

# DIGITAL THIN LINE ARRAY



The Seiche Digital Thin Line Array is a high-performance, miniaturised underwater acoustic measurement device for static and low-speed towed monitoring applications.

## A STATE-OF-THE-ART SYSTEM

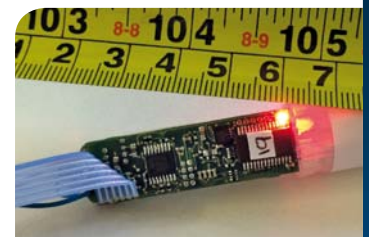
Developed using Seiche's proven expertise as a world-leading acoustic solutions provider, this array can be tailored to individual requirements and deployed as a cost-effective method of offshore monitoring.

## DIGITAL ACQUISITION 'DAQ' MODULES

At the heart of the system, and measuring just 22 mm in diameter including over-connectors, the Seiche-designed array housed within the acoustic section can incorporate up to 32 (or upgraded to 64) digital hydrophone sensors.

Each hydrophone has an integrated miniaturised low noise amplifier and a 20 or 24 bit A/D convertor. Due to the fact that the signal is digitised prior to significant transmission, a high signal to noise ratio is achieved. Gain is configurable in real-time and the system also allows the low cut filter to be adjusted. Specific frequencies can be targeted for detection – such as aircraft locator beacons.

Modules acquiring environmental and orientation data are integrated at key points within the array. These include; compass [3-axis], attitude, pressure and temperature (CAPT). Synchronous sampling provides further versatility and advanced techniques such as beam forming are achievable.



## APPLICATIONS

- Defence surveillance and protection
- Beacon location
- Research
- Marine mammal monitoring
- Environmental monitoring
- Autonomous vehicle deployment

## UNDERWATER COMPONENTS

An array will consist of the following sections, tailored to your requirements:

- Tow – to set the distance between the towing vessel and acoustic section
- VIM – to mitigate vibrations when towing
- Acoustic – contains the hydrophones, DAQ modules and non-acoustic sensors
- Tail – to accurately position the acoustic section when towed

These sections are designed to incorporate adjustable buoyancy for different types of deployments and are trimmed during the manufacturing process. They are filled with synthetic isoparaffinic fluid (Isopar-M™) and pressurised to achieve the right volume and, for the active section, to guarantee a mechanical path between the water and hydrophones and sensors. Sections are interconnected with an air-tight lightweight connector.

## TOPSIDE COMPONENTS

Electronics are contained within a robust housing. This unit enables onward real-time data transmission over ethernet for display and/or processing. The ethernet board controls the PSU, in order to regulate voltage to a suitable level for the underwater acoustic section. Since the acoustic section can be connected using different configurations, voltage is regulated to the most suitable level every time the array is powered on.

### SPECIFICATIONS

Low cut filter (10 Hz, 100 Hz, 1 kHz, 2 kHz)
Pre-amplifier 24 dB gain
Gain stage 0, 12, 24, 36, 48, 60, 72 dB
Antialiasing filter 10 kHz (typical)
20 or 24 bit Analog to Digital convertor dedicated to each hydrophone
Sampling rates from 4 kHz to 96 kHz (depending upon configuration)
Adjustable sampling frequency in real-time
Low power 18V–36V, 60W for 32 hydrophones, 15W for 8 hydrophones
Target frequency up to 5 kHz at 150 mm spacing
Max. length of underwater sections 50 m



## CASE STUDY

One such system was recently delivered to a major European navy. It provided a very low noise and highly configurable solution.

The system incorporated 32 hydrophones, spaced appropriately to achieve tuning for 2 kHz and 4 kHz frequencies. It featured remotely selectable low cut filters of 10 Hz, 100 Hz, 1 kHz and 2 kHz, accompanied by selectable gain from 24 dB to 96 dB in 12 dB steps.

Integrated through the array were four CAPT modules, which provided environmental information, alongside precise positioning and orientation data. This particular array configuration had a 60 watt power requirement.