjust channel setting and volume.

### **Determining the Options and Capabilities of your Model**

There are many options that the COM-S surface unit may be ordered with. The MODEL NUMBER contains a sequence of letters that describe in short form the exact options that the communicator contains. The Model Number is shown on the label affixed to the inside of the case.



The Model Number Option Codes are listed in full detail on the next page...



## DIVELINK Ordering Information

**Commercial and Military SURFACE UNITS in Waterproof Case** 



\* These channel bands are separated enough in frequency to provide standard non-interfering simultaneous communication.



## **PRODUCT DESCRIPTION**

#### Surface Unit

The Surface Unit consists of a Communicator Panel in a waterproof case that contains rechargeable gelcel batteries and universal charger. Also included are a transducer (removable) with an extension cable, and a hand-held microphone (see Figure 1). An optional noise reduction headset with noise cancelling boom microphone may also be purchased for noisy deck environments.

#### **Communicator Panel**

Table 1 describes the Communicator Panel control and indicator items identified in Figure 2.

Item	Function
1. XDCR	Connection for transducer
2. HEADSET	Connection for headset
3. MIC	Connection for hand-held microphone
4. CHANNEL	Switch to indicate channel selection
5. SPEAKER (ON/OFF)	Switch to turn internal speaker on/off
6. VOLUME	Switch to control volume of internal speaker and headset
7. LINE OUT	Connection for external recording device
8. POWER (ON/OFF)	Switch to turn Surface Unit on/off
9. POWER indicator light	When turned on, indicates <b>POWER ON</b> .
10. EXTERNAL POWER	Connection for charging battery, for surface units that contain rechargeable battery pack option BAT-S08. Use charger CHG-S08. Do not connect charger if alkaline batteries are installed.
11. LOW BATTERY indicator light	Indicates battery condition.

#### **Table 1: Communicator Panel Controls and Indicators**



Figure 1: Surface Unit



Figure 2: Front Panel



### PREPARATION

#### General

The surface unit is built into a waterproof case. It should be latched closed during transport to the dive site. When being stored for a period of time in this condition, it is possible that an increase in the barometric pressure will make it difficult to open the case. To alleviate this condition, there is a pressure equalization valve under the handle (see Figure 1) that may be turned anti-clockwise to allow air inside the case.

## **ASSEMBLING EQUIPMENT**

#### **Installing New Batteries**

To install new batteries in the Communicator Panel:

Unscrew the four captivating bolts, turning them anti-clockwise (see Figure 1).

Grasp the two handles and pull the front panel away from the case.

Turn the panel over to expose the back panel and batteries.

Loosen the Velcro® battery-retaining strap and the turnbuckles, then remove the three batteries.

Figure 3: Battery Replacement



Install fresh ALKALINE batteries and reverse the previous steps to reassemble the equipment. If you are installing RECHARGEABLE BAT-S08 gel-cells, then the same procedure is used.

### To install alkaline or rechargeable lantern batteries:

- 1. Position three lantern batteries with the springs aligning with the holes in the white mounting plate.
- 2. Make sure the turnbuckles are loose on the battery retaining bar, then install the assembly with the hooks facing outwards.
- 3. Tighten the turnbuckles by hand **until the three batteries are compressed against the mounting plate**.
- 4. Install the loose end of the Velcro® batteryretaining strap under the turnbuckle, then under the tie-down bracket.
- 5. Bring the loose end over the turnbuckle.
- 6. Press the Velcro® end together.











#### **Plugging In the Transducer**

Caution: The transducer contains a sensitive ceramic element. Although the element is encased in a protective housing, it is susceptible to mechanical impact. Great care must be taken to prevent the transducer from being dropped or bumped against a hard object.

On the Communicator Panel, flip up the waterproof cover of the **XDCR** connection (see Figure 2).

Apply a small coating of grease, such as *Dow Corning*® *4 Electrical Insulating Compound*, onto the contacts of the extension cable plug.

Plug the extension cable fully into the **XDCR** connection.



Caution: The transducer is most subject to damage when it is attached to the extension cable, as it can swing easily and hit objects while being lowered into the water. Particular care must be taken to avoid this occurrence.

Lower the transducer into the water as close as possible to the same depth as the diver (see the section entitled *Barriers to Transmission*). If operating in shallow waters, position the transducer halfway between surface and bottom. If there are excessive currents in the area, or if operating while under way, attach a small weight to the transducer to prevent it from drifting upwards.



## **Plugging In the Optional Noise Reduction Headset**

To plug the headset into the Communicator Panel:

Apply a small coating of grease, such as *Dow Corning*® *4 Electrical Insulating Compound*, onto the contacts of the boom microphone and headset plugs.

Plug the boom microphone into the side of choice on the headset. The side chosen depends on which hand you use to operate the push-to-talk button on the headset.

On the Communicator Panel, flip up the waterproof cover of the **HEADSET** connection (see Figure 2).

Plug the headset cable fully into the **HEADSET** connection.





## Plugging In the Hand-Held Microphone

To plug the hand-held microphone into the Communicator Panel:

Apply a small coating of grease, such as *Dow Corning*® *4 Electrical Insulating Compound*, onto the contacts of the hand-held microphone plug.

On the Communicator Panel, flip up the waterproof cover of the **MIC** connection and plug the hand-held microphone fully in.



### Plugging In an External Recording Device

An external recording device with a MONO <sup>1</sup>/<sub>4</sub>" standard plug can be plugged into the **LINE OUT** connection on the Communicator Panel (see Figure 2). This connection is electrically isolated in order to eliminate any risk of electrical hazard or ground loop.

### Plugging In an External Power Source

The external power source is used for battery charging ONLY, for those SURFACE units that are equipped with rechargeable batteries. Do NOT plug any external power source into this connector if using alkaline batteries. Rechargeable batteries may be ordered, DIVELINK part number BAT-S08. The charger may also be ordered, DIVELINK part number CHG-S08. The warranty becomes void if anything other than CHG-S08 is plugged into this connector.

Plug charger CHG-S08 into the **EXTERNAL POWER** connection on the Communicator Panel (see Figure 2).

## WHAT TO EXPECT WHEN COMMUNICATING UNDERWATER

## **Barriers to Transmission**

Several factors can be barriers to sound transmission in the water.

**Water density**. Sound transmission can be interrupted by a change in water density, most typically by the *thermocline*. (The thermocline is a layer of water located typically within ten feet of the ocean surface; it has a markedly different temperature than the water below ten feet.)

Important!: It must be understood that it is not always possible for the Surface Unit transducer, if it is located **over** the thermocline, to communicate with divers **under** the thermocline. In addition, if the transducer is lowered below the thermocline, it should **not** be allowed to touch the ocean floor.

**Wave action or sea floor**. Sound transmission can be reduced by wave action at the surface, or by the sea floor.

**Background noise**. Sound transmission range can be reduced by "background" noise, which is generated by a rough sea, by rain, by biological noise such as a snapping shrimp, or by man-made noises such as engines and high speed propellers.

**Body shadow**. Long-range sound transmission can be affected by the position of the diver's body in relation to the DIVELINK equipment. A range reduction can occur if the diver's body is in the line of sight between his/her equipment and that of another diver or a Surface Unit. This effect is known as *body shadow*. It is caused by the absorption of sound by air inside the diver's dry suit, or by air in the diver's lungs. To prevent body shadow, the diver should turn 45° so that the line of sight between the DIVELINK equipment is restored.

**Factors not affecting sound transmission**. On the positive side, underwater sound transmission is **not** affected by muddy or turbid water, and is equally good in fresh and salt water.

#### **Range Considerations**

In consideration of the barriers to sound transmission underwater (see the section entitled *Barriers to Transmission*), use the following guidelines for optimal range:

Divers should report the position of the thermocline to other divers and surface personnel.

Avoid trying to transmit through a solid object, such as a ship's hull or an underwater cliff. Attempting to do so causes the sound transmission to be a product of reflections from the surface, the ocean floor, or underwater objects. Keep the transducer away from the ocean floor, and as close as possible to the same depth as the diver.

Other important considerations:

- The lower frequency channels will transmit over a longer range.
- A calm sea will allow the greatest range.
- A surface layer of fresh water in will block transmission, when situated in the ocean close to an estuary, particularly after heavy wind and rain.

## **OPERATION**

### General

Because the Surface Unit contains sensitive, electronic equipment, it should be exposed to as little water as possible. The unit must not be immersed in water, struck by a wave, or operated by a wet diver.

While a few drops of water are permissible, they should be toweled off immediately. In particular, the front panel of the unit, and any attached equipment, should be kept clean and dry.



**Important!**: Under no circumstances should the cover be closed if the front panel is wet. Doing so creates a closed environment that causes the trapped water to evaporate. This produces a moist atmosphere that can corrode the internal components.

## **Turning the Surface Unit On**

To turn the unit on, flip the **POWER** switch to the **ON** position (see Figure 2). When you do so, the **POWER** indicator light should turn on.

## If Using Alkaline Batteries

The Surface Unit will have various conditions that may be interpreted by the **POWER** indicator light, **LOW BATTERY** indicator light and **POWER** switch. The following table refers to replaceable Alkaline lantern batteries only.

POWERLOW BATTERYindicatorindicator lightlight		POWER switch position	Condition of Surface Unit
•	•	OFF	Off
2m2	•	ON	On, battery good
Street and	●+ <sup>∑</sup> w <sup>t</sup> sometimes on during transmission	ON	normal operation, battery good
Smr. Shine	ર્ટ્યું∺+● always on during transmission	ON	battery getting weak – replace (alkaline)
Swa Swa	S.W.Z	ON	replace (alkaline)

Sm.	= Light is on	• = Light is off
- HAN	0	0

Table 2: Indicator Lights and Power Switch Settings for ALKALINE Batteries

### If Using Rechargeable Battery Pack and Charger

If the Surface Unit has been loaded with BAT-S08 batteries, it may be charged with the CHG-S08 charger supplied by DIVELINK. This will provide for a fully charged condition within 12 hours. The charger may be plugged in at all times to keep the cells in fully charged condition. The Surface Unit will regulate charge current and indicate fully charged condition with the front panel Power Indicator Lights. The status of the Battery may therefore be determined by viewing the Power Indicator Lights during several modes of operation:

- 1. When the Power Switch is ON and the unit is functioning.
- 2. When the Power Switch is ON and the unit is plugged into the charger adaptor CHG-S08.
- 3. When the Power Switch is OFF and the unit is plugged into the charger adaptor CHG-S08.

1. Power Switch is ON, No external Power Plugged In.	POWER INDICATOR LIGHTS
Normal operation. Possible flashing of LOW BATTERY indicator during transmission.	POWER LOW BATTERY
Normal Operation, but batteries are getting low. Time to consider recharging battery using CHG-S08 charger.	POWER MZ A WZ LOW BATTERY
Batteries are totally discharged or disconnected. Inspect Battery Pack then Recharge Battery Pack using CHG-S08 charger.	POWER EXTERNAL POWER

2. Power Switch is ON, CHG-S08 plugged into EXTERNAL POWER	POWER INDICATOR LIGHTS
Normal operation. Battery power is being supplemented by the external charger.	POWER 2 CONSTRUCTION LOW BATTERY EXTERNAL POWER

3. Power Switch is OFF, CHG-S08 plugged into EXTERNAL POWER	POWER
	INDICATOR
	LIGHTS
NOT CONNECTED Situation.	POWER LOW BATTERY
Batteries are NOT being charged.	
BOTH INDICATORS ARE OFF.	EXTERNAL
Check for bad connection at CHG-S08 charger power plugs. Check for power at outlet.	POWER
Normal operation.	POWER MZ COW BATTERY
Batteries are being charged.	2 N
LOW BATTERY indicator is ON meaning that the batteries are CHARGING.	EXTERNA POWER
Normal Operation.	POWER
LOW BATTERY indicator is OFF meaning that the batteries have finished charging and charge current has been cut off.	EXTERNAL POWER

#### **Table 3: Indicator Lights and Power Switch Settings**



Caution: Do NOT use CHG-S08 to attempt recharging of Alkaline batteries. This will cause battery leakage and void the warranty.



#### **Turning the Internal Speaker On**

To turn the speaker on, flip the **SPEAKER** switch to the **ON** position (see Figure 2).

#### **Receiving Transmissions from Divers**

A signal from a diver can be received on the headset or on the internal speaker. The **VOLUME** switch (see Figure 2) adjusts both the headset and internal speaker simultaneously. The internal speaker can be switched off by flipping the **SPEAKER** switch to the **OFF** position.

#### **Sending Transmissions to Divers**

A transmission can be sent using the boom microphone on the headset or the handheld microphone. To activate the boom microphone, press and hold the push-to-talk button on the headset. To activate the hand-held microphone, press and hold the push-to-talk button.



**Note**: Sound is transmitted through the microphone that has had its push-to-talk button pushed. That is the microphone you should speak into.



#### Channels

Examine the Model/Serial label.

Look for the **Channel Code**.

Model COM-S-4CADE 4 Channel Surface Unit Wireless Ultrasonic Communicator S/N M030034 Made In Canada

Cha	nnel Code
А	31250 Upper
В	Public Safety
С	32768 Upper
D	28500 Upper
Е	25000 Upper
F	31250 Lower
G	32768 Lower
Н	28500 Lower
1	25000 Lower

This indicates the Channel under each switch number. The switch number "1", "2", "3", "4" etc. indicates each relevant digit of the **Channel Code**. The letters of the **Channel Code** can be interpreted from the above chart.

**Example:** A model that has a Channel Code:

COM -	S	-	4CADE
-------	---	---	-------

The "4" indicates 4 channel model.

	Switch	Channel	Detail
1 7	Number	Code	
3	1	С	32768 Hz Upper Sideband
2	2	А	31250 Hz Upper Sideband
1	3	D	28500 Hz Upper Sideband
CHANNEL	4	E	25000 Hz Upper Sideband

Therefore, when the switch is turned to "1", the Surface Unit will be transmitting and receiving on Channel C, 32768 Hz Upper Sideband.

If the model you have is Single Channel, then there will be no channel switch.

## DIVE<sup>2</sup>INK<sup>®</sup>

**Example:** A two channel model has a Channel Code:

	Switch Number	Channel Code	Detail
3 2	1	А	31250 Hz Upper Sideband
1 CHANNEL	2	В	Public Safety Channel (Classified) Non- interfering and separate from all other channels)

(Note: a 2 channel model will have other positions labeled 3 and 4 however these positions will not be selectable.)

Special Eight Channel Model COM-S08

The Channel Code will show simply: "COM-S08" This 8 channel model is comprised of a predetermined set of frequencies.

Switch	Channel	Detail
Position	Code	
1	С	32768 Hz Upper Sideband
2	G	32768 Hz Lower Sideband
3	A	31250 Hz Upper Sideband
4	F	31250 Hz Lower Sideband
5	D	28500 Hz Upper Sideband
6	Н	28500 Hz Lower Sideband
7	E	25000 Hz Upper Sideband
8		25000 Hz Lower Sideband

Important! Eight channel selections are available for the purpose of being compatible with other common frequencies and switch positions in commercial use. Although there are up to eight selections, they all cannot be used simultaneously as eight separate channels. Doing so can cause interference among channels.

The eight standard channels are distributed across the frequency spectrum as follows:



As can be seen from the frequency chart above, for example, channel C will overlap and interfere with channel A. If communication is desired on separate channels without interference, then non-overlapping channels must be selected. Three channels are available (for three independently communicating groups of divers) at any one time. The best combination is channel C, F and I. Note: The Public Safety Channel is separate from all other channels.

## **Option - Waterproof Connectors for Case Closed Operation**

It is possible to operate the Surface Unit with the case closed using part number OPTION-WP-EXT. This option is beneficial when operating during severe weather conditions, and may be ordered with the Surface Unit or may be retrofitted at a later date.

Both the headset / boom microphone and the transducer may be plugged into waterproof connectors at the side of the case, and will be delivered with a different connector than the type used to plug in to the front panel.





### MAINTENANCE

#### Storage

When shipping or storing the unit for extended periods, it is important to dry off the front panel before closing the case.

### **Opening the Surface Unit**

The **only** reason to remove the Surface Unit front panel is to install fresh batteries.



**Important!** Opening the electronic enclosure inside the Surface Unit is a factory service procedure only. Opening it yourself will void the warranty. There are no user-serviceable parts inside. See the section entitled *SERVICING*.

### Cables

All cables should be kept free of cuts. If damaged, the part should be replaced, for example by another surface unit

transducer extension (Part Number CAB-S08). Use of plastic strapping ("Quick-Tie", Zap-Strap") can damage cables and cause leakage/corrosion and failure. Use of these ties voids warranty.

### Connectors

Apply a small coating of grease, such as *Dow Corning*® *4 Electrical Insulating Compound* onto the contacts of the boom microphone, transducer and headset plugs.



If your model has the OPTION-WP-EXP external connectors for case-closed operation, then apply grease lightly to the rubber parts only of the water proof connectors. Avoid filling the connector holes completely with grease as this will tend to resist proper connection when pressing the connectors together. Conversely it is also important that grease does not completely wipe off the rubber parts as this will cause wear. Therefore, regular maintenance should include the light application of grease to both parts of any open connector pair.

## **SPECIFICATIONS**

DIVELINK Surface Unit COM-S-x (All Models)	
Transmission ty	pe: Wireless ultrasonic. Upper or Lower Side Band, depending on Channel Code ordered. See page 16 for Channel Code chart with frequencies.
Transmission:	20 watts nominal acoustic output power.
Nominal Range: Calm Sea – 20 watt: up to 2000 Meters.	
Reception:	Automatic squelch and automatic gain over full operating range.
Audio:	5000Hz bandwidth, 120 dB dynamic range. Splash Proof Front Panel Speaker.
Replaceable Parts: Or Alternative:	<ul> <li>MIC-S08 Hand held microphone</li> <li>EAR-MIC-S08 Optional Noise Reduction Headset (comes with MIC-S01 boom microphone) EAR-MIC-SNM replacement headset without microphone MIC-S01 replacement boom microphone</li> <li>XDR-S08 transducer with 55 ft cable</li> <li>BAT-S08 rechargeable battery pack (3 required); 5 Amp Hour Gel-Cel lead acid.</li> <li>CHG-S08-UNIV universal charger for BAT-S08.</li> <li>of 6 Volt 18000 mAh Alkaline Lantern Batteries (not included), Energizer brand part # 529 or equivalent. Do NOT use non-alkaline (carbon) type flashlight cells, they have inadequate power output.</li> </ul>
Order parts at	http://www.divelink.net/purchase/wireless-surface-unit
Operation:	Over 24 hours operation using 18000 mAh <b>Alkaline</b> batteries, 16 hours using BAT-S08 rechargeable, (with 5% overall transmit time).
Warranty:	One year warranty.
Housing:	Heavy Duty Pelican 1450 case.
Dimensions:	Approx. 16" L x 13" W x 6 7/8" D
Weight:	Approx. 13 lbs with batteries and accessories.

## WARRANTY

## Period and Coverage

The manufacturer warrants the Surface Unit for a period of one year from the original date of purchase, to be free of defects arising from material or craftsmanship used or provided by the manufacturer, provided that: The unit is used under normal conditions, and in compliance with the operating instructions set out in this manual (see the *OPERATION* and *MAINTENANCE* sections), by the original owner.

The unit is not used for purposes other than those for which it was designed, or otherwise is not abused, misused, or subjected to unusual conditions. No unauthorized attachments or modifications are made to the unit.

Should the unit prove to be defective within the warranty period, it will be repaired or replaced free of charge, at the election of the manufacturer, excluding shipping and handling charges.

## Transferability

This warranty is non-transferable and is solely for the benefit of the original purchaser.

## Limitations

This warranty is voided in the event that service or repairs to the unit are not performed by the DIVELINK factory.

This warranty specifically does not extend to damage to the unit caused by improper maintenance, modification or tampering.

## DISCLAIMER

The unit is intended for use only by certified SCUBA divers who are aware of and trained to deal with the risks and hazards associated with diving. The unit is not proclaimed or intended to be used as a substitute for safe diving practices. It is the personal responsibility of anyone operating the unit to ensure that they and their partner(s) observe all rules of their certification training.

The manufacturer, its distributors and retailers make no warranties, either expressed or implied, with respect to the unit, or this owner's manual, except for those stated earlier.

It is expressly understood that in purchasing or using the unit, the purchaser or any other person who uses it accepts it "as is", with the entire risk as to its quality, performance, merchantability, or fitness for any particular purpose resting with the user. These conditions exclude replacement of defective parts as required by the original purchaser in the first year after purchase, as described in the *Period and Coverage* section.

 $(\mathbf{i})$ 

Important!: By purchasing the unit, it is agreed and understood that in no event will the manufacturer, its distributors or retailers be held liable for any personal injuries arising from its operation, or for any damages whether direct, indirect, incidental, or consequential, even if the manufacturer, distributor or retailer have been advised of such damages.

## SERVICING

## **Contact Information**

Shipping Address: DIVELINK Underwater Communications Ltd. 300-1095 McKenzie Avenue, Victoria, BC Canada V8P 2L5

Telephone: 1-250-479-4868

E-mail: sales@divelink.net

Internet Web Page: www.divelink.net

## Warranty/Repair Conditions

Any defect of the unit in workmanship or material, as covered in the *WARRANTY* and *DISCLAIMER* sections of this manual, and discovered within one year from the date of purchase, must be promptly reported to the DIVELINK factory.

No product returns will be accepted by the factory without a Returned Merchandise Authorization (RMA). The factory provides the RMA number and shipping instructions to the owner, who returns the defective part, freight prepaid, to the factory (see the section entitled *Sending Procedure*).

DIVELINK will repair or replace the defective part at no charge, within a reasonable time, as it deems necessary.

## Sending Procedure

Inside the box in which you are sending the defective part, provide the following on a single sheet of paper:

- RMA number
- Your complete shipping address (no Post Office [P.O.] box numbers)
- Your phone number (with area code)
- Description of the problem for each part being returned (as detailed as possible)