

Acoustic Transducers and Arrays

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Communication Transducer

Communication Transducer: 50° Wide Conical Beam Angle, No Sidelobes.

BII7600 series communication transducers are broadband to transmit and receive communication signals and cover wide field of the interest underwater and support directional communication in vertical and horizontal planes. They have no sidelobes to avoid spurious echoes or source sounds from uninterested directions. Besides, the transducers can be used as array elements for user-defined large planar/cylindrical/spherical arrays.

Typica	l App	lications
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Pinger/Beacon/Transponder/Positioning Communication/Tele	metry Navigation/Obstacle Avoidance	Control/Alarm/Security System	Array Element
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$\underline{\mathsf{Specifica}}\mathsf{tions}$

FFVS: Free-field Voltage Ser	nsitivity, in dB V/μPa, TV	R: Transmitting Voltag	e Response, dB μPa/V@	1m. Gp : Conductance of	of the Transducer.		
Parametric Transducer	BII7600Q/100	BII7601/70	BII7601Q/60	BII7601H/50	BII7602/38	BII7602H/30	
Resonant Frequency fs:	100 kHz	70 kHz	60 kHz	50 kHz	38 kHz	30 kHz	
Signal Type:			opping, DSSS, PSK, CDM/ SINE/Chirp Pulses, Cont				
Radiation Face:	Circular Plane						
Directivity Pattern:	Conical Beam at fs, R	efer to Graph of <u>Direct</u>	ivity Pattern.				
-3dB Beam Width:	50° at fs						
Side Lobe Level:	No side lobes						
Quality Factor Q _m :	3.0. Note: -3dB band	width $\Delta f = f_s/Q_m$. $Q_m deg$	etermines the transient i	response or the rise and	fall rings of steady	-state response.	
η _{ea at fs} at f _s :	0.1 to 0.4 in Water, E	lectroacoustic Efficien	cy, Load Medium Depen	dent.			
	at f << fs, η _{ea} / η _{ea at fs}	≈ 0.1225*(k*ΦD)². Wa	ave Number k = 2π/λ; ΦΙ	D = Transducer Diamete	er.		
η_{ea} at f << f_s:	emit high power sou	nds at frequencies far	w at f << f _s and drops g from f _s . at frequencies far from	•			
Power Factor at f _s :	0.6 to 0.9						
TVR at f₅:	140.0	137.0	135.5	136.4	137.0	138.0	
Radiation Sound Level SL:	$SL = 20*logV_i + TVR, c$	dB μPa@1m. Driving V	oltage V _i is in unit of V _{rms}	s•	•	1	
Admittance at fs:	G = 87 μS	G = 165 μS	G = 86 μS	G = 90 μS	G = 107 μS	G = 168 μS	
	Transducer without	Impedance Matching	Unit	Transducer with Impedance Matching Unit			
Dairing Voltage V at F	0 0	l and Duty Cycle D < 10 or 600, whichever is les	the state of the s	Pulsed Driving Signal and Duty Cycle D < 100%: Maximum V V _{imax} = V(MIPP * Z), in V _{rms} . Z is impedance at fs.			
Driving Voltage V _i at f _s :	Continuous Operation at 100% Duty Cycle: Maximum V_i , $V_{imax} = V(MCIP/G_{max})$, in V_{rms} . Continuous Operation at 100% Duty Cycle: Maximum V_i , $V_{imax} = V(MCIP/G_{max})$, in V_{rms} .						
	· ·		Maximum V _i ,	•			
	$V_{imax} = V(MCIP/G_{max}),$	in V _{rms} .	Maximum V _i , dance matching is recor	V _{imax} = √(MCIP * Z)	, in V _{rms} .	cle: Maximum V _i ,	
Input Power P _i :	$V_{imax} = V(MCIP/G_{max}),$ To achieve higher sou	in V _{rms} . und level, built-in impe		$V_{imax} = V(MCIP * Z)$ mmended to step up dr	, in V _{rms} .	cle: Maximum V _i ,	
·	$V_{imax} = V(MCIP/G_{max}),$ To achieve higher sou	in V _{rms} . und level, built-in impe	edance matching is recor	$V_{imax} = V(MCIP * Z)$ mmended to step up dr	, in V _{rms} .	cle: Maximum V _i ,	
·	$V_{imax} = V(MCIP/G_{max}),$ To achieve higher sou $P_i = V_i^2 * G$. Refer to C 300 Watts	in V _{rms} . und level, built-in impe G-B Graph: G is conduct 500 Watts	dance matching is recor tance, G _{max} is maximum	$V_{imax} = V(MCIP * Z)$ mmended to step up dr G at f _s .	, in V _{rms} . iving voltage inside	cle: Maximum V _i , the transducer.	
MIPP at f _s :	$V_{imax} = V(MCIP/G_{max}),$ To achieve higher sou $P_i = V_i^2 * G$. Refer to C 300 Watts	in V _{rms} . und level, built-in impe G-B Graph: G is conduct 500 Watts	dance matching is recor tance, G _{max} is maximum 400 Watts	$V_{imax} = V(MCIP * Z)$ mmended to step up dr G at f _s .	, in V _{rms} . iving voltage inside	cle: Maximum V _i , the transducer.	
Input Power P _i : MIPP at f _s : MPW at MIPP and f _s :	$V_{imax} = V(MCIP/G_{max}),$ To achieve higher sou $P_i = V_i^2 * G$. Refer to G 300 Watts Maximum Input Pulse	in V _{rms} . und level, built-in impe G-B Graph: G is conduc 500 Watts e Power at f _s : P _i = V _i ² * 9 Seconds	dance matching is recortance, G _{max} is maximum 400 Watts G _{max} or MIPP Watts, wh	V _{imax} = V(MCIP * Z) mmended to step up dr G at f _s . 400 Watts ichever is less.	, in V _{rms} . iving voltage inside 500 Watts	the transducer. 600 Watts	
MIPP at f _s :	$V_{imax} = V(MCIP/G_{max}),$ To achieve higher sou $P_i = V_i^2 * G$. Refer to G 300 Watts Maximum Input Pulse 7 Seconds	in V _{rms} . und level, built-in impe 5-B Graph: G is conduc 500 Watts e Power at f _s : P _i = V _i ² * 9 Seconds	dance matching is recortance, G _{max} is maximum 400 Watts G _{max} or MIPP Watts, wh	V _{imax} = V(MCIP * Z) mmended to step up dr G at f _s . 400 Watts ichever is less.	, in V _{rms} . iving voltage inside 500 Watts	the transducer. 600 Watts	

How to determine pulse width, duty cycle and off-time with input pulse power (peak power) at fs:

- 1. Determine the input pulse power (IPP, peak power) with sound intensity required by the project. IPP MUST be less than MIPP.
- 2. Pulse Width ≤ (MIPP * MPW*(120°c-T)/103°c)/IPP. T: Water Temperature in °c.
- 3. Duty Cycle D \leq MCIP*(120°c-T)/103°c)/IPP.
- 4. Off-time $\geq PW^*(1-D)/D$.

4. On time 21 W (1 D)/D.										
	-187.0 -180.5 -181.0 -181.0 -182.0 -									
FFVS at f _s :	FFVS Sensitivity Loss over extension cable at $f_s(dB) = 20 * \log \{\left(1 + \frac{2\pi f_s C_c}{B}\right) / \sqrt{[G^2 + (B + 2\pi f_s C_c)^2]/(G^2 + B^2)} \}$ G: Conductance at f_s ; B: Susceptance at f_s ; Cc: Capacitance of Extension Cable. Cable is of 100 pF/meter roughly.									
			<u>vstem.pdf</u> for conversion	between G-B and Z-θ	, if necessary.					
	FFVS: Free-field Volta	ge Sensitivity, dB V/μ	Pa.							
Receiving Sound Level SL:	$SL = 20*logV_o - FFVS$,	dB μPa. Receiving Vol	tage V_o is in unit of V_{rms} .							
Operating Depth:	Maximum 300 m and	Limited by the cable I	ength if the cable has wi	re leads or a non-wate	erproof connector.					
	1. Default: Free Hang	ing (FH)								
	2. Thru-hole Mountin	g with Single O-ring (T	THSO)							
Mounting Options:	3. Thru-hole Mountin	g with Double O-ring	(THDO)							
	4. Bolt Fastening Mou	inting (Stainless Steel)	(BFMSS)							
	5. End-face Mounting	(EFM)								



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6. Flage Mounting (FOM) 7. Flash Mounting (FOM) 7. Fla	SEEST-THEAGENE	Acoustic Transuu	cers and rurays		· · · · · · · · · · · · · · · · · · ·	benulowave.com				
Please refer to online document ApoutsCortem pelf for a complete list of Mounting Options and more details. 1. Two Conductor Schiedled Called (CF), Bubber or PVC Lacket. 2. 50 IN 653 Coca (1653) 3. 50 IN 6174/U Coxe (16(174)) (Coxe (16(1			•							
1. Two Conductors Shelided Cable (SC), Rubber or PVC Jacket. 2. 50 In R657/A/L Cost R65174) 3. 50 In R657/A/L Cost R65174) 4. 50 In R657/A/L Cost R65174) 5. Shelided Cable with Twelted Pair and Telon (PTPI) Jacket, 200-3.2 mm (SC3), up to 2007C, AWC326 Conductors. 4. Handling Do not use the cable to support transducer weight in air and water if the transducer has a mounting part. Do not bend the cable. 5. Default: Two 2- Custom. 5. Default: Wire Leads MMI, for Transmit, Receive Signal, and DC Power Supply. 5. Default: Wire Leads MMI, for Transmit, Receive Signal, and DC Power Supply. 6. Default: Wire Leads MMI, for Transmit, Receive Signal, and DC Power Supply. 7. Alex Bird, (SMC) (Max. Diameter 01-14 mm), for Transmit or Receive Signal. 8. KW Wire R6178 Cast Service Temperature up to 1651 Ca 135-77 cmm for Parameter of Receive Signal. 8. KW Wire R6178 Cast Service Temperature up to 1651 Ca 135-77 cmm for Parameter of Receive Signal. 8. KW Wire R6178 Cast Service Temperature up to 1651 Ca 135-77 cmm for Parameter of Receive Signal. 8. KW Good Cast Repr. Smp (BS), 49VCC or +18VCC power supply for Builtinin 77R Switch. 8. Alma Samana Rulp Par (Receive Signal) SW MMI, Small Cast Service Temperature up to 1651 Ca 135-77 cmm for Parameter of Receive Signal. 9. Cast Service Max. Switch Connector is for uses underwere. Other connectors and wire leads are for dry uses and are not control to the Connector of the Service MMI (SW MI) and the		• ,	•							
2. SO D ROSS Coas (ROSS) 3. SO D ROSS (Coas (ROSS) 3. SO D ROSS (Coas (ROSZ)) 4. SO D ROSZ (2014 (Coas (ROSZ)) 4. SO D ROSZ (2014 (Coas (ROSZ)) 5. Shelded Coble with Invited Pair and I effort (PIFE) Jacket, 400+3, mm (SC32), up to 200°C, AWG20 Conductors, 5. Shelded Coble with Invited Pair and I effort (PIFE) Jacket, 400+3, mm (SC32), up to 200°C, AWG20 Conductors, 6. Shelded Coble with Invited Pair and I effort (PIFE) Jacket, 400+3, mm (SC40), up to 200°C, AWG20 Conductors, 6. Shelded Coble with Invited the Coable. Cable Length: 1. Default: 1 m. 2. Custom. 1. Default: 1 m. 2. Cust					te list of Mounting Op	otions and more deta	ils.			
Coble: 3. SO R RC174/L Cox R (RC174)			, ,,	ber or PVC Jacket.						
Cable: 4. \$0.0 RG178/LIC case [RG178] (Operating Temperature Ranges - 70°C To -200°C) 5. Shedded Cable with Twisted Pair and Trillon (PTF) Jacket, 00–23. Pm. (CC2), a to 200°C, AWC26 Conductors. 6. Shedded Cable with Twisted Pair and Trillon (PTF) Jacket, 00–23. Pm. (CC2), a to 200°C, AWC26 Conductors. 6. Shedded Cable with Twisted Pair and Trillon (PTF) Jacket, 00–23. Pm. (CC2), a to 200°C, AWC26 Conductors. 6. Shedded Cable with Twisted Pair and Trillon (PTF) Jacket, 00–23. Pm. (CC2), a to 200°C, AWC26 Conductors. 6. Shedded Cable with Twisted Pair and Trillon (PTF) Jacket, 00–23. Pm. (CC2), a to 200°C, AWC26 Conductors. 6. Shedded Cable with Twisted Pair and Trillon (PTF) Jacket, 00–23. Pm. (CC2), a to 200°C, AWC26 Conductors. 6. Line Twisted Pair and Twist		,	•							
(LaPolic Service) 5. Shelded Cable with Twisted Pair and Tellon (PTEP) Jacket, 00-40 mm (ECSI), but 10 2007C, AWCR2C Conductors. 6. Shelded Cable with Twisted Pair and Tellon (PTEP) Jacket, 00-40 mm (ECSI), but 10 2007C, AWCR2C Conductors. Handling: Do not use the cable to support transducer weight in air and water if the transducer has a mounting part. Do not bend the cable. 1. Default: 1 m. 2. Custom. 1. Default: 1 m. 2. Custom. 1. Default: 1 m. 2. Custom. 2. Note: Micro (PTEP) Jacket (PTEP)			•							
Sine 4DAH (mm): 5. Sine dec Cable with Invited Pair and Tefon (PIFE) Jacket, 09-4.0 mm (SCAD), up to 2007C, AWC202 Conductors. Handlings Do not use the cable: 5. Default: Write Leads (MM), for Transmit, Receive Signal, and DC Power Supply. 2. Make BKC (MR) (Max. Dismerter CH 24 mm.), for Transmit or Receive Signal. 3. Microsoft (MR) (Max. Dismerter CH 24 mm.), for Transmit or Receive Signal. 4. NE PRICE (MR) (Max. Dismerter CH 24 mm.), for Transmit or Receive Signal. 4. NE PRICE (MR) (Max. Dismerter CH 24 mm.), for Transmit or Receive Signal. 4. NE PRICE (MR) (Max. Dismerter CH 24 mm.), for Transmit or Receive Signal. 5. 1/8" (3.5mm) Tis Play (TR) (Max. Dismerter CH 25 mm.), for Transmit or Receive Signal. 5. 1/8" (3.5mm) Tis Play (TR) (Max. Dismerter CH 25 mm.), for Transmit or Receive Signal. 5. 1/8" (3.5mm) Tis Play (TR) (Max. Dismerter CH 25 mm.), for Transmit or Receive Signal. 7. 49/DC atterty Sing (BS), 49/DC or -18/DC (power supply for Bult-in 17/R Switch. 8. 4 mm Banana Play Par (Received All stack Cools) (Mg), ED (power supply for Bult-in 17/R Switch. 8. 4 mm Banana Play Par (Received All stack Cools) (Mg), ED (power supply for Bult-in 17/R Switch. 8. 4 mm Banana Play Par (Received All stack Cools) (Mg), ED (power supply for Bult-in 17/R Switch. 8. 4 mm Banana Play Par (Received All stack Cools) (Mg), ED (power supply for Bult-in 17/R Switch. 8. 4 mm Banana Play Par (Received All stack Cools) (Mg), ED (power supply for Bult-in 17/R Switch. 8. 4 mm Banana Play Par (Received All stack Cools) (Mg), ED (power supply for Bult-in 17/R Switch. 9. Demeloic con the cool-microsoft on metric spring spots of an errory. Weight in Arr: Weight in Arr: Weight in Arr: Weight in Arr: 1. Default: 40°C to -40°C or 44°T is 240°T (mg). Weight in Arr: 2. Demeloic con the cool-microsoft on metric spring spots on an errory. 2. September with 0.51 mouths active service of the spring spring spots on an errory. 2. Default: 40°C to -40°C or 44°T is 240°T. 2. September with 0.51 mouths active service o	Cable:	-	, ,,,			20000 11110000 1				
Handling: Do not use the cable to support transducer weight in air and water if the transducer has a mounting part. Do not bend the cable.										
Cable Length: 1. Default: Im. 2. Custom. 1. Default: Wire Leads (WL), for Transmit, Receive Signal, and DC Power Supply. 2. Male Rec (RMC) (Max. Diameter of 91.4 am, for Transmit or Receive Signal. 8MC with RG178 Coax: Service Temperature up to 165°C or 329°F. 3. Mil-5015 Style (pin) (MRI) (Max. Diameter of 91.4 am, for Transmit or Receive Signal. 4. XLR Plug (pin) (MRI), Rating: 133 VRMS), 154. (Max. Diameter 02.0 z.mm), for Transmit or Receive Signal. 5. 137°C (Samm) TSP Sing (TRS) (Max. Diameter of 91.5 mm), for Receive Signal. 6. VAX Plug (pin) (MRI), Rating: 133 VRMS), 154. (Max. Diameter 02.1 to 10.5 5 mm), for Sing (MRI). 6. Underwater Mateable Connector (pin) (UMC) (Max. Diameter 02.1 to 10.5 5 mm), for Sing (MRI). 8. Amount of MRI (MRI) (M										
Default: Im. 2. Custom.		_	e the cable to support	t transducer weight in a	ir and water if the tra	ansducer has a moun	ting part. Do not bend			
Default Wire Leads MVL/ for Transmit Receive Signal, and DC Power Supply,	Calabaran		-1							
2. Males BNC (BNC) (Max. Diameter 94.3 mm), for Transmit or Receive Signal. 8. Not. 15015 Style (pin) (MIL) (Max. Diameter 0.19 to 0.30 mm), for Transmit or Receive Signal. 4. XIR Plug (pin) (XIR, Rains; 133 VMIs.) 53. (Max. Diameter 0.02 mm), for Transmit or Receive Signal. 5. 1/8" (3.5mm) Tis Plug (TRS) (Max. Diameter 0.02 mm), for Transmit or Receive Signal. 5. 1/8" (3.5mm) Tis Plug (TRS) (Max. Diameter 0.02 mm), for Transmit or Receive Signal. 7. +9VIC Bettery Stap (BS), +9VIC or +12VIC power supply for Bulls in TR S which. 8. 4mm banan Plug Pain (Recaid and Back colon pley), for power supply for Bulls in TR S which. 8. 4mm banan Plug Pain (Recaid and Back colon pley), for power supply for Bulls in TR S which. 8. 4mm banan Plug Pain (Recaid and Back colon pley), for power supply for Bulls in TR S which. 8. 4mm banan Plug Pain (Recaid and Back colon pley), for power supply for Bulls in TR S which. 8. 4mm banan Plug Pain (Recaid and Back colon pley), for power supply for Bulls in TR S which. 8. 4mm banan Plug Pain (Recaid and Back colon pley), for power supply for Bulls in TR S which. 9. 21 Actual length Hepends on Mounting Parts. 1. Actual length Hepends on Mounting Parts. 1. Actual length Hepends on Mounting Parts. 2. 1. Actual length Hepends on Mounting Parts. 2. 1. Actual length Hepends on Mounting Parts. 3. 1. Actual length Hepends on Mounting Parts. 9. 1. Actual length Hepends on Mounting Parts. 9. 1. Actual length Hepends on Mounting Parts. 1. Actual length Hepends on Mounting Parts. 9. 1. Actual length Hepends on Mounting Parts. 9. 1. Actual length Hepends on Mounting Parts. 1. Actual length Hepends on Mounting Parts. 1. Actual length Hepends on Mounting Parts. 9. 1. Actual length Hepends on Mo	Cable Length:									
BNC with RG178 Coast. Service Temperature up to 167°C or 329°F. 3. MIL-Sott Style (pin) (MLI) (Max. Diameter 0210 c 030 mm), for Transmit or Receive Signal. 4. XIR Plug (pin) (XIR), Rating: 133 WNR), 15A. (Max. Diameter 020.2 mm), for Transmit or Receive Signal. 5. 158° (3.5mm) TRS Plug (Fis) (XIR), Rating: 133 WNR), 15A. (Max. Diameter 020.2 mm), for Transmit or Receive Signal. 7. +9VDC attenty-Snap (RTS) (Max. Diameter 020.5 mm), for Receive Signal (No. Underwater Mateable Connector (pin) (UMC) (Max. Diameter 021.5 to 0.035 mm), for Transmit or Receive Signal. 7. +9VDC attenty-Snap (Bask Color) (IPP), DC power supply for Bull-in IT // Switch. 8. 4mm Banane Plug Pini (Red and Bask Color) (IPP), DC power supply for Bull-in IT // Switch. Note: Underwater Mateable Connectors of the view survey. 8. 2D Ameter can be customized to meet spacing specs of an array. 2. Diameter can be customized to meet spacing specs of an array. 2. Diameter can be customized to meet spacing specs of an array. 2. Diameter can be customized to meet spacing specs of an array. 2. Diameter can be customized to meet spacing specs of an array. 3. Elegable High Temperature: 3. Default: 10° Cto +60° Ccr or 14° For 140° Fc. 2. Bespotse High Temperature Transducers of the spacing specs of an array. 2. Bespotse High Temperature Transducers and power amplifiers. Order Separately as standalone devices or append -IMMC0 to the part number for integrating Billiocol into the transducers and specify impedance in Q at 1s. For example, Bibosoc High Control of the Contro										
Size Dischiration of the Control of		, , ,		**	•					
4. XLR Plug (pin) (XR), Rating: 133 YMNS, 15A. (Max. Diameter Q2.0 Z mm), for Transmit or Receive Signal. 5. 15/8* (3.5mm) TRS Plug (FRS) (Max. Diameter Q10.5 mm), for Receive Signal (3.5mm) (5.5 plug (15.5mm) TRS Plug (15.5mm)			· ·	· ·		Cianal				
Size DDH (mm): 1. Actual length H depends on Mounting Parts. 2. Dameter can be customized to meet spaling space of an array. Weight in Air: 2. Dameter can be customized to meet spaling space of an array. Weight in Air: 3. Expose the plant in the customized to meet spaling space of an array. Weight in Air: 3. Expose the plant in the customized to meet spaling space of an array. Weight in Air: 3. Dameter can be customized to meet spaling space of an array. Weight in Air: 3. Dameter can be customized to meet spaling space of an array. Weight in Air: 3. Dameter can be customized to meet spaling space of an array. Weight in Air: 3. Despetit in the customized to meet spaling space of an array. Weight in Air: 3. Despetit in the customized to meet spaling space of an array. Weight in Air: 3. Despetit in the customized to meet spaling space of an array. Weight in Air: 3. Despetit in the customized to meet spaling space of an array. Weight is with 0.15 m cable. Actual weight depends on Mounting Parts, cable Types and Length. 3. Despetit in the customized to meet spaling space of an array. 3. Despetit in 10 to 60 °C or 41 °T to 140 °F. 2. Bespoke High Temperature Transducer: 10°C to 120°C, or 14°F to 248°F, Append HT to part number. 3. Despetit in 10 to 60 °C or 41 °T to 140 °F. 2. Bespoke High Temperature Transducer: 10°C to 120°C, or 14°F to 248°F, Append HT to part number. 3. Despetit in 10 to 60 °C or 41 °T to 140 °F. 2. Bespoke High Temperature Transducer: 10°C to 120°C, or 14°F to 248°F, Append HT to part number. 3. Despetit in 10 to 60 °C or 41 °T to 140 °F. 2. Bespoke High Temperature Transducer: 10°C to 120°C, or 14°F to 248°F, Append HT to part number. 3. Despetit in 10 to 60 °C or 41 °T to 140 °F. 2. Bespoke High Temperature Transducer: 10°C to 120°C, or 14°F to 248°F, Append HT to part number. 3. Despetit in 10 to 60 °C or 41 °T to 140 °F. 2. Bespoke High Temperature Transducer: 10°C to 120°C, or 14°F to 248°F, Append HT to part number. 3. Despetit in 10 to 60 °C or 41 °T				·		_				
6. Underwater Mateable Connector (pin) (IMCI) (Max. Diameter 021.5 to 035 mm), for Transmit or Receive Signal. 7. +9VCB Battery Sing of 181, +9VDC or val SVDC power supply for Built-in 77,8 witch. Note: Underwater Mateable Connector is for uses underwater. Other connectors and wire leads are for dry uses and are not waterproofed. 0.2740	Connector Ontions:			·	·	iit of Neceive Signal.				
7. +9VDC Battery Snap (BS), +9VDC or +18VDC power supply for Built-in 7/R Swirtch. 8. 4mm Banana Plug Plag Pick ed and Black Colon (BP), LC power supply for Built-in 7/R Swirtch. Note: Underwater Mateable Connector is for uses underwater. Other connectors and wire leads are for dry uses and are not waterproofed. 9. 27/40	connector Options.	' '	• , , ,	•	•	r Transmit or Possivo	Signal			
8. 4mm Banana Plug Pair (Red and Black Color) (BP), DC power supply for Built-in T/R Switch. Note: Underwater Matebale Connector is for uses underwater. Other connectors and wire leads are for dry uses and are not waterproofed. Q2740 Q3345 Q4250 Q4865 Q6060 Q7365 1. Actual length H depends on Mounting Parts. 2. Diameter can be customized to meet specing specs of an array. Q12 R Q Q2 R Q Q4 R Q Q7						i Transmit or Neceive	Signal.			
Note: Underwater Mateable Connector is for uses underwater. Other connectors and wire leads are for dry uses and are not waterprovided. ### Opart						witch				
waterproofed. waterproofed. 0.724rd 0.33445 0.42x50 0.48x65 0.60x60 0.73x65		_	•	, , , , ,	• •		r dry uses and are not			
Size DDH (mm): 27x40			nateable connector is	o for ages affact water.	other connectors an	id whe leads are to	ary uses and are not			
1. Actual length H depends on Mounting Parts. 2. Diameter can be customized to meet spacing specs of an array. 2. Diameter can be customized to meet spacing specs of an array. 2. Diameter can be customized to meet spacing specs of an array. 2. Diameter can be customized to meet spacing specs of an array. 2. Diameter can be customized to meet spacing specs of an array. 2. Diameter can be customized to meet spacing specs of an array. 2. Diameter can be customized to meet spacing species of the spe			ф33v45	Φ42x50	Φ48v65	Φ60x60	Φ73x65			
Display Disp	Size MDvH (mm):				Ψ40λ03	Φυυλου	Ψ73λ03			
Delay D. 2 kg D. 3 kg D. 4 kg D. 7 kg D. 9 kg D. 1 kg	Size QDXII (IIIII).	_								
Weight in Air: Weight is with 0.15 m cable. Actual weight depends on Mounting Parts, Cable Types and Length. 1. Default: -10 °C to +60 °C or 14 °F to 140 °F. 2. Bespoke High Temperature Transducer: -10°C to 120°C, or 14°F to 248°F. Append HT to part number. 20 °C to +60 °C or -4 °F to 140 °F. 3 Bission Response Impedance Matching between transducers and power amplifiers. Order Separately as standalone devices or append -HMxx0 to the part number for integrating BIIG000 into the transducer, and specify impedance in Q at fs. For example, Bilixxxx Individual Max0 Bilixxxx Individual to the part number for integrating BIIG000 into the transducer, and specify impedance in Q at fs. For example, Bilixxxx Individual Response Air Cable Response Re					0.71-	0.01-	4.41-			
Default: 10 °C to +60 °C or 14 °F to 140 °F.	Weight in Air:						1.1 Kg			
Operation Temperature: 2. Bespoke High Temperature Transducer: -10°C to 120°C, or 14°F to 248°F. Append HT to part number. 5torage Temperature: -20°C to +60°C or -4°F to 140°F. Bill6000 Bespoke Impedance Matching between transducers and power amplifiers. Order Separately as standalone devices or append -ImMxOt to the part number for integrating Bill6000 into the transducer, and specify impedance in Ω at fs. For example, Billxxxx. IMPR Billxxxx transducer with builti-in Impedance Watching unit as 80 load at fs. 1. Whe Rive > 1/G. TWR increases, FFVS discreases. Generally, this is true for low frequency transducers. 2. When Rive > 1/G. TWR increases, FFVS discreases. Generally, this is true for high frequency transducers. 2. When Rive > 1/G. TWR increases, FFVS discreases. Generally, this is true for high frequency transducers. 3. When Rive > 1/G. TWR increases, FFVS discreases. Generally, this is true for high frequency transducers. 3. When Rive > 1/G. TWR increases, FFVS discreases. Generally, this is true for high frequency transducers. 3. When Rive > 1/G. TWR increases, FFVS discreases. Generally, this is true for high frequency transducers. 3. Bill2000 Into the transducer. For example, Billxxxxx transducer with a builti-in TYR switch into transducer or append -I'R to the part number for integrating and filter. 3. Bill2000 Into the transducer. For example, Billxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx		_			Parts, Cable Types an	d Length.				
2. Bespoke High Temperature: 2. Or Yor 6+0° Cor -4* To 10.0**. Or 14* To 128* T. Append HI to part number. Bill6000 Bespoke Impedance Matching between transducers and power amplifiers. Order Separately as standalone devices or append -IMMx01 to the part number for integrating Bil6000 into the transducer, and specify impedance in Ω at fs. For example, Bilbxxx-IM8Ω: Bibxxx transducer with built-in Impedance Matching unit as 8Ω load at fs. TVR and FFVS variation of a transducer with built-in Impedance Matching with the transducers. 1. When R _{Mx} ≥ 1/6, TVR increases, FFVS increases. Generally, this is true for low frequency transducers. 2. When R _{Mx} ≥ 1/6, TVR increases, FFVS increases. Generally, this is true for high frequency transducers. 2. When R _{Mx} ≥ 1/6, TVR increases, FFVS increases. Generally, this is true for high frequency transducers. 3. When R _{Mx} ≥ 1/6, TVR increases, FFVS increases. Generally, this is true for high frequency transducers. 3. When R _{Mx} ≥ 1/6, TVR increases, FFVS increases. Generally, this is true for high frequency transducers. 4. Bil2100 Transmitting & Receiving Switch. Order Separately as standalone devices or append ±TR to the part number for integrating and filter: 4. Bil2100 Into the transducer. For example, Bilbxxxx TRIR Bilbxxxx transducer with built-in T/R Switch. 4. Integrating impedance matching network and T/R switch into transducer by append ±TRIMxxxX to the part number. For example, Bilbxxxx transducers with a built-in T/R Switch and an impedance matching network as 3500 load at fs. 4. Bill1000 Power Amplifiers for SDNAR, NDT, HIFU. Order Separately as standalone devices. 4. Bill1000 Power Amplifiers for SDNAR, NDT, HIFU. Order Separately as standalone devices. 4. Bill1000 Power Amplifiers for SDNAR, NDT, HIFU. Order Separately as standalone devices. 5. Bill1000 Power Amplifiers for SDNAR, NDT, HIFU. Order Separately as standalone devices. 5. Bill1000 Power Amplifiers for SDNAR, NDT, HIFU. Order Separately as standalone devices. 5. Bill1000 Power Amp	Operation Temperature:									
Bilisood Bespoke Impedance Matching between transducers and power amplifiers. Order Separately as standalone devices or append -HMXxx0 to the part number for integrating Bilisood into the transducer, and specify impedance in Q at fs. For example, Bilisxxos IMMSD: Bilixxxx transducer with built-in Impedance Matching unit as 80 load at fs. TVR and FFVS variation of a transducer with built-in Impedance Matching Network: 1. When R _{Mx} < 1/16, TVR Indereases, FFVS decreases. Generally, this is true for low frequency transducers. 2. When R _{Mx} > 1/16, TVR Indereases, FFVS increases. Generally, this is true for low frequency transducers. R _{Mx} : Impedance Matched Resistance such as 50 G. G: Transducer Conductance at Operating Frequency. TR Switch with Preamp ali 12100 Into the transducer. For example, Bilixxxos Transducer with built-in T/R Switch. Impedance Matching and Integrating Impedance matching network and T/R switch into transducer with built-in T/R Switch. Integrating Impedance matching network and T/R switch into transducer with built-in T/R Switch. Integrating Impedance matching network and T/R switch into transducer with built-in T/R Switch. Integrating Impedance matching network and T/R switch into transducer with built-in T/R Switch. Integrating Impedance matching network and T/R switch into transducer with built-in T/R Switch. Integrating Impedance matching network and T/R switch into transducer with built-in T/R Switch. Integrating Impedance matching network and T/R switch into transducer with built-in T/R Switch. Integrating Impedance matching network and T/R switch into transducer with built-in T/R Switch. Integrating Impedance matching network and T/R switch into transducer with built-in T/R Switch for Switch Transducer Bilisood-Transducer Properties of Switch for Switch Transducer Support of Transducer Bilisood-Transducer Switch From Transducer Swit	· · · · · · · · · · · · · · · · · · ·		•	-10°C to 120°C, or 14°F	to 248°F. Append HT	to part number.				
append - Mbxx0 to the part number for integrating BII6000 into the transducer, and specify impedance in Ω at fs. For example, BIIxxxx. MBx Bilixxxx. transducer with built-in impedance Matching mit as 80 load at fs. TVR and FFVS variation of a transducer with built-in impedance Matching Network: 1. When Ray ≤ 1/6, TVR increases, FFVS increases. Generally, this is true for law frequency transducers. Rm: Impedance-Matched Resistance such as 50 0.6. Transducer Conductance at Operating Frequency. Rm: Impedance-Matched Resistance such as 50 0.6. Transducer Conductance at Operating Frequency. Bil200 Transmitting & Receiving Switch. Order Separately as standalone devices and append -TR to the part number for integrating and filter: Impedance Matching and Integrating impedance matching network and T/R switch into transducer with built-in T/R switch into transducer with built-in T/R switch into transducer with part number. For example, Bilxxxxx-TRIMSDOC Bilxxxx-TRIMSDOC Bilxxx-TRIMSDOC Bilxxxx-TRIMSDOC Bilxxxx-TRIMSDOC Bilxxxx-TRIMSDOC Bilxxxx-TRIMSDOC Bilxxxx-TRIMSDOC Bilxxxx-TRIMSDOC Bilxxxx-TRIMSDOC Bilxxxx-TRIMSDOC Bilxxx-TRIMSDOC Bilxxx-TRIMSDOC Bilxxx-TRIMSDOC Bilxxx-TRIMSDOC Bilxxx-TRIMSDOC Bilxxx-TRIMSDOC Bilxx-TRIMSDOC Bilxx-TRIMSDOC Bilxx-TRIMSDOC Bilxx-TRIMSDOC Bilxx-TRIMSDOC Bilxx-TRIMSDOC Bilxx-TRIMSDOC Bilxx-TRIMSDOC Bilxx-TRIMSDOC Bilxx	Storage Temperature:									
IMBCI: Biboxox transducer with built-in Impedance Matching with as 80 load at fs. 1 When R _M × 1/G, TVR and FFVS variation of a transducer with built-in Impedance Matching Network: 1. When R _M × 1/G, TVR increases, FFVS decreases. Generally, this is true for high frequency transducers. 2. When R _M × 1/G, TVR decreases, FFVS increases. Generally, this is true for high frequency transducers. 2. When R _M × 1/G, TVR decreases, FFVS increases. Generally, this is true for high frequency transducers. 3. When R _M × 1/G, TVR decreases, FFVS increases. Generally, this is true for high frequency transducers. 3. When R _M × 1/G, TVR decreases, FFVS increases. Generally, this is true for high frequency transducers. 3. When R _M × 1/G, TVR decreases, FFVS increases. Generally, this is true for high frequency transducer. 3. When R _M × 1/G, TVR decreases, FFVS increases. Generally, this is true for high frequency transducer. 4. Bib200 Transmitting & Receiving Switch. Order Separately as standalone devices or append -TR to the part number for integrating influence that the transducer into the transducer with a built-in T/R switch and an impedance matching network as a 50Ω load at fs. 3. Default: No built-in temperature sensor. 4. Default: No built-in temperature sensor. 4. Bib200 Power Amplifiers 5. Bib200 Power Amplifiers for SONAR, NDT, HIFU. Order Separately as standalone devices. 9. Potable Transmitter 8. Bib200 Power Amplifiers for SONAR, NDT, HIFU. Order Separately as standalone devices. 9. Bib200 Power Amplifiers for SONAR, NDT, HIFU. Order Separately as standalone devices. 9. Bib200 Power Amplifiers for SONAR, NDT, HIFU. Order Separately as standalone devices. 9. Bib200 Power Amplifiers for SONAR, NDT, HIFU. Order Separately as standalone devices. 9. Bib200 Series portable accustic transmitters. 9. Bib200 Power Amplifiers for SONAR, NDT, HIFU. Order Separately as standalone devices. 9. Bib200 Series portable accustic transmitters. 9. Bib200 Series portable accustic transmitters. 9. Bib200 S										
TVR and FFVS variation of a transducer with built-in Impedance Matching Network: 1. When R _M < 1/6, TVR increases, FFVS increases. Generally, this is true for low frequency transducers. 2. When R _M > 1/6, TVR decreases, FFVS increases. Generally, this is true for low frequency transducers. R _M : Impedance-Matched Resistance such as 50 Ω. G. Transducer Conductance at Operating Frequency. TR Switch with Preamp and filter: Bili2100 Transducer. For example, Bllxxxxx TRININGN: Bli2100 Transducer. For example, Bllxxxxx TRININGN: Bli2100 Into the transducer. For example, Bllxxxx TRININGN: Blixxxx TRININGN: Transducer Blixxxx TRININGN: Blixxxx TRININGN: Transducer Blixxxx TRININGN: The transducer. Power Amplifier: Blixxxxx TRININGN: Blixxxx TRININGN: Transducer Blixxxxx TRININGN: Blixxxx Transducer. Blixxxx TRININGN: Blixxxx TRININGN: Transducer. Blixxxx TRININGN: Blixxxx TRININGN: Transducer. Blixxxx TRININGN: Blixxxx TRININGN: Blixxxx TRININGN: Transducer. Blixxxxx TRININGN: Blixxxx TRININGN: Blixxxxx TRININGN: Blixxxxx TRININGN: Blixxxxx TRININGN: Blixxxxx TRININGN: Blixxxxx TRININGN: Blixxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx										
1. When R _{sux} > 1/6, TVR increases, FFVS decreases. Generally, this is true for low frequency transducers. 2. When R _{sux} > 1/6, TVR decreases, FFVS decreases. Generally, this is true for high frequency transducers. R _{suc} : Impedance-Matched Resistance such as 50 0. G: Transducer Conductance at Operating Frequency. RESWITCH WITH PREAM BILLION Transmitting & Receiving Switch. Order Separately as standalone devices or append -TR to the part number for integrating and filter: RID2100 Into the transducer. For example, Billixxx transducer will builtin- IT/R Switch. Impedance Matching and Integrating Impedance matching network and T/R switch into transducer by append -TRIMXCO to the part number. For example, Billixxxx-TRIMSOC: Billixxxx-TRIMSXXX. Power Amplifier: Billixxxx-TRIMSOC: Billixxx-TRIMSOC: Billixx-TRIMSOC: Billixx-TRIMSOC: Billixxx-TRIMSOC: Billixxx-TRIMSOC: Billixxx-TRIMSOC: Billixxx-TRIMSOC: Billixxx-TRIMSOC: Billixxx-TRIMSOC: Billixx-Tx-TRIMSOC: Billixxx-TRIMSOC: Billixxx-Tx-Trixx-Tx-Tx-Tx-Tx-Tx-Tx-Tx-Tx-Tx-Tx-Tx-Tx-T										
2. When Raw > 1/G, TVR decreases, FFVS increases. Generally, this is true for high frequency transducers. Raw: Impedance-Matched Resistance such as 50 \(\Omega \). G. Transducer Conductance at Operating Frequency. Bil2100 Transmitting & Receiving Switch. Order Separately as standalone devices or append -TR to the part number for integrating and filter: Bil2100 Into the transducer. For example, Bilxxxx transducer with built-in T/R Switch. Impedance Matching and Integrating Impedance matching network and T/R switch into transducer with built-in T/R Switch. Integrating Impedance matching network and T/R switch into transducer with built-in T/R Switch. Integrating Impedance matching network as a 500 load at fs. 1. Default: No built-in temperature sensor. 2. Built-in temperature sensor. 2. Built-in temperature sensor. 3. Built-in temperature sensor. 4. Built-in temperature sensor. 5. Built-in temperature sensor. 5. Built-in temperature sensor. 6. Built-in Voltage or Son AR, NDT, HIFU. Order Separately as standalone devices. Portable Transmitter: 8. Built-300 series portable acoustic transmitters. 8. Built-300 series portable acoustic transmitters. 9. Built-300 series portable acoustic transmitters. WARNING: 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. 6. SON BNC/SMA/SMC consector, it is buyer's sole responsibility to make sure that the BNC/SMA/SMC shield of the signal source is firmly grounded for operating safety before hooking up transducer for Built-in T/R Switch for Sound Receiving with Transducer Bil760x/xx-TR or Bil760x/xx-TRIMXx0. Yes, Fixed Gain Preamp and Filter are built inside transducer housing. Yes, Fixed Gain Preamp and Filter are built inside transducer housing. 1. Avoid signal loss over cable. 3. Bespoke: 0 dit to 60 dB. 2. Bespoke: 0 dit to	Impedance Matching:	i g								
Rs.: Impedance-Matched Resistance such as 50 O. G: Transducer Conductance at Operating Frequency. RS Witch with Preamp and filter: RS Witch with Preamp and Biliz100 Transmitting & Receiving Switch. Order Separately as standalone devices or append -TR to the part number for integrating Biliz100 into the transducer. For example, Bilixxxx-TR. Bilixxxx transducer with built-in T/R Switch. Impedance Matching and Integrating Impedance matching network and T/R switch into transducer by append -TRIMxxQ to the part number. For example, Bilixxxx-TRIMSOQ: Bilixxxx-TRIMSOQ: Bilixxxx-TRIMSOQ: Bilixxxx-TRIMSOQ: Bilixxxx-TRIMSOQ: Bilixxxx-TRIMSOQ: Bilixxxx-TS witch and an impedance matching network as a 500 load at fs. 1. Default: No built-in temperature sensor. 2. Built-in temperature sensor. Append -TS to part number (Bilixxxx-TS) for integrating a temperature sensor in the transducer. Power Amplifier: 8. Bilis000 Power Amplifiers for SONAR, NDT, HIFU. Order Separately as standalone devices. Potable Transmitter: 8. Bilis000 Power Amplifiers for SONAR, NDT, HIFU. Order Separately as standalone devices. RARNING: 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. Ror SOO BNC/SMA/SMC connector, It is buyer's sole responsibility to make sure that the BNC/SMA/SMC shield of the signal source is firmly grounded for operating safety before hooking up transducer/hydrophone to the signal source. Coax with BNC/SMA/SMC is not intended for hand-held use at voltages above 30Vac/60Vdc. 8 pecifications of Built-in T/R Switch for Sound Receiving with Transducer BilT60x/xx-TR or BilT60x/xx-TRIMxxQ. Yes, Fixed Gain Preamp and Filter are built inside transducer housing. 1. Avoid signal loss caused by strong sounds levels in low frequency range. 2. Avoid signal loss caused by strong sounds levels in low frequency range. 3. Avoid signal loss caused by impedance matching network which is built inside tra										
TR Switch with Preamp and filter: Bill 2100 Into the transducer. For example, Billsxxxx-Transducer with built-in 7/R Switch. Integrating Bill 100 into the transducer. For example, Billsxxxx-Transducer with built-in 7/R Switch. Integrating impedance matching network and T/R switch into transducer with built-in 7/R Switch. Integrating impedance matching network and T/R switch into transducer with built-in 7/R Switch. Billsxxxx-TRIMISOD: Billsxxxx-TRIMISOD: Billxxxx-TRIMISOD: Billxxxx-TRIMIXXxx-TRIMIXXxx-TRIMIXXxx-TRIMIXXxx-TRIMIXXxx-TRIMIXXx-TRIMIXXx-TRIMIXXx-TRIMIXXx-TRIMIXXx-TRIMIXXX-TRIMIXXX-TRIMIX		· · · · · · · · · · · · · · · · · · ·								
and filter: Bill 2100 into the transducer. For example, Bilxxxx transducer with built-in T/R Switch. Impedance Matching and RS witching: Integrating Impedance matching network and T/R switch into transducer by append -TRIMxxΩ to the part number. For example, Bilxxxx-TRIMS00: Bilxxxx transducer with a built- in T/R Switch and an impedance matching network as a 50Ω load at fs. Temperature Sensor: 1. Default: No built-in temperature sensor. 2. Built-in temperature sensor. 2. Built-in temperature sensor. Append -TS to part number (Bibxxx-TS) for integrating a temperature sensor in the transducer. Power Amplifier: Bils000 Power Amplifiers for SONAR, NDT, HIFU. Order Separately as standalone devices. Potable Transmitter: Bils8030 series portable acoustic transmitters. Portable Tyr System: Bils8030 series portable transmit and receive systems. WARNING: DAMGER — Hiefd NOTTAGE on wires. Wires shall be insulated for safety. DO NOT TOUCH THE WIRES BEFORE THE DRIVING SIGNAL IS SHUTDOWN. Cable shield must be grounded firm by for safety. For SOB SNC/SMA/SMC connector, it is buyer's sole responsibility to make sure that the BNC/SMA/SMC shield of the signal source is firmly grounded for operating afety before hooking up transducer/hydrophone to the signal source. Coax with BNC/SMA/SMC is not intended for hand-held use at voltages above 30Vac/60Vdc. Specifications of Built-in T/R Switch for Sound Receiving with Transducer BIl760x/xx-TR or Bil760x/xx-TRIMxxQ. Yes, Fixed Gain Preamp and Filter are built inside transducer housing. 1. Defau		· · · · · · · · · · · · · · · · · · ·			· · · · · · · · · · · · · · · · · · ·					
Integrating Impedance Matching and R Switching: Bibxox-TRIMSOΩ: Bibxox transducer with a built-in T/R Switch and an impedance matching network as a 50Ω load at fs. Temperature Sensor: 1. Default: No built-in themperature sensor. 2. Built-in temperature sensor. 3. Built-in temperature sensor. 3. Built-in temperature sensor. 3. Built-in temperature sensor. Append -TS to part number (Bibxoxx-TS) for integrating a temperature sensor in the transducer. Power Amplifier: Biis000 Power Amplifiers for SONAR, NDT, HIPU. Order Separately as standalone devices. Portable T/R System: Biis030 series portable acoustic transmitters. Portable T/R System: Biis030 series portable transmit and receive systems. WARNING: 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 SOO BNC/SMA/SMC connector, it is buyer's sole responsibility to make sure that the BNC/SMA/SMC shield of the signal source is firmly grounded for operating safety before hooking up transducer/hydrophone to the signal source. Coax with BNC/SMA/SMC is not intended for hand-held use at voltages above 30Vac/60Vdc. Specifications of Built-in T/R Switch for Sound Receiving with Transducer BII760x/xx-TR or BII760x/xx-TRIMxxΩ. Yes, Fixed Gain Preamp and Filter are built inside transducer housing. 1. Avoid saturation caused by strong sounds levels in low frequency range. 2. Avoid signal loss caused by impedance matching network which is built inside transducers. Preamp Gain: 1. Default: 40 dB 2. Bespoke: 0 dB to 60 dB. 3. Perfault: 14 to 450 kHz. 3. Default: 40 dB 3. Default: 40 dB 4. Default: 40 dB 5. Bespoke: 0 dB to 60 dB. 5. Bespoke: 0 dB to 60 dB. 6. Default: 40 dB 7. Default: 40 dB 8. Default: 40 dB 9. Bespoke: 0 dB to 60 dB. 9. Default: 40 dB 9. Bespoke: 0 dB to 60 dB. 9. Default: 40 dB 9. Def	·						number for integrating			
TR Switching: Blbcox-TRIM50Ω: Blbcox transducer with a built-in T/R Switch and an impedance matching network as a 50Ω load at fs. 1. Default: No built-in temperature sensor. 2. Built-in temperature sensor. Append -T5 to part number (Blbxxxx-T5) for integrating a temperature sensor in the transducer. Bils000 Power Amplifiers Bils000 Power Amplifiers for SONAR, NDT, HIFU. Order Separately as standalone devices. Potable Transmitter: Bils030 series portable decive systems. WARNING: 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 SOΩ BNC/SMA/SMC connector, it is buyer's sole responsibility to make sure that the BNC/SMA/SMC shield of the signal source is firmly grounded for operating safety before hooking up transducer/hydrophone to the signal source. Coax with BNC/SMA/SMC is not intended for hand-held use at voltages above 30Vac/60Vdc. Specifications of Built-in T/R Switch for Sound Receiving with Transducer BIJ760x/xx-TR or BIJ760x/xx-TRIMxxΩ. Yes, Fixed Gain Preamp and Filter are built inside transducer housing. 1. Avoid signal loss over cable. 3. Avoid signal loss caused by strong sounds levels in low frequency range. 2. Avoid signal loss caused by unpedance matching network which is built inside transducers. 1. Default: 40 dB 2. Bespoke: 20 to 60 dB. 1. Default: 40 dB 2. Bespoke: 20 to 60 dB. 2. Bespoke: 20 to 60 dB. 2. Customized. Specify when ordering. 1. Default: 11 Hz to 450 kHz. 2. Customized. Specify when ordering. 1. Reduce Noise. Both ocean ambient noises and the self-noises of electronic devices decrease when frequency increases. It is recommended to choose a built-in high pass filter to reject noises in low frequency range. For example, if you are interested in the signals greater than 200 Hz, you may specify a high pass filter with -3dB cut-off frequency at 100 Hz to improve signal to noise ratio of the signals of the interest. 2. Avoid Saturati										
1. Default: No built-in temperature sensor. 2. Built-in temperature sensor, Append -TS to part number (Bllxxxx-TS) for integrating a temperature sensor in the transducer. Power Amplifier: BISO00 Power Amplifiers for SONAR, NDT, HIFU. Order Separately as standalone devices. Potable Transmitter: BIB080 series portable acoustic transmitters. Portable T/R System: BIB080 series portable transmit and receive systems. WARNING: 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/SMA/SMC connector, it is buyer's sole responsibility to make sure that the BNC/SMA/SMC shield of the signal source is firmly grounded for operating safety before hooking up transducer/hydrophone to the signal source. Coax with BNC/SMA/SMC is not intended for hand-held use at voltages above 30Vac/60Vdc. Specifications of Built-in T/R Switch for Sound Receiving with Transducer BIJT60x/xx-TR or BIJ760x/xx-TRIMxxΩ. Yes, Fixed Gain Preamp and Filter: Preamp Gain: Yes, Fixed Gain Preamp and Filter are built inside transducer housing. 1. Avoid signal loss over cable. 3. Avoid signal loss caused by impedance matching network which is built inside transducers. 1. Default: 40 dB 2. Bespoke: 0 dB to 60 dB. 1. Default: 40 dB 2. Bespoke: 0 dB to 60 dB. 1. Default: 100 kHz to 10 MHz. 2. Customized. Specify when ordering. 1. Reduce Noise. Both ocean ambient noises and the self-noises of electronic devices decrease when frequency increases. It is recommended to choose a built-in high pass filter to reject noises in low frequency range. For example, if you are interested in the signals greater than 200 Hz, you may specify a high pass filter with -3dB cut-off frequency at 100 Hz to improve signal to noise ratio of the signals of the interest. 2. Avoid Saturation. When there are strong low frequency noises, disturbances, and/or vibrations, resulting from rough surface waves and/or mechanical movements of			-			-	-			
2. Built-in temperature sensor. Append -TS to part number (Bllxxxxx-TS) for integrating a temperature sensor in the transducer. Power Amplifier: 8 5000 Power Amplifiers for SONAR, NDT, HIFU. Order Separately as standalone devices. Potable Transmitter: 8 8030 series portable acoustic transmitters. Portable T/R System: 8 8030 series portable transmit and receive systems. WARNING: 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 SOΩ BNC/SMA/SMC connector, it is buyer's sole responsibility to make sure that the BNC/SMA/SMC shield of the signal source is firmly grounded for operating safety before hooking up transducer/hydrophone to the signal source. Coax with BNC/SMA/SMC is not intended for hand-held use at voltages above 30Vac/60Vdc. Specifications of Built-in T/R Switch for Sound Receiving with Transducer Bll760x/xx-TR or Bll760x/xx-TRIMxxΩ. Yes, Fixed Gain Preamp and Filter are built inside transducer housing.	TR Switching:				an impedance matci	ning network as a 500	2 load at is.			
Power Amplifier: BISO00 Power Amplifiers for SONAR, NDT, HIFU. Order Separately as standalone devices. Potable Transmitter: BIB030 series portable acoustic transmitters. Portable T/R System: BIB080 series portable transmit and receive systems. WARNING: 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 SO0 BNC/SMA/SMC connector, it is buyer's sole responsibility to make sure that the BNC/SMA/SMC shield of the signal source is firmly grounded for operating safety before hooking up transducer/hydrophone to the signal source. Coax with BNC/SMA/SMC is not intended for hand-held use at voltages above 30Vac/60Vdc. Specifications of Built- in T/R Switch for Sound Receiving with Transducer BII760x/xx-TR or BII760x/xx-TRIMxxΩ. Yes, Fixed Gain Preamp and Filter are built inside transducer housing.	Temperature Sensor:		•		TC) C					
Potable Transmitter: Portable T/R System: Bil8030 series portable acoustic transmitters. Portable T/R System: Bil8080 series portable transmit and receive systems. WARNING: 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/SMA/SMC connector, it is buyer's sole responsibility to make sure that the BNC/SMA/SMC shield of the signal source is firmly grounded for operating safety before hooking up transducer/hydrophone to the signal source. Coax with BNC/SMA/SMC is not intended for hand-held use at voltages above 30Vac/60Vdc. Specifications of Built-in T/R Switch for Sound Receiving with Transducer BIl760x/xx-TR or BIl760x/xx-TRIMxxΩ. Preamp and Filter: Preamp and Filter: Preamp Gain: Preamp Gain: 1. Default: 40 dB 2. Bespoke: 0 dB to 60 dB. 1. Default: 40 dB 2. Bespoke: 0 dB to 60 dB. 1. Default: 40 dB 2. Bespoke: 20 to 60 dB. 1. Default: 11 Nz to 450 kHz. 2. Customized. Specify when ordering. 1. Reduce Noise. Both ocean ambient noises and the self-noises of electronic devices decrease when frequency increases. It is recommended to choose a built-in high pass filter to reject noises in low frequency range. For example, if you are interested in the signals greater than 200 Hz, you may specify a high pass filter with -3dB cut-off frequency at 100 Hz to improve signal to noise ratio of the signals of the interest. 2. Avoid Saturation. When there are strong low frequency noises, disturbances, and/or vibrations, resulting from rough surface waves and/or mechanical movements of the platform, it is recommended to specify a high pass filter to avoid hydrophone saturation in these low frequency ranges. Voltage Noise RTI en: Voltage Noise RTI en: O. 56 fA/VHz. 1. 6 pA/VHz.			I I I		-,0 0 -		in the transducer.			
Portable T/R System: Bili8080 series portable transmit and receive systems. WARNING: 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/SMA/SMC connector, it is buyer's sole responsibility to make sure that the BNC/SMA/SMC shield of the signal source is firmly grounded for operating safety before hooking up transducer/hydrophone to the signal source. Coax with BNC/SMA/SMC is not intended for hand-held use at voltages above 30Vac/60Vdc. Specifications of Built-in T/R Switch for Sound Receiving with Transducer Bil760x/xx-TR or Bil760x/xx-TRIMxxΩ. Yes, Fixed Gain Preamp and Filter are built inside transducer housing. 1. Avoid signal loss over cable. 3. Avoid signal loss caused by strong sounds levels in low frequency range. 2. Avoid signal loss caused by impedance matching network which is built inside transducers. Preamp Gain: 1. Default: 40 dB 2. Bespoke: 0 dB to 60 dB. 2. Bespoke: 20 to 60 dB. 3. Default: 1 Hz to 450 kHz. 4. Default: 1 Hz to 450 kHz. 5. Customized. Specify when ordering. 5. Customized. Specify when ordering. 6. Reduce Noise. Both ocean ambient noises and the self-noises of electronic devices decrease when frequency increases. It is recommended to choose a built-in high pass filter to reject noises in low frequency range. For example, if you are interested in the signals greater than 200 Hz, you may specify a high pass filter with -3dB cut-off frequency at 100 Hz to improve signal to noise ratio of the signals of the interest. 6. Avoid Saturation. When there are strong low frequency noises, disturbances, and/or vibrations, resulting from rough surface waves and/or mechanical movements of the platform, it is recommended to specify a high pass filter to avoid hydrophone saturation in these low frequency ranges. Voltage Noise RTI in: 2. O. In V/VHz at default gain. 3. On V/VHz at default gain. 4. On V/VHz at default gain. 5. On V/VHz at default g	Power Amplifier:	<u> </u>			as standalone device	es.				
WARNING: 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 50Q BNC/SMA/SMC connector, it is buyer's sole responsibility to make sure that the BNC/SMA/SMC shield of the signal source is firmly grounded for operating asfety before hooking up transducer/hydrophone to the signal source. Coax with BNC/SMA/SMC is not intended for hand-held use at voltages above 30Vac/60Vdc. Specifications of Built-in T/R Switch for Sound Receiving with Transducer BII760x/xx-TR or BII760x/xx-TRIMxxΩ. Yes, Fixed Gain Preamp and Filter are built inside transducer housing. 1. Avoid saturation caused by strong sounds levels in low frequency range. 2. Avoid signal loss over cable. 3. Avoid signal loss caused by impedance matching network which is built inside transducers. Preamp Gain: 1. Default: 40 dB 2. Bespoke: 0 dB to 60 dB. 1. Default: 40 dB 2. Bespoke: 20 to 60 dB. 1. Default: 11 tz to 450 kHz. 2. Customized. Specify when ordering. 2. Customized. Specify when ordering. 3. Reduce Noise. Both ocean ambient noises and the self-noises of electronic devices decrease when frequency increases. It is recommended to choose a built-in high pass filter to reject noises in low frequency range. For example, if you are interested in the signals greater than 200 Hz, you may specify a high pass filter to reject noises, alisturbances, and/or vibrations, resulting from rough surface waves and/or mechanical movements of the platform, it is recommended to specify a high pass filter to avoid hydrophone saturation in these low frequency ranges. Voltage Noise RTI en: Voltage Noise RTI en: Voltage Noise RTI en: 0.56 fA/VHz. 1.6 pA/VHz.	Potable Transmitter:	BII8030 series portal	ole acoustic transmitte	ers.						
shield must be grounded firmly for safety. for 50Ω BNC/SMA/SMC connector, it is buyer's sole responsibility to make sure that the BNC/SMA/SMC shield of the signal source is firmly grounded for operating safety before hooking up transducer/hydrophone to the signal source. Coax with BNC/SMA/SMC is not intended for hand-held use at voltages above 30Vac/60Vdc. Specifications of Built-in T/R Switch for Sound Receiving with Transducer BII760x/xx-TR or BII760x/xx-TRIMxxΩ. Yes, Fixed Gain Preamp and Filter are built inside transducer housing. 1. Avoid signal loss over cable. 2. Avoid signal loss over cable. 3. Avoid signal loss caused by impedance matching network which is built inside transducers. Preamp Gain: 1. Default: 40 dB 2. Bespoke: 20 to 60 dB. 2. Bespoke: 20 dB to 60 dB. 2. Bespoke: 20 to 60 dB. 3. Default: 1 Hz to 450 kHz. 1. Default: 100 kHz to 10 MHz. 2. Customized. Specify when ordering. 2. Customized. Specify when ordering. 3. Reduce Noise. Both ocean ambient noises and the self-noises of electronic devices decrease when frequency increases. It is recommended to choose a built-in high pass filter to reject noises in low frequency at 100 Hz to improve signal to noise ratio of the signals greater than 200 Hz, you may specify a high pass filter with -3dB cut-off frequency at 100 Hz to improve signal to noise ratio of the signals greater than 200 Hz, you may specify a high pass filter with -3dB cut-o	Portable T/R System:	BII8080 series portal	ole transmit and receiv	ve systems.						
For 50Ω BNC/SMA/SMC convector, it is buyer's sole responsibility to make sure that the BNC/SMA/SMC shield of the signal source is firmly grounded for operating safety before hooking up transducer/hydrophone to the signal source. Coax with BNC/SMA/SMC is not intended for hand-held use at voltages above 30Vac/60Vdc. Specifications of Built-in T/R Switch for Sound Receiving with Transducer BII760x/xx-TR or BII760x/	WARNING: DANGER — HIGH	VOLTAGE on wires. Wi	res shall be insulated	for safety. DO NOT TOU	CH THE WIRES BEFOR	E THE DRIVING SIGNA	L IS SHUT DOWN. Cable			
Specifications of Built-in T/R Switch for Sound Receiving with Transducer BII760x/xx-TR or BII760x/xx-TRIMxxΩ. Yes, Fixed Gain Preamp and Filter are built inside transducer housing. 1. Avoid sturation caused by strong sounds levels in low frequency range. 2. Avoid signal loss over cable. 3. Avoid signal loss caused by impedance matching network which is built inside transducers. Preamp Gain: 1. Default: 40 dB 2. Bespoke: 0 dB to 60 dB. 1. Default: 11 tz to 450 kHz. 2. Customized. Specify when ordering. 1. Reduce Noise. Both ocean ambient noises and the self-noises of electronic devices decrease when frequency increases. It is recommended to choose a built-in high pass filter to reject noises in low frequency ange. For example, if you are interested in the signals greater than 200 Hz, you may specify a high pass filter with -3dB cut-off frequency at 100 Hz to improve signal to noise ratio of the signals of the interest. 2. Avoid Saturation. When there are strong low frequency noises, disturbances, and/or vibrations, resulting from rough surface waves and/or mechanical movements of the platform, it is recommended to specify a high pass filter to avoid hydrophone saturation in these low frequency ranges. Voltage Noise RTI en: 7. O nV/VHz at default gain. 1. O nV/VHz at default gain. 1. O nV/VHz.	shield must be grounded firm	mly for safety.								
Specifications of Built-in T/R Switch for Sound Receiving with Transducer BII760x/xx-TR or BII760x/xx-TRIMxxΩ. Yes, Fixed Gain Preamp and Filter are built inside transducer housing. 1. Avoid saturation caused by strong sounds levels in low frequency range. 2. Avoid signal loss cover cable. 3. Avoid signal loss caused by impedance matching network which is built inside transducers. 1. Default: 40 dB 2. Bespoke: 0 dB to 60 dB. 1. Default: 1 Hz to 450 kHz. 2. Customized. Specify when ordering. 1. Reduce Noise. Both ocean ambient noises and the self-noises of electronic devices decrease when frequency increases. It is recommended to choose a built-in high pass filter to reject noises in low frequency range. For example, if you are interested in the signals greater than 200 Hz, you may specify a high pass filter with -3dB cut-off frequency at 100 Hz to improve signal to noise ratio of the signals of the interest. 2. Avoid Saturation. When there are strong low frequency noises, disturbances, and/or vibrations, resulting from rough surface waves and/or mechanical movements of the platform, it is recommended to specify a high pass filter to avoid hydrophone saturation in these low frequency ranges. Voltage Noise RTI en: 7.0 nV/VHz at default gain. 1.0 nV/VHz at default gain. 1.0 pA/VHz.	for 50Ω BNC/SMA/SMC con	nector, it is buyer's sole	responsibility to mak	e sure that the BNC/SN	A/SMC shield of the s	ignal source is firmly	grounded for operating			
Preamp and Filter: Preamp and Filter: Preamp and Filter: Preamp and Filter: Preamp Gain: Preamp	safety before hooking up tra	nsducer/hydrophone to	o the signal source. Co	oax with BNC/SMA/SMC	is not intended for ha	and-held use at voltag	es above 30Vac/60Vdc.			
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Preamp Gain: 1. Default: 40 dB 2. Bespoke: 0 dB to 60 dB. 2. Bespoke: 20 to 60 dB. 2. Bespoke: 20 to 60 dB. 3. Default: 1 Hz to 450 kHz. 3. Customized. Specify when ordering. 4. Reduce Noise. Both ocean ambient noises and the self-noises of electronic devices decrease when frequency increases. It is recommended to choose a built-in high pass filter to reject noises in low frequency range. For example, if you are interested in the signals greater than 200 Hz, you may specify a high pass filter with -3dB cut-off frequency at 100 Hz to improve signal to noise ratio of the signals of the interest. 2. Avoid Saturation. When there are strong low frequency noises, disturbances, and/or vibrations, resulting from rough surface waves and/or mechanical movements of the platform, it is recommended to specify a high pass filter to avoid hydrophone saturation in these low frequency ranges. Voltage Noise RTI en: 7.0 nV/VHz at default gain. 1.0 nV/VHz at default gain. 1.0 pA/VHz.	Freamp and Filter.	2. Avoid signal loss o	ver cable.							
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1. Reduce Noise. Both ocean ambient noises and the self-noises of electronic devices decrease when frequency increases. It is recommended to choose a built-in high pass filter to reject noises in low frequency range. For example, if you are interested in the signals greater than 200 Hz, you may specify a high pass filter with -3dB cut-off frequency at 100 Hz to improve signal to noise ratio of the signals of the interest. 2. Avoid Saturation. When there are strong low frequency noises, disturbances, and/or vibrations, resulting from rough surface waves and/or mechanical movements of the platform, it is recommended to specify a high pass filter to avoid hydrophone saturation in these low frequency ranges. Voltage Noise RTI en: 7.0 nV/VHz at default gain. 1.0 nV/VHz at default gain. 1.6 pA/VHz.		1. Default: 1 Hz to 45	60 kHz.		1. Default: 100 kHz	to 10 MHz.				
1. Reduce Noise. Both ocean ambient noises and the self-noises of electronic devices decrease when frequency increases. It is recommended to choose a built-in high pass filter to reject noises in low frequency range. For example, if you are interested in the signals greater than 200 Hz, you may specify a high pass filter with -3dB cut-off frequency at 100 Hz to improve signal to noise ratio of the signals of the interest. 2. Avoid Saturation. When there are strong low frequency noises, disturbances, and/or vibrations, resulting from rough surface waves and/or mechanical movements of the platform, it is recommended to specify a high pass filter to avoid hydrophone saturation in these low frequency ranges. Voltage Noise RTI en: 7.0 nV/VHz at default gain. 1.0 nV/VHz at default gain. 1.6 pA/VHz.		2. Customized. Speci	fy when ordering.		2. Customized. Spec	cify when ordering.				
-3dB Bandwidth: signals greater than 200 Hz, you may specify a high pass filter with -3dB cut-off frequency at 100 Hz to improve signal to noise ratio of the signals of the interest. 2. Avoid Saturation. When there are strong low frequency noises, disturbances, and/or vibrations, resulting from rough surface waves and/or mechanical movements of the platform, it is recommended to specify a high pass filter to avoid hydrophone saturation in these low frequency ranges. Voltage Noise RTI en: 7.0 nV/VHz at default gain. 1.0 nV/VHz at default gain. 1.6 pA/VHz.										
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2. Avoid Saturation. When there are strong low frequency noises, disturbances, and/or vibrations, resulting from rough surface waves and/or mechanical movements of the platform, it is recommended to specify a high pass filter to avoid hydrophone saturation in these low frequency ranges. Voltage Noise RTI en: 7.0 nV/VHz at default gain. 1.0 nV/VHz at default gain. 1.6 pA/VHz.	-3dB Bandwidth:	signals greater than	200 Hz, you may speci	ify a high pass filter wit	n -3dB cut-off frequer	ncy at 100 Hz to impro	ove signal to noise ratio			
and/or mechanical movements of the platform, it is recommended to specify a high pass filter to avoid hydrophone saturation in these low frequency ranges. Voltage Noise RTI en: 7.0 nV/VHz at default gain. 1.0 nV/VHz at default gain. 1.6 pA/VHz.		of the signals of the i	nterest.			•				
these low frequency ranges. Voltage Noise RTI en: 7.0 nV/VHz at default gain. 1.0 nV/VHz at default gain. Current Noise RTI in: 0.56 fA/VHz. 1.6 pA/VHz.		2. Avoid Saturation.	When there are strong	g low frequency noises, o	disturbances, and/or v	ibrations, resulting fro	om rough surface waves			
Voltage Noise RTI en:7.0 nV/VHz at default gain.1.0 nV/VHz at default gain.Current Noise RTI in:0.56 fA/VHz.1.6 pA/VHz.		and/or mechanical n	novements of the pla	tform, it is recommend	ed to specify a high p	ass filter to avoid hy	drophone saturation in			
Current Noise RTI in: 0.56 fA/VHz. 1.6 pA/VHz.		these low frequency	ranges.							
	Voltage Noise RTI e _n :	7.0 nV/vHz at defaul	t gain.		1.0 nV/VHz at defau	ılt gain.				
Input Dynamic Range: ≥ 100 dB at 100 kHz Bandwidth.	Current Noise RTI in:	0.56 fA/VHz.			1.6 pA/√Hz.					
	Input Dynamic Range:	≥ 100 dB at 100 kHz	Bandwidth.							

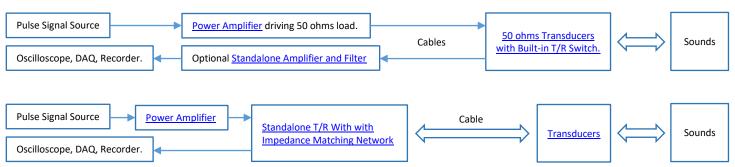


Acoustic Transducers and Arrays

www.benthowave.com

Band Pass Filter:	1st and/or 2nd order, 20/Decade to 40 dB/Decade Ro	oll-off.						
Output Signal Type:	Differential	Single-ended						
Output Impedance:	10 Ω	50 Ω						
Cable Drive Capability:	200 m	1000 m						
Cable:	Four Conductor Shielded Cable	Four Conductor Shielded Cable or Two Coaxial cables. Cable type						
Cable:	Four Conductor Shielded Cable	being used is determined by frequency range and cable length.						
Connector:	Refer to Connector Options.							
Signal Conditioning:	Standalone Programmable Gain Amplifier and Filters to compensate the loss of sound propagation and spreading. Order separately.							
Power Supply								
Supply Voltage V _s :	+8.5 to +32 VDC	+7.5 to +32 VDC						
Current (Quiescent):	6.8 mA	8 mA						
	+9VDC Battery, Marine Battery, Automobile Battery	r, Fixed DC Linear Power Supply, Not Included.						
Suggested DC Supply:	DO NOT use variable power supply whose maximum supply voltage is higher than the above rated voltage.							
	DO NOT use switching mode DC power supply.							
DC Supply Cable:	Two Conductor Shielded Cable if the cable of Receiv	Two Conductor Shielded Cable if the cable of Receiving Signal is Coax.						
DC Supply Connector:	Refer to Connector Options.							

System Setup of Transmitting and Receiving Sounds.



Wiring Information of a Transducer without T/R Switch. Cables will be labelled with #1, #2, #3, #4, #5 ...for multiple arrays inside a transducer.

Single Ended Signal:	Shielded Cable	Coax, BNC.	Underwater Connector	MIL-5015 Connector	XLR Plug
Signal:	White or Red	Center Contact	Contact 2	Contact C	Pin 2
Signal Common:	Black	Shield	Contact 1	Contact B	Pin 3
Shielding and Grounding	Shield	Shield	Contact 3	Contact A	Pin 1
Please contact us for bespol	ce wirings of differential	ransducers such as dipole, quadi	rupole, multimode rings, and flex	tensional sources.	

Wiring Information of Transmitting Sounds of a Transducer with T/R Switch.

Single Ended Signal:	Shielded Cable	Coax, BNC.	Underwater Connector	MIL-5015 Connector	XLR Plug
Signal:	White or Red	Center Contact	Contact 2	Contact C	Pin 2
Signal Common:	Black	Shield	Contact 1	Contact B	Pin 3
Shielding and Grounding	Shield	Shield	Contact 3	Contact A	Pin 1

Wiring Information of Receiving Sounds of a Transducer with T/R Switch.

Differential Output:	Wire Leads	Underwater/XLR Conne	ctor	XLR + 9V Battery Snap	TRS + 9V Battery Snap
+VDC	Red	Pin 3		Battery Female Snap	Battery Female Snap
Common	Black	Pin 1		Battery Male Snap	Battery Male Snap
Signal+	White	Pin 2		XLR Pin 2	TRS Tip
Signal-	Blue, Green, or Yellow	Pin 4		XLR Pin 3	TRS Ring
Signal Common	N/A	N/A		XLR Pin 1	TRS Sleeve
Shielding	Shield	N/A	N/A		N/A
Cincle Ended Outsut	Wire Leads	BNC Male,	Underwater/XLR	XLR Plug and	TRS Plug and
Single Ended Output:	wire Leads	9V Battery Snap	Connector	9V Battery Snap	9V Battery Snap
+VDC	Red	Female Snap	Pin 3	Battery Female Snap	Battery Female Snap
Common	Black	Male Snap	Pin 1	Battery Male Snap	Battery Male Snap
Signal	White	Center Pin or Contact	Pin 2	XLR Pin 2	TRS Tip
Signal Common	Blue, Green, or Yellow	BNC Shield	Pin 4	XLR Pin 1 and Pin 3	TRS Ring and Sleeve
Shielding	Shield	N/A	N/A	XLR Metal Shell	N/A

Wiring Information of Temperature Signal.

Single Ended Signal:	Shielded Cable	Coax, BNC, SMC, SMA	Underwater Connector	XLR Plug	TRS Plug
Signal:	White or Red	Center Contact	Contact 2	Pin 2	Tip
Signal Common:	Black	Shield	Contact 1	Pin 3	Ring
Shielding and Grounding	Shield	Shield	Contact 3	Pin 1	Sleeve



Acoustic Transducers and Arrays

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How to Order Transducers without T/R Switches. The default options are for stock items which are regularly available.

FH: Free Hangin	FH: Free Hanging. SC for Transmit: Shielded Cable (Rubber Jacket, 600V) with 2 conductors. Coax: 50 Ω Coaxial Cable. WL: Wire Leads.										
Part Number	-Appendage	-M	ounting	-Cable Length	-Cable Type	-Connector for signals of Transmit and Temperature Sensor					
BII7600 Series	Default:	De	fault:	Default:	SC for low frequency signal.	Default: WL .					
BII7000 Series	None.	FH		10m.	Coax for high frequency signal.	Default. WL.					
Example:			Description	on							
DU7601/70 DEN	ISS-0.3m-SC-UMO	,	BII7601/7	BII7601/70 Transducer, Bolt Fastening Mounting (Stainless Steel) (BFMSS), 0.3m Shielded Cable, Male Underwater Mateable							
BII/001//0-BFIV	133-0.3111-3C-01010	-	Connector.								
BII7601/70-HT-I	FH-6m-RG178-BN	C	BII7601/7	70 Transducer, Se	rvice Temperature: -10 °C to 120 °C	C, or 14 °F to 248 °F. Free Hanging, 6m RG178 Coax, BNC Male.					
,	0Ω-FH-20m-RG58	-8	BII7601/7	70 Transducer, Bu	ilt-in Impedance Matching Networ	k as 50Ω load at fs, Free Hanging, 20m RG58 Coax, Male BNC.					
BNC											
BII7601/70-IM8Ω-FH-10m-SC-XLR BII7601/70 Transducer, Built-in Impedance Matching Network as 8Ω load at fs, Free Hanging, 10m Shielde					k as 8Ω load at fs, Free Hanging, 10m Shielded Cable, XLR Plug.						
BII7601/70-TS-IM8Ω-FH-10m-SC- BII7601/70 Transducer, Built-in Temperature Sensor, Built-in Impedance Matching Network to 8Ω at fs, Free Hangi						Impedance Matching Network to 8Ω at fs, Free Hanging, 10m					
WL/TRS			Shielded	Cable, Wire Leads	s for Transmit Signal, TRS for Tempe	erature Signal.					

How to Order Transducers with T/R Switches. The default options are for stock items which are regularly available.

FH: Free Hanging. SC for Low Frequency Transmit: Shielded Cable (Rubber Jacket, 600V) with 2 conductors. Coax for High Frequency Transmit: 50 Ω Coaxial Cable. SC for Low Frequency Receive: Shielded Cable with 4 conductors. Coax for High Frequency Receive: 50 Ω Coaxial Cable. WL: Wire Leads. HPF: -3dB High Pass Filter Frequency. LPF: -3dB Low Pass Filter Frequency. Cable of Temperature sensor is two-conductor shielded cable. Cable of DC Supply is two-conductor shielded cable in case that receive cable is coax.

Part Number	-Appendage	-Receive Gain	-HPF/L	PF	-Mounting	-Cable Length	-Cable Type	-Connector for signals of Transmit/ Receive/DC Supply/Temperature
BII7600	Default:	Default:	-3dB Re	eceive bandpass	Default:	Default:	Default:	Default: WL .
Series	TRIM50Ω	40 dB	Freque	ncies.	FH.	10m.	SC or Coax	Default: WL.
Example:				Description				
1	BII7601/70-TR-IM50Ω-40dB-100Hz/200kHz-BFMSS-				OdB, Receive Ba	andpass Filter: 100H	Iz to 200kHz. Bolt	latching Network as 50Ω load at fs, -fastening Mounting (Stainless Steel), or Receive Signal, 9V Battery Snap for
BII7601/70-TS-TR-IM50Ω-40dB-100Hz/200kHz- Network as BFMSS-10m-SC-MIL/XLR/BS/TRS Mounting (\$\frac{1}{2}\$					Σ load at fs, Red nless Steel), 10r	eive Gain: 40dB, Re	eceive Bandpass F IIL-5015 Connecto	Switch, Built-in Impedance Matching ilter: 100Hz to 200kHz. Bolt-fastening or for Transmit Signal, XLR for Receive

Question:

What if the mating connector of my DAQ module or recording device is NOT available from BII?

- 1. Buyer may order BII products with wire leads, and buyer assembles the mating connector to the cable end.
- 2. A connector adaptor might be assembled by BII by customization, and BII ships the adaptor to buyer as accessory of the device. Please contact BII for customizations.
- 3. Many adaptors for standard connectors are available in worldwide electronic suppliers such as BNC to SMA, BNC to SMC, XLR to TRS, etc. Check out your local suppliers.

What are the advantage and disadvantage of a built-in T/R Switch and a standalone T/R Switch?

A built-in T/R Switch amplifies the received signal of the sensing element before the signal is polluted by EMI noise, and before it is attenuated by cable capacitance, inductance, and resistance.

Cable and Connector Information for High Power Signals (from Power Amplifier and to Transducers). Non-UL Uses.

	Wire and Cable Types	Ratings of Voltage, Current or Power, and Temperature.
Cable:	AWG18 Wires (WR)	3000 Vrms, 10 Arms.
	Two Conductor Shielded Cable (SC)	600 Vrms, 5 Arms.
	High Temperature Shielded Cable (HTSC199)	600 Vrms, 6 Arms, up to +199°C or 390 °F, Non-waterproof.
	Coax RG58 (50Ω) (RG58)	1400 Vrms, 4 Arms.
	Coax RG174/U (50Ω) (RG174)	1100 Vrms, 1.6 Arms.
	Coax RG178B/U (50Ω) (RG178).	750 Vrms, 0.86 Arms, up to +200°C or 390°F.
Connector:	Connector Type	Ratings of Voltage, Current or Power, and Temperature.
	1. Wire Leads (WL)	Used for Cables or Wires.
	2. 50Ω BNC (BNC), Bayonet Lock. Panel Mount or In-line.	500Vrms, 316W.
	In-line BNC: Input uses Pin, output uses Socket.	-65°C to 165°C, or -53.9°F to 329°F.
	Panel Mount BNC: Both Input and Output use BNC Jacks.	Used for Grounded Signal with Metal Enclosures or Coax Cables.
	MIL-5015 Type Connector (MIL), Thread Fastening. Panel Mount or In-line. Input uses Pin, output uses Socket.	500Vrms, 13 A; Up to +125°C or 257°F, or,
		900Vrms, 13 A; Up to +125°C or 257°F.
		Used for Metal Enclosures or Shielded Cables.
	4. XLR Connector (XLR), Positive Latchlock.	133Vrms, 15 A; -25°C to +75°C or -13°F to +167°F.
	Panel Mount or In-line. Input uses Pin, output uses Socket.	Used for Metal Enclosures or Shielded Cables.
	5. Underwater Mateable Connector (UMC), Thread Fastening.	600Vrms, 10A. Waterproof, IP68.
	Panel Mount or In-line. Input uses Pin, output uses Socket.	Used for Metal Enclosures or Shielded Cables.

How to choose cable and connector for BII devices: Driving Voltage V_{drive} (V_{rms}) = $\sqrt{Power} * R_L = \sqrt{Power}/G$. R_L : Resistance of a transducer in load medium at f_s . G: conductance at f_s : $R_L = 1/G$ at f_s . BII lists G-B data at f_s and/or the graph of G-B vs Frequency in online datasheet.

Case 1. Deliver 1000 Wrms to 3 k Ω transducer at f_s . Note: the 3 k Ω is the resistance of the transducer in load medium at f_s .

Driving voltage to transducer $V_{drive} = \sqrt{1000*3000} = 1732 \text{ V}_{rms}$. The current to 3 k Ω transducer I $_{drive} = V_{drive}/R_L = 1732 \text{V}_{rms}/3000\Omega = 0.57733 \text{ A}_{rms}$. Therefore, AWG18 Wire and Wire leads are suitable.

Case 2. Deliver 500 Wrms to 300 Ω transducer at f_s . Note: the 300 Ω is the resistance of the transducer in load medium at f_s .



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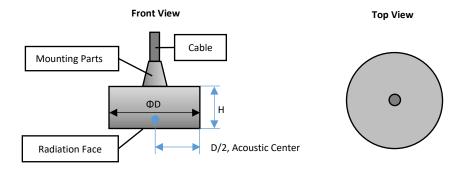
Driving voltage to transducer $V_{drive} = \sqrt{500*300} = 387.3 \, V_{rms}$. The current to $300 \, \Omega$ transducer I $_{drive} = V_{drive}/R_L = 387.3 \, V_{rms}/300\Omega = 1.291 \, A_{rms}$. Therefore, Two Conductor Shielded Cable and MIL-5015 Type Connector or Underwater Mateable Connector (UMC) are suitable.

Case 3. Deliver 300 Wrms to 50 Ω transducer at f_s .

Driving voltage to transducer $V_{drive} = \sqrt{300*50} = 122.5 \text{ V}_{rms}$. The current to 50 Ω transducer I $_{drive} = V_{drive}/R_L = 122.5 \text{V}_{rms}/50\Omega = 2.45 A_{rms}$. Therefore, 50Ω RG58 Coax and BNC are suitable.

Physical Size (Dimensional Unit: mm)

Cable-out Layout



Directivity Pattern:

