

UM-8360

User Manual for BlueComm 100

Issue A Rev 2

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Note



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The amendment history records all amendments and additions made to this manual.

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Section 1 – Introduction

1.1 Scope of this Manual

This user manual defines the setup and operation of the Type 8360 BlueComm 100 High Ambient Light (HAL) optical modem. The information and procedures within this manual are based on Sonardyne's experience and knowledge.

1.2 Purpose of this Manual

This user manual contains information for anyone involved with setting up and operating the BlueComm 100 optical modem using omMonitor software.

To make sure the safety of the installer and operator is maintained it is important that all warnings and cautions in *Section 2 – Safety* of this manual and in any additional manuals are read and fully understood.

1.3 Related Publications

To make sure the equipment is operated safely, a *Sonardyne Safety Manual* is supplied with this user manual. It is important that the *Sonardyne Safety Manual* is read and fully understood before proceeding with any activity on the equipment.

Table 1-1 Related Publications

Publication	Title
<i>Sonardyne Safety Manual</i>	<i>Operational and Safety Precautions</i>

1.4 Conventions

Table 1-2 Conventions used in this Manual

Format	Convention
Boldface Type	User Input, Menu Options, Keys, e.g. Click OK
Arrow (>)	Selection of an additional menu item e.g. File > Save
<i>Italic Type</i>	References to Figures, Tables, Sections and other internal/external source

Section 2 – Safety

2.1 Introduction

Before any activity is carried out on the equipment, it is recommended that the included *Sonardyne Safety Manual* and all warnings and cautions in this manual are read and fully understood.

It is recommended the operator complies with the Health and Safety Regulations applicable to the vessel and the region before operating this equipment.

Operators and service personnel must be familiar with the normal operating and safety procedures for subsea equipment.

Documentation must be consulted whenever a warning symbol is found on the equipment, in order to determine the nature of the potential hazard and any actions which must be taken.

If any additional equipment is used, any warnings and cautions in the equipment user manual must be read and fully understood.

If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

The safety of any system incorporating this equipment is the responsibility of the assembler of the system.

2.2 Safety Procedures

Before carrying out any procedure on the equipment, make sure all the following warnings and cautions are read and understood.

2.2.1 Warnings



Do not stare at the light source. Do not stare at exposed lamp in operation as this may be harmful to the eyes.

The Risk Group 2 (RG2) classification is for maximum exposure times between 0.25 seconds and 100 seconds. Optical radiation at this level is not dangerous due to humans' natural aversion response.

The Blue Light Hazard has been assessed in accordance with IEC/TR 62778 and has been classified as risk group 2 (RG2 - EN62471).



Personal protection. Appropriate protective equipment such as protective footwear, hard hat and gloves must be worn when handling or carrying out any procedures involving Sonardyne and other equipment.



Heavy Equipment. Many Sonardyne products and equipment types, such as transponders, transceivers, cable drums etc. require Manual Handling Equipment (MHE) for lifting due to their heavy weight. If MHE is not available, it is the responsibility of the operator to perform a manual handling risk assessment prior to carrying out manual lifting/handling. Refer to the individual equipment documentation for weight specifications.

2.2.2 Cautions



Risk of equipment damage. All instruments must be maintained according to their individual operating manuals. Failure to follow recommended procedures could result in instrument failure, and loss of system integrity.



Risk of Damage to Connectors and Seals. Failure to clean sand or silt correctly could result in damage to the connectors and O-ring seals.



Risk of Damage to Protective Coating. Do not use any abrasive brushes or sharp tools to clean the instrument and remove any marine growth as this will damage the protective coating and increase the risk of corrosion.

Section 3 – Technical Description

3.1 Description

BlueComm is a wireless, high speed optical communications technology that can transfer data underwater at broadband speeds. Using BlueComm allows the extraction of large amounts of data in an energy efficient manner and supports the transmission of camera imagery and high definition video in real-time.

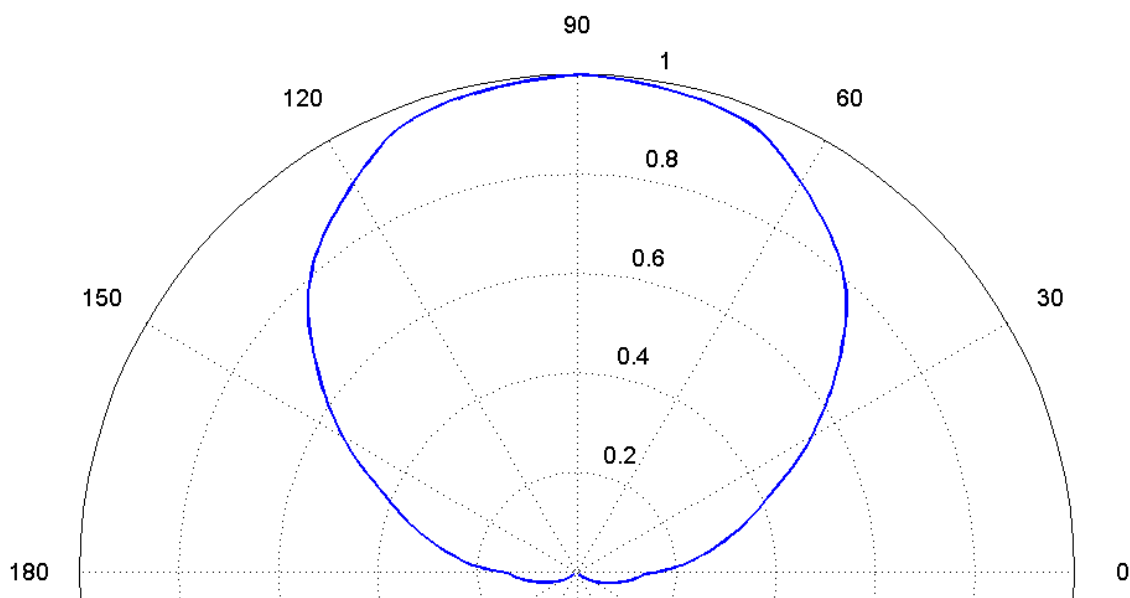
The Bluecomm system is configured and controlled using omMonitor software.

3.2 Optical Modem

The optical modem houses a combined emitter and receiver in a single, domed module. The receiver and emitter are multi-element and arranged to achieve a wide angle of operation. The emitter uses Light Emitting Diodes (LEDs) operating in the visible light band (blue). The LEDs are modulated using a digital code, at rates in the MHz band so the human eye perceives the emitter as constantly on. The emitter produces approximately 6 Watts of optical power when all LEDs are on. The BlueComm receiver uses silicon photodiodes to amplify only the received modulated light.

The BlueComm optical modem system is capable of bidirectional communication in high ambient light environments at 1.8, 2.5 or 5 Mbps data rates, over ranges of 0 to 15 meters, depending on water clarity. Communications with optical modems and across the optical link use standard 100BaseT Ethernet protocols. *Figure 3-1* shows the transmission pattern of the BlueComm optical modem.

Figure 3-1 Transmission Pattern of BlueComm Optical Modem



3.3 Hardware

3.3.1 Housing

BlueComm is encased in high strength titanium body with a bonded glass dome (see *Figure 3-2*).

Figure 3-2 BlueComm Optical Modem

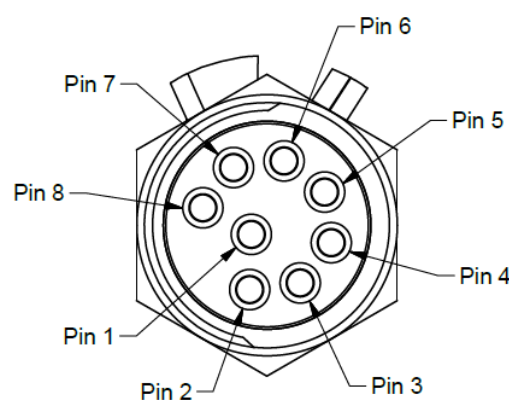


3.3.2 Connections

BlueComm uses a rear Subconn MCBH8F Titanium underwater connector for power and Ethernet communications. The connector details are shown in *Figure 3-3*.

Figure 3-3 Connector Pin Out

Main connector cable assy				
Subconn	Function	Ethernet	Wire colour	Molex
1	Ethernet Tx+	RJ45-1	White/Orange	
2	GND		Black 280-100A	2 & 4
3	Ethernet Tx-	RJ45-2	Orange	
4	Power 28VDC		Red 280-1024	1 & 3
5	not connected			
6	SCREEN			
7	Ethernet Rx+	RJ45-3	White/Green	
8	Ethernet Rx-	RJ45-6	Green	



3.3.3 Power

BlueComm is powered from an external 24–36 V DC power supply with a peak power requirement of 30 W.

Section 4 – Installation and Setup

4.1 Introduction

BlueComm can be configured and operated using the omMonitor software (supplied on DVD) and is designed to run on Windows® 7 and Windows® 8 operating systems.

omMonitor software should be installed on the PC prior to connecting the BlueComm. Knowledge of changing Ethernet adaptor settings will be beneficial.

4.2 Installing omMonitor Software

1. Insert the Optical Modem Monitor Software DVD into the PC DVD drive.
2. The installation procedure will start automatically. If for any reason it doesn't, navigate to and double click the **omMonitor.exe** file on the DVD.
3. Windows will prompt for a firewall exemption (the default option can be accepted and will work ok).
4. Follow the on screen instructions until the software installation has completed.
5. A shortcut can be created on the desktop by right-clicking **omMonitor.exe** and selecting **Send to > Desktop**.

4.3 Setting the PC IP address

The IP addresses of the BlueComm instruments come pre-configure to¹:

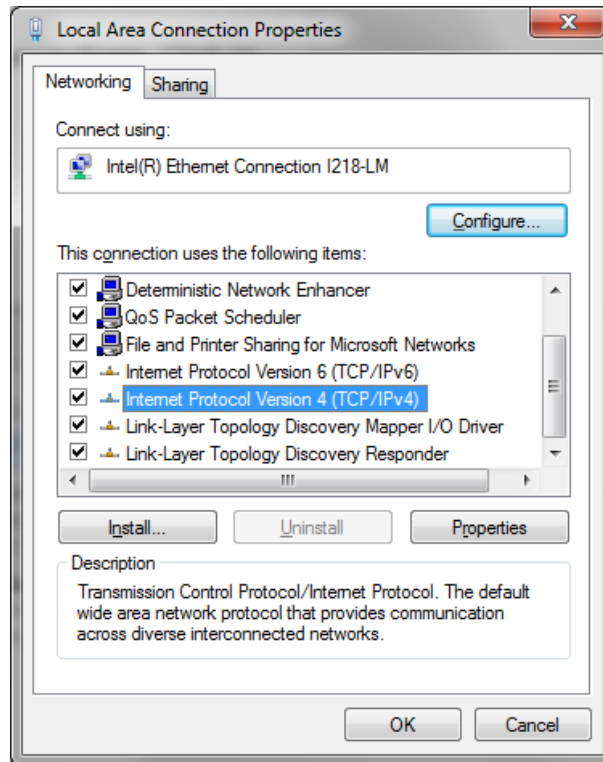
- Local IP address: 192.168.2.150
- Remote IP address: 192.168.2.50

Follow the instructions below to ensure that your PC's IP address is configured to the same subnet.

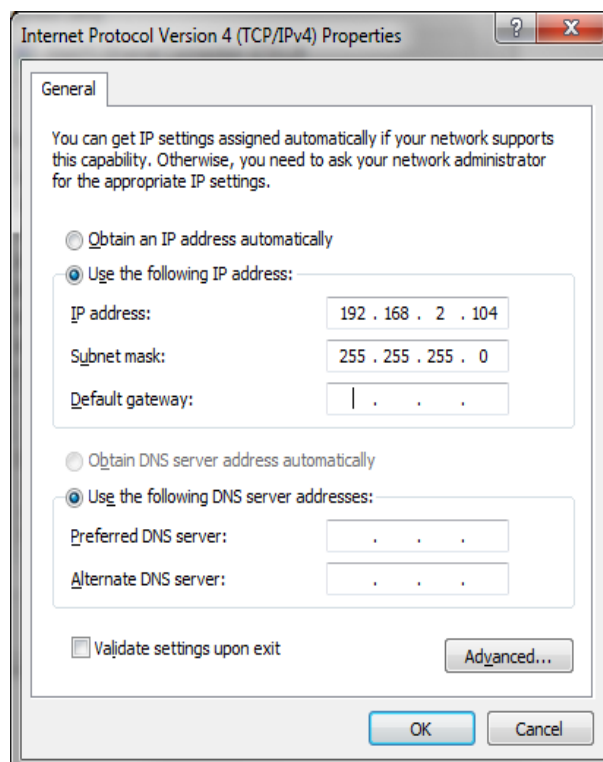
1. Open the **Control Panel** and click **Network and Sharing Center**.
2. In the left pane click **Change adaptor settings**, right-click the **Local Area Connection** (LAN) and then select **Properties**.

¹ The IP address of the BlueComm units can be changed using the omMonitor software

3. On the **Networking** tab click **Internet Protocol Version 4** and then click **Properties**.



4. Type the **IP address** and **Subnet mask** as shown below (this is the default IP address for the omMonitor software) and then click **OK**.



4.4 Powering the BlueComm

The BlueComm modems are rated up to 30 W each so a sufficiently rated Power Supply Unit (PSU) must be used.

1. Using the test leads supplied, connect the black jack plug to 0 V and the red jack plug to 24 V DC.
2. Connect the Local BlueComm instrument to the PC that has been configured with the correct IP address.
3. Position the BlueComm modems approximately 1 m apart with the dome facing toward each other. Turn the power to both BlueComm modems on, the LED arrays will flash during the start-up sequence.

Warning



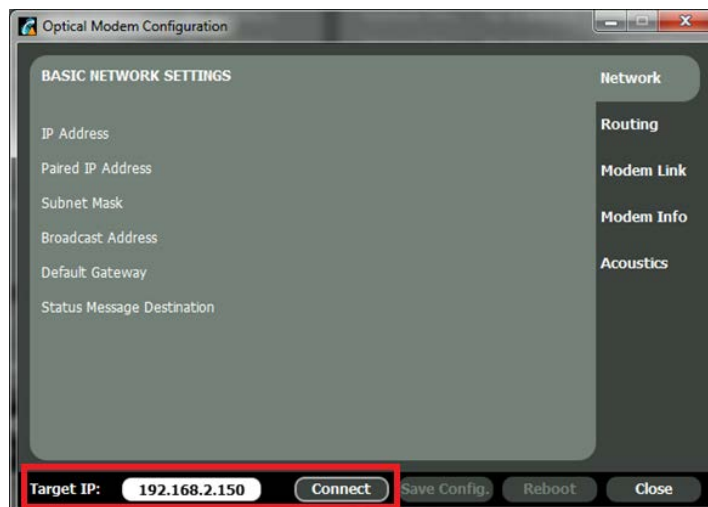
Do not stare at the light source.

4.5 Configuring omMonitor software

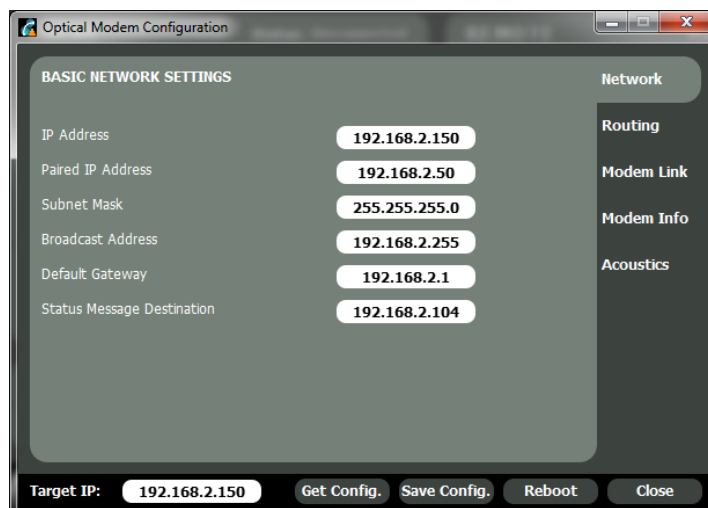
1. Start the omMonitor software and click **Configuration**.



2. Enter the Local IP address in the **Target IP** box and then **click Connect**.



3. When connected the **Basic Network Settings** window should appear as shown below.



4.5.1 Description of Network parameters

Item	Description
IP address	The Target modem's IP address.
Paired IP address	The IP address of the modem at the other side of the optical link from the Target modem.
Subnet Mask	The target modem's subnet mask.
Default Gateway	The target modem's default gateway.
Status Message Destination	The IP address the target modem will be sending status information to. This is typically the computer running the Optical Modem Monitor software.

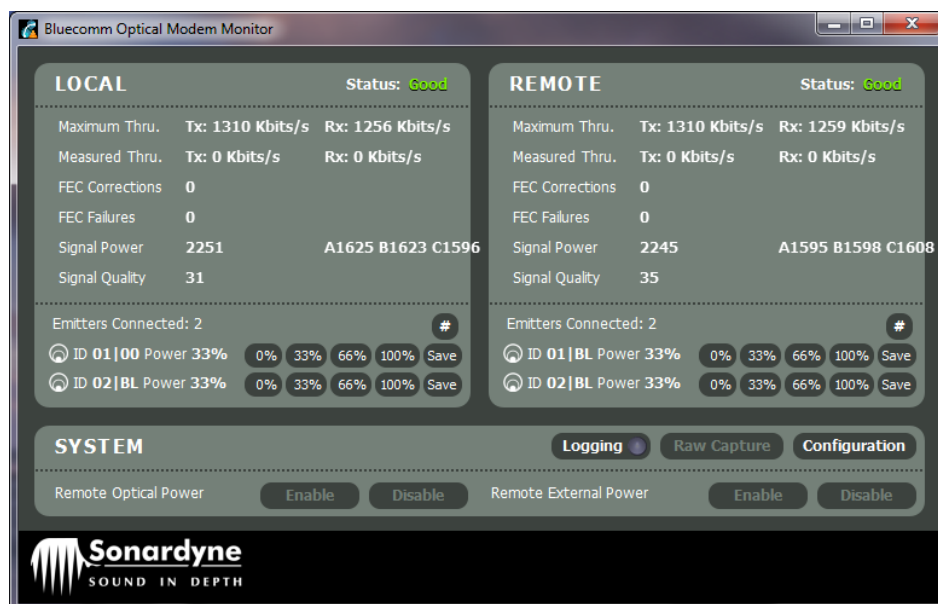
Note

 The "Status Message Destination" must be the same as the PC IP address to receive link information. Close the dialog box and check the link status on the main page.

4.5.2 Link Status

4.5.2.1 Good Link

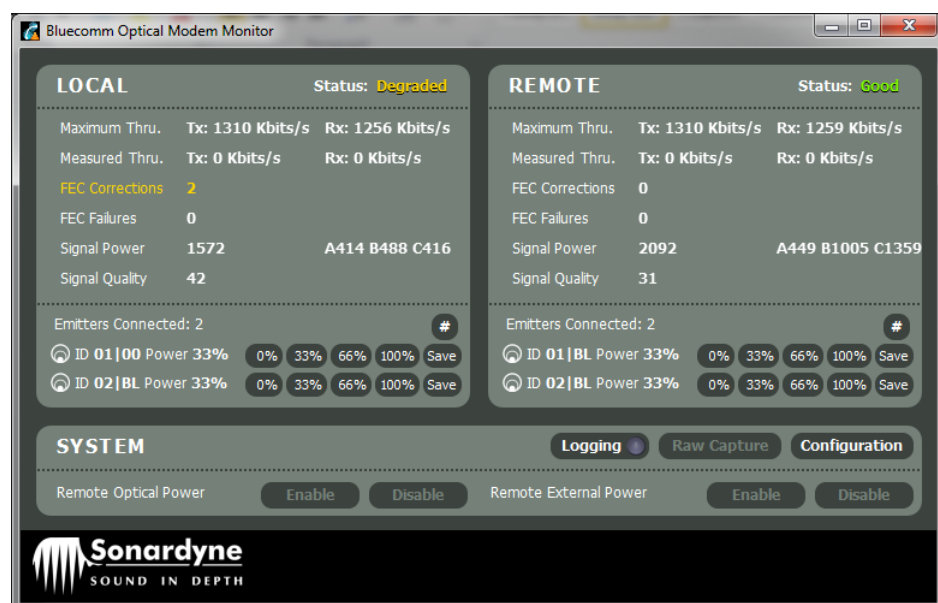
If the status indicates **Good**, the link is operating without any errors.



4.5.2.2 Degraded Link

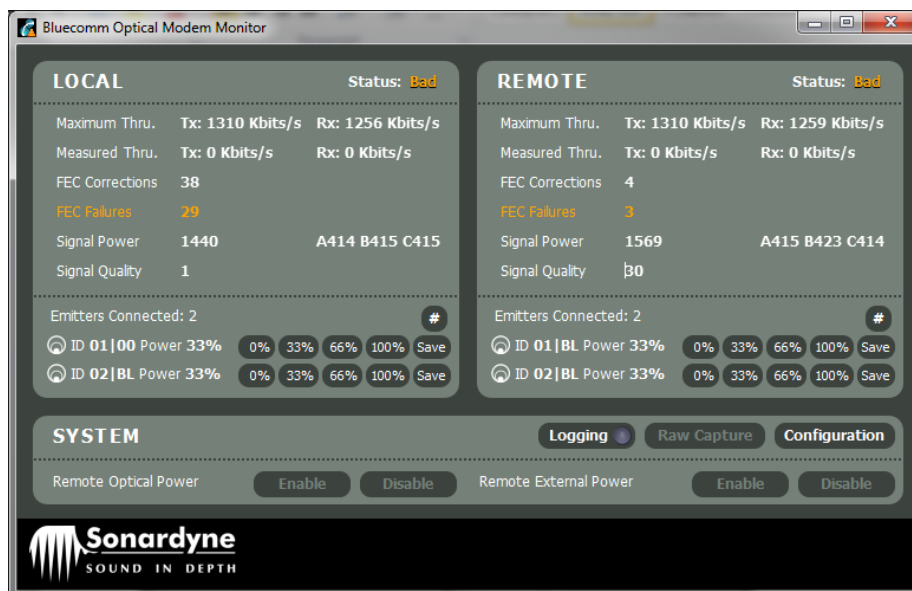
If the status indicates **Degraded**, the optical link is degraded and therefore errors are being detected and corrected in the data. The signal power (optical energy) is likely to be marginal for the data rate requested.

Either increase the optical power (in this case for the Remote unit as the Local is struggling to receive) or reduce the data rate; refer to Section 4.5.3 “Changing Optical Power” and Section 4.5.4 “Changing the Link Speed”.



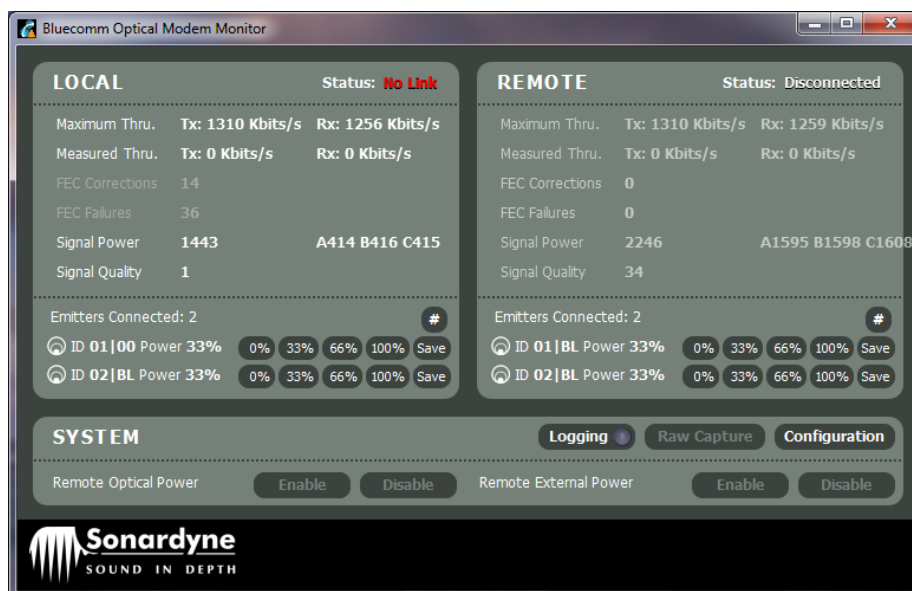
4.5.2.3 Bad Link

If the status indicates **Bad**, the optical link is failing to correct all detectable error, therefore data will be lost. Increase the optical power level and reduce the link speed; refer to Section 4.5.3 “Changing Optical Power” and Section 4.5.4 “Changing the Link Speed”.



4.5.2.4 No Link

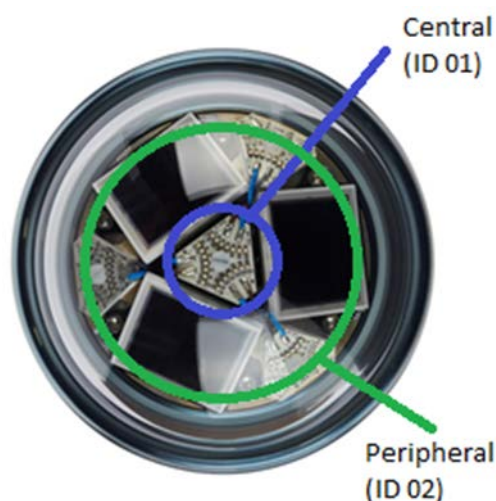
If the status indicates **No Link**, the optical link has failed to be established. Ensure both modems are operational and configured for the same link speed and transmission symmetry; refer to Section 6 – “Fault Diagnosis and Troubleshooting”.



4.5.3 Changing Optical Power

For energy efficiency, the minimum optical power should be used that provides a good optical link. However, operationally the link is likely to be used at maximum power, which is 100% on all emitters connected.

The optical power can be controlled using the percentage buttons as shown below. The emitters are split into two banks: Central (**ID 01**) and Peripheral (**ID 02**).



The settings shown above will have the all LED strings illuminated on the Central (ID 01) emitter on the local optical modem.

4.5.4 Changing the Link Speed

The **Link Speed** of the optical link can be varied depending on the desired operating range and conditions. Also, the data bandwidth **Sync Tx Symmetry Ratio** can be biased in a particular direction, e.g. 90% uplink and 10% downlink.

To configure the data bandwidth click on **Configuration** and then select the **Modem Link** tab. The **Link Speed** and bandwidth bias slider can then be set. Reducing the link rate increases the energy per bit and therefore the reliability of the link.

When setting the link speed it is recommended that the modems are configured independently using the **Set Target Modem** button. Using **Set All Modems** is reliant on the optical communications to being functional; therefore if the new link speed fails to work in the environment then direct configuration will be required.

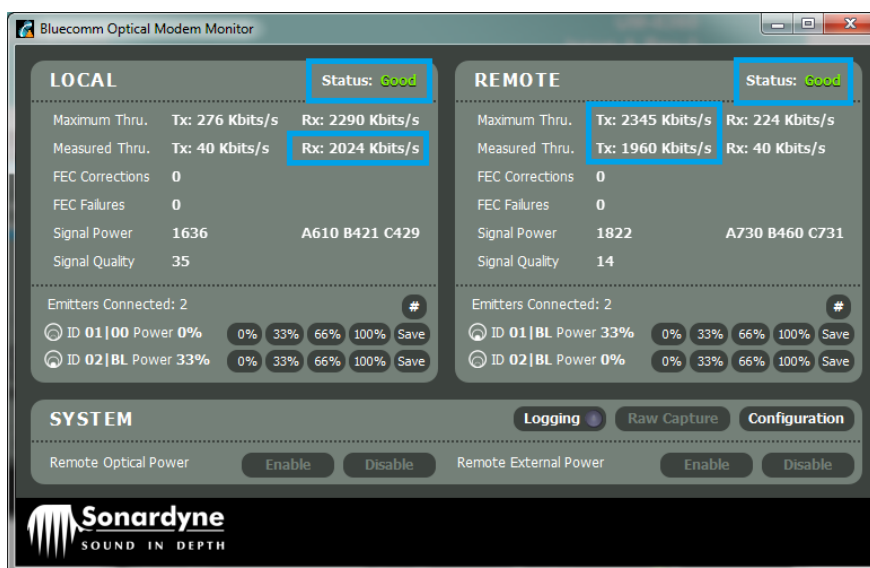


When the modem has been power cycled it will start using the start-up link settings, therefore it may be necessary to set the current link setting to the start-up condition to gain control of the remote instrument that has been power cycled. Once the link has been established the current setting of both modems can be changed.

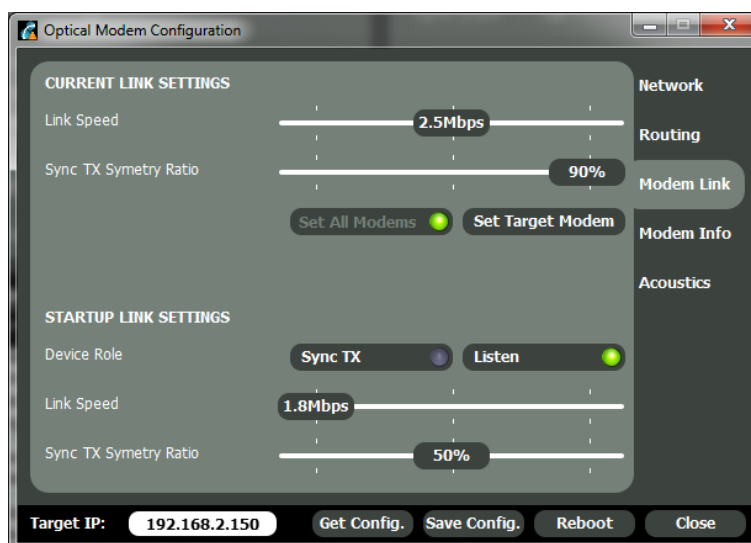
4.6 Connections – Example Setup

The setup example below demonstrates video transmission over the optical link using an IP Camera as shown in *Figure 4-1 BlueComm Test Setup*.

- Connect the Remote BlueComm to power supply and Ethernet to the IP Camera using the BlueComm test cable.
- Connect the Local BlueComm to power supply and PC using BlueComm test cable.
- Launch the omMonitor software and check the link performance and modem link settings window; see highlighted boxes.
- Launch a web browser and connect to the IP Web camera by typing the camera's IP address, which in this case is 192.168.2.100.



- Check the link performance and data throughput is within the specified link speed. Note the asymmetric configuration 2345 kbps uplink and 224 kbps down link.

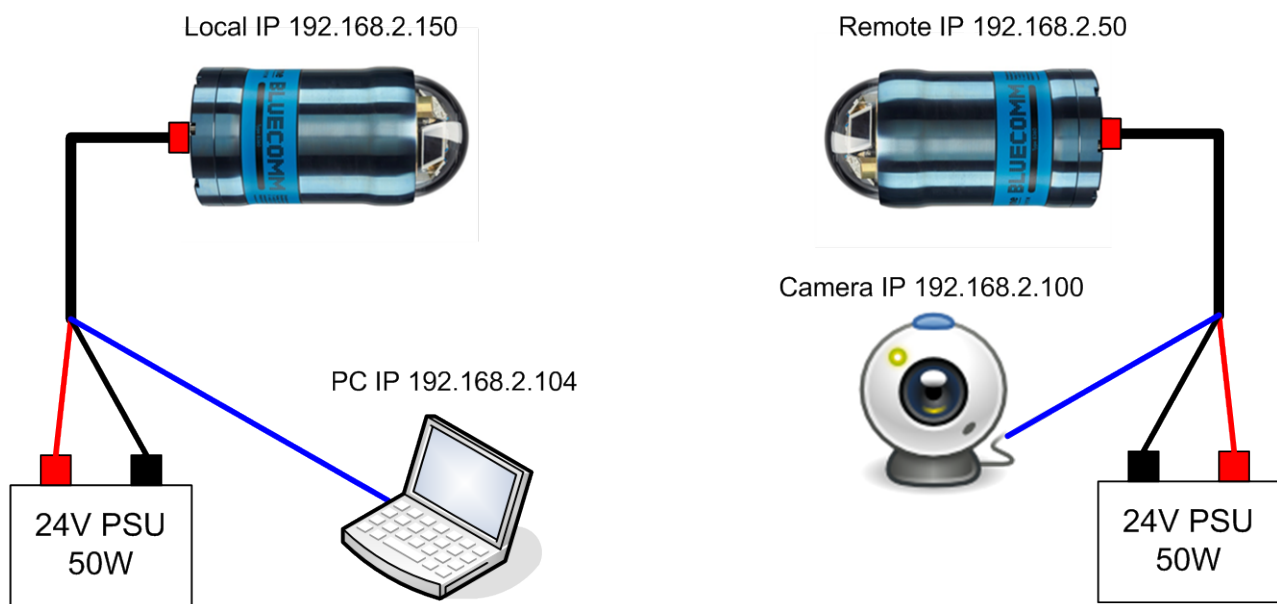


4.7 System Testing

The BlueComm system can be tested on land using the configuration shown in *Figure 4-1 BlueComm Test Setup*. Optical link performance can be affected by fluorescent and modern LED lighting and works best in natural light conditions or in the dark. If error conditions are observed under fluorescent lighting, the units can be brought closer together until a link is achieved.

For in-water deployments, the local and remote BlueComm units should be positioned in a line-of-sight arrangement.

Figure 4-1 BlueComm Test Setup



4.8 Optical Modem Limitations

4.8.1 Background Light and Noise

The optical modem receiver is negatively affected by background light and noise. The BlueComm system can operate with significant background light but will always operate better, over longer ranges and higher data rates when there is less ambient light. When in the presence of very high background light, it is best to use the highest emitter power level and lowest link rate.

4.8.2 Fluorescent Lighting

Fluorescent lamps operate at frequencies that reduce the effective range of the BlueComm modems. Error free operation is typically possible at ranges of 2–3 m at rates of 2.5 Mbps and less at 5 Mbps.

4.8.3 Air

Optical modems are designed to operate at maximum light levels when submerged in water. When operated in air it is recommended to reduce the output levels to 33 % or less. Temperatures are monitored in several locations and will automatically reduce output levels when the processor's temperature exceeds 60°C or the emitters exceed 70°C.

Section 5 – Operation

5.1 Introduction

Before operating the equipment, make sure **Section 2 – Safety** is read and fully understood.

Once the modems have been deployed they can be configured and controlled using omMonitor software (see *Section 5.3 “Using omMonitor Software”*).

The following section gives some useful information for using the modems.

5.2 Operational Guidelines

5.2.1 Communications Link

The BlueComm optical modem’s communications link enables operation in shallow waters, in the presence or absence of daylight. A near-line-of-sight geometry between emitter and receiver is required, at typically less than 10 meters separation between the optical modem pair. If the communications link is marginal, refer to the optical power readout, and adjust the modem range to increase the average power.

5.2.2 Bi-directional Communications using Time Division Multiplexing

Time division multiplexing (TDM) is a method for transmitting and receiving signals bi-directionally by reserving a specific time segment for each direction of communication. During TDM, the optical system provides a constant bandwidth channel with pre-allocated transmit and receive windows. During a transmit window the optical modem will always transmit empty packets even if no data payload is present.

The BlueComm optical modem uses the TDM architecture described above. In a bidirectional optical link both ends are made up of a BlueComm optical modem. One modem, known as the synchronization transmitter (SYNC_TX), is configured to always transmit during its transmit period, and to stop transmission during its receive period. The other modem, known as the listener (LISTENER), waits to receive the transmitted packets from the SYNC_TX, and aligns its transmission window to occur when the other unit is receiving.

5.2.3 Local

The label “local” is used to describe the end of the optical link with direct Ethernet connectivity. The user interfaces with the optical system at the local optical modem, where command and control of the optical link originates. This connection may be high speed in the case of a fiber optic link(> 10 Mbps) or low speed in the case of a synchronous digital subscriber line (SDSL) link(< 2 Mbps).

5.2.4 Remote

The label “remote” is used to describe the end of the optical link that communicates with the local end using the optical communications link. No wired communications with the surface are possible with the remote optical modem during operation.

5.3 Using omMonitor Software



Double-click the omMonitor icon to start the software. The omMonitor main window will open and is described in detail below.



5.3.1 Main omMonitor Window

Each system has its own pane displayed in the main window. The **LOCAL** pane displays receiver information such as: throughput, error count, signal power and signal quality. The **REMOTE** pane displays throughput and emitter information sent by the Remote system through the optical link, and allows emitter power levels to be set.

The **REMOTE** pane being permanently or intermittently greyed out usually indicates a poor optical connection between the Remote and Local systems.

If the **LOCAL** pane is greyed out while the **REMOTE** pane is not, the operator computer may be connected to the Remote system. Disconnect the Remote system and connect the Local system to the operator computer.

The **SYSTEM** pane contains buttons linking to the configuration windows as well as system power controls for Remote emitters and encoder.

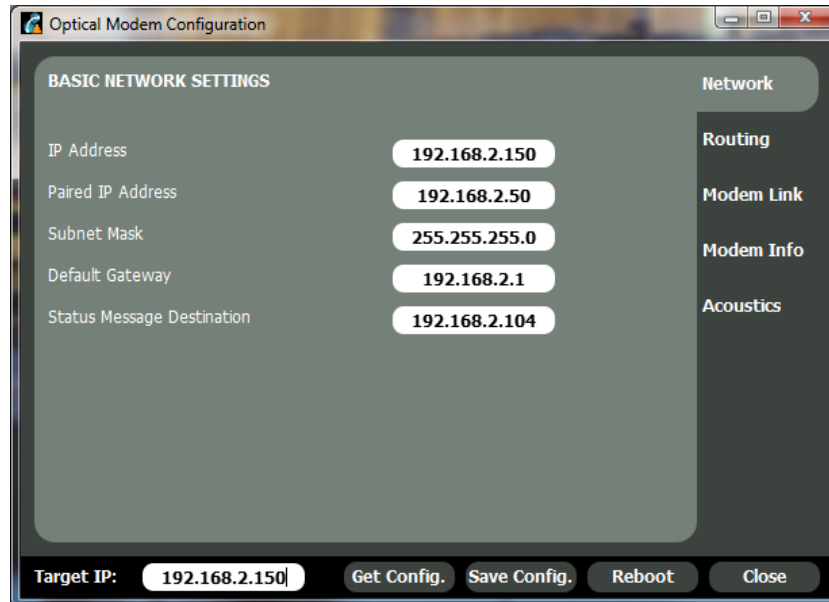
Note



For diagnosis and troubleshooting, see *Section 6.1 “Optical Link Diagnosis”*.

5.3.2 Network Tab

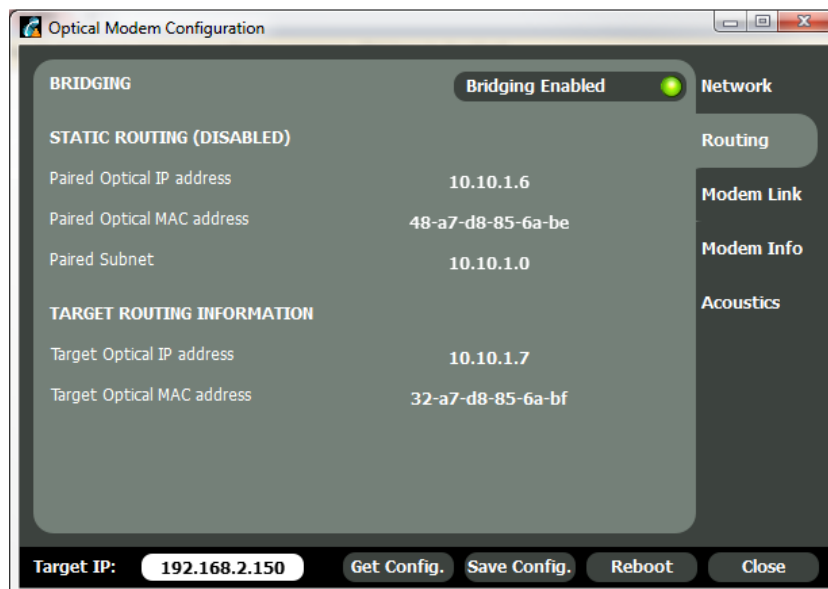
The Network tab allows the network settings to be changed in relation to the external interface. The Network tab is described below.



Item	Description
IP address	The Target modem's IP address.
Paired IP address	The IP address of the modem at the other side of the optical link from the Target modem.
Subnet Mask	The target modem's subnet mask.
Default Gateway	The target modem's default gateway.
Status Message Destination	The IP address the target modem will be sending status information to. This is typically the computer running the Optical Modem Monitor software.

5.3.3 Routing Tab

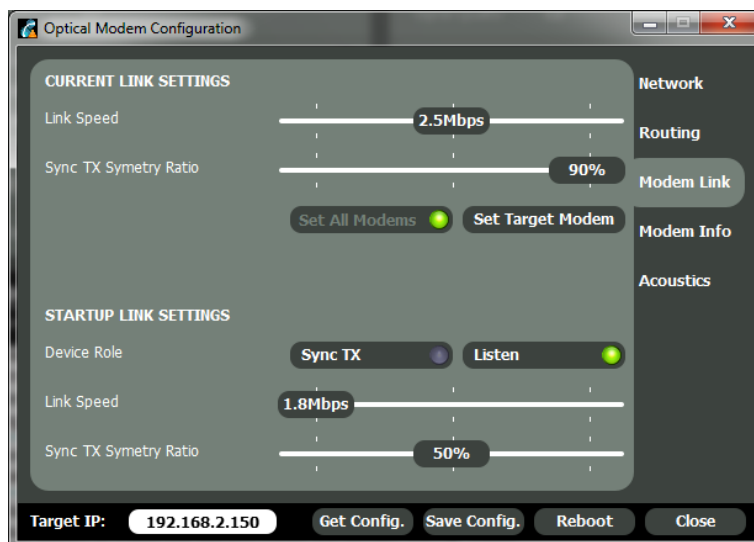
The Routing tabs allows advanced networking options to be configured for the optical modem relating to the forwarding mechanism used to transfer data from one unit to the other. When bridging is disabled, the **STATIC ROUTING** section allows setting of static routing parameters. The **TARGET ROUTING** contains information needed for the static routing configuration of the paired device. The Routing tab is described below.



Item	Description
Paired Optical IP address	The target modem's optical interface's IP address. This value must match the Target Optical IP address of the modem the target modem will be paired with.
Paired Optical MAC address	The target modem's optical interface's MAC address. This value must match the Target Optical MAC address of the modem the target modem will be paired with.
Paired Subnet	The target modem's subnet.

5.3.4 Modem Link Tab

The Modem Link tab allows modem role and modes to be switched. Each mode defines the basic bit rate and transmit/receive bandwidth allocations for the system.

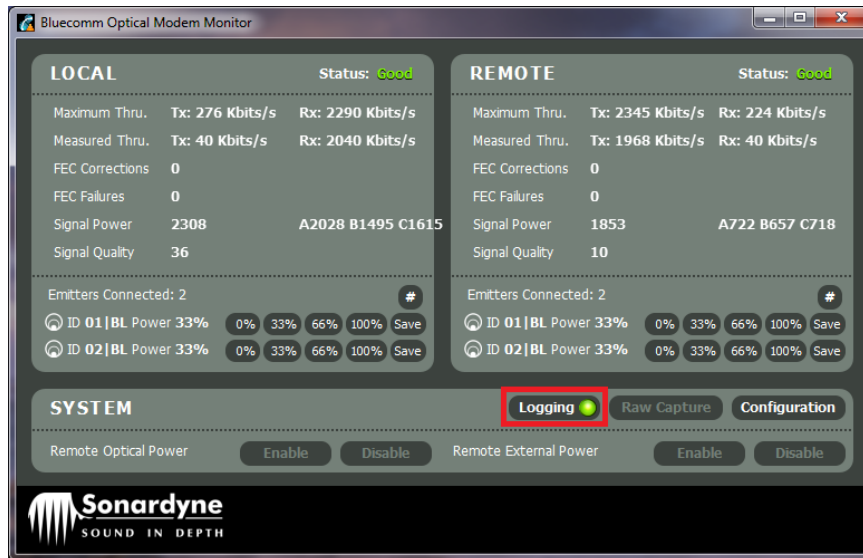


Item	Description
Transmission Modes	Switches transmission modes as well as force current mode and set default modes. In its startup state or if the operator edits the Target IP field, no modes are displayed.
Set Target Modes	Loads the modes available on the Target modem and displays them as a list with their associated controls. If the Target modem is already set up and communicating with its pair, the indicator on the Auto button of the mode the modems are in will light up green. Clicking the Auto button will automatically change both sides of the link to the new mode.
Startup Link Settings	This section displays the operating conditions on start up.
Device Role	Toggles the target optical modem between Sync TX and Sync Listen modes. This should typically be set as the opposite of the optical modem on the other side of the link.
Link Speed	Speed of the optical link – 1.8, 2.5 & 5 Mbps
Sync Tx Symmetry Ratio	This allows the link to be setup to provide symmetrical data bandwidth or bias towards the prominent data flow. For example a video camera requires a higher uplink bandwidth than downlink, therefore the Sync Tx Symmetrical Ratio would be set to 90% (uplink, 10% downlink).

5.3.5 Logging

Click on the **Logging** button to enable logging of diagnostic data to file. This file maybe requested by customer support in the event of configuration or operational issues.

The location of the file is: **C:\Users\xxxx\Lumasys OMM\log** (where xxxx is the user log on).

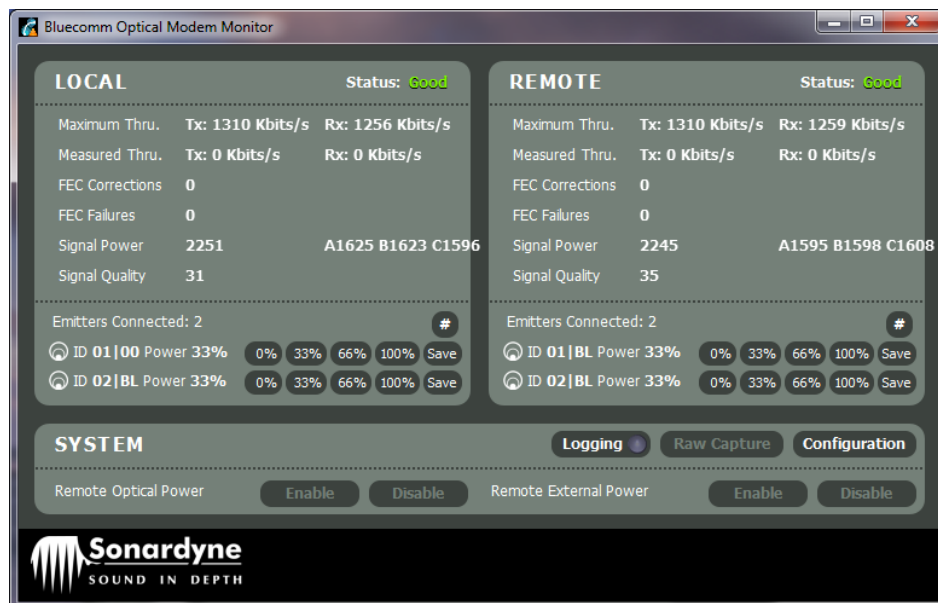


Section 6 – Fault Diagnosis and Troubleshooting

6.1 Optical Link Diagnosis

6.1.1 Optical Link Status Pane

The Link Information pane for the **LOCAL** modem displays detailed information about receiver performance.



Item	Description
Maximum Thru	Calculated maximum throughput values in both Tx and Rx directions based on TDMA scheduler settings. For a unidirectional Local receiver, maximum Tx throughput will be 0 kbit/s, as it is not equipped with emitters. These values give the operator an idea of what maximum link performance will be although it is not advised to stray too close to this limit(<200 Kbit/s) with loosely integrated network traffic.
Measured Thru	Actual sum of all data transiting through the optical link in each direction every second.
FEC Corrections	Number of Modulated frames per second the optical modem identified as being corrupted and was able to correct. This number becomes inaccurate once the FEC Failures value becomes non-null.
FEC Failures	Number of Modulated frames per second the optical modem logic identified as being corrupted but couldn't correct modulo 256. Once it starts increasing, this value rapidly becomes confusing and should only be used as an indication that the link is unusable.
Signal Power	Peak received optical signal power, measured in radiometric units of Watts. Typical values for a good optical link are in the micro-Watt region.

6.1.2 Optical Link Troubleshooting

The Link Status indicator at the top of the **LOCAL** modem pane allows the operator to gauge link quality at a glance using five states as described in *Table 6-1*.

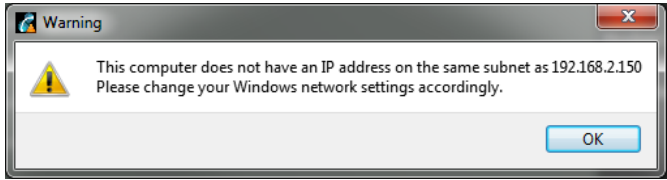
Table 6-1 Optical Link Troubleshooting

Link Status	Description	Remedy
 No connection:	This is the state the software starts in and indicates no status information is being received.	- Check Local modem power and connectivity. - Verify that the Operator IP address entered during the Local configuration process is correct.
 Bad connection:	This state indicates the Local modem is unable to decode an error-free signal.	- Check that Remote modem power is on. - Check light path from the Remote modem to the Local modem. If in free space, reduce distance or increase emitter power. - Verify that the receiver (Local modem) is not operating in artificial high ambient light conditions (office lighting, vehicle lights). Modulated high ambient light (i.e. fluorescent ballast) can interfere with the signal-modulated light. Extremely bright ambient light, as in direct sunlight exposure, will temporarily saturate the receiver.
 Degraded connection	This state indicates the Local modem has detected and corrected errors present on the signal. The FEC Corrections field should be higher than 0. It is possible for this state to be displayed during normal operation and may be ignored, although extended operation in this state indicates that the optical signal SNR is too low for error-free demodulation and remedial action should be taken, as in the case of a "bad" connection, above.	As Above.
 Good connection	This state indicates the Local modem hasn't detected any errors. This is the state the system should be in the majority of the time.	N/A
Emitter Pane	The Emitter pane allows the emitter status to be monitored and modified. Each connected emitter can be set to 0%, 33%, 66% and 100% power. The save buttons saves the current state of an emitter as its start-up mode.	- Setting all emitters to 0% will break the optical link. - It is possible to saturate the receiver and degrade reception at close ranges at full emitter power. - Acoustic Downlink must be enabled in order to send commands to a Remote unidirectional system.

Like the Local modem pane, the Remote modem pane features a Link Status indicator, as well as an emitter pane

6.1.3 General Troubleshooting

Table 6-2 General Troubleshooting

Problem	Remedy
Cannot ping the BlueComm Optical Modem.	- Make sure the correct IP address is being pinged. If the IP address has been lost, refer to the relevant entry in the troubleshooting guide. - Make sure the device is powered up. - Make sure the device has a proper Ethernet connection towards your computer. - Disable Windows Firewall. - Try pinging the device using another computer.
Lost the optical modem's IP address.	- Using Wireshark (available for free at www.wireshark.org) or another Ethernet packet parser, listen on the network interface device the optical modem is connected to. Turn off all other optical modems likely to be physically or optically connected to your computer to minimise confusion. - UDP packets whose payload start by ASCII characters "10," (parenthesis's excluded) are likely to be coming from the optical modem. - If no UDP packets are being seen, locate unexpected ARP requests.
Cannot change an IP address field in the Monitor software.	- This is a side effect of the field validation mechanism that prevents operators from entering invalid IP addresses in the system. To get around this, always make sure to leave a number in each IP address field. - Example: 192.168.3.10 -> 192.168.5.10. I cannot delete the 3 number and type 5 in its place. - Solution: 192.168.3.10 add 5 digit -> 192.168.35.10 remove 3 digit -> 192.168.5.10
The Configuration window states that no IP address on the computer match the Target's IP address subnet.	Make sure that the value in the Target IP field is correct, or change the IP address for the network peripheral used to communicate with the modem in Windows to be on the same subnet as the Local system, such as the operator IP address (multiple IP addresses can be registered for the same peripheral). 
Nothing changes in the configuration window after I click Connect.	- Check that the Target IP address is valid. - Click Connect again as it may get more than one request to fetch data from the modem.

Section 7 – Retrieval and Storage

7.1 Retrieval

1. After use thoroughly clean the BlueComm in clean fresh water to remove all accumulation of salt, sand and silt.
2. Remove any accumulated marine growth.
3. Dry the BlueComm with a lint free cloth.
4. Inspect all cables and connections for signs of abrasion, cracks or splits.

7.2 Storage

On completion of all checks in the previous section the BlueComm can be placed in storage as described below. Refer to *Table 7-1* for the recommended storage conditions.

1. Store the BlueComm in its transit case.
2. Equipment must be kept in a dry, non-condensing atmosphere (20% to 80% humidity), free from corrosive agents and isolated from sources of vibration.
3. The packaging should be stored on solid, level and damp proof floors. It must not be stored directly on damp or dirt floors or areas prone to flooding. In this case suitable shelving raised off the floor should be used.
4. It is recommended to visually inspect the equipment at least annually.
5. When equipment is taken from low temperature storage for immediate use its temperature should be raised to normal operating temperature before use.

Table 7-1 Storage Conditions

Item	Specification
Storage Temperature	-20 to 55°C
Relative Humidity	20 to 80% (non-condensing)

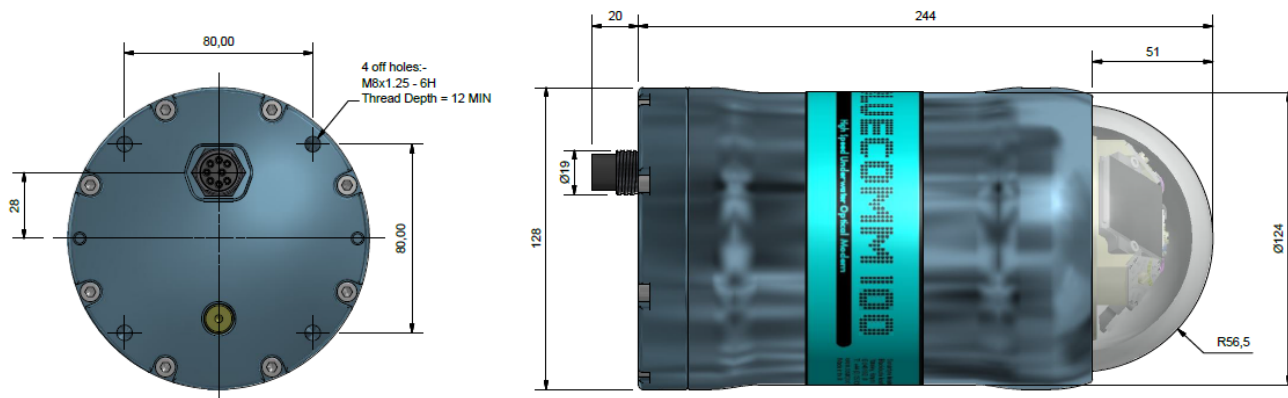
Section 8 – Technical Specifications

8.1 Specifications

Feature	Specification
Depth Rating	4,000 m
Data Rate	1–5 Megabits Per Second
Optical Communication Range	0–15 m
Materials	Titanium and Glass Dome
Supply Voltage	24–36 V DC
Rear Connector Type	Subconn MCBH8F Ti
Communications Interface	10/100 Base-T Ethernet (Static IP Address)
Power consumption	10–30 W (Dependent on Transmit Ratio)
Command Interface	Graphical User Interface / UDP Command Set
Communications Type	Bidirectional, Time Division Multiplexing
Optical Transmit Power	6 W (Radiometric)
Optical Wavelength	450 nm (Royal Blue)
Emitter Beam Pattern	60° (Half Angle)
Receive Beam Pattern	60° (Half Angle)
Dimensions; Length x Diameter	264 mm x 128 mm
Operating Temperature Range	-5 to 40°C
Storage Temperature Range	-20 to 55°C
Weight in Air/Water	5.2/2.4 kg

8.2 Dimensions

Figure 8-1 BlueComm Dimensions



Definitions

Term	Definition
ASCII	American Standard Code for Information Interchange
Acoustic Modem	Describes either the acoustic modem in its own pressure housing on the Lander or on the ROV
FEC	Forward Error Correction
GUI	Graphical User Interface
HAL	High Ambient Light
IP	Internet Protocol
LAN	Local Area Network
Lander	Video camera system with battery power that includes optical/ acoustic telemetry. This system is deployed on the sea floor, and streams video through the water over the optical link to an ROV
LED	Light Emitting Diode
Listener	Optical modem that is always listening. No transmit for unidirectional applications
Local	Optical modem with direct connectivity
Long Range OM RX	Lowered optical modem used to receive with a PMT under its dome
Long Range OM TX only	Optical modem used on Lander with 42 LED emitter under dome
MAC	Media Access Control
PMT	Photomultiplier tube
PSU	Power Supply Unit
Remote	Optical modem with connectivity through optical/acoustic link
SDSL	Synchronous digital subscriber line
SNR	Signal to Noise Ratio
Sonardyne	Sonardyne International Limited and its affiliates
SYNC_TX	Synchronization transmitter. Optical modem that is always transmitting
TDM	Time Division Multiplexing
UDP	User Datagram Protocol

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