



BII7140 Series Acoustic Array Elements

Acoustic Elements for underwater and ultrasonic (air) Arrays, Streamers, Beacons, and Positioning. These acoustic elements feature small size, low cost and easy integration, and are ready to be assembled in discrete arrays such as linear (broadside, end-fire, Mills Cross), planar and 3-D arrays to implement different acoustic applications. Depending on the operating frequency, these elements can be treated as Points, Lines or Rectangle Aperture in array signal processing. Beam steering, array focusing, bearing measurement, side-lobe suppression, and user-defined beam pattern (broad or narrow) can be achieved by complex weighting (Digital or FFT Beamforming) technique. Differential output and shielded twisted pair cable provide great EMI noise rejection over long cable. Multiple elements can be combined in series or parallel to make up an array distributing hundreds meters in field.

BII manufactures two types of array elements: [Omnidirectional \(Toroidal\) Beam Elements](#) for Linear Array and [Planar Array Elements](#) for Planar Array.

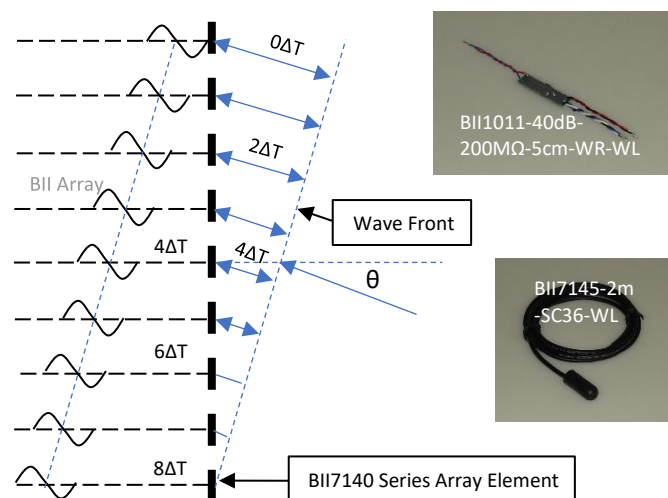
Typical Applications:

Oil-filled Streamer Element/Towed Array/Seabed Array.	Acoustic Beacons: Pingers, Tags and Remote Tracking; Acoustic Positioning.
Monitoring Seismic Sources/Airgun/Watergun/Seismology.	Array Focusing and Beam Steering, Vector Hydrophone Element.
Passive Acoustic Monitoring System (PAM System), Sonobuoy.	Marine Seismic Detector/Exploration/Borehole Seismic.

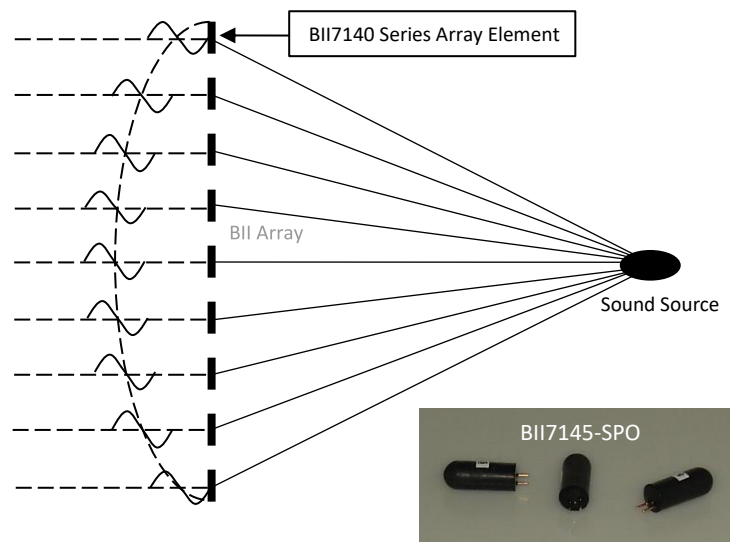
Related Products [Hydrophone Preamplifier with Filters](#)

[Low Noise Broadband Hydrophone as Discrete Array Elements](#)

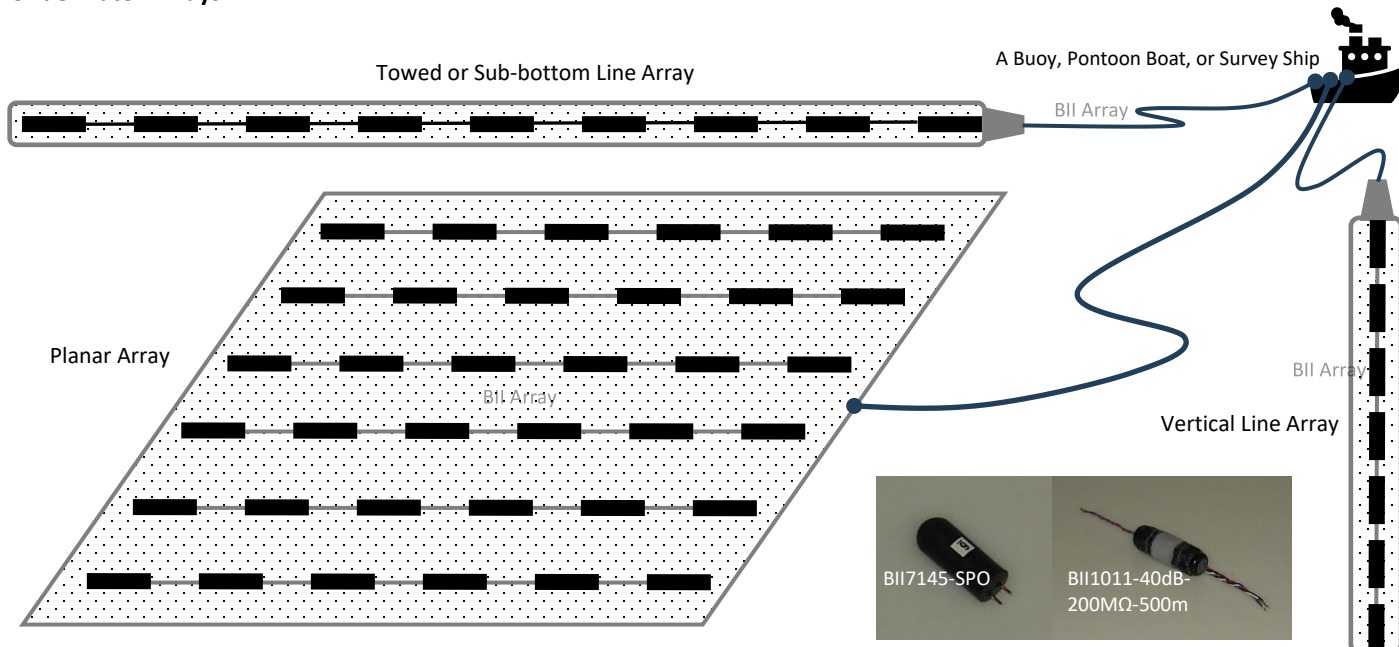
Linear (Rectangular) Array Beam Steering



Linear, Annular, and Planar Array Beam Focusing



Underwater Arrays



Specifications of Omnidirectional (Toroidal) Beam Directivity Elements

Hydrophones are tested in water at 20°C unless stated otherwise.

DF: Differential Output; SE: Single Ended Output; BPF: Band Pass Filter; HPF: High Pass Filter; LPF: Low Pass Filter. DW: Deep Water, UMC: Underwater Mateable Connector, FFVS: Free-field Voltage Sensitivity, TVR: Transmitting Voltage Response.

Acoustic Array Element		BII7141	BII7142	BII7143	BII7144	BII7145	BII7147	BII7148	
Aperture Size (ΦDxL, mm):		Φ9.5x8	Φ9.5x8	Φ9.5x8	Φ9.5x8	Φ9.5x8	Φ6x5	Φ4x4	
		-202±2	-201±2	-207±2	-205±2	-185±2	-205.5±1.5	-216±2	
Sensitivity at 1kHz: (dBV/μPa)		Sensitivity Loss over Extension Cable (dB) = 20*log[C _h /(C _h +C _e)]. C _h : Hydrophone Capacitance; C _e : Capacitance of Extension Cable. Shielded cable is of 100pF/meter roughly. For example, sensitivity of a BII7143 with 100m cable ≈ -207.0 + 20*log (13.4nF/(13.4nF+10nF)) = -211.84 dBV/μPa.							
Sensitivity Matching: (at 1kHz, at 20°C.)		Tolerance: a. ±2.0 (Default); b. ±1.0; c. ±0.5; d. ±0.3; e. ±0.1; in dB V/μPa. 1. Sensitivity is tested at 1 kHz. 2. Hydrophones whose sensitivity variations are out of specified tolerance are rejected.							
Usable Frequency (±3dB V/μPa)	In Water:	0.1Hz~120kHz				10Hz~140kHz	5Hz~230kHz	2Hz~350kHz	
	In Air:	0.1Hz ~ 9kHz				10Hz ~ 9kHz	5Hz ~ 12kHz	2Hz ~ 15kHz	
	Minimum Usable Frequency depends on -3dB high pass filter f _{-3dB} = 1/(2πR _i C _h). R _i : Input Resistance or Impedance of Preamp. C _h : Capacitance of hydrophone at 1 kHz. (1) when a BII7141 and a BII preamp of R _i = 200 MΩ are used to detect sounds, -3dB high pass frequency of detection = 0.27 Hz. (2) when a BII7143 and a BII preamp of R _i = 100 MΩ are used to detect sounds, -3dB high pass frequency of detection = 0.12 Hz.								
Preamplifier:		No. Standalone preamplifier and built-in filter is available by separate order to drive long cable. Customized Standalone Preamp for uses in oil-filled linear array: (1) Potted, Depth Rating: 5MPa. (2) Input/Output Options: Shielded Cable or Twisted Pairs.							
Capacitance@1kHz, ±10%:		2.92nF	1.5nF	13.4nF	2.26nF	0.27nF	0.54nF	1.5nF	
Dissipation@1kHz:		0.011	0.008	0.02	0.005	0.008	0.005	0.005	
Noise Density at f << f _s : dB μPa/√Hz		33.1~10logf	31.0~10logf	33.0~10logf	35.3~10logf	24.0~10logf	31.0~10logf	40.4~10logf	
		1. f in kHz; f _s : Resonance Frequency which is close to the frequency of maximum FFVS. 2. Noise densities in this datasheet are calculated values with transducer parameters being measured in water. 3. As hydrophones works with preamps or data acquisition modules, total noise density is determined by all noise sources. Generally, the total noise density is much higher than the ones stated in this datasheet.							
Cable Length at (FFVS-3dB):		8.5 m	4.4 m	39 m	6.6 m	0.79 m	1.58	6 m	
Tips for Simple Array:		BII7143 can drive long shielded cable or coax without significant sensitivity loss. Therefore, a simple line (linear) array with multiple BII7143 elements can be configured quickly and easily which is being suspended by long cable bundles from the bottom of a buoy or a pontoon boat.							
Output Signal Type:		Differential	Differential	Single-Ended	Single Ended	Single Ended	Differential	Single Ended	
Sensing Element:		Shielded	Shielded	Shielded	Shielded	Unshielded	Shielded	Shielded	
Unshielded sensing elements pick up EMI noise if any in air and shallow water. Electronic filters are recommended in subsequent signal processing circuit.									
Acceleration Sensitivity: (dB μPa/(m/s ²))	Axial Plane is XZ or Vertical Plan. XY Plane is Horizontal Plane which is perpendicular to acoustic axis.								
	Axial:	109.2	109.6	115.2	129.2	108.4	111.0	121.0	
	XY:	≤ 80.0	≤ 80.0	≤ 113.0	≤ 127.0	≤ 110.6	≤ 80.0	≤ 80.0	
	Bespoke Vibration Compensation available upon request: When suspended from a ship or boat, buoy, or used in towed array, the hydrophone experiences a large movement and induced vibration resulting from surface waves, currents, hydrodynamic flow turbulence, cable movement, etc... The translational acceleration in axial direction can be cancelled with special design and construction, and acceleration sensitivity in other directions are also lower (partially cancelled). Spurious signals caused by induced vibration can be reduced. Acceleration Sensitivity with Compensation: 1. ≤ 60 to 90 dB in axial direction or XZ Plane. 2. ≤ 60 to 90 dB in XY Pane.								
Underwater Projector:		No				Yes. Do NOT drive projectors in air.		N/A	N/A
Resonance fs: (±5%)		N/A				120kHz	100kHz	N/A	N/A
Quality factor Q _m at f _s :		N/A				4.0	2.7	N/A	N/A
Maximum Drive Voltage:		N/A				300 Vrms.		N/A	N/A
Maximum Pulse Width:		N/A				100 mS		N/A	N/A
Maximum Duty Cycle:		N/A				10% at Maximum Drive Voltage. 100% at 10.6 Vrms.		N/A	N/A
TVR at f _s (dB μPa/V@1m):		N/A				134.6	137.0	N/A	N/A
Directivity Pattern:		Omnidirectional in low frequency range, Toroidal in high frequency range. Refer to graph of Beam Pattern .							
Side Lobe Level:		No side lobes.							
Electrical Insulation:		> 500 MΩ at 500 VDC.							
Shielded Cable, Twisted Pair, Pins:		1. Default: Differential or Single Ended Output: Shielded Two Conductor Cable (ΦD=2.6mm, TPU Jacket) (SC26) Differential or Single Ended Output: Shielded Twisted Two Conductor Cable (ΦD=3.6mm, PVC Jacket) (SC36) Single Ended Output: Coax RG174/U (ΦD=2.8mm) (RG174) 2. Single Ended Output: Coax RG178/U (ΦD=1.8mm) (RG178), up to 200°C or 392°F. 3. Differential or Single Ended Output: Twisted Pair, AWG26 Wires (PVC Jacket by default or Teflon Jacket upon request) (WR) 4. Differential or Single Ended Output: Solder Pins on Both Ends: Brass alloy with gold finish, Φ1x5 mm. (SPB) 5. Differential or Single Ended Output: Solder Pins on One End: Brass alloy with gold finish, Φ1x5 mm. (SPO)							
Cable/Wire Length:		1. Default: 0.15 m. 2. Customized: up to 1 m.							
Electrical Leads:		1. Default: Wire Leads (WL). 2. Solder Pins (SPB). Solder Pins on both ends of hydrophone cylindrical body. 3. Solder Pins (SPO). Solder Pins on one end of hydrophone cylindrical body. 3. BNC Male (BNC). Note: BNC with RG178 Coax: Service Temperature up to +135°C or 275°F.							
Mounting Options:		Free Hanging (FH)							
Maximum Depth:		150 m	350 m	150 m	900 m	900 m	500 m	700 m	
		Limited by the cable length if the cable has wire leads or a non-waterproof connector.							

Housing Size (Cable & Wire):	ΦD x Length = Φ12.6 x 25 mm	Φ12.6x32	Φ9.5x18	Φ7.5x15
Overall Size (Solder Pins):	ΦD x Length = Φ12.6x30 mm	Φ12.6x30 mm	N/A	N/A
Weight (in air):	9 grams	11 grams	7 grams	6 grams
	Actual weight depends on Cable Types and Length.			
Operation Temperature:	1. Shielded Cable and RG174 Coax: -10°C to +70°C or 14°F to 158°F. 2. AWG26 Wires: -10°C to +105°C or 14°F to 221°F. 3. RG178 Coax and Solder Pins: -10°C to +120°C or 14°F to 248°F.			
	BII7143-HT200: -10°C to 200°C, or 14°F to 392°F. Maximum Pressure at 200°C or 392°F: 0.5 MPa.			
Storage Temperature:	-20°C to +60°C or -4°F to 140°F.			
Array Design Service:	Line (Linear) Array, Rectangular Planar Array, and Circular Planar Array design.			
	Side Lobe Level SLL, -3dB Beam Angle θ_{-3dB} ; Array Element Spacing d; Array Element Number N; Beam Steering, FFVS loss, and mutual effects among these parameters.			
Customization:	Please contact BII to customize BII7140 series for your specific acoustic projects.			
WARNING for Projector Applications: DANGER — HIGH VOLTAGE on wires. Wires shall be insulated for safety. DO NOT TOUCH THE WIRES BEFORE THE DRIVING SIGNAL IS SHUT DOWN. Cable shield must be grounded firmly for safety.				
For 50Ω BNC Male connector, it is buyer's sole responsibility to make sure that the (female) BNC shield of the signal source is firmly grounded for operating safety before hooking up transducer/hydrophone to the signal source. Coax with BNC is not intended for hand-held use at voltages above 30Vac/60Vdc.				
Sound Measurement in Air: The hydrophones can be used to detect sounds in air. Receiving sensitivity in air is same to the one in water in low frequency range.				

How to Order and Hydrophone Wirings

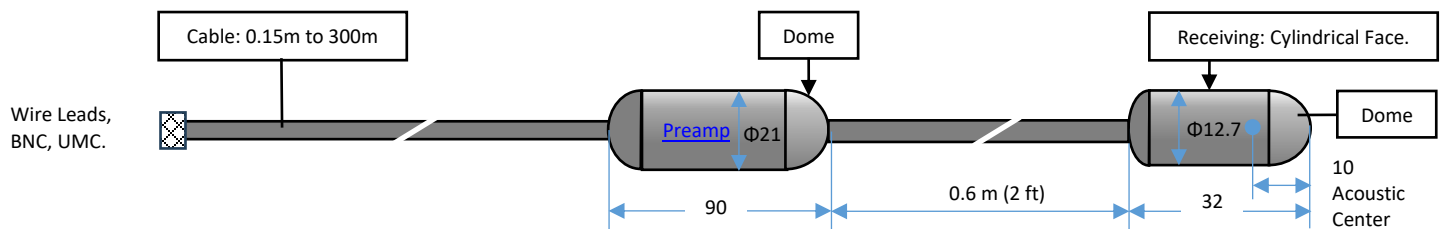
BII714x	-Cable Length in m	-Cable	-Connector	-Sensitivity Matching Tolerance
Example of Part Number:	Description			
BII7141-0.15m-SC36-WL-2dB	BII7141 Hydrophone, 0.15m Shielded Twisted Cable (ΦD=3.6mm), Wire Leads. Sensitivity Matching Tolerance: ±2.0 dB.			
BII7141-1m-AWG26-WL-1dB	BII7141 Hydrophone, 1m AWG26 Wires (Three 1m wires), Wire Leads. Sensitivity Matching Tolerance: ±1.0 dB.			
BII7141-SPB-2dB	BII7141 Hydrophone, Solder Pins on Both Ends. Sensitivity Matching Tolerance: ±2.0 dB.			
BII7141-SPO-2dB	BII7141 Hydrophone, Solder Pins on One End. Sensitivity Matching Tolerance: ±2.0 dB.			
BII7143-50m-RG174-BNC-1dB	BII7143 Hydrophone, 50m RG174 Coax with BNC male. Sensitivity Matching Tolerance: ±1.0 dB.			
BII7143-HT200-6m-RG178-BNC-1dB	BII7143 Hydrophone, Service Temperature: -10°C to 200°C (14°F to 392°F), 6m RG178 Coax with BNC male. Sensitivity Matching Tolerance: ±1.0 dB. (Note: BNC can ONLY withstand up to +135°C or 275°F).			

Wirings

Wiring of Differential:	Two Conductor Shielded Cable	Twisted Pair	Solder Pins	
Signal +	White or Red	White	Pin 1	
Signal -	Black	Black	Pin 3	
Common & Shielding	Cable Shield	Green	Pin 2	
Wiring of Single Ended:	Two Conductor Shielded Cable	Twisted Pair	Coax with Wire Leads	Solder Pins
Signal	White or Red	White	Center Contact	Pin 1
Signal Common	Black	Black	Cable Shield	Pin 2
Shielding	Cable Shield	N/A	Coax Shield	N/A

Array Elements with Integrated Preamps: Cylindrical Receiving Face

Array Element: Free Hanging with Smooth Domes for Linear/Planar/Conformal Discrete Arrays. Illustration Only, Size Scale is NOT 1:1.



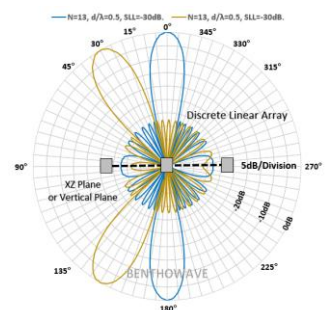
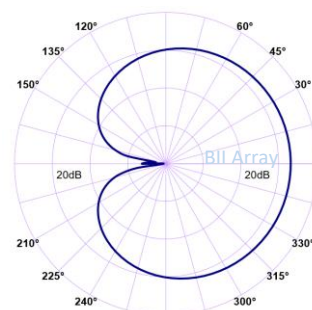
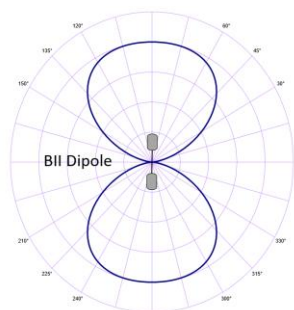
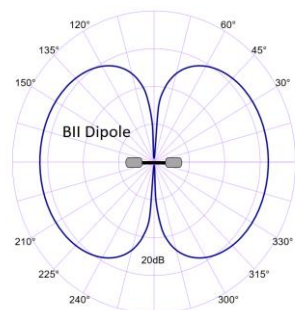
The streamlined hemispherical domes minimize drag forces and hydrodynamic noises caused by the hydrophone in motion or the flow past the hydrophone.

Simple Array Consisting of BII7140 Series Hydrophones.

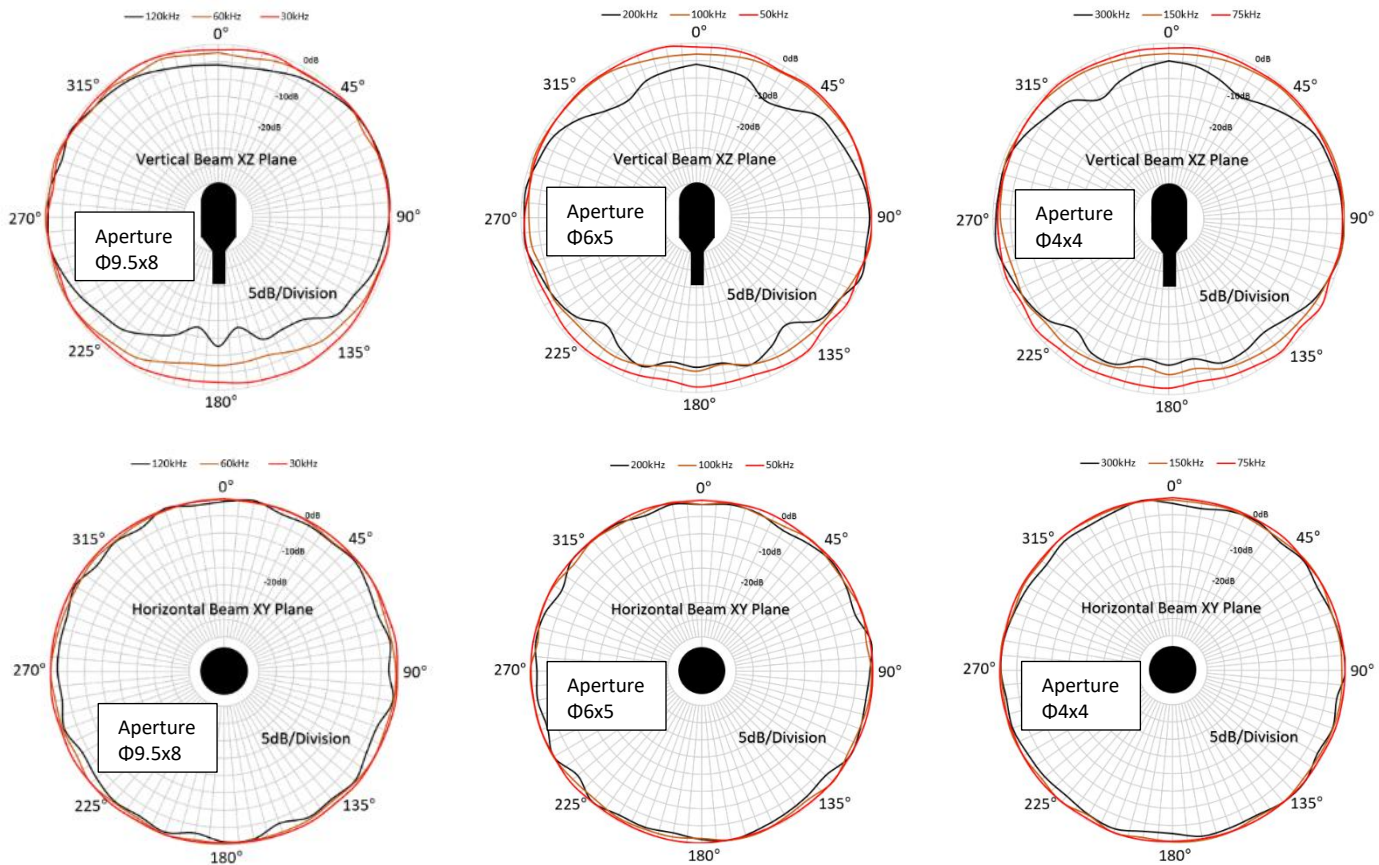
“Figure 8” Pattern of a Dipole (Pressure-Gradient).

Cardioid Pattern

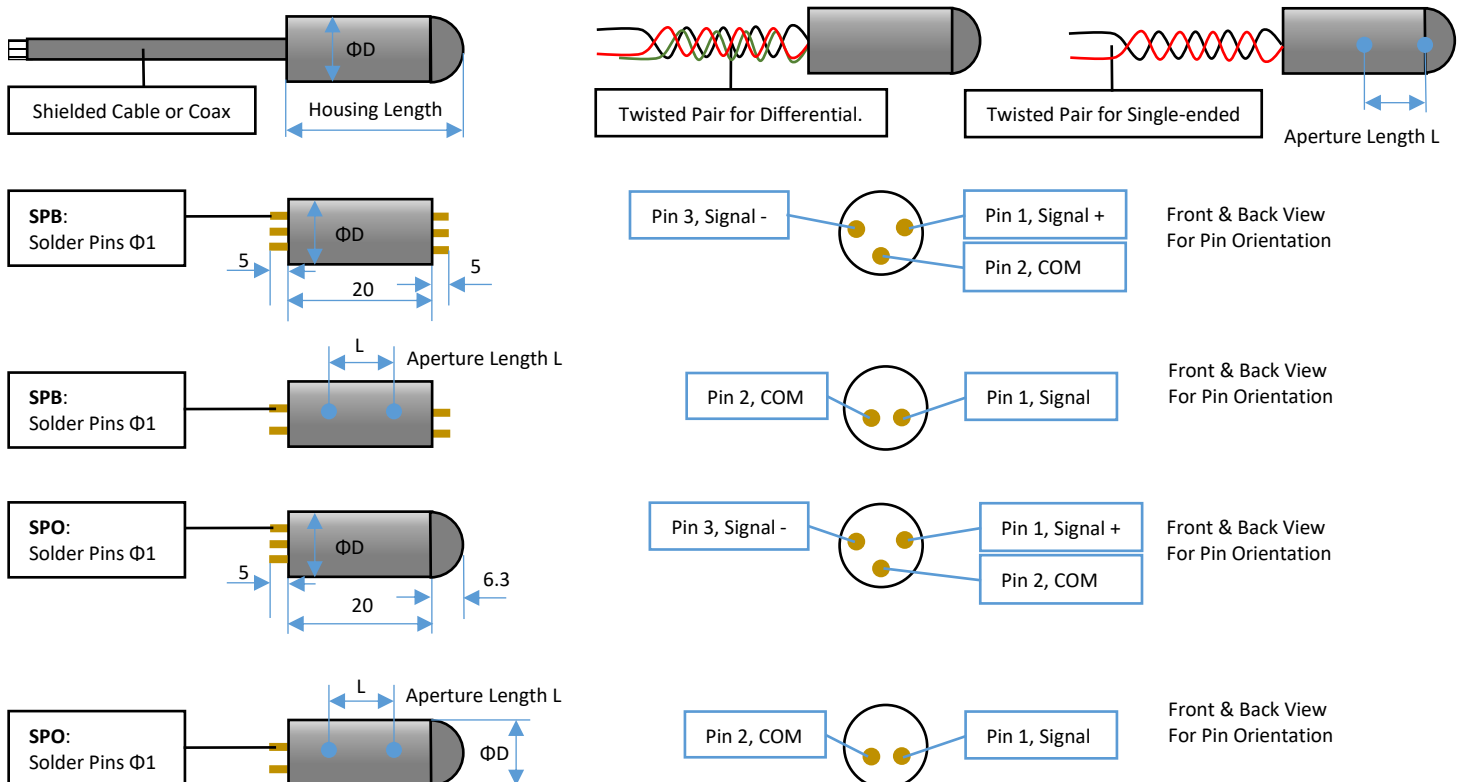
Linear Array with BII Discrete Hydrophones



Directivity Pattern



Physical Size (Dimensional Unit: mm):



Specifications of Planar Array Elements (Conical Beam)

Hydrophones are tested in water at 20°C unless stated otherwise.		
DF: Differential Output; SE: Single Ended Output; BPF: Band Pass Filter; HPF: High Pass Filter; LPF: Low Pass Filter. DW: Deep Water, UMC: Underwater Mateable Connector, FFVS: Free-field Voltage Sensitivity, TVR: Transmitting Voltage Response.		
Acoustic Planar Array Element	BII7149	BII7070 Series Planar Array Element
Typical Applications:	Linear and Planar Array.	
Aperture Size:	Length x Width = 6.5 x 6.5 mm, Square Planar Aperture.	
Sensitivity @ 1kHz:	-205.5 + Sensitivity Loss over the cable, dB V/μPa. Variation: ± 2 dB.	
	Sensitivity Loss over Extension Cable (dB) = 20*log[C _h /(C _h +C _c)].	
	C _h : Hydrophone Capacitance; C _c : Capacitance of Extension Cable. Cable is of 100 pF/meter roughly. For example, sensitivity of a BII7149 with 1m cable ≈ -205.5 + 20*log (0.286nF/(0.286nF+0.1nF)) = -208.1 dBV/μPa.	
Sensitivity Matching: (at 1kHz, at 20°C.)	Tolerance: a. ±2.0 (Default); b. ±1.0; c. ±0.5; d. ±0.3; e. ±0.1; in dB V/μPa. 1. Sensitivity is tested at 1 kHz. 2. Hydrophones whose sensitivity variations are out of specified tolerance are rejected.	
Built-in Preamplifier:	No. Standalone preamplifier is available by separate order to drive long cable.	
	Customized Standalone Preamp for uses in oil-filled linear array: (1) Potted, Depth Rating: 5 MPa. (2) Input/Output Options: Shielded Cable or Twisted Pairs.	
Usable Frequency:	in Water: 10 Hz ~ 550 kHz at ±3dB V/μPa.	
	in Air: 10 Hz ~ 16 kHz, in -3dB V/μPa.	
	Usable frequency of an array is limited by geometry tolerance of installation comparing to sound wavelength.	
	Minimum Usable Frequency depends on -3dB high pass filter $f_{-3dB} = 1/(2\pi R_i C_h)$. R _i : Input Resistance or Impedance of Preamp. C _h : Capacitance of hydrophone at 1 kHz. When a BII7149 and a BII preamp of R _i = 100 MΩ are used to detect sounds, -3dB high pass frequency of detection = 5.62 Hz.	
Capacitance C _h @ 1kHz:	0.286 nF ±10%	
Dissipation @ 1kHz:	0.026	
Noise Density at f << f _s : dB μPa/√Hz	44.6 – 10*log f	
	1. f in kHz; f _s : Resonance Frequency which is close to the frequency of maximum FFVS.	
	2. Noise densities in this datasheet are calculated values with transducer parameters being measured in water. 3. As hydrophones works with preamps or data acquisition modules, total noise density is determined by all noise sources. Generally, the total noise density is much higher than the ones stated in this datasheet.	
Output Signal Type:	Single Ended	
Shielding of Sensing Element:	Shielded	
Acceleration Sensitivity: μPa/(m/s ²).	143.6 dB along acoustic axis; Other directions: ≤ 141.0 dB.	
	Bespoke Vibration Compensation, available upon request: When suspended from a ship or boat, buoy, or used in towed array, the hydrophone experiences a large movement and induced vibration resulting from surface waves, currents, hydrodynamic flow turbulence, cable movement, etc... The translational acceleration in axial direction can be cancelled with special design and construction, and acceleration sensitivity in other directions are also lower (partially cancelled). Spurious signals caused by induced vibration can be reduced. Acceleration Sensitivity with Compensation: 1. ≤ 80 to 100 dB in axial direction of the hydrophone. 2. ≤ 90 to 110 dB in other directions of the hydrophone.	
Underwater Projector:	Yes. Do NOT use projectors in air to avoid damage.	
Resonance Frequency f _s :	420 ± 5% kHz	
Quality factor Q _m at f _s :	3.5	
Maximum Drive Voltage:	1. Default: 300 Vrms. 2. Customized to 600 Vrms.	
Maximum Pulse Width:	100 mS	
Maximum Duty Cycle:	10% at Maximum Drive Voltage. 100% at 10.6 Vrms.	
TVR at f _s (dB μPa/V@1m):	≤ 150.0	
Directivity Pattern:	Conical Beam	
-3dB Beam Width:	9900°/f(kHz)	
Electrical Insulation:	> 500 MΩ at 500 VDC.	
Mounting Options:	Free Hanging (FH)	
Operating Depth:	Maximum: 300 m or 3 MPa pressure and limited by the cable length if the cable has wire leads or a non-waterproof connector.	
Housing Size:	ΦD x Length = Φ12.6 x 20 mm	
Weight (in air):	10 grams, Actual weight depends on Cable Types and Length.	
Cable:	1. Coax RG174/U (ΦD=2.8mm) (RG174).	
	2. Coax RG178/U (ΦD=1.8mm) (RG178).	
	3. Twisted Pair: Two AWG26 Wires (AWG26, PVC Jacket by default or Teflon Jacket upon request) (WR).	
	4. Shielded Twisted Two Conductor Cable (ΦD=3.6mm, PVC Jacket) (SC36).	
	5. Shielded Two Conductor Cable (ΦD=2.6mm, TPU Jacket) (SC26)	
Cable Length:	1. Default: 0.15 m. 2. Customized: up to 10 m.	
Connector:	1. Default: Wire Leads (WL)	
	2. Male BNC (BNC) (Max. Diameter Φ14.3 mm).	
	3. SMA (Plug, Male Pin) (SMA), Voltage Rating: 335 VRMS Continuous. (Max. Diameter Φ9.24 mm).	
	4. SMC (Plug, Female Socket) (SMC), Voltage Rating: 335 VRMS Continuous. (SMC) (Max. Diameter Φ6.4 mm).	
	5. 1/8" (3.5mm) TRS Plug (TRS35) (Max. Diameter Φ10.5 mm).	
	6. Underwater Mateable Connector (pin) (UMC) (Max. Diameter Φ21.5 to Φ35 mm).	
	Note: Underwater Mateable Connector is for uses underwater. Other connectors and wire leads are for dry uses and are not waterproofed.	
Operation Temperature:	1. Shielded Cable and RG174 Coax: -10°C to +70°C or 14°F to 158°F.	
	2. AWG26 Wires: -10°C to +105°C or 14°F to 221°F.	
	3. RG178 Coax: -10°C to +120°C or 14°F to 248°F.	
	Note: Limited by connector service temperature if any.	

Storage Temperature:	-20°C to +60°C or -4°F to 140°F.				
Customization:	Please contact BII to customize BII7140 series for your specific acoustic projects.				
Single Ended Output:	Wire Leads	Underwater Connector	BNC/SMA/SMC	Coax with Wire Leads	TRS Unbalanced mono
Signal	White or Red	Pin 2	Center Contact	Coax Center Contact	Tip
Signal Common	Black	Pin 1	Shield	Coax Shield	Ring & Sleeve
Shielding	Shield	Pin 3	Shield	Coax Shield	Ring & Sleeve
Array Design Service:	Line (Linear) Array, Rectangular Planar Array, and Circular Planar Array design.				
	Side Lobe Level SLL, -3dB Beam Angle θ_{-3dB} ; Array Element Spacing d; Array Element Number N; Beam Steering, FFVS loss, and mutual effects among these parameters.				
WARNING for Projector Applications: DANGER — HIGH VOLTAGE on wires. Wires shall be insulated for safety. DO NOT TOUCH THE WIRES BEFORE THE DRIVING SIGNAL IS SHUT DOWN. Cable shield must be grounded firmly for safety.					
For 50Ω BNC Male connector, it is buyer's sole responsibility to make sure that the (female) BNC shield of the signal source is firmly grounded for operating safety before hooking up transducer/hydrophone to the signal source. Coax with BNC is not intended for hand-held use at voltages above 30Vac/60Vdc.					
Sound Measurement in Air: The hydrophones can be used to detect sounds in air. Receiving sensitivity in air is same to the one in water in low frequency range.					

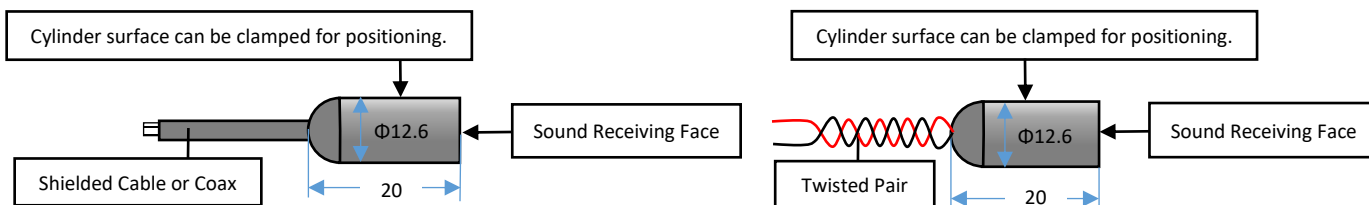
How to Order

Hydrophone	-Cable Length	-Cable	-Connector	-Sensitivity Matching Tolerance
BII7149	in meter	Refer to Options	Refer to Options	Refer to Options. in dB V/μPa, at 1kHz.
Example of Part Number:	Description			
BII7149-1m-RG174-BNC-2dB	BII7149 Hydrophone, 1m RG174/U Coax Cable, BNC Male, Sensitivity Matching Tolerance: ±2.0 dB.			
BII7149-1m-RG174-WL-1dB	BII7149 Hydrophone, 1m RG174/U Coax Cable, Wire Leads. Sensitivity Matching Tolerance: ±1.0 dB.			

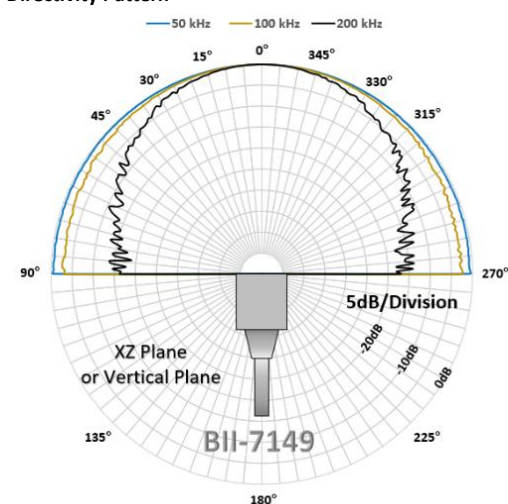
Physical Size (Dimensional Unit: mm):

The cylinder surface of the element can be used for clamps or jigs to position the element. To avoid damaging element surface:

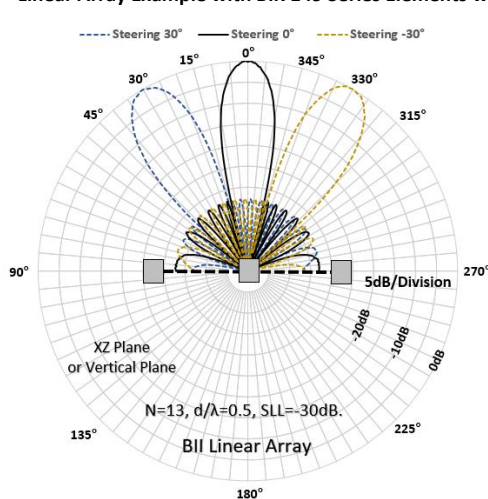
1. The clamping force should be less than 5 N.
2. The surfaces of the clamps or jigs must be smooth and do not have any sharp and spike.



Directivity Pattern

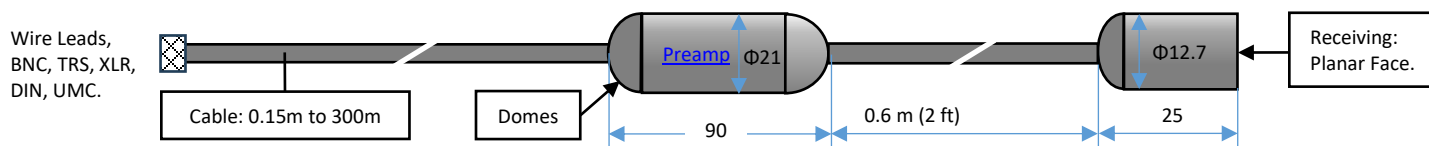


Linear Array Example with BII7149 Series Elements with Sidelobe Suppression



Bespoke Array Elements with Integrated Preamps: Planar Receiving Face

Array Element: Free Hanging with Smooth Dome for Linear/Planar/Conformal Discrete Arrays. Illustration Only, Size Scale is NOT 1:1.



The streamlined hemispherical domes minimize drag forces and hydrodynamic noises caused by the hydrophone in motion or the flow past the hydrophone.

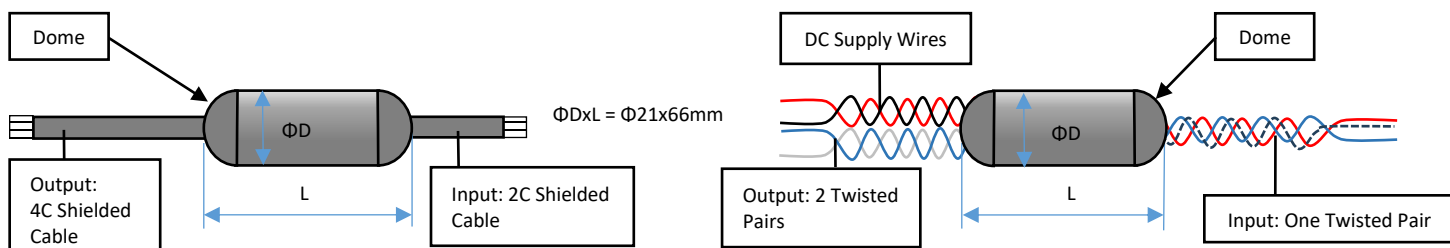
Standalone Preamp: Customized for uses in oil-filled linear array, 5MPa (or 500m Water Depth) pressure rating.

Physical Size (Dimensional Unit: mm): $\Phi D \times L = \Phi 21 \times 66 \text{ mm}$.

Part Number:

BII1011-40dB-200M Ω -500m: BII1011, Preamp, 40dB Gain, Input Impedance: 200M Ω , 500m Underwater Pressure Ratings, 5cm Wire Bundle.
 BII1011-40dB-100M Ω -500m: BII1011, Preamp, 40dB Gain, Input Impedance: 100M Ω , 500m Underwater Pressure Ratings, 5cm Wire Bundle.
 BII1011-40dB-20M Ω -500m: BII1011, Preamp, 40dB Gain, Input Impedance: 20M Ω , 500m Underwater Pressure Ratings, 5cm Wire Bundle.
 BII1011-40dB-2M Ω -500m: BII1011, Preamp, 40dB Gain, Input Impedance: 2M Ω , 500m Underwater Pressure Ratings, 5cm Wire Bundle.

Refer to [BII1011 datasheet](#) for more information on cable driving capability, power consumption, frequency response etc.



Differential Input	2C Shielded Cable	One Twisted Pair	Differential Output and DC Supply Cable	4C Shielded Cable	Two Twisted Pair
Input +	White or Red Wire	Red Wire	Output +	White Wire	White Wire
Input -	Black Wire	Blue Wire	Output -	Blue Wire	Blue Wire
---	---	---	DC Supply	Red Wire	Red Wire
---	---	---	DC Supply Common and Output Common	Black Wire	Black Wire
Input Common & Shielding	Cable Shield	Black Wire	Shielding	Cable Shield	N/A
Single Ended Input	2C Shielded Cable	One Twisted Pair	Differential Output and DC Supply Cable	4C Shielded Cable	Two Twisted Pair
Input	White Wire	Red Wire	Output	White Wire	White Wire
Input Common	Black Wire	Blue Wire	Output Common	Black Wire	Black Wire
---	---	---	DC Supply	Red Wire	Red Wire
---	---	---	DC Supply Common	Black Wire	Black Wire
Shielding	Shielded	N/A	Shielding	Cable Shield	N/A