



Newsletter – *May 2016*

# ASB Systems Pvt. Ltd.

## Can we Talk?

Communication is life,  
Without it, a Dodo.

Well, who says that only living beings communicate? Machines can communicate too, and it is not limited to the Robot controlling entity from Terminator movies. In fact, Modems have been “Determinators” of mankind’s progress. We users have been oblivious of their existence, even though Modems, communicating devices, have been an integral part of our lives for decades.

We know them as “Modems”, an abbreviation for “Modulators-Demodulators”. Widely used for Internet communication, today the so-called Wi-Fi routers are just an extension of these Modems. Our Mobile phones are modems, which convert voice into an electronic format and further into a wireless signal, which can then be transmitted onwards to a Cell site, and vice-versa.

Without Modems, we would not have any form of electronic communication. We would just have “deaf-and-dumb” machines like Vacuum cleaners, Toasters or Washing machines. No Phones, TV or Internet.

So in this issue of our Newsletter, we will discuss Modems. And the Modem that we are going to present here is no ordinary one...it is capable of communicating Underwater...yes, we are talking about Underwater Acoustic modems!

## In this issue...



The Humble  
De-terminator  
Modem



The Multi-  
purpose  
Modem



Making a  
Choice for the  
right Modem

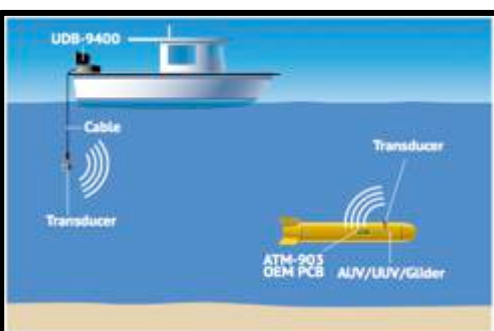
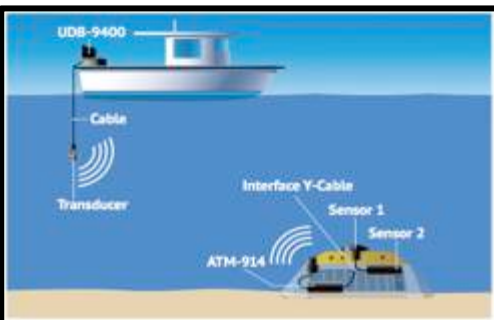
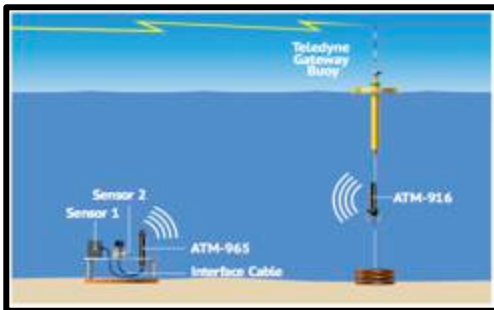


LBL  
Application &  
Enhanced  
Data logger

## Teledyne Benthos Modems are used for underwater communication

They are designed to move 144 character messages, in one direction at a time, ie. In bi-directional Half Duplex mode. These modems support a bit rate of 80 to 10k. Ranges are frequency and condition dependent, from approx 1000m till more than 6000m. They can provide range measurement at 0.5m resolution with every transmission.

These modems are not built to support video streaming and 4G networks under the sea!



## APPLICATIONS

### Oceanographic

- Real-time command, control, and acquisition of data from underwater instrumentation
- Acoustic Doppler Current Profiler
- Current meters
- Tide gauges

### Offshore Oil/Gas Industry

- Command, control, and acquisition of data from remote underwater instrumentation
- Long range, low frequency communication with remote wellhead location
- Wireless communications between platform and sea floor instrumentation

### Ocean Research/Ocean Studies

- Ocean observatories
- Trawl Resistant Bottom Mount (TRBM)
- CTD instruments
- Acoustic Doppler Current Profiler

### Vehicle Communication

- AUV/UUV glider communication
- Autonomous Ocean Sampling Network communication (AOSN)

Modem applications include remote monitoring of oceanographic sensors, control of wellhead and pipeline valves, positioning and subsea networking.

Benthos modems are designed to meet both high data rate requirements and higher reliability, lower data rate requirements.

Teledyne Benthos Underwater Acoustic Modems are used worldwide in subsea applications to transmit your data wirelessly through water. The Teledyne Benthos ATM-900 series Acoustic Modems are a major enhancement to previous modem lines offered. The new ATM-900 series provides a long list of special purpose, flexible extensions supporting multiple capabilities beyond “just” underwater communications. These capabilities range from high capacity data logging, through updated data storage and user command line interfaces to real-time clock integration. Each surface unit can operate using cables from 2m to 200m with a mating transducer for each cable.



**Operational Frequencies**

- LF (9-14 kHz)
- MF (16-21 kHz)
- Band C (22-27 kHz)

**Transducers:**

- Omni
- Directional
- Integrated
- Remote



Depth ratings up to 6000m

Advantage	Modem type	Limitation
<ul style="list-style-type: none"> <li>• Suffers from less attenuation, provides longer ranges up to 6000m</li> <li>• Can be used in Noisy environments</li> </ul>	LF - Low Frequency 9-14 kHz	<ul style="list-style-type: none"> <li>• Prone to Multipath reflections due to higher power outputs</li> <li>• Can interfere with common acoustic systems working around 12 kHz frequency</li> <li>• Fairly large transducer size of 10cm diameter</li> </ul>
<ul style="list-style-type: none"> <li>• Allows longer ranges up to 5000m, and yet is out of the frequency range of other long range acoustic systems like Echosounders</li> </ul>	MF - Medium Frequency 16-21 kHz	<ul style="list-style-type: none"> <li>• Comparatively large transducer size of 7.5cm diameter</li> </ul>
<ul style="list-style-type: none"> <li>• Small transducer size, suitable for u/w vehicles</li> <li>• More robust communication due to lesser multipath (due to its low power)</li> </ul>	Band C 22-27 kHz	<ul style="list-style-type: none"> <li>• Limited range</li> <li>• Low power output</li> <li>• Limitation to use in noisy environments</li> </ul>

## Application Extension: LBL

SMART MODEM ACOUSTIC RELEASE TECHNOLOGY (SMART) is a unique concept from Teledyne Benthos that combines the proven technology of an underwater acoustic release with the reliable undersea communications functionality of an acoustic modem.

The SM-975 supports all the most current optional features of the Teledyne Benthos underwater acoustic modem line such as: In-band acoustic recorder, arbitrary waveform playback, LBL operations, and high capacity data logging. This self-buoyant modem features the ATM-900 Series modem electronics, batteries and a transducer, all housed in a glass sphere with an updated burn wire release mechanism. The acoustic modem allows the user full telemetry capability to full ocean depth, with RS-232 connectivity to attached sensors.

The SM-976 is similar in design to the SM-975 and is primarily intended for short deployments. The SM-976 features rechargeable lithium ion batteries and comes in a convenient storage/transport case that includes a battery charger and complete spare parts kit. The SM-976 is an ideal product for use as a node in a long baseline (LBL) positioning system or as data collection instrument.



## Value Addition – Enhanced Data Logger

Benthos modems also offer a data logging capability for recording output from the external sensors, as well as a sophisticated query language that allows great flexibility in retrieving logged data, whether acoustically or via direct serial connection.

Benthos modems have long had a data logging facility, but as of firmware release 8.6.0 on the ATM-900 series platform this functionality was greatly enhanced to give end users many more options for logging and retrieving their sensor data. Here are some of the benefits the enhanced data logger offers. Maximum data buffer size increased from 704KB to 6MB (standard) or 4GB (with optional SDHC card interface) Data may be partitioned into individual records of up to 4KB in size. This can be of help in the following cases:

- Case 1: A sensor unit attached to the modem that outputs variable-length records every half hour
- Case 2: A sensor unit attached that outputs digests in which individual data clusters are separated by a newline ("`\n`", ASCII 10 or 0x0A) character
- Case 3: A sensor unit outputs a regular stream of data that it is desirable to group into 256-byte chunks
- Case 4: Two sensor units are attached to a single modem, both outputting bursts of data at regular intervals

Do contact us for further details for the exact working of this amazing technology.



Positioning – DGPS

Subsea Positioning – DVL, USBL

Heading – Dual Antenna GPS

Inertial Measurement Sensors

Bathymetry – Singlebeam & Multibeam

Echosounders

Survey Software

Currents and Discharge measurements

Scientific Echosounders

Motion Sensors

Dredging – Real-time monitoring, Graviprobe

Sub-Bottom Profiling

Underwater communication – Modems, Acoustic Release

Underwater Imaging – Offshore, Structural inspection, Underwater Vision solutions

Geophysical Survey systems

Water Quality sensors and probes

Surface Current measurement

Buoys, Floats, Instrument housings, Bottom mounts, Mooring systems

